CLEARWATER PROGRAM

Environmental Impact Report/ Environmental Impact Statement Appendices *FINAL*

SCH# 2008101074

November 2012

U.S. Army
Corps of Engineers

SANITATION DISTRICTS OF LOS ANGELES COUNTY

ICF INTERNATIONAL

CLEARWATER PROGRAM

Environmental Impact Report/ Environmental Impact Statement Appendices

FINAL

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Also Available at:

www.ClearwaterProgram.org

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PRELIMINARY SCREENING ANALYSIS

PRELIMINARY SCREENING ANALYSIS FOR THE CLEARWATER PROGRAM

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ABBREVIATIONS

ASBS	areas of special biological significance
Basin Plan	Los Angeles RWQCB Basin Plan
BMPs	best management practices
Cal/OSHA	California Division of Occupational Safety and Health
CalARP	California Accidental Release Program
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAO	Cease and Abate Order
CDO	Cease and Desist Order
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
CWC	California Water Code
dBA	A-scale decibels
DOT	Department of Transportation
EFH	essential fish habitat
EIR	environmental impact report
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FMP	Pacific Coast Groundfish Fishery Management Plan
FORCO	Fletcher Oil and Refining Company
FTA	Federal Transit Administration
GPM	gallons per minute
HCP	habitat conservation plan
HMI	hazardous materials inventory
I-	Interstate
IPS	inches per second
JO	Joint Outfall
JOD	Joint Outfall Districts
JOS	Joint Outfall System
JWPCP	Joint Water Pollution Control Plant
LAXT	Los Angeles Export Terminal

LBWRP	Long Beach Water Reclamation Plant
LCWRP	Los Coyotes Water Reclamation Plant
LUSTs	leaking underground storage tanks
MGD	million gallons per day
MRZ	Mineral Resource Zones
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NCCP	natural community conservation plan
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
Ocean Plan	California Ocean Plan
PCBs	polychlorinated biphenyls
Port Master Plan	Community Plan for the Port
POWRP	Pomona Water Reclamation Plant
PPV	peak particle velocity
PV Shelf	Palos Verdes Shelf
RCRA	Resource Conservation and Recovery Act
RMP	Risk Management Plan
RWQCB	regional water quality control board
Sanitation Districts	Sanitation Districts of Los Angeles County
SCAG	Southern California Association of Governments
SEA	Significant Ecological Area
SJCWRP	San Jose Creek Water Reclamation Plant
SP Shelf	San Pedro Shelf
SR-	State Route
State Route 1	Pacific Coast Highway
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TBM	tunnel boring machine
TraPac	Trans Pacific Container Service Corporation
USGS	U.S. Geological Survey
WNWRP	Whittier Narrows Water Reclamation Plant
WRPs	water reclamation plants

Chapter 1
CLEARWATER PROGRAM PRELIMINARY SCREENING ANALYSIS

1.1 Introduction

This Preliminary Screening Analysis has been prepared for the Sanitation Districts of Los Angeles County (Sanitation Districts) and the U.S. Army Corps of Engineers (Corps) to provide a preliminary environmental evaluation of the Clearwater Program. The Sanitation Districts and the Corps have determined that an environmental impact report (EIR) and environmental impact statement (EIS) will be prepared for the Clearwater Program, which will address the potentially significant impacts identified within this document. The Preliminary Screening Analysis was used to screen issues determined to have no impact or less than significant impact from further analysis in the EIR and the EIS and to provide public disclosure for the rationale for these determinations. The Preliminary Screening Analysis includes a project description, an evaluation of environmental impacts, and a list of references.

1.1.1 Regulatory Guidance

This Preliminary Screening Analysis follows the methods and format proposed in Appendix G of the State CEQA Guidelines (State of California Natural Resources Agency 2010), the City of Los Angeles CEQA Guidelines (2006), and the Sanitation Districts' thresholds, and it relies on expert opinion based on facts, technical studies, and other substantial evidence to document its findings. The Corps has generally adopted the CEQA thresholds for the purposes of the Clearwater Program NEPA analysis.

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Chapter 2
PROJECT DESCRIPTION

2.1 Project Description

2.1.1 Sanitation Districts of Los Angeles County

The Sanitation Districts serve the regional wastewater and solid waste management needs of approximately 5.4 million people in Los Angeles County. The Sanitation Districts' service area covers approximately 820 square miles and encompasses 78 cities and unincorporated territory within the county. The 23 separate districts that comprise the Sanitation Districts work cooperatively under a Joint Administration Agreement with one administrative staff headquartered near the city of Whittier. The individual districts operate and maintain their own portions of the collection system. Of the 23 districts, 17 are collectively known as the Joint Outfall Districts (JOD). The JOD has a population of 4.8 million people and is served by the Joint Outfall System (JOS).

The JOS is a regional interconnected system of wastewater conveyance, treatment, and disposal facilities that serve 73 cities and some unincorporated areas (approximately 640 square miles). The JOS provides wastewater conveyance and treatment, water reuse, and effluent disposal for residential, commercial, and industrial wastewater users within the jurisdictions of the 17 participating districts of the JOD.

2.1.2 Program Location and Setting

The JOS is located in the central, southern, and eastern portions of Los Angeles County extending from the San Gabriel Mountain foothills south to the Palos Verdes Peninsula and San Pedro Bay, and from San Bernardino and Orange Counties west to the cities of Glendale and Los Angeles and to Santa Monica Bay.

There are three major rivers in the JOS service area: the Rio Hondo, Los Angeles, and San Gabriel. Major creeks include San Jose and Coyote. The Rio Hondo flows southwest from its headwaters at Sawpit Dam into the Los Angeles River, which discharges into the Pacific Ocean. Upstream, the Rio Hondo receives tertiary treated effluent discharges from the Sanitation District water reclamation plants (WRPs). The San Gabriel River flows southwesterly from its headwaters in the San Gabriel Mountains and forms a tidal prism before discharging into the Pacific Ocean at Seal Beach. The tidal prism of the San Gabriel River is the area within the river where there is a mixing of freshwater from upstream rain water, tertiary treated effluent, and other freshwater sources, and salt water from the Pacific Ocean.

There are two major spreading grounds in the JOS for recharging groundwater into the Los Angeles area groundwater basins. One spreading ground is located on the Rio Hondo River at the Rio Hondo Spreading Grounds in the city of Montebello. The other is located on the San Gabriel River at the San Gabriel Coastal Spreading Grounds in the city of Pico Rivera. These spreading grounds use Sanitation Districts' tertiary treated effluent, water imported from the State Water Project, and rain water to recharge the groundwater basin through percolation. In addition to the spreading grounds beneficially reusing tertiary treated water, there are three saltwater barrier projects in the Los Angeles area that further treat

and pump the recycled water into the ground to prevent the intrusion of saltwater into the groundwater basins.

Five of the upstream WRPs are permitted to discharge tertiary treated effluent into the receiving water bodies discussed in this section. The San Jose Creek Water Reclamation Plant (SJCWRP), located in an unincorporated area of Los Angeles next to the city of Whittier, discharges into San Jose Creek and the San Gabriel River. The Pomona Water Reclamation Plant (POWRP), located in the city of Pomona, discharges into the south fork of the San Jose Creek. The Los Coyotes Water Reclamation Plant (LCWRP), located in the city of Cerritos, discharges into the San Gabriel River. The Long Beach Water Reclamation Plant (LBWRP), located in the city of Long Beach, discharges into Coyote Creek. In addition, a portion of the recycled water undergoes advanced treatment at the Water Replenishment District of Southern California's Advanced Water Treatment Facility and is injected into the ground at the Alamitos Seawater Barrier Project to prevent saltwater intrusion into the freshwater aquifer. The Whittier Narrows Water Reclamation Plant (WNWRP), located in the city of South El Monte, discharges into the Rio Hondo, the Rio Hondo Spreading Grounds, and the San Gabriel Coastal Spreading Grounds. The La Cañada Water Reclamation Plant (LACAWRP), located in the city of La Cañada Flintridge, discharges recycled water into irrigation system storage impoundments at a nearby golf course. The final destination for recycled water that is not beneficially reused is the Pacific Ocean, where the Los Angeles and San Gabriel Rivers outlet in the Port of Los Angeles and Seal Beach, respectively.

Solids generated at the six upstream WRPs, as a byproduct of the treatment processes, are returned back to the JOS conveyance system for consolidated solids processing at the Joint Water Pollution Control Plant (JWPCP) in the city of Carson. This conveyance system is a network of variously sized subterranean sewers. This network converges into nine main Joint Outfall (JO) trunk sewers that deliver wastewater to the six upstream WRPs and the JWPCP. The JWPCP is located on approximately 400 acres bordered by West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the Interstate (I-) 110 to the west. Activities at the JWPCP include wastewater treatment, as well as solids processing and biosolids management for the entire JOS. After processing, the biosolids are transported from the JWPCP, via trucks, to various biosolids management facilities for beneficial use or for landfill co-disposal within California and Arizona.

The wastewater, after being treated to a secondary level at the JWPCP, is conveyed in two tunnels to Royal Palms Beach where the tunnels converge into a subterranean manifold structure. The manifold structure connects the tunnels to the offshore ocean outfalls. Outfalls are seafloor pipelines that extend from the shore to the diffuser area. Diffusers are also seafloor pipelines, but have holes that allow for the release of the secondary treated effluent into the ocean. There are four outfalls, but only two operate on a regular basis. These outfalls are located to the south of the terrestrial Palos Verdes Peninsula on an ocean formation known as the Palos Verdes Shelf (PV Shelf).

2.1.3 Clearwater Program Objectives

The Clearwater Program is necessary to ensure adequate JOS wastewater system capacity and reliability through the year 2050. Specifically, the following objectives were identified in the Master Facilities Plan (MFP) and are the California Environmental Quality Act (CEQA) objectives:

- Provide adequate system capacity to meet the needs of the growing population
- Provide overall system reliability by allowing the inspection, maintenance, repair, and replacement of aging infrastructure

- Provide support for emerging recycled water reuse and biosolids beneficial use opportunities
- Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies

2.1.4 Program and Project Elements

2.1.4.1 Program Elements

As a result of the Clearwater Program planning effort, system-wide improvements were identified in the MFP and will be evaluated at either a program or project level. Seven program elements, with associated facilities, within the JOS will be analyzed at the program level. The program elements include:

- Conveyance improvements
- Plant expansion
- Process optimization
- WRP effluent management
- Solids processing
- Biosolids management
- JWPCP effluent management

The program elements were organized by facility/location for analysis. The facilities associated with the program elements and their locations and proposed modifications are shown in Table 2-1. Also refer to Table 3-2 in Chapter 3 of the Clearwater Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for a summary of program elements.

Table 2-1. Program-Level Facilities and Proposed Actions

Existing Facilities	Existing Location	Program Element	Proposed Action(s) for Each Program Element
Conveyance System			
JO Trunk Sewers	Located between 5 and 25 feet bgs generally in public rights-of-way of existing streets throughout the entire JOS service area.	Conveyance Improvements	Relief to approximately 33 miles of JO trunk sewers throughout JOS service area (identified in Figure 3-4 in Chapter 3 of the EIR/EIS).
Water Reclamation Plants			
SJCWRP	Located at 1965 Workman Mill Road. Site is 51 acres within unincorporated Los Angeles County, near the city of Whittier. The site is bounded by San Jose Creek to the north, State Route (SR-) 60 to the south, Workman Mill Road to the east, and the San Gabriel River to the west.	Plant Expansion	Expansion of SJCWRP by 25 MGD; total permitted capacity would increase from 100 MGD to 125 MGD. Expansion would be located adjacent to the San Gabriel River where existing treatment facilities are currently located.
		Process Optimization	Process optimization would be located at existing parking lot and existing maintained lawn area adjacent to San Jose Creek.
		WRP Effluent Management	Discharge would potentially range from a 69 MGD decrease to an 8 MGD increase. Other reuses would potentially range from a 45 to 94 MGD increase. Discharge would continue from existing discharge point(s) into unlined portions of San Jose Creek and the San Gabriel River and into the lined portion of the San Gabriel River.
POWRP	The POWRP is located at 295 Humane Way on a 14-acre site in the city of Pomona. The POWRP is bounded by a railroad right-of-way and industrial uses to the north, the Humane Society and Humane Way to the east, and Elephant Hill to the west.	Process Optimization	Process optimization within the existing WRP footprint on existing vacant/disturbed land.
		WRP Effluent Management	Discharges for groundwater replenishment would potentially increase by 1 to 2 MGD. Other reuses would potentially increase by 5 to 7 MGD. Discharge would continue at existing discharge point(s) into unlined portions of San Jose Creek.
LCWRP	Located at 16515 Piuma Avenue on a 34-acre site within the city of Cerritos. The treatment facilities occupy the lower southwest corner of the site. The remaining 20 acres are occupied by the Iron-Wood Nine Golf Course. The LCWRP is bounded to the north by Southern California Edison property, to the south by SR-91, to the east by I-605, and to the west by the San Gabriel River.	Process Optimization	Process optimization within the existing WRP footprint on the Iron-Wood Nine driving range.

Table 2-1 (Continued)

Existing Facilities	Existing Location	Program Element	Proposed Action(s) for Each Program Element
		WRP Effluent Management	Reuse would potentially increase by 3 to 22 MGD. Discharge would be similar to the current range of discharges. Discharge would continue at existing discharge point(s) into lined portions of the San Gabriel River.
LBWRP	Located at 7400 E. Willow Street on a 17-acre site in the city of Long Beach. The LBWRP is bounded by Willow Street to the north, Coyote Creek to the south and east, and the San Gabriel River to the west.	Process Optimization	Process optimization within the existing WRP footprint on vacant disturbed land.
		WRP Effluent Management	Reuse would potentially increase by 4 to 10 MGD. Discharge would be similar to the current range of discharges. Discharge would continue at existing discharge point(s) into lined portions of Coyote Creek.
WNWRP	The WNWRP is located at 301 N. Rosemead Boulevard on a 27-acre site near the city of South El Monte. The WNWRP is surrounded by the Whittier Narrows Recreational Area to the north, undeveloped industrial areas to the south, Legg Lake and nurseries to the east, and largely unused utility areas to the west.	WRP Effluent Management	Discharges for groundwater replenishment would potentially increase by 4 MGD. Other reuses would potentially increase by 4 MGD. Discharge would continue at existing discharge point(s) into unlined portions of the Rio Hondo.
JWPCP			
JWPCP	City of Carson	Solids Processing	Would continue to process solids in accordance with existing practices. Six new anaerobic digesters would be constructed and operated within the JWPCP footprint and replacement of existing facilities may occur due to aging.
JWPCP and throughout California	City of Carson and throughout California	Biosolids Management	Approximately 1,850 wet tons of biosolids will be generated by 2050. This would result in an increase of 20 truck trips required for transport of biosolids to biosolids management facilities. The current practice of transporting biosolids from JWPCP to biosolids management facilities within California and Arizona would continue.
JWPCP and Ocean Discharge System	See Table 2-2.	JWPCP Effluent Management	To be further evaluated at the project level.

bgs = below ground surface
MGD = million gallons per day

The program includes relief to approximately 33 miles of JO trunk sewer lines. Relief would include the replacement of current pipes with larger diameter pipes or the addition of new pipes or parallel pipes. It is assumed all 33 miles would include additional new pipes, and there would be some unknown length of existing pipes that would be maintained or fixed (i.e., rehabilitated).

The program includes expansion and process optimization to meet a treatment capacity shortfall and to ensure the WRPs will continue to meet discharge limits. This would include a 25 million gallons per day (MGD) expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP. All construction associated with the expansion at the SJCWRP and process optimization at the WRPs would be done within the footprint of the existing WRP facilities (see Figures 3-5, 3-6, 3-7, and 3-8 in Chapter 3 of the EIR/EIS). Process optimization would include the construction of large underground wastewater storage tanks at each WRP. Once constructed, the tank would store wastewater during peak flows periods and be released during low flow periods to maximize the efficiency of the wastewater treatment process.

The program would also include WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP. The management of the effluent would depend on demand for recycled water, as described in Table 2-1. Therefore, the program includes some increases and decreases in recycled water discharged into the receiving water bodies at each of the aforementioned WRPs.

As there would be no program construction or operation activities at the LACWRP, this WRP is not analyzed or further discussed in this document.

Centralized solids processing would continue at the JWPCP in accordance with existing practices. Approximately six new anaerobic digesters would be added to stabilize sludge and meet future generation rates. These digesters would be constructed within the existing footprint of the JWPCP facility (see Figure 3-9 in Chapter 3 of the EIR/EIS). Some additional solids processing equipment may need to be replaced due to aging. This equipment would be located within the JWPCP, in the same general vicinity that the current solids processing equipment is located.

Biosolids management at the JWPCP would continue to use some of the locations the Sanitation Districts currently use for beneficial use. There would be an increase in the biosolids transported from the JWPCP to the beneficial use locations. Truck trips would increase by approximately 20 trips per day. There are eight potential new locations for beneficial use of biosolids management. These are located between 60 and 300 miles from the JWPCP in Kings, Kern, Yuma, San Bernardino, and Riverside Counties (refer to Figure 3-10 in Chapter 3 of the EIR/EIS for locations of the anticipated biosolids beneficial use locations and Table 3-7 in Chapter 3 for a list of the facilities and their locations and distances from the JWPCP).

2.1.4.2 Project Elements

A major component of the MFP will be to evaluate, at a project level, the possible construction of a new or modified ocean discharge system and the rehabilitation of the existing ocean outfalls. This project would discharge secondary treated effluent from the JWPCP to either the SP Shelf or PV Shelf, through a new offshore tunnel or the existing ocean outfalls. The project has three functional categories (1) tunnel alignment (onshore and offshore), (2) shaft site, and (3) riser and diffuser area. The project elements, organized by functional category, are described in Table 2-2.

Table 2-2. Location of Project Elements

Project Element	Jurisdiction	Location
Tunnel Alignments		
Wilmington to SP Shelf	City of Carson Community of Wilmington, City of Los Angeles Port of Los Angeles/State of California	Onshore approximately 100 to 200 feet bgs extending approximately 10,700 feet following Wilmington Boulevard south to Port of Los Angeles. Offshore approximately 100 to 200 feet bgs or below the seafloor starting at Port of Los Angeles extending approximately 65,200 feet southeast to LAXT and to the SP Shelf.
Wilmington to PV Shelf	City of Carson Community of Wilmington, City of Los Angeles Port of Los Angeles/State of California	Onshore is same as Wilmington Boulevard to SP Shelf Alignment. Offshore approximately 100 to 250 feet bgs or below the seafloor, starting at the Port of Los Angeles and extending 38,100 feet to the PV Shelf.
Figueroa/Gaffey to PV Shelf	City of Carson Community of Wilmington, City of Los Angeles Community of San Pedro, City of Los Angeles State of California	Onshore approximately 70 to 370 feet bgs following Figueroa Street south, to John S. Gibson Boulevard, south to Gaffey Street extending 34,000 feet. Offshore approximately 100 to 250 feet below the seafloor extending from Angels Gate 11,400 feet to the PV Shelf.
Figueroa/Western to Royal Palms	City of Carson Community of Wilmington, City of Los Angeles Community of San Pedro, City of Los Angeles	Onshore approximately 70 to 450 feet bgs following Figueroa Street, southwest under Harbor Regional Park, south on North Gaffey, West on Capitol Drive, south on Western Avenue. There would be no offshore tunnel; rehabilitation would occur to the existing ocean outfalls, as under all the alternatives.
Shaft Sites		
JWPCP West	City of Los Angeles	Southeast corner of West Lomita Boulevard and Figueroa Street
JWPCP East	City of Carson	Northwest corner of West Lomita Boulevard and Main Street
TraPac	Port of Los Angeles	Located at the TraPac container terminal approximately Wilmington Boulevard and Harry Bridges Boulevard
LAXT	Port of Los Angeles	Terminal Island, northeast corner of Ferry Street and Terminal Way
Southwest Marine	Port of Los Angeles	Terminal Island, east of Southwest Marine Warehouses
Angels Gate	Community of San Pedro, City of Los Angeles	Northwest of South Gaffey Street and West Paseo Del Mar, immediately north of Paseo Del Mar
Royal Palms	Community of San Pedro, City of Los Angeles	Mostly within Sanitation Districts' property at Royal Palms Beach near the beach access road, Kay Fiorentino Drive.
Riser/Diffuser Area		
SP Shelf	State of California; federal past 3 nautical miles	SP Shelf in the Pacific Ocean
PV Shelf	State of California	PV Shelf in the Pacific Ocean
Existing Ocean Outfalls	State of California	Existing ocean outfalls located on the PV Shelf in the Pacific Ocean

The program and project elements would require a number of permits and actions from various local, state, and federal agencies. The following table summarizes the types of permits that would be required for the program and project elements.

Table 2-3. Public Agencies Whose Approval May Be Required

Permit/Action	Program[a]	Project
Federal		
United States Army Corps of Engineers		
Permit under Section 404 of the Clean Water Act for discharge of dredged or fill material into waters of the United States	X	X
Permit under Section 103 of the Marine Protection, Research, and Sanctuaries Act for the transportation of dredged material intended for ocean disposal		X
Permit under Section 10 of the Rivers and Harbors Act for work or structures in or affecting Navigable waters of the United States		X
United States Fish and Wildlife Service		
Compliance with Section 7 of the federal Endangered Species Act for effects to listed species and critical habitat through coordination via the lead federal agency	X	X
National Marine Fisheries Service		
Compliance with Section 7 of the federal Endangered Species Act for effects to listed species and critical habitat through coordination via the lead federal agency		X
Compliance with the federal Marine Mammal Protection Act for effects (e.g., take or harassment) to marine mammals through coordination via the lead federal agency		X
Compliance with the federal Magnuson-Stevens Fishery Act for effects to essential fish habitat through coordination via the lead federal agency		X
United States Environmental Protection Agency		
Confirm conformity with the Clean Air Act		X
Determine suitability of dredged material for ocean disposal in accordance with Section 103 of the Marine Protection, Research, and Sanctuaries Act		X
Review and submit recommendations to the Corps related to the issuance of permits under Section 10 of the Rivers and Harbors Act, Section 404 of the Clean Water Act, and ensure compliance with Section 404(b)(1) of the Clean Water Act		X
Review and submit recommendations to the California State Water Quality Control Board for the National Pollutant Discharge Elimination System permit for discharge of treated wastewater under Section 402 of the Clean Water Act	X	
Determine suitability of construction-related dewatering for ocean disposal or discharge into waters of the United States		X
Coordinate with the Los Angeles Regional Water Quality Control Board for issuance of 401 Water Quality Certification		X
United States Coast Guard		
Permit for Private Aids to Navigation for Navigable Waters of the United States		X
State		
Regional Water Quality Control Board[b]		
Permit under Section 402 of the Clean Water Act (National Pollutant Discharge Elimination System)		X
General Permit (National Pollutant Discharge Elimination System) for dewatering and construction activities	X	X
Water Quality Certification under Section 401 of the Clean Water Act	X	X
Waste Discharge Requirements under the Porter-Cologne Act		X
California Office of Historic Preservation		
Compliance with Section 106 of the National Historic Preservation Act through coordination via the lead federal agency		X

Table 2-3 (Continued)

Permit/Action	Program[a]	Project
California Department of Fish and Game		
Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code for activities that would alter a state river, stream, or other Waters of the State	X	
Consistency Determination under Section 2080.1 of the California Fish and Game Code for take of state-listed endangered or threatened terrestrial and aquatic species (that are also listed under the federal ESA)	X	X
Compliance with oil spill prevention and response planning requirements set forth in Subdivision 4 of 14 CCR Division 1 for marine vessels carrying petroleum and nontank vessels over 300 gross tons (Under the California Office of Spill Prevention and Response).		X
California Coastal Commission		
Coastal Development Permit for development within the coastal zone		X
Federal Coastal Zone Management Act Consistency Determination		X
State Lands Commission		
Land Use Lease for encroachments, docks, dredging, and crossing on state tidal and submerged lands		X
California Department of Transportation		
Easement and/or rights-of-way		X
Local		
South Coast Air Quality Management District		
Conformity with the Air Quality Management Plan		X
Permit or update to existing permits for emissions	X	
City of Los Angeles		
Easements and/or rights-of-way		X
Building permits, fire plan approvals, land lease, and/or easements for construction of facilities at Port of Los Angeles, Royal Palms Beach, and Angels Gate Park		X
City of Carson		
Conformance to building and safety construction requirements at JWPCP	X	X
County of Los Angeles		
Easements and/or rights-of-way	X	X
Easements through park and recreation areas		X
Fire protection plan approvals	X	X

[a] Applies to program elements other than JWPCP effluent management.
[b] Regional Water Quality Control Board-Los Angeles Region (Region 4) has jurisdiction in the project area.

2.1.5 Level of Analysis and General Methodology

As a result of the Clearwater Program planning effort, program and project elements have been identified and are evaluated in this Preliminary Screening Analysis at either the program or project level. A program-level analysis is prepared when the lead agency has a proposed program or series of actions over time that can be characterized as one large project and specific construction information is typically unavailable. A program-level analysis generally analyzes broad environmental effects of the program with the understanding that additional site-specific environmental review may be required for particular aspects of the program at the time those aspects are proposed for implementation and construction (CEQA Guidelines Section 15168). However, it is possible for a program-level analysis to identify and address all potential environmental impacts, which would preclude the need for additional project-level environmental documentation. Should there be project-specific impacts that are not analyzed in the program-level; a subsequent CEQA analysis would be required. Project-specific elements were identified in the MFP for a new ocean discharge system, which will be evaluated at the project level. A

project-level analysis generally has access to all the necessary construction information and is able to analyze the specific details of environmental effects of project elements. Therefore, in this document, program elements are analyzed at the program level, and project elements are analyzed at the project level. Any program or project element that is identified as having a potentially significant impact under construction or operation will be further analyzed in the EIR/EIS.

The Preliminary Screening Analysis analyzes potential impacts resulting from the construction and/or operation of individual elements. These elements form the building blocks for alternatives that are ultimately evaluated in the EIR/EIS. Therefore, some elements would not be constructed under the Clearwater Program. While the program elements are common to all program alternatives, different project elements combine to form the alternatives. For purposes of analysis in the Preliminary Screening Analysis, program elements are categorized by facility/location. The categories and associated program elements are shown in the following table.

Table 2-4. Categories for Program Analysis

Category	Program Element Analyzed
Conveyance System	Conveyance improvements
WRPs	Expansion of the SJCWRP Process optimization at the SJCWRP, POWRP, LCWRP, LBWRP WRP effluent management at all WRPs (SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP)
JWPCP	Solids processing Biosolids management

Project elements are organized by functional category. The categories and associated project elements are shown in the following table.

Table 2-5. Categories for Project Analysis

Category	Project Element Analyzed
Tunnel Alignment (onshore and offshore)	Wilmington to SP Shelf Wilmington to PV Shelf Figueroa/Gaffey to PV Shelf Figueroa/Western to Royal Palms Beach
Shaft Sites	JWPCP East JWPCP West TraPac LAXT Southwest Marine Angels Gate Royal Palms
Riser/Diffuser Areas	SP Shelf PV Shelf Existing Ocean Outfalls

For some environmental resources, the analysis herein is conducted at the program or project scale, rather than by individual facilities/elements. This occurs when the overall results are either all less than significant or all potentially significant. This organization applies to the following resources: agriculture, air quality, greenhouse gases, and traffic.

2.1.6 Document Organization

This document is organized into sections for each environmental resource topic. Each resource section includes the following:

- An impact table listing all thresholds (i.e., significance criteria) that will be analyzed for the resource. An overall significance determination for each threshold is provided based upon the analysis. The most severe impact determinations for all program elements and all project elements for each threshold are identified in the table. If no box is checked under a particular threshold in the summary impact table, that threshold does not apply to the program or project element being analyzed. Only those thresholds determined to be potentially significant will be included in the EIR/EIS.
- An analysis of the program, organized by threshold, followed by an analysis of the project, organized by threshold. At the beginning of the analysis, there is a summary of the impact determination for the threshold, followed by a list that identifies (with an X) elements that would result in potentially significant impacts during construction and operation. Only those elements considered to have a potentially significant impact will be brought forward for analysis in the EIR/EIS. Elements that have a dash (–) are considered to have no impact or less than significant impact and will not be addressed in the EIR/EIS.

Chapter 3
ENVIRONMENTAL CHECKLIST

3.1 Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by this project (i.e., the program or project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklists on the following pages.

☒ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology/Soils/Minerals
☒ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials	☒ Hydrology/Water Quality/Public Health
☒ Land Use/Planning	☒ Marine Environment (Marine Hydrology, Water Quality, Biological Resources, Noise and Public Health)	☒ Noise and Vibrations (Terrestrial)
☒ Employment, Housing, Socioeconomics, and Environmental Justice	☒ Public Services	☒ Recreation
☒ Transportation and Traffic (Terrestrial)	☒ Transportation and Traffic (Marine)	☒ Utilities/Service Systems/Energy
☒ Growth Inducing	☒ Mandatory Findings of Significance	

Aesthetics Checklist

		Program			Project		
I.	**AESTHETICS.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
AES-1.	Conflict with adopted goals or policies that protect visual quality of a designated scenic vista or scenic resource, resulting in an adverse aesthetic impact such as obstruction of view or degradation of visual character?	☐	☒	☐	☒	☐	☐
AES-2.	Substantially damage scenic resources (including, but not limited to, trees, rock outcroppings, and historic buildings) within a state scenic highway?	☐	☒	☐	☐	☐	☒
AES-3.	Substantially degrade the existing visual character or quality of the site or its surroundings?	☐	☒	☐	☒	☐	☐
AES-4.	Result in an adverse effect due to shading on existing visual character or quality of the site or its surroundings?	☐	☐	☒	☒	☐	☐
AES-5.	Create a new source of substantial light or glare that would adversely affect day or nighttime views of the area?	☐	☒	☐	☒	☐	☐

Aesthetics Program Discussion

AES-1. Overall Determination: Less Than Significant Impact. All of the program elements would not be located within a designated scenic vista or scenic resource area. Furthermore, construction and operation of program elements would not result in a degradation of visual character. Therefore, construction and operational impacts related to all program elements would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

X = Potentially Significant Impact and will be addressed in the EIR/EIS
– = Less Than Significant Impact or No Impact and will not be addressed in the EIR/EIS
N/A = Not Applicable

Conveyance System. The visual character of the JOS service area is a highly variable and diverse urban area. The conveyance system primarily exists underground in the public rights-of-way. The JOS service area has varying topography and a wide variety of building heights and shapes. These features block and prohibit clear lines of sight to public streets in many areas.

Construction of conveyance improvements would generally occur within the existing public street right-of-way. It would involve removing, replacing, or maintaining existing sewer lines. The construction would not involve tall cranes and would be limited in duration.

Once operational, the conveyance system would be located underground and would not have any large aboveground facilities. There may be some aboveground facilities located at existing pumping stations throughout the JOS service area which would be of similar size and scale as the existing pumping station facilities and which are screened from view with fencing and/or planted ornamental landscaping.

Construction and operation of conveyance improvements would not conflict with adopted goals or policies that protect the visual quality of a designated scenic vista or scenic resource due to the highly variable nature of the existing urban area, the lack of clear lines of sight in the urban area, and the temporary nature of the construction on the conveyance system. Therefore, construction and operation of conveyance improvements would result in impacts that are less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. The WRPs are not located within a designated scenic vista or scenic resource area (City of Los Angeles 1998; Garrow and Signo pers. comm.; City of Pomona 1976). The existing visual character of each WRP is generally described as industrial, comprising large wastewater treatment equipment, aboveground pipes, and machinery.

The surrounding visual character of each of the WRPs varies widely due to the differing surrounding land uses. Primarily, the WRPs are immediately surrounded by highly urbanized and channelized receiving waters including the San Gabriel River, San Jose Creek, and Coyote Creek. Also, immediately surrounding the WRPs are freeways and roads, including SR-60 and I-605. Other nearby uses add to the varying visual character including light industrial buildings, recreational/open space (El Dorado Park, Iron-Wood Nine Golf Course, and Elephant Hill), and single family and multi-family residential homes

(refer to Figures 2-4, 2-5, 2-6, 2-7 in Chapter 2 of the EIR/EIS for references to these surrounding land uses).

Under the program, all construction associated with the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would occur within the footprint of each WRP. Once operational, the WRP facilities would be either underground or would be part of existing WRP infrastructure.

WRP effluent management may result in a change in the amount of recycled water discharged into the receiving waters at each WRP. The discharges would use the same discharge points and pipes as currently used. Construction would not be required and operation would simply result in either a greater or lesser volume of recycled water discharging into the receiving waters. Therefore, the discharge of recycled water using existing discharge points would not result in an obstruction of views or degradation of visual character.

None of the WRPs are located within a designated scenic vista or scenic resource area; therefore, construction and operational impacts would not occur and the WRPs will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP is not included in a designated scenic vista or scenic resource area (City of Los Angeles 1998; Signo pers. comm.). The existing visual character of the JWPCP is heavy industrial comprising large wastewater treatment equipment, aboveground pipes, and pieces of machinery. Much of the site is highly visible from the elevated I-110, especially to northbound traffic. A portion of the southeast side of the site is visible from a residential neighborhood south of Lomita Boulevard. The structures on site vary greatly and are generally less than 50 feet high.

Construction would not occur at the JWPCP under the biosolids management element. There would be an increase in transportation of biosolids from the JWPCP for beneficial use at various locations throughout the state of California. The land application and beneficial use locations are generally located in areas dominated by agriculture or in light industrial/commercial areas. The actual land use application or beneficial use would occur on existing agricultural land or in existing buildings. Therefore, the existing aesthetic character of these areas consists of visual qualities associated with agricultural or industrial land uses. These qualities include large buildings, large equipment, high truck volumes, and relatively flat topography.

Some construction would occur within the existing footprint of the JWPCP to add several new digesters for solids processing and remove several existing ones. These activities would be located in proximity to the existing digesters on the interior of the JWPCP. Construction activities would not be visible from the exterior of the JWPCP because of interceding structures and distances from viewers outside of the JWPCP (see Figure 3-9 in Chapter 3 of the EIR/EIS for a location of solids processing construction location).

Since the JWPCP is not located within a designated scenic vista or scenic resource area, impacts associated with the construction and operation of solids processing facilities and the operation of biosolids management at the JWPCP would not occur. The increase in biosolids management at existing beneficial use areas or land application areas throughout the state of California are already part of the visual character of the existing setting (e.g., trucks traveling along roadways). The additional trucks associated with the increase in biosolids management would not alter the existing conditions; therefore, impacts would be less than significant. These issues will not be addressed in the EIR/EIS at the program level.

AES-2. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not be located near a designated or proposed state scenic highway, and would not substantially damage scenic resources within a state scenic highway. Therefore, construction and operational impacts related to all program elements would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level. (See AES-1 [Program] for a discussion of the existing visual character and quality of program elements and additional construction and operation details.)

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The construction of the conveyance system may occur at or near the public rights-of-way of designated scenic roadways. However, construction and maintenance activities of utilities within the public rights-of-way, scenic or otherwise, are typical roadway activities that would not alter the existing scenic resources viewed from the roadway. Furthermore, since the construction would be temporary and short in duration, any change to the aesthetic value of the scenic road would be restored upon construction completion. Once operational, the conveyance system would be located underground and would not reduce the aesthetic value of a designated state scenic roadway. Construction and operation of the conveyance improvements would not reduce the aesthetic value of any scenic roadways; therefore, impacts would be less than significant. This issue will not be addressed in the EIR/EIS at the program level.

WRPs. The WRPs are not located near a designated or proposed state scenic roadway (Caltrans 2009). Therefore, impacts would not occur during construction or operation and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP is not located near a designated or proposed state scenic roadway (Caltrans 2009). Therefore, impacts would not occur during the construction or operation of solids processing facilities or the operation of biosolids management at the JWPCP. This issue will not be addressed in the EIR/EIS at the program level.

There would be an increase in transportation of biosolids from the JWPCP and beneficially applied to various locations throughout the state of California. The increased number of trucks may travel on or near designated scenic roadways; however, trucks are part of the visual character of roadways, scenic or otherwise. The land applications and beneficial use locations are generally located in areas dominated by agriculture or in light industrial/commercial areas, which could be located adjacent to or near designated scenic roadways. However, the actual land use application or beneficial use would occur on existing agricultural land or in existing buildings. Therefore, additional land use applications or truck trips to existing buildings would not result in an aesthetic change to any designated scenic roadways that may exist. Impacts would be less than significant. This issue will not be addressed in the EIR/EIS at the program level.

AES-3. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not substantially degrade the existing visual character or quality of the site or its surroundings. Therefore, construction and operational impacts related to all program elements would be less than significant and this threshold will not be addressed in the EIR/EIS at the program level. (See AES-1 [Program] for a discussion of the existing visual character and quality of program elements and additional construction and operation details.)

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction and operation of conveyance improvements would not obstruct views or degrade the visual character of existing roadways or the surrounding urban character of the JOS service area because structures exist that interfere with the line of sight and because of distance and scale. Construction and operational impacts would be less than significant and this issue will not be addressed in the EIR/EIS at the program level.

WRPs. Construction equipment for plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be contained within the footprint of each facility (see Figures 3-5, 3-6, 3-7, and 3-8 in Chapter 3 of the EIR/EIS for a location of the construction at each WRP). Construction would generally occur on the interior of the WRP property and not on the periphery. Therefore, construction equipment would be screened from view by existing facilities and topography, and would be distant from off-site viewers. Construction impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

Once operational, the new equipment at the WRPs would blend with the existing equipment within the footprint of these facilities. The new equipment would be of the same massing and height as the existing WRP. Furthermore, process optimization would primarily consist of equipment that would operate underground and have limited aboveground features. Therefore, operational impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

WRP effluent management may result in a change in the amount of recycled water discharged into the receiving waters at each WRP. Construction would not be required and operation would simply result in either a greater or lesser volume of recycled water discharging into the receiving waters. Therefore, the discharge of recycled water using existing discharge points would not substantially degrade the visual character of the area.

JWPCP. Construction equipment at the JWPCP for solids processing would be contained within the footprint of the facility. Construction would generally occur on the interior of the JWPCP property, and not on the periphery of the facility. Therefore, construction equipment would be screened from view by existing facilities and topography, and would be distant from off-site viewers. Construction impacts would be less than significant, and this issue will not be addressed at the program level in the EIR/EIS.

Once operational, the equipment at the JWPCP would blend with the existing equipment within the footprint of the existing facilities. The new equipment would be of the same massing and height as the existing JWPCP equipment. Therefore, impacts would be less than significant and this issue will not be addressed at the program level in the EIR/EIS.

Biosolids management would use existing agricultural land or existing buildings; therefore, it would not result in an obstruction of view or degradation of visual character of a designated scenic resource because the land and buildings already exist. Biosolids management would increase the number of trucks in the locations where beneficial use is performed. Operational impacts associated with the biosolids management element would be less than significant and will not be addressed in the EIR/EIS at the program level.

AES-4. Overall Determination: No Impact. Construction and operation of program elements would not result in an adverse effect due to shading on existing visual character or quality of the site or its surroundings. Therefore, no impacts would occur and this threshold will not be addressed in the EIR/EIS at the program level. (See AES-1 [Program] for a discussion of the existing visual character and quality of program elements and additional construction and operation details.)

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance system would not use tall cranes or other large construction equipment that would have a shading impact on surrounding land uses. Furthermore, since the construction would be temporary and short in duration, any effect due to shading would be eliminated upon construction completion. Operation of the conveyance system would be completely underground, and would not result in shading or shadow impacts. Impacts would not occur under construction or operation; therefore, this issue will not be addressed in the EIR/EIS at the program level.

WRPs. Construction of the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be located internal to each WRP footprint and not on the periphery. Any shading generated by the construction equipment such as cranes would not have an impact on surrounding land uses. Impacts would not occur under construction; therefore, this issue will not be addressed in the EIR/EIS at the program level.

Under operation, most of the process optimization equipment at the WRPs would be below ground. Any new aboveground equipment would be low profile and would blend with the existing equipment and facilities at the WRPs. Plant expansion at the SJCWRP would take place immediately adjacent to the existing treatment facilities on the western/northwest side of the plant. Therefore, the expansion would blend in with the existing facilities and not result in shading or shadowing effects. Furthermore, there are no sensitive receptors to shading or shadowing in the affected area of SJCWRP. Operational impacts would not occur; therefore, this issue will not be addressed in the EIR/EIS at the program level.

WRP effluent management would not result in any new construction at any of the WRPs. Furthermore, the increase or decrease in recycled water discharging into receiving waters would not result in any type of shading. Therefore, WRP effluent management would result in no shading or shadowing impacts and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction of the solids processing element at the JWPCP would be located internal to the JWPCP facilities, and not on the periphery. Therefore, any shading generated by the construction equipment for the new digesters would not have an impact on surrounding land uses. All new aboveground digesters would blend with the existing equipment and facilities at the JWPCP. Therefore, construction and operation of the solids processing facilities would not result in shading or shadowing

impacts on surrounding land uses. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Construction would not occur under the program biosolids management element. Therefore, construction impacts on shading and shadowing would not occur. Operation of the biosolids management element would result in an increased number of truck trips to transport the increased quantity of biosolids from the JWPCP to beneficial use locations and/or land fill locations. The transportation of biosolids via semi-truck would not result in shading/shadow impacts. Therefore, impacts under the operation of biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

AES-5. Overall Determination: Less Than Significant Impact. Construction and operation of program elements would not create a new source of substantial light or glare that would adversely affect nighttime views of the area. Construction and operational impacts related to all program elements would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level. (See AES-1 [Program] for a discussion of the existing visual character and quality of program elements and additional construction and operation details.)

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance system would not occur at nighttime unless it is required by the jurisdiction where the construction were to occur. There would likely be no nighttime lighting associated with the conveyance systems. Construction of the conveyance system would primarily occur within the public rights-of-way. Lighting would be hooded and directed on the construction site. Spill would be minimized due to the need of construction workers to see into the conveyance system trench to perform construction activities. Therefore, impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. Once operational, the conveyance system would be located underground and would not require lighting. Periodically, emergency maintenance of the conveyance system would be needed at night if a portion of the conveyance system needs repair. However, this is temporary, periodic, and currently occurs within the JOS. Therefore, operation of the conveyance improvements would not require nighttime lighting and would not produce substantial light or glare. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Each WRP has nighttime lighting for safety and operation purposes. Furthermore, the Sanitation Districts perform regular and periodic shut downs at night during low flow periods as part of their regular operation and maintenance of the WRPs. These shutdowns require nighttime lighting. There may be some nighttime construction for plant expansion of the SJCWRP and process optimization at the WRPs. Since the Sanitation Districts currently perform regular nighttime maintenance at the WRPs, which uses lighting, the temporary and periodic construction of the expansion and process optimization would not result in a significant change in periodic nighttime lighting. Furthermore, periodic lighting at the WRPs from nighttime maintenance as well as construction activities from unassociated projects, such as roadway construction and maintenance, is the existing condition. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Once operational, plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in additional nighttime lighting. Some ancillary lighting may be

added immediately around the SJCWRP expansion area; however, existing lighting would be sufficient for safety purposes. Process optimization would be buried below ground, and the existing use above ground would be returned to current conditions. Therefore, under operating conditions, process optimization would result in the same lighting as existing conditions. Glare and lighting impacts associated with plant expansion and process optimization would be less than significant and will not be addressed in the EIR/EIS at the program level.

Currently, wastewater effluent management at the WRPs does not include nighttime lighting. Under the program, it would also not include nighttime lighting. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP currently has nighttime lighting for safety and operation purposes. It is surrounded by a variety of nighttime light-producing uses including the I-110, athletic fields, and retail centers along Main Street. Figueroa Street is bound on both sides by the JWPCP between Lomita Boulevard and Sepulveda Boulevard and does not have any sensitive light land uses (i.e., residential homes). Currently, biosolids trucks travel north on Figueroa Street and access I-110 using Figueroa Street and Sepulveda Boulevard.

Construction and operation of solids processing facilities at the JWPCP would result in some additional nighttime lighting to the JWPCP. Nighttime construction may be required during low flow periods of the JWPCP. Under operating conditions, lights would be located on top of each of the solids processing digesters for safety purposes. This additional lighting at the JWPCP during construction and operation would not result in a substantial increase in light or glare at the JWPCP. The additional lighting on the six digesters would not produce enough light to increase the overall effect of the existing nighttime lighting at the JWPCP. Construction and operation of the solids processing digesters would result in impacts that are less than significant and will not be addressed in the EIR/EIS at the program level.

The increased number of trucks transporting biosolids would use Figueroa Street to reach I-110. Lighting would come from trucks transporting biosolids at night. However, the area north of the JWPCP is industrial, and currently there are numerous sources of nighttime lighting including I-110. Therefore, the additional trucks from biosolids management would not produce enough light to increase the overall effect of the existing nighttime lighting in the area. Biosolids would be either applied to existing agricultural lands or beneficially used at existing buildings. Neither of these actions would require additional lighting nor cause additional glare. Therefore, operational impacts associated with biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

Aesthetics Project Discussion

AES-1. Overall Determination: Potentially Significant Impact. Construction of several project elements have the potential to conflict with adopted goals or polices that protect visual quality of a designated scenic vista or scenic resource. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Once operational, the project elements would be located primarily underground or under the ocean with a few aboveground facilities located at the shaft sites. Therefore, operation of all project elements would not result in adverse aesthetic impacts on designated visual resources or a degradation of visual character. (Refer to Figures 3-13 to 3-23 for locations and surrounding land uses of shaft sites in Chapter 3 of the EIR/EIS).

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Onshore and Offshore. Construction and operation of the onshore and offshore tunnels would occur at depths well below ground surface. There are no designated scenic vistas or resources below ground surface. Therefore, construction and operation of the tunnels would not conflict with adopted goals or policies that protect visual quality of a designated scenic vista or scenic resource. Impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East and JWPCP West. See AES-1 (Program) for a description of the existing visual character of the JWPCP. The JWPCP is not included in a designated scenic vista or scenic resource area (City of Los Angeles 1998; Signo pers. comm.). Since there are no designated scenic vistas or resources within the general vicinity of the JWPCP, construction and operation at the JWPCP East or JWPCP West shaft site would not result in impacts on designated scenic vistas or resources. This issue will not be addressed in the EIR/EIS at the project level.

Shaft Sites – TraPac, LAXT, and Southwest Marine. The Trans Pacific Container Service Corporation (TraPac) shaft site is located in the Port of Los Angeles, generally at the intersection of Harry Bridges Boulevard and vacated King Boulevard/Wilmington Boulevard. The shaft site would be approximately 1 acre during construction of the project and approximately 0.3 acre during operation. The Port of Los Angeles is a highly industrialized area with many active heavy industry facilities. TraPac is a container terminal that stores hundreds of stacked containers from cargo ships. These containers can be stacked as high as several stories (each container is assumed to be approximately 10 feet in height). Directly across from the TraPac terminal is the Harry Bridges Boulevard Buffer, which is a park area for the residents of Wilmington. The buffer includes a 30 to 40 foot tall earthen berm along Harry Bridges Boulevard to protect Wilmington residents and park users from the noise from activities at the TraPac container terminal and from trucks traveling on Harry Bridges Boulevard. The Harry Bridges Boulevard buffer is not considered a designated scenic vista or scenic resource. There are several designated scenic vistas along Harbor Boulevard in San Pedro and the Port of Los Angeles. However, these vistas are over 2 miles away and topography, as well as existing buildings and port activities, would prevent clear and direct views to construction activities and equipment at the TraPac shaft site. Furthermore, the existing stacked containers at TraPac would continue to exist during construction and operation at the shaft site and would block direct views of construction activities and equipment at the shaft site from these vistas. Once the shaft site is operational, it would have limited (e.g., access hatch) or no aboveground facilities.

Therefore, construction and operation at the TraPac shaft site would not result in any impacts on designated scenic vistas or scenic resources and will not be addressed in the EIR/EIS at the project level.

The Los Angeles Export Terminal (LAXT) shaft site is located on Ferry Street across from the City of Los Angeles Terminal Island Water Reclamation Plant in the Port of Los Angeles. See the TraPac discussion for a general description of the visual character of the Port of Los Angeles. There are no sensitive receptors from an aesthetic standpoint (e.g., single-family residential or recreational) near or within the general proximity of the LAXT shaft site. Construction and operation at the LAXT shaft site would result in no impact and will not be addressed in the EIR/EIS at the project level.

The Southwest Marine shaft site is located west of South Seaside Avenue on Southwest Marine in the Port of Los Angeles. There are no sensitive receptors from an aesthetic standpoint (e.g., single-family residential or recreational) near or within the general proximity of the Southwest Marine shaft site. Construction and operation at the Southwest Marine shaft site would result in no impacts on scenic views and will not be addressed in the EIR/EIS at the project level.

Shaft Site – Angels Gate and Royal Palms. The Angels Gate shaft site is located in the community of San Pedro near the intersection of Gaffey Street and Paseo Del Mar. The City of Los Angeles Transportation Element (City of Los Angeles 1999a) designates Paseo Del Mar, Harbor Boulevard, and South Pacific Avenue as Future Alignments Designated as Scenic. However, these routes are not officially designated scenic highways by the federal government, state, or county. The Pacific Ocean, a scenic resource of California, can be seen from within Angels Gate Park. In addition, the Korean Bell, which is a landmark in the city of Los Angeles, is immediately north of the shaft site. Therefore, construction at the Angels Gate shaft site would result in potentially significant impacts and will be addressed in the EIR/EIS at the project level. Once operational, there would be limited, low-profile, facilities at the Angels Gate shaft site (e.g., access hatch). This low-profile facility would not block or intercede with views from the various locations discussed above because of its low profile. Therefore, operational impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

The Royal Palms shaft site would be located at the existing manifold facilities owned by the Sanitation Districts at the beach. The beach is located off of Paseo Del Mar, which is a designated scenic road in the San Pedro Community Plan. Construction at the Royal Palms shaft site would result in potentially significant impacts and will be addressed in the EIR/EIS at the project level. Once operational, there would be the same existing Sanitation District aboveground facilities at the beach that are currently there. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – San Pedro Shelf. The Pacific Ocean is generally considered a scenic resource. There are some oil platforms currently located several miles off shore from the Palos Verdes Peninsula. The SP Shelf riser and diffuser would be located approximately 7 miles off the coast of the Port of Los Angeles. During construction, offshore barges and a construction platform would be present. These vessels and platform would be illuminated for safety and due to construction occurring 24 hours a day. At sea level, the curvature of the earth and atmospheric conditions limit a person's range of vision to approximately 3 miles. The SP Shelf construction site would be located beyond this distance and would blend into the horizon. At night, the lights projected by the construction site would be difficult to see from land and would not be distinguishable from existing oil platforms offshore, which currently use nighttime lighting. Therefore, construction of the SP Shelf riser and diffuser would result in a less than significant impact on designated scenic resources or vistas and will not be addressed in the EIR/EIS at the project level.

Once operational, the riser and diffuser would exist on the ocean floor of the SP Shelf. Maintenance may be required periodically, but would typically be done during the day, using boats and barges. Barges, boats, and ships are typically seen on the Pacific Ocean in this area due to its proximity to the Ports of Los Angeles and Long Beach; therefore, the few additional barges on the ocean required for periodic maintenance of the SP Shelf riser and diffuser would not result in a significant impact on a designated scenic vista or resource. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – Palos Verdes Shelf. The offshore construction equipment associated with the PV Shelf riser and diffuser would have the potential to conflict with goals and policies that protect the visual quality of scenic resources or vistas (e.g., the Pacific Ocean). Although the offshore construction would be considered temporary, it would introduce large equipment and lights not normally located within the general vicinity of scenic vistas and resources. The equipment and lights would be visible from land due to the proximity of the riser and diffuser area to the shore (approximately 2 miles). Therefore, construction of the PV Shelf riser and diffuser would result in a potentially significant impact on a designated scenic resource or vista and will be addressed in the EIR/EIS at the project level.

The PV Shelf operations would be the same as the SP Shelf operations described previously. Operation of the riser and diffuser on the PV Shelf would result in no impacts under operating conditions and will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – Existing Ocean Outfalls. The rehabilitation of the existing ocean outfalls would have the potential to conflict with goals and policies that protect the visual quality of scenic resources or vistas (e.g., the Pacific Ocean). Although the offshore construction would be considered temporary, it would introduce equipment and lights not normally located within the general vicinity of scenic vistas and resources. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS.

AES-2. Overall Determination: No Impact. There are no scenic roadways that would be affected by project elements. Construction impacts would not damage scenic resources along a scenic route. Therefore, no impacts would occur and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. See AES-1 (Program) for a description of the existing visual character of the JWPCP and AES-1 (Project) for a discussion of operational impacts associated with these project elements. There are no designated scenic roadways within the vicinity of the JWPCP; therefore, construction and operation at the JWPCP East and JWPCP West shaft sites would not result in an impact. A segment of the onshore tunnel alignment is within the vicinity of the locally designated city of Los Angeles scenic roadway, Gaffey Street (City of Los Angeles 1999a). This segment of the onshore tunnel would be located below ground surface and below Gaffey Street. Therefore, construction and operation of the onshore tunnel would not impact any scenic resources within the viewshed of Gaffey Street. Furthermore, construction and operation of the offshore tunnel would not result in an impact on

designated scenic roadways as there are no roadways off shore or under the ocean floor. There are no scenic roadways located within the vicinity of the TraPac, LAXT, and Southwest Marine shaft sites (Caltrans 2010; City of Los Angeles 1999a). The County of Los Angeles Transportation Element (City of Los Angeles 1999a) designates Paseo Del Mar, Harbor Boulevard, and South Pacific Avenue as Future Alignments Designated as Scenic. However, these routes are not officially designated scenic highways by federal, state, or County. Thus, for the purposes of this threshold, these roadways are not considered to be designed state scenic roadways. Furthermore, impacts to views from the shaft sites adjacent to these roads and surrounding areas are discussed in AES-1, AES-3, and AES-4. Therefore, construction and operational impacts of the project would not occur and will not be addressed in the EIR/EIS at the project level.

AES-3. Overall Determination: Potentially Significant Impact. Construction and operation of several of the project elements could substantially degrade the existing visual character or quality of the site or its surroundings. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnel would be located below ground surface and below the ocean floor. There is no visual character or quality at the depths of construction or operation. Therefore, construction and operation of the onshore and offshore tunnels would not degrade existing visual character or quality and impacts would not occur. This issue will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East and JWPCP West. Construction at either the JWPCP East or JWPCP West shaft sites would occur over a number of years. Although a noise barrier would be located around either of these sites, construction equipment such as cranes would be visible to adjacent sensitive receptors (residential receptors, recreation receptors at the Wilmington Athletic Complex). Under operating conditions, a surge tower would be located on either site, along with other ancillary equipment. The surge tower could change the existing visual character and quality of either location. Therefore, construction and operation of either the JWPCP East or JWPCP West shaft sites would result in potentially significant impacts. This issue will be addressed at the project level in the EIR/EIS.

Shaft Sites – TraPac, LAXT, and Southwest Marine. The TraPac, LAXT, and Southwest Marine shaft sites are all located within the Port of Los Angeles. The visual character and quality of these areas are highly industrial. There are no aesthetically sensitive receptors with views of TraPac, LAXT, and Southwest Marine. Therefore, construction and operation would not substantially degrade the existing visual character or quality of the site or its surroundings. Impacts would not occur and this issue will not be addressed at the project level in the EIR/EIS.

Shaft Sites – Angels Gate and Royal Palms. The Angels Gate and Royal Palms shaft sites are adjacent to the Pacific Ocean. Furthermore, they are located within designated recreational areas and have the unique visual character of a coastal park. Therefore, construction and operation at either the Angels Gate shaft site or Royal Palms shaft site could potentially degrade the existing visual character or quality of the

site or its surroundings. Construction and operational impacts would be potentially significant and will be addressed at the project level in the EIR/EIS.

Riser/Diffuser Areas – San Pedro Shelf, Palos Verdes Shelf, and Existing Ocean Outfalls. The construction at the riser and diffuser areas could result in a change in the visual character or quality of views of the Pacific Ocean, which is considered a scenic resource. Therefore, construction impacts would be potentially significant and will be addressed at the project level in the EIR/EIS. Once operational, the riser and diffuser on the PV Shelf or the SP Shelf would be located on the sea floor, as are the existing ocean outfalls. Maintenance trips would be required by boats a few times a year, which already occur to the existing ocean outfalls. Furthermore, due to the proximity of the Ports of Los Angeles and Long Beach, barges and ships are common off the coast of Southern California and comprise the existing visual character of views to the Pacific Ocean. Therefore, operational impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

AES-4. Overall Determination: Potentially Significant Impact. Construction and operation of several project elements could result in an adverse effect due to shading on existing visual character or quality of the site or its surroundings. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnel alignments would be located underground where there would be no possibility of shadows or shading. Therefore, construction and operation of the tunnels would not result in shading impacts. Impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East and JWPCP West. During construction at either the JWPCP East or JWPCP West shaft sites, there would be a number of large pieces of equipment, including approximately 100-foot tall cranes and 20-foot tall noise barriers. These pieces of equipment could cast shadows on surrounding sensitive receptors including residences and the Wilmington Athletic Complex. Furthermore, under operating conditions, there would be a surge tower located at either one of these shaft sites, which could also cast shadows on sensitive receptors. Therefore, impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Shaft Sites – TraPac, LAXT, and Southwest Marine. There are no sensitive receptors that would be affected by shadows in the Port of Los Angeles. The shaft sites at TraPac, LAXT, and Southwest Marine would be located in highly industrialized areas with no aesthetically sensitive surrounding land uses; therefore, construction at these locations would not result in adverse shading to sensitive receptors. Once operational, the only visible element remaining would be an access hatch to a belowground access structure. Since these facilities are low profile, they would not result in shade and shadow impacts. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – Angels Gate and Royal Palms. During construction at either the Angels Gate or Royal Palms shaft sites, there would be a 20-foot-tall noise barrier. This noise barrier could cast shadows on surrounding sensitive receptors including residences. Therefore, shading impacts during construction would be potentially significant and will be addressed in the EIR/EIS at the project level. Once operational, either shaft site would consist of a belowground access structure. Since these facilities are low profile, they would not result in shade and shadow impacts. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level

Riser/Diffuser Areas – San Pedro Shelf, Palos Verdes Shelf, and Existing Ocean Outfalls. These locations would be off the coast of Southern California. A barge would be stationed over the riser and diffuser area for long periods of time during construction, and some equipment could cast shadows. However, the only potentially sensitive receptor off the coast are marine biological species, and the small area at which the barge and equipment would cover compared to the entire coast of Southern California at varying depths is negligible. Furthermore, once the riser and diffuser are constructed on either the PV Shelf or the SP Shelf, they would sit on the sea floor and not cast shadows. The existing ocean outfalls would remain in their current location and do not cast shadows. Therefore, impacts would be less than significant during construction and operation and will not be addressed in the EIR/EIS at the project level.

AES-5. Overall Determination: Potentially Significant Impact. Construction of several project elements have the potential to create a new source of substantial light or glare that would adversely affect nighttime views of the area. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Once operational, the project elements would not create any nighttime lighting, since all project elements would be located below ground surface and, therefore, would not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnel alignments would be located underground. There are no sensitive receptors to light or glare underground. Therefore, construction and operation of the tunnels would not result in light or glare impacts. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East and JWPCP West. Construction at either the JWPCP East or JWPCP West shaft site would involve working swing shifts, which would also include lights and glare at night for several years. The nighttime lighting used during construction could produce substantial light or glare, adversely affecting sensitive receptors, such as residences. Therefore, construction at the JWPCP East or JWPCP West shaft sites would result in potentially significant impacts and will be addressed in the EIR/EIS at the project level.

Once operational, the JWPCP East or JWPCP West shaft sites could have surge towers approximately two to three stories in height. The surge towers would resemble existing towers at the JWPCP and would have safety lighting associated with them. These lights would be hooded and would be similar to the existing safety lighting at the JWPCP. Therefore, operational impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – TraPac, LAXT, and Southwest Marine. The shaft sites are located within the highly industrialized area of the Port of Los Angeles. The Port of Los Angeles has an existing nighttime visual setting with numerous lights. Although TraPac and Southwest Marine would be access shaft sites, and not generally used during the nighttime, they would have some safety lighting. LAXT would be a working shaft site and would have nighttime lighting. There are no light-sensitive receptors within proximity to these shaft sites. Furthermore, since the port already has significant amounts of nighttime lighting, the lighting used at each of these shaft sites for a temporary construction period would not result in significant impacts. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

Once these shaft sites are operational, they would have low-profile access hatches. These hatches may have some security lighting. However, as discussed previously, there is a significant amount of lighting generated by the port that makes up the existing nighttime setting, and the access hatch lighting would not significantly add to or alter the existing nighttime setting of the port. Therefore, operational impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – Angels Gate and Royal Palms. See the JWPCP East and JWPCP West shaft sites discussion. Construction at either the Angels Gate or Royal Palms shaft site would introduce light and glare to existing sensitive receptors during nighttime construction activities. Impacts would be potentially significant during construction and will be addressed in the EIR/EIS at the project level.

Once operational, there may be some low-profile aboveground facilities at either shaft site. These facilities may have safety lighting. The safety lighting would be low profile and hooded so as not to cast glare or light. There are currently light poles and nighttime street lighting in both locations; therefore, operational impacts at Angels Gate and Royal Palms would be less than significant and will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Areas – San Pedro Shelf, Palos Verdes Shelf, and Existing Ocean Outfalls. The offshore construction would involve swing shifts, which would also include lights. The nighttime lighting used during construction could produce substantial light or glare adversely affecting views. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the new riser and diffuser would be located on the bottom of the ocean. No lighting would be associated with the operation of these. In addition, the existing ocean outfalls would remain in their existing location and would not require lighting. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Agriculture and Forestry Resources Checklist

		Program			Project		
		Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
II.	**AGRICULTURE AND FOREST RESOURCES.** In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the program/project:						

	Program			Project		
	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
AG-1. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐	☐	☒
AG-2. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	☐	☒	☐	☐	☐	☒
AG-3. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), or timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☒	☐	☐	☒
AG-4. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☒	☐	☐	☒
AG-5. Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐	☐	☒

Agriculture and Forestry Resources Program Discussion

AG-1. Overall Determination: Less Than Significant. Construction and operation of the program elements would result in less than significant impacts on agricultural and forest lands. Therefore, Threshold AG-1 will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	–	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	–	–

AG-1. All Program Elements. The program elements are primarily located in the county of Los Angeles, which is urbanized. Biosolids management would truck treated biosolids to other areas of California for beneficial use, including land use application at farms. The U.S. Environmental Protection Agency (EPA) regulates biosolids through 40 Code of Federal Regulations (CFR) Part 503. The standards are applicable to land application, surface disposal, and incineration. For disposal in a municipal solid waste landfill, the biosolids must meet standards from 40 CFR Part 258. Biosolids generated at the JWPCP meet EPA Class B pathogen reduction requirements provided in Alternative 2, Use of Processes to Significantly Reduce Pathogens, through time and temperature requirements for anaerobic digestion. Vector attraction reduction requirements are met by reducing the mass of volatile solids during anaerobic digestion. JWPCP biosolids are sampled monthly and analyzed for total metals concentrations. Since the 1993 promulgation of the federal rules governing biosolids management, the JWPCP biosolids have consistently complied with the most stringent requirements related to metals concentrations. Since the biosolids generated at the JWPCP meet all federal requirements, they can generally be utilized at any location. The biosolids management program element would not convert farmland to another use since it would apply biosolids on existing farmland for beneficial use.

The proposed locations for the program are identified by the California Department of Conservation's Farmland Mapping and Monitoring Program as "area not mapped" and thus, would not convert prime farmland, unique farmland, or farmland of statewide importance (farmland), to non-agricultural use (California Department of Conservation 2008).

Therefore, the program elements would not convert any farmland to a non-agricultural use. Impacts would not occur; therefore, this issue will not be addressed in the EIR/EIS at the program level.

AG-2. Overall Determination: Less Than Significant. Construction and operation of the program elements would result in less than significant impacts on agricultural and forest lands. Therefore, Threshold AG-2 will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	–	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	–	–

AG-2. All Program Elements. The program elements would be located primarily in the urbanized Los Angeles area. The Los Angeles area is not a part of the Williamson Act (Department of Conservation Division of Land Resource Protection 2006) and is generally not zoned for agricultural uses. The SJCWRP is located adjacent to land zoned A-1 (light agriculture) and the WRP site is zoned residential/agriculture (County of Los Angeles Department of Regional Planning 2010). However, the expansions and upgrades would be located within the footprint of the existing SJCWRP, which currently is not agricultural land, and no land zoned for agriculture would be taken out of use by the proposed expansions and upgrades at this WRP. All of the other program and project elements would be located on lands that are not zoned for agriculture or identified by the Williamson Act.

The biosolids management program element would not conflict with existing zoning; rather, it would apply biosolids on existing farmland, currently zoned as farmland or currently within the Williamson Act, to be beneficially used. The program elements would not conflict with existing zoning for agricultural use or conflict with a Williamson Act contract. Therefore, impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

AG-3. Overall Determination: Less Than Significant. Construction and operation of the program elements would result in less than significant impacts on agricultural and forest lands. Therefore, Threshold AG-3 will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	–	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	–	–

AG-3. All Program Elements. The program would not be located on forest land. The biosolids management element would not involve the beneficial use of biosolids on any forest land. Therefore, the construction and operation of the program elements would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), or timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)). Therefore, no impact would occur, and this issue will not be addressed in the EIR/EIS at the program level.

AG-4. Overall Determination: Less Than Significant. Construction and operation of the program elements would result in less than significant impacts on agricultural and forest lands. Therefore, Threshold AG-4 will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	–	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	–	–

AG-4. All Program Elements. The program elements would not be located on forest land. The biosolids management element would not involve the beneficial use of biosolids on any forest land. Therefore, the construction and operation of the program elements would not result in the loss of forest

land or conversion of forest land to non-forest use. No impact would occur, and this issue will not be addressed in the EIR/EIS at the program level.

AG-5. Overall Determination: Less Than Significant. Construction and operation of the program elements would result in less than significant impacts on agricultural and forest lands. Therefore, Threshold AG-5 will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	–	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	–	–

AG-5. All Program Elements. See discussion under AG-1 (Program) and AG-2 (Program). There is no existing farmland within or around the program element sites. The construction and operation of the program elements would not involve other changes in the existing environment that would result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. Biosolids management would not conflict with existing zoning; rather, it would apply biosolids on existing farmland to be beneficially used. Impacts would not occur, and this issue will not be addressed in the EIR/EIS at the program level.

Agriculture and Forestry Resources Project Discussion

AG-1. Overall Determination: No Impact. Construction and operation of all project elements would result in no impacts on agriculture or forest lands. Therefore, Threshold AG-1 will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

AG-1. All Project Elements. The project element locations are identified as "Urban and Build-Up Land" on the Important Farmland of California 2006 map (California Department of Conservation 2009). Furthermore, the project elements are located in a predominately developed urban setting with no agricultural uses on or surrounding the project area. Offshore project elements would be located in the ocean, which is not used as farmland. Therefore, the project elements would not convert any farmland to a non-agricultural use. Impacts would not occur, and this issue will not be addressed in the EIR/EIS at the project level.

AG-2. Overall Determination: No Impact. Construction and operation of all project elements would result in no impacts on agriculture or forest lands. Therefore, Threshold AG-2 will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

AG-2. All Project Elements. The project elements would be located primarily in the urbanized Los Angeles area. The Los Angeles area is not a part of the Williamson Act (Department of Conservation Division of Land Resource Protection 2006) and is generally not zoned for agricultural uses. The offshore project elements would be located in the ocean, which is not used as farmland. The project elements would not conflict with existing zoning for agricultural use or conflict with a Williamson Act contract. Therefore, no impact would occur, and this issue will not be addressed in the EIR/EIS at the project level.

AG-3. Overall Determination: No Impact. Construction and operation of all project elements would result in no impacts on agriculture or forest lands. Therefore, Threshold AG-3 will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

AG-3. All Project Elements. The project elements would be located on urbanized land or in the ocean. Therefore, no impact would occur on forestland, and this issue will not be addressed in the EIR/EIS at the project level.

AG-4. Overall Determination: No Impact. Construction and operation of all project elements would result in no impacts on agriculture or forest lands. Therefore, Threshold AG-4 will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

AG-4. All Project Elements. See AG-3 (Project). Therefore, the construction and operation of the project elements would not result in the loss of forest land or conversion of forest land to non-forest use. No impact would occur, and this issue will not be addressed in the EIR/EIS at the project level.

AG-5. Overall Determination: No Impact. Construction and operation of all project elements would result in no impacts on agriculture or forest lands. Therefore, Threshold AG-5 will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

AG-5. All Project Elements. See discussion under AG-1 (Project) and AG-2 (Project). Impacts would not occur, and this issue will not be addressed in the EIR/EIS at project level.

Air Quality Checklist

		Program			Project		
III.	**AIR QUALITY.** When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
AQ-1.	Conflict with or obstruct implementation of the applicable air quality management plan?	☒	☐	☐	☒	☐	☐
AQ-2.	Exceed the SCAQMD significance thresholds for construction- and/or operation-related emissions?	☒	☐	☐	☒	☐	☐
AQ-3.	Exceed SCAQMD's Localized Significance Thresholds?	☒	☐	☐	☒	☐	☐
AQ-4.	Create an objectionable odor at the nearest sensitive receptor?	☒	☐	☐	☒	☐	☐
AQ-5.	Does not conform to the EPA-approved State Implementation Plan and exceed de minimis thresholds?	☒	☐	☐	☒	☐	☐
AQ-6.	Expose the public to significant levels of toxic air contaminant?	☒	☐	☐	☒	☐	☐

Air Quality Program Discussion

AQ-1 to AQ-6. Overall Determination: Potentially Significant Impact. All program elements, except conveyance improvements and WRP effluent management, would emit emissions during construction and operation that could exceed thresholds. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

All Program Elements (Except Conveyance Improvements and WRP Effluent Management). Construction of all program elements except conveyance improvements and WRP effluent management (which are discussed below) has the potential to emit air quality emissions that could exceed thresholds. Therefore, construction activities for all the thresholds have the potential to result in significant impacts and will be evaluated for all program elements in the EIR/EIS at a program level. Operation of WRP process optimization and solids processing would unlikely emit air quality emissions that could exceed thresholds due to the nature of the program (e.g., wastewater operation). However, the air quality analysis will evaluate operational activities for all program elements (except the conveyance system improvements and WRP effluent management as discussed below) for all thresholds in the EIR/EIS at a program level.

Conveyance System. Conveyance improvements and associated construction could occur at any point, on an as-needed basis, between 2018 and the buildout year of 2050. The scope and exact location of these improvements have yet to be defined; therefore, it is too speculative to quantify construction-related emissions for activities that would occur over the next 40 years. Construction equipment used at that time would comply with applicable air quality standards and requirements. Therefore, construction impacts are considered less than significant, and this issue will not be addressed in the EIR/EIS at the program level. There would be no operational emissions or impacts associated with conveyance system improvements because operation of the conveyance system is passive in nature and would not generate air pollution. Therefore, impacts would not occur, and this issue will not be addressed in the EIR/EIS at the program level.

Potential sources of odors during construction activities would arise from equipment exhaust. Odors from these sources would be localized and generally confined to the construction site. The conveyance system construction would utilize typical construction techniques, and the odors would be typical of most construction sites. Additionally, the odors would be temporary, occurring when equipment is operating. Construction activities associated with the conveyance system would be required to comply with the South Coast Air Quality Management District's Nuisance Rule 402 and, as such, would not create a significant level of objectionable odors. Potential impacts during construction would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level. The Sanitation Districts has an extensive odor control program to strategically control odors from the conveyance system throughout the JOS. The existing odor control program would continue to be in place during the future conveyance system improvements identified under the program, minimizing any odor impacts. Potential impacts during operation of conveyance system improvements would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

WRP Effluent Management. There is no construction associated with WRP effluent management. During operations, there may be an increase or decrease in treated effluent discharged into the receiving waters at each WRP under effluent management. The effluent would be discharged through existing discharge points and pipes. WRP effluent management would not have the potential to create objectionable odors because wastewater is treated to a tertiary level at the WRPs, at which point all odors are removed. The effluent is then beneficially reused or discharged into receiving waters. Therefore, WRP effluent management would not result in construction or operation emissions, and impacts would not occur under any of the thresholds. This issue will not be addressed in the EIR/EIS at the program level.

Air Quality Project Discussion

AQ-1 to AQ-6. Overall Determination: Potentially Significant Impact. All project elements would emit emissions during construction and operation that could exceed thresholds. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. Construction of all project elements has the potential to emit air quality emissions that could exceed thresholds. Emissions will be calculated in the EIR/EIS for individual construction activities (e.g., shaft construction, offshore and onshore tunneling, riser and diffuser area construction, etc.). Peak daily emissions will then be determined by summing emissions from overlapping construction activities. Therefore, construction activities for all project elements and thresholds have the potential to result in significant impacts and will be evaluated in the EIR/EIS at a project level. Operation of the project is unlikely to emit air quality emissions that could exceed thresholds because once operational, wastewater would be conveyed via gravity and discharged to the Pacific Ocean. However, operational activities for all thresholds for all project elements will be evaluated in the EIR/EIS at a project level.

Biological Resources Checklist

		Program			Project		
IV.	**BIOLOGICAL RESOURCES (TERRESTRIAL).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
BIO -1.	Result in direct or indirect impacts to riparian habitats or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or U.S. Fish and Wildlife Service (USFWS)?	☒	☐	☐	☐	☐	☒
BIO -2.	Result in direct or indirect take of a federally listed, threatened, or endangered plant or wildlife species?	☒	☐	☐	☒	☐	☐
BIO -3.	Result in direct or indirect take of a state listed, threatened, or endangered plant or wildlife species?	☒	☐	☐	☐	☒	☐
BIO -4.	Result in direct or indirect impacts to designated critical habitat for any state or federally listed threatened or endangered plant or wildlife species?	☐	☐	☒	☐	☐	☒
BIO -5.	Result in direct or indirect impacts to any CDFG wildlife species of special concern?	☒	☐	☐	☒	☐	☐
BIO -6.	Result in direct or indirect impacts to any rare, endemic, or regionally sensitive plants on California Native Plant Society (CNPS) Lists 1 or 2?	☐	☒	☐	☐	☒	☐

		Program			Project		
IV.	**BIOLOGICAL RESOURCES (TERRESTRIAL).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
BIO -7.	Result in direct or indirect impacts to any habitat conservation plans (HCPs), natural community conservation plan (NCCP), or other approved local, regional, or state HCPs?	☐	☐	☒	☐	☐	☒
BIO -8.	Result in direct or indirect impacts on wetlands, waters, or special aquatic habitats regulated by the Corps, CDFG, CCC, RWQCB, or the County of Los Angeles?	☒	☐	☐	☐	☐	☒
BIO -9.	Directly or indirectly interfere with the movement of any freshwater fish or terrestrial wildlife species through impacts to or reduction in quality of a documented wildlife corridor or habitat linkage?	☒	☐	☐	☐	☒	☐
BIO -10.	Conflict with any other federal, state, or local policies or ordinances protecting biological resources?	☒	☐	☐	☒	☐	☐

Biological Resources Program

Methodology and Screening Results

A literature review was conducted to identify special-status biological resources known to occur within and in the vicinity of the program (and project) area. Special-status resources include federally and state-listed threatened and endangered species identified as candidates for federal or state listing, state sensitive species, state fully protected species, plant species with a California Native Plant Society (CNPS) ranking, and depleted natural communities. Literature reviewed included the California Natural Diversity Database (CNDDB) Rarefind 4 application (CDFG 2011a), and the CNPS Rare and Endangered Vascular Plants of California (CDFG 2011a). A query of the CNDDB and CNPS was performed for the U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangles associated with the program locations. The specific quadrangles queried included El Monte, Baldwin Park, San Dimas, Whittier, Los Alamitos, Seal Beach, and Long Beach. A summary of the query results is provided in Table 3-1. It should be noted that additional special-status species are included in Table 3-1 if judged to have a potential to occur based on reports of occurrence on other adjacent quadrangles, personal knowledge, and experience with prior projects in the region.

On February 4, 2010, ICF biologist Mikael Romich conducted a field visit to the SJCWRP, WNWRP, LBWRP, POWRP, and the JWPCP East and West shaft sites. In addition, discharge locations and the surrounding area were visited for the SJCWRP and WNWRP, and areas downstream of the POWRP.

Table 3-1. Program Analysis Special-Status Plants and Animals Screening Table

Program Facility	Species	Classification	Location of Identification Relative to the Program Facility	Level of Impact Relative to Program Components
JWPCP	Palos Verdes Blue Butterfly	Federally Endangered State Endangered	The specific location is not identified within the 0.25-mile buffer, but the facility is within the range identified. However, the range of this species is on the other side of I-110, and the site does not support host plants.	Construction disturbance is separated from species range by the I-110. Impacts would be less than significant
	Pocketed Free-Tailed Bat (*Nyctinomops femorosaccus*)	California Species of Special Concern	Not known in the vicinity. However, buildings to be demolished offer potential roost habitat.	The building demolition would result in potentially significant impacts.
	Mud Nama (*Nama stenocarpum*)	CNPS List 2.2	The JWPCP is within the range of this species. However, there are no wetlands in the vicinity of the facility that would support this species.	There are no suitable conditions for this plant. No impacts would occur.
	Coulter's Goldfields (*Lasthenia glabata*)	CNPS List 1B.1	The JWPCP is within the range of this species. However, there are no wetlands in the vicinity of the facility that would support this species.	There are no suitable conditions for this plant. No impacts would occur.

Table 3-1 (Continued)

Program Facility	Species	Classification	Location of Identification Relative to the Program Facility	Level of Impact Relative to Program Components
SJCWRP	Western Yellow Billed Cuckoo	Federal Candidate State Threatened	The range is located within the 0.25-mile buffer, upstream of the project along the San Gabriel River.	Changes in flow in San Gabriel River would not affect the habitat upstream. Impacts would be less than significant.
	Least Bell's Vireo	Federal Endangered State Endangered	Riparian vegetation occurs in unlined channel segments.	If effluent reduction were to alter the riparian habitat, impacts on this species would be potentially significant.
POWRP	Intermediate Mariposa-Lily	Special Vascular Plants, Bryophytes, and Lichens List. CNPS List 1 B.2	The range is located in the 0.25-buffer and extends east outside the buffer.	Program components (construction and effluent management) would not impact this species. No impacts would occur.
	Many-Stemmed Dudleya (*Dudleya multicaulis*)	CNPS List 1 B.2	The range is located in the 0.25-mile buffer and extends east outside the buffer.	Program components (construction and effluent management) would not impact this species. No impacts would occur.
LBWRP	Tricolored Blackbird	CDFG Species of Special Concern	Located within the 0.25-mile buffer. The range is limited to an area outside the facility (on the golf course located on other side of I-605).	Construction on the facility site would not impact this species. Impacts would be less than significant.
	Western Pond Turtle	CDFG Species of Special Concern	The specific location is not identified within the 0.25-mile buffer. However, Coyote Creek and San Gabriel River are within the range for this species.	Changes in the amount of discharge would result in potentially significant impacts.
	Coast Horned Lizard	CDFG Species of Special Concern	The specific location is located outside the facility but within the 0.25-mile buffer. However, the range of this species at this location is on the other side of I-605.	Construction of storage tank for process optimization would not significantly disturb this species. Impacts would be less than significant.
	Southern Tarplant	CNPS List 1B.1	The range is located within the 0.25-mile buffer, but the range extends away from the facility. It is unlikely that the southern tarplant will be located on the facility property.	Program components would not impact the species. Impacts would be less than significant.
WNWRP	Coast California Gnatcatcher	Federally Threatened	The range is located within the 0.25-mile buffer.	The program components only include changes to effluent management. No impacts would occur.
	Least Bell's Vireo	Federal Endangered State Endangered	Riparian vegetation occurs in unlined channel segments.	If effluent reduction were to alter the riparian habitat, impacts on this species would be potentially significant.

The general biological setting for each program facility location is described under Impact BIO-1. Because habitats and inhabiting species are interconnected, the biological setting under BIO-1 provides a discussion of listed species in addition to the threshold-specific riparian plant community. Subsequent thresholds refer back to the biological setting discussed in Impact BIO-1 if relevant or if it highlights additional information specific to the threshold. The terminology in the analysis refers to short-term

direct and indirect impacts, which typically refer to construction impacts, and long-term direct and indirect impacts, which typically refer to operational impacts. Generally, short-term direct and indirect impacts are discussed first for each program element followed by long-term direct and indirect impacts.

Biological Resources Program Discussion

BIO-1. Overall Determination: Potentially Significant Impact. Construction of all program elements would not significantly impact the riparian plant community and will not be addressed in the EIR/EIS at the program level. Operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could significantly impact the riparian plant community. Therefore, operational impacts related to these specific program elements will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Improvements to the conveyance system were not analyzed at a project-specific level because they have not been identified adequately to evaluate potential impacts. The improvements would be underground, in the public rights-of-way in existing streets, and are not expected to disturb habitat above ground. However, the conveyance system improvements may impact overlapping riparian habitat or jurisdictional aquatic features. Therefore, improvements to the conveyance system should evaluate the potential for direct impacts on jurisdictional waters on a case-by-case basis as specific conveyance improvements are designed in subsequent CEQA documents. No other direct impacts as a result of improvements to the conveyance system are anticipated. Improvements to the conveyance system have the potential to indirectly impact adjacent special-status wildlife species. Therefore, improvements to the conveyance system should also evaluate the potential for indirect impacts on special-status wildlife species on a case by case basis when specific locations and improvements have been identified in subsequent CEQA documents.

Under operation, the conveyance system would be underground and would convey, via gravity, wastewater from points of origin (i.e., businesses and homes) to the WRPs or JWPCP for treatment. Therefore, direct and indirect impacts on special-status wildlife species, riparian habitat, or other sensitive biological communities would not occur during operation of the conveyance system and will not be addressed in the EIR/EIS at the program level.

WRPs - Plant Expansion and Process Optimization. The proposed construction footprint for the SJCWRP plant expansion and process optimization would be located in an existing turfed lawn area and an existing developed area. There are no riparian plant communities or special-status biological resources within the lawn or developed areas. Therefore, direct construction impacts on riparian plant communities or special-status biological resources would not occur and will not be addressed in the EIR/EIS at the program level. However, the construction footprint would be close enough to riparian habitat that indirect impacts from construction noise and activity could result in a significant impact on the least Bell's vireo and various other species. Therefore, indirect impacts will be addressed in the EIR/EIS at the program level as identified in BIO-2 and BIO-3. The indirect impacts associated with the operation and maintenance of the expanded plant and process optimization at the SJCWRP would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition. Therefore, long-term indirect impacts of operation on riparian plant communities and special-status

biological resources are considered less than significant and will not need to be addressed in the EIR/EIS at the program level.

The proposed construction footprint for process optimization at the POWRP would occur within an area that is currently developed. This currently developed area does not support any riparian plant communities or special-status biological resources. Therefore, direct construction and operational impacts on special-status biological resources or riparian plant communities would not occur and will not be addressed in the EIR/EIS at the program level. Construction of process optimization at the POWRP would occur within 10 feet of vegetation associated with Elephant Hill. The habitat adjacent to the process optimization is predominantly non-native grassland with occasional shrubs typical of a chaparral community and scattered walnut trees. One of the special-status wildlife species that could potentially occupy habitat in the area is the federally listed (threatened) coastal California gnatcatcher; however, it has a low likelihood of occupying this habitat due to the predominance of non-native grass. Therefore, indirect impacts of construction on California gnatcatcher are considered less than significant. A potentially jurisdictional channel that supports walnuts occurs immediately adjacent to and west of the process optimization footprint. Indirect impacts of construction on this jurisdictional feature is considered less than significant since all direct disturbance is limited to the construction footprint area. Therefore, indirect impacts on special-status biological resources or riparian plant communities as a result of construction would be considered less than significant and will not be addressed in the EIR/EIS at the program level.

The indirect impacts associated with the operation and maintenance of process optimization would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition. Therefore, long-term indirect impacts of operation and maintenance of process optimization at the POWRP are considered less than significant and will not be addressed in the EIR/EIS at the program level. Two rare plants, the intermediate Mariposa lily and the many-stemmed dudleya (CNPS List 1B.2 species), occur approximately 0.2 mile from the POWRP facility. Since construction would be limited to a developed area within the POWRP facilities, neither of these plant species would be affected; therefore, they will not be addressed in the EIR/EIS at the program level.

The proposed footprint for process optimization at the LCWRP would occur within an area that is currently vegetated with turf grass as part of an existing driving range. A golf course is located to the north and west. Riparian plant communities or special-status biological resources are not located within the process optimization footprint and do not occur adjacent to the footprint. Therefore, no potential indirect construction impacts would occur on special-status biological resources or riparian plant communities and will not be addressed in the EIR/EIS at the program level. The increase in indirect impacts associated with the operation and maintenance of process optimization at the LCWRP would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition. Therefore, potential long-term indirect impacts of operation and maintenance of process optimization on special-status biological resources or riparian plant communities would not occur and will not be addressed in the EIR/EIS at the program level.

The proposed footprint for process optimization at the LBWRP would occur within an area that is currently a ruderal field with some ornamental landscaping. There are no riparian plant communities within this area or adjacent to it. The existing degraded ruderal plant community has a low potential for the southern tarplant to occur. Therefore, impacts on this species and other special-status plant species would be considered less than significant and will not be addressed in the EIR/EIS at the program level. Developed areas associated with the LBWRP occur to the north, south, and east of the process optimization footprint. To the west is a city of Long Beach debris catch basin that appears to be heavily managed. During a field investigation on February 2010, the site appeared to be recently disturbed and

was comprised of mostly bare ground. No special-status biological resources are expected to occur within the debris catch basin or construction footprint. Therefore, potential indirect impacts of construction on special-status biological resources or riparian plant communities are considered less than significant and will not be addressed in the EIR/EIS at the program level. The indirect impacts associated with the operation and maintenance of process optimization would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition. Therefore, long-term indirect impacts of operation and maintenance of process optimization at the LBWRP on special-status biological resources or riparian plant communities are considered less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs – Effluent Management. There is no construction proposed as part of WRP effluent management; therefore, construction impacts would not occur. Changes in the amount and timing of effluent being discharged to San Jose Creek and the San Gabriel River from the POWRP and SJCWRP have the potential to have a significant indirect impact on riparian plant communities and several special-status biological resources through potential changes in the structure and extent of riparian habitat. Potentially impacted species include: least Bell's vireo, yellow warbler, yellow-breasted chat, and western pond turtle. Therefore, potential indirect impacts on riparian habitat and these dependent special-status biological resources will be addressed in the EIR/EIS at the program level. Changes in the amount and timing of effluent being discharged from the WNWRP to the San Gabriel River, Zone 1 Ditch, and Rio Hondo have the potential to have a significant impact on riparian plant communities and several special-status species, including least Bell's vireo, yellow warbler, yellow-breasted chat, and western pond turtle. Potential indirect impacts on riparian plant communities and dependent, special-status species will be addressed in the EIR/EIS at the program level.

Changes in the amount and timing of effluent being discharged from the LCWRP into the San Gabriel River do not have the potential to have a significant impact on riparian plant communities or other special-status biological resources because this segment of the receiving water is a concrete-lined channel. Likewise, changes in the amount and timing of effluent being discharged from the LBWRP into Coyote Creek and through to the San Gabriel River do not have the potential to have an impact on riparian plant communities or other special-status biological resources because the receiving waters are in a concrete-lined channel.

It is unlikely there would be changes in the distribution and abundance of non-native fish species (such as tilapia) that occur within the channel as a result of effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP because the Sanitation Districts manage the release of treated effluent from their WRPs in such a way that fish are not stranded. Furthermore, under CEQA, impacts on non-native fish would be considered less than significant because they are invasive and not considered a part of the natural habitat. However, these impacts will be addressed in the EIR/EIS at the program level since alterations in flow have the potential to significantly impact native fish species.

For piscivorous birds that may feed on non-native fish, changes in the availability of food could lead to changes in their feeding behavior. However, an overall reduction in the distribution of non-native fish is not expected to a have a measurable negative impact on piscivorous birds. Therefore, potential indirect impacts on piscivorous birds are considered less than significant and will not be addressed in the EIR/EIS at the program level. No potential indirect impacts on terrestrial wildlife species movement as a result of effluent management at the LCWRP and LBWRP are expected as releases would occur in a concrete channel. No other potentially significant indirect impacts on special-status biological resources as a result of effluent management have been identified.

JWPCP. The proposed footprint for the digesters, which would be constructed for solids processing, would be located within the JWPCP, an area that is currently developed. This developed area does not support any riparian plant communities or special-status biological resources. The JWPCP is located within 0.25 mile of the known range of the Palos Verdes blue butterfly, a federally and state-listed endangered species. However, the range of this species is separated from the JWPCP facilities by a major highway (I-110). Therefore, the potential for impacts on this species is less than significant and will not be addressed in the EIR/EIS. West of the digesters are natural areas associated with the Wilmington Drain. However, no indirect impacts are expected, as this area is over 600 feet away and is separated from the solids processing digester construction area by the I-110. The Bixby Marsh is located north of the JWPCP. However, no indirect impacts are expected because this area is over 1,000 feet away and is separated from the solids processing digester construction area by existing JWPCP infrastructure. One species of special concern, the pocketed free-tailed bat, occurs in a range within 0.25 mile of the JWPCP site, and could potentially roost on existing JWPCP structures. Potential impacts on this species will be evaluated in the EIR/EIS at the program level as identified in BIO-5. No other special-status biological resources are expected to occur within the solids processing digester construction footprint. The indirect impacts associated with the operation and maintenance of the proposed solids processing digesters are expected to contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition. Therefore, operation and maintenance impacts associated with solids processing are not expected to occur, and this issue will not be addressed in the EIR/EIS at the program level.

Implementation of biosolids management would increase the quantity of biosolids at the JWPCP. This would also increase composting, land application, and activities at landfills within the JOS service area and areas outside the JOS service area. The land applications and beneficial use locations generally would be in areas dominated by agriculture or in light industrial/commercial areas. The actual land use application or beneficial use would occur on existing agricultural land or in existing buildings. The Sanitation Districts would only use sites that are properly permitted and for which all site-specific impacts, including the potential to affect special-status biological resources, have been mitigated through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, operation of biosolids management at the JWPCP and at beneficial use locations would not have an impact on riparian plant communities or special-status biological resources and will not be addressed in the EIR/EIS at the program level.

BIO-2. Overall Determination: Potentially Significant Impact. Construction of plant expansion and process optimization at the SJCWRP and operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could significantly impact federally endangered species. Therefore, impacts related to these specific program elements will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. As described under BIO-1 (Program), improvements to the conveyance system would be evaluated on a case-by-case basis, once specific improvements have been designed. This would include an analysis of potential impacts from construction on federally listed threatened or endangered species. The conveyance system would be underground and during operations would convey, via gravity, wastewater from points of origin to the WRPs or JWPCP for treatment. Therefore, direct and indirect

impacts on special-status wildlife species would not occur during operation of the conveyance improvements and will not be addressed in the EIR/EIS at the program level.

WRPs. As described under BIO-1 (Program), there is a probability of coastal California gnatcatcher presence in the undeveloped habitat adjacent to the POWRP. However, the probability of occurrence is sufficiently low, based on predominance of non-native grass, and indirect construction and operational impacts on this species would be less than significant. Therefore, construction and operation of process optimization at the POWRP would not have a significant impact on this federally listed endangered species and will not be addressed in the EIR/EIS at the program level.

As described under BIO-1 (Program), the federally listed least Bell's vireo may nest in riparian areas adjacent to the SJCWRP and could potentially be significantly impacted by noise and activity associated with construction of plant expansion or process optimization at the SJCWRP; this issue will be addressed in the EIR/EIS at the program level. None of the other WRPs have federally listed endangered species located within the WRP or adjacent to the construction areas and, therefore, direct or indirect impacts associated with construction or operation of process optimization at the POWRP, LCWRP, or LBWRP would not occur and will not be addressed in the EIS/EIS at the program level.

WRP effluent management would have potentially significant impacts on federally endangered species as identified in BIO-1 and this will be addressed in the EIR/EIS at the program level.

JWPCP. As described under BIO-1, construction at the JWPCP would be located distant from, and on the opposite side of I-110, the known range of the Palos Verdes blue butterfly. Therefore, the construction and operation of solids processing facilities would have no impact on this federally listed endangered species.

BIO-3. Overall Determination: Potentially Significant Impact. Construction of plant expansion and process optimization at the SJCWRP and operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could significantly impact state-listed species. Therefore, impacts related to these specific program elements will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See analysis under BIO-1 (Program) and BIO-2 (Program), which is applicable to this threshold. Impacts on state-listed species would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. See analysis under BIO-1 (Program) and BIO-2 (Program) for plant expansion and process optimization at the SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and WRP effluent management at all WRPs, which is applicable to this threshold. In addition to what is disclosed in BIO-1 and BIO-2 regarding WRP effluent management from the SJCWRP and POWRP, the range of the western yellow billed cuckoo, a state-listed threatened species, includes a portion of the San Gabriel River upstream of the mouth of San Jose Creek within 0.25 mile upstream of the SJCWRP and about 12 miles downstream of the POWRP. Since WRP effluent management would not affect flows upstream of existing outfalls, and the channel downstream of the POWRP is primarily concrete-lined, the potential

for impacts on this species as part of WRP effluent management from POWRP or SJCWRP would be less than significant and will not be addressed in the EIR/EIS at the program level. However, plant expansion and process optimization at the SJCWRP, and effluent management at the SJCWRP, POWRP, and WNWRP would have the potential to have a significant impact on least Bell's vireo and will be addressed in the EIR/EIS at the program level.

JWPCP. As described under BIO-1 (Program) and BIO-2 (Program), the potential for construction of the solids processing digesters at the JWPCP to impact the federally and state-listed endangered Palos Verdes blue butterfly is less than significant and will not be addressed in the EIR/EIS at the program level. No other state-listed endangered, threatened plant or wildlife species are known to occur within range of the JWPCP digester construction footprint. Therefore, impacts on state-listed species would be less than significant and will not be addressed in the EIR/EIS at the program level.

BIO-4. Overall Determination: No Impact. No impacts would occur during construction or operation on critical habitat as a result of the program elements. Therefore, this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See analysis under BIO-1 (Program) and BIO-2 (Program), which is applicable to this threshold. Impacts would not occur on critical habitat and will not be addressed in the EIR/EIS at the program level.

WRPs. See analysis under BIO-1 (Program) and BIO-2 (Program) for plant expansion and process optimization at the SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and WRP effluent management at all WRPs, which is applicable to this threshold. In addition to what is disclosed in BIO-1 and BIO-2, designated critical habitat for the coastal California gnatcatcher currently occurs south of the WNWRP. However, the designated critical habitat area is on the opposite side of San Gabriel Boulevard, a major arterial, from the WNWRP and would be unaffected by program-related construction and effluent management. Therefore, this issue will not be addressed in the EIR/EIS at the program level.

JWPCP. See analysis under BIO-1 (Program) and BIO-2 (Program), which is applicable to this threshold. Impacts would not occur on critical habitat because there is no designated critical habitat at the JWPCP and, therefore, this issue will not be addressed in the EIR/EIS at the program level.

BIO-5. Overall Determination: Potentially Significant Impact. Construction and operation of several program elements could significantly impact California Department of Fish and Game (CDFG) wildlife species of special concern. Therefore, impacts related to these specific program elements will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See analysis under BIO-1 (Program) and BIO-2 (Program), which is applicable to this threshold. Impacts would not occur on critical habitat and will not be addressed in the EIR/EIS at the program level.

WRPs. See analysis under BIO-1 (Program) and BIO-2 (Program) for plant expansion and process optimization at the SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and WRP effluent management at all WRPs, which is applicable to this threshold. Impacts associated with WRP effluent management at all WRPs on the following special-status species of concern would be potentially significant and will be addressed in the EIR/EIS at the program level: western pond turtle, yellow warbler, and yellow-breasted chat.

JWPCP. As described under BIO-1 (Program), the pocketed free-tailed bat (California special-status species of concern) could exist on structures at the JWPCP; potentially significant impacts on this special-status species of concern will be addressed in the EIR/EIS at the program level.

BIO-6. Overall Determination: Less Than Significant Impact. Impacts would not occur on any sensitive plant species during construction or operation. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See analysis under BIO-1 (Program) and BIO-2 (Program), which is applicable to this threshold. Impacts would not occur to critical habitat and will not be addressed in the EIR/EIS at the program level.

WRPs. See analysis under BIO-1 (Program) and BIO-2 (Program) for plant expansion and process optimization at the SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and WRP effluent management at all WRPs, which is applicable to this threshold. In addition to the information disclosed in BIO-1 and BIO-2, rare plant species mapped as occurring in the vicinity of the POWRP include the many-stemmed dudleya and intermediate Mariposa lily. Both plant species have been mapped as occurring approximately 0.2 mile from the POWRP facilities. However, these species would

not be found in the developed, landscaped, or ruderal areas within the construction footprint. Therefore, there would be no impact, and these species will not be addressed in the EIR/EIS at the program level.

JWPCP. The mud nama and Coulter's goldfields have been mapped as occurring within 0.8 mile of the JWPCP facilities. However, these species would not be found in the developed areas within the JWPCP facilities; therefore, there would be no impact, and these species will not be addressed in the EIR/EIS at the program level.

BIO-7. Overall Determination: No Impact. Construction and operation of all program elements would not impact a natural community conservation plan (NCCP) or habitat conservation plan (HCP). Therefore, this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Currently, there is one NCCP in Los Angeles County (CDFG 2012), the Palos Verdes Peninsula NCCP. The Palos Verdes NCCP area (City of Rancho Palos Verdes 2006) does not overlap any of the program elements. No other HCPs or NCCPs are located in Los Angeles County (USFWS 2011a) that would overlap any areas affected by the program elements. Therefore, construction and operation of all program elements would not impact existing NCCPs or HCPs and will not be addressed in the EIR/EIS at the program level.

BIO-8. Overall Determination: Potentially Significant Impact. Construction of all program elements would not result in significant impacts and will not be addressed in the EIR/EIS at the program level. Operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could significantly impact wetlands, waters of the U.S., or aquatic habitat. Therefore, operational impacts related to these specific program elements will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See analysis under BIO-1 (Program) and BIO-2 (Program), which is applicable to this threshold. Construction and operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. See analysis under BIO-1 (Program) for plant expansion and process optimization at the SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and WRP effluent management at all WRPs, which is applicable to this threshold. Construction and operational impacts for plant expansion and process optimization at the SJCWRP, and process optimization at the POWRP, LCWRP, and LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level. Operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could be potentially significant and will be addressed in the EIR/EIS at the program level.

JWPCP. See analysis under BIO-1 (Program), which is applicable to this threshold. Impacts would not occur because there is no aquatic habitat within the proposed construction or operation footprint of solids processing at the JWPCP, or adjacent to the footprint of solids processing and, therefore, will not be addressed in the EIR/EIS at the program level.

BIO-9. Overall Determination: Potentially Significant Impact. As discussed in BIO-1, impacts on movement of freshwater non-native fish species and terrestrial wildlife species could occur as a result of WRP effluent management at the SJCWRP, POWRP, and WNWRP. Impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See analysis under BIO-1 and BIO-2 (Program), which is applicable to this threshold. Construction and operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. See analysis under BIO-1 (Program) for plant expansion and process optimization at the SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and WRP effluent management at all WRPs, which is applicable to this threshold. Construction and operational impacts for plant expansion and process optimization at the SJCWRP, and process optimization at the POWRP, LCWRP, and LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level. Operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could result in potentially significant impacts on movement of freshwater non-native fish species and terrestrial wildlife species within San Jose Creek, the San Gabriel River, the Rio Hondo, and the San Gabriel Tidal Prism and will be addressed in the EIR/EIS at the program level.

JWPCP. See analysis under BIO-1 (Program), which is applicable to this threshold. Impacts would not occur because there is no aquatic habitat within the proposed construction or operation footprint of solids processing at the JWPCP, or adjacent to the footprint of solids processing, and, therefore, will not be addressed in the EIR/EIS at the program level.

BIO-10. Overall Determination: Potentially Significant Impact. Construction of the conveyance improvements, plant expansion and process optimization at the WRPs and solid processing at the JWPCP would be potentially significant. Therefore, impacts related to these specific program elements will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The federal Migratory Bird Treaty Act and Fish and Game Code protect nests of native birds during nesting season. Generally, if trees or other suitable nesting habitat are within proximity of the construction sites, native birds during nesting season can be disturbed due to noise, dust, and emissions, and this disturbance can be a violation of the federal Migratory Bird Treaty Act and Fish and Game Code. Therefore, construction of the conveyance system will be addressed in the EIR/EIS at the program level. The indirect impacts associated with the operation and maintenance of the conveyance system would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction for plant expansion and process optimization at the SJCWRP, and process optimization at the POWRP and LBWRP could result in potentially significant impacts on nesting birds. Therefore, potentially significant impacts will be addressed in the EIR/EIS at the program level. The indirect impacts associated with the operation and maintenance of process optimization and the plant expansion would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition. Likewise, construction at the LCWRP would take place in an area that is either developed or in use as part of a golf driving range. The current recreational use involves frequent motion due to golfing activity and turf maintenance. As a result, the construction area associated with the LCWRP provides negligible biological value. Therefore, long-term indirect impacts of operation and maintenance at the WRPs are considered less than significant and will not be addressed in the EIR/EIS at the program level. Construction would not occur as part of WRP effluent management; therefore, construction impacts would not occur. The WNWRP is located adjacent to a designated Significant Ecological Area (SEA). Due to the close proximity to a designated SEA, effluent management at the WNWRP could result in potentially significant impacts on the biological resources available at the SEA and, therefore, will be addressed in the EIR/EIS at the program level.

JWPCP. Construction of solids processing facilities would not result in impacts because the entire construction footprint and surrounding area is completely developed with no pervious surfaces, vegetation, or wildlife habitat. There would be no construction associated with biosolids management and, therefore, impacts would not occur. The indirect impacts associated with the operation and maintenance of the solids processing digesters and biosolids management would contribute a negligible amount of additional noise, dust, and motion when compared to the existing condition.

Biological Resources Project

Methodology and Screening Results

A CNDDB search was conducted for each of the onshore project element locations as a preliminary search to identify the potential for biological resources. Searches were initially conducted on November 16, 2009, and verified on April 15, 2011; identified species are listed in Table 3-2. The search area included a 0.25-mile radius around each shaft site. Plant populations within 0.5 mile of each other are considered as one occurrence. As described in the program discussion for biological resources, because the variation in a species' range is determined by the accuracy of the data submitted to the CNDDB, the location of a project element within a species' range does not mean that the species necessarily occurs within that location, nor does it guarantee a species is not present at the location. Therefore, the CNDDB search was also conducted for the USGS San Pedro and Torrance quadrangles (USGS 2009a, 2009b) to determine species occurrences near the shaft sites.

An additional database search was conducted to determine if the species identified in the CNDDB are rare, endemic, or regionally sensitive plants on CNPS Lists 1 or 2. The information from the CNDDB and the CNPS database searches is presented in Table 3-2. In February 2010, ICF biologist James

Hickman visited the TracPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms shaft sites and ICF biologist Mike Romich visited the JWPCP East and JWPCP West shaft sites.

Table 3-2. Project Analysis Special-Status Plants and Animals Screening Table

Project Facility	Species	Classification	Location of Identification Relative to the Project Facility	Level of Impact Relative to Project Components
JWPCP East	Palos Verdes Blue Butterfly	Federally Endangered State Endangered	The specific location is not identified within the 0.25-mile buffer, but the facility is within the range identified. However, potential impacts for host plants at this site very low.	Impacts due to construction disturbance would be less than significant.
	Mud Nama (*Nama stenocarpum*)	CNPS List 2.2	The JWPCP is within the range of this species. However, there are no wetlands in the vicinity of the facility that would support this species.	There are no suitable conditions for this plant. No impacts would occur.
	Coulter's Goldfields (*Lasthenia glabata*)	CNPS List 1B.1	The JWPCP is within the range of this species. However, there are no wetlands in the vicinity of the facility that would support this species.	There are no suitable conditions for this plant. No impacts would occur.
JWPCP West	Palos Verdes Blue Butterfly	Federally Endangered State Endangered	The specific location is not identified within the 0.25-mile buffer, but the facility is within the range identified. However, potential for host plants at this site very low.	Impacts due to construction disturbance would be less than significant.
	Mud Nama	CNPS List 2.2	The JWPCP is within the range of this species. However, there are no wetlands in the vicinity of the facility that would support this species.	There are no suitable conditions for this plant. No impacts would occur.
	Coulter's Goldfields	CNPS List 1B.1	The JWPCP is within the range of this species. However, there are no wetlands in the vicinity of the facility that would support this species.	There are no suitable conditions for this plant. No impacts would occur.
	Pocketed Free-Tailed Bat (*Nyctinomops femorosaccus*)	California Species of Special Concern	The presumed extant occurs west of I-110. The species is not known to occur within the project vicinity.	The shaft construction would not involve potential roosts or other habitat. No impacts would occur.
TraPac	Palos Verdes Blue Butterfly	Federally Endangered State Endangered	The specific location is not identified within the 0.25-mile buffer, but the facility is within the range identified. However, there is no vegetation on the site. Therefore, there is no potential habitat for Palos Verde blue butterfly.	There is no vegetation at the site. No impacts would occur.
LAXT	Coast Woolly-heads	CNPS 1B.2 species	The specific location is not identified within the 0.6-mile buffer, but the facility is within the range identified. There is a low probability of occurrence at this site due to ground disturbance and landscaping.	Impacts due to construction disturbance would be less than significant.

Table 3-2 (Continued)

Project Facility	Species	Classification	Location of Identification Relative to the Project Facility	Level of Impact Relative to Project Components
Southwest Marine	South Coast Saltscale	CNPS 1B.2 species	The specific location is not identified within the 1-mile buffer, but the facility is within the range identified. However, the site is entirely paved with no vegetation.	There is no vegetation at the site. No impacts would occur.
	Davidson's Saltscale	CNPS 1B.2 species	The specific location is not identified within the 1-mile buffer, but the facility is within the range identified. However, the site is entirely paved with no vegetation.	There is no vegetation at the site. No impacts would occur.
	Estuary Seablite	CNPS 1B.2 species	The specific location is not identified within the 1-mile buffer, but the facility is within the range identified. However, the site is entirely paved with no vegetation.	There is no vegetation at the site. No impacts would occur.
Angels Gate	Lyon's Pentacheata	CNPS 1B.1 species	The specific location is not identified within the 0.20-mile buffer, but the facility is within the range identified. However, the site is either paved or turf. Therefore, the probability of occurrence is very low.	Impacts due to construction disturbance would be less than significant.
	Island Green Dudleya	CNPS 1B.2 species	The specific location is not identified within the 0.20-mile buffer, but the facility is within the range identified. However, the site is either paved or turf. Therefore, the probability of occurrence is very low.	Impacts due to construction disturbance would be less than significant.
	Peregrine Falcon	Federally Delisted State Fully Protected Species	Peregrine falcon was observed over sea bluffs approximately 500 feet southwest of the project site during site visit.	Impacts due to construction disturbance would be potentially significant.
	Burrowing Owl	State Species of Special Concern	There is a potential for occurrence of the species within ground squirrel burrows on site.	Impacts due to construction disturbance would be potentially significant.
Royal Palms	Coastal Bluff Scrub Habitat		This area is mapped as coastal scrub habitat. However, the construction footprint is developed or composed ruderal vegetation.	Impacts due to construction disturbance would be potentially significant.
	Island Green Dudleya	CNPS Listed species	Specific range of this species occurs within 0.25-mile of the project site. The coastal bluff scrub community in the vicinity of the project footprint could support this species.	Impacts due to construction disturbance would be potentially significant.
	Palos Verdes Blue Butterfly	Federally Endangered State Endangered	The specific location occurs within 0.25-mile of the range of this species. However, the potential for host plants at this site very low.	Impacts due to construction disturbance would be less than significant.
	California Coastal Gnatcatcher	Federally Threatened	The coastal bluff scrub habitat could support this species.	Impacts due to construction disturbance would be potentially significant.

Biological Resources Project Discussion

Onshore Tunnel and Offshore Tunnel Alignments. The onshore tunnels would be constructed more than 70 feet bgs, sometimes as deep as 450 feet. Biological resources would not be affected by the construction and operation of the onshore and offshore tunnels; therefore, they will not be addressed in the EIR/EIS at the project level. Furthermore, offshore tunnel alignment impacts on marine biological resources are discussed in Section XI (Marine Environment).

The general biological setting and presence of sensitive species for each project facility location is described in Impact BIO-1. Because habitat and species are interconnected, the biological setting under BIO-1 provides a discussion of listed species in addition to the threshold-specific riparian plant community. Subsequent thresholds refer back to the biological setting discussed in Impact BIO-1, if relevant or if it highlights additional information specific to the threshold. This analysis includes short-term direct and indirect impacts, typically from construction, and long-term direct and indirect impacts, typically from operation. Generally, construction impacts are discussed first for each project element and then operational impacts are discussed.

BIO-1. Overall Determination: No Impact. No riparian habitat or sensitive natural communities occur at any of the shaft site locations. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

Shaft Site – JWPCP East. The proposed footprint for the JWPCP East shaft site occurs within an area that has been subject to regular and frequent disturbances. Based on aerial imagery, the site was completely developed in 1999. Between 1999 and 2002, structures on the site were demolished. By 2003, it appears that ruderal vegetation was beginning to colonize the site. Currently, the site is generally vacant with some remediation equipment in the general proximity. During the field visit, only early colonizing non-native grasses and other non-native annuals and forbs were observed on the project site. No riparian habitat or sensitive natural communities were observed on the site. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities from the JWPCP East would occur, and this issue will not be addressed in the EIR/EIS at the project level.

The ruderal vegetation and developed areas that currently exist on the project site are not expected to support any special-status biological resources. The JWPCP East shaft site is located in the range of the Palos Verdes blue butterfly, although the site is not within the identified buffer area of recorded observations of this species. Because the project site is dominated by ruderal vegetation and does not support coastal sage scrub vegetation community, the probability of the site supporting food plants for Palos Verdes blue butterflies is very low. Therefore, short-term or long-term direct or indirect impacts on sensitive natural communities or special-status biological resources that support them would not occur and will not be addressed in the EIR/EIS at the project level.

Residential and commercial development occurs to the south and east, and ruderal and developed areas occur to the north and west of the JWPCP East shaft site. Overall, no special-status biological resources are expected to occur adjacent to the JWPCP East shaft site footprint. Therefore, no short-term indirect impacts are expected to occur and will not be addressed in the EIR/EIS at the project level. Furthermore, because of the developed area surrounding the JWPCP East shaft site, no long-term indirect impacts on special-status biological resources from the JWPCP East shaft site would occur and will not be addressed in the EIR/EIS at the project level.

Shaft Site – JWPCP West. The proposed footprint for the JWPCP West shaft site occurs within an area that has been subject to regular and frequent disturbances. Based on aerial imagery, the site was dominated by development in 2004. Between 2004 and 2010, the amount of ruderal vegetation has increased but the site remains dominated by both developed and barren areas. During the field visit, only early colonizing non-native grasses and other non-native annuals and forbs were observed on the project site. There was also one row of eucalyptus trees in the center of the site and a row of ornamental landscaping along the eastern border. No riparian habitat or sensitive natural communities were observed on the site. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities at the JWPCP West shaft site would occur, and this issue will not be addressed in the EIR/EIS at the project level.

The ruderal vegetation, ornamental landscaping, eucalyptus trees, and developed areas that currently exist on the project site are not expected to support any special-status biological resources. Interstate 110 occurs to the west, JWPCP to the north, ruderal areas to the south, and the Wilmington Athletic Complex to the east. Overall, no special-status biological resources are expected to occur adjacent to the JWPCP West shaft site footprint. The JWPCP West shaft site is located in the range of the Palos Verdes blue butterfly, although the site is not within the identified buffer area of recorded observations of this species. Because the project site is dominated by ruderal vegetation and does not support coastal sage shrub vegetation community, the probability of the site supporting food plants for Palos Verdes blue butterfly is very low. Therefore, short-term direct impacts on special-status biological resources would not occur at the JWPCP West shaft site and will not be addressed in the EIR/EIS at the project level. Furthermore, because of the developed area surrounding the shaft site, no long-term indirect impacts on special-status biological resources from operation at the JWPCP West shaft site have been identified, and this issue will not be addressed in the EIR/EIS at the project level.

Shaft Site – TraPac. The proposed footprint for the TraPac shaft site occurs within an area that is completely developed. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities would occur at the TraPac shaft site, and this issue will not be addressed in the EIR/EIS at the project level.

Because the area is fully developed, short-term and long-term direct and indirect impacts would not result on special-status biological resources at the TraPac shaft site, and this issue will not be addressed in the EIR/EIS at the project level. Developed areas occur to the east, west, and south. To the north exists Harry Bridges Boulevard with an active construction site farther north. Overall, no special-status biological resources are expected to occur adjacent to the TraPac shaft site footprint. Therefore, no short-term and long-term indirect impacts would occur and will not be addressed in the EIR/EIS at the project level.

Shaft Site – LAXT. The proposed footprint for the LAXT shaft site occurs within an area that is mostly developed. The exception is an area with ruderal vegetation and ornamental landscaping that occurs along the western portion of the site. There is a row of eucalyptus trees (20 to 30 feet in height). There is also an area of open water, which appears to have been part of a water treatment process. Areas adjacent

to the site are mostly developed, but with ruderal and ornamental landscaping to the south. Species in this area include ice-plant (*Carpobrotus chilensis*), telegraph weed (*Heterotheca grandiflora*), and filaree (*Erodium* sp.). Some landscape species that were also found include unknown ornamental pines (*Pinus* sp.), eucalyptus (*Eucalyptus* sp.), and blackwood acacia (*Acacia melanoxylon*). A few scattered mulefat (*Baccharis salicifolia*) were also observed here. A row of pine trees (20 to 30 feet in height) also occurs in the buffer to the south, along Terminal Way. Other large trees (predominantly eucalyptus) occur along Ferry Street and Terminal Way. No riparian or sensitive natural communities exist at the LAXT shaft site or surrounding it. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities at the LAXT shaft site would occur, and this issue will not be addressed in the EIR/EIS at the project level.

This site is within the mapped range of the federal- and state-listed endangered Palos Verdes blue butterfly, but outside of the 0.25-mile buffer from known occurrences. Because this site is entirely developed, it supports no habitat for the Palos Verdes blue butterfly. Therefore, the LAXT shaft site would not result in short-term and long-term direct or indirect impacts on special-status biological resources, and this issue will not be addressed in the EIR/EIS at the project level.

The LAXT shaft site is within the 0.6-mile buffer of occurrences of coast woolly-heads, a CNPS 1B.2 plant species. However, since the shaft site is virtually all developed land and does not support a coastal strand plant community, short-term and long-term direct or indirect impacts would not occur on this species and will not be addressed in the EIR/EIS at the project level.

Shaft Site – Southwest Marine. The proposed footprint for the Southwest Marine shaft site occurs within an area that is completely developed with concrete, asphalt, and a building (a small storage shed). No riparian habitat or sensitive natural communities were observed on the site. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities at the Southwest Marine shaft site would occur, and this issue will not be addressed in the EIR/EIS at the project level.

Typical Port of Los Angeles development surrounds the shaft site. Two piers with mechanical cranes occur just west of the site. Terminal Island Federal Correctional facility is located south of, and adjacent to, the site. This area was not accessible for a site visit, but is completely developed. Across Seaside Avenue, to the east of the Southwest Marine shaft site, is a boulder breakwater. The shaft site is located approximately 1.4 miles northwest of the documented least tern (special-status species) breeding colony. Within the Port of Los Angeles, developed areas can provide nesting opportunities for special-status species such as least tern. However, the Southwest Marine shaft site, and the area surrounding it, is not known to provide this function. Therefore, short-term direct impacts on special-status biological resources would not occur and will not be addressed in the EIR/EIS at the project level. The open water habitat of the port may occasionally provide foraging opportunities for piscivorous birds. During construction, birds may be less likely to forage for fish in the vicinity of the shaft site because of construction activities. However, the affected area would be small and the overall availability of fish would not be affected. Therefore, the project is not expected to result in any measurable negative impact on piscivorous birds. Overall, direct and indirect short-term and long-term impacts on special-status biological resources would be less than significant and will not be addressed in the EIR/EIS at the project level.

Approximately 8 to 10 brown pelicans (*Pelecanus occidentalis californicus*) were observed flying over the project area and/or perched on the breakwater during the field visit. In addition, a nest occurs in a light stand at the far end of the breakwater, approximately 900 feet from the shaft site at the closest point. The nest does not appear to be active, and the species is unknown. No access was available to this area.

The western portion of the breakwater occurs at the closest point approximately 400 feet from the shaft site. Besides brown pelicans, the only other wildlife species detected were California sea lion (*Zalophus californianus*) (swimming between the piers west of the site) and unknown gulls (*Larus* sp.). Gulls are commonly observed in close proximity to construction and other human activity and sea lions do not leave the water in the shaft site vicinity. Therefore, short-term indirect impacts would not occur to these species and, therefore, will not be addressed in the EIR/EIS at the project level.

Shaft Site – Angels Gate. The proposed footprint for the Angels Gate shaft site occurs within a park. The majority of the shaft site is on an asphalt parking lot. The rest of the site is dominated by grasses and other herbaceous species associated with the park. The majority of the park is mowed. No riparian or sensitive natural communities exist at Angels Gate shaft site or surrounding it. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities at the Angels Gate shaft site would occur. This issue will not be addressed in the EIR/EIS at the project level.

The species found in the turf identified at the park include non-native grasses and ruderal species (i.e., black mustard [*Brassica nigra*], wild radish [*Raphanus sativus*], cheeseweed [*Malva parviflora*], London rocket [*Sisymbrium irio*], and ripgut brome [*Bromus diandrus*]). A row of palms, both Mexican fan palm (*Washingtonia robusta*) and Canary Island date palm (*Phoenix canariensis*), occurs along Gaffey Street on the eastern edge of the site. Ground squirrels and their burrows were found throughout the site and buffer area on the north side of Del Mar Street. Although there are suitable burrows for burrowing owl, no burrowing owls were observed, nor was any sign of presence of burrowing owls observed. Due to the presence of potentially suitable habitat and local records within one mile of the site at the White Point Nature Preserve (Larson 2007), significant impacts could occur on burrowing owls and this issue will be addressed in the EIR/EIS at the project level.

The Angels Gate shaft site is located within the 0.20-mile buffers from known occurrences of two CNPS species, Lyon's pentachaeta (CNPS 1B.1) and island green dudleya (CNPS 1B.2). However, the probability of either of these species to occur in the low-mown grass and ruderal plant communities at this shaft site is low. Therefore, impacts on either species would be less than significant and will not be addressed in the EIR/EIS at the project level.

Due to the developed nature and lack of suitable habitat at the Angels Gate shaft site, there is a low potential for special-status biological resources to occur. Therefore, direct construction and operational impacts on special-status biological resources are not expected (excluding the burrowing owl, which is discussed above). Impacts on special-status biological resources would be less than significant and will not be addressed in the EIR/EIS at the project level.

Point Fermin Park occurs adjacent and south of the Angels Gate shaft site, across Paseo Del Mar. The park is completely landscaped with large trees (including fig [*Ficus carica*], pine [*Pinus sp*.], and eucalyptus [*Eucalyptus sp*.]). Beyond the area lies a series of cliffs and the open ocean. The cliffs support a known nesting location for American peregrine falcon (*Falco peregrinus*), which was also observed during the field visit. A total of two peregrine falcons were observed, one foraging and flying from a point just south of the shaft site to a steep rock faced cliff near the park (Point Fermin). From the northern extent of the cliffs and near where the falcons were observed, the shaft site is approximately 200 feet to the east at the closest point.

Overall, potential indirect construction impacts on special-status biological resources would be less than significant since the shaft site and adjacent land in Point Fermin Park is either paved or landscaped lawn that does not support significant biological resources. However, there is the potential for indirect impacts

on nesting birds, in particular to the state fully protected American peregrine falcon, and this issue will be addressed in the EIR/EIS at the project level.

No long-term operational indirect impacts on special-status biological resources from the Angels Gate shaft site would occur because the shaft would be converted into a belowground access structure that would be connected to the tunnel. Therefore, this issue will not be addressed in the EIR/EIS at the project level.

Shaft Site – Royal Palms. The proposed footprint for the Royal Palms shaft site is dominated by non-native grasses and ruderal species, particularly cheeseweed. The site also contains sporadic ice plant. No riparian or sensitive natural communities exist at the Royal Palms shaft site or surrounding it. Therefore, no short-term or long-term direct or indirect impacts on riparian habitat or sensitive natural communities at the Royal Palms shaft site would occur, and this issue will not be addressed in the EIR/EIS at the project level. No special-status species occur on the site due to the lack of suitable habitat; therefore, no direct impacts on biological resources have been identified and this issue will not be addressed in the EIR/EIS at the project level.

The surrounding area includes a rocky beach to the south and east. The area to the north contains a steep slope, which is mostly bare, but does contain sporadic plants (predominantly non-native grasses and ice plant). Some landscape species also occur on this slope, including Indian fig cactus (*Opuntia ficus-indica*), blackwood acacia, Mexican fan palm, and Canary Island date palm. There is coastal scrub habitat found along the bluff east of the Royal Palms shaft site. One federally listed threatened species, the coastal California gnatcatcher, may inhabit this type of habitat. Therefore short-term and long-term indirect impacts on this species will be addressed in the EIR/EIS at the project level. A small area to the west of the site and most of the area east of the site contains mostly non-native grasses and other ruderal species, as well as occasional California brittlebush (*Encelia californica*). Numerous fan palms and Canary Islands date palms occur west of the site; these trees are cleanly trimmed. The range of a CNPS 1B.2 species, island green dudleya, is also found within 0.25 mile of the site and could be present in the coastal bluff scrub habitat adjacent to the project site to the east. However, this plant would not be expected in the ruderal and developed area of the shaft site footprint. The rest of the surrounding area is developed with residences and a parking lot. Therefore, no short-term or long-term impacts on special-status plants would occur, and this issue will not be addressed in the EIR/EIS at the project level. A drainage pipe terminates on the top of the slope just southeast of the site. The water flows a short distance to the parking lot, then into the rock and the ocean. This drainage feature is located outside of the project footprint and would not be affected by construction at the shaft site.

The range of the federally and state-listed endangered Palos Verdes blue butterfly is within 0.25 mile of the Royal Palms shaft site. However, the species is currently only known to occupy two sites that are located on U.S. Naval property on the Palos Verdes peninsula (USFWS 2008). In addition, the shaft site and surrounding area has developed and ruderal habitat and is not likely to support host plants for this species; therefore, short-term and long-term direct and indirect impacts would not occur and will not be addressed in the EIR/EIS at the project level.

No potential long-term indirect impacts on special-status biological resources from the Royal Palms shaft site would occur because once operational, the shaft would be converted into a belowground access structure that would be connected to the tunnel. Therefore, this issue will not be addressed in the EIR/EIS at the project level.

BIO-2. Overall Determination: Potentially Significant Impact. Construction at the Royal Palms shaft site could significantly impact federally listed threated species. Therefore, construction impacts related to this specific project element will be addressed in the EIR/EIS at the project level. Operational impacts at all project elements would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

All Shaft Sites. As discussed in BIO-1 (Project), the only federally listed species that could occur adjacent to a shaft site is the coastal California gnatcatcher at the Royal Palms shaft site. Construction impacts could be potentially significant to this species and will be addressed in the EIR/EIS at the project level. As discussed in BIO-1 (Project), no other shaft site has a federally listed species that could occur on site or adjacent to the site. Therefore, construction and operational impacts would not occur at the other shaft sites and will not be addressed in the EIR/EIS at the project level.

BIO-3. Overall Determination: Less Than Significant Impact. No impacts would occur on state-listed species. Therefore, this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

All Shaft Sites. As discussed in BIO-1 (Project), no impacts on the Palos Verdes blue butterfly, a federally and state-listed endangered species, would occur at the JWPCP East, JWPCP West, or Royal Palms shaft sites. No other state-listed threatened or endangered species have been identified as potentially occurring at the shaft sites. Therefore, construction and operational impacts would not occur, and this issue will not be addressed in the EIR/EIS at the project level.

BIO-4. Overall Determination: Less Than Significant Impact. The shaft sites are not located in areas designated critical habitat. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

All Shaft Sites. See analysis under BIO-1 (Project). All of the shaft sites are primarily developed with minimal sparse ruderal or non-native vegetation. None of the shaft sites or adjacent lands are designated critical habitat for any threatened or endangered species (USFWS 2011b). Therefore, impacts would not occur during construction and operation, and this issue will not be addressed in the EIR/EIS at the project level.

BIO-5. Overall Determination: Potentially Significant Impact. Construction at the Angels Gate shaft site could significantly impact state species of special concern. Therefore, construction impacts related to the Angels Gate shaft site will be addressed in the EIR/EIS at the project level. Operational impacts on all project elements would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

All Shaft Sites. See analysis under BIO-1 (Project). The Angels Gate shaft site is the only shaft site with the potential to impact the burrowing owl (state species of concern) during construction. Therefore, these species will be addressed in the EIR/EIS at the project level. No other shaft sites have state species of special concern; therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

BIO-6. Overall Determination: Less Than Significant Impact. Construction and operational impacts on sensitive plant species would be less than significant. Therefore, this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

All Shaft Sites. See analysis under BIO-1 (Project). Construction and operational impacts on coast woolly-heads at the LAXT shaft site; south coast saltscale, Davidson's saltscale, or estuary seablite at the Southwest Marine shaft site; Lyon's pentachaeta at the Angels Gate shaft site; or island green dudleya at the Angels Gate or Royal Palms shaft sites would not occur. Therefore, this issue will not be addressed in the EIR/EIS at the project level.

BIO-7. Overall Determination: Less Than Significant Impact. The shaft sites are not located within or near an HCP or NCCP and no impacts could occur. Therefore, this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfall	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

All Shaft Sites. See analysis in BIO-7 (Program). There are limited HCPs/NCCPs in the Los Angeles region and the shaft sites are not located in any of the HCPs/NCCPs. Impacts would not occur and this issue will not be addressed in the EIR/EIS at the project level.

BIO-8. Overall Determination: No Impact. Construction and operation at the shaft sites would not impact wetlands, waters of the U.S., or aquatic habitat. Therefore, this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

Shaft Sites – JWPCP East, JWPCP West, TraPac, LAXT, Southwest Marine, and Angels Gate. See analysis in BIO-1 (Project). There are no wetlands or waters of the U.S. that currently exist on the JWPCP East, JWPCP West, TraPac, Southwest Marine, LAXT, or Angels Gate shaft sites. Furthermore, construction and operation at the shaft sites do not have the potential to impact aquatic habitat because all construction would be contained within shaft site boundaries.

Shaft Site – Royal Palms. There is one drainage feature potentially under the jurisdiction of the U.S. Army Corps of Engineers (Corps) and the CDFG at the eastern boundary of the Royal Palms shaft site. However, this feature is outside the project footprint and would be unaffected by construction at the shaft site. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

BIO-9. Overall Determination: Less Than Significant Impact. Construction and operational impacts on the movement of freshwater non-native fish species and terrestrial wildlife species would be less than significant. Therefore, this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

Shaft Sites – JWPCP East, JWPCP West, TraPac, LAXT, and Southwest Marine. Construction at these sites would be contained within each shaft site and would have no effect on surface waters. Therefore, there would be no impact on the movement of fish or other aquatic life. Likewise, these sites do not provide wildlife migration corridors, and shaft construction would have no impact on movement of terrestrial wildlife species. Therefore, construction and operation impacts would not occur and this issue will not be addressed in the EIR/EIS at the project level.

Shaft Sites – Royal Palms and Angels Gate. The Royal Palms and Angels Gate shaft site locations are adjacent to shoreline that is within the Los Angeles County General Plan land use designation of SEA. While areas adjacent to the shoreline can function as important wildlife corridors or provide habitat linkage, these sites are previously developed sites. As a result, the potential for construction at these two shaft sites to directly or indirectly interfere with the movement of terrestrial wildlife species through impacts on or reduction in quality of a documented wildlife corridor or habitat linkage would be less than significant. Therefore, this issue will not be addressed in the EIR/EIS at the project level.

BIO-10. Overall Determination: Potentially Significant Impact. Impacts on noise and disturbance as a result of construction at the JWPCP East, JWPCP West, LAXT, Angels Gate, and Royal Palms shaft sites could conflict with the California Fish and Game Code and the federal Migratory Bird Treaty Act. Therefore, construction impacts related to these specific project elements would be potentially significant and this threshold will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Biological Resources (Terrestrial) evaluates biological impacts resulting from land-based activities or occurring on land-based biological resources. The construction and operation on the riser and diffuser area and rehabilitation of the existing ocean outfalls would be performed in the ocean. Impacts on marine biological resources associated with these project elements are discussed in Section XI (Marine Environment).

Shaft Sites – JWPCP East, JWPCP West, LAXT, Angels Gate, and Royal Palms. Birds nesting in ornamental landscaping and ruderal vegetation on and around these shaft sites could be affected by construction noise, light, dust, and activity. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Once the shaft sites are operational, they would not disturb nesting birds because they would be self-contained and primarily located underground. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Cultural Resources Checklist

		Program			Project		
V.	**CULTURAL RESOURCES (TERRESTRIAL AND MARINE).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
CUL-1.	Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5 or result in an adverse effect on a historic property pursuant to 36 CFR Section 800.5?	☒	☐	☐	☒	☐	☐
CUL-2.	Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5 or result in an adverse effect on a historic property that is an archaeological site pursuant to 36 CFR Section 800.5?	☒	☐	☐	☒	☐	☐
CUL-3.	Result in disturbance or destruction of a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☒	☐	☐
CUL-4.	Result in disturbance of any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☒	☐	☐

		Program			Project		
CUL-5.	Result in direct or indirect damage or removal of a significant submerged marine cultural resource or result in alteration or cause change to stable environmental conditions for a significant submerged cultural resource(s)?	☐	☐	☐	☒	☐	☐

Cultural Resources Program Discussion

CUL-1. Overall Determination: Potentially Significant Impact. Construction of several program elements could cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5. Therefore, construction impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Approximately 33 miles of the conveyance system would be improved within the JOS. The conveyance system is located within existing public rights-of-way of streets in the JOS service area; therefore, construction would occur within these rights-of-way. Construction would be temporary in duration. However, because the location of the construction on the conveyance system is unknown as is whether existing historical resource are located within the vicinity of construction, impacts would be potentially significant and will be addressed in the EIR/EIS at the program level. Subsequent site-specific CEQA documents may be needed for the conveyance system improvements once the location of the improvements is known. During operation, the conveyance system would be underground and would convey, via gravity, wastewater from points of origin (e.g., businesses and homes) to the WRPs. Therefore, operational impacts on historic resources would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Historical structures or potentially historical structures need to be present, or near to, program facilities in order for a potential impact to occur. Plant expansion and process optimization at the SJCWRP, and process optimization at the POWRP, LCWRP, and LBWRP may have the potential to impact historical resources. It is currently unknown whether designated historical resources or potentially historical resources exist within proximity to these WRPs. Therefore, construction activities at the WRPs have the potential to impact unknown historical resources in the area. Process optimization at each of the WRPs would operate underground and would not have the ability to impact historical structures. The expansion of SJCWRP would be located within the existing footprint of the WRP and would be compatible with it during operation. Therefore, operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRP effluent management at each of the WRPs includes the continued discharge of tertiary treated effluent into existing water bodies and the continued beneficial reuse of the treated effluent (e.g., using recycled water for landscaping). The actual discharge or beneficial reuse of treated effluent does not have the potential to impact historical resources because there is no physical action that could change or alter a historical resource. Therefore, operation of the WRP effluent management element would not result in impacts and will not be addressed in the EIR/EIS at the program level.

JWPCP. An increase of solids processing and biosolids management would take place within the existing JWPCP. There are some structures that are over 50 years of age at the JWPCP, but they have been altered substantially over time to maintain their function and purpose at the JWPCP. Construction of solids processing facilities would take place within the JWPCP and, therefore, it would potentially alter some of the existing JWPCP structures. Thus, construction impacts would be potentially significant and

will be addressed in the EIR/EIS at the program level. Once the solids processing digesters are operational, they would be self-contained and would not have the ability to affect historic structures; therefore, impacts would not occur and will not be addressed in the EIR/EIS at the program level. Any increase in biosolids production at the JWPCP would not have the potential to affect historical resources because no construction would take place under biosolids production and the operation would simply involve an increase in truck trips, which has no ability to affect historical resources. The biosolids would be beneficially applied in various locations throughout the state of California. This would not adversely affect existing historical resources because the land application would simply require application on existing agricultural land, and the use would occur within an established building or area that uses biosolids. Therefore, the operation of biosolids management would not result in impacts on historical resources and will not be addressed in the EIR/EIS at the program level.

CUL-2. Overall Determination: Potentially Significant Impact. Construction of several program elements could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5. Therefore, construction impacts related to these specific program elements would be potentially significant, and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See CUL-1 (Program) for details. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Known and unknown archeological resources are typically found and altered during ground-disturbing construction activities that occur within 15 to 20 feet of ground surface. Ground-disturbing activities would occur at the POWRP, LCWRP, and LBWRP during process optimization and at the SJCWRP during process optimization and plant expansion. Therefore, construction activities at the WRPs may result in an impact on unknown archeological resources and will be addressed in the EIR/EIS at the program level. Operations would not involve ground disturbance and would consist of in place structures; therefore, operations would not affect archeological resources. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Construction would not occur under WRP effluent management. The continued discharge of treated effluent from the WRPs into existing receiving waters and continued beneficial reuse would not affect archeological resources because these activities do not involve ground disturbance, and the act of discharging water would not affect archaeological resources. Therefore, operation of WRP effluent management would not result in a significant impact on archaeological resources and will not be addressed in the EIR/EIS at the program level.

JWPCP. The construction of six anaerobic digesters at the JWPCP would result in ground disturbance. The digesters are usually placed two to three stories bgs and excavation would be required. Therefore, construction activities at the JWPCP may result in an impact on unknown archeological resources and will be addressed in the EIR/EIS at the program level. Operations would not involve ground disturbance

and thus would not affect archeological resources. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Any increase in biosolids production at the JWPCP would not involve ground disturbance and thus, would not have the potential to impact archeological resources. The biosolids would be beneficially applied in various locations throughout the state of California. The actual land use application or beneficial use would occur on existing agricultural land or in existing reuse buildings or areas. The actual application or beneficial use of biosolids would not adversely affect known or unknown archeological resource because ground disturbance would not occur and this issue will not be addressed in the EIR/EIS at the program level.

CUL-3. Overall Determination: Potentially Significant Impact. Plant expansion and process optimization at SJCWRP; process optimization at the POWRP, LCWRP, and LBWRP; and construction of solids processing digesters at JWPCP could result in disturbance or destruction of a unique paleontological resource or site or unique geologic feature. Therefore, construction impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

See CUL-2 (Program) regarding construction and operational impacts on archeological resources, which would also apply to paleontological resources. Construction impacts identified in CUL-2 (Program) would be potentially significant for paleontological resources and will be addressed in the EIR/EIS at the program level. Operations would not involve ground disturbance and, thus, would not affect paleontological resources. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

CUL-4. Overall Determination: Potentially Significant Impact. Construction of all program elements could result in the disturbance of human remains. Therefore, construction impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See CUL-1 (Program) for details. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Human remains generally are only found and disturbed during ground-disturbing activities of construction. There are no formal cemeteries located near any of the WRPs, except the POWRP (ESRI 2009a). Spada Cemetery is located approximately 0.5 mile west of the POWRP. It is highly unlikely

there would be any human remains interred outside formal cemeteries and located on site at any of the WRPs. The WRPs are located on developed industrial lands, which have been regularly disturbed over time during facility construction, upgrades, and modifications. Previous land disturbance at these facilities would have uncovered any unknown human remains interred outside formal cemeteries. Furthermore, WRP effluent management would not involve ground-disturbing activities and, therefore, would have no potential to disturb unknown human remains interred outside cemeteries. However, it is unknown if Native American remains may be interred somewhere within the general vicinity of the construction of the WRP program elements. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once plant expansion and process optimization at SJCWRP and process optimization at POWRP, LCWRP, and LBWRP are operational, human remains would not be disturbed. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP is also located on developed industrial land, which has been regularly disturbed over time during facility construction, upgrades, and modifications. Previous land disturbance at these facilities would have uncovered any unknown human remains interred outside formal cemeteries. However, it is unknown if Native American remains may be interred somewhere within the general vicinity of the construction of the solids processing facilities. Therefore, construction impacts associated with solids processing would be potentially significant and will be addressed in the EIR/EIS at the program level. Once the solids processing digesters are operational, human remains would not be disturbed. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Operation of biosolids management would not involve ground-disturbing activities and, therefore, would have no potential to disturb unknown human remains, including Native American remains, interred outside cemeteries.

CUL-5. Overall Determination: Not Applicable. There would be no construction or operation in the marine environment for the program elements. Therefore, construction and operation of the program elements would not result in direct or indirect damage or removal of a significant submerged marine cultural resource or result in alteration or cause change to stable environmental conditions for a significant submerged cultural resource(s). Construction and operational impacts are not applicable, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	N/A	N/A
SJCWRP – Plant Expansion	N/A	N/A
WRP – Process Optimization	N/A	N/A
WRP – Effluent Management	N/A	N/A
JWPCP – Solids Processing	N/A	N/A
JWPCP – Biosolids Management	N/A	N/A

Cultural Resources Project Discussion

CUL-1. Overall Determination: Potentially Significant Impact. Construction of several project elements could substantially adversely impact historical resources. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See CUL-5.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See CUL-5.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnels would be constructed at depths between 70 and 450 feet bgs or below the seafloor. At these depths, historical resources are not likely present. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. All of the shaft sites, with the exception of Angels Gate and Royal Palms, are located primarily on disturbed vacant or industrial land. However, there could be unknown historical resources located at or within the vicinity of the JWPCP East, JWPCP West, TraPac, LAXT, or Southwest Marine shaft sites. The Angels Gate and Royal Palms shaft sites have the potential for historical resources to be located on site or nearby. Therefore, construction at any shaft site has the potential to cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Under operating conditions, all shaft sites would consist of a belowground access structure and potentially ancillary aboveground facilities with low profiles. Therefore, operational impacts on a historical resource would not occur and will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – San Pedro Shelf and Palos Verdes Shelf. See CUL-5 (Project) for a discussion of impacts on cultural resources in the marine environment.

Riser/Diffuser Area – Existing Ocean Outfalls. The existing ocean outfalls are more than 50 years of age; therefore, they could be a significant historical architectural resource and will be addressed in the EIR/EIS at the project level. See CUL-5 (Project) for a discussion of impacts on cultural resources in the marine environment.

CUL-2. Overall Determination: Potentially Significant Impact. Construction of several project elements could disturb or destroy archaeological resources. Therefore, construction impacts related to these specific project elements would be potentially significant for these specific project elements and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See CUL-5.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See CUL-5.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See CUL-5.	

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnels would be constructed at depths between 70 and 450 feet bgs or below the seafloor. Typically, prehistoric and historic archaeological resources are found buried within 10 to 15 feet bgs. Although, on rare occasions, archaeological resources have been found at greater depths (20 to 30 feet). These resources are found at shallow depths because it typically takes many years for sediment to accumulate and cover resources that have been left behind. Therefore, construction and operational impacts associated with the onshore and offshore tunnels have a low potential to affect prehistoric and historic archaeological resources and, therefore, would be less than significant and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Known and unknown archeological resources are typically found and altered during ground-disturbing construction activities conducted at depths of 10 to 15 feet as discussed under the tunnel alignments. The project elements include the construction of large shafts in multiple locations at depths greater than 15 feet bgs. Therefore, construction of the project elements could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5 at ground disturbing activities conducted at shallower depths. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See CUL-1 (Project) for operational impacts. Operational impacts would not occur on archeological resources and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. See CUL-5 (Project) for a discussion of impacts on cultural resources in the marine environment.

CUL-3. Overall Determination: Potentially Significant Impact. Construction of several project elements could disturb or destroy unique paleontological resources. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See CUL-5.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See CUL-5.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See CUL-5.	

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnels would be constructed at depths between 30 and 450 feet bgs or below the seafloor and would extend through geologic materials that could contain paleontological resources. Therefore, construction impacts of the onshore and offshore tunnels would be potentially significant for paleontological resources and will be addressed in the EIR/EIS at the project level.

Once operational, the onshore and offshore tunnels would simply convey secondary treated effluent to the ocean. The tunnels would remain in the subsurface and would be self-contained. Operations would not result in the disturbance or destruction of a unique paleontological resource or site. Therefore, operation of the onshore tunnels would have no impact and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Known and unknown unique paleontological resources are typically found and altered during ground-disturbing construction activities, similar to archeological resources. However, these resources can be located much deeper than 15 feet bgs because of how the geologic processes that preserve paleontological resources throughout millions of years occur. Sediment and other geology is deposited in an area and modified through either sedimentation or deposition. This modification can result in the burying of geology and the preservation of fossils deep below the ground surface. Therefore, the discussion of impacts on archeological resources in CUL-2 (Project) would also apply to paleontological resources. The construction at any shaft site could result in disturbance or destruction of a unique paleontological resource or site or unique geologic feature. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See CUL-2 (Project) for a discussion of operational impacts on archeological resources as they would be similar to paleontological resources. Operation at any shaft site would not result in impacts on paleontological resources and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. See CUL-5 (Project) for a discussion of impacts on cultural resources in the marine environment.

CUL-4. Overall Determination: Potentially Significant Impact. Construction of all shaft sites could result in disturbance of human remains, including those interred outside of formal cemeteries. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See CUL-5.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See CUL-5.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See CUL-5.	

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnels would be constructed at depths between 70 and 450 feet bgs or below the seafloor. Human remains would not be located at those depths. Therefore, construction and operational impacts of the onshore and offshore tunnels would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Construction at any shaft site has the potential to result in disturbance of human remains, including those interred outside of formal cemeteries, if present at the shaft site locations. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. See

CUL-1 (Project) for operational impacts. Operational impacts would not occur to unknown human remains and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. See CUL-5 (Project) for a discussion of impacts on cultural resources in the marine environment.

CUL-5. Overall Determination: Potentially Significant Impact. Construction at all the riser and diffuser areas could directly or indirectly damage or remove a submerged marine cultural resource or alter or cause change to stable environmental conditions of a significant submerged marine cultural resource. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

Tunnel Alignments – Onshore and Offshore. Construction and operation of the onshore tunnel and offshore tunnels would not occur within the marine environment. Therefore, this threshold is not applicable and will not be addressed in the EIR/EIS at the project level for these project elements.

All Shaft Sites. Construction and operation at the shaft sites would not occur within the marine environment. Therefore, this threshold is not applicable and will not be addressed in the EIR/EIS at the project level for these project elements.

Riser/Diffuser Area – San Pedro Shelf and Palos Verdes Shelf. The new riser and diffuser would be located on the PV Shelf or SP Shelf in the Pacific Ocean. Since it is currently unknown whether there are submerged prehistoric or historical cultural resources located on the PV Shelf or SP Shelf riser and diffuser areas, the construction of the riser and diffuser could have a significant impact on submerged marine resources. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the riser and diffuser would discharge treated effluent through the diffuser into the Pacific Ocean. The operation may have the potential to indirectly damage any unknown significant submerged marine cultural resources. Therefore, operational impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – Existing Ocean Outfalls. There is a potential for submerged cultural resources to be located within proximity to the existing ocean outfalls. This is because plotted obstructions/shipwrecks are located within the vicinity of the existing ocean outfalls, the existing ocean outfalls are near shore, and the existing ocean outfalls are within proximity to land forms and areas of high marine activity (Point Fermin, the Ports of Los Angeles and Long Beach). Therefore, construction and operation at the existing ocean outfalls has the potential to impact submerged cultural resource and will be addressed in the EIR/EIS at the project level.

Geology and Soils/Mineral Resources Checklist

		Program			Project		
VI.	**GEOLOGY AND SOILS/MINERAL RESOURCES.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
GEO-1.	Expose people, structures, or property to major geologic hazards such as landslides, mudslides, or ground failure?	☒	☐	☐	☒	☐	☐
GEO-2.	Expose people or structures to a substantially adverse effect, including the risk of loss, injury, or death involving rupture of a known earthquake fault?	☒	☐	☐	☒	☐	☐
GOE-3.	Expose people or structures to a potential substantially adverse effect, including the risk of loss, injury, or death involving strong seismic ground shaking?	☒	☐	☐	☒	☐	☐
GEO-4.	Expose people or structures to a potential substantially adverse effect including the risk of loss, injury, or death involving substrate consisting of material that is subject to liquefaction or other secondary seismic hazards in the event of ground shaking?	☒	☐	☐	☒	☐	☐

		Program			Project		
VI.	**GEOLOGY AND SOILS/MINERAL RESOURCES.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
GEO-5.	Substantially accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition, which would not be contained or controlled on site?	☒	☐	☐	☒	☐	☐
GEO-6.	Result in unstable earth conditions or changes in geologic substructure?	☐	☒	☐	☒	☐	☐
GEO-7.	Be located in soil characterized by shrink-swell potential that might result in deformation of foundations or damage to structures?	☒	☐	☐	☒	☐	☐
GEO-8.	Destroy, permanently cover, or materially and adversely modify one or more distinct and prominent geologic or topographic features. Such features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, and wetlands?	☐	☐	☒	☒	☐	☐
GEO-9.	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐	☐	☒

		Program			Project		
VI.	**GEOLOGY AND SOILS/MINERAL RESOURCES.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
GEO-10.	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☒	☐	☐	☒

Geology and Soils/Mineral Resources Program Discussion

GEO-1. Overall Determination: Potentially Significant Impact. Impacts associated with landslides, mudslides, and ground failure during construction and operation of POWRP process optimization would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Landslides and mudslides typically occur in areas with unstable slopes. Although it is unknown exactly where the conveyance system would be improved, the conveyance system is generally located within existing public rights-of-way of streets in the JOS service area. Therefore, construction would occur within these rights-of-way. Trenching and digging would be required to improve the conveyance system. Public streets are generally flat with little to no relief that could cause landslides or mudslides during construction. Furthermore, roads and the public rights-of-way are typically graded and built with materials to specifically prevent ground failure in order to maintain the road. Finally, all construction for improvements to the conveyance system would be built according to engineering standards and the California Building Code, and consequently, the potential for ground failure would not increase. Therefore, construction of the conveyance system would not experience or result in landslides, mudslides, or ground failure. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Under operation, the conveyance system would be underground and would convey, via gravity, wastewater from points of origin (i.e., businesses and homes) to the WRPs. Therefore, landslides, mudslides, or ground failure would not occur during the operation of the conveyance improvements and will not be addressed in the EIR/EIS at the program level.

WRPs. Landslides and mudslides typically occur in areas with unstable slopes. The SJCWRP, LCWRP, and LBWRP are located in areas that are not susceptible to landslides, mudslides, or ground failure (California Department of Conservation 1999a, 1999b, 1999c). The construction activities associated with process optimization tanks and plant expansion would not increase the potential risk from ground failure. Furthermore, construction of the plant expansion at the SJCWRP and the underground tanks for process optimization at the SJCWRP, LCWRP, and LBWRP would be built according to engineering standards and the California Building Code; consequently, the potential for ground failure would not increase. There would be no additional employees at these WRPs, and the operation of the plant expansion and process optimization would not include additional habitable buildings. Therefore, the construction and operation at the SJCWRP, LCWRP, and LBWRP would not result in or increase exposure to landslides, mudslides, and ground failure. Construction and operational impacts would not occur at the SJCWRP, LCWRP, and LBWRP and will not be addressed in the EIR/EIS at the program level.

The POWRP is located in a landslide zone and could be susceptible to landslides and mudslides because Elephant Hill is located to the south/southwest of the WRP (California Department of Conservation 1999d). During construction of the process optimization facilities at the POWRP, construction workers could be exposed to landslides or mudslides in this area. Once operational, there would be no additional

employees at the POWRP and the operation of process optimization would not include additional habitable buildings. Also, the location of the POWRP facility was selected to reduce ground failure potential, and what is being proposed does not increase the potential risk from ground failure. Any underground tanks for process optimization would be built according to engineering standards and the California Building Code; consequently, the potential for ground failure would not increase. However, because the POWRP is located in an area identified as having the potential for landslides, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRP effluent management at each of the WRPs includes the continued discharge of tertiary treated effluent into existing receiving waters and the continued beneficial reuse of the treated effluent (e.g., using recycled water for landscaping). The discharge would occur at existing discharge points along receiving waters. The actual discharge or beneficial reuse of treated effluent does not have the potential to cause or be exposed to landslides, mudslides, or ground failure. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP is located on flat, fully-developed land with no relief to support either a landslide or a mudslide. Construction activities associated with the solids processing digesters would not increase the potential risk from ground failure. Furthermore, construction of the solids processing digesters would be built according to engineering standards and the California Building Code; consequently, the potential for ground failure would not increase. The number of employees would not increase at the JWPCP, and construction and operation of the solids processing digesters would not include additional habitable buildings. Therefore, construction and operation at the JWPCP would not result in or increase exposure to landslides, mudslides, or ground failure. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Biosolids management would not result in construction; therefore, it does not have the potential to cause or increase exposure to landslides, mudslides, or ground failure. The increase in biosolids at the JWPCP would require an increased number of trucks to transport the biosolids to beneficial use locations throughout the state of California. Land application of biosolids would simply require application on existing agricultural land and beneficial use would occur within an established building or area that uses biosolids. Therefore, the operation of biosolids management would not result in or increase exposure to landslides, mudslides, or ground failure. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

GEO-2. Overall Determination: Potentially Significant Impact. Although none of the program elements are located in an Alquist-Priolo fault zone characterized by surface rupture that might be related to a fault, several program elements would likely be susceptible to seismic activity. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	X
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

Conveyance System. Although it is unknown exactly where the conveyance system would be improved, the conveyance system is generally located within existing public rights-of-way of streets in the JOS service area. Therefore, construction would occur within these rights-of-way. While it is unlikely the

conveyance system would cross a designated Alquist-Priolo fault (see the WRPs determination discussion for more on Alquist-Priolo), Southern California is a seismically active area. Therefore, construction and operation of the conveyance improvements would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRPs. Surface rupture is generally limited to land immediately adjacent to an active fault. The Alquist-Priolo Special Studies Zone Act (1978) requires that special geologic studies be conducted to locate and assess the activity level of any fault within a potential development site. The Alquist-Priolo faults are identified by the state of California. None of the WRPs are located within immediate proximity to an Alquist-Priolo fault (California Department of Conservation 1986a, 1991, 2012); therefore, they would not be impacted by an Alquist-Priolo fault or a surface fault rupture.

However, the program elements are located in southern California, which is an area known for active fault lines and numerous earthquakes. The WRPs are located within the general vicinity of many faults including the Workman, Los Alamitos, San Jose, Whittier, Raymond Hill, Newport-Inglewood, Cabrillo, and Palos Verdes Faults. Faults such as these are typical of southern California, and it is reasonable to expect a strong seismic event within the life of the program. Furthermore, the 1997 Uniform Building Code locates the entire Los Angeles area within Seismic Risk Zone 4. Areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake. For additional information regarding the program's exposure to seismic activity see GEO-3 (Program). The construction and operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP could be susceptible to seismic activity. Therefore, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRP effluent management at each of the WRPs includes the continued discharge of tertiary treated effluent into existing receiving waters and the continued beneficial reuse of the treated effluent (e.g., using recycled water for landscaping). The discharge would occur at existing discharge points along receiving waters. Because the WRPs are not located along or across an Alquist-Priolo fault, the actual discharge or beneficial reuse of treated effluent would not be impacted by an area characterized by surface rupture. Therefore, operational impacts associated with WRP effluent management would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP is not located within immediate proximity to an Alquist-Priolo fault (California Department of Conservation 1986b); therefore, it would not be impacted by an Alquist-Priolo fault or a surface fault rupture. For additional information regarding the JWPCP's exposure to seismic activity see GEO-3 (Program). The construction and operation of the solids processing digesters and the operation of biosolids management could be susceptible to seismic activity. Therefore, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

GEO-3. Overall Determination: Potentially Significant Impact. All of the program elements (except WRP effluent management) could expose people or structures to strong seismic ground shaking. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	X
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

Conveyance System. The conveyance system would be built in compliance with the most up-to-date building codes required by the state of California and the California Building Code, which would minimize potential impacts to the greatest degree feasible. However, because the conveyance system is located in southern California, which is a seismically active area, construction and operation of the conveyance improvements would result in potentially significant impacts and will be addressed in the EIR/EIS at the program level.

WRPs. It is reasonable to expect a strong seismic event within the life of the plant expansion at the SJCWRP and the process optimization facilities at the SJCWRP, POWRP, LCWRP, and LBWRP because they are located in southern California, an area known for frequent seismic activity. None of the structures constructed or operated would be habitable and process optimization or plant expansion would not result in a substantial increase of employees at any of the WRPs. Plant expansion and process optimization facilities would be built in compliance with the most up-to-date building codes required by the state of California and the California Building Code, which would minimize potential impacts to the greatest degree feasible. Nevertheless, the WRPs are located in southern California, which is a seismically active area. Therefore, construction and operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP could expose people or structures to a potential substantially adverse effect, including the risk of loss, injury, or death involving strong seismic ground shaking. Construction and operational impacts would be potentially significant, and this issue will be addressed in the EIR/EIS at the program level.

The operation of WRP effluent management would include a change in the volume of treated effluent discharged from the WRPs. The volume of treated effluent would continue to be discharged from the same discharge points and locations along the receiving waters. WRP effluent management is not susceptible to groundshaking and, therefore, will not be addressed in the EIR/EIS at the program level.

JWPCP. See the conveyance system and WRPs discussion for details. Construction and operation of the solids processing digesters and operations of the biosolids management could expose people or structures to a significant adverse effect involving strong seismic ground shaking. Construction and operational impacts would be potentially significant, and this issue will be addressed in the EIR/EIS at the program level.

GEO-4. Overall Determination: Potentially Significant Impact. Several program elements would likely be susceptible to substantially adverse effects involving substrate subject to liquefaction. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	X
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Liquefaction in soils and sediments occurs when granular material is subjected to large, rapidly applied loads (e.g., earthquake shaking), causing the soil to behave like a liquid. Earthquake-induced liquefaction most often occurs in areas underlain by unconsolidated, saturated sediments. Much of southern California covers a large expanse of unconsolidated alluvial sediment. Therefore, construction and operation of the conveyance improvements could expose structures to significant adverse effects involving substrate that is subject to liquefaction. Construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRPs. The soils at the SJCWRP are a combination of alluvial sediments and thin clay, and the onsite materials are stiff and dense (Fugro 2011). This soil has a low potential for liquefaction; therefore, construction and operation of plant expansion and process optimization at the SJCWRP would not expose people or structures to a potential substantially adverse effect from liquefaction. Construction and operational impacts at the SJCWRP would be less than significant and will not be addressed in the EIR/EIS at the program level.

The POWRP, LCWRP, and LBWRP may have soils with liquefaction potential, and construction and operation of process optimization at these sites could expose people or structures to a significant adverse effect, including the risk of loss, injury, or death involving substrate consisting of material that is subject to liquefaction or other secondary seismic hazards in the event of ground shaking. Therefore, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRP effluent management at each of the WRPs includes the continued discharge of tertiary treated effluent into existing receiving waters and the continued beneficial reuse of the treated effluent (e.g., using recycled water for landscaping). The discharge would occur at fully lined, existing discharge points along receiving waters (i.e., San Gabriel River), with the exception of the POWRP, WNWRP, and SJCWRP, which would discharge some effluent into unlined channels. The discharge of treated effluent would not be subject to liquefaction or other secondary seismic hazards. Impacts associated with WRP effluent management would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The soils at the JWPCP are a combination of alluvial sediments and thin clay, and the onsite materials are stiff and dense (Fugro 2011). This soil has a low potential for liquefaction; therefore, construction of solids processing facilities and operation of solids processing facilities and biosolids management at the JWPCP would not expose people or structures to a potential significant adverse effect from liquefaction. Construction and operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

GEO-5. Overall Determination: Potentially Significant Impact. Construction of several program elements could result in substantial wind or water erosion. Therefore, construction impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Areas particularly vulnerable to wind and water erosion generally have large amounts of exposed soils, highly erodible soils, and steep slopes. Generally, land in the JOS service area that is serviced by the conveyance system is highly developed and is not susceptible to erosion. However, construction of the conveyance system would involve trenching, cut, and fill. During construction, earth-moving operation could increase short-term erosion. The storage and movement of soil greatly affects the amount of erosion that occurs. If soil is improperly stored or transported, wind and water can erode soil. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Under operating conditions, the conveyance system piping would be buried in the public rights-of-way of streets. Therefore, the operation of the conveyance improvements would not substantially accelerate the processes of wind or water erosion and sedimentation. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Areas particularly vulnerable to wind and water erosion generally have large amounts of exposed soils, highly erodible soils, and steep slopes. Generally, land in the JOS service area and around the WRPs is highly developed and is not susceptible to erosion. Areas that are the most susceptible to erosion include steep unvegetated slopes with erodible soils. At the LCWRP, soils are sandy loam, silty loam, clay, and clay loam within the first 60 inches. These soils generally have a low erosion potential. The SJCWRP is located in sandy loam, which has a low erosion potential within the first 60 inches. The erodibility potential of soils at the POWRP and LBWRP is currently unknown. During construction, earth-moving operation could increase short-term erosion at the sites. The storage and movement of soil greatly affects the amount of erosion that occurs. If soil is improperly stored or transported, wind and water can erode soil. Therefore, construction impacts would be potentially significant for plant expansion at the SJCWRP and for process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP and will be addressed in the EIR/EIS at the program level.

Once the expansion of the SJCWRP has concluded and process optimization facilities are operating, there would be no potential for wind and water erosion. The process optimization tanks would be located below ground surface, and the surface would be returned to existing conditions at each WRP (see BIO-1 (Program) for a general description of existing conditions). The SJCWRP expansion would be contained within concrete structures that would not cause wind or water erosion.

Currently, discharges of treated effluent from the SJCWRP, POWRP, and WNWRP occur from existing discharge points to unlined portions of various receiving waters (San Jose Creek, the San Gabriel River, and the Rio Hondo). These discharges do not cause erosion problems within the receiving waters. WRP effluent management would result in some changes to the discharge volume at various existing discharge points into unlined receiving waters from the SJCWRP, POWRP, and WNWRP. Although there would be a change in volume over time, the change would not occur rapidly enough or in great enough volumes in the unlined portions of receiving waters to create erosion. The change would not occur rapidly because it is based on scheduled procedures within each of the WRPs that are implemented during the operation of the WRPs and at peak and low flow periods through the WRP treatment processes. Changes in discharge volumes from the LCWRP and LBWRP would not result in erosion impacts because the receiving waters from these WRPs are concrete-lined. Therefore, impacts associated with WRP effluent management would be less than significant and will not be addressed in the EIR/EIS at the program level.

JWPCP. The geological setting at the JWPCP consists of a wide variety of soils including sandy loam, gravelly loam, clay, clay loam, and sand (located very deep). These soils have a low to high erodibility potential. Construction of the solids processing digesters would involve cut and fill. During construction of new facilities, earth-moving operations could increase short-term erosion at the sites. The storage and movement of soil greatly affects the amount of erosion that occurs. If soil is improperly stored or transported, wind and water can erode soil. Therefore, construction impacts for solids processing would be potentially significant, and this issue will be addressed in the EIR/EIS at the program level. Once the solids processing digesters are operating, there would be no potential for wind or water erosion to occur. The area around the digesters would be completely impervious and covered with concrete or asphalt. All stormwater and wash water would be collected by the storm drain system and would not be diverted to pervious surfaces where they could result in water erosion. Therefore, operational impacts of solids processing would be less than significant and will not be addressed in the EIR/EIS at the program level.

Operation of biosolids management at the JWPCP would continue as it currently does in the existing buildings. The increase in truck trips to/from the JWPCP would not result in wind and water erosion. Biosolids management would increase composting, land application, and activities at landfills within the JOS service area and areas outside the JOS service area. The land application and beneficial use locations are generally located in areas dominated by agriculture or in light industrial/commercial areas. The actual land use application or beneficial use would occur on existing agricultural land or in existing buildings. The Sanitation Districts would only use sites that are properly permitted and for which all site-specific impacts, including the potential for wind and water erosion, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, operation of biosolids management at the JWPCP and at beneficial use locations would not have an impact on wind or water erosion. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

GEO-6. Overall Determination: Less Than Significant Impact. Construction and operation of the program elements would not result in unstable earth conditions or changes to geologic substructure. Therefore, construction and operational impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the improvements to the conveyance system would require trenching and excavation to reach and improve approximately 33 miles of non-contiguous conveyance system infrastructure. All construction would generally occur within the public rights-of-way of existing streets. The Sanitation Districts currently maintain and improve the conveyance system throughout the JOS service area using standard practices and procedures. The Sanitation Districts would implement required construction safety standards, including construction setbacks and shoring to ensure stable earth conditions during construction of the conveyance improvements. Therefore, construction of the conveyance system would not result in unstable earth conditions or changes in geologic substructure. Construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. Operation of the improvements to the conveyance system would be completely underground and within a self-contained system, as under current operations. Therefore, operation of the conveyance improvements would not result in unstable earth conditions or changes in geologic substructure. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LBWRP, and LCWRP would be within the existing footprints of the WRPs. The WRPs are fully developed with existing infrastructure. Construction would involve soil excavation at all WRPs, which could result in the creation of temporary slopes and pits at the excavation sites. As they currently do for all construction activities within the JOS service area, the Sanitation Districts would implement required construction safety standards, including construction setbacks and shoring to ensure stable earth conditions during construction. Construction of the plant expansion and the process optimization facilities would not result in unstable earth conditions or a change in geology substructure with the application of the current construction practices of the Sanitation Districts. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. For

a discussion of landslide and mudslide impacts associated with construction and operation of POWRP process optimization, refer to GEO-1 (Program).

Operation of the plant expansion at the SJCWRP would occur within enclosed, self-contained structures, piping, and ancillary equipment. Process optimization would consist of underground storage tanks for wastewater, piping, and ancillary equipment that would be self-contained and would provide for additional efficiency in the wastewater treatment process. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management would consist of an increase or decrease in the volume of tertiary treated effluent discharged from each of the WRPs using existing designated discharge points. Discharge would not occur at new areas. A change in volume of discharge would not result in unstable earth conditions or changes to geologic substructure. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction of solids processing digesters would occur within the existing footprint at the JWPCP. The JWPCP is fully developed with existing infrastructure. Construction of the solids processing digesters would involve cut and fill. This construction could result in the creation of temporary slopes and pits at the excavation sites. As they currently do for all construction activities within the JOS service area, the Sanitation Districts would implement required construction safety standards, including construction setbacks and shoring to ensure stable earth conditions during construction. Construction would not result in unstable earth conditions or a change in geology substructure with the application of the Sanitation Districts current construction practices. Therefore, construction impacts of the solids processing digesters would be less than significant and will not be addressed in the EIR/EIS at the program level. Once the digesters are built, they would be stationary, self-contained structures. Therefore, under operating conditions, impacts would not occur and will not be addressed in the EIR/EIS at the program level.

An increase in the biosolids processed at the JWPCP would require an increase in truck trips to transport the biosolids from the JWPCP to beneficial use and disposal locations. The increase in truck trips would not result in unstable earth conditions or changes in geologic substructure. Land application of biosolids and beneficial use would occur on existing agricultural lands and within existing beneficial use buildings. Therefore, these activities would not result in unstable earth conditions or changes in the geologic substructure. Construction and operational impacts associated with biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

GEO-7. Overall Determination: Potentially Significant Impact. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level. Operation of several of the program elements could be located in soil characterized by shrink-swell potential (i.e., expansive soil) that might result in damage to foundations or structures. Therefore, operational impacts related to these program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	X
SJCWRP – Plant Expansion	–	X
WRP – Process Optimization	–	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	X
JWPCP – Biosolids Management	N/A	–

Conveyance System. Shrink-swell potential (also known as expansive soils) is the quality of soil that determines its volume change when it experiences a change in moisture content. Shrink-swell in soils is measured by the volume change resulting from the shrinking soil when it dries and by the expanding soil as it takes up moisture. The volume change behavior of soils is influenced by the amount of moisture change, the amount of clay in the soil, and the type of mineral in the clay. In general, the soil with the highest clay content shrinks and swells the most. In the JOS service area, three soils are considered highly expansive (Cropley, Ramona-Placentia, and Diablo-Altamont).

Improvements to the conveyance system would be constructed using trenching within public rights-of-way in existing streets. The actual construction of the improvements could result in the discovery of soils with shrink-swell potential, but the construction would not result in the damage to structures (i.e., infrastructure that would be replaced or added). However, should shrink-swell soils be discovered, the operation of the improvements to the conveyance system could result in damage to the infrastructure. The Sanitation Districts have standard construction practices and design procedures to reduce damage to their facilities; however, it is unknown where exactly the shrink-swell soils may occur. Therefore, while construction impacts would not occur, operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRPs. See shrink-swell discussion above under Conveyance System. The LCWRP has soils with a moderate shrink-swell potential (Jones & Stokes 1994). The shrink-swell potential of the soils located at the SJCWRP, POWRP, and LBWRP is currently unknown. All of these facilities have highly disturbed natural soil settings that now primarily consist of artificial fill. Therefore, construction impacts would not occur and will not be addressed in the EIR/EIS at the program level.

See shrink-swell discussion above under Conveyance System as it applies to the construction and operation of the expansion of SJCWRP and process optimization at the SJCWRP, POWRP, LBWRP, and LCWRP. Operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management would consist of an increase or decrease in the volume of tertiary treated effluent discharged from each of the WRPs using existing designated discharge points. A change in volume of discharge would not result in damage to structures due to shrink or swell of underlying soil. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. See shrink-swell discussion under Conveyance System as it applies to the JWPCP. The JWPCP has soils with relatively high expansion soil potential (Fugro 2011). Therefore, while construction impacts would not occur, operational impacts associated with solids processing would be potentially significant and will be addressed in the EIR/EIS at the program level.

An increase in the biosolids processed at the JWPCP would require an increase in truck trips to transport the biosolids from the JWPCP to beneficial use and disposal locations. The increase in truck trips would not result in damage to structures due to soil shrink-swell potential. Land application of biosolids and beneficial use would occur on existing agricultural lands and within existing beneficial use buildings. Therefore, these activities would not result in damage to structures associated with shrink-swell potential. Construction and operational impacts associated with biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

GEO-8. Overall Determination: No Impact. There are no prominent geologic or topographic features within or near any of the program elements. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance improvements would generally take place in existing urban areas and within the existing rights-of-way of public streets. There are typically no distinct or prominent geologic features within the public rights-of-way of streets. Once operational, the conveyance system would be located underground. Therefore, construction and operation of the conveyance improvements would not destroy, permanently cover, or materially destroy a distinct and prominent geologic or topographic feature. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. The program elements would be constructed and operated within currently developed WRPs. Distinct and prominent geological or topographic features do not exist within any of the WRP footprints. Because these elements would be located within existing wastewater treatment infrastructure, they would not destroy, permanently cover, or materially and adversely modify one or more distinct and prominent geologic or topographic feature. Construction and operational impacts would not occur on unique geologic or topographic features as a result of plant expansion at the SJCWRP or process optimization at the SJCWRP, POWRP, LCWRP, or LBWRP and will not be addressed in the EIR/EIS at the program level.

WRP effluent management may result in an increase or decrease in volume of treated effluent from the WRPs. However, the discharge would occur at existing discharge points and the increase or decrease would generally not alter the existing channels (see discussion above regarding erosion and Hydrology, Water Quality (Freshwater), and Public Health [Section IX] for additional information regarding discharges and impacts associated with volume changes). Therefore, operation of WRP effluent management would not destroy, permanently cover, or materially destroy a distinct and prominent geologic or topographic feature and will not be addressed in the EIR/EIS at the program level.

JWPCP. The expansion of solids processing and the increase in biosolids management would occur within the existing footprint of the JWPCP and beneficial use locations. There are no unique geological or topographical features within the JWPCP or adjacent to the JWPCP. Since solids processing and biosolids management would be located within existing JWPCP and existing beneficial use locations, these program elements would not destroy, permanently cover, or materially and adversely modify one or more distinct and prominent geologic or topographic features. Therefore, there would be no impact associated with the construction and operation of the solids processing digesters and the operation of biosolids management. This issue will not be addressed in the EIR/EIS at the program level.

GEO-9. Overall Determination: No Impact. Construction and operation of all program elements would not result in the loss of availability of a known mineral resource of value to the region or state. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Although it is unknown exactly where the conveyance system would be improved, the conveyance system is generally located within existing public rights-of-way of streets in the JOS service area. Therefore, construction would occur within these rights-of-way. Trenching and digging would be required to improve the conveyance system. Public streets are generally not designated as areas of mineral resources with significance to the state. Furthermore, the streets within the JOS service area are typically located in urban areas. Should any minerals be discovered within the public right-of-way during construction, the conveyance improvements would not preclude the extraction of the minerals. Therefore, construction and operational impacts of the conveyance system would not result in the loss of availability of a known mineral resource and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction of the plant expansion at SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. The WRPs are located in areas mapped by the State of California Department of Conservation Division of Mines and Geology as Mineral Resource Zones (MRZ) -1 and MRZ-3 (1994). MRZ-1 consists of areas of no mineral resource significance, and MRZ-3 consists of areas of undetermined mineral resource significance. Furthermore, the naturally occurring soils at the existing facilities have been extensively altered over time with excavation and the introduction of artificial fill. Therefore, construction and operational impacts on mineral resources of value to the region and residents of the state would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP is located north and outside of the designated boundaries of the Wilmington Oil Field and, therefore, construction activities associated with solids processing would not have an impact on the oil field (Hesson and Olilang 1990). The construction and operation of the solids processing digesters would occur on existing developed land within the footprint of the existing facility. Therefore, construction and operation would not have an impact on important mineral resources. Construction and operational impacts associated with the solids processing digesters would not occur and will not be addressed in the EIR/EIS at the program level.

Refer to GEO-5 for a discussion of biosolids operation at the JWPCP and beneficial use locations. Operation of biosolids management would not have an impact on important mineral resources and will not be addressed in the EIR/EIS at the program level.

GEO-10. Overall Determination: No Impact. Construction and operation of all program elements would not result in the loss of availability of a locally important mineral resource recovery site. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. See GEO-9 (Program). Construction and operation of the program elements would not result in the loss of availability of a locally important mineral resource as they would generally occur in existing public rights-of-way or on existing developed land within the footprint of existing facilities. The existing developed land has been extensively altered over the years and, therefore, there are no locally important mineral resources located at the facilities. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Geology and Soils/Mineral Resources Project Discussion

GEO-1. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements could expose people, structures, or property to major geologic hazards such as landslides, mudslides, or ground failure. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

Tunnel Alignments – Onshore and Offshore. Construction of onshore and offshore tunnels would include crossing fault lines. Therefore, construction of the onshore and offshore tunnels would have the potential to expose people to ground failure. Under operating conditions, the onshore and offshore tunnels could also be exposed to ground failure. Therefore, construction and operation of the onshore and offshore tunnels could expose people or structures to ground failure and impacts would be potentially significant. Construction and operational impacts will be addressed in the EIR/EIS at the project level.

Shaft Sites. The Royal Palms shaft site is located at the base of a coastal bluff. None of the shaft site locations are within designated landslide areas; however, they could be exposed to ground failure during construction and operation (California Department of Conservation 1999e, 1999f). Therefore, construction and operational impacts associated with any shaft site would be potentially significant and will be addressed in the EIR/EIS at the project level.

Riser/Diffuser Areas. Construction and operational impacts associated with the SP Shelf and PV Shelf riser and diffuser and rehabilitation of the existing ocean outfalls would be potentially significant and will be addressed in the EIR/EIS at the project level.

GEO-2. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements could be located in an earthquake fault zone, a known active fault zone, or an area characterized by surface rupture. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be address in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. There are many faults within proximity of the project elements. The Palos Verdes Fault and Cabrillo Fault are located in proximity to project shaft sites. Furthermore, some of the onshore and offshore tunnels would cross both the Palos Verdes Fault and the Cabrillo Fault at certain points. Construction and operational impacts associated with all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

GEO-3. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements could expose people or structures to a potential substantially adverse effect, including the risk of loss, injury, or death involving strong seismic ground shaking. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. See Geo-2 (Project). It is reasonable to expect a strong ground motion seismic event within the life of the project because it is located in southern California, which is an area known for seismic activity. Construction and operational impacts associated with all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

GEO-4. Overall Determination: Potentially Significant Impact. Construction and operation of all the project elements could expose people or structures to substrate consisting of materials that are subject to liquefaction or other secondary seismic hazards in the event of ground shaking. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be address in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. Several of the project shaft sites (specifically Southwest Marine, LAXT, and TraPac) are within liquefaction zones (City of Los Angeles Navigate LA 2009). The JWPCP East and JWPCP West shaft sites are not located in a liquefaction zone, but are located next to one (City of Los Angeles Navigate LA 2009). The tunnel alignments may also extend through liquefaction zones. Therefore, construction and operational impacts of all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

GEO-5. Overall Determination: Potentially Significant Impact. Construction of several project elements could substantially accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition, which would not be contained or controlled on site. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore and Offshore. Construction and operation of the tunnels would occur in the subsurface and thus would not expose soils to wind or water erosion. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Construction at the shafts would involve the removal of large amounts of soil to excavate the shaft sites. During construction at any shaft site, earth-moving operations could increase short-term wind and water erosion at the sites. The storage and movement of soil greatly affects the amount of erosion that occurs. If soil is improperly stored or transported, wind and water can erode soil. See HYD-1, HYD-5, and HYD-7 (Program and Project) for more information on the stormwater pollution prevention plan (SWPPP), which controls water erosion. However, construction impacts would be considered potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the shaft sites would consist of a belowground access structure and potentially limited aboveground facilities, such as pumps and pipes. The shaft sites would essentially be returned to their existing conditions. Most of the shaft site locations are fully developed with asphalt or pavement or have

disturbed soil conditions with ruderal characteristics. Therefore, operation at any shaft site would not result in the substantial acceleration of wind and water erosion. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. The construction and operation of the riser and diffuser on the SP Shelf or the PV Shelf and rehabilitation of the existing ocean outfalls would be located under or on the ocean floor. Because of their location in the ocean, construction and operation of these project elements would not substantially accelerate the process of wind and water erosion. Therefore, no impacts would occur under the construction and operation of the riser and diffuser or the rehabilitation of the existing ocean outfalls and will not be addressed in the EIR/EIS at the project level. For a discussion of marine sediment characteristics and impacts on marine sediment, refer to MAR-2 (Project).

GEO-6. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements could result in unstable earth conditions or changes in geologic substructure. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. Construction and operation of the project elements includes extensive subsurface construction. Therefore, construction and operational impacts of all project elements could result in unstable earth conditions or changes to the geologic substructure. Impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

GEO-7. Overall Determination: Potentially Significant Impact. Construction and operation of several project elements have the potential to be located in soil characterized by shrink-swell potential that might result in damage to structures. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

Tunnel Alignments – Onshore and Offshore. Shrink-swell is that quality of the soil that determines its volume change with change in moisture content. Shrink-swell in soils is measured by the volume change resulting from the shrinking soil when it dries and by the expanding soil as it takes up moisture (Jones & Stokes 1994). The volume change behavior of soils is influenced by the amount of moisture change, the amount of clay in the soil, and the type of mineral (e.g., montmorillinite) in the clay. In general, the soil with the highest clay content shrinks and swells the most, although the type of clay is an important

contributing factor (Jones & Stokes 1994). Damage to buildings, such as cracking of foundations, could result from differential movements and several alternating periods of shrink and swell. Regionally, three soil associations (Cropley, Ramona-Placentia, and Diablo-Altamont) have soils that are considered highly expansive.

The onshore and offshore tunnels would generally extend through the following geologic formations:

- Pleistocene (Lakewood Formation, San Pedro Sand, and Timms Point Silt) sediment deposits of unconsolidated sand and silt (Parsons 2011)
- Miocene (Monterey Formation) marine sedimentary rock deposits of mudstone, shale, and fine-grained rock extensively folded and faulted with the offshore Palos Verdes Anticlinorium (Parsons 2011)
- Miocene (Monterey Formation) marine sedimentary rock deposits of mudstone, shale, and fine-grained rock (Parsons 2011)

These formations are generally not known for their high clay content. Therefore, the probability for shrink-swell potential is considered low. Furthermore, the onshore and offshore tunnels would be designed to withstand movement of soil and the subsurface. Therefore, construction and operational impacts associated with the onshore and offshore tunnels would be less than significant and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites, All Riser/Diffuser Areas. Soil characteristics at the shaft sites and offshore riser and diffuser could shrink and swell. Therefore, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

GEO-8. Overall Determination: Potentially Significant Impact. Construction at the Angels Gate and Royal Palms shaft sites and at the riser and diffuser areas could modify one or more distinct and prominent geologic or topographic feature. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Onshore and Offshore. There are no hilltops, ridges, canyons, rock outcrops, streambeds, or wetlands located in the subsurface. Therefore, construction and operation of the onshore and offshore tunnels could not have an impact on any distinct or prominent geologic or topographic features. This issue will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East, JWPCP West, TraPac, LAXT, and Southwest Marine. There are no distinct or prominent geologic or topographic features located at the JWPCP East, JWPCP West, TraPac, LAXT, and Southwest Marine shaft sites. These sites are located within urban areas on existing developed locations. Therefore, construction and operation at these shaft sites would result in no impacts and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – Angels Gate and Royal Palms; All Riser/Diffuser Areas. The Angels Gate shaft location would be constructed on an area with steep hillsides along coastal bluffs. The Royal Palms shaft site would also be constructed in a coastal bluff area. The riser and diffuser areas would be constructed in areas of the PV Shelf and SP Shelf that are previously undisturbed. Therefore, construction impacts on these project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Once operational, the shaft would consist of a belowground access structure and the riser and diffuser would be located underground or below the ocean floor and would transport treated effluent from the JWPCP for discharge to the Pacific Ocean. Therefore, operation of these project elements would not destroy or materially and adversely modify an existing geologic or topographic feature. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

GEO-9. Overall Determination: No Impact. Construction and operation of all project elements would not result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state. Therefore, no impacts would occur and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore; All Shaft Sites. The Wilmington Oil Field is the largest oil field in California (Crowder and Olson 1978). It is located about 20 miles south of downtown Los Angeles and encompasses all of the Long Beach Harbor and most of the Los Angeles Harbor (Crowder and Olson 1978). The oil field is located in some middle Miocene and early Pliocene sediments (Parsons 2011). The oil field has eight separate producing zones with a range of depths. Generally, the oil-producing zones are found well below 1,000 feet bgs, at depths between 2,500 and 4,000 feet bgs (Crowder and Olson 1978).

Construction at the shaft sites and onshore tunneling would be located above the existing Wilmington oil-producing field sediments. The shaft sites would generally extend from the ground surface to depths between 50 and 245 feet bgs. The onshore tunnels would be located at depths between 70 and 450 feet bgs. Therefore, the shaft sites and the onshore tunnel would be located above the oil-producing sediments. Because the depths of the shaft site and tunnels would be relatively shallow compared to the location of the oil-producing sediment of the Wilmington Oil Field, the shaft sites and tunnel would not have an impact on the oil field. For a discussion of abandoned and producing oil wells within or adjacent to the project element locations, see UTL-5 and UTL-3 (Project). Furthermore, the construction and operation of the onshore tunnels and shafts would not preclude the exploration or access to subsurface mineral resources. The Wilmington Oil Field could still be accessed and explored for extraction purposes even with the construction and operation of the onshore tunnels and shafts. Therefore, construction and operation of the project elements would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Tunnel Alignments – Offshore; All Riser/Diffuser Areas. The offshore tunnel alignments would be located below the seafloor and the riser and diffuser locations would be located offshore on either the SP Shelf or PV Shelf. Therefore, the offshore tunnel alignments and riser and diffuser locations would

not be located within proximity of the Wilmington Oil Field and would not have an impact on this known mineral resource. Furthermore, the construction and operation of the offshore tunnel and riser and diffuser would not preclude the exploration or access to subsurface mineral resources. Any undiscovered mineral resource off the coast of California could still be accessed and explored for extraction purposes even with the construction and operation of these project elements. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

GEO-10. Overall Determination: No Impact. Construction and operation of all the project elements would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore; All Shaft Sites. See GEO-9 (Project) regarding the Wilmington Oil Field. The City of Los Angeles General Plan does not identify any locally important mineral resources in either the communities of San Pedro or Wilmington or the Port of Los Angeles (City of Los Angeles 1999b; City of Los Angeles 1990; City of Los Angeles 1999c; and City of Los Angeles 1992). The city of Carson does not identify any additional locally important mineral resource other than the Wilmington Oil Field (City of Carson 2004). Therefore, the project elements would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Tunnel Alignments – Offshore; All Riser/Diffuser Areas. See GEO-9 (Project). There are no known locally important mineral resource recovery sites delineated on a local general plan, specific plan, or other land use plan for areas located below the seafloor or on the SP Shelf and PV Shelf. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Greenhouse Gas Emissions Checklist

		Program			Project		
VII.	**GREENHOUSE GAS EMISSIONS.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
GHG-1.	Generate greenhouse gas emissions, either directly or indirectly, above 10,000 metric tons of CO_2e per year, where emissions include direct, indirect, and, to the extend information is available, life cycle emissions during construction and operation?	☒	☐	☐	☒	☐	☐
GHG-2.	Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing greenhouse gas emissions?	☒	☐	☐	☒	☐	☐

Greenhouse Gas Emissions Program Discussion

GHG-1 and GHG-2. Overall Determination: Potentially Significant Impact. All program elements, except conveyance system and WRP effluent management, would produce emissions during construction and operation that could exceed thresholds. Therefore, impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

All Program Elements (except Conveyance System and WRP Effluent Management). Construction of plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; and solids processing facilities at the JWPCP could generate greenhouse gas emissions either directly or indirectly that may have a significant impact on the environment as discussed in AQ-1 (Program) through AQ-6 (Program). Therefore, the impacts of construction of all program elements, except conveyance system and WRP effluent management, would be potentially significant and will be addressed in the EIR/EIS at the program level.

Operation of plant expansion, process optimization, solids processing, and biosolids management could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. Operation of the conveyance improvements is unlikely to emit greenhouse gas emissions that could exceed thresholds because it transports wastewater in sewer lines. However, the greenhouse gas analysis will evaluate operational activities of all program elements (except WRP effluent management as discussed below) for all thresholds in the EIR/EIS at a program level.

Conveyance System. Conveyance system improvements could occur at any point between 2018 and the planning horizon of 2050 and would occur on an as-needed basis. Therefore, activities associated with the conveyance system are considered to be too speculative to determine where and when those improvements would occur. These improvements would be subject to project-level review prior to construction. Therefore, impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level. The conveyance system currently does not contribute to GHG emissions under operating conditions and would not contribute to GHG emissions once improvements became operational because the conveyance system generally utilizes gravity flow. Therefore, operational impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

WRP (Effluent Management). During operations, there may be an increase or decrease in treated effluent discharged into the receiving waters at each WRP under effluent management. The effluent would be discharged through existing discharge points and pipes. Therefore, WRP effluent management would not result in construction or operation greenhouse gas emissions, and impacts would not occur under any of the thresholds. This issue will not be addressed in the EIR/EIS at the program level.

Greenhouse Gas Emissions Project Discussion

GHG-1 and GHG-2. Overall Determination: Potentially Significant Impact. All project elements would produce emissions during construction and operation that could exceed thresholds. Therefore, impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. Construction of all project elements could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment as discussed in AQ-1 (Project) through AQ-6 (Project). Construction impacts from the project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Operation of the project would likely not generate greenhouse gas emissions because it would generally consist of passive water flow; however, all project elements will be addressed in the EIR/EIS at the project level.

Hazards and Hazardous Materials Checklist

VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the program/project:	Program			Project		
	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
HAZ-1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☒	☐	☐
HAZ-2. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?	☐	☒	☐	☒	☐	☐
HAZ-3. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☒	☐	☐
HAZ-4. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?	☐	☒	☐	☒	☐	☐
HAZ-5. Result in a substantial spill, release, or explosion of hazardous material(s) due to a terrorist action?	☒	☐	☐	☐	☒	☐

VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the program/project:	Program			Project		
	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
HAZ-6. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☒	☐	☐	☐	☒

Hazardous materials are generally the raw materials for product or process that may be classified as toxic, flammable, corrosive, or reactive. Department of Transportation (DOT) Hazardous Materials Regulations cover all aspects of hazardous materials packaging, handling, and transportation (49 CFR Parts 100–185). The California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control is authorized by the EPA to enforce and implement federal hazardous materials laws and regulations (California Health and Safety Code, Division 20, Chapter 6.5). Hazardous materials that may be stored, handled, or transported are classified by the following:

- Corrosive materials—solids, liquids, or gases that can damage living material or cause fire.
- Explosive materials—any compound that is classified by the National Fire Protection Association (NFPA) as an A, B, or C explosive.
- Oxidizing materials—any element or compound that yields oxygen or reacts when subjected to water, heat, or fire conditions.
- Toxic materials—gases, liquids, or solids that may create a hazard to life or health by ingestion, inhalation, or absorption through the skin.
- Unstable materials—those materials that react from heat, shock, friction, contamination, etc., and are capable of violent decomposition or autoreaction but are not designed primarily to be explosives.
- Radioactive materials—those materials that undergo spontaneous emission of radiation from decaying atomic nuclei.
- Water-reactive materials—those materials that react violently or dangerously upon exposure to water or moisture.

Soil and groundwater that becomes contaminated through the release or spill of hazardous materials can also be considered hazardous depending on the level of contamination and the regulatory thresholds for the particular hazardous material that is released.

Hazards and Hazardous Materials Program Discussion

HAZ-1. Overall Determination: Potentially Significant. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level. Operation of the SJCWRP expansion could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, operational impacts related to the SJCWRP expansion would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	X
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Hazardous materials could be present on site during the construction of the conveyance improvements, and these types of materials include diesel and lubricants. These materials would only be used periodically and temporarily during construction; therefore, they would not be routinely transported, used, or disposed. A discussion of hazardous materials that could be present on site during construction of the improvements to the conveyance system is included in HAZ-3 (Program).

Trenching and soil excavation would be required for the improvements to the conveyance system throughout the JOS service area. Currently, the Sanitation Districts regularly and frequently use standard practices to determine, handle, and dispose of any contaminated soil found during construction. Any contaminated soil found during the conveyance system upgrades would be subject to all of these regularly employed practices by the Sanitation Districts. Therefore, impacts associated with contaminated soil found during construction of the conveyance improvements would be less than significant and will not be addressed in the EIR/EIS at the program level.

Once operational, the conveyance system would generally transport sewage to the WRPs by gravity. The transport includes accepting wastewater from industrial facilities that treat and release industrial effluent into the Sanitation Districts' conveyance system. The industrial facilities located within the JOS service could use hazardous materials in their routine daily practices and processes. All hazardous materials disposed of within the conveyance system are highly regulated by the Clean Water Act as point source pollution. The discharge from the point sources into the conveyance system is regularly monitored and tested, and the results are reported to the Sanitation Districts to ensure industrial facilities are meeting their wastewater treatment requirements under the Clean Water Act and state regulations. The conveyance system could accept an increased volume of treated industrial effluent via the improvements. However, because industrial effluent is treated and highly regulated, the increase in volume would not result in an increase in hazardous materials within the effluent. Therefore, the operation of the conveyance system improvement would not involve any defined hazardous materials. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction of plant expansion at the SJCWRP and process optimization facilities at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in the routine transport, use, or disposal of hazardous materials. A discussion of hazardous materials that could be present during construction at the WRPs is included under HAZ-3 (Program). These materials include diesel and lubricants that would aid in construction activities. These materials would only be used periodically and temporarily during construction of the program elements; therefore, they would not be routinely transported, used, or disposed. As discussed for the conveyance system, the Sanitation Districts regularly use standard practices to determine, handle, and dispose of contaminated soil found during construction. None of the WRPs are sites included on a list of hazardous materials (see HAZ-2 [Program] for additional details). Therefore, it is unlikely contaminated soil would be discovered during excavation activities associated with the expansion or process optimization at the SJCWRP and the other WRPs. However, if contaminated soils are discovered, the Sanitation Districts would use their regularly employed practices to contain the contaminated soil or groundwater and to appropriately remove it. Therefore, construction would not create a significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials. Construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Chemicals are used at the WRPs to treat wastewater. Depending on the quantities of hazardous materials stored on site, either a business plan or a California Accidental Release Program (CalARP) Risk Management Plan (RMP) is submitted to the local agency with the delegated authority for that program. Furthermore, federal RMPs are required at two of the WRPs due the quantities of hazardous materials stored, handled, and used. Table 3-3 summarizes the hazardous material regulatory program applicable to each JOS treatment facility, including the associated primary hazardous chemicals triggering regulatory thresholds.

Table 3-3. Hazardous Materials Regulatory Program at the JOS Treatment Facilities

Treatment Facility	Chlorine (Gas)	Sodium Hypochlorite (Liquid)	Sulfur Dioxide (Gas)	Sodium Bisulphite (Liquid)	Aqueous Ammonia (Liquid)	Applicable Program	Delegated Authority
SJCWRP	X		X		X	CalARP RMP Federal RMP	Los Angeles Co. Fire Dept. EPA
POWRP		X		X	X	Business Plan	Los Angeles Co. Fire Dept.
LCWRP	X		X		X	CalARP RMP Federal RMP	Los Angeles Co. Fire Dept. EPA
LBWRP		X		X	X	CalARP RMP	City of Long Beach Fire Dept.
WNWRP		X		X	X	Business Plan	Los Angeles Co. Fire Dept.
JWPCP		X				Business Plan	Los Angeles Co. Fire Dept.

The operation of process optimization at all WRPs would not change the volume of hazardous materials stored. Therefore, impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Operation of the plant expansion at SJCWRP would increase the volume of chlorine used on site to disinfect wastewater effluent. Since the volume of chlorine would change at the SJCWRP, the RMP would likely need to be updated. There could be an increased hazard to the public or environment through the routine use of chlorine. Therefore, operational impacts of plant expansion at the SJCWRP would be potentially significant and will be addressed in the EIR/EIS at the program level.

Construction would not occur under WRP effluent management. Operation would simply consist of a change in the volume of tertiary treated effluent from existing discharge points into receiving waters. Therefore, operation of WRP effluent management would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials and will not be addressed in the EIR/EIS at the program level.

JWPCP. See HAZ-1 (Program) and HAZ-3 (Program) regarding the types of hazardous materials that could be used during construction of the solids processing facilities and standards regarding the containment and handling of contaminated soil or groundwater (if found) during construction. Construction of the solids processing digesters at the JWPCP would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

At the JWPCP, chemicals are currently used to treat the wastewater to appropriate levels. Specifically, the JWPCP handles and uses large amounts of chlorine in the form of sodium hypochlorite (bleach) to disinfect wastewater effluent before it is discharged into the Pacific Ocean. The plant has a hazardous materials inventory (HMI) statement and a consolidated contingency plan, as well as a business plan, to properly manage and control this hazardous material. However, since sodium hypochlorite is not used in solids processing or biosolids management, there would be no increase in the amount of it used at the JWPCP under solids processing or biosolids management. Since there would be no change to the existing setting under operating conditions, impacts would not occur.

Biosolids management would result in an increase in the amount of biosolids handled and transported at the JWPCP. The EPA regulates biosolids through 40 CFR Part 503. Biosolids are not considered a hazardous material. Therefore, the operation of solids processing facilities and biosolids management at the JWPCP would not create a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

HAZ-2. Overall Determination: Less Than Significant Impact. All program elements are not located on a site included on a list of hazardous materials sites compiled pursuant to Government Code Section 6596.2. Therefore, construction and operational impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The conveyance system would include improvements to approximately 33 miles of JOS trunk sewer lines. Construction of the improvements would generally result in excavation of soil within the public right-of-way of existing streets. It is unknown exactly where the construction of the conveyance improvements would occur and whether these locations might be a site on a list of hazardous materials sites. However, as discussed under HAZ-1 (Program), should any contaminated soil be found during construction, the Sanitation Districts would use standard practices to properly determine, handle, and dispose of the soil. Therefore, construction and operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. The program facilities are not identified in any of the California hazardous materials databases. A search of SJCWRP (1965 Workman Mill Road), LCWRP (16515 Piuma Avenue), LBWRP (7400 E. Willow Street), and POWRP (295 Humane Way) in the California EPA Cortese List as a Department of Toxic Substance and Control Hazardous Waste Site did not yield any results (CalEPA 2009a). Additionally, none of the aforementioned site addresses are listed in the EnviroStor database of hazardous substances release sites (CalEPA 2009b). Geotracker, the California database of leaking underground storage tanks (LUSTs), does not report any LUSTs at the program facility locations; however, within the vicinity of the SJCWRP and the LCWRP, two LUST cases were reported. These cases have since been completed and closed and would not present any hazardous issues to those WRP program areas (SWRCB 2009). Finally, there are no active cease and desist orders or clean up and abatement orders for hazardous materials/facilities within the program facility locations (CalEPA 2009c). Since the program facilities are not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, construction and operation at these facilities would not create a significant hazard to the public or the environment. Additionally, WRP effluent management would simply consist of a change in the volume of tertiary treated effluent from existing discharge points into receiving waters. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The JWPCP site, located at 212 W. Lomita Blvd, is included on the Cortese List; this will be further discussed in the HAZ-2 (Project) discussion because it is in an area related to the project (CalEPA 2009a) and not the program. See HAZ-1 (Program) for a discussion of the Sanitation Districts standard practices to determine, handle, and dispose of contaminated soil. These standard practices would be employed during the construction and soil excavation associated with the solids processing digesters.

Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. See HAZ-1 (Program) for a discussion of operational impacts associated with solids processing digesters and biosolids management. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

HAZ-3. Overall Determination: Potentially Significant. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level. Operation of the SJCWRP could result in a reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment through the increased use of chlorine to disinfect the wastewater effluent. Therefore, operation of the SJCWRP would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	X
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance improvements would involve the handling and use of some hazardous materials including fuel, lubricants, and diesel. Existing regulations, such as CCR Title 22 and Title 26, and the California Hazardous Waste Control Law, would govern proper containment, spill control, and disposal of hazardous waste generated during construction activities. Implementation of increased inventory accountability, spill prevention controls, and waste disposal controls associated with these regulations would limit both the frequency and severity of potential releases of hazardous materials. In addition, construction would comply with the Los Angeles County and cities of Pomona, Long Beach, and Cerritos fire codes, as well as other jurisdictions within the JOS service area, which regulate the construction of buildings, and local municipal public property code, which regulates the discharge of materials into the sanitary sewer and storm drain. The latter requires the construction of spill-containment structures to prevent the entry of forbidden materials, such as hazardous materials, into sanitary sewers and storm drains. Implementation of increased spill prevention controls, spill release notification requirements, and waste disposal controls associated with these regulations would limit the potential releases of hazardous materials.

Standard best management practices (BMPs) would also be used during construction activities to minimize runoff of contaminants, in compliance with the State General Permit for Stormwater Discharges Associated with Construction Activity (Water Quality Order 99-08-DWQ) and the project-specific SWPPP. Construction activities would be conducted using BMPs in accordance with city and county guidelines. Applicable BMPs include, but are not limited to, vehicle and equipment fueling and maintenance; material delivery, storage, and use; spill prevention and control; solid and hazardous waste management; and contaminated soil management. Program facility design and specifications would be reviewed by local fire departments for conformance to the municipal fire code as a standard practice. Implementation of increased spill prevention controls associated with these BMPs would limit the potential releases of hazardous materials.

Construction equipment that would be used to build the program facilities has the potential to release oils, greases, solvents, and other finishing materials through accidental spills. Spill or upset of these materials would have the potential to affect surrounding land uses. However, the consequences of construction-related spills are generally reduced in comparison to other accidental spills and releases. This is because the amount of hazardous material released during a construction-related spill is small, as the volume in any single piece of construction equipment is generally less than 50 gallons, and fuel trucks

are limited to 10,000 gallons or less. Construction-related spills of hazardous materials are not uncommon, but the enforcement of construction and demolition standards, including BMPs by appropriate local and state agencies (i.e., fire departments) would minimize the potential for an accidental release of petroleum products and/or hazardous materials during construction. Federal, state, and local controls have been enacted, and are enforced, to reduce the effects of potential hazardous materials spills during construction of program facilities.

Construction of the conveyance improvements would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

See HAZ-1 (Program) for a discussion of operational impacts associated with the conveyance system. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. See HAZ-1 (Program) and HAZ-3 (Program) for a discussion of hazardous materials and the potential for spills to occur during construction. The Sanitation Districts have standard practices associated with determining, handling, and disposing of contaminated soil or groundwater. Therefore, construction impacts associated with the SJCWRP expansion and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level.

Operational impacts associated with the increased volume of chlorine used at the SJCWRP could create a significant hazard to the public through a reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment. Therefore, operational impacts associated with the expansion of the SJCWRP would be potentially significant and will be addressed in the EIR/EIS at the program level. All other WRPs would not experience an increase in the volume of existing hazardous materials currently used on site and, therefore, operational impacts would not occur at the POWRP, LCWRP, or LBWRP and will not be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management would simply consist of a change in the volume of tertiary treated effluent from existing discharge points into receiving waters. Therefore, WRP effluent management would not result in operational impacts and will not be addressed in the EIR/EIS at the program level.

JWPCP. See HAZ-1 (Program) and HAZ-3 (Program) for a discussion of hazardous materials and the potential for spills to occur during construction. The Sanitation Districts have standard practices associated with determining, handling, and disposing of contaminated soil and groundwater. Therefore, construction impacts associated with solids processing at the JWPCP would be less than significant and will not be addressed in the EIR/EIS at the program level.

See HAZ-1 (Program) for a discussion of operational impacts associated with solids processing digesters and biosolids management. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

HAZ-4. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not emit hazardous emissions or involve handling hazardous or acutely hazardous materials within 0.25 mile of an existing or proposed school. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance improvements would occur within the public rights-of-way of existing streets. It is unknown where the construction could take place within the JOS service area; therefore, construction could take place within 0.25 mile of an existing or proposed school. However, construction of the conveyance improvements would result in the temporary, limited, and periodic handling of hazardous materials typically used in construction, such as diesel or lubricants. See HAZ-1 and HAZ-3 (Program) for a discussion of these materials and the potential for accidental spills. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. See HAZ-1 (Program) for a discussion of operational impacts associated with the improvements to the conveyance system. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. The SJCWRP, POWRP, LCWRP, and LBWRP are not located within 0.25 mile of a school (USGS Geographic Names Information Systems 2009). Therefore, construction and operation of plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, LBWRP; and the operation of WRP effluent management would not emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials, substances, or wastes within 0.25 mile of a school. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Wilmington Junior High is located approximately 0.2 mile southeast of the southeast corner of the JWPCP at the intersection of East Lomita Boulevard and North Wilmington Boulevard (USGS Geographic Names Information Systems 2009). However, the increase in biosolids production and the new solids processing digesters would be located on the western side of the JWPCP, which is more than 0.25 mile from the school. Furthermore, construction of the solids processing digesters would result in the temporary, limited, and periodic handling of hazardous materials typically used in construction, such as diesel or lubricants. See HAZ-1 and HAZ-3 (Program) for a discussion of these materials and the potential for spills during construction. Finally, the current operation of the biosolids management and solids processing do not emit hazardous substances because hazardous substances are not required for the operation of these program elements. All emissions from the biosolids production, handling, and transport are controlled through the odor control mechanisms incorporated into the existing infrastructure of the JWPCP and odors are not considered hazardous emissions. Therefore, construction and operation at the JWPCP would not emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

HAZ-5. Overall Determination: Potentially Significant Impact. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level. Operation of the SJCWRP plant expansion could result in a substantial spill or release of chlorine as a result of a terrorist action. Therefore, operational impacts associated with the SJCWRP plant expansion would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	X
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction activities associated with improvements to the conveyance system would involve the handling and use of some volume of hazardous materials including vehicle fuels and other flammable chemicals. The potential consequence of a terrorist action on such activities would mainly concern relatively small potential targets such as construction vehicles and program facilities undergoing construction. Fuel volume in any single piece of construction equipment is generally less than 50 gallons and fuel trucks are limited to 10,000 gallons or less. The enforcement of construction and demolition standards, including BMPs by appropriate local and state agencies (i.e., fire departments) as identified in HAZ-3 (Program), would minimize the potential for a spill, release, or explosion of hazardous materials due to a terrorist action. Furthermore, the enforcement of these standards would reduce the impact should a spill, release, or explosion of hazardous material occur due to a terrorist action. Therefore, construction of the conveyance improvements would not result in a substantial spill, release, or explosion of hazardous material(s) due to a terrorist action. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. Once the conveyance system improvements are operational, they would be located underground and would not use or otherwise transport hazardous materials. Therefore, operational impacts of the conveyance system would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. See HAZ-5 (Program) for a discussion of potential releases due to a terrorist action during construction as it is relevant to construction at each of the WRPs. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level.

As discussed in HAZ-1 and HAZ-3 (Program), the expansion of the SJCWRP would result in an increased use or volume of chlorine under operating conditions. This increase in volume could result in an accidental spill or release due to a terrorist action under operating conditions. Therefore, operational impacts associated with plant expansion at the SJCWRP would be potentially significant and will be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management would simply consist of a change in the volume of tertiary treated effluent from existing discharge points into receiving waters. Therefore, WRP effluent management would not result in operational impacts and will not be addressed in the EIR/EIS at the program level.

JWPCP. See HAZ-5 (Program) for details regarding the potential for hazardous materials releases due to a terrorist action during construction as it is relevant to the construction of the solids processing digesters at the JWPCP. See HAZ-1 (Program) for details regarding operation of the solids processing digesters and biosolids management. A substantial spill, release, or explosion of hazardous materials would not

result during construction or operation due to a terrorist action. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

HAZ-6. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not result in exposing people or structures to wildland fires due to the fact that program elements are not located in areas designated as having high wildfire potential. Therefore, construction and operational impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance improvements would generally occur within the rights-of-way of existing streets in urban neighborhoods. Typically, the rights-of-way of existing streets are not identified as wildfire areas. Furthermore, the conveyance system is below ground and would not be damaged in a wildfire. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. The SJCWRP, POWRP, LCWRP, and LBWRP are generally not located in areas that would be subject to wildfires. The SJCWRP and LCWRP are located in developed, urbanized areas that would not be subject to wildfires. The LBWRP and POWRP are adjacent to open space areas. The LBWRP is adjacent to El Dorado Park and El Dorado Municipal Golf Course in Long Beach. El Dorado Park/Municipal Golf Course is a managed park and golf course that is regularly maintained to remove potential fuel sources and is watered on a regular basis. Construction and operation of process optimization at LBWRP would not result in a wildfire hazard. The POWRP is adjacent to Elephant Hill, which is designated as open space and is not regularly maintained. However, it is completely surrounded by development and roadways such as West Mission Boulevard, which likely would act as a fire break from any fire moving from the south. Construction and operation of process optimization at POWRP would not result in a wildfire hazard. However, this issue is carried forward to the EIR/EIS as it relates to impacts from mudflow under Impact HYD-11 in Chapter 11.

The WNWRP is located in the Whittier Narrows Recreational Area. The recreational area is a maintained recreation and park area by the County of Los Angeles and also acts as an area of flood control through the use of the Whittier Narrows Dam. No construction would occur as a result of the program at WNWRP and the operation of WRP effluent management inherently cannot be threatened by wildfires or result in the exposure of people or structures to wildfire because it is a change in volume of treated effluent discharged into receiving waters.

Therefore, construction and operation of the program elements at the WRPs would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at a program level.

JWPCP. The JWPCP is located in a fully developed urban area surrounded by pavement and concrete. It is not adjacent to any wildland areas or open space. Therefore, construction and operation of solids processing facilities and operation of biosolids management would not be affected by wildfires. Biosolids management at land application sites or other beneficial use locations would occur at existing sites located in agricultural or industrial and commercial areas with a low potential for wildfires to occur.

Therefore, these program elements would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Impacts would be less than significant and will not be addressed in the EIR/EIS at a program level.

Hazards and Hazardous Materials Project Discussion

HAZ-1. Overall Determination: Potentially Significant Impact. Construction of several project elements could create a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

All impacts associated with the riser and diffuser and hazards (e.g., the DDT/PCB study area) are discussed in the Marine Environment Section.

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. A discussion of hazardous materials that could be present on site during construction of the tunnel alignments and at the shaft sites is included in HAZ-3 (Project). These materials include diesel and lubricants that would aid in the construction of the tunnels and at the shaft sites. These materials would only be used periodically and temporarily during construction of the project elements; therefore, they would not be routinely transported, used, or disposed.

Construction of the tunnel and at the shaft sites would likely dispose of hazardous materials in the form of contaminated soil. Construction of the project elements would involve constructing shaft sites and excavating large amounts of soil in areas with past and present industrial uses; therefore, it is likely large quantities of the soil excavated in these areas may be contaminated. Currently, the Sanitation Districts regularly and frequently use standard practices to determine, handle, and dispose of any contaminated soil found during construction. The soils would be excavated, tested on site to determine their hazardous nature, and then transported off site to an appropriate hazardous material disposal facility, if they are deemed hazardous. Furthermore, the tunnel boring machine (TBM) may use a bentonite slurry method to drill the tunnel. Generally, bentonite slurry would not be considered hazardous waste because it does not meet any of the Resource Conservation and Recovery Act (RCRA) hazardous waste characteristics. However, if the slurry were to come into contact with contaminated soils or groundwater, the slurry may become hazardous depending on the nature of contamination encountered. It is unlikely that spent/waste bentonite slurry can be disposed of at a typical Class III municipal landfill. The spent slurry would likely have to be dried, profiled, and sent to a special landfill licensed to receive such wastes. Since the volume of contaminated soils could be large and the bentonite slurry method could become hazardous, the construction of these project elements would involve the transport or disposal of hazardous materials, which could result in a hazard to the public or environment. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

The operation of these project elements would not involve the routine handling, transport, or disposal of hazardous materials. Operation of the project elements would involve the transport of secondary treated effluent from the JWPCP to the Pacific Ocean for discharge. The secondary treated effluent is not considered a hazardous material. Therefore, operation of the project elements would not handle,

transport, or dispose of a hazardous material and operational impacts will not be addressed in the EIR/EIS at the project level.

HAZ-2. Overall Determination: Potentially Significant Impact. The JWPCP East shaft site is located on a list of hazardous materials sites. Therefore, construction impacts related to the JWPCP East shaft site would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore and Offshore. The onshore and offshore tunnels would be constructed below ground surface and below the seafloor. Currently, the alignments at the proposed depths are not listed on any database of hazardous materials sites. The construction of the onshore and offshore tunnels would not act as a preferential pathway for the migration of groundwater contamination to an uncontaminated area if it were to encounter groundwater contamination. The tunneling process typically precludes this migration as the space between the tunnel liner and surrounding earth from tunnel over excavation is grouted. Once the onshore and offshore tunnels are complete, the tunnel would remain in the subsurface and would not transport hazardous materials. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Site – JWPCP East. A search of hazardous materials databases was conducted for the shaft sites. Table 3-4 identifies that the JWPCP East site is located on a list compiled pursuant to Government Code Section 65962.5.

Table 3-4. Hazardous Listings for the JWPCP and JWPCP East Sites

Project Location	GeoTracker (LUST sites)	Cortese List Department of Toxic Substance and Control Hazardous Waste Site	EnviroStor	Superfund	Cortese CDO, CAO	Existing Conditions Known
JWPCP and JWPCP East	Not listed	Not listed	Not listed	Not listed	Received a CDO in 1988 and a CAO in 2006	Located on former FORCO site with existing groundwater remediation occurring.

LUST = leaking underground storage tank
CDO = cease and desist order
CAO = cease and abate order
Source: CalEPA 2009a, CalEPA 2009b, CalEPA 2009c, SWRCB 2009.

The JWPCP has been identified on the Cortese Cease and Desist Order (CDO) and Cease and Abate Order (CAO) lists; the CDO occurred in 1988 and the CAO occurred in 2006 (CalEPA 2009c). It is more than likely that these incidences have since been addressed and no longer present any hazardous issues to the area. Furthermore, although it was not identified on any of the database searches, the JWPCP East shaft site is located on the Fletcher Oil and Refining Company (FORCO) site that has at least three

existing oil wells. The JWPCP is currently under remediation for the removal of volatile organic compounds and petroleum products that are affecting the groundwater and soil (Parsons 2011).

Therefore, construction at the JWPCP East would occur at locations identified by hazardous materials lists and as a result may potentially create a significant hazard to the public or the environment. Construction impacts would be potentially significant related to the JWPCP East shaft sites and will be addressed in the EIR/EIS at the project level.

Once operational, the JWPCP East shaft site would consist of a belowground access structure and aboveground facilities that may include a pumping plant and surge tower. The operation of the project would convey secondary treated effluent from the JWPCP to the Pacific Ocean for discharge. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP West, LAXT, TraPac, Southwest Marine, Angels Gate, and Royal Palms. The JWPCP West, LAXT, TraPac, Southwest Marine, Angels Gate, and Royal Palms shaft sites are not located on a list of hazardous materials as summarized in Table 3-5. Several of these shaft sites are located in industrial areas (TraPac and LAXT), but the project sites have not been specifically identified on a hazardous materials list.

Table 3-5. Hazardous Listings for the JWPCP West, TraPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms Shaft Sites

Shaft Site	GeoTracker (LUST sites)	Cortese List Department of Toxic Substance and Control Hazardous Waste Site	EnviroStor	Superfund	Cortese CDO, CAO
JWPCP West	Not listed	Not listed	Not listed	Not listed	Not Listed
TraPac	Not listed	Not listed	Not listed	Not listed	Not listed
LAXT	LUST site; case is closed	Not listed	Not listed	Not listed	Not listed
Southwest Marine	Not listed, but there are two LUST sites located 1000 feet north of Southwest Marine; both cases are closed	Not listed, but an active state response site is located north of the Southwest Marine shaft site	Not listed	Not listed	Not listed
Angels Gate	Within vicinity of LUST site; case is currently open; but it is not located on site.	Not listed	Not listed	Not listed	Not listed
Royal Palms	Not listed	Not listed	Not listed	Not listed	Not listed

LUST = leaking underground storage tank
CDO = cease and desist order
CAO = cease and abate order
Source: CalEPA 2009a, CalEPA 2009b, CalEPA 2009c, SWRCB 2009.

As shown in Table 3-5, the Southwest Marine shaft site was listed as being within the vicinity of LUST sites and one state response site. The two LUST sites located near the Southwest Marine shaft site are approximately 1000 feet north of the main project site. These two closed LUST sites are the locations of the Southwest Marine Shipyard and the Pan Pacific Fisheries; furthermore, these two sites are not located on the Southwest Marine shaft site and, therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level. Berth 240, located just north of the Southwest Marine shaft site, has been listed on the Cortese List as a Department of Toxic Substance and Control Hazardous Waste site. The status of this listing is currently active. Berth 240 was used for ship

building and ship repair. Hazardous materials located at this site include polychlorinated biphenyls (PCBs), antimony, arsenic, chromium, copper, lead, mercury, zinc, other metals, and petroleum hydrocarbons (CalEPA 2009a). As required by CalEPA's Brownfields Memorandum of Agreement, the Los Angeles Harbor Department is in the process of submitting a request of oversight to the Department of Toxic Substances Control and the regional water quality control board (RWQCB). However, because this site is not located on the Southwest Marine shaft site, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level [indirect impacts associated with possibly contaminated soil and water are discussed in HAZ-1 (Project)]. The Terminal Island Water Reclamation Plant, located in proximity to the LAXT shaft site, did have a LUST on site; however, this case is closed and would not present any significant impact on the project element (SWRCB 2009). A separate hazardous materials database search of the LAXT shaft site location was conducted in February 2007 (Parsons 2011). None of the databases searched reported a listing within the LAXT area. Because none of the sites are located at the LAXT shaft site, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HAZ-3. Overall Determination: Potentially Significant Impact. Construction of several project elements could create a significant hazard to the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

All impacts associated with the riser and diffuser and hazards (e.g., the DDT/PCB study area) will be discussed in the Marine Environment Section.

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. Construction activities for the project elements would involve the handling and use of some volume of hazardous materials including vehicle fuels and other flammable chemicals. Fuel volume in any single piece of construction equipment is generally less than 50 gallons and fuel trucks are limited to 10,000 gallons or less. The enforcement of construction and demolition standards, including BMPs by appropriate local and state agencies (i.e., fire departments) as identified in HAZ-3 (Program), would minimize the potential for a spill, release, or explosion of hazardous materials. Furthermore, the enforcement of these standards would reduce the impact should a spill, release, or explosion of hazardous material occur.

However, construction of the project elements may involve the handling and transportation of large quantities of hazardous soils and bentonite slurry, as discussed in HAZ-1 (Project). Furthermore, construction would also involve drilling and tunneling in a known oil field (Wilmington Oil Field) with existing and abandoned oil wells and natural gas pockets. Therefore, construction of the project elements could create a significant hazard to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

As discussed HAZ-1 (Project), the operation of the project elements would not involve handling, transport, or disposal of hazardous materials. Therefore, the operation of the project elements would not

create a significant hazard to the public through a reasonably foreseeable upset or release of hazardous materials. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HAZ-4. Overall Determination: Potentially Significant Impact. Only one shaft site (JWPCP East) is located within 0.25 mile of an existing school. Therefore, construction impacts related to the JWPCP shaft site would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Onshore Tunnel Alignments. The onshore tunnel alignments may be located within 0.25 mile of a school depending on the vertical distance from the ground to the top of the tunnel. However, any hazardous or contaminated materials generated or used during tunneling would be contained within the tunnel and removed at the shaft site locations. Therefore, potential impacts related to hazardous or contaminated materials would occur at the shaft sites and are discussed below. Impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Offshore Tunnel Alignments and All Riser/Diffuser Areas. These project elements would be located under or on the seafloor. No schools exist in these locations; therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP West, TraPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms. JWPCP West, TraPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms shaft sites are not located within 0.25 mile of a school. Construction and operation of these project elements would not emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials, substances, or wastes within 0.25 mile of a school. Impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Site – JWPCP East. The only project element within 0.25 mile of a school is the JWPCP East shaft site. As discussed in HAZ-1 (Project), the shaft site could have hazardous soils and may use a bentonite slurry mixture that would have to be separated on site and transported off site. Construction at the JWPCP East shaft site could result in handling and transporting hazardous materials within 0.25 mile of an existing school. Therefore, construction impacts at the JWPCP East shaft site would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the JWPCP East shaft site would consist of a belowground access structure with aboveground facilities that may include a pumping plant and a surge tower. The operation of the project would convey secondary treated effluent from the JWPCP to the Pacific Ocean for discharge. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HAZ-5. Overall Determination: Less Than Significant Impact. Construction and operation of the project elements would not result in a substantial spill, release, or explosion of hazardous materials due to a terrorist action. Therefore, construction and operational impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore and Offshore; All Riser/Diffuser Areas. An act of terrorism could initiate events described in this section such as hazardous materials release and/or explosion. Terrorism risk can be generally defined by the combined factors of threat, vulnerability, and consequence. In this context, terrorism risk represents the expected consequences of terrorist actions (i.e., spill, release, or explosion of hazardous materials) taking into account the likelihood that these actions will be attempted, and the likelihood that they will be successful. Of the three combined factors, the threat of a terrorist action cannot be directly affected by construction activities of the project elements because it is unknown whether actions will be attempted by terrorists. The vulnerability of the construction sites can be reduced by implementing security measures. The expected consequences of a terrorist action can also be affected by certain measures, such as emergency response preparations and action plans in the event of a spill, release, or explosion of hazardous materials.

Hazardous materials could be used during construction of the onshore and offshore tunnel and the riser and diffuser. The vulnerability of these hazardous materials to terrorist actions would be reduced through security measures required at the shaft sites and riser/diffuser areas. Access to the tunnels and riser would be highly restricted and controlled using regularly practiced tunneling construction security measures at the shaft sites. (See the discussion that follows for the specific security measures employed at the shaft sites.) The expected consequences of a terrorist action would be reduced through the implementation of the various jurisdictions emergency response plans (see Public Services Section XIV and Chapter 16 in the EIR/EIS) and through required construction and emergency response plans in the tunnel and at the riser and diffuser area (see Public Services Section XIV and Chapter 16 in the EIR/EIS). Therefore, construction of the onshore and offshore tunnels and the riser and diffuser would not result in a substantial release, spill, or explosion of hazardous materials due to a terrorist action. Construction impacts would not occur and will not be addressed in the EIR/EIS at the project level.

As discussed in HAZ-1 (Project), hazardous materials would not be handled, transported, or disposed of during project operation. Therefore, there would be no hazardous materials to upset and be released or spilled in the event of a terrorist action. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. See HAZ-5 (Project) for a discussion of terrorism risk and results of terrorist actions. Access to the tunnels and riser, as well as the shaft sites, would be highly restricted and controlled using regularly practiced tunneling construction security measures at the shaft sites. Specifically, a "tag-in-tag-out" security system is employed at all times, so the names and number of personnel in the tunnel are known. Therefore, no unauthorized personnel would be allowed to access the tunnels. These highly restrictive security measures would significantly reduce the vulnerability to a terrorist action by

preventing unauthorized access from the shaft sites to the tunnels and riser. Security and appropriate construction worker identification would be required and enforced at the construction site due to the inherent dangerous working conditions at the construction sites. This security and identification would significantly reduce the vulnerability of the construction sites to a terrorist action.

Construction and demolition activities for the project elements would involve the handling and use of certain amounts of hazardous materials, including vehicle fuels and other flammable chemicals as identified in HAZ-3 (Project). The potential consequence of a terrorist action on such activities would mainly concern relatively small potential targets such as construction vehicles and project elements undergoing construction. Fuel volume in any single piece of construction equipment is generally less than 50 gallons and fuel trucks are limited to 10,000 gallons or less. The enforcement of construction standards, including BMPs by appropriate local and state agencies (i.e., fire departments), would minimize the potential for a spill, release, or explosion of hazardous materials from construction equipment due to a terrorist action. Furthermore, the enforcement of these standards would reduce the impact should a spill, release, or explosion of hazardous material occur due to a terrorist action.

The types of hazardous materials (contaminated sediment and bentonite slurry) present at the shaft sites during construction are not highly flammable and would not result in an explosion. Furthermore, it is highly unlikely a terrorist action would release all of the contaminated sediment or bentonite slurry on site or being transported. Therefore, the amount released or spilled would be much less compared to the overall amount extracted. Any release or spill of these materials would be appropriately contained under normal containment and during cleanup actions after a hazardous materials release. Consequences associated with a terrorist attack during general construction would be low. Impacts related to the vulnerability of the project elements during construction, and consequences of having sensitive receptors on site during construction activities, would be low because the damage and general effect would be limited. Construction and operation of the project elements would not result in a substantial spill, release, or explosion of hazardous material(s) due to a terrorist action. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

As discussed in HAZ-1 (Project), hazardous materials would not be handled, transported, or disposed of during the operation at the shaft sites. Therefore, there would be no hazardous materials upset, released, or spilled in the event of a terrorist action. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HAZ-6. Overall Determination: No Impact. Construction and operation of the project elements would not expose people or structures to wildfires. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. The project elements are not located in areas that would be subject to wildfires. The shaft sites are all located in developed and urbanized areas and would not be subject to a wildfire. The tunnel alignments would be located below the subsurface and would not be subject to a wildfire. The

riser would be located below the ocean floor and the diffuser at the ocean floor, and thus, they would not be subject to wildfires. Therefore, construction and operation of the project elements would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Hydrology, Water Quality (Freshwater), and Public Health Checklist

		Program			Project		
IX.	**HYDROLOGY, WATER QUALITY (FRESHWATER), AND PUBLIC HEALTH.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
HYD -1.	Create pollution, contamination, or nuisance as defined in Section 13050 of the California Water Code (CWC) or cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body?	☒	☐	☐	☒	☐	☐
HYD -2.	Adversely change the level, rate, or direction of flow of groundwater?	☐	☒	☐	☒	☐	☐
HYD -3.	Result in an increased level of groundwater contamination or affect the fate and transport of existing groundwater contamination (including that from direct percolation, injection, or salt water intrusion)?	☒	☐	☐	☒	☐	☐
HYD -4.	Cause regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations (CCR), Title 22, Division 4, and Chapter 15 and in the Safe Drinking Water Act?	☒	☐	☐	☒	☐	☐

		Program			Project		
IX.	**HYDROLOGY, WATER QUALITY (FRESHWATER), AND PUBLIC HEALTH.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
HYD -5.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?	☒	☐	☐	☒	☐	☐
HYD -6.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site?	☐	☒	☐	☐	☒	☐
HYD -7.	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☒	☐	☐
HYD -8.	Result in demonstrable and sustained reduction of groundwater recharge capacity?	☐	☐	☒	☐	☐	☒
HYD -9.	Place housing or other structures within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary, Flood Insurance Rate Map, or other flood hazard delineation map, which would impede or redirect flood flows?	☐	☒	☐	☐	☒	☐

		Program			Project		
IX.	**HYDROLOGY, WATER QUALITY (FRESHWATER), AND PUBLIC HEALTH.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
HYD -10.	Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☒	☐	☐	☐	☒
HYD -11.	Be subject to inundation by seiche, tsunami, or mudflow?	☒	☐	☐	☒	☐	☐
HYD -12.	Substantially increase workers' or the public's actual or potential exposure to wastes or pathogens?	☐	☒	☐	☐	☐	☒

Hydrology, Water Quality (Freshwater), and Public Health Program Discussion

Impacts on the San Gabriel River Tidal Prism are addressed in the EIR/EIS at the program level.

HYD-1. Overall Determination: Potentially Significant Impact. Construction and operation of program elements could create pollution, contamination, or a nuisance as defined by Section 13050 of the California Water Code. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. As discussed in GEO-5 (Program), construction of the conveyance improvements would involve trenching, cut, and fill. During construction, earth-moving activities could increase short-term erosion at the sites, resulting in stormwater runoff or erosion. This runoff could result in a violation of water quality standards. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

The improvements to the conveyance system could result in accepting more flow from industrial facilities in the JOS service area as discussed in HAZ-1 (Program). However, the conveyance system transports all wastewater to the WRPs, where the wastewater is treated to appropriate levels. Furthermore, each industrial facility within the JOS service area must comply with the National Pollutant Discharge Elimination System (NPDES) requirements for discharges into the conveyance system. The Sanitation Districts regularly monitor and test discharge water from industrial facilities to ensure compliance with permitted amounts of discharged constituents. Therefore, operation of the conveyance improvements would not create pollution, contamination, or a nuisance, and operating the expansion and upgrades to the conveyance system would result in a less than significant impact and will not be addressed in the EIR/EIS at the program level.

WRPs. See HYD-1 (Program), Conveyance System, for a discussion of construction impacts, which would also apply to the construction of the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once operational, plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would result in no impacts. The majority of the process optimization facilities would be buried underground and the surface would be restored to previous existing conditions. The expansion of the SJCWRP would use existing treatment technologies to treat wastewater to a tertiary level and then release it using existing discharge points into existing receiving waters. The expansion would require an increase in the permitted capacity of the plant from 100 MGD to 125 MGD. The increase in permitted capacity would require the Sanitation Districts to apply for a new wastewater permit from the Los Angeles RWQCB. This permit would ensure that the wastewater treatment requirements for the SJCWRP are met. Therefore, operational impacts would be less than significant for expansion at SJCWRP and process optimization and will not be addressed in the EIR/EIS at the program level.

Under operating conditions, WRP effluent management could lead to a reduction in effluent released to receiving waters. This reduction could cause a change in the water quality of the receiving waters. Therefore, operational impacts on water quality associated with WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP would be potentially significant and will be addressed in the EIR/EIS at the program level. In addition, the San Gabriel River Tidal Prism has the potential to be impacted by WRP effluent management. WRP effluent management at the POWRP, WNWRP, and SJCWRP (discharge locations at the confluence of San Jose Creek and the San Gabriel River) would not have an impact on the San Gabriel River Tidal Prism because discharge locations are all located above the spreading grounds. The treated effluent discharged into the receiving waters above the spreading grounds stays primarily within the spreading grounds and infiltrates into the ground. However, WRPs with discharge locations below the spreading grounds would result in potentially significant impacts on the tidal prism, and the SJCWRP (for the discharge location downstream of the spreading grounds), LCWRP, and LBWRP will be addressed in the EIR/EIS at the program level.

JWPCP. See HYD-1 (Program), Conveyance System, for a discussion of construction impacts, which would also apply to the construction of the solids processing digesters. Construction-related impacts on water quality associated with solids processing would be potentially significant and will be addressed in the EIR/EIS at the program level. Once operational, the solids processing digesters would be completely self-contained and would process solids for appropriate disposal or beneficial use. Therefore, operation of the solids processing facilities would not create pollution, contamination, or a nuisance, and impacts would not occur. Operational impacts on water quality associated with solids processing will not be addressed in the EIR/EIS at the program level.

Operation of biosolids management would increase composting, land application, and activities at landfills within the JOS service area and areas outside the JOS service area. The EPA regulates biosolids through 40 CFR Part 503. The standards are applicable to land application, surface disposal, and incineration. For disposal in a municipal solid waste landfill, the biosolids must meet standards from 40 CFR Part 258. Biosolids generated at the JWPCP do meet EPA Class B pathogen reduction requirements provided in the EPA's Alternative 2, Use of Processes to Significantly Reduce Pathogens, through time and temperature requirements for anaerobic digestion. Vector attraction reduction requirements are met by reducing the mass of volatile solids during anaerobic digestion. JWPCP biosolids are sampled monthly and analyzed for total metals concentrations. Since the 1993 promulgation of the federal rules governing biosolids management, the JWPCP biosolids have consistently complied with the most stringent requirements related to metals concentrations. The land application and beneficial use locations are generally located in areas dominated by agriculture or industrial/commercial areas. The actual land application or beneficial use would occur on existing agricultural land or in existing beneficial use buildings. The Sanitation Districts would only use sites that are properly permitted and for which all site-specific impacts, including the potential to create water pollution, water contamination, or a nuisance, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, operation of biosolids management would result in impacts that are less than significant to water quality and will not be addressed in the EIR/EIS at the program level.

HYD-2. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not adversely change the level, rate, or direction of flow of groundwater. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction and operation of the conveyance improvements generally would not require the extraction of groundwater and, therefore, would not change the existing levels of groundwater within the JOS service area. Furthermore, it would not require a change in existing impervious surface areas (i.e., concrete roads) within the JOS service area and, therefore, would not change the rate of groundwater recharge in the service area. Finally, it would generally be located in areas with existing utilities and, therefore, would not substantially interfere with the downward flow of groundwater. Therefore, it would not adversely change the level, rate, or direction of flow of groundwater. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction and operation for plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not adversely change the level, rate, or direction of flow of groundwater. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

The operation of WRP effluent management involves changing rates of reuse and discharge from each WRP, which could alter groundwater level, rate, or direction of flow. However, the state has requirements that cap the amount of recycled water that can be recharged as groundwater (Central Basin Municipal Water District 2005), and these caps would not be exceeded under the program[1]. Therefore, impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction and operation of the solids processing digesters would occur within the existing footprint of the JWPCP. Construction and operation would occur above the groundwater table and thus would not require dewatering that could lead to flooding. Geologic testing conducted in 2010 encountered groundwater between 43 and 62 feet bgs (Sanitation Districts 2010). A previous investigation at the JWPCP did conclude, however, that zones of near saturation occur at 5 to 10 feet bgs (Geo Logic Associates 1995:14). Therefore, construction and operation of the solids processing digesters (approximately 30 feet bgs) would not adversely change the level, rate, or direction of flow of groundwater. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

See Hyd-1 (Program) for a discussion of biosolids management operations applicable to this threshold. The land application of biosolids or the beneficial use of biosolids in an existing facility would not adversely change the level, rate, or direction of flow of groundwater. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the program level.

[1] Groundwater recharge with recycled water is limited to 50,000 acre-feet per year or a maximum of 150,000 acre-feet over 3 years (Central Basin Urban Water Management Plan 2005).

HYD-3. Overall Determination: Potentially Significant Impact. Construction of all program elements and operation of WRP effluent management could result in an increased level of groundwater contamination or affect the fate and transport of existing groundwater contaminants. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Conveyance improvements could result in groundwater contamination due to release of contaminants such as fuels or lubricants during conveyance construction activities. Therefore, construction impacts on groundwater contamination associated with the conveyance system would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once operational, the conveyance system would be buried underground and would be self-contained. The entire system is regularly maintained and examined for leaks and structure failure. It would be highly unlikely for the conveyance system to leak such that it would release untreated wastewater into the subsurface and contaminate groundwater. Therefore, operation of the conveyance improvements would not have the ability to increase groundwater contamination or affect the fate and transport of existing groundwater contamination. Operational impacts of the conveyance system would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. Depths to groundwater at the WRPs range from 3 feet to 30 feet bgs. Construction associated with process optimization would include excavation to approximately 30 feet bgs, and groundwater has the potential to seep into the excavated areas at all sites. Construction of process optimization would contact groundwater, and could lead to groundwater contamination. Therefore, construction impacts associated with plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be potentially significant and will be addressed in the EIR/EIS at the program level. The discussion for HYD-1 (Program) regarding the operation of the conveyance system is applicable to the operation of the expansion at SJCWRP and process optimization at SJWRP, POWRP, LCWRP, and LBWRP. Operations would result in less than significant impacts on groundwater contamination will not be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management could result in an increase or decrease in the volume of tertiary treated effluent discharged from the WRPs. Recycled water used for groundwater recharge must comply with water reclamation requirement limits and a rigorous monitoring program in accordance with RWQCB requirements. However, operational impacts associated with WRP effluent management would be potentially significant, and this issue will be addressed in the EIR/EIS at the program level. In addition, the San Gabriel River Tidal Prism has the potential to be impacted by WRP effluent management as discussed in HYD-1 (Program). WRPs with discharge locations downstream of the spreading grounds would result in potentially significant impacts on the tidal prism. These include the SJCWRP (discharge location downstream of the spreading grounds), LCWRP, and LBWRP and, therefore, will be addressed in the EIR/EIS at the program level.

JWPCP. See HYD-1 (Program) and HYD-3 (Program) for details on construction and construction spills for the conveyance system that are applicable to the construction of the solids processing digesters at the JWPCP. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at

the program level. See HYD-1 (Program) and HYD-3 (Program) for details on operation of the conveyance system that are applicable to the operation the solids processing digesters at the JWPCP. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

There would be an increase in the quantity of biosolids that must be managed by the Sanitation Districts. This would increase composting, land application, and activities at landfills within the JOS service area and areas outside the JOS service area. The actual land application or beneficial use would occur on existing agricultural land or in existing beneficial use buildings. The Sanitation Districts will only use sites that are properly permitted and for which all site-specific impacts, including the potential for impacting groundwater, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, the increase in biosolids at the JWPCP would not result in increased levels of groundwater contamination at the existing beneficial use sites or landfills. Operational impacts of biosolids would not occur and will not be addressed in the EIR/EIS at the program level.

HYD-4. Overall Determination: Potentially Significant Impact. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level. Operation of WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP could significantly impact production wells. Therefore, operational impacts related to WRP effluent management at the WRPs would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The producing potable water aquifers range from depths of 1,000 feet to 2,000 feet in the JOS service area (MWD 2007). In shallower areas, many of the aquifers are confined by thick aquitards (sediments that allow very limited groundwater migration) and are protected from surface contamination (MWD 2007). The production wells in the JOS service area draw from deep aquifers specifically to avoid contamination that is located closer to the surface. Construction of the conveyance improvements would occur within the public rights-of-way of existing streets at depths less than 30 feet bgs. Construction would not cause regulatory standards in existing production wells to be violated due to the depth of the production wells and the depth of the location of the conveyance system construction. Operation of the conveyance system would occur in a self-contained system, as it currently does. It would not cause regulatory standards in existing production wells to be violated. Therefore, construction and operation of the conveyance improvements would not cause regulatory water quality standards at an existing production well to be violated. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. See HYD-4 (Program) for details regarding conveyance system construction and operation that are applicable to the construction and operation of the expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP. Construction and operational impacts on existing production wells would not occur and will not be addressed in the EIR/EIS at the program level.

Because portions of the Rio Hondo, San Jose Creek, and San Gabriel River are unlined, a change in the volume of tertiary treated effluent discharged from the SJCWRP, POWRP, or WNWRP could result in a change of water quality in a production well. Therefore, operation of WRP effluent management at the

SJCWRP, POWPR, and WNWRP would be potentially significant and will be addressed in the EIR/EIS at the program level. Additionally, discharges from the LCWRP and LBWRP are released to Los Coyotes Creek and the San Gabriel River, and flow into the San Gabriel River Tidal Prism. A change in volume of treated effluent discharged from locations downstream of the spreading grounds from the SJCWRP, LCWRP, and LBWRP could alter the volume of freshwater flows that enter the tidal prism, potentially resulting in increased salinity within the tidal prism and a resultant increase in saltwater intrusion within connected aquifers. Impacts would be potentially significant; therefore operation of WRP effluent management at the SJCWRP, LCWRP, and LBWRP will be addressed in the EIR/EIS at the program level.

JWPCP. See HYD-4 (Program) for details regarding construction and operation of the conveyance system that are applicable to the construction and operation of the solids processing digesters at the JWPCP. See HYD-1 (Program) for details regarding operation of biosolids management that would be applicable to this threshold. Construction and operation of solids processing facilities and operation of biosolids management would not violate regulatory water quality standards at an existing production well. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

HYD-5. Overall Determination: Potentially Significant Impact. Construction of all program elements and operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could substantially alter the existing drainage pattern of the site or area. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See HYD-1 (Program) for details regarding conveyance construction impacts, which are applicable to this threshold. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once operational, the conveyance system would convey wastewater to the WRPs or JWPCP for treatment. The conveyance system would be buried underground and the surface conditions would be returned to their existing conditions (i.e., concrete, pavement, and curbs and gutters found normally along the public rights-of-way of existing streets). Therefore, operation of the conveyance improvements would not substantially alter the existing drainage pattern of the site or area; impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. See HYD-1 (Program) for details regarding WRP construction impacts, which are applicable to this threshold. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

The WRPs are fully developed and have completely developed drainage systems to collect stormwater as well as discharge tertiary treated effluent from the WRPs into receiving waters. Plant expansion at the SJCWRP would result in new treatment facilities located adjacent to the existing facilities in an area of maintained lawn and concrete. The operation of these facilities would not substantially alter the existing drainage pattern of the site or area. The impervious area generated by the new facilities would tie into the existing stormwater drainage system on site. Under operating conditions, process optimization facilities

at the SJCWRP, POWRP, LCWRP, and LBWRP would be buried underground, and surface conditions would be returned to their existing conditions, which include parking lots and maintained lawn areas for the SJCWRP, asphalt and disturbed soil for the POWRP, a driving range for the LCWRP, and a disturbed soil and ruderal vegetation area for the LBWRP. Therefore, the operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in an alteration of drainage at the WRPs that would result in substantial erosion or siltation on or off site. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

The operation of WRP effluent management at the SJCWRP, POWRP, and WNWRP could alter the existing drainage pattern of unlined receiving waters due to a change in volume. Therefore, operations of WRP effluent management at the SJCWRP, POWRP, and WNWRP would be potentially significant and will be addressed in the EIR/EIS at the program level.

During operation of WRP effluent management, the LBWRP and LCWRP would continue to discharge tertiary treated effluent into concrete-lined receiving waters; there would be no erosion due to the concrete lining of the channel. Therefore, operation of WRP effluent management at the LBWRP and LCWRP would not result in impacts and will not be addressed in the EIR/EIS at the program level.

JWPCP. See HYD-1 (Program) for details regarding JWPCP construction impacts, which are applicable to this threshold. Construction impacts of the solids processing digesters would be potentially significant and will be addressed in the EIR/EIS at the program level.

The JWPCP is a fully developed site with an extensive stormwater drainage system used to collect all stormwater runoff generated by the impervious surfaces on site. There are no natural features adjacent to the area where the solids processing digesters would operate. Therefore, the operation of the solids processing digesters would not substantially alter the existing drainage pattern of the site or area. Operational impacts of solids processing would not occur and will not be addressed in the EIR/EIS at the program level.

Biosolids would be beneficially used or landfilled at existing sites designed to receive biosolids. Therefore, the increase in biosolids at the JWPCP would not result in alteration of existing drainage patterns at the receiving beneficial use sites or landfills that would cause substantial erosion or siltation. Operational impacts as a result of biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

HYD-6. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not substantially alter the existing drainage pattern of the site or area or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site. Therefore, construction and operational impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction of the conveyance improvements would result in trenching and soil excavation. This would result in an alteration to the existing drainage pattern of a site. However, the construction of the improvements to the conveyance system would be temporary, and the site would be

returned to its existing conditions with the completion of construction. Therefore, construction of the conveyance improvements would not substantially alter the existing drainage pattern of a site that would result in onsite or offsite flooding. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Once operational, the conveyance system would convey wastewater to the WRPs or JWPCP for treatment. The conveyance system would be buried underground and self-contained. Surface conditions would be returned to their existing conditions (i.e., concrete, pavement, and curbs and gutters found normally along the public rights-of-way of existing streets). Therefore, operation of the conveyance improvements would not substantially alter existing drainage patterns resulting in flooding on site or off site. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would occur within the existing footprint of each of the WRPs. Generally, the existing footprint of the WRPs consists of impervious surfaces with an existing stormwater drainage system. Construction would alter the drainage pattern of the WRPs; however, development would contribute only a minor addition to existing impervious surfaces. Furthermore, none of the WRPs are located within a 100-year flood zone as discussed in HYD-9 (Program). Therefore, although construction could modify the existing drainage patterns of the WRPs, it would not result in flooding on site or off site. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

The WRPs are fully developed and have completely developed drainage systems to collect stormwater as well as discharge tertiary treated effluent from the WRPs into receiving waters. The operation of plant expansion facilities at the SJCWRP would not substantially alter the existing drainage pattern of the site or area. The impervious area created by these facilities would tie into the existing stormwater drainage system on site. Under operating conditions, the majority of the process optimization facilities at the SJCWRP, POWRP, LCWRP, and LBWRP would be buried underground and the surface would be returned to previous existing conditions, which include parking lots and maintained lawn areas for the SJCWRP, asphalt and disturbed soil for the POWRP, a driving range for the LCWRP, and a disturbed soil and ruderal vegetation area for the LBWRP. Therefore, the operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not cause an alteration of drainage at the WRPs that would result in substantial flooding on site or off site. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Under effluent management operations, the volume of tertiary treated effluent discharged from the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP could increase or decrease depending on future reuse demand. Although there could be an increase in the volume of tertiary treated effluent discharged from the WRPs, this discharge would not flow into the stormwater drainage system, but would be directly discharged into receiving waters. These receiving waters are specifically maintained for flood and drainage purposes during wet and dry flows and would be able to accommodate any increase in treated effluent discharged from the WRPs. Therefore, operation of the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP would not create or contribute runoff that would alter the existing drainage pattern of a site in a manner that would result in flooding on site or off site. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction of the solids processing digesters would occur within the existing footprint of the JWPCP. Generally, the existing footprint of the JWPCP consists of impervious surfaces with an existing stormwater drainage system. Construction would alter the drainage pattern; however, development would contribute only a minor addition to existing impervious surfaces. Furthermore, the JWPCP is not located

within a 100-year flood zone as discussed in HYD-9 (Program). Therefore, although construction would modify the existing drainage patterns of the JWPCP, it would not result in flooding on site or off site. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

The JWPCP is a fully developed site with an extensive stormwater drainage system that collects all stormwater runoff generated by the impervious surfaces on site. The solids processing digesters would be self-contained and would be connected to the existing treatment systems at the JWPCP. Therefore, the operation of the solids processing digesters would not substantially alter the existing drainage so that flooding would occur on or off site. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

See HYD-1 (Program) for a discussion of biosolids management operations applicable to this threshold. The existing drainage pattern of the biosolids beneficial use sites or landfills would not be substantially altered and, therefore, impacts would not occur. Impacts will not be addressed in the EIR/EIS at the program level.

HYD-7. Overall Determination: Potentially Significant Impact. Construction of all program elements (except solids processing and biosolids management) could create or contribute runoff water that could provide additional sources of pollutants or exceed the capacity of existing or planned stormwater drainage systems as discussed below. Therefore, construction impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See HYD-1 (Program) for details regarding conveyance system construction impacts, which are applicable to this threshold. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once operational the conveyance system would convey wastewater to the WRPs or JWPCP for treatment. The conveyance system would be buried underground and the system would be self-contained. Surface conditions would be returned to their existing conditions (i.e., concrete, pavement, and curbs and gutters found normally along the public rights-of-way of existing streets). Therefore, operation of the conveyance improvements would not create runoff water or provide substantial additional sources of polluted runoff. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. See HYD-1 (Program) for details regarding WRP construction impacts, which are applicable to this threshold. Construction impacts associated with plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be potentially significant and will be addressed in the EIR/EIS at the program level.

Operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in substantial runoff that would exceed the capacity of storm drains or generate polluted runoff. The WRPs are fully developed and have drainage systems to collect stormwater as well as discharge tertiary treated effluent from the WRPs into receiving waters. Plant expansion at the SJCWRP would result in new treatment facilities. The operation of these facilities

would not substantially alter the existing drainage pattern of the site or area. The impervious area generated by the new facilities would tie into the existing stormwater drainage system on site. Under operating conditions, process optimization would be buried underground and the surface would be returned to previous existing conditions. Therefore, the operation of the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in polluted runoff. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Under effluent management operations, the volume of tertiary treated effluent discharged from the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP could increase or decrease. The effluent would continue to be tertiary treated and regulated by the RWQCB via the Clean Water Act and other state regulations. Therefore, the effluent would not introduce any new pollutants into the receiving waters. Therefore, WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP would not generate additional sources of polluted runoff. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. See HYD-1 (Program) for details regarding JWPCP construction impacts, which are applicable to this threshold for the construction of the solids processing digesters. Construction impacts of the solids processing digesters would be potentially significant and will be addressed in the EIR/EIS at the program level.

The JWPCP is a fully developed site with an extensive stormwater drainage system used to collect all stormwater runoff generated by the impervious surfaces on site. There are no natural features adjacent to the area where the solids processing digesters would operate. The solids processing digesters would be self-contained and would be connected to the existing treatment systems at the JWPCP. Therefore, the operation of the solids processing digesters would not create or contribute to runoff that would exceed the drainage system or provide substantial sources of polluted runoff. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

See HYD-1 (Program) for details regarding biosolids management operational impacts, which are applicable to this threshold. Operational impacts of biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

HYD-8. Overall Determination: No Impact. Construction and operation of all program elements would not result in demonstrable and sustained reduction of groundwater recharge capacity. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Groundwater recharge capacity refers to the capacity of an aquifer area to refill or recharge a potable groundwater aquifer and whether that refill capacity would be diminished (through reductions in soil permeability, surface area, or other effects). Construction and operation of the conveyance improvements could occur at or below the groundwater table. Throughout most of the subbasin, the near surface Bellflower aquiclude restricts vertical percolation into the underlying aquifers, and creates local semi-perched groundwater conditions. Groundwater enters the basin through surface

and subsurface flows and by direct percolation of precipitation, stream flow, and applied water. The aquifers are replenished predominantly within the forebay areas where permeable sediments are exposed at ground surface (DWR 2003). Most of the aquifers in the Los Angeles Basin that store recharge water are at depths much greater than 20 feet bgs. Construction would follow standard engineering and construction practices currently used by the Sanitation Districts to maintain their conveyance system. Trenching at the surface and up to 20 feet bgs would have no impact on groundwater. Deeper construction could puncture this aquiclude and cause it to drain to lower aquifers; however, the typical depths of conveyance system construction would not cause this to occur and, therefore, would not cause subsidence in the aquifer(s) in the JOS service area. Therefore, construction and operation of the conveyance improvements would not cause subsidence of soil and would not result in a reduction of groundwater recharge capacity. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction and operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not cause subsidence of soil and would, therefore, not result in a reduction of groundwater recharge capacity. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Under WRP effluent management operations, the volume of tertiary treated effluent discharged from the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP could increase or decrease depending on future reuse demand. Effluent would continue to be used for groundwater recharge at the spreading grounds and effluent management would not reduce the basin's recharge capacity. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction and operation of the solids processing digesters at the JWPCP would not cause subsidence of soil and would, therefore, not result in a reduction of groundwater recharge capacity. The additional biosolids digesters are expected to cover a relatively small area of the JWPCP, and they would be constructed in an area of impervious surfaces at the plant. Therefore, construction and operation of the digesters would not reduce groundwater recharge capacity and will not be addressed in the EIR/EIS at the program level.

Biosolids would be beneficially used or land filled at existing sites designed to receive biosolids. Therefore, the increase in biosolids at the JWPCP or at offsite locations would not add impervious surfaces that could reduce groundwater recharge capacity at the receiving beneficial use sites or landfills. Operational impacts of biosolids would not occur and will not be addressed in the EIR/EIS at the program level.

HYD-9. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not place housing or other structures within a 100-year floodplain, which would impede or redirect flood flows. Therefore, impacts would be less than significant and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Although it is unknown where the improvements to the conveyance system would occur, it is likely that most of the improvements would occur outside the designated 100-year floodplain,

which would remove them from flooding hazards. However, should construction occur within a 100-year flood zone, the construction equipment, which would consist of typical backhoes, jackhammers, and bulldozers, would not impede or redirect flood flows. Furthermore, the construction would be temporary and once it is completed, it generally would not result in an aboveground structure(s). Therefore, construction impacts would be less than significant and operational impacts would not occur. Construction and operational impacts will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. Construction and operation of program elements at the WRPs and JWPCP would not place housing or other structures within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary, Flood Insurance Rate Map, which would impede or redirect flood flows. All of the program facilities are located outside the 100-year flood hazard area. Therefore, impacts would not occur, and this issue will not be addressed in the EIR/EIS at the program level.

HYD-10. Overall Determination: Less Than Significant Impact. Construction and operation of program elements would not expose people or structures to a significant risk involving flooding including flooding as a result of the failure of a levee or dam. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System and JWPCP. Construction and operation of the conveyance improvements and solids processing and biosolids management would not increase the number of people working at the JWPCP. Furthermore, the conveyance system would be underground during operating conditions. Therefore, these program elements would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Therefore, construction and operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. The closest dam upstream of a program facility is Santa Fe Dam, located 6.3 miles upstream of the SJCWRP. If the dam were to fail, there would be ample time for evacuation during construction at this facility. Furthermore, during operations, plant expansion at the SJCWRP and process optimization at SJCWRP would not require an increase in the number of people currently working at the WRP. Therefore, construction and operational impacts associated with the SJCWRP would be less than significant and will not be addressed in the EIR/EIS at the program level.

HYD-11. Overall Determination: Potentially Significant Impact. Construction and operation of the POWRP could be subject to inundation by a mudflow. Therefore, construction and operational impacts related to this specific program element would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System and JWPCP. As discussed under GEO-1 (Program), improvements to the conveyance system, solids processing at the JWPCP, and biosolids management at the JWPCP and elsewhere in the state of California typically would be located in flat areas that would not support mudflows. Furthermore, the JWPCP is not located in an area designated as a landslide area (California Department of Conservation 1999e). Finally, these program facilities would be located inland (over 5 miles away from the coast) with numerous intervening structures related to the urban environment (buildings, freeways, etc.) that they would not be subject to inundation through a tsunami or seiche. Therefore, construction and operation of the improvements to the conveyance system and at the JWPCP would not be subject to inundation by seiche, tsunami, or mudflow. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. As discussed in GEO-1 (Program), the plant expansion at the SJCWRP and process optimization at the SJCWRP, LCWRP, and LBWRP typically would be located in flat areas, within the footprint of the existing WRPs, in areas that would not support a mudflow. Furthermore, these facilities are located sufficiently inland (over 5 miles away from the coast) with many intervening urban structures that they would not be subject to inundation through a tsunami or seiche. Therefore, construction and operation at these three WRPs would not be subject to inundation by seiche, tsunami, or mudflow and will not be addressed in the EIR/EIS at the program level. However, the POWRP is located adjacent to an identified landslide area; therefore, during construction, it could be subject to a mudflow. Therefore, construction and operational impacts would be potentially significant for process optimization at the POWRP and will be addressed in the EIR/EIS at the program level.

HYD-12. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not substantially increase workers' or the public's actual or potential exposure to wastes or pathogens. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Construction and operation of all program elements would not substantially increase workers' or the public's actual or potential exposure to wastes or pathogens. The Sanitation Districts would continue to comply with all California Division of Occupational Safety and Health (Cal/OSHA) requirements for worker safety. Worker exposure to wastes or pathogens would be minimized because the Sanitation Districts would continue to comply with water quality standards for adequate disinfection. Furthermore, none of the program elements result in an increase in the number of employees at the various facilities over existing conditions; therefore, operation of the program would not expose new employees to pathogens.

The effluent discharged into receiving waters or used as reclaimed water throughout Southern California is tertiary treated effluent that conforms with all RWQCB and California Department of Public Health standards.

Biosolids management at the JWPCP includes an increase in biosolids; however, biosolids would continue to be processed and transported according to EPA standards. Furthermore, the actual land application or beneficial use would occur on existing agricultural land or in existing beneficial use buildings. The Sanitation Districts would only use sites that are properly permitted and for which all

site-specific impacts, including the potential for affecting riparian areas and sensitive natural communities, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, construction and operational impacts would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

Hydrology, Water Quality (Freshwater), and Public Health Project Discussion

HYD-1. Overall Determination: Potentially Significant Impact. Construction at all shaft sites could create pollution, contamination, or nuisance as defined in Section 13050 of the California Water Code (CWC) or cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body. Therefore, construction impacts for these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. The tunneling construction method determines the volume of water that could be generated within the tunnel. The tunnel would be watertight because of use of a TBM. Equal pressure between the cutting face of the TBM and the soil would be maintained to retain the integrity of the tunnel as it is drilled and to prevent collapse. Minimal leakage of groundwater into the excavation would occur because the soil interface is isolated within the pressurized cutting face. Therefore, minimal volumes of water would need to be removed through dewatering during tunnel construction. However, any water generated by tunnel construction would be collected at the working shaft site and diverted to the sewer for treatment by either the Sanitation Districts at the JWPCP or the City of Los Angeles at the Terminal Island Water Reclamation Plant. Water generated during tunnel construction would not be released directly into receiving waters. Therefore, onshore and offshore tunnel construction would not create pollution, contamination, or nuisance. Construction impacts would be less than significant, and will not be addressed in the EIR/EIS at the project level.

Once the onshore and offshore tunnels are operational, they would be self-contained and would convey secondary treated effluent from the JWPCP to the Pacific Ocean. This conveyance would not result in water pollution, contamination, or a nuisance. Therefore, operational impacts would not occur, and this issue will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Construction at all shaft sites could result in water quality impacts through the generation of nuisance water during the shaft construction process or the handling of large amounts of excavated soil. The earth-moving and excavation activities could increase short-term erosion at the sites, which could result in a violation of water quality standards. Therefore, construction impacts associated with any shaft site would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the shaft sites would consist of self-contained, underground facilities. There could also be some low-profile, aboveground facilities. Operational impacts would not exist and will not be addressed in the EIR/EIS at the project level.

HYD-2. Overall Determination: Potentially Significant Impact. Construction and operation of several project elements could adversely change the level, rate, or direction of flow of groundwater as the tunneling occurs. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. As discussed under Impact HYD-1 (Project), the onshore and offshore tunnel construction method would cause the tunnel to be watertight. Some water, however, typically enters the excavation by entrainment in cuttings. The water volumes are low, so there is little potential to affect groundwater flow direction during tunneling. Furthermore, the tunnel diameter is small (approximately 22 foot external diameter) relative to the thickness of the sediments through which it is constructed. Therefore, groundwater would flow above and below the tunnel during both construction and operations, and there would be no substantial change in flow rate. Therefore, construction and operational impacts on groundwater flow volume, rate, and direction for the onshore and offshore tunnel would be less than significant and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Construction and operations at the shaft sites could result in a change in the direction, rate, or flow of groundwater. Therefore, impacts associated with all the shaft sites would be potentially significant and will be addressed in the EIR/EIS at the project level.

HYD-3. Overall Determination: Potentially Significant Impact. Construction of several project elements could result in an increased level of groundwater contamination through salt water intrusion, or affect the fate and transport of existing groundwater contaminants. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore. The onshore tunnel has the potential to result in an increased level of groundwater contamination (including that from percolation, injection, or salt water intrusion). There are salt water intrusion barriers along the coast of southern California, such as the Dominguez Gap seawater barrier. These barriers are comprised of wells that inject freshwater into the subsurface to maintain a barrier and prevent salt water from intruding into the fresh groundwater aquifers. Although these barriers would not directly conflict with the onshore tunnel alignments, if the TBM passes within proximity of the barriers, the operation of the injection well(s) may need to be temporarily suspended. Therefore, construction impacts along the onshore tunnel alignment would be potentially significant, and this issue will be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the onshore tunnel applicable to this threshold. Operation of any onshore tunnel would not result in an increased level of groundwater contamination, and no impacts would occur. Operational impacts will not be addressed in the EIR/EIS at the project level.

Tunnel Alignments – Offshore. Construction of the offshore tunnel would not affect the fate of existing groundwater contamination and would not result in an increased level of groundwater contamination. There is no known existing groundwater contamination at the depths the offshore alignments would be constructed; therefore, the fate of existing contamination cannot be affected and an increase above existing levels cannot occur. Because the tunnel would be installed behind the cutter head and each segment would be sealed to the earlier segment with a neoprene gasket, groundwater would be prevented from freely flowing into the tunnel. The tunnel itself would contain very few hazardous materials during construction, thereby minimizing the potential for spills and releases. If any hazardous materials were released during tunneling, it would be physically impossible for them to leach into the groundwater because they would be moving against the pressure gradient created by the tunnel. Therefore, construction of the offshore tunnel would not result in an increased level of groundwater contamination. Impacts would not occur and will not be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the offshore tunnel applicable to this threshold. Operation of the offshore tunnel would not result in an increased level of groundwater contamination, and no impacts would occur. Operational impacts will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Groundwater contamination could occur in association with spills within the shaft excavation or on the ground surface in the construction area. Shaft construction also has the potential to affect existing groundwater contamination, primarily by affecting the direction and rate of groundwater flow via construction and any associated dewatering activities. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the shaft sites applicable to this threshold. Under operating conditions, the shaft sites would consist of a self-contained, belowground access structure that would not have the ability to influence existing groundwater contamination or increase groundwater contamination above existing levels. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HYD-4. Overall Determination: Potentially Significant Impact. Construction of the onshore tunnel, and at the JWPCP East and JWPCP West shaft sites, could violate regulatory water quality standards in an existing production well. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore. There are several production wells located near the JWPCP that are identified in the JWPCP Tunnel and Ocean Outfall Feasibility Report (Parsons 2011). These wells could be located near the path of the onshore tunnel alignments. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the onshore tunnels applicable to this threshold. Operation of any onshore tunnel would not cause regulatory standards in an existing production well to be violated, and no impacts would occur. Therefore, operational impacts will not be addressed in the EIR/EIS at the project level.

Tunnel Alignments – Offshore. There are no potable wells located offshore. Therefore, construction and operation of any offshore tunnel would not have an impact on water quality standards in potable wells and will not be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the offshore tunnels applicable to this threshold. Operation of any offshore tunnel would not cause regulatory standards in an existing production well to be violated, and no impacts would occur. Impacts will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East and JWPCP West. See HYD-4 (Project) for details regarding potable wells within the vicinity of the JWPCP. Construction at the JWPCP East shaft site or JWPCP West shaft site could cause regulatory water quality standards to be violated at these existing wells. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See HYD-1(Project) for a discussion of operational impacts of the JWPCP East and JWPCP West shaft sites applicable to this threshold. Operation at these two shaft sites would not cause regulatory standards in an existing production well to be violated and no impacts would occur. Impacts will not be addressed in the EIR/EIS at the project level.

Shaft Sites – TraPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms. These shaft sites are located on the ocean side of the saltwater intrusion barriers that exist in the Los Angeles region. There are no potable wells located on the ocean side of the salt water intrusion barrier; therefore, construction and operation of these wells would not result in water quality violations of a potable well because none exist within the vicinity of the shaft sites. Impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. There are no potable wells in the ocean. Construction and operation of the riser and diffuser would not be applicable to production well thresholds and, therefore, are not discussed in this section or in the Marine Environment Section XI.

HYD-5. Overall Determination: Potentially Significant Impact. Construction at all shaft sites could substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion or siltation on site or off site. Therefore, construction impacts related to these specific project elements would be potentially significant and will be included in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. Similar to the air quality impacts, water quality impacts associated with tunneling the onshore and offshore alignments would not actually occur within the tunnel, but rather at the shaft sites, as discussed in HYD-1 (Project). Therefore, impacts associated with any excavated material and any water generated during tunneling are discussed under shaft sites. Construction and operational impacts associated with the tunnel alignments would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. See HYD-1(Project) for details regarding the construction at the shaft sites. Construction at any shaft site could substantially alter the existing drainage patterns of the site that could result in substantial erosion or siltation on site or off site. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See HYD-1(Project) for details regarding the operation at the shaft sites that are applicable to this threshold. Operation at the shaft sites would not substantially alter the existing drainage pattern of the sites and would not cause erosion or siltation on site or off site. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HYD-6. Overall Determination: Less Than Significant Impact. Construction and operation of project elements would not substantially alter the existing drainage pattern of the site or area or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. Construction and operation of the onshore and offshore tunnels would be located below the ground surface and below the seafloor. There is no drainage pattern in the subsurface and, therefore, tunneling would not alter the drainage pattern to cause flooding. See the analysis below regarding any nuisance water generated during tunneling at the shaft sites. Therefore, construction and operation would not result in flooding on site or off site. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. As stated in the Feasibility Report (Parsons 2011), groundwater infiltration through the temporary shaft walls in the soft ground should be less than 10 gallons per minute (GPM) with no more than 0.5 GPM from any 1 square foot of wall. Permanent inflows should be 0 GPM as the walls are expected to be water tight. Once shaft site walls are shored up with concrete, any water continues to flow down on the outside of the shaft site wall, eliminating the potential to significantly alter drainage at the surface or to significantly alter the rate of runoff at the surface. The diameter of the shaft sites (approximately 25 to 60 feet) is relatively small compared to the existing environment and thus, the shaft site itself does not add much impervious surface such that drainage patterns would be significantly altered. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the shaft sites applicable to this threshold. Operation at any shaft site would not result in a substantial change to the existing drainage pattern of a site, resulting in flooding on site or off site, and impacts would not occur. Operational impacts will not be addressed in the EIR/EIS at the project level.

HYD-7. Overall Determination: Potentially Significant Impact. Construction at all shaft sites could create or contribute to runoff water which could then exceed the capacity of the existing stormwater drainage system. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. As discussed previously in HYD-1 (Project), tunnel boring of the onshore and offshore tunnel has the potential to create some water during tunneling. Dewatering volumes are minimized during tunnel construction because of the construction technique. As tunnel construction proceeds, the watertight tunnel is constructed in place. Water can only enter the excavation at the cutting head of the TBM. This area is isolated within the pressurized cutting face, and experiences minimal leakage. Moreover, any water generated by tunnel construction would be collected at the working shaft and diverted to the sewer for treatment by either the Sanitation Districts at the JWPCP or the city of Los Angeles at the Terminal Island Water Reclamation Plant. Impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for a discussion of operational impacts of the tunnels applicable to this threshold. Operation of the tunnels would not generate runoff; therefore, impacts would not occur. Operational impacts will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Construction at any shaft site has the potential to generate water, which could result in runoff that would exceed the capacity of the existing stormwater drainage system. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

See HYD-1 (Project) for details regarding the operation at the shaft sites that are applicable to this threshold. Operations at any shaft site would not generate additional runoff water; therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HYD-8. Overall Determination: No Impact. Construction and operation of all project elements would not result in a reduced capacity for groundwater recharge. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. As discussed under HYD-8 (Program), groundwater recharge capacity refers to the capacity of an area to refill or recharge a potable groundwater aquifer and whether that refill capacity would be diminished (through reductions in soil permeability, surface area, or other effect). The construction and operation of the project elements would not occur in designated groundwater recharge areas. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HYD-9. Overall Determination: Less Than Significant Impact. Construction and operation of all project elements would result in impacts that are less than significant regarding flood zones, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore and Offshore. Construction and operation of the onshore and offshore tunnels would be located below ground surface. Therefore, they would not be located within a designated 100-year flood zone. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. The City of Los Angeles General Plan Safety Element (1996) identifies several shaft sites that are located in the 100-year and 500-year flood zones. The TraPac, Angels Gate, and Royal Palms shaft sites are within the 100-year flood zone, and the Southwest Marine shaft site is located within the 500-year flood zone. Construction of the project at the shaft sites identified in the flood zones would involve heavy and large equipment; however, it would not involve any permanent structures or homes. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

Under operating conditions, all of the shaft sites would consist of a belowground access structure. There could be some aboveground facilities that would not result in impeding or redirecting flood waters. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. Because there are no flood zones in the ocean, impacts associated with flooding and flood zones are not applicable and will not be addressed in the EIR/EIS at the project level or in the Marine Environment Section XI.

HYD-10. Overall Determination: No Impact. Construction and operation of the project elements would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Therefore, impacts would be less than significant and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. No levees or dams are located within the vicinity of the project elements (California Department of Conservation 1999e, 1999f). Furthermore, once operational, project elements would not require an increase in employees and, therefore, would not expose people to flooding. Finally, once operational, all project elements would be below ground surface, with the potential for a few aboveground facilities. These structures would have a limited potential for damage during flooding. Construction and operational impacts would not occur; therefore, this issue will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. Because there is no possibility for flooding through the failure of a dam or levee during the construction or operation of the riser and diffuser, impacts associated with flooding are not applicable and will not be addressed in the EIR/EIS at the project level or in the Marine Environment Section XI.

HYD-11. Overall Determination: Potentially Significant Impact. Construction of several project elements would be located within designated tsunami inundation zones. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Onshore and Offshore. Construction and operation of the onshore and offshore tunnel would be located in the subsurface. The subsurface is not affected by tsunamis, seiches, or mudflows; therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East, JWPCP West, and Angels Gate. The JWPCP East and JWPCP West shaft sites are located inland and not within a tsunami inundation zone. The JWPCP is a fully developed industrial site with wastewater treatment facilities and has no topographic variation or relief that could support a mudflow. Per the City of Los Angeles General Plan Public Safety Element (1996), the Angels Gate shaft site is located outside of the tsunami hazard zone; therefore, it would not experience the potential effects of a tsunami. Furthermore, the Angels Gate shaft site is relatively flat and would have a low potential for a mudflow. Therefore, construction and operational impacts associated with these three shaft sites would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – TraPac, LAXT, Southwest Marine, and Royal Palms. The TraPac, LAXT, Southwest Marine, and Royal Palms shaft sites are located within a designated tsunami inundation zone (County of Los Angeles 2009). Furthermore, Royal Palms is located at the base of a coastal bluff and thus could be affected by a mudslide during inclement weather. Therefore, construction impacts at Royal Palms would be potentially significant and will be addressed in the EIR/EIS at the project level.

During operations, the shaft sites would primarily consist of a self-contained, belowground access structure. The shaft sites could have a few low-profile, aboveground facilities. These facilities would not be subject to inundation by a tsunami or mudflow because of their low profile and the fact that they would be self-contained. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. The riser and diffuser areas are not at risk for mudflows or seiche due to the lack of exposed steep slopes or confined bodies of water in the area. Furthermore, these areas are located in the ocean and, therefore, not subject to mudflows or seiches. However, the riser and diffuser areas and existing ocean outfalls are located in a tsunami zone. Therefore, during construction, impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Once the riser and diffuser and/or existing ocean outfalls are constructed, they would be located on the bottom of the ocean and not susceptible to a tsunami; therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

HYD-12. Overall Determination: No Impact. Construction and operation of the project elements would not substantially increase workers' or the public's actual or potential exposure to wastes or pathogens. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Hydrology, Water Quality (Freshwater), and Public Health is specific to freshwater impacts. All impacts on ocean water quality associated with the construction and operation of the riser and diffuser are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. Construction and operation of project elements would not substantially increase workers' or the public's actual or potential exposure to wastes or pathogens. Construction or operation of any tunnel or shaft would not involve potential wastes or pathogens; therefore, there would be no risk of exposure to workers or the public. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Land Use and Planning Checklist

		Program			Project		
X.	**LAND USE AND PLANNING.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
LU-1.	Physically divide an established community?	☐	☐	☒	☐	☐	☒
LU-2.	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☒	☐	☐
LU-3.	Be located within the vicinity of a private airstrip and result in a conflict with the airport land use plan, or where such a plan has not been adopted, be located within 2 miles of an airport or private airstrip and result in safety hazard for people residing or working in the project area?	☐	☐	☒	☐	☐	☒

Land Use and Planning Program Discussion

LU-1. Overall Determination: No Impact. Construction and operation of the program elements would not divide an established community. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Conveyance improvements would generally be constructed underground within public rights-of-way in existing roads. Therefore, construction would not divide an existing community, and work would be temporary. Once operational, the improvements to the conveyance system would be located completely underground and, therefore, would not divide an existing community. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. Generally, the program elements would be constructed and operated within the footprint of existing JOS facilities. Biosolids management would occur at existing beneficial use or land application facilities, and no new facilities would be built to accommodate the additional biosolids generated by the program. Therefore, construction and operation of the WRPs and JWPCP would not physically divide an established community, and impacts would not occur. This issue will not be addressed in the EIR/EIS at the program level.

LU-2. Overall Determination: Potentially Significant Impact. Construction and operation of several program elements could conflict with applicable land use plans, policies, or regulations. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

Conveyance System. Improvements to the conveyance system generally would be constructed and operated within the public rights-of-way of existing streets. Permits from the jurisdictions the conveyance system would be located in may be required; however, because the improvements would occur within the public rights-of-way of existing streets, they would not conflict with any applicable land use plan, policy, or regulation of the jurisdictions. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. The construction and operation of the WRPs and JWPCP would occur in multiple jurisdictions as identified in Table 2-1 of this appendix.

The modifications to the WRPs would be located in the county of Los Angeles and the cities of Cerritos, Long Beach, and Pomona. Therefore, the construction of plant expansion at the SJCWRP and process

optimization at the SJCWR, POWRP, LCWRP, and LBWRP would be subject to the general plans and zoning of Cerritos, Long Beach, and Pomona, and the General Plan of the County of Los Angeles. Furthermore, the majority of the program is located in the Southern California Association of Governments (SCAG) region; therefore, the program elements would also be subject to the regional comprehensive plan. Construction at the WRPs could conflict with these applicable land use plans and regulations and will be addressed in the EIR/EIS at the program level. Once these program elements are complete and operational, they are not expected to conflict with applicable land use plans. However, this issue will be addressed in the EIR/EIS at the program level.

WRP effluent management would result in the continued discharge of treated effluent from existing discharge points into receiving waters. Discharge of treated effluent cannot conflict with applicable land use plans, policies, or regulations. Policies that specifically regulate the quality of the discharge are discussed in Hydrology, Water Quality (freshwater) and Public Health Section IX and Chapter 11. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the program level.

The JWPCP is located in the city of Carson, where the construction of the solids processing digesters and the increase in the operations of biosolids management would occur. However, the biosolids would then be transported to other locations in the state of California. These locations include the counties of Kings, Kern, Yuma, San Bernardino, and Riverside. Therefore, the construction of the solids processing digesters and the operation of biosolids management could conflict with applicable land use plans, policies, and regulations. Once the solids processing digesters are complete and operational, they are not expected to conflict with applicable land use plans. However, this issue will be addressed in the EIR/EIS. Therefore, construction and operation will be addressed in the EIR/EIS at the program level.

LU-3. Overall Determination: No Impact. All program elements would not be located within the vicinity of a private airstrip or within 2 miles of an airport and would not conflict with an airport land use plan. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Although it is unknown where the improvements to the existing conveyance system would occur under the program, construction and operation of the improvements to the conveyance system would not conflict with an airport land use plan or result in a safety hazard. The conveyance system is located completely underground and while cranes and heavy equipment may be used during construction of the improvements, they would not be so large or tall as to affect air traffic. Furthermore, once the conveyance system improvements are operational, they would generally be located underground. Therefore, impacts associated with the construction and operation of the conveyance improvements would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. The only program facility located within 2 miles of an airport is the LBWRP (ESRI 2009b). The Los Alamitos Army Airfield is located approximately 1 mile south/southeast of the LBWRP. The I-605 separates the LBWRP and the airfield. The Long Beach Airport is approximately 2.7 miles from the LBWRP, just outside the 2-mile radius of the threshold. Construction and operation of the program elements would not have an impact on either the Los Alamitos Army Airfield or the Long Beach Airport. Construction of process optimization facilities at the LBWRP would include heavy

equipment and perhaps some typical construction cranes; however, the cranes would not be sufficiently tall to obstruct or conflict with any air traffic. All construction would occur within the footprint of the existing LBWRP. Once operational, the majority of the process optimization facilities at the LBWRP would be underground and would not obstruct air traffic. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Land Use and Planning Project Discussion

LU-1. Overall Determination: No Impact. Construction and operation of all project elements would not physically divide an established community. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Construction and operation of all project elements would be located at existing industrial facilities, existing open space areas, underground, or in the middle of the ocean; they would not be located in the middle of a community. Therefore, construction and operation of all project elements would not physically divide an established community, and impacts would not occur. This issue will not be addressed in the EIR/EIS at the project level.

LU-2. Overall Determination: Potentially Significant Impact. Construction and operation of project elements could conflict with applicable land use plans, policies, or regulations of an agency with jurisdiction over project elements, as discussed below. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

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Tunnel Alignments – Onshore and Offshore; All Shaft Sites. Construction of project elements would occur over multiple jurisdictions as identified in Table 2-2 of this appendix. The onshore tunnel would extend through the city of Carson and the Port of Los Angeles, and the communities of Wilmington and San Pedro, which are located in the city of Los Angeles. The shaft sites also would be located in the city of Carson, the Port of Los Angeles, and the communities of San Pedro and Wilmington. Therefore, these project elements would be subject to the City of Los Angeles and City of Carson General Plans and zoning, the Community Plans of San Pedro and Wilmington, the General Plan Element for the Port, the Community Plan for the Port (Port Master Plan), and potentially other applicable land use plans of these

cities and communities. Furthermore, several project elements are located within the Local Coastal Plan of the San Pedro Community. The entire project is located in the SCAG region; therefore, construction of the project elements would also be subject to the regional comprehensive plan. Construction of all project elements could conflict with these applicable land use plans, policies, or regulations and, therefore, impacts would be potentially significant. This issue will be addressed in the EIR/EIS at the project level. Once the project elements are complete and operational, the project elements are not expected to conflict with applicable land use plans. However, this issue will be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. The SP Shelf riser and diffuser area is located more than 3 nautical miles off the southern California coast. Therefore, it is located in federal waters, rather than state waters, and is primarily governed by the Coastal Zone Management Act. The PV Shelf riser and diffuser area and the existing ocean outfalls are located within 3 nautical miles of the southern California coast. Therefore, they are located in state waters, primarily governed by the California Coastal Act and local coastal programs. Construction and rehabilitation could conflict with these applicable plans, policies, and regulations. This issue will be addressed in the EIR/EIS at the project level. Once the project elements are complete and operational, the project elements would be located on the seafloor and are not expected to conflict with applicable land use plans. However, this issue will be addressed in the EIR/EIS at the project level.

LU-3. Overall Determination: No Impact. None of the project elements are located within 2 miles of an airstrip or airport or located within an airport land use plan. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Construction and operation of the project elements would not be located within 2 miles of a public or private airstrip and would not conflict with any airport land use plans (ESRI 2009b). Therefore, there would be no construction or operational impacts associated with all project elements. This issue will not be addressed in the EIR/EIS at the project level.

Marine Environment (Marine Hydrology, Water Quality, Biological Resources, Noise and Public Health) Checklist

		Program (marine environment thresholds are generally not applicable to the program elements)			Project		
XI.	**MARINE ENVIRONMENT (MARINE HYDROLOGY, WATER QUALITY, BIOLOGICAL RESOURCES, NOISE AND PUBLIC HEALTH).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
MAR-1.	Create pollution, contamination, or nuisance, as defined in Section 13050 of the California Water Code (CWC), or cause regulatory standards to be violated, as defined in the applicable NPDES permit(s) or State Water Quality Control Plan for ocean waters for concentration and emissions of discharge?	☐	☐	☐	☒	☐	☐
MAR-2.	Substantially degrade marine sediment quality or character?	☐	☐	☐	☒	☐	☐
MAR-3.	Result in the substantial loss of individuals or the reduction of existing habitat, of a state- or federally listed endangered, threatened, rare, protected, candidate, or sensitive plant or animal species or a species of special concern?	☐	☐	☐	☒	☐	☐
MAR-4.	Result in the substantial degradation or disruption of habitat for marine biota or local biological communities?	☐	☐	☐	☒	☐	☐

		Program (marine environment thresholds are generally not applicable to the program elements)			Project		
XI.	**MARINE ENVIRONMENT (MARINE HYDROLOGY, WATER QUALITY, BIOLOGICAL RESOURCES, NOISE AND PUBLIC HEALTH).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
MAR-5.	Interfere with the movement/migration corridors of marine biota?	☐	☐	☐	☒	☐	☐
MAR-6.	Result in adverse effects to public health?	☐	☐	☐	☒	☐	☐
MAR-7.	Impair beneficial uses designated in the California Ocean Plan	☐	☐	☐	☒	☐	☐

Marine Environment (Marine Hydrology, Water Quality, Biological Resources, Noise and Public Health) Program Discussion

Please note that impacts on the San Gabriel River Tidal Prism are addressed in Hydrology, Water Quality (Freshwater), and Public Health Section IX.

The conveyance system; plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP; new solids processing digesters at the JWPCP; and the biosolids management at the JWPCP and throughout California would not be located in the marine environment. These program elements would be constructed and operated on land. Therefore, marine environment thresholds do not apply to these program elements and marine issues will not be addressed in the EIR/EIS at the program level.

Marine Environment (Marine Hydrology, Water Quality, Biological Resources, Noise and Public Health) Project Discussion

Construction and operation of the riser and diffuser on either the SP Shelf or the PV Shelf, or construction and operation of the rehabilitation of the existing ocean outfalls, are the only project elements that would be located in the marine environment and, therefore, could have an impact on the marine environment. Construction at the Royal Palms shaft site would occur in proximity to the ocean and could affect the marine environment. The construction and operation of all other project elements would occur on land. Therefore, the marine environment thresholds only apply to the riser and diffuser areas and the Royal Palms shaft site; other project elements will not be addressed in this section and the EIR/EIS at the project level.

MAR-1. Overall Determination: Potentially Significant Impact. Construction and operation on all the riser and diffuser areas could create pollution, contamination, or nuisance, as defined in Section 13050 of the CWC, or cause regulatory standards to be violated, as defined in the applicable NPDES permit(s) or state water quality control plan for ocean waters for concentration and emissions of discharge. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Riser/Diffuser Areas. Construction activities such as sediment excavation and ballast rock placement, as well as utilizing equipment that requires fuels, would result in potentially significant impacts. Additionally, construction and operations could take place either in or near the dichlor-diphenyl-tricholorethan/ polychlorinated biphenyl (DDT/PCB) Study Area as discussed in MAR-3 (Project). Therefore, impacts would be potentially significant, and this issue will be addressed in the EIR/EIS at the project level.

MAR-2. Riser/Diffuser Areas – Overall Determination: Potentially Significant Impact. Construction and operation on all the riser and diffuser areas could substantially degrade marine sediment quality or character. Therefore, impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Riser/Diffuser Areas. As discussed in MAR-4 (Project), benthic communities are adapted to live in specific types of sediment. The construction of the SP Shelf or the PV Shelf riser and diffuser could disturb the marine sediment quality or character. It would include the construction of either a riser and diffuser on the SP or PV Shelf, and/or include modifications to the existing ocean outfall system on the PV Shelf. This in-water construction could suspend and transport sediment to different areas of the ocean floor. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

The operation of the riser and diffuser and rehabilitation of the existing ocean outfalls would include the discharge of treated effluent into the Pacific Ocean. Depending on the ocean currents and the discharge at the new location, the discharge could substantially degrade marine sediment quality or character around the diffuser. Operational impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

MAR-3. Overall Determination: Potentially Significant Impact. Construction and operation on all riser and diffuser areas could result in the substantial loss of individuals or the reduction of existing habitat, of a state- or federally listed endangered, threatened, rare, protected, candidate, or sensitive plant or animal species or a species of special concern. Therefore, impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Riser/Diffuser Areas. Construction and operation of the riser and diffuser on the SP Shelf or PV Shelf and of the existing ocean outfalls could result in the substantial loss of individuals or the reduction of existing habitat of a state- or federally listed endangered, threatened, rare, protected, candidate, or sensitive marine plant or animal species or a species of special concern. Impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

MAR-4. Overall Determination: Potentially Significant Impact. Construction and operation on all riser and diffuser areas could result in the substantial degradation or disruption of marine habitat or local biological communities. Therefore, impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Riser/Diffuser Areas. Benthic (bottom dwelling) and demersal (bottom associated) marine species are adapted to live with specific bottom types and, on a finer scale, often show preferences among similar types of sediments. For example, species that burrow through or live in tubes within soft sediments (infauna) would not be found on exposed rocks, while those that form permanent attachments to hard surfaces would not be successful in a sand bed. Within these broader soft-bottom and hard-bottom habitat types, there are further influences of sediment characteristics, so that different assemblages are found in fine sand and coarse sand bottoms, or on low-relief rock cobble versus a high-relief rocky reef. In addition, water depth, currents, and nutrient availability play important roles in bottom community characteristics.

Information from a photographic survey of marine communities on the SP Shelf was conducted with a geological survey of the same area (Cadien et al. 2006). Photographic transect survey data and professional knowledge was used to identify marine habitats (Cadien et al. 2006). All hard- and soft-bottomed sediment types on the shelf and areas of the slope from an 8- to 255-meter (26- to 837-foot) depth were examined. Habitat and bottom types on the SP and PV Shelves tend to be patchy, with mixed bottom types common. Overall, the SP Shelf has bottom areas with abrupt transitions from soft- to hard-bottom, but frequently bottom areas are more transitional with overlap of habitats and bottom types within an area. The survey identified seven habitat types on the shelf and upper slope, variously composed of seven community groups (Cadien et al. 2006). Information from this survey, along with sediment and geological data from this and other studies, was utilized to associate potential riser and diffuser locations with the type of marine habitats likely to be found in the area.

Bottom sediments on the PV Shelf appear to be alternating layers of sand and clay through most of the southeastern extent of the area with sediments comprising clay with some thin sand layers to the northwest (Fugro 2011). The San Pedro escarpment is located on the PV Shelf, and the San Pedro Sea Valley is located to the south. While the actual habitat composition through most of the PV Shelf area (on the SP Shelf) was not determined, soft-bottomed communities are likely similar to the mid-shelf and outer shelf/upper slope communities found during the photographic transect survey. Hard-bottomed habitat detected by remote sensing on the PV Shelf is near the San Pedro Sea Valley and likely supports reef communities similar to those found elsewhere on the SP Shelf. The photographic survey revealed that the composition of assemblages on the shelf related to depth gradients and bottom type, as expected. All assemblages were relatively widespread on the shelf.

Sediments vary on the SP Shelf. At approximately 65 meters (213 feet), they are composed of alternating layers of sand and clay, with deep sand (greater than approximately 5 meters or 15 feet) bottom sediments. Marine habitat in the vicinity of the SP Shelf riser and diffuser area appears to be primarily soft-bottomed, bioturbated muddy sand, based on remote sensing data. There are some hard-bottom areas;

however, the photographic transect found primarily soft-bottomed habitat with a mid-shelf community typified by brittle stars and white sea urchins (Dartnell et al. 2006; Cadien et al. 2006). Slightly down slope on the transect is an area identified as outer shelf/upper slope habitat. This habitat is typified by fragile sea urchins and Pacific sanddab. Further down slope, the mid-shelf community is again common. In addition, some hard-bottomed habitat was noted in photographic transects to the southeast (Dartnell et al. 2006; Cadien et al. 2006). Hydroids and bryozoans, as well as hard-bottom associated species such as lingcod and blackeye goby, likely dominate this nearby reef habitat.

The SP Shelf and PV Shelf riser and diffuser areas and the existing ocean outfalls are located within the Pacific Coast Groundfish Fishery Management Plan (FMP). The FMP identifies essential fish habitat (EFH) off the coast of California, and the goals and policies of the FMP are to be considered in conjunction with the national standards of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). EFH is defined as those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity. The SP Shelf and PV Shelf are both areas identified as EFH within the FMP. Habitat for recreational fishing is also important on the SP and PV Shelves. There are known recreational fishing reefs located on both shelves within the general vicinity of the PV Shelf riser and diffuser area. There are two fishing reefs located on the PV Shelf within the general vicinity of the riser and diffuser locations. There are also two fishing reefs located on the SP Shelf within the general vicinity of the riser and diffuser locations. Target species at these reefs would be rockfish, lingcod, ocean whitefish, and California scorpion fish. Kelp and sand bass might be at reefs located at shallower depths.

Construction of a new riser and diffuser could disrupt the ocean floor around the riser and diffuser location; therefore, construction could result in a substantial loss, degradation, or disruption of habitat of marine biota or local biological communities. However, construction of a new ocean outfall would provide habitat, just as the existing ocean outfall provides habitat. This would be a beneficial impact.

As discussed in MAR-2 (Project), there would be some potential for the discharge of the new ocean outfall to change sediment characteristics and, therefore, habitat, during its operation.

Rehabilitation of the existing ocean outfall system could also result in degradation or disruption of marine biota or local biological communities. The existing ocean outfalls would need to be inspected, and new ballast rock may need to be added to the outfall. This could disrupt the extensive and variable communities that are currently established on the existing ocean outfalls.

Therefore, construction and operation of the new riser and diffuser and rehabilitation of the existing ocean outfalls could result in the substantial loss, degradation, or disruption of habitat for marine biota or local biological communities. Construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

MAR-5. Overall Determination: Potentially Significant Impact. Construction and operation on all riser and diffuser areas could interfere with the movement/migration corridors of marine biota. Therefore, impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Riser/Diffuser Areas. Disturbances associated with construction related to water quality, underwater sound, vessel strikes, and entanglement could interfere with migration corridors. Therefore, construction of the riser and diffuser and rehabilitation of the existing ocean outfalls would have the potential to interfere with the movement/migration corridors of marine biota. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts are not expected to occur because the riser and diffuser and the existing ocean outfalls are located on the seafloor; however, this issue will also be addressed in the EIR/EIS at the project level.

MAR-6. Riser/Diffuser Areas – Overall Determination: Potentially Significant Impact. Construction impacts would not occur and will not be addressed in the EIR/EIS at the project level. Operation on all riser and diffuser areas could result in adverse effects to public health. Therefore, operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	N/A	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	N/A	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	X

Riser/Diffuser Area – San Pedro Shelf and Palos Verdes Shelf. Construction impacts are not applicable because treated effluent would not be released during construction. Under operating conditions, the SP Shelf and PV Shelf riser and diffuser would release secondary treated effluent into the Pacific Ocean at a newly located discharge location. While secondary treated effluent does not adversely affect public health due to its level of treatment and removal of bacteria, this issue will be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – Existing Ocean Outfalls. Rehabilitation of the existing ocean outfalls would allow for the continued use of the existing ocean outfalls and would not adversely affect public health. Under this project element, there would be no net increase in the amount of discharge from the ocean outfall. Furthermore, there would be no change in the quality of the effluent. Therefore, the discharge would remain the same as the existing conditions, which currently does not adversely affect public health. However, operation of the rehabilitation of the existing ocean outfalls will be addressed in the EIR/EIS at the project level.

MAR-7. Overall Determination: Potentially Significant Impact. Construction and operation on all riser and diffuser areas could impair beneficial uses designated in the California Ocean Plan. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

Shaft Site – Royal Palms. Construction at the Royal Palms shaft site could affect beneficial uses of the beach and coastal area as designated in the California Ocean Plan. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Once the shaft site is operational, existing conditions will return; therefore, impacts are not expected to occur; however, operational impacts will be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – San Pedro Shelf and Palos Verdes Shelf. Marine beneficial uses and water quality standards are managed by the State Water Resources Control Board (SWRCB) and the nine California RWQCBs. SWRCB formulates and adopts a water quality control plan for the marine waters of California in the California Ocean Plan (Ocean Plan) (SWRCB 2005). The Ocean Plan identifies applicable beneficial uses of marine waters and establishes water quality objectives necessary to achieve and maintain the beneficial uses (SWRCB 2005). The beneficial uses identified for the Pacific Ocean by the Ocean Plan include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated areas of special biological significance (ASBS); management of rare and endangered species; marine habitat; fish migration; fish spawning; and shellfish harvesting (SWRCB 2005).

The beneficial uses identified by the Los Angeles RWQCB Basin Plan (Basin Plan) for the general nearshore[2] (Los Angeles RWQCB 1995) and offshore areas in Los Angeles County are similar to those uses identified in the Ocean Plan, and they include industrial service supply; navigation; water contact recreation; water non-contact recreation; commercial and sport fishing; marine habitat; wildlife habitat; the support of rare species; the support of migration patterns; and high quality waters that support the spawning and early development of fish and the suitable collection of shellfish for human consumption and commercial or sport purposes (Los Angeles RWQCB 1995). The RWQCB will evaluate the request for 401 certification for the construction and operation of a diffuser on the SP Shelf or PV Shelf based upon the beneficial uses and water quality standards.

Constructing the new riser and diffuser on either the SP Shelf or PV Shelf could disturb ocean sediment as discussed in MAR-2 (Project). Furthermore, it would be constructed either within or in proximity to the designated DDT/PCB Study Area as discussed in MAR-2 (Project) and MAR-1 (Project). This could temporarily affect designated beneficial uses. Under operating conditions, the new riser and diffuser would release secondary treated effluent into the Pacific Ocean. The release at the San Pedro and Palos Verdes diffuser and riser areas would be a newly located discharge influenced differently by the currents

[2] Nearshore is defined by the Basin Plan as: Nearshore includes the zone bounded by the shoreline and a line 1,000 feet from the shoreline or the 30 foot contour depth, whichever is farther from the shoreline.

than the present discharge at the existing ocean outfalls. Although the amount of discharge would not change from what is currently released at the existing ocean outfalls, the change in location and the influence of currents could result in an impact on beneficial uses. Therefore, construction and operation of the new riser and diffuser has the potential to substantially affect designated beneficial uses and would result in potentially significant impacts that will be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – Existing Ocean Outfalls. Rehabilitation of the existing ocean outfalls could affect designated beneficial uses. During construction, the DDT/PCB study area could be disturbed. During operation there would be no net increase in the amount of discharge from the existing ocean outfalls. Therefore, the discharge would remain the same as the existing conditions. Currently, the discharge does not result in affecting designated beneficial uses; however, this will be addressed in the EIR/EIS at the project level. Therefore, construction and operational impacts for the rehabilitation of the existing ocean outfalls will be addressed in the EIR/EIS at the project level.

Noise and Vibrations (Terrestrial) Checklist

		Program			Project		
XII.	**NOISE AND VIBRATIONS (TERRESTRIAL).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
NOI -1.	Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☒	☐	☐	☒	☐	☐
NOI -2.	Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☒	☐	☐
NOI -3.	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐	☒	☐
NOI -4.	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☒	☐	☐
NOI -5.	Be located within an airport land use plan area, or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐	☐	☒

		Program			Project		
XII.	**NOISE AND VIBRATIONS (TERRESTRIAL).** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
NOI -6.	Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐	☐	☒

Noise and Vibrations (Terrestrial) Program Discussion

NOI-1. Overall Determination: Potentially Significant Impact. Construction and operation of several program elements could expose persons to or generate noise levels in excess of standards. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	X

Conveyance System. Construction of approximately 33 miles of conveyance system upgrades would likely exceed standards established in local general plans or noise ordinances. This construction would generally occur within public rights-of-way along roads; however, it could be located in residential neighborhoods or within immediate proximity to sensitive receptors. Sensitive noise receptors are generally defined by specific city or county jurisdictions but typically include residential uses, institutional uses such as schools, and hospitals and parks. Therefore, construction of the conveyance improvements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once operational, the conveyance system would be located underground and would be used to transport wastewater to the WRPs and JWPCP for treatment. The conveyance of wastewater would not result in any noise. No new pumping stations or generators would be part of the operation of the conveyance system. Therefore, the operation of the conveyance improvements would not exceed standards established by a local general plan or noise ordinance. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. The WRPs are primarily located in industrial areas immediately adjacent to freeways and major arterial roads. Traffic noise generated by automobiles is the main source of noise in the WRP areas. Depending on the size of the freeway or road and the traffic patterns, approximately 70 to 78 A-scale decibels (dBA) of noise can be generated at 50 feet. Sensitive noise receptors are generally defined by specific city or county jurisdictions but typically include residential uses, institutional uses such as schools, and hospitals and parks. Generally, potentially sensitive receptors adjacent to the SJCWRP, POWRP, and LBWRP that would experience construction activities under the program would be located more than 300 feet away from construction activities. Iron-Wood Nine Golf Course is within the footprint of the LCWRP and may be considered a sensitive noise receptor closer than 300 feet.

Noise levels generated by construction equipment (or by any point source) decrease at a rate of approximately 6 dBA per doubling of distance from the source (Harris 1979). Therefore, if a particular construction activity generated average noise levels of 89 dBA at 50 feet, the noise level would be 83 dBA at 100 feet, 77 dBA at 200 feet, 71 dBA at 400 feet, and so on. This calculated reduction in noise level is based on the loss of energy resulting from the geometric spreading of the sound wave as it leaves the source and travels outward. Intervening structures that block the line of sight, such as buildings, would further decrease the resultant noise level by a minimum of 5 dBA. Therefore, much of the construction noise generated by the WRP expansion and upgrades may be attenuated to acceptable levels (below 65 dBA) prior to reaching the sensitive receptors. The Sanitation Districts may use drilled piles for the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP. This would include a drill auger, inserting an I-beam, and backfilling. The Sanitation Districts

currently never pile drive within their facilities and would not pile drive for the program construction activities because vibrations from the pile driving can damage the existing facilities.

Construction-generated noise is typically exempt per jurisdictional municipal codes if the construction is conducted during daytime hours and not on Sundays or federal holidays. However, some construction may occur in the evening hours and, therefore, would not comply with existing standards. Therefore, a discussion of the construction impacts and attenuating measures will be incorporated in the EIR/EIS at the program level.

Operational noise for the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not result in a significant increase over the ambient noise levels at the existing WRP facilities or surrounding areas. Currently, the ambient noise levels of the facilities are that of an industrial use next to freeways. The Sanitation Districts currently use noise attenuating mechanisms at all their plants including locating pumps below ground surface and noise reduction measures on all compressors. The new facilities at the WRPs would primarily be underground or would blend in with existing equipment, which do not currently create substantial noise (i.e., above 60 dBA). All new equipment would either be located below ground or would have noise reducing mechanisms that are similar to those currently used by the Sanitation Districts. It is anticipated the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would not include alarms, bells, or other loud industrial noises and would operate as the current equipment at the facilities operates. Finally, no additional loud speaker systems would be added at the facilities. Therefore, it is reasonable to assume operation would increase the ambient noise level of less than 5 dBA, which is barely audible to the human ear. Furthermore, there would be no new employees associated with the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; therefore, there would be no increase in traffic noise generated by employees. Operational impacts from the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management at each of the WRPs would result in a change in volume of treated effluent discharged into receiving waters from existing discharge points. Currently, the Sanitation Districts discharge effluent, which may generate minor levels of noise. Simply changing the volume of discharging effluent would not create additional noise that would exceed standards established in a local general plan or noise ordinance. Therefore, operational impacts from WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. The existing noise setting at the JWPCP is primarily dominated by I-110 and traffic noise. The Pacific Coast Highway (State Route 1) also passes near to the plant. There are several sensitive receptors near the facility including residences to the north, south, east, and west. Wilmington Junior High is to the east and Bay Harbor Hospital and the Kaiser Foundation Hospital are located over 1 mile to the southwest. Pumps, aerators, trucks, and other equipment at the JWPCP generate noise, however, not above normally acceptable noise levels for industrial uses.

The construction of the solids processing digesters would be located within the existing JWPCP footprint. It would result in similar construction noise as that generated at the WRP facilities. Pile driving would not occur as the Sanitation Districts do not use pile driving to construct treatment plant facilities. Therefore, much of the construction noise generated by the solids processing may be attenuated to acceptable levels (below 65 dBA) prior to reaching the sensitive receptors. Furthermore, construction-generated noise is typically exempt per jurisdictional municipal codes if the construction is

conducted during daytime hours and not on Sundays or federal holidays. Although construction at the JWPCP would not occur during the evening/nighttime hours, or on Sundays or federal holidays, construction noise attenuating measures are generally applied. Therefore, a discussion of the construction impacts associated with solids processing and attenuating measures will be addressed in the EIR/EIS at the program level.

Once the new solids processing equipment is operational, it would not generate any noise. Currently, the existing solids processing equipment does not generate noise levels above those typical of the JWPCP uses. Furthermore, there would be no increase in employees at the JWPCP due to the operation of the new solids processing digesters; therefore, no new noise from employee trips would occur. The new solids processing digesters equipment would not add significantly to the existing ambient noise level. Therefore, operation of the new solids processing digesters would not expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

An increase of approximately 20 truck trips per day at the JWPCP would be generated by the increase in biosolids. Therefore, the operation of biosolids management could generate noise levels on existing streets. Operational impacts associated with the biosolids management at the JWPCP would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once the biosolids leave the JWPCP, they would be transported to multiple locations throughout California. No single location would receive all trips. Furthermore, all of the locations for beneficial use, landfill, or land application of biosolids are located in either industrial areas or agricultural areas, typically with existing elevated ambient noise levels. Therefore, any slight increase in truck trips at each of the locations would not generate significant noise levels above existing ambient levels. Operation of biosolids management at the beneficial use, landfill, or land application locations would be less than significant and will not be addressed in the EIR/EIS at the program level.

NOI-2. Overall Determination: Less Than Significant Impact. Construction and operation of the program elements would not result in excessive groundborne vibrations or groundborne noise levels. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction activities associated with grading and excavation may result in some minor amount of ground vibration. Construction of conveyance improvements would not involve special construction methods such as pile driving or blasting. Vibration from conventional construction activity is typically below a level of human perception and well under levels that would cause damage to existing buildings, when the activity is more than approximately 50 feet from the receiver. For this program element, conventional construction activities could take place at distances closer than 50 feet from sensitive receptors. Based on data from the Federal Transit Administration (FTA), small bulldozers (which are representative of the size of construction equipment that would be on site) produce vibration levels of 0.003 inches per second (IPS) peak particle velocity (PPV) at a distance of 25 feet. This level is well below widely accepted levels of perception thresholds (for example, the California Department of Transportation (Caltrans) has identified a PPV of between 0.0059 and 0.019 IPS PPV as the threshold of

human perception). The FTA maintains a 0.12 IPS PPV threshold for potential damage to "extremely fragile historic buildings" (Caltrans 2004). Additionally, vibration from these activities would be short-term and would end when construction is completed; therefore, construction and operational impacts associated with the conveyance system would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs. Process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would involve constructing large underground storage tanks within the existing footprint of these WRPs. This construction would not involve traditional pile driving as described in NOI-1(Program). Furthermore, blasting would not occur because of the potential damage that could be done to the existing facilities located at each WRP. Therefore, pile driving and blasting would not result in groundborne vibrations. The use of construction equipment would result in a minor increase in groundborne vibrations during grading and excavation. However, as identified in the conveyance discussion, the vibrations would be well below widely accepted levels of perception thresholds. Therefore, construction impacts associated with groundborne vibrations at the SJCWRP, POWRP, LCWRP, and LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level.

Groundborne noise and vibration associated with plant expansion during construction and operation may occur, but is expected to be limited and may only occur during use of heavy construction equipment. The Sanitation Districts do not pile drive (or use other equipment with the potential for large or sustained vibration effects) within their facilities because vibrations can damage the existing facilities. Therefore, construction and operation associated with plant expansion is expected to be less than significant and will not be addressed in the EIR/EIS at the program level.

The operation of process optimization facilities would involve operating underground wastewater storage tanks and wastewater treatment facilities similar to those already located at the WRPs. Operation of these facilities would not result in groundborne vibrations. Wastewater treatment utilizes pumps and gravity to treat wastewater in large concrete facilities. None of the treatment processes create vibrations. Operation of process optimization would involve the storage of wastewater until the WRP can treat it. The storage of wastewater would not generate groundborne vibrations. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Operation of WRP effluent management would involve a change in the volume of tertiary treated effluent discharged from existing discharge points at each WRP. The change in volume discharged from each WRP would not result in groundborne vibrations. Therefore, operational impacts of WRP effluent management would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction at the JWPCP for the solids processing digesters may involve limited groundborne vibrations during use of heavy construction equipment; however, this construction is not expected to include pile driving, per the discussion above in NOI-1 (Program). Therefore, construction impacts associated with the solids processing digesters would be less than significant and will not be addressed in the EIR/EIS at the program level. Once operational, the new solids processing digesters would operate exactly as the existing ones and would not generate any groundborne vibrations or noise. Therefore, operation of the solids processing digesters would not result in groundborne vibrations and impacts would not occur. Operational impacts will not be addressed in the EIR/EIS at the program level.

Biosolids management at the JWPCP and at beneficial use and landfill facilities in California does not currently result in groundborne vibrations. The management includes beneficial use, landfill, and land application. At the JWPCP, there would be an increase in truck trips associated with the increase in biosolids transported to other areas of California; this increase in truck trips would not result in

groundborne vibrations. Currently, biosolids-hauling trucks use Figueroa Street to access I-110. Figueroa is bounded on both sides by the JWPCP, between Lomita and Sepulveda, and does not have any sensitive receptors to groundborne vibrations (i.e., residential homes) along it. Therefore, operation of biosolids management would not result in groundborne vibrations and will not be addressed in the EIR/EIS at the program level.

NOI-3. Overall Determination: Potentially Significant Impact. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level. Operation of biosolids management at the JWPCP could result in a substantial permanent increase in ambient noise levels in the project vicinity. Therefore, operational impacts related to this specific program element would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	N/A	–
SJCWRP – Plant Expansion	N/A	–
WRP – Process Optimization	N/A	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	N/A	–
JWPCP – Biosolids Management	N/A	X

Conveyance System. Construction impacts associated with the conveyance system are not discussed under this threshold, as construction impacts are not considered "substantial permanent increases in ambient noise levels." For a discussion of construction impacts associated with the conveyance system, see NOI-4 (Program).

See NOI-1 (Program) for a discussion of the operation of the improvements to the conveyance system. The operation of the conveyance system would not result in a substantial permanent increase in ambient noise and operational impacts would not occur. Operational impacts will not be addressed in the EIR/EIS at the program level**.**

WRPs. Construction impacts associated with the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP are not discussed under this threshold, as construction impacts are not considered "substantial permanent increases in ambient noise levels." For a discussion of construction impacts associated with the WRPs, see NOI-4 (Program).

See NOI-1 (Program) for a discussion of the operation of the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level**.**

As discussed in NOI-1 (Program), operation of WRP effluent management would not result in the substantial permanent increase in ambient noise. Operational impacts for WRP effluent management will not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction impacts associated with new solids processing digesters are not discussed under this threshold, as construction impacts are not considered "substantial permanent increases in ambient noise levels." For a discussion of construction impacts associated with solids processing digesters see NOI-4 (Program).

See NOI-1 (Program) for a discussion of the operation of the solids processing digesters. Operational impacts associated with the solids processing digesters would not occur and will not be addressed in the EIR/EIS at the program level**.**

See NOI-1 (Program) for a discussion of the operation of the increase in biosolids at the JWPCP. The increase in biosolids and the increase in trucks could result in a substantial permanent increase in noise in the project vicinity. Therefore, impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

NOI-4. Overall Determination: Potentially Significant Impact. Construction and operation of several program elements could result in a substantial temporary or periodic increase in ambient noise levels. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	X

Conveyance System. Operational impacts associated with the conveyance system are not discussed under this threshold, as operational impacts are not considered "substantial temporary or periodic increase in ambient noise levels." For a discussion of operational impacts associated with the conveyance system see NOI-3 (Program).

See NOI-1 (Program) for a discussion of the construction of the improvements to the conveyance system. The construction of the conveyance improvements could result in a substantial temporary or periodic increase in ambient noise. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

WRPs. Operational impacts associated with the plant expansion at the SJCWRP would require the potential operation of emergency generators, which could result in substantial temporary or periodic increase in ambient noise levels; therefore, operation of the plant expansion at the SJCWRP would be potentially significant and will be addressed in the EIR/EIS at the program level.

Operational impacts associated with process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP are not discussed under this threshold, as operational impacts are not considered "substantial temporary or periodic increase in ambient noise levels." For a discussion of operational impacts associated with process optimization see NOI-3 (Program).

See NOI-1 (Program) for a discussion of the construction of the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level**.**

As discussed in NOI-1 (Program), construction would not occur under WRP effluent management and, therefore, temporary or periodic increases in ambient noise would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Operational impacts associated with the new solids processing digesters are not discussed under this threshold, as operational impacts are not considered "substantial temporary or periodic increase in ambient noise levels." For a discussion of operational impacts associated with the solids processing digesters see NOI-3 (Program).

See NOI-1 (Program) for a discussion of the construction of the solids processing digesters. Construction impacts associated with the solids processing digesters would be potentially significant and will be addressed in the EIR/EIS at the program level**.**

See NOI-1 (Program) and NOI-3 (Program) for a discussion of the operation of the increase in biosolids at the JWPCP. The increase in biosolids and the increase in truck trips could result in a substantial temporary or periodic increase in noise in the project vicinity. Therefore, operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

NOI-5. Overall Determination: No Impact. None of the program elements would be located within an airport land use plan area or within 2 miles of a public airport and would not expose people residing or working in the project area to excessive noise. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. It is unknown where the improvements to the existing conveyance system would occur under the program. However, construction and operation of the improvements to the conveyance system would not conflict with an airport land use plan or result in a safety hazard (see LU-3 [Program]). The conveyance system is generally located underground. Cranes and heavy equipment may be used during construction of the improvements; however, they would not be so large or tall as to impact air traffic. Furthermore, once the conveyance improvements are operational, they would generally be located underground. Therefore, impacts on airport land use plans or public airports associated with the construction and operation of conveyance improvements would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. The only program facility located within 2 miles of an airport is the LBWRP (ESRI 2009b). The Los Alamitos Army Airfield is located approximately 1 mile south/southeast of the LBWRP. The I-605 separates the LBWRP from the airfield. The Long Beach Airport is approximately 2.7 miles from the LBWRP, just outside the 2-mile radius of the threshold. None of the program elements are located within an airport land use plan area, and workers would not be subject to excessive aircraft noise levels. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

NOI-6. Overall Determination: No Impact. Construction and operation of the program elements would not expose people residing or working in the project area to excessive noise levels associated with a private airstrip. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. See NOI-5 (Program). Impacts on airport land use plans or public airports associated with the construction and operation of conveyance improvements would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. See NOI-5 (Program). The program elements would not be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Noise and Vibrations (Terrestrial) Project Discussion

NOI-1. Overall Determination: Potentially Significant Impact. Construction at all shaft sites could expose persons to or generate noise levels in excess of standards established in a local general plan. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

All noise impacts associated with the construction and operation of the riser and diffuser on the SP Shelf, PV Shelf, and at the existing ocean outfalls are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. The construction of the onshore and offshore tunnel would occur below the ground, and would not result in the generation of noise levels in excess of standards established in local general plans or noise ordinances. Therefore, construction impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Once operational, the onshore and offshore tunnels would not generate any noise. The tunnels would convey secondary treated effluent in self-contained tunnels from the JWPCP to the Pacific Ocean. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East and JWPCP West. Construction at the JWPCP East or West shaft site would not include pile driving. Pile installation would use drilling methods, similar to the pile construction that would occur at the WRPs and the JWPCP for solids processing. However, the use of heavy specialized equipment would occur at these shaft sites. Therefore, construction could expose people to or generate noise levels in excess of standards established in local general plans or noise ordinances. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Under operating conditions, there could be some surface structures located at either shaft site, such as a surge tower. Surge towers are currently part of the JWPCP facility and generate minimal noise. They function as hydrologic controls during high tides and protect the JWPCP from potential flooding. Therefore, operational impacts at the JWPCP East or JWPCP West shaft site would be less than significant and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – TraPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms. Construction of the shaft itself and construction activities at the shaft sites would use heavy specialized equipment. Construction could expose people to or generate noise levels in excess of standards established in local general plans or noise ordinances. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

During operations, the shaft sites would primarily consist of a self-contained, belowground access structure. These access structures would not generate any noise. There may be some low-profile support structures at the surface, but these support structures would not generate noise. Therefore, operation at any shaft site would not expose persons to or generate noise levels in excess of standards established in local general plans or noise ordinances. Operational impacts would not occur and will not be addressed in the EIR/EIS.

NOI-2. Overall Determination: Potentially Significant Impact. Construction of all land-based project elements could expose persons to or generate excessive groundborne vibration. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

All noise impacts associated with the construction and operation of the riser and diffuser on the SP Shelf, PV Shelf, and at the existing ocean outfalls are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. Tunneling in the onshore and offshore alignments could expose sensitive receptors to groundborne vibrations. Construction of the onshore and offshore tunnels would be potentially significant and will be addressed in the EIR/EIS at the project level. Once operational, the onshore and offshore tunnels would not result in groundborne vibrations or noise. The existing onshore tunnel and ocean outfalls do not generate any vibrations and the onshore and offshore tunnels would operate exactly like the existing tunnel and ocean outfalls. Therefore, operational impacts from the onshore and offshore tunnels would not occur and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Construction at all shaft sites could result in excessive groundborne vibrations or noise depending on the type of equipment used. This could expose surrounding sensitive receptors (such as residences and schools) to vibrations. Therefore, construction impacts would be potentially significant at any shaft site and will be addressed in the EIR/EIS at the project level.

Once operational, the shaft sites would not result in groundborne vibrations or noise levels. The shaft sites would operate to support the subsurface tunnel and ocean outfall conveying treated effluent from the JWPCP to the Pacific Ocean. No vibrations would be generated with this action. Therefore, operational impacts at any shaft site would not occur and will not be addressed in the EIR/EIS at the project level.

NOI-3. Overall Determination: Less than Significant Impact. Construction impacts would not occur and will not be addressed in the EIR/EIS at the project level. Operation of all land-based project elements would not result in substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	–	Shaft Site – Southwest Marine	N/A	–
Tunnel Alignment – Offshore	N/A	–	Shaft Site – Angels Gate	N/A	–
Shaft Site – JWPCP East	N/A	–	Shaft Site – Royal Palms	N/A	–
Shaft Site – JWPCP West	N/A	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	N/A	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	N/A	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

All noise impacts associated with the construction and operation of the riser and diffuser on the SP Shelf, PV Shelf, and at the existing ocean outfalls are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. Construction impacts associated with all project elements are not discussed under this threshold, as construction impacts are not considered "substantial permanent increases in ambient noise levels." For a discussion of construction impacts associated with all project elements see NOI-4 (Project).

See NOI-1 (Project) for a discussion of the operation impact determinations for all project elements. Operational impacts would be either less than significant (JWPCP East and JWPCP West) or would not occur (all remaining shaft sites and onshore and offshore tunnel alignments) and will not be addressed in the EIR/EIS at the project level.

NOI-4. Overall Determination: Potentially Significant Impact. Construction impacts at all shaft sites would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	N/A	Shaft Site – Southwest Marine	X	N/A
Tunnel Alignment – Offshore	–	N/A	Shaft Site – Angels Gate	X	N/A
Shaft Site – JWPCP East	X	N/A	Shaft Site – Royal Palms	X	N/A
Shaft Site – JWPCP West	X	N/A	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	X	N/A	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	X	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

All noise impacts associated with the construction and operation of the riser and diffuser on the SP Shelf, PV Shelf, and at the existing ocean outfalls, are discussed in Marine Environment Section XI.

Tunnel Alignments – Onshore and Offshore. See NOI-1 (Project) for a discussion of the construction impact determinations for the tunnel alignments. Construction impacts would not result in a substantial temporary or periodic increase in ambient noise levels; therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level. Operational impacts are not applicable because they are not addressed under this threshold, which specifically addresses temporary or periodic increase in ambient noise levels in the project vicinity.

All Shaft Sites. See NOI-1 (Project) for a discussion of the construction and operational impact determinations for all project elements. Construction impacts for all shaft sites would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts are not applicable because they are not addressed under this threshold which specifically addresses temporary or periodic increase in ambient noise levels in the project vicinity.

NOI-5. Overall Determination: No Impact. None of the project elements would be located within an airport land use plan area or within 2 miles of a public airport and, therefore, would not expose people residing or working in the project area to excessive noise. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. None of the project elements are located within an airport land use plan area or within 2 miles of a public airport (ESRI 2009b). Therefore, workers at the facilities would not be subject to excessive aircraft noise levels. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at project level.

NOI-6. Overall Determination: No Impact. None of the project elements would be located within the vicinity of a private airstrip and, therefore, would not expose people residing or working in the project area to excessive noise. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. See NOI-5 (Project). None of the project elements are located within the vicinity of a private airstrip and, therefore, would not expose people or workers to excessive noise. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Employment, Housing, Socioeconomics, and Environmental Justice Checklist

XIII. EMPLOYMENT, HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE. Would the program/project:	Program			Project		
	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
SOC-1. (Population and Housing) Result in displacement of a large number of people necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐	☐	☒
SOC-2. (Population and Housing) Result in displacement of substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐	☐	☒
SOC-3*. (Environmental Justice) Result in environmental impacts that are disproportionately high and adverse on minority and low income populations?	☐	☐	☐	☒	☐	☐
SOC-4. Cause a substantial change in local employment or the labor force?	☐	☒	☐	☒	☐	☐
SOC-5. Cause a substantial decrease in property values in the project area?	☐	☒	☐	☐	☒	☐

*Threshold SOC-3 (Environmental Justice) is a NEPA requirement and is not addressed under CEQA. Because the program is assessed under CEQA only, SOC-3 is not applicable to the program and noted as such in the analysis in this section.

Employment, Housing, Socioeconomics, and Environmental Justice Program Discussion

SOC-1. Overall Determination: No Impact. Construction and operation of the program elements would not result in displacement of a large number of people necessitating the construction of replacement housing elsewhere. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. The construction of the conveyance improvements would generally occur within the public rights-of-way of existing streets. Operation of the conveyance improvements would be located underground. Therefore, construction and operation of the conveyance improvements would not result in the displacement of large numbers of people necessitating the construction of replacement housing elsewhere. Construction and operational impacts associated with the conveyance system would not occur and will not be addressed in the EIR/EIS at the program level.

Construction and operation of the plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; and the new solids processing digesters at the JWPCP would all occur within the footprint of these facilities. Furthermore, biosolids at the JWPCP would be managed within the footprint of the JWPCP, would be transported along existing public rights-of-way, and would be beneficially used or land filled at existing beneficial use, landfills, or land application locations. WRP effluent management would continue to discharge treated effluent via existing discharge points into existing water bodies. Therefore, none of the construction or operation activities at the WRPs or the JWPCP would result in the displacement of large numbers of people necessitating the construction of replacement housing. Construction and operational impacts associated with these program elements would not occur and will not be addressed in the EIR/EIS at the program level.

SOC-2. Overall Determination: No Impact. Construction and operation of all program elements would not result in displacement of substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. As discussed in SOC-1 (Program), all construction and operation would generally take place within the existing rights-of-way of streets, the existing footprints of the WRPs and the JWPCP, and at existing beneficial use, landfill, or land application locations. There is no housing currently located at any of these sites. Therefore, the program elements would not result in a

displacement of substantial numbers of existing housing. Construction and operational impacts would not occur for any of the program elements and will not be addressed in the EIR/EIS at the program level.

SOC-3. Overall Determination: Not Applicable. An analysis of environmental impacts that are disproportionately high and adverse on minority and low-income populations is required by NEPA. The program elements are only analyzed under CEQA because there is no federal action as part of the construction or operation of the program elements and, therefore, NEPA is not applicable. Thus, this threshold is not applicable to the construction and operation of program elements and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	N/A	N/A
SJCWRP – Plant Expansion	N/A	N/A
WRP – Process Optimization	N/A	N/A
WRP – Effluent Management	N/A	N/A
JWPCP – Solids Processing	N/A	N/A
JWPCP – Biosolids Management	N/A	N/A

SOC-4. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not cause a substantial change in local employment or the labor force. Impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Construction of the conveyance improvements; the plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; and the solids processing digesters at the JWPCP would require some construction workers. Construction firms would bid on construction contracts for the various program elements, and the winning firms would assign employees they currently employ to the construction jobs. The construction workers would not need specialized training and would be located within the JOS service area. Therefore, the construction of the program elements would not cause a substantial change in the local employment or labor force. Construction impacts for all program elements would be less than significant and will not be addressed in the EIR/EIS at the program level.

The operation of the program elements would not require the hiring of additional employees. The operation of the improvements to the conveyance system would occur underground and would convey wastewater via gravity to the WRPs and JWPCP for treatment. It would not require additional employees to operate. The operation of the plant expansion at the SJCWRP would simply allow a greater volume of wastewater to be treated and the existing employees at the SJCWRP would oversee the operation of this treatment. The operation of process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would store wastewater underground prior to treatment; the ability to store wastewater would not require additional employees. WRP effluent management could change the volume of tertiary treated effluent discharged into existing water bodies; however, the change in volume would not require any additional employees as it would continue to be discharged from existing discharge points. The new solids processing digesters would be connected to the existing system at the JWPCP, and the existing employees

would operate and maintain the new digesters. The increase in biosolids management would result in an increase in truck trips per day. However, these additional truck trips would likely be absorbed and operated by the current transportation companies hired to haul the biosolids. Therefore, the increase in biosolids would not result in the development of new transportation companies or the hiring of new employees. Operation of all program elements would not cause a substantial change in local employment or labor force. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

SOC-5. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not cause a substantial decrease in property values in the program area. Impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Construction of the conveyance improvements would generally occur within the public rights-of-way of existing streets and would not extend into private property. Construction of improvements at the WRPs and the JWPCP would occur within the footprint of the facilities and would not extend into residential neighborhoods or private property surrounding the plants. Therefore, construction impacts associated with all program elements would be less than significant and will not be addressed in the EIR/EIS at the program level.

The operation of the conveyance improvements, the improvements at the WRPs, WRP effluent management, and solids processing at the JWPCP would not result in a substantial decrease in property values in the project area. Operation of the conveyance system would occur underground, within the public rights-of-way of existing streets, and would not extend into private property. Operation of all improvements to the WRPs and JWPCP would be within the footprint of the existing facilities. WRP effluent management would continue to consist of effluent discharge into currently receiving channels. Therefore, operational impacts associated with all project elements would not occur and will not be addressed in the EIR/EIS at the program level.

Biosolids management would increase the number of truck trips from the JWPCP. However, trucks typically use Figueroa Street, between Lomita and Sepulveda, to access I-110, and there are no residential properties along this section of Figueroa to experience a decrease in property values. Therefore, the increase in truck trips would not result in a substantial decrease in property values. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Employment, Housing, Socioeconomics, and Environmental Justice Project Discussion

SOC-1. Overall Determination: No Impact. Construction and operation of all project elements would not result in displacement of a large number of people necessitating the construction of replacement housing elsewhere. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore and Offshore; All Riser/Diffuser Areas. The onshore tunnel alignment would be constructed and operated below the ground surface. The offshore tunnel alignment and the riser and diffuser areas would be located below the seafloor and/or below the ocean surface. People and homes do not exist at these locations; therefore, this threshold is not applicable to these project elements.

All Shaft Sites. Construction and operation at all shaft sites would occur in primarily industrial areas (TraPac, LAXT, Southwest Marine), vacant lots owned by the Sanitation Districts (JWPCP East, JWPCP West), or open space/parking lots (Angels Gate, Royal Palms). Therefore construction and operation would not result in the displacement of any people necessitating the construction of replacement housing elsewhere. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

SOC-2. Overall Determination: No Impact. Construction and operation of all project elements would not result in displacement of substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere. No impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore and Offshore; All Riser/Diffuser Areas. The onshore tunnel alignment would be constructed and operated below the ground surface. The offshore tunnel alignment and the riser and diffuser areas would be located below the seafloor and/or below the ocean surface. People and homes do not exist at these locations; therefore, this threshold is not applicable to these project elements.

All Shaft Sites. See SOC-1 (Project). Construction and operation at any shaft site would not result in the displacement of substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere. All shafts sites are in industrial areas, on land currently owned by the Sanitation

Districts, or open space/parking lots. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

SOC-3. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements, with the exception of the offshore tunnel, have the potential to result in environmental impacts that are disproportionately high and adverse on minority and low-income populations. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction[1]	Operation[1]		Construction[1]	Operation[1]
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

[1] Environmental justice is addressed in the EIR/EIS using significant and unavoidable determinations from other resource chapters. The final determination will be provided in the resource evaluations in each resource chapter in the EIR/EIS. Any impacts determined to be significant and unavoidable will be evaluated for environmental justice to determine if there are disproportionate effects on low-income and minority populations.

All Project Elements (Except Tunnel Alignment – Offshore). Construction of the project elements would occur in areas of Los Angeles known to be depressed socio-economically or known to have high minority populations. Therefore, construction of all project elements have the potential to result in environmental impacts that are disproportionately high and adverse on minority and low-income populations. Furthermore, operation of the project elements could result in environmental impacts. Therefore, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Tunnel Alignment – Offshore. The offshore tunnel alignment would be constructed below the seafloor. People do not live within the ocean and, therefore, the area above the offshore tunnel alignments does not have presence of minority or low-income population. Thus, the construction and operation of the offshore tunnel would not result in environmental impacts that are disproportionately high and adverse on minority and low-income populations. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

SOC-4. Overall Determination: Potentially Significant Impact. Construction of all project elements has the potential to substantially change the local employment or the labor force. Therefore, construction impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

All Project Elements. Construction of the onshore and offshore tunnels and the riser and diffuser would require specialized construction workers nationally and internationally to relocate to the JOS service area. There would likely be fewer than 100 of these highly specialized workers; however, support staff, engineers, and other construction employees, may be needed. Construction at the shaft sites would also require more construction workers than those specialized to work on the tunnels and riser and diffuser. Construction could occur from 6 to 8 years. Therefore, construction of the project elements could substantially change the local employment or labor force. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the project elements would convey treated effluent to the Pacific Ocean for discharge. The conveyance would not require any additional employees. The system would be entirely self-contained. Maintenance would be performed by the existing staff, who regularly maintains the existing ocean outfalls. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

SOC-5. Overall Determination: Less Than Significant Impact. Construction and operation of project elements would not cause a substantial decrease in property values in the project area. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore. The onshore tunnel could require easements to be obtained from property owners for the purpose of accessing the underground tunnel if necessary; however, the purchase of easements would not have a detrimental effect of property values as these easements would be partial underground easements and would not preclude use of the property at the surface. The underground tunnels would be accessible for service and repair work from the shaft sites. In case of an accident, any hazardous materials would be removed via the shaft sites. Therefore, the private properties would not be disturbed in order to provide access to the tunnel. Due to the average tunnel depth of 200 feet, the subsidence of the soil under the private properties would not be an issue. Additionally, purchase of the easements by the Sanitation Districts would ensure that property owners do not have any liabilities. Thus, impacts of the underground easements on private properties would be less than significant; however, the EIR/EIS will identify the parcels that may require an easement.

Tunnel Alignments – Offshore; All Riser/Diffuser Areas. The offshore tunnel alignment would be constructed and operated below the ground surface. The offshore tunnel alignment and the riser and diffuser areas would be located below the seafloor and/or below the ocean surface. Homes do not exist at these locations. Therefore, this threshold is not applicable to these project elements.

All Shaft Sites. Similar industrial uses exist in the neighborhood surrounding the JWPCP where project construction activities would occur, and no new incompatible land uses would be introduced. Construction and operation of new shaft sites would be on industrially zoned land (e.g., the Port of Los Angeles) or on Sanitation Districts' property (e.g., the JWPCP). At the Angels Gate shaft site, the closest surrounding uses are recreational; however, residential uses are located across from Gaffey. These

properties could experience temporary but adverse construction impacts, such as construction noise (Noise Section XII), for the duration of construction at this shaft site (between 4 and 8 years). During construction, affected property owners may experience a decrease in property value. However, any decrease in property value would be temporary, isolated to these homes, and would not be applicable to the whole of the project area (e.g., other shaft sites, and onshore and offshore tunnel alignments).

There are several residential properties to the north of the Royal Palms shaft site, overlooking Royal Palms Beach. As with the properties located adjacent to Angels Gate, these properties could experience temporary but adverse construction impacts, such as construction noise (these impacts are further discussed in Noise Section XII) for the duration of construction at this shaft site (between 4 and 8 years). During construction, affected property owners may experience a decrease in property value. However, any decrease in property value would be temporary, isolated to these homes, and would not be applicable to the whole of the project area (e.g., other shaft sites and onshore and offshore tunnel alignments). Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

Once operational, the shaft sites would support the conveyance of treated effluent to the Pacific Ocean for discharge. The shaft sites may include some low-profile aboveground structures such as access hatches (TraPac, LAXT, Southwest Marine, Angels Gate, and Royal Palms) or a three-story surge tower (JWPCP East and JWPCP West). The surge towers would blend in with the existing JWPCP buildings. The system would be primarily underground and entirely self-contained. Therefore, operation at any shaft site would not cause a substantial decrease in property values in the area and operational impacts would be less than significant. Operational impacts will not be addressed in the EIR/EIS at the project level.

Public Services Checklist

		Program			Project		
XIV.	**PUBLIC SERVICES.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
PS-1.	Require the substantial expansion of existing fire protection facilities or the construction of new fire protection facilities to maintain an acceptable level of service?	☐	☒	☐	☐	☐	☒
PS-2.	Require the substantial expansion of existing police service facilities or the construction of new police service facilities to maintain an acceptable level of service?	☐	☒	☐	☐	☐	☒
PS-3.	Require the substantial expansion of existing school facilities or require the building of new facilities?	☐	☐	☒	☐	☐	☒
PS-4.	Require the substantial expansion of existing parks and/or recreation opportunities or require the building of new recreation facilities?	☐	☐	☒	☐	☒	☐
PS-5.	Impair implementation of or physically interfere with an existing emergency response or emergency preparedness plan or emergency evacuation plan or require the preparation of a new emergency response or preparedness plan?	☒	☐	☐	☒	☐	☐

Public Services Program Discussion

PS-1. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not require the substantial expansion of existing fire protection facilities or the construction of new fire protection facilities to maintain an acceptable level of service. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Typically, the need for increased fire services is either associated with an increase in population or an increase in uses or activities that require fire services because of their inherent nature (e.g., oil storage terminals). Construction and operation of the program elements would not be directly associated with an increase in population. Furthermore, as discussed below, the inherent nature of the uses of each program element is that of wastewater conveyance and treatment, and these uses typically do not generate a need for fire services. Fire services were contacted in each of the jurisdictions of the program facilities to confirm whether there was a need for expanded services associated with the program. Responses from fire services can be found in Appendix 16-A of the EIR/EIS, and they indicate that the program elements do not create a need for increased fire services. Therefore, construction and operation of the program elements would not result in the need for substantial expansion of existing fire protection facilities or the construction of new fire protection facilities; impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Construction and operation of the conveyance improvements would not require the expansion of existing fire protection facilities or the construction of new fire protection facilities. The conveyance system is currently underground and conveys wastewater to the WRPs and JWPCP for treatment and is generally located within the public rights-of-way of roads. This type of infrastructure does not require fire services because of their purpose to convey wastewater; therefore, during construction and operation of the conveyance improvements, an increase in fire services or facilities would not be required and impacts would not occur. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Construction and operation at the WRPs would not require the substantial expansion of existing fire protection facilities or the construction of new fire protection facilities. The WRPs treat wastewater and are not facilities that require regular fire protection services (see Section VIII for a discussion of hazardous materials currently used at the WRPs during operation and emergency plans). Plant expansion at the SJCWRP would involve the continued operations to treat wastewater and, therefore, would not increase the need for fire protection services. Process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would include underground storage tanks of wastewater and, therefore, would not increase the need for fire protection services. WRP effluent management would continue to release volumes of treated effluent from the WRPs into receiving waters and, therefore, would not require increased fire services. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Construction and operation at the JWPCP would not require the substantial expansion of existing fire protection facilities or the construction of new fire protection facilities. The existing solids processing digesters do not require regular fire services; the new digesters would be similar to the existing ones. The operation of biosolids management would consist of an increase in truck trips to take the biosolids from the JWPCP to existing biosolids use facilities or land application facilities. An increase in truck trips would not require expanded fire services. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

PS-2. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not require the substantial expansion of existing police service facilities or the construction of new police service facilities to maintain an acceptable level of service. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Typically, the need for increased police services is either associated with an increase in population or an increase in uses or activities that require police services because of their inherent nature (e.g., correctional facilities or prisons). Construction and operation of the program elements would not be directly associated with an increase in population. Furthermore, as discussed below, the inherent nature of the uses of each program element is that of wastewater conveyance and treatment, and these uses typically do not generate a need for police services. Police services were contacted in each of the jurisdictions of the program facilities to confirm whether there was a need for expanded services associated with the program. The responses from police services can be found in Appendix 16-A of the EIR/EIS, and they indicate that the program elements do not create a need for increased police services. Therefore, construction and operation of the program elements would not result in the substantial expansion of existing police facilities or the construction of new police facilities; impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Construction and operation of the conveyance improvements would not require the expansion of existing police facilities or the construction of new police facilities. The conveyance system is currently underground and it conveys wastewater to the WRPs and JWPCP for treatment and is generally located within the public rights-of-way of roads. This type of infrastructure does not require police services because of their purpose to convey wastewater. During construction, traffic plans may be required to control traffic and re-route traffic; however, these types of traffic plans and any required police and security to implement them are typical of utilities located in existing public rights-of-way. Therefore, during construction and operation of the conveyance improvements, an increase in police services or facilities would not be required, and impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Construction and operation at the WRPs would not require the substantial expansion of existing police facilities or the construction of new police facilities. The WRPs treat wastewater and are not facilities that require regular police services. Plant expansion at the SJCWRP would involve the continued treatment of wastewater and, therefore, would not increase the need for police services. Process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would include underground storage tanks of wastewater and, therefore, would not increase the need for police services. WRP effluent management

would continue to release volumes of treated effluent from the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP into receiving waters and, therefore, would not need expanded police services. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level

Construction and operation at the JWPCP would not require the substantial expansion of existing police facilities or the construction of new police facilities. The existing solids processing digesters do not require regular police services; the new digesters would be similar to the existing ones. The operation of biosolids management would consist of an increase in truck trips to transport the biosolids from the JWPCP to existing biosolids use facilities or land application facilities. An increase in truck trips would not require additional police services. Impacts would be less than significant and will not be addressed in the EIR/EIS at the program level

PS-3. Overall Determination: No Impact. Construction and operation of all program elements would not generate new students or adversely impact any school facilities necessitating the building of new schools. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Typically, the need for increased school services, such as new buildings, is associated with land uses and activities that result in an increase in population and, specifically, an increase in the population of school-age children (e.g., subdivisions). Construction and operation of the program elements would not be associated with an increase in population of school-age children. Furthermore, the inherent nature of the uses of each program element is that of wastewater conveyance and treatment, and these uses typically do not generate a need for school services. School districts were contacted in each of the jurisdictions of the program facilities to confirm whether there was a need for expanded services associated with the program. The responses from school districts can be found in Appendix 16-A of the EIR/EIS, and they indicate that the program elements do not create a need for increased school services. Therefore, construction and operation of the program elements would not result in the substantial expansion of existing school facilities or the construction of new school facilities; impacts would not occur and will not be addressed in the EIR/EIS at the program level.

PS-4. Overall Determination: No Impact. Construction and operation of all program elements would not require the substantial expansion of existing parks and/or recreation opportunities or require the building of new recreation facilities. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Typically, the need for increased parks and recreational services is associated with land uses and activities that result in an increase in population (e.g., subdivisions). Construction and operation of the program elements would not be directly associated with an increase in population. Furthermore, the inherent nature of the uses of each program element is that of wastewater conveyance and treatment, and these uses typically do not generate a need for parks or recreational services. Therefore, construction and operation of the program elements would not result in the substantial expansion of existing park or recreational facilities or the construction of new park or recreational facilities; impacts would not occur and will not be addressed in the EIR/EIS at the program level.

PS-5. Overall Determination: Potentially Significant Impact. Construction of some program elements could impair implementation of or physically interfere with an existing emergency response or emergency preparedness plan or emergency evacuation plan, or require the preparation of a new emergency response or preparedness plan. Therefore, construction impacts related to these specific program elements would be potentially significant, and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The conveyance system is currently underground and conveys wastewater to the WRPs and JWPCP for treatment and is generally located within the public rights-of-way of roads. During construction, traffic plans may be required to control traffic and re-route traffic; however, these types of traffic plans are typical of utilities located in existing public rights-of-way. Once operational, the conveyance system would be located underground and would not have the ability to impair or conflict with an emergency preparedness plan. Therefore, construction and operation of the conveyance improvements would not impair the implementation of or physically interfere with an existing emergency response or emergency preparedness plans; impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. Construction of plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; and solids processing facilities at the JWPCP could result in activities that could physically interfere with the implementation of an emergency preparedness plan; therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level. Once the elements at these WRPs and the JWPCP are operational (including WRP effluent management), the conveyance of wastewater through the system, the discharge of recycled water, and the processing of solids, would not require additional employees or require new emergency preparedness plans. Furthermore, the program elements would be located within the footprint of existing facilities and, therefore, would not physically interfere with emergency preparedness plans. Additional truck trips related to biosolids management are small (about 20 additional daily truck trips from the JWPCP), and these trucks would follow existing designated truck routes. Therefore, the small number of trucks would not impair implementation of or physically interfere with an existing emergency preparedness plan. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Public Services Project Discussion

PS-1. Overall Determination: No Impact. Construction and operation of all project elements would not require the substantial expansion of existing fire protection facilities or the construction of new fire protection facilities to maintain an acceptable level of service. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Typically, the need for increased fire services is either associated with an increase in population or an increase in uses or activities that require fire services because of their inherent nature (e.g., oil storage terminals). Construction and operation of the project elements would not be associated with an increase in population. Furthermore, as discussed below, the inherent nature of the uses of each project element is that of supporting wastewater treatment or discharging treated wastewater, and these uses typically do not generate a need for fire services. Fire services were contacted in each of the jurisdictions of the project facilities to confirm whether there was a need for expanded services associated with the project. Responses from fire services can be found in Appendix 16-A of the EIR/EIS, and they indicate that the project elements do not create a need for increased fire services. Therefore, construction and operation of the project elements would not result in the substantial expansion of existing fire protection facilities or the construction of new fire protection facilities; impacts would not occur and will not be addressed in the EIR/EIS at the project level.

PS-2. Overall Determination: No Impact. Construction and operation of all project elements would not require the substantial expansion of existing police service facilities or the construction of new police service facilities to maintain an acceptable level of service. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Typically, the need for increased police services is either associated with an increase in population or an increase in uses or activities that require police services because of their inherent nature (e.g., correctional facilities or prisons). Construction and operation of the project elements would not be associated with an increase in population. Furthermore, the inherent nature of the uses of each project element is that of supporting wastewater treatment or discharging treated wastewater, and these uses typically do not generate a need for police services. Police services were contacted in each of the jurisdictions of the project facilities to confirm whether there was a need for expanded services associated with the project. The responses from police services can be found in Appendix 16-A of the EIR/EIS, and they indicate that the project elements do not create a need for increased police services.

Therefore, construction and operation of the project elements would not result in the substantial expansion of existing police facilities or the construction of new police facilities; impacts would not occur and will not be addressed in the EIR/EIS at the project level.

PS-3. Overall Determination: No Impact. Construction and operation of all project elements would not require the substantial expansion of existing school facilities or require the building of new facilities. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Typically, the need for increased school services, such as new buildings, is associated with land uses and activities that result in an increase in population and, specifically, an increase in the population of school-age children (e.g., subdivisions). Construction and operation of the project elements would not be associated with an increase in population of school-age children. Furthermore, the project elements would not generate new students or adversely impact any school facilities necessitating the building of new schools. School districts were contacted in each of the jurisdictions of the project elements to confirm whether there was a need for expanded services associated with the project. The responses from school districts can be found in Appendix 16-A of the EIR/EIS, and they indicate that the project elements do not create a need for increased school services. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

PS-4. Overall Determination: Less Than Significant Impact. Construction and operation of the project elements would not require the substantial expansion of existing parks and/or recreation opportunities or require the building of new recreation facilities. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Typically, the need for increased parks and recreational services is associated with land uses and activities that result in an increase in population (e.g., subdivisions). Construction and operation of the project elements would not be associated with an increase in population. Furthermore, the inherent nature of the uses of each project element is that of supporting wastewater treatment and discharging treated wastewater, and these uses does not generate a need for parks or recreational services. (For specific impacts on Angels Gate, Point Fermin, and Royal Palms [existing recreational areas and parks] associated with construction at the Royal Palms shaft site and the Angels Gate shaft site, see

Recreation Section XV.) Therefore, impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

PS-5. Overall Determination: Potentially Significant Impact. Construction of the project elements could impair implementation of or physically interfere with an existing emergency response or emergency preparedness plan or emergency evacuation plan or require the preparation of a new emergency response or preparedness plan. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

All Project Elements. Construction of the project elements could result in activities that could physically interfere with the implementation of an emergency preparedness plan; therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Once operational, the project elements would be located in the subsurface with minimal aboveground facilities located within existing developed areas. Therefore, operation of all project elements would result in no impacts and will not be addressed in the EIR/EIS at the project level.

Recreation Checklist

XV.	RECREATION. Would the program/project:	Program			Project		
		Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
REC-1.	Result in a substantial loss or diminished quality of recreational, educational, or visitor-oriented opportunities, facilities, or resources?	☒	☐	☐	☒	☐	☐
REC-2.	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☒	☐	☐
REC-3.	Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐	☐	☒

Recreation Program Discussion

REC-1. Overall Determination: Potentially Significant Impact. Construction of process optimization at the LCWRP could result in the diminished quality of recreational opportunities. Therefore, construction impacts related to this specific program element would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Recreational opportunities related to WRP Effluent Management are discussed in Hydrology, Water Quality (Freshwater), and Public Health Section IX of this appendix or Chapter 11 within the context of designated beneficial uses for the receiving waters.

Conveyance System. The construction of the conveyance improvements would generally occur within the public streets rights-of-way and, therefore, may occur near to or adjacent to recreational, educational, or visitor-oriented opportunities. However, construction and maintenance activities related to utilities within the public rights-of-way are typical. Furthermore, since the construction would be temporary and short in duration, any effect from construction to the recreational opportunity would be restored upon construction completion. Construction of the conveyance improvements would not substantially reduce or diminish the quality of recreational, educational, or visitor-oriented opportunities; therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the program level. Once operational, the conveyance system would be located underground and would not substantially diminish the quality of recreational, educational, or visitor-oriented opportunities, facilities, or resources. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Some recreational resources are located within the general vicinity of several WRPs. A golf course is located to the north/northeast across the San Jose Creek from the SJCWRP. Elephant Hill, an open space recreational area, is located to the west/southwest of the POWRP. El Dorado Park, an open space recreational area, and El Dorado Park Golf Course are located to the north and west, respectively, of the LBWRP. The San Gabriel River separates the LBWRP from the golf course, and Willow Street separates the LBWRP from the park. Whittier Narrows Recreation Area is located to the north of the WNWRP and Legg Lake is located to the east across from Rosemead Boulevard. Finally, part of Iron-Wood Nine Golf Course is located within the boundaries of the LCWRP.

Construction and operation of the plant expansion and process optimization at the SJCWRP would not diminish the quality of the golf course. The golf course is not directly adjacent to the SJCWRP and is separated from the WRP by the San Jose Creek. Construction and operation of the plant expansion would take place along the west/northwestern side of the SJCWRP, adjacent to the San Gabriel River and away from the golf course. Construction of process optimization would take place in an existing parking lot of the SJCWRP and would be separated from the golf course by more than 250 feet and San Jose Creek. Therefore, the construction of plant expansion and process optimization at the SJCWRP would be physically separated from the golf course so as not to diminish the golfing experience. Once operational, the majority of the process optimization facilities would exist underground and the surface would be returned to an existing parking lot. Therefore, construction and operational impacts associated with improvements at the SJCWRP would not result in a substantial loss or diminished quality of recreational

opportunities or resources. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Construction and operation of process optimization at the POWRP would not diminish the quality of the existing recreational opportunities within the general vicinity of this WRP. Construction of process optimization would occur in the center of the POWRP and approximately 75 feet from the nearest edge of Elephant Hill. Elephant Hill is a large open space area, and there are no special features or amenities directly adjacent to the process optimization construction area. Visitors to Elephant Hill could move away from or enjoy the remaining area of Elephant Hill should construction of process optimization at the POWRP inhibit their enjoyment. Construction impacts of process optimization at POWRP would be less than significant and will not be addressed in the EIR/EIS at the program level. Once operational, the majority of the process optimization facilities would be located underground and the surface would be returned to its existing condition of vacant lot/wastewater support facilities. Therefore, operational impacts associated with process optimization at the POWRP would not occur and will not be addressed in the EIR/EIS at the program level.

Construction and operation of process optimization at the LBWRP would not diminish the quality of the existing recreational opportunities within the general vicinity of this WRP. Construction of process optimization at the LBWRP would be located south of the existing Leo J. Vander Lans Advanced Water Treatment Facility and north of the LBWRP existing wastewater treatment facilities. This construction would be located more than 500 feet from El Dorado Park and El Dorado Park Golf Course. Furthermore, San Gabriel River and Willow Street both separate these two recreational areas from the construction area. Finally, the park is open space and there are no special amenities located on southern edge adjacent to Willow Street. Therefore, users of the park could move away from the construction to other areas of park should the construction inhibit users enjoyment of the park. The golf course only has a few holes adjacent to the San Gabriel River, west of the construction area. The very nature of golf allows players to move through the course and not remain at one hole. Therefore, players would move from these holes and not remain stationary for long periods should the construction inhibit their enjoyment of the golf course. Therefore, construction of process optimization would not substantially diminish the quality of the park or golf course due to the distance and the separation by the river and the street and the availability of other areas of the park and golf course open to users. Construction impacts of process optimization at LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level. Once operational, the majority of the process optimization facilities would be located underground and the surface would be returned to its existing condition of vacant disturbed soil. Therefore, operational impacts of process optimization at the LBWRP would not occur and will not be addressed in the EIR/EIS at the program level.

Construction of process optimization at the LCWRP could result in a disruption of the existing Iron-Wood Nine Golf Course driving range. The proposed location for the underground storage tank is beneath a portion of the existing driving range. Therefore, construction of the process optimization could result in a substantial loss or diminished quality of the driving range. Construction impacts of process optimization at the LCWRP would be potentially significant and will be addressed in the EIR/EIS at the program level. Once operational, the majority of the process optimization facilities would be located underground and the surface of the driving range would be returned to its existing conditions. Therefore, operational impacts of process optimization at the LCWRP would not occur and will not be addressed in the EIR/EIS at the program level.

WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP would result in a change in volume of discharged water into the existing water bodies; however, this change would not substantially diminish the quality of recreational opportunities or resources. Some of the receiving waters

have designated beneficial uses of recreation under the Clean Water Act. However, much of the recreation is restricted by Los Angeles County Department of Public Works (by restricted access to the receiving waters) or may be reviewed by SWRCB. Furthermore, the current primary function is specifically to be maintained for flood and drainage purposes during wet and dry flows. Therefore, impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

JWPCP. There are no recreational facilities within the general vicinity of the improvement locations at the JWPCP. Furthermore, the construction and operation of solids processing facilities and the operation of biosolids management would be located within the interior of the JWPCP. Therefore, construction and operation of solids processing facilities and operation of biosolids management at the JWPCP would not have an impact on recreational opportunities and will not be addressed in the EIR/EIS at the program level.

Once the biosolids are transported from the JWPCP, they are beneficially used at existing locations, land filled, or applied to agricultural land. The increase in biosolids at the JWPCP to be beneficially used or disposed of would not diminish the quality of recreational opportunities or resources. The land applications and beneficial use locations are generally located in areas dominated by agriculture or in light industrial/commercial areas and, generally, recreational resources would not be located within close proximity to these existing uses. The actual land use application or beneficial use would occur on existing agricultural land or in existing beneficial use buildings. The Sanitation Districts would only use sites that are properly permitted and for which all site-specific impacts, including impacts on offsite recreational resources, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, operational impacts associated with biosolids management on recreational opportunities would not occur and will not be addressed in the EIR/EIS at the program level.

REC-2. Overall Determination: No Impact. Construction and operation of all program elements would not increase the use of existing neighborhood and regional parks. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. The construction and operation of all program elements would not result in an increase in use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. Construction and operation of improvements under the program would generally occur within existing public rights-of-way or would occur within the footprint of the WRPs and JWPCP, with the exception of WRP effluent management, and would not extend into areas surrounding the facilities. WRP effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP would result in a change in volume of discharged water into the existing water bodies; however, this change would not substantially diminish the quality of recreational opportunities or resources at neighborhood or regional parks. Furthermore, as previously discussed, once the biosolids are transported from the JWPCP, they are beneficially used at existing locations, land filled, or applied to agricultural land. The actual land use application or beneficial use would occur on existing agricultural land or in existing beneficial use buildings. Therefore,

construction and operational impacts for all program elements to existing neighborhood and regional parks would not occur and will not be addressed in the EIR/EIS at the program level.

REC-3. Overall Determination: No Impact. Construction and operation of all program elements would not include recreational facilities or require the construction of new recreational facilities. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Construction and operation of program elements do not include recreational facilities. See REC-1 (Program) for information about existing recreational opportunities. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Recreation Project Discussion

REC-1. Overall Determination: Potentially Significant Impact. Construction at the JWPCP West, Angels Gate, and Royal Palms shaft sites could result in a diminished quality of recreational opportunities. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Recreational opportunities and the riser/diffuser areas are discussed in Marine Environment Section XI within the context of designated beneficial uses for the Pacific Ocean and the coastal area.

Tunnel Alignments – Onshore and Offshore. Construction and operation of the onshore and offshore tunnels would occur below the ground surface and below the seafloor. There are no recreational opportunities at these depths. Therefore, the construction and operation of the onshore and offshore tunnels would not substantially diminish the quality of recreational opportunities or resources. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East, TraPac, LAXT, and Southwest Marine. There are no recreational facilities adjacent or in proximity to the JWPCP East, LAXT, and Southwest Marine shaft sites. The LAXT and Southwest Marine shaft sites are located within the Port of Los Angeles on Terminal Island and are removed from all recreational locations at the port. The JWPCP East shaft site is surrounded by residential homes, retail, and commercial uses and does not have any recreational uses adjacent or within proximity to it. Therefore, construction and operation at these shaft sites would not substantially diminish

recreational opportunities or resources. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Directly across from the TraPac terminal is the designated Harry Bridges Boulevard Buffer, which will be a future park area for the residents of Wilmington. The buffer will include a 30- to 40-foot tall earthen berm along Harry Bridges Boulevard to buffer Wilmington residents and park users from the noise generated by activities at the TraPac container terminal and from trucks traveling on Harry Bridges Boulevard. Currently, the Harry Bridges Boulevard Buffer is under construction. TraPac specifically is a container terminal that stores hundreds of stacked containers removed from cargo ships. These containers can be stacked as high as several stories (assuming each container is approximately 10 feet in height). The construction at the TraPac shaft site would occur behind the containers, effectively shielding the buffer from noise or other construction activities. Furthermore, the berm associated with the buffer would shield users of the buffer from shaft construction. Once constructed, the TraPac shaft site could have low-profile aboveground facilities associated with it, such as access hatches. These would remain screened from view by the containers. Therefore, construction and operation at the TraPac shaft site would not substantially diminish existing recreational opportunities. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP West, Angels Gate, and Royal Palms. The JWPCP West shaft site would be located at the corner of West Lomita and Figueroa Street. Immediately across Figueroa Street is the Wilmington Athletic Complex, which includes soccer fields and baseball fields. The noise barrier surrounding the shaft site would not necessarily prevent noise, light, and glare impacts on users of the Wilmington Athletic Field. Therefore, construction impacts associated with the JWPCP West shaft site would be potentially significant on the Wilmington Athletic Field and will be addressed in the EIR/EIS at the project level. Once operational, the shaft site could have permanent facilities such as a three-story surge tower and a pumping plant, which are consistent with the type of facilities already at the JWPCP. Therefore, operation at the JWPCP West shaft site would not have an impact on the Wilmington Athletic Complex. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Construction at the Angels Gate and Royal Palms shaft sites has the potential to result in a substantial loss or diminished quality of recreational, educational, or visitor-oriented opportunities, facilities, or resources. Angels Gate and Royal Palms Beach are two designated recreational areas of the city of Los Angeles. Construction at these areas would occur over a number of years and could reduce the quality of the existing recreational experience at these two locations due to noise, vibration, and traffic. Therefore, construction at the Angels Gate and Royal Palms shaft sites could substantially diminish the quality of recreational resources at these locations. Construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Operation at the Angels Gate or Royal Palms shaft sites would not have an impact on recreational, educational, or visitor-oriented facilities or resources. The shaft would be converted into a smaller belowground access structure that would be connected to the tunnel. Any aboveground facilities at the Royal Palms shaft site would exist in the same location as the current facilities. Therefore, these facilities would not inhibit the use of Angels Gate Park or Royal Palms Beach. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

REC-2. Overall Determination: Potentially Significant Impact. Construction at the JWPCP West, Angels Gate, and Royal Palms shaft sites could result in the increased use of existing neighborhood and regional parks. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Recreational opportunities associated with the riser/diffuser areas are discussed in Marine Environment Section XI within the context of designated beneficial uses for the Pacific Ocean and the coastal area

Tunnel Alignments – Onshore and Offshore. See REC-1 (Project) for construction and operation details. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP East, TraPac, LAXT, and Southwest Marine. See REC-1 (Project) for construction and operation details. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Shaft Sites – JWPCP West, Angels Gate, and Royal Palms. See REC-1 (Project) for construction details. The presence of construction activities near the Wilmington Athletic Complex, the Angels Gate Park, and the Royal Palms Beach may shift use away from those areas during the construction period and increase the use of other recreational areas. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. See REC-1 (Project) for operation details. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

REC-3. Overall Determination: No Impact. Construction and operation of all project elements would not include recreational facilities or require the expansion of existing facilities. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. The construction and operation of all project elements do not include the development of recreational facilities or require the expansion of existing facilities. Use may temporarily shift away from certain facilities during construction (e.g., Angels Gate or Royal Palms), but this temporary shift would not require the construction of new facilities elsewhere due to the availability of other areas of the coastline for recreational enjoyment. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Transportation and Traffic (Terrestrial) Checklist

	Program			Project		
XVI. TRANSPORTATION AND TRAFFIC (TERRESTRIAL). Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
TRT-1. Conflict with an applicable plan, ordinance, or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant elements of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☒	☐	☐
TRT-2. Conflict with an applicable congestion management program, including, but not limited to level of service standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☒	☐	☐
TRT-3. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☒	☐	☐	☒
TRT-4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☒	☐	☐

	Program			Project		
XVI. TRANSPORTATION AND TRAFFIC (TERRESTRIAL). Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
TRT-5. Result in inadequate emergency access?	☒	☐	☐	☒	☐	☐
TRT-6. Conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or otherwise substantially decrease the performance of safety of such facilities?	☒	☐	☐	☒	☐	☐

Transportation and Traffic (Terrestrial) Program Discussion

TRT-1, TRT-2, TRT-4, TRT-5, and TRT-6. Overall Determination: Potentially Significant Impact. Construction and operation of several program elements could exceed thresholds related to traffic. Therefore, construction and operational impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	X
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

All Program Elements (Except WRP Effluent Management). Construction of all program elements except WRP effluent management (which is discussed below and does not include construction) has the potential to impact traffic and exceed traffic and transportation thresholds. Therefore, construction activities for Thresholds TRT-1, TRT-2, and TRT-4 through TRT-6 will be evaluated for all program elements in the EIR/EIS at the program level. Operation of the program elements may also affect transportation and circulation. For example, construction- and operation-related activities resulting from solids processing and the operation of biosolids management at the JWPCP could conflict with an applicable congestion management program, including, but not limited to, level-of-service standards established by the county congestion management agency for designated roads or highways. According to the city of Carson guidelines, a detailed traffic study must be prepared if the project adds 50 or more new trips to and from the site during a peak hour. Biosolids truck trips from the JWPCP are anticipated to increase. Therefore, construction and operational impacts would be potentially significant and will be addressed in the EIR/EIS at the program level. Therefore, the traffic analysis will evaluate construction and operational activities for all program elements (except WRP effluent management as discussed below) for Thresholds TRT-1, TRT-2, and TRT-4 through TRT-6 in the EIR/EIS at a program level.

WRP (Effluent Management). WRP effluent management would include a change in the volume of treated effluent discharged from the WRPs. The very nature of discharging treated effluent does not generate traffic and cannot have an impact on traffic. Therefore, the operation of WRP effluent management would not impact traffic or circulation and will not be addressed in the EIR/EIS at the program level.

TRT-3. Overall Determination: No Impact. Construction and operation of all program elements would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. See LU-3 (Program), for details regarding public airports and private airstrips. Construction and operational impacts would not occur; therefore, this issue will not be addressed in the EIR/EIS at the program level.

Transportation and Traffic (Terrestrial) Project Discussion

TRT-1, TRT-2, TRT-4, TRT-5, and TRT-6. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements could generate traffic levels that could exceed traffic related thresholds. Therefore, construction and operational impacts related to all project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. Construction of all project elements has the potential to generate traffic that could exceed thresholds. Therefore, construction activities for all project elements for Thresholds TRT-1, TRT-2, TRT-4, TRT-5, and TRT-6 will be evaluated in the EIR/EIS at a project level. Operation of the project is unlikely to generate traffic that could exceed thresholds because once operational, treated effluent would be conveyed belowground and discharged to the Pacific Ocean. However, operational activities for all thresholds for all project elements will be evaluated in the EIR/EIS at a project level.

TRT-3. Overall Determination: No Impact. Construction and operation of all project elements would not result in a change in air traffic patterns. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. See LU-3 (Project) for details regarding public airports and private airstrips. Construction and operation of all project elements would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. Construction and operational impacts would not occur; therefore, this issue will not be addressed in the EIR/EIS at the project level.

Transportation and Traffic (Marine) Checklist

		Program (marine transportation and traffic thresholds are not applicable to the program elements*)			Project		
XVII.	**TRANSPORTATION AND TRAFFIC (MARINE).** Would the project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
TRM-1.	Interfere with the operation of designated vessel traffic lanes entering and exiting the Port of Los Angeles?	☐	☐	☐	☒	☐	☐
TRM-2.	Impair the level of safety for vessels navigating the Main Channel or West Basin areas within the Port of Los Angeles, or precautionary areas outside the Port of Los Angeles?	☐	☐	☐	☒	☐	☐

*The program elements would not be located in the marine environment. All program elements would be constructed and operated on land. Therefore, none of the Transportation-Traffic Marine thresholds apply to the program elements and marine transportation impacts will not be addressed in the EIR/EIS at the program level.

Transportation and Traffic (Marine) Project Discussion

The only project elements that would be located in the marine environment and could have an impact on marine transportation and traffic are:

- The offshore tunnel alignments
- The riser and diffuser on either the PV Shelf or the SP Shelf
- The existing ocean outfalls

The construction and operation of all other project elements would occur on land and would not have an impact on marine transportation and traffic. Therefore, the marine transportation and traffic thresholds only apply to the offshore tunnel alignments, the riser and diffuser areas, and the existing ocean outfalls; all other project elements will not be addressed in this section or in the EIR/EIS.

TRM-1. Overall Determination: Potentially Significant Impact. Construction of the offshore tunnels and at all the riser and diffuser areas could interfere with the operation of designated vessel lanes entering and exiting the Port of Los Angeles. Additionally, operation of the SP Shelf riser and diffuser could interfere with the operation of designated vessel lanes. Therefore, construction and operational impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	X	–

Tunnel Alignments – Offshore. Non-hazardous material excavated from construction of the offshore tunnel could potentially be loaded onto barges at a location within the Port of Los Angeles where it would then be transported to the LA-2 or LA-3 ocean disposal site. This would create additional marine vessel activity and traffic within the Port of Los Angeles and has the potential to interfere with the operation of designated vessel traffic lanes entering and exiting the Port of Los Angeles. Therefore, construction impacts would be potentially significant, and will be addressed in the EIR/EIS at the project level. Once the offshore tunnel is operational, it would be located below the surface of the ocean and would not require any additional vessel traffic. Therefore, operation of the offshore tunnel would not interfere with the operation of designated vessel traffic lanes entering and exiting the Port of Los Angeles and impacts would not occur; this issue will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. Construction activities at the riser/diffuser areas have the potential to interfere with the operation of designated vessel traffic lanes entering and exiting the Port of Los Angeles. The construction of the new riser and diffuser on either the PV Shelf or SP Shelf would require the construction and operation of a construction platform, similar to those used for oil exploration in the ocean. Barges may also be anchored to the platform. The rehabilitation of the existing ocean outfalls would require the use of multiple barges, and may require some type of ocean surface platform. These construction structures and barges could interfere with the operation of designated vessel traffic lanes entering and exiting the Port of Los Angeles. Therefore, construction impacts at the riser/diffuser areas would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational the construction platform and multiple barges would be removed from all of the riser/diffuser areas. Barges and ships would only be used for periodic maintenance purposes and would not remain in one place for extended durations. Currently, the existing ocean outfalls are periodically maintained and, therefore, any maintenance of the existing ocean outfalls after rehabilitation would be no different than the existing conditions. Operational impacts associated with the rehabilitated existing ocean outfalls would not occur and will not be addressed in the EIR/EIS at the project level.

Periodic maintenance activities associated with a riser and diffuser on either the SP Shelf or on the PV Shelf would be the same as those of the existing ocean outfalls. However, although similar in nature to maintenance of the existing ocean outfalls, the operation of a new riser and diffuser on the SP Shelf has the potential to interfere with marine transportation and traffic due to the proximity of the riser and diffuser area to the marine vessel travel lanes. Therefore, operation of a new riser and diffuser on the SP Shelf would be potentially significant and will be addressed in the EIR/EIS at the project level.

Operation of a riser and diffuser on the PV Shelf would not have the potential to interfere with marine transportation and traffic because any periodic maintenance activities would occur outside the designated vessel lanes. Therefore, operation of a new riser and diffuser on the PV Shelf would not interfere with the operation of the designated vessel traffic lanes and will not be addressed in the EIR/EIS at the project level.

TRM-2. Overall Determination: Potentially Significant Impact. Construction of the offshore tunnel and at the SP and PV Shelf riser and diffuser areas could impair the level of safety for vessels navigating in the Port of Los Angeles or precautionary areas outside the port. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	N/A	N/A
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	N/A	N/A
Shaft Site – JWPCP East	N/A	N/A	Shaft Site – Royal Palms	N/A	N/A
Shaft Site – JWPCP West	N/A	N/A	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	N/A	N/A	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	N/A	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Offshore. Non-hazardous material excavated from the offshore tunnel alignments could potentially be loaded onto barges at a location within the Port of Los Angeles where it would then be transported to the LA-2 or LA-3 ocean disposal site. This would create additional marine vessel activity and traffic within the Port of Los Angeles and has the potential to impair the level of safety for vessels entering and exiting the Port of Los Angeles. Therefore, construction impacts would be potentially significant, and this issue will be addressed in the EIR/EIS at the project level. Once the offshore tunnel is operational, it would be located below the surface of the ocean and would not require any additional vessel traffic. Therefore, operation of the offshore tunnel would not impair the level of safety for vessels and impacts would not occur; this issue will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – San Pedro Shelf and Palos Verdes Shelf. The construction of a new riser and diffuser on the PV Shelf or SP Shelf has the potential to impair the level of safety for vessels navigating the Main Channel, West Basin area, or precautionary areas. Construction of a new riser and diffuser would involve assembly of diffuser sections at the Port of Los Angeles and then towing the assembled diffuser sections to the offshore riser and diffuser area. The diffuser sections could be a significant

length, requiring careful maneuvering through the Port of Los Angeles. Therefore, construction impacts of a new riser and diffuser on either the SP Shelf or the PV Shelf would be potentially significant and will be addressed in the EIR/EIS at the project level.

Operation of a new riser and diffuser on either the SP Shelf or the PV Shelf would have no impact on the safety of vessels. As discussed previously, once the new riser and diffuser are operating, they would only require periodic maintenance. The vessels that would be used for this maintenance are similar to vessels that regularly use the Port of Los Angeles under existing conditions and would not substantially increase or impair the safety of vessel traffic entering and leaving the port. Therefore, operation of a new riser and diffuser would have no impact and will not be addressed in the EIR/EIS at the project level.

Riser/Diffuser Area – Existing Ocean Outfalls. Rehabilitation of the existing ocean outfalls would not impair the level of safety for vessels. Construction barges and ships would leave from and return to the Port of Los Angeles en route to the existing ocean outfall location; however, these vessels would be similar to those that regularly use the Port of Los Angeles under existing conditions. Therefore, construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level. As previously discussed, once the rehabilitated existing ocean outfalls are operating, they would only require periodic maintenance as under existing conditions. Therefore, operation of the rehabilitated existing ocean outfalls would not change from existing conditions and there would be no impact. This issue will not be addressed in the EIR/EIS at the project level.

Utilities and Service Systems and Energy Checklist

		Program			Project		
XVIII. UTILITIES AND SERVICE SYSTEMS AND ENERGY. Would the program/project:		Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
UTL-1.	Exceed wastewater treatment requirements of the applicable regional water quality control board?	☐	☒	☐	☐	☐	☒
UTL-2.	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐	☐	☒
UTL-3.	Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☒	☐	☐
UTL-4.	Require new or expanded entitlements because sufficient water supplies would not be available to serve the project?	☐	☒	☐	☒	☐	☐
UTL-5.	Result in the disruption or impediment of utility service to areas during construction?	☐	☒	☐	☐	☒	☐
UTL-6.	Be served by landfill(s) with insufficient permitted capacity to accommodate the project's solid waste disposal needs during construction and operation?	☐	☒	☐	☒	☐	☐

		Program			Project		
XVIII. UTILITIES AND SERVICE SYSTEMS AND ENERGY. Would the program/project:		Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
UTL-7.	Be in noncompliance with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐	☐	☒
UTL-8.	Require new, offsite energy supply and distribution infrastructure or capacity-enhancing alterations to existing facilities that are not anticipated by adopted plans or programs?	☐	☒	☐	☒	☐	☐

Utilities and Service Systems and Energy Program Discussion

UTL-1. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not exceed wastewater treatment requirements of the applicable regional water quality control board. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. Construction and operation of the improvements to the conveyance system would facilitate the conveyance of wastewater via gravity to the WRPs and JWPCP for treatment. The improvements to the conveyance system could accept additional volumes of wastewater; however, the additional volume of wastewater would be treated under the current permitted capacity of the POWRP, LBWRP, LCWRP, WNWRP and JWPCP (for SJCWRP see below). Therefore, the construction and operation of the conveyance improvements would not exceed wastewater treatment requirements. Construction and operational impacts associated with the conveyance system would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. SJCWRP would expand by 25 MGD for a total capacity of 125 MGD. This is the only WRP expansion proposed. The increase in permitted capacity would require the Sanitation Districts to apply for a new wastewater permit from the Los Angeles RWQCB. This permit would require wastewater treatment levels and criteria for the SJCWRP to continue to be met, as they currently are. Therefore, plant expansion at the SJCWRP would not exceed wastewater treatment requirements of the applicable RWQCB permits. Construction and operational impacts associated with plant expansion at the SJCWRP would be less than significant, and this issue will not be addressed in the EIR/EIS at the program level.

The other WRPs would maintain their permitted capacities and would not treat additional wastewater. Process optimization would not change the capacity of the WRPs but rather normalize the flows through the WRPs to more efficiently treat the wastewater and discharge or recycle the treated effluent. Therefore, impacts would not occur under the construction and operation of process optimization at all of the WRPs and will not be addressed in the EIR/EIS at the program level.

WRP effluent management would continue to discharge treated effluent into existing receiving waters. Any change in volume of this discharge would not result in an exceedence of wastewater treatment requirements since the discharge is regulated through the permits granted by the RWQCB to each WRP. Therefore, operation of WRP effluent management would not result in an exceedence of wastewater treatment requirements and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction and operation of solids processing facilities and operation of biosolids management at the JWPCP would not result in an exceedence of wastewater treatment requirements of the applicable RWQCB. The increase in solids processing would not increase the volume of secondary treated effluent from the JWPCP. The JWPCP would continue to operate within its permitted discharge requirement of 400 MGD. However, the increase in solids processing would increase biosolids management. This increase would require additional trucks to transport the biosolids off site for beneficial use, landfill, or land application. This increase in biosolids would not exceed wastewater

treatment requirements. The actual land use application or beneficial use would occur on existing agricultural land or in existing beneficial use buildings. The Sanitation Districts would only use sites that are properly permitted and for which all site-specific impacts, including exceeding wastewater treatment requirements, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations. Therefore, impacts associated with construction and operation of solids processing facilities and the operation of biosolids management would be less than significant and will not be addressed in the EIR/EIS at the program level.

UTL-2. Overall Determination: No Impact. Construction and operation of all program elements would not result in the construction of new water or wastewater treatment facilities, the construction of which could cause significant environmental effects. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. All program elements include the construction of new or improvements to wastewater treatment facilities. Potential significant impacts associated with the construction and operation of all program elements are discussed in the applicable resource sections of this Preliminary Screening Analysis (e.g., cultural resources, hazards and hazardous materials, air quality, noise, etc.). Any impact deemed potentially significant in this Preliminary Screening Analysis will be further addressed in the EIR/EIS. Because the potentially significant impacts of the program elements (e.g., wastewater treatment facilities) are being evaluated in their respective resource sections, this issue will not be addressed in the EIR/EIS at the program level.

UTL-3. Overall Determination: Potentially Significant Impact. Construction of all program elements could increase the amount of runoff. Therefore, construction impacts related to these specific program elements would be potentially significant and will be addressed in the EIR/EIS at the program level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	–
SJCWRP – Plant Expansion	X	–
WRP – Process Optimization	X	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	X	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The generation of stormwater runoff is affected by a change in the amount of impervious (e.g., roads, sidewalks, gutters) or pervious (e.g., lawns, parks, natural open space) surfaces in a location. Exposed soils during construction can generate more stormwater runoff when compared to existing conditions, as can a substantial reduction in pervious surfaces due to an increase in the amount of impervious surfaces (e.g., converting a park to a parking structure). Construction and operation of the conveyance improvements would occur in the existing public rights-of-way of streets. During construction, runoff could be generated as discussed in HYD-7 (Program). Therefore, construction of the conveyance improvements would have potentially significant impacts and will be addressed in the EIR/EIS at the program level. Operation would not substantially increase impervious surfaces over the

current existing impervious surface conditions. Therefore, operation would not generate new or large volumes of stormwater requiring the construction of new stormwater drainage facilities, and impacts would not occur. Therefore, operational impacts will not be addressed in the EIR/EIS at the program level.

WRPs. The program includes plant expansion at the SJCWRP and process optimization at the SJCWRP, LCWRP, POWRP, and LBWRP within the existing footprint of these facilities. Construction would likely not need new stormwater drainage facilities but would require management plans to control any stormwater generated by the program construction sites as required under NPDES. This issue is discussed in more detail in HYD-7 (Program). Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the program level.

Once construction is complete, the site surface for the plant expansion at the SJCWRP and process optimization at the SJCWRP, LCWRP, POWRP, and LBWRP would return to existing conditions. In general, the improvements to the WRPs would not substantially increase impervious surfaces at the WRPs and, therefore, would not result in a substantial increase in stormwater runoff. The operation of the improvements to the WRPs would utilize existing stormwater drainage facilities and would not require the construction of new facilities. Therefore, operational impacts associated with the improvements to the WRPs would be less than significant and will not be addressed in the EIR/EIS at the program level.

WRP effluent management would continue to discharge tertiary treated effluent into existing receiving waters. Any change in volume of this discharge would not result in the construction of new stormwater drainage facilities. The existing receiving waters primarily act as flood control channels, and are maintained and operated to receive stormwater runoff, as well as the discharge from the WRPs. Therefore, operation of WRP effluent management would not result in the need for new stormwater drainage facilities and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction of the solids processing digesters would likely not require new stormwater drainage facilities but would require management plans to control any stormwater generated by the program construction sites as required under NPDES (see HYD-7 [Program]). Therefore, construction impacts associated with the solids processing digesters would be potentially significant and will be addressed in the EIR/EIS at the program level. The new solids processing digesters would operate on existing impervious surfaces. Furthermore, operation of the solids processing digesters would utilize existing stormwater drainage facilities and would not require the construction of new facilities. Because the operation of the solids processing digesters would not substantially increase impervious surfaces, the operation would not result in a substantial increase in stormwater runoff requiring new stormwater drains. Operational impacts associated with the solids processing digesters would not occur and will not be addressed in the EIR/EIS at the program level.

The operation of biosolids management would continue to occur at the JWPCP and would not require the construction of new buildings or impervious surfaces. The biosolids would be transported to existing beneficial use locations, existing landfills, or existing land application areas. Since the biosolids management locations already exist, they would not increase the stormwater volume and would not need new stormwater drainage facilities. Therefore, impacts associated with the operation of biosolids management would not occur and will not be addressed in the EIR/EIS at the program level.

UTL-4. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not require new or expanded entitlements because sufficient water supplies would be available. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The construction and operation of the conveyance improvements would not require new or expanded entitlements for potable water. Construction would require trenching and excavation for the replacement and/or maintenance of existing conveyance pipelines. Operation would simply involve the conveyance of wastewater via gravity to the WRPs and JWPCP for treatment. Therefore, construction and operation of the conveyance improvements would not require new or expanded entitlements for potable water and sufficient water supplies would be available. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. The plant expansion at the SJCWRP; process optimization at the SJCWRP, LCWRP, POWRP, and LBWRP; and improvements at the JWPCP would not result in an increased demand for potable water. Some potable water would be required during construction of the improvements at the SJCWRP, POWRP, LCWRP, LBWRP, and JWPCP for drinking water purposes and spraying water on graded areas for dust control. However, construction would be temporary and would not require new entitlements for potable water sources to be developed. Therefore, construction impacts associated with these WRPs and the JWPCP would be less than significant and will not be addressed in the EIR/EIS at the program level.

Operation of plant expansion at the SJCWRP and process optimization at the SJCWRP, LCWRP, POWRP, and LBWRP would not use large quantities of potable water. Currently, the WRPs and JWPCP use “wash water” for all water uses except drinking and safety showers. The wash water is recycled water from the facilities. The solids processing digesters also use wash water. Since the improvements at the WRPs and the JWPCP would not increase the number of employees at each facility, potable water for drinking or showering purposes would not increase. Furthermore, effluent management at the SJCWRP, POWRP, LCWRP, LBWRP, and WNWRP may actually increase the availability of treated water for beneficial reuse in the JOS service area as an additional supply to potable water supplies. Therefore, operation of the program may actually create additional water supplies for industry, landscaping, and other uses. The operation of the WRPs and JWPCP would not require new or expanded entitlements. Operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

UTL-5. Overall Determination: Less Than Significant Impact. Construction would not result in the disruption or impediment of utility services to areas during construction. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation[a]
Conveyance System – Conveyance Improvements	–	N/A
SJCWRP – Plant Expansion	–	N/A
WRP – Process Optimization	–	N/A
WRP – Effluent Management	N/A	N/A
JWPCP – Solids Processing	–	N/A
JWPCP – Biosolids Management	N/A	N/A

[a] Threshold addresses construction-specific impacts; operation does not apply.

Conveyance System. The improvements to the conveyance system would generally be constructed in the public rights-of-way of existing streets adjacent to other utilities. The Sanitation Districts regularly maintain its existing conveyance system without disrupting utility services to areas. Construction on the conveyance system would be performed in accordance with the Sanitation Districts' normal maintenance practices. Therefore, construction impacts would not result in the disruption or impediment of utility service during construction. Construction impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs and JWPCP. Construction for the plant expansion at the SJCWRP; process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; and solids processing at the JWPCP would be within the existing footprints of the facilities. Because construction would be constrained to the existing footprints, it would not disrupt existing utilities. Biosolids management and WRP effluent management do not include any construction and, therefore, would not disrupt existing utility services. Therefore, the construction of improvements to the WRPs and the JWPCP would not result in disruption to or impediment of utility service to areas during construction. Impacts would not occur and will not be addressed in the EIR/EIS at the program level.

UTL-6. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would be served by landfill(s) with sufficient permitted capacity to accommodate solid waste disposal needs. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. Construction of the conveyance improvements and improvements to the WRPs and the JWPCP would include the demolition of several existing solids processing digesters and, therefore, would generate a small amount of waste during a single occasion. The metal of the solids processing digesters could be recycled per waste management standards and the remaining could be disposed of at a landfill. The program elements' construction waste would primarily consist of soil, as process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would require the excavation of large amounts of soil to build the underground storage tanks. Construction waste also would include concrete and asphalt. Concrete and asphalt are typically recycled and not sent to landfills. The excavated soil could be land filled or it could be beneficially reused at other Sanitation District locations or other

Los Angeles County locations. Construction solid waste could be sent by rail to Mesquite Landfill, located in Imperial County off Highway 78 and 5 miles northeast of the city of Glamis. Mesquite Landfill can receive a maximum amount of 20,000 tons per day, and has a current available capacity of 600 million tons with a projected closing date of 100 years (Sanitation Districts 2007). Therefore, construction of all program elements would be served by a landfill with sufficient capacity. Construction of all program elements would result in less than significant impacts on landfills and will not be addressed in the EIR/EIS at the program level.

Operation of the program elements would not result in significant amounts of solid waste. The program elements would upgrade and improve wastewater treatment facilities, which by their very nature, do not produce large amounts of solid waste (e.g., trash). Furthermore, the program does not include an increase in the number of employees at the WRPs or the JWPCP. Employees are generators of solid waste in industrial and commercial uses. Therefore, if the number of employees does not increase under the program, the volume of solid waste would not increase. For a discussion of biosolids, (which are not solid waste, but rather products of the wastewater treatment process), please see AG-1 (Program) for additional details on biosolids. Therefore, operation of all program elements would be served by a landfill with sufficient capacity. Operational impacts for all program elements would not occur and will not be addressed in the EIR/EIS at the program level.

UTL-7. Overall Determination: No Impact. Construction and operation of all program elements would comply with federal, state, and local statute and regulations related to solid waste. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

All Program Elements. The construction and operation of all program elements would comply with all regulations related to solid waste, such as the California Integrated Waste Management Act and city recycling programs. Furthermore, the biosolids management element would comply with all biosolids waste disposal and beneficial use regulations as described in UTL-1 (Program). Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the program level.

UTL-8. Overall Determination: Less Than Significant Impact. Construction and operation of all program elements would not require new, offset energy supply, and distribution infrastructure or capacity enhancing alterations to existing facilities. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the program level.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	–	–
SJCWRP – Plant Expansion	–	–
WRP – Process Optimization	–	–
WRP – Effluent Management	N/A	–
JWPCP – Solids Processing	–	–
JWPCP – Biosolids Management	N/A	–

Conveyance System. The construction and operation of the conveyance improvements would not require new, offsite energy supply and distribution infrastructure or capacity-enhancing alterations to existing facilities that are not anticipated by adopted plans or programs. Construction would primarily require trenching and excavation and restoring roads to existing conditions after construction. This would typically require minimal amounts of energy usually in the form of diesel fuel for construction equipment. It would not require substantial amounts of electricity. Therefore, construction would not require new energy supplies. Wastewater is generally conveyed through the system by gravity; therefore, energy is typically not required under operating conditions. Construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the program level.

WRPs. Construction for the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would require some energy. Energy would primarily be used in the form of diesel for construction equipment, and small amounts of electricity may be required for construction activities, such as welding. However, construction would be temporary and would not be so substantial as to require new offsite energy supplies. Therefore, construction impacts associated with the plant expansion at the SJCWRP and process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP would be less than significant and will not be addressed in the EIR/EIS at the program level.

The operation of process optimization at the SJCWRP, POWRP, LCWRP, and LBWRP may require the pumping of wastewater, which would require some energy. However, process optimization is primarily wastewater storage and, therefore, would not require a substantial amount of energy. Furthermore, process optimization and the WRPs would use variable frequency drives. Rather than running at a constant set point, the variable frequency drives ramp up and down based on the volume of wastewater flow. Therefore, energy is saved during low flow periods. Impacts associated with the operation of process optimization would be less than significant.

The operation of the plant expansion at the SJCWRP would increase energy use. The SJCWRP currently receives approximately 5 megawatts (MW) of energy from methane captured at the Puente Hills landfill through the use of internal combustion engine(s). The remaining necessary energy of approximately 1 to 2 MW is obtained from the grid. Utility power is currently available and used at the SJCWRP whenever the internal combustion engines are out of service or need maintenance. This would continue under the operation of the plant expansion. The plant expansion at the SJCWRP would potentially increase the use of energy to approximately 8.5 MW by 2050. Therefore, at least 2 to 3 MW would likely need to be obtained from the grid. Overall, the operation of the plant expansion would result in less than significant impacts and will not be addressed in the EIR/EIS at the program level.

The operation of WRP effluent management would continue to discharge treated effluent into receiving waters. This discharge is currently performed, and would continue to perform, via gravity and would not involve the use of electricity or energy. Therefore, impacts associated with WRP effluent management would not occur and will not be addressed in the EIR/EIS at the program level.

JWPCP. Construction at the JWPCP would require some energy, which would primarily be used in the form of diesel for construction equipment. Small amounts of electricity may be required for construction activities, such as welding. However, construction would be temporary and would not be so substantial as to require new offsite energy supplies. Therefore, construction impacts associated with solids processing at the JWPCP would be less than significant and will not be addressed in the EIR/EIS at the program level

The JWPCP produces electricity when it treats wastewater through the gas anaerobic digestion process from the solids processing. A combined cycle power plant at the JWPCP uses gas turbines to produce

approximately 18 to 20 MW of electricity and a steam turbine generator produces approximately 4 to 6 MW of electricity. Therefore, the electricity needed to operate the proposed solids processing digesters would be provided by the JWPCP. Utility power is currently available and used whenever the JWPCP onsite power plant and steam turbine generators are out of service or need maintenance. This would continue under the operation of the new solids processing digesters. Therefore, the operation of the solids processing digesters would result in less than significant impacts and will not be addressed in the EIR/EIS at the program level.

The operation of biosolids management would not require electrical energy. The biosolids would be transported to existing beneficial use facilities, existing landfills, or existing land application areas. The transportation would require some additional diesel. The existing uses would process the biosolids as they currently do. Therefore, biosolids management would not require any new, offsite energy supply and distribution infrastructure. Operational impacts would be less than significant and will not be addressed in the EIR/EIS at the program level.

Utilities and Service Systems and Energy Project Discussion

UTL-1. Overall Determination: No Impact. Construction and operation of all project elements would not exceed wastewater treatment requirements. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	See Marine Environment.	
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	See Marine Environment.	
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	See Marine Environment.	

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. The project elements would allow the Sanitation Districts to continue to meet their wastewater treatment requirements. The project elements would ensure reliability in the existing infrastructure. The JWPCP would continue to operate at its permitted capacity of 400 MGD, and construction and operation of the project elements would not increase the permitted capacity of the JWPCP. The project elements would not exceed wastewater treatment requirements of the applicable RWQCB. Therefore, construction and operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

UTL-2. Overall Determination: No Impact. Construction and operation of all project elements would not require the construction of new water or wastewater treatment facilities. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. All project elements include the construction of new wastewater treatment facilities. Potential significant impacts associated with the construction and operation of all project elements are discussed in the applicable resource sections of this Preliminary Screening Analysis (e.g., cultural resources, hazards and hazardous materials, air quality, noise, etc.). Any impact deemed potentially significant in this Preliminary Screening Analysis will be further addressed in the EIR/EIS. Because the potentially significant impacts of the project elements are being evaluated in their respective resource sections, this issue will not be addressed in the EIR/EIS at the project level.

UTL-3. Overall Determination: Potentially Significant Impact. Construction at all shaft sites may generate runoff that could require the construction of new stormwater drainage facilities. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	N/A	N/A	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	N/A	N/A	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	N/A	N/A
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	N/A	N/A
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	N/A	N/A

Tunnel Alignments – Onshore and Offshore. Based on the anticipated construction method of using a TBM, the tunnel would be watertight. Equal pressure between the cutting face and the soil would be maintained. There would be minimal leakage of groundwater into the excavation because the soil interface is isolated within the pressurized cutting face. Therefore, only minimal volumes of nuisance water would need to be removed from the tunnel during construction. Water generated during tunnel construction would not be released directly into receiving waters. Furthermore, any inflow of water and/or slurry used during tunneling activities would be pumped back to a working shaft site, and thus impacts would occur at the shaft sites and not at the tunnel (similar to air quality impacts). Therefore, this threshold is not applicable to construction of the onshore and offshore tunnels and will not be addressed in the EIR/EIS at the project level.

Once the onshore and offshore tunnels are operational, they would convey secondary treated effluent from the JWPCP to the Pacific Ocean for disposal. This method of conveyance would not generate any new stormwater or require any new storm drains. Therefore, this threshold is not applicable to the operation of the onshore and offshore tunnels and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Any runoff generated at the shaft sites would be put into the sanitary sewer system maintained by the Sanitation Districts at the JWPCP, or the sewer system maintained by the City of Los Angeles for disposal at the Terminal Island Water Reclamation Plant on Terminal Island in the Port of Los Angeles. The storm drain system in the region is separate from the sewer system; all discharge into the sewer system is treated at wastewater treatment plants, whereas typically storm drains outlet into receiving waters and/or the Pacific Ocean. Construction at any shaft site would likely not need new stormwater drainage facilities but would require management plans to control any stormwater generated by the project construction sites. See HYD-7 (Project). Therefore, construction impacts associated with all shaft sites would be potentially significant and will be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. There is no runoff generated by the construction or operation of the riser and diffuser as these would be located in the Pacific Ocean. Therefore, this threshold is not applicable to the

construction or operation on the SP Shelf or PV Shelf and the rehabilitation and operation of the existing ocean outfalls and will not be addressed in the EIR/EIS at the project level.

UTL-4. Overall Determination: Potentially Significant Impact. Construction of the onshore and offshore tunnels and at all shaft sites could require new or expanded entitlements. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. Construction of all project elements may require substantial volumes of water that could require new or expanded entitlements because sufficient water supplies may not be available to serve the project. The water demand during construction of the onshore tunnel, offshore tunnel, and at the shaft sites has likely not been included in any water purveyor urban water management plans or water master plans. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the onshore tunnel, offshore tunnel, and shaft site permanent facilities would require no water. They would convey secondary treated effluent from the JWPCP to the Pacific Ocean. The conveyance of secondary treated effluent does not require potable water. Therefore, operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. Construction on the SP Shelf or the PV Shelf would occur in the ocean, as would the rehabilitation of the existing ocean outfalls. No potable water would be required for construction in these areas. Furthermore, once operational, the riser and diffuser on the SP Shelf or PV Shelf would be located below the ocean surface and would discharge secondary treated effluent, as would the rehabilitated existing ocean outfalls. Thus, under operating conditions, potable water would not be used. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

UTL-5. Overall Determination: Less Than Significant Impact. Construction of all project elements would not result in the disruption or impediment of utility services during the construction period. Therefore, impacts would be less than significant, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation[a]
Tunnel Alignment – Onshore	–	N/A	Shaft Site – Southwest Marine	–	N/A
Tunnel Alignment – Offshore	–	N/A	Shaft Site – Angels Gate	–	N/A
Shaft Site – JWPCP East	–	N/A	Shaft Site – Royal Palms	–	N/A
Shaft Site – JWPCP West	–	N/A	Riser/Diffuser Area – SP Shelf	–	N/A
Shaft Site – TraPac	–	N/A	Riser/Diffuser Area – PV Shelf	–	N/A
Shaft Site – LAXT	–	N/A	Riser/Diffuser Area – Existing Ocean Outfalls	–	N/A

[a] Threshold addresses construction-specific impacts; operation does not apply.

Tunnel Alignments – Onshore and Offshore. The Sanitation Districts have studied the existing utilities along the alternative tunnel alignments and surrounding the shaft sites (Parsons 2011). Since the onshore tunnel would be located at depths of approximately 70 to 450 feet, only existing deep utility facilities could potentially conflict with the onshore tunnel alignments (Parsons 2011). These utilities could include abandoned or active oil production wells, monitor and injection wells, pier and bridge pilings, high pressure oil and natural gas pipelines, and utility channel crossings (Parsons 2011). Typical service utilities such as electricity, water, and wastewater would not be affected by the onshore and offshore tunnel alignments based on the depth of tunnel installation (Parsons 2011). These types of utilities are typically located within the public right-of-way of streets at depths no greater than 30 feet bgs.

As discussed in HYD-3 (Project), construction of the onshore tunnel may require the temporarily suspension of a salt water barrier injection well. This would disrupt an existing utility service that could result in significant impacts. However, these impacts would be fully analyzed under HYD-3 (Project) and will not be included in this threshold.

Therefore, these utilities would not experience a disruption or impediment during tunnel construction. Construction impacts would be less than significant and will not be addressed in the EIR/EIS at the project level.

All Shaft Sites. Typical service utilities such as electricity, water, and wastewater would not be affected by the shaft sites because these utilities are generally within the rights-of-way of the street and, therefore, would not experience interference with the JWPCP East, TraPac, LAXT, Angels Gate, Royal Palms, or Southwest Marine shaft sites (Parsons 2011).

The JWPCP West and JWPCP East shaft sites would be constructed in the general vicinity of the Wilmington Oil Field. There are a number of abandoned and active oil wells within the vicinity of the shaft sites. Any active oil production well within the vicinity of these two shaft sites would be avoided during construction. Therefore, construction at these two shaft sites would not result in a disruption of oil production from the Wilmington Oil Field.

The JWPCP West shaft site would require crossing Figueroa Street and West Lomita Boulevard. There are a number of small diameter utilities in both of these streets, such as an Air Force pipeline, Unocal pipelines, and an abandoned sewer line. These utilities would either have to be relocated or avoided as is common for in-street construction. Because avoidance of utility disruption is a standard construction practice that requires coordination with utility providers, this impact is considered to be less than significant.

Construction impacts associated with construction at the shaft sites would be less than significant and will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. The riser and diffuser areas on the SP Shelf or the PV Shelf would be located off the coast of Southern California, and there are no existing utilities located within the vicinity of the risers and diffuser areas (Parsons 2011). In addition, there are no existing utilities within the vicinity of the existing ocean outfalls. Therefore, there would be no construction impacts on utilities for the riser and diffuser areas, and this will not be addressed in the EIR/EIS at the project level.

UTL-6. Overall Determination: Potentially Significant Impact. Construction of all project elements, except rehabilitation of the existing ocean outfalls, could result in large amounts of solid waste over an extended period of time. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	X	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	X	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. Excavated soil generated by the construction of all project elements, except for the rehabilitation of the existing ocean outfalls, would be disposed of at several locations, depending on whether it is hazardous or non-hazardous materials. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level. Rehabilitation of the existing ocean outfalls would not involve trenching or dredging; therefore, disposal of dredged material would not be required. Therefore, construction impacts associated to rehabilitation of the existing ocean outfalls would be less than significant and will not be addressed in the EIR/EIS at the project level.

Under operating conditions, the project elements would be self-contained, and would convey secondary treated effluent from the JWPCP to the Pacific Ocean for disposal. Operation of the project elements would not generate any solid waste and, therefore, no impacts would occur. Operational impacts will not be addressed in the EIR/EIS at the project level.

UTL-7. Overall Determination: No Impact. All project elements would comply with all regulations related to solid waste, such as the California Integrated Waste Management Act and city recycling programs. Therefore, no impacts would occur, and this threshold will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	–	–	Shaft Site – Southwest Marine	–	–
Tunnel Alignment – Offshore	–	–	Shaft Site – Angels Gate	–	–
Shaft Site – JWPCP East	–	–	Shaft Site – Royal Palms	–	–
Shaft Site – JWPCP West	–	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	–	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	–	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

All Project Elements. The construction and operation of all project elements would comply with all regulations related to solid waste, such as the California Integrated Waste Management Act and city recycling programs. Therefore, impacts would not occur and will not be addressed in the EIR/EIS at the project level.

UTL-8. Overall Determination: Potentially Significant Impact. Construction of the tunnels and shafts would result in an increased use of energy. Therefore, construction impacts related to these specific project elements would be potentially significant and will be addressed in the EIR/EIS at the project level. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	–	Shaft Site – Southwest Marine	X	–
Tunnel Alignment – Offshore	X	–	Shaft Site – Angels Gate	X	–
Shaft Site – JWPCP East	X	–	Shaft Site – Royal Palms	X	–
Shaft Site – JWPCP West	X	–	Riser/Diffuser Area – SP Shelf	–	–
Shaft Site – TraPac	X	–	Riser/Diffuser Area – PV Shelf	–	–
Shaft Site – LAXT	X	–	Riser/Diffuser Area – Existing Ocean Outfalls	–	–

Tunnel Alignments – Onshore and Offshore; All Shaft Sites. Construction of the tunnels and at all shaft sites would require increased energy use. Therefore, construction impacts would be potentially significant and will be addressed in the EIR/EIS at the project level.

Once operational, the onshore and offshore tunnels would be used to convey secondary treated effluent from the JWPCP to the Pacific Ocean for discharge via gravity and would typically not require the use of electricity. The shafts would be converted into belowground access structure that would not require electricity. Therefore, operation would not result in an increased use of electricity and impacts would not occur. Operational impacts will not be addressed in the EIR/EIS at the project level.

All Riser/Diffuser Areas. Electricity would not be used to construct the riser and diffuser or to rehabilitate the existing ocean outfalls. Portable generators that use diesel would be used on the construction platforms and barges. Therefore, construction of the riser and diffuser and/or rehabilitation of the existing ocean outfalls would not require new, offsite energy supplies, or distribution infrastructure. Construction impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Once operational, the riser and diffuser would release secondary treated effluent into the Pacific Ocean. This would not require the use of electricity. Therefore, the operation of the new riser and diffuser and the rehabilitation of the existing ocean outfalls would not require new, offsite energy sources. Operational impacts would not occur and will not be addressed in the EIR/EIS at the project level.

Growth Inducing Checklist

		Program			Project		
XIX.	**GROWTH INDUCING.** Would the program/project:	Potentially Significant Impact	Less Than Significant Impact	No Impact	Potentially Significant Impact	Less Than Significant Impact	No Impact
1	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example through extension of roads or other infrastructure)?	☒	☐	☐	☒	☐	☐
2	Remove obstacles to growth (e.g., through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development)?	☒	☐	☐	☒	☐	☐
3	Require expansion for one or more public services to maintain desired levels of service?	☒	☐	☐	☒	☐	☐
4	Cause economic effects that could result in other activities that could significantly affect the environment?	☒	☐	☐	☒	☐	☐
5	Set a precedent that could encourage and facilitate other activities that could significantly affect the environment?	☒	☐	☐	☒	☐	☐

Growth Inducing Program Discussion

XIX-1 through XIX-5. Overall Determination: Potentially Significant Impact. Construction and operation of all program elements would have potentially significant growth-inducing impacts and, therefore, will be addressed in the EIR/EIS.

Program Element Is Potentially Significant During	Construction	Operation
Conveyance System – Conveyance Improvements	X	X
SJCWRP – Plant Expansion	X	X
WRP – Process Optimization	X	X
WRP – Effluent Management	N/A	X
JWPCP – Solids Processing	X	X
JWPCP – Biosolids Management	N/A	X

All Program Elements. The program elements could do the following:

- Indirectly induce growth through the extension of infrastructure.
- Remove obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the JOS service area.
- Require the expansion of one or more public services.
- Cause economic effects that could result in other activities that could significantly affect the environment (e.g., if implementation of the program would require other supporting infrastructure such as new roads or power plants to be built, causing an economic impact on the residents of the program area).

It is unlikely the program elements would set a precedent that could encourage and facilitate other activities that could significantly affect the environment. Development of long-range planning documents is within the purview of the Sanitation Districts, similar to other utilities and service districts. The Sanitation Districts have embarked on a master facilities planning process previously and have been operating under their 2010 MFP; development of an updated MFP would not set a precedent. However, this impact and those discussed above will be addressed in the EIR/EIS.

Growth Inducing Project Discussion

XIX-1 through XIX-5. Overall Determination: Potentially Significant Impact. Construction and operation of all project elements would have potentially significant growth-inducing impacts and, therefore, will be addressed in the EIR/EIS.

Project Element Is Potentially Significant During	Construction	Operation		Construction	Operation
Tunnel Alignment – Onshore	X	X	Shaft Site – Southwest Marine	X	X
Tunnel Alignment – Offshore	X	X	Shaft Site – Angels Gate	X	X
Shaft Site – JWPCP East	X	X	Shaft Site – Royal Palms	X	X
Shaft Site – JWPCP West	X	X	Riser/Diffuser Area – SP Shelf	X	X
Shaft Site – TraPac	X	X	Riser/Diffuser Area – PV Shelf	X	X
Shaft Site – LAXT	X	X	Riser/Diffuser Area – Existing Ocean Outfalls	X	X

All Project Elements. The project elements could do the following:

- Indirectly induce growth through the extension of infrastructure.
- Remove obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the JOS service area.
- Require the expansion of one or more public services.
- Cause economic effects that could result in other activities that could significantly affect the environment (e.g., if the TBM would require a lot of offsite power resulting in the need for new power generating facilities, causing an economic impact that could have a significant effect on the environment).

It is unlikely the project elements would set a precedent that could encourage and facilitate other activities that could significantly affect the environment. The Sanitation Districts have an existing ocean discharge system that is currently being used and the project is proposed in response to growth in the region as well as the need to increase infrastructure reliability. However, impacts will still be addressed in the EIR/EIS.

Chapter 4
REFERENCES

4.1 Printed References

Cadien, D.B., et al. 2006. Identifying biological assemblages of soft and hard bottom habitats on the San Pedro Sea Shelf, California using remote sampling technique [Poster]. Abstract OS15F – 12IN: American Geophysical Union. EOS Transaction AGU, 87(36) in 2006 Ocean Science Meeting Supplement, Program and Abstracts. Honolulu, Hawaii: U.S.A. American Geophysical Union.

California Department of Conservation. 1986a. State of California Special Studies Zones. Los Alamitos Quadrangle. Los Angeles County, CA. 7.5 Minute Series. Available: <http://gmw.consrv.ca.gov/shmp/download/ap/pdf/LOSALAMITOS.PDF>. Accessed: January 20, 2012.

———. 1986b. State of California Special Studies Zones. Torrance Quadrangle. Los Angeles County, CA. 7.5 Minute Series. Available: <http://gmw.consrv.ca.gov/shmp/download/ap/pdf/TORRANCE.PDF>. Accessed: January 20, 2012.

———. 1991. State of California Special Studies Zones. El Monte Quadrangle. Los Angeles County, CA. 7.5 Minute Series. Available: <http://gmw.consrv.ca.gov/shmp/download/ap/pdf/ELMONTE.PDF>. Accessed: January 20, 2012.

———. 1999a. State of California Seismic Hazard Zones. El Monte Quadrangle. Available: <http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_elmo.pdf>. Accessed: January 20, 2012.

———. 1999b. State of California Seismic Hazard Zones. Whittier Quadrangle. Available: <http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_whitt.pdf>. Accessed: January 20, 2012.

———. 1999c. State of California Seismic Hazard Zones. Los Alamitos Quadrangle. Available: <http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_lalmi.pdf>. Accessed: January 20, 2012.

———. 1999d. State of California Seismic Hazard Zones. San Dimas Quadrangle. Available: <http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_sdim.pdf>. Accessed: January 20, 2012.

———. 1999e. State of California Seismic Hazard Zones. Torrance Quadrangle. Available: <http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_tor.pdf>. Accessed: January 20, 2012.

———. 1999f. State of California Seismic Hazard Zones. San Pedro Quadrangle. Available: <http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_sped.pdf>. Accessed: January 20, 2012.

———. 2008. Los Angeles Important Farmland. Available: <ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2008/los08.pdf >. Accessed: November 17, 2011.

———. 2009. Important Farmland in California, 2006. Division of Land Resource Protection, Farmland Mapping and Monitoring Program. Available: <ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/pdf/statewide/2006/fmmp2006_08_11.pdf>. Accessed: November 18, 2011.

———. 2012. Alquist-Priolo Earthquake Fault Zone Maps. Available: <http://www.quake.ca.gov/gmaps/ap/ap_maps.htm>. Accessed: January 20, 2012.

California Department of Conservation, Division of Mines and Geology. 1994. Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California Part II Los Angeles County. Generalized Mineral Land Classification Map of Los Angeles County – South Half. Open-File Report 94-14, Plate 1B.

CDFG (California Department of Fish and Game). 2011a. California Natural Diversity Database. Rarefind 4 Application. Results of species queries for Baldwin Park, El Monte, Long Beach, Los Alamitos, San Dimas, San Pedro, Torrance, Seal Beach, and Whittier quads. Available: <https://nrmsecure.dfg.ca.gov/gridprint.aspx>. Accessed: November 18, 2011.

———. 2011b. Summary of Natural Community Conservation Plans (NCCPs). November. Available: <http://www.dfg.ca.gov/habcon/nccp/status/index.html>. Accessed: November 15, 2011.

———. 2012. Summary of Natural Community Conservation Plans (NCCPs). January 2012. Available: <http://www.dfg.ca.gov/habcon/nccp/>. Accessed: January 21, 2012.

Caltrans (California Department of Transportation). 2004. Transportation- and Construction-Induced Vibration Guidance Manual. Sacramento, CA. June.

———. 2009. Officially designated State Scenic Highways. Available: <http://www.dot.ca.gov/hq/LandArch/scenic/schwy.htm>. Last Updated: November 16, 2007. Accessed: November 18, 2009.

———. 2010. California Scenic Highway Program. Officially Designated State Scenic Highways. Available: <http://www.dot.ca.gov/hq/LandArch/scenic/schwy.htm>. Accessed: April 26, 2010. Last revised: November 16, 2007.

CalEPA (California Environmental Protection Agency). 2009a. Department of Toxic Substances Control Cortese List. Available at: http://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTESE&site_type=CSITES%2COPEN%2CFUDS%2CCLOSE&status=ACT%2CBKLG%2CCOM&reporttitle=HAZARDOUS%20WASTE%20AND%20SUBSTANCES%20SITE%20LIST. Accessed on: November 18, 2009.

———. 2009b. EnviroStor Database. Available at: http://www.envirostor.dtsc.ca.gov/public/search.asp. Accessed on: November 18, 2009.

———. 2009c. Cortese List Data Resources List of Active CDO and CAO from Water Board (MS Excel, 632 KB). Available at: < http://www.calepa.ca.gov/SiteCleanup/CorteseList/>. Accessed on: November 18, 2009. California Natural Diversity Database (CNDDB). California Natural Diversity Database Search. 2008.

Central Basin Municipal Water District. 2005. 2005 Urban Water Management Plan. Carson, CA.

City of Carson. 2004. General Plan City of Carson. Final. Carson, CA. Prepared by the City of Carson.

City of Los Angeles. 1990. San Pedro Specific Plan. Los Angeles, CA. November, 30 1990.

———. 1992. Port of Los Angeles A Part of the General Plan of the City of Los Angeles. Adopted 1982.

———. 1996. City of Los Angeles General Plan, Safety Element. Adopted November 26, 1996.

———. 1998. City of Los Angeles General Plan, Transportation Element, Map E, Scenic Highways in the City of Los Angeles. Prepared by the Citywide Transportation. June 1998.

———. 1999a. Transportation Element of the General Plan. Available: <http://cityplanning.lacity.org/cwd/gnlpln/transelt/index.htm>. Accessed: April 27, 2010.

———. 1999b. San Pedro Community Plan. Available: http://www.lacity.org/PLN.

———. 1999c. Wilmington-Harbor City Community Plan. July 14.

City of Los Angeles –Navigate LA. 2009. Available: <http://navigatela.lacity.org/index.cfm>. Accessed: November 18, 2011.

City of Pomona. 1976. City of Pomona General Plan. Map 9 – Scenic Views in the Community.

City of Rancho Palos Verdes. 2006. NCCP Reserve Boundary Parcels. Map. Available: <http://www.palosverdes.com/rpv/planning/Palos-Verdes-Nature-Preserve/NCCP%20Preserve.official%20map.06_26_06.pdf>. Accessed: November 21, 2011.

County of Los Angeles. 2009. Tsunami Inundation Map for Emergency Planning. State of California – County of Los Angeles. Torrance and San Pedro Quadrangle Map. March 1, 2009. Available: <http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/LosAngeles/.

County of Los Angeles, Department of Regional Planning. 2010. Unincorporated Areas Zoning Map. Available: <http://planning.lacounty.gov/gisnet>. Accessed: February 2, 2010.

Crowder, Robert and Larry Olson. 1978. Polymer Flooding in Wilmington Oil Field, Ranger Zone, Fault Block V and Shallow Aquifers and Surface Casing Requirements for Wilmington and Belmont Offshore Oil Fields. Publication No. TR22. Published by: California Department of Conservation Division of Oil and Gas.

Dartnell et al. 2006. An Empirical Approach to Mapping the Distribution of Seafloor Geologic and Biologic Characteristics Offshore San Pedro, Southern California. 2006 Ocean Sciences Meeting. Honolulu, HI. February 20.

Department of Conservation, Division of Land Resource Protection. 2006. California Williamson Act 2004. Geographic Information System data as of 1-1-2004. Printed May 19, 2006. Available: <ftp://ftp.consrv.ca.gov/pub/dlrp/WA/Map%20and%20PDF/CALIFORNIA%20WILLIAMSON%20ACT/CA%20WA%202004.pdf>. Accessed: January 19, 2012.

DWR (Department of Water Resources). 2003. California's Groundwater - Bulletin 118. October.

ESRI. 2009a. Street Map: Cemeteries. Geographic Information System data layer.

———. 2009b. Street Map: Airports. Geographic Information System data layer.

Fugro (Fugro West, Inc.). 2011. Preliminary Site Characterization Report JWPCP Tunnel and Ocean Outfall Project Los Angeles, California. Prepared for Sanitation Districts of Los Angeles County, November 2011. Fugro Job No. 04.B3387004.

GeoLogic Associates. 1995. Preliminary Geotechnical Investigation Expansion of Water Treatment Facilities Carson Joint Water Pollution Control Plant Expansion. Prepared for County Sanitation Districts of Los Angeles County, October 1995. Job No. 9421.

Harris, C. M. (ed.). 1979. Handbook of noise control. 2nd edition. New York: McGraw-Hill, Inc.

Hesson, Bruce and Herman Olilang. 1990. Seal Beach Oil Field Alamitos and Marine Areas. Publication No. TR39. Published by: Department of Conservation Division of Oil and Gas.

Jones & Stokes. 1994. Draft Program Environmental Impact Report for the Joint Outfall System, 2010 Master Facilities Plan. November. Sacramento, CA. Prepared for the Sanitation Districts of Los Angeles County, Whittier, CA.

Larson, K. 2007. Birds of the Peninsula, November and December 2006. Humin'. Vol. XXIX (1): 4-5. Palos Verdes/South Bay Audubon Society. Palos Verdes, CA.

LARWQCB (Los Angeles Regional Water Quality Control Board). 1995. Water Quality Control Plan for the Los Angeles Region – Basin Plan for the Coastal Watershed of Los Angeles and Ventura Counties. Available at: <http://www.swrcb.ca.gov/rwqcb4/html/meetings/tmdl/Basin_plan/basin_plan_doc.html> Accessed: June 2007.

MWD (Metropolitan Water District). 2007. A Status Report on the Use of Groundwater in the Service Area of the Metropolitan Water District of Southern California. Report Number 1308. September. Pages: IV-3-1 – IV-3-16.

Parsons. 2011. Professional Design Services for the Preliminary Engineering of the Joint Water Pollution Control Plant Tunnel and Ocean Outfall Feasibility Study Report. Prepared for Sanitation Districts of Los Angeles County, November 30, 2011. Parsons Project No. 260252.

Sanitation Districts (Sanitation Districts of Los Angeles County). 2007. Mesquite Regional Landfill – Site Information. Accessed: January 22, 2010. Available: http://mrlf.org/index.php?pid=5.

———. 2010. JWPCP Depth to Water and Depth to Bottom Data. February 12, 2010.

State of California Natural Resources Agency. 2010. Adopted Text of the CEQA Guidelines Amendments (Adopted December 30, 2009, Effective March 18, 2010. Available: <http://ceres.ca.gov/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQA_Guidelines_Amendments.pdf>. Accessed: November 15, 2011.

SWRCB (State Water Resources Control Board). 2005. California Ocean Plan. Water Quality Control Plan, Ocean Waters of California.

———. 2009. GeoTracker: Environmental Data for Regulated Facilities in California. Available: <http://geotracker.swrcb.ca.gov/>. Accessed: November 18, 2009.

USFWS (U.S. Fish and Wildlife Service). 2008. Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus palosverdesensis*). 5-Year Review: Summary and Evaluation. Carlsbad, CA. March.

———. 2011a. Habitat Conservation Plans. Regional Habitat Conservation Plans. Pacific Southwest Region. Carlsbad Fish & Wildlife Office. Available: <http://www.fws.gov/carlsbad/HCPs/CarlsbadCFWORegionalHCPs%20.html>. Accessed: November 18, 2011.

———. 2011b. FWS Critical Habitat for Threatened & Endangered Species. Online mapper. Available: <http://criticalhabitat.fws.gov/crithab/>. Accessed: November 18, 2011.

USGS (U.S. Geological Survey). 2009a. San Pedro Quadrangle California. 7.5-Minute Series.

———. 2009b. Torrance Quadrangle California. 7.5-Minute Series.

USGS Geographic Names Information System (GNIS). 2009. Available: <http://geonames.usgs.gov/>. Accessed: November 16, 2009.

4.2 Personal Communications

Garrow, Pat. Senior Planner. City of Long Beach Advance Planning Department. November 30, 2011 – Email.

Signo, John F. Senior Planner. City of Carson Planning Division. December 5, 2011 – Email.

Appendix 1-B

AGENCY AND PUBLIC SCOPING REPORT

Appendix 1-B
AGENCY AND PUBLIC SCOPING REPORT

Introduction

The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts of Los Angeles County (Sanitation Districts) to ensure that the Joint Outfall System (JOS), serving 73 cities and unincorporated county areas within metropolitan Los Angeles County, will continue to provide environmentally sound and cost-effective wastewater management through the year 2050. This report summarizes the public and agency scoping efforts that occurred during the preparation of the Clearwater Program Draft Master Facilities Plan (MFP) and associated Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

The Clearwater Program MFP and EIR/EIS were prepared in conformance with the California State Water Resources Control Board's policy for implementing the Clean Water State Revolving Fund (SRF) Program for the construction of wastewater management facilities. In addition, the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) require project proponents to consult with agency and public stakeholders during the preparation of the draft EIR/EIS. The lead agencies – the Sanitation Districts and the U.S. Army Corps of Engineers (Corps) – made a commitment to go beyond the statutory requirements outlined in CEQA and NEPA by engaging and involving agencies and the public early and often throughout the planning process.

Public Outreach and Participation

Public outreach for the Clearwater Program began in January 2007 and continues today. The Sanitation Districts relied on multiple forms of outreach to ensure that potentially impacted communities were engaged early in the planning process, long before any decisions were made. This multi-faceted approach, the components of which are listed below, facilitated a productive exchange of information and ideas between the Sanitation Districts and stakeholders.

- Public Workshops (San Pedro, Wilmington, Rancho Palos Verdes, and Carson)
- Slide Presentations
- Individual and Group Meetings (Over 500)
- Informational Video
- Newsletter Updates
- Internet Website (www.ClearwaterProgram.org)
- Telephone Hot-Line (877-300-WATER)

Notice of Preparation

CEQA requires the preparation and circulation of a Notice of Preparation (NOP) at the onset of the EIR process. An NOP must provide sufficient information describing a project and potentially significant environmental impacts such that it enables responsible agencies to provide a meaningful response. At minimum, the NOP needs to include:

- Brief description of the proposed project
- Description of the proposed project's location
- Probable environmental effects of the proposed project
- Date, time, and place of the public hearing
- Address where documents or files relating to the proposed project are available for review
- Address where written comments on the scope of the EIR may be sent
- Deadline for submitting comments

In accordance with CEQA, the Sanitation Districts issued an NOP on October 10, 2008, indicating that an EIR would be prepared for the Clearwater Program MFP. The NOP was sent to 834 stakeholders. The NOP included a description of the programmatic evaluation of the infrastructure and facilities within the JOS and the potential changes required to manage wastewater flows projected through the year 2050. Additionally, the NOP described the project-specific need for a new Joint Water Pollution Control Plant (JWPCP) effluent tunnel/ocean outfall, and the area under consideration for its construction. As required by CEQA, the NOP listed the probable environmental effects of the Clearwater Program MFP's program-wide and project-specific components. A copy of the NOP is included at the end of this report as Attachment 1.

Notice of Intent

NEPA requires the preparation and publication of a Notice of Intent (NOI) to prepare a draft EIS. At minimum, an NOI needs to include:

- Description of the proposed action
- Description of possible alternatives to the proposed action
- Description of the lead agency's scoping process, including time and place of scoping meetings
- Name and address of the lead agency contact for the proposed action and EIS

The Corps determined that the Clearwater Program would require the preparation of an EIS. In accordance with NEPA, the Corps published the NOI in the Federal Register (Volume 73, No. 194) on October 6, 2008, announcing its intent to prepare a draft EIS/EIR for the Clearwater Program in conjunction with the Sanitation Districts. A copy of the NOI is included at the end of this report as Attachment 2.

The NOI explained that the construction of a new JWPCP effluent tunnel/ocean outfall identified in the Clearwater Program MFP would entail discharge of dredge and fill materials in waters of the United States, work in navigable waters of the United States, and, potentially, transport of dredge material for ocean disposal – all of which require federal permits. The Corps would potentially need to issue permits

pursuant to Section 404 of the Clean Water Act; Section 10 of the Rivers and Harbors Act; and, if necessary, Section 103 of the Marine Protection, Research, and Sanctuaries Act.

In addition to publishing the NOI in the Federal Register, hardcopies were mailed to multiple agencies and an electronic version was distributed via email to other interested parties and stakeholders.

NOP and NOI Comments

A summary of written and oral comments received on the NOP and NOI during the scoping period is presented in Table 1. Copies of written comments and the transcripts of oral comments received at the scoping meetings are included at the end of this report as Attachments 3 and 4, respectively.

Table 1. Summary of Written and Oral Comments on the NOP/NOI

Date	Agency/Organization	Commenter	Comment Summary
10/15/2009	Office of Planning and Research	Scott Morgan	▪ Provides confirmation of receipt and forward to identified agencies.
10/15/2009	California Integrated Waste Management Board	Margo Reid Brown	▪ Identifies that letter regarding NOP will be made part of the record of the California Integrated Waste Management Board.
10/17/2008	Department of Conservation, Division of Oil, Gas, and Geothermal Resources	Paul Frost	▪ Asks for oil wells to be plotted on maps. ▪ Identifies specific required actions and resources related to building and construction near plugged and abandoned wells.
10/17/2008	South Coast Air Quality Management District	Steve Smith	▪ Requests that draft EIR be sent with applicable data/appendices. ▪ Recommends resources and specific methodology and to be used in analysis. ▪ Recommends resources for development of mitigation measures. ▪ Provides data source information.
10/20/2008	Native American Heritage Commission	Dave Singleton	▪ Recommends actions to assess impacts to historical resources.
10/30/2008	City of Norwalk	Chino Consunji	▪ Identifies future transportation projects to take place in the service area.
11/3/2008	City of Glendora	David Chantarangsu	▪ Provides source for growth projections.
11/4/2008	U.S. Environmental Protection Agency	Paul Amato	▪ Requests that two hardcopies and one compact disc copy of the draft EIS be sent to his office when sending to Washington DC office.
11/4/2008 (attached 7/30/2008 letter)	U.S. Environmental Protection Agency	Carmen White	▪ Provides information on Superfund site located on the Palos Verdes Shelf and outfall alignment.

Table 1 (Continued)

Date	Agency/Organization	Commenter	Comment Summary
5/5/2008 (attached 11/4/2008 letter)	U.S. Environmental Protection Agency	Paul Amato	▪ Asks for rationale for thresholds of significance to be described. ▪ Identifies NEPA requirements for alternatives evaluation and discussion. ▪ Provides clarification of draft EIS scope for Air Quality analysis. Includes methodology and sources. ▪ Provides clarification of draft EIS scope for Biological Resources analysis. ▪ Provides clarification of draft EIS scope for Hazards and Hazardous Materials analysis. ▪ Provides clarification of draft EIS scope for Hydrology/Water Quality. Includes methodology and sources. ▪ Provides clarification of draft EIS scope for Cumulative Impacts. Includes methodology and sources. ▪ Provides clarification of draft EIS scope for mitigation monitoring and reporting. Includes methodology. ▪ Describes/requests cumulative impact analysis for outfall on Marine Environment.
11/5/2008	Federal Emergency Management Agency	Gregor Blackburn	▪ Requests review of FIRMs and provides a summary of NFIP floodplain management building requirements.
11/5/2008	San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy	Belinda Faustinos	▪ Provides source for Conservancy's Watershed and Open Space Plan. ▪ Includes sources of GIS planning tools for access to habitat, watershed, and recreation information. ▪ Describes concerns about assumption of wastewater flow increases. ▪ Identifies potential for wastewater flow reductions. ▪ Identifies concerns for habitat, open space, and recreation.
11/5/2008	Resident	JoAnn Wysocki	▪ Oral comments identifying concerns similar to those mentioned in her 11/12/2008 comment letter.
11/5/2008	Wilmington Property Owners of Wilmington	Arthur Hernandez	▪ Identifies possible alignment alternatives.
11/6/2008	Resident	JoAnn Wysocki	▪ Partial draft of 11/12/2008 comments.
11/6/2008	Resident	JoAnn Wysocki	▪ Wants to know the Corps' primary concern for the project. ▪ Question regarding whether city of LA Quimby funds apply to this project. LACSD unsure, but will check with city. ▪ Comment regarding the delivery of comments to Corps. ▪ Proposes alternative route for the tunnel: Sanitation Plant in Carson, west on Lomita to Vermont Avenue, south through Five Points, along Gaffey to channel, left hand turn on channel and arrive at Harbor. ▪ Discussion of getting on Corps' mailing list. ▪ Question regarding length of truck trips/construction, which was identified to be 4 to 8 years.

Table 1 (Continued)

Date	Agency/Organization	Commenter	Comment Summary
11/6/2007	Resident and President of the Harbor Association of Industry and Commerce	Bill Lyte	▪ Harbor Association of Industry and Commerce is to support the project as it provides critical infrastructure and vital construction jobs. ▪ Recommends choosing excavation sites within the Port of Los Angeles. ▪ Suggests electric trucks for transfer of tunneling muck. ▪ Suggests clean excavated material to be used as fill in the Port.
11/6/2008	Resident	Mark Wells	▪ Raises concerns that the construction truck traffic would be using existing taxed infrastructure (three vehicular bridges and one train bridge) to get to and from Terminal Island construction shaft site. ▪ Points out that the residents being impacted by the construction would not directly benefit from the project. ▪ Asks what residents of San Pedro would receive from having a tunnel go under their neighborhoods.
11/6/2008	Marine Animal Care Center, Fort MacArthur	David Bard	▪ Asks which alignment is preferred. ▪ Requests more specifics regarding potential shaft sites in and around Angels Gate Park. ▪ Wants to know the ratio of treated outflow between the new outfall and the existing outfalls. ▪ Asks if the draft EIR will address the effects of a new outfall on nutrient loads in the ocean or subsequent effects on the increase of algae and bio-toxins and effects on the marine life. ▪ Questions how the prevailing currents will impact the outflow.
11/6/2008	Resident	Richard Pawlowski	▪ Asks the size of the outflow pipe. ▪ Suggests that harnessing energy from the high-velocity outflow should be considered. ▪ Suggests piping some of the semi-clean water to places that might use it for lakes or the Owens Valley dust problem. ▪ States that the EIR should include the impacts from truck traffic every day for 8 years. Mentions that the clean truck program has just been put into effect.
11/6/2008	Wilmington Resident	Pat Roman	▪ States that it is a big problem that only 40 percent of the reclaimed water is being used. Consider thoughtfully the infrastructure for cumulative projects, construction permitting, and water use.
11/6/2008	Point Fermin Resident	Ron Stolte	▪ Supports Terminal Island.
11/12/2008	Resident	JoAnn Wysocki	▪ Identifies concerns for alignment and effects to the Wilmington area.
11/13/2008	County of Los Angeles, Department of Parks and Recreation	Jui Ing Chien	▪ Requests analysis of impact of site shaft to park.
11/14/2008	City of Los Angeles, Bureau of Sanitation	Enrique Zaldivar	▪ Provides information about city of LA's wastewater facilities. ▪ Requests TIWRP's effluent to be included in outfall analysis.
11/14/2008	Marine Mammal Care Center at Fort MacArthur	David Bard	▪ Requests analysis of impact to ocean nutrients and algal blooms.

Table 1 (Continued)

Date	Agency/Organization	Commenter	Comment Summary
11/17/2008	Palisades Residence Association	Not applicable	▪ Requests the use of specific aesthetics analysis. ▪ Requests the use of specific air quality sources and analysis. ▪ Requests including the analysis of specific biological resources. ▪ Requests analysis of specific cultural resources. ▪ Requests specific concerns for water quality and wind be addressed. ▪ Requests specific documents be incorporated or discussed. ▪ Requests description of construction noise. ▪ Requests specific analysis of local transportation and traffic impacts. ▪ Requests thorough analysis of cumulative impacts considering the other projects in the area.
11/18/2008	Port of Los Angeles	Ralph Appy	▪ Identifies jurisdictional issues related to use of Harbor District property. ▪ Identified requirements for consideration in alternatives. ▪ Identifies various specific issues/areas for analysis that are of particular concern to the Port. ▪ Provides Port site construction performance requirements. ▪ Provides a table of Port-identified related cumulative projects.
11/21/2008	California State Lands Commission	Gail Newton	▪ Provides information on potential need for a lease if discharge pipelines located on sovereign lands.
12/5/2008	California State Lands Commission	Jane Smith	▪ Provides information on potential need for a lease if discharge pipelines located on sovereign lands.
12/8/2008	County of Los Angeles, Department of Public Works	Dennis Hunter	▪ Requests opportunity to review EIR and traffic studies. Includes methodology and resources.
1/29/2009	County of Los Angeles Fire Department	Frank Vidales	▪ Requests erosion control, watershed management, rare and endangered species, vegetation fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and County Oak Tree Ordinance be addressed in the draft EIR.
Unknown	Resident	Pat Rome	▪ Requests explanation of use of reclaimed water, and construction permits.
Unknown	Resident	JoAnn Wysocki	▪ Partial draft of 11/12/2008 comments.

Public Scoping Meetings

Scoping is the process by which input is solicited from agencies and stakeholders on the nature and extent of issues and impacts to be addressed in an EIR and/or EIS and the methods by which they will be evaluated. Scoping helps to identify the range of actions, alternatives, environmental effects, methods of assessment, and mitigation measures to be analyzed in greater detail. It also helps eliminate those issues that are not relevant to the decision at hand.

Formal scoping meetings are not required by CEQA, but are necessary when preparing an EIR/EIS jointly with a federal agency due to NEPA requirements. NEPA specifically requires the lead agency to consult with federal agencies that have jurisdiction by law or have special expertise on the proposed action, and to solicit public input during the preparation of the EIS. NEPA requires the federal lead agency's scoping process to:

- Invite affected federal, state, and local agencies, Indian tribes, project proponents, and others interested in the EIS process
- Determine the potential significant environmental issues to be analyzed in depth
- Identify and eliminate issues determined to be insignificant or addressed in other documents
- Allocate assignments among the lead agency and cooperating agencies regarding preparation of the EIS, including impact analysis and identification of mitigation measures
- Identify related environmental documents under development
- Identify other environmental review and consultation requirements

Five public scoping meetings for the Clearwater Program were conducted in fall 2008, soon after the NOP and NOI were released. Notice of all five scoping meetings was included in the NOP; the fifth meeting was also noticed in the NOI. An advertisement announcing the public scoping meetings was placed in the Daily Breeze, San Gabriel Valley Tribune, Pasadena Star News, Whittier Daily News, Inland Valley Daily Bulletin, Impacto, Peninsula News, Press Telegram, Beach Reporter, Wave Pub West Edition, La Opinion, and Random Lengths News. A copy of the advertisement is included at the end of this report as Attachment 5.

The Sanitation Districts and the Corps conducted a joint public scoping meeting, in both English and Spanish, for the Clearwater Program EIR/EIS:

November 6, 2008 at 6:30 pm
Crowne Plaza Los Angeles Harbor Hotel
601 S. Palos Verdes Street
San Pedro, California

The Sanitation Districts conducted four additional public scoping meetings for the EIR:

October 29, 2008 at 6:30 pm
Carson Community Center
801 East Carson Street
Carson, California

October 30, 2008 at 1:30 pm
Sanitation Districts Joint Administration Office
1955 Workman Mill Road
Whittier, California

October 30, 2008 at 6:30 pm
Sanitation Districts Joint Administration Office
1955 Workman Mill Road
Whittier, California

November 5, 2008 at 6:30 pm
Wilmington Senior Center
1371 Eubank Avenue
Wilmington, California

Additional Scoping Meetings

In addition to the five public scoping meetings conducted in October/November 2008, scoping meetings were held with federal, state, and local agencies as well as councils of governments, environmental groups, and community advisory committees.

Federal Agency Consultations

Table 2 lists the scoping meetings with federal agencies prior to release of the draft EIR/EIS.

Table 2. List of Federal Agency Coordination Meetings

Date	Agency/Organization
3/22/2007	U.S. Navy (Defense Fuel Support Point)
3/28/2007	U.S. Coast Guard
10/22/2007	U.S. Environmental Protection Agency
12/10/2007	U.S. Environmental Protection Agency
3/9/2009[a]	National Marine Fisheries Service
3/23/2009[a]	U.S. Fish and Wildlife Service
6/26/2009[a]	U.S. Coast Guard
7/16/2009	Bureau of Ocean Energy Management
2/9/2010[a]	U.S. Environmental Protection Agency
3/17/2010[a]	National Marine Fisheries Service
3/19/2010[a]	U.S. Fish and Wildlife Service
8/26/2010	Bureau of Ocean Energy Management
8/25/2011[a]	U.S. Environmental Protection Agency

[a] The U.S. Army Corps of Engineers participated in this agency scoping meeting.

State Agency Consultations

Table 3 lists the scoping meetings with state agencies held prior to release of the draft EIR/EIS.

Table 3. List of State Agency Coordination Meetings

Date	Agency/Organization
10/22/2007	Regional Water Quality Control Board, Los Angeles Region
3/29/2011[a]	California Coastal Commission
5/18/2011[a]	State Lands Commission
7/14/2011[a]	California Department of Fish and Game
12/8/2011	Regional Water Quality Control Board, Los Angeles Region

[a] The U.S. Army Corps of Engineers participated in this agency scoping meeting.

Local Agency Consultations

Table 4 lists the scoping meetings with local agencies held prior to release of the draft EIR/EIS.

Table 4. List of Local Agency Coordination Meetings

Date	Agency/Organization
1/28/2006	City of Los Angeles, Economic Development
2/23/2006	City of Los Angeles, Port of Los Angeles
3/1/2006	City of Los Angeles, Bureau of Sanitation
4/18/2006	City of Los Angeles, Council District 15
8/22/2006	City of Los Angeles, Environmental Affairs
9/20/2006	City of Los Angeles, Port of Los Angeles
10/2/2006	City of Los Angeles, Department of Water and Power
10/11/2006	City of Los Angeles, Port of Los Angeles
12/8/2006	City of Los Angeles, Department of Recreation and Parks
2/2/2007	California Water Company
2/2/2007	City of Palos Verdes Estates
2/7/2007	Los Angeles Board of Harbor Commissioners
2/8/2007	City of Los Angeles, Director of Environmental Affairs
2/8/2007	City of Los Angeles
2/15/2007	City of Long Beach
2/27/2007	Los Angeles County, Sybil Brand Commission
3/27/2007	Los Angeles Fire Department, Harbor Division
4/3/2007	Water Replenishment District of Southern California
5/14/2007	Metrolink
8/30/2007	City of Rancho Palos Verdes
9/13/2007	City of Los Angeles, Port of Los Angeles
10/18/2007	Los Angeles Board of Harbor Commissioners
4/7/2008	City of Los Angeles, Council District 15
4/25/2008	City of Los Angeles, Council District 1
7/24/2008	City of Gardena
12/1/2008	Central Basin Municipal Water District
12/16/2008	County of Los Angeles, Department of Parks and Recreation
1/30/2009	Metropolitan Water District of Southern California
9/2/2009	South Coast Air Quality Management District
11/10/2009	City of Los Angeles, Department of Parks and Recreation
2/4/2010	City of Los Angeles, Department of Transportation
2/4/2010	County of Los Angeles, Department of Public Works
2/8/2010	City of Carson
3/5/2010	County of Los Angeles, Regional Planning
7/26/2010	City of Los Angeles, Port of Los Angeles
7/28/2010	City of Los Angeles, Department of Recreation and Parks
10/7/2010	County of Los Angeles, Department of Beaches and Harbors
4/7/2011	County of Los Angeles, Supervisorial District 4
4/12/2011	City of Los Angeles, Council District 15
4/13/2011	City of Carson
4/14/2011	City of Rancho Palos Verdes
5/10/2011	City of Los Angeles
5/11/2011	City of Rancho Palos Verdes
5/23/2011	City of Rolling Hills Estates

Table 4 (Continued)

Date	Agency/Organization
5/24/2011	City of Rolling Hills
6/14/2011	City of Rancho Palos Verdes
6/30/2011	City of Los Angeles, Bureau of Sanitation
8/29/2011	City of Los Angeles, Bureau of Sanitation
6/23/2011	City of Los Angeles, Port of Los Angeles
11/17/2011	City of Los Angeles, Port of Los Angeles
1/11/2011	City of Carson
2/3/2012	City of Los Angeles, Council District 15

Other Consultations

Table 5 lists the scoping meetings with councils of governments, environmental groups, neighborhood councils, chambers of commerce, and community advisory committees held prior to release of the draft EIR/EIS.

Table 5. List of Other Organization Coordination Meetings

Date	Agency/Organization
12/19/2006	JWPCP Community Advisory Committee
1/23/2007	Northeast San Pedro Neighborhood Council
1/30/2007	Wilmington Neighborhood Council
1/31/2007	Wilmington Neighborhood Council
1/31/2007	Central San Pedro Neighborhood Council
2/13/2007	Carson Chamber of Commerce
2/13/2007	Wilmington Chamber of Commerce
2/13/2007	Port Community Advisory Committee
2/15/2007	Saint Peter and Paul Elementary School
2/15/2007	San Pedro Homeowners United
2/16/2007	Wilmington Coordinating Council
2/26/2007	Los Angeles Unified School District, District 8
2/27/2007	Coastal San Pedro Neighborhood Council
2/27/2007	Port Citizen Advisory Committee
3/1/2007	Wilmington Chamber of Commerce
3/1/2007	Dodson Middle School
3/7/2007	Northwest San Pedro Neighborhood Council Board
3/7/2007	Pacific Corridor Community Advisory Committee
3/9/2007	Ponte Vista Community Advisory Committee
3/9/2007	Northwest San Pedro Neighborhood Council
3/9/2007	Coastal Neighborhood Council
3/15/2007	San Pedro Chamber of Commerce
3/16/2007	Harbor City/Harbor Gateway Chamber of Commerce
3/22/2007	Harbor City/Harbor Gateway Chamber of Commerce
3/22/2007	Harbor Gateway Neighborhood Council
3/23/2007	San Pedro Chamber of Commerce
3/27/2007	Palos Verdes Peninsula Chamber of Commerce

Table 5 (Continued)

Date	Agency/Organization
3/28/2007	Harbor City/Harbor Gateway Chamber of Commerce
3/28/2007	San Pedro Homeowners United
3/29/2007	Lomita Chamber of Commerce
4/10/2007	Harbor City Neighborhood Council
4/10/2007	Neighborhood Council Review Commission
4/11/2007	Lomita Chamber of Commerce
4/17/2007	Central San Pedro Neighborhood Council
4/19/2007	Fleming Middle School
4/23/2007	Palos Verdes Peninsula Land Conservancy
4/24/2007	Marine Mammal Care Center at Fort MacArthur
4/25/2007	Wilmington Coordinating Council
4/25/2007	Wilmington Chamber of Commerce
4/25/2007	Surfrider Foundation, West Los Angeles and Malibu Chapter
4/25/2007	Heal the Bay
4/26/2007	Palos Verdes Peninsula Chamber of Commerce
4/27/2007	Wilmington Community Advisory Committee
4/27/2007	Richard Henry Dana Middle School
4/30/2007	Wilmington Middle School
5/3/2007	Palos Verdes Peninsula Chamber of Commerce
5/3/2007	Torrance Chamber of Commerce
5/3/2007	Lomita Chamber of Commerce
5/3/2007	San Pedro Chamber of Commerce
5/3/2007	Wilmington Chamber of Commerce
5/15/2007	Eshelman Avenue Elementary
5/21/2007	Lomita Chamber of Commerce
5/24/2007	Santa Monica Baykeeper
5/24/2007	California Coastkeeper Alliance
5/24/2007	San Pedro High School
6/4/2007	Santa Monica Bay Restoration Commission
6/7/2007	Port of Los Angeles High School
6/25/2007	Saint John Fisher Elementary School
6/26/2007	Stephen M. White Middle School
7/2/2007	Palos Verdes High School
7/17/2007	Ridgecrest Intermediate School
7/23/2007	Coalition for a Safe Environment
8/2/2007	Wilmington Chamber of Commerce
8/23/2007	Harbor City Neighborhood Council
8/24/2007	Coastal San Pedro Neighborhood Council
8/27/2007	Harbor City/Harbor Gateway Neighborhood Council
8/27/2007	Harbor City
8/28/2007	Barton Hill Elementary School
8/29/2007	San Pedro Chamber of Commerce
8/29/2007	Wilmington Neighborhood Council

Table 5 (Continued)

Date	Agency/Organization
8/31/2007	Holy Family Elementary School
9/17/2007	Los Angeles Harbor College
10/11/2007	Palos Verdes Peninsula Chamber of Commerce
10/12/2007	Carson High School
10/29/2007	Banning High School
11/14/2007	Harbor Regional Park Advisory Board
11/19/2007	Torrance Area Chamber of Commerce
12/3/2007	African American Chamber of Commerce
12/3/2007	Long Beach Chamber of Commerce
1/8/2008	South Bay Association of Chambers of Commerce
1/9/2008	Palos Verdes Peninsula Chamber of Commerce
1/16/2008	Sierra Club, Los Angeles Chapter
1/28/2008	Coastal San Pedro Neighborhood Council
2/6/2008	San Pedro Business Improvement District
2/14/2008	Harbor Gateway South Neighborhood Council
2/20/2008	Lomita Chamber of Commerce
2/20/2008	Harbor City Neighborhood Council
3/18/2008	Port Community Action Committee
4/10/2008	Wilmington Chamber of Commerce
4/24/2008	Harbor Association of Industry and Commerce
5/13/2008	Central San Pedro Neighborhood Council
6/5/2008	Harbor City/Harbor Gateway Chamber of Commerce
8/18/2008	Coastal San Pedro Neighborhood Council
12/3/2008	San Gabriel Valley COG
3/4/2009	Gateway Cities COG, Public Works Steering Committee
4/23/2009	South Bay Cities COG
6/25/2009	Gateway Cities COG, Public Works Steering Committee
3/15/2011	JWPCP Community Advisory Committee
5/17/2011	Palos Verdes Peninsula Land Conservancy
5/25/2011	Coastal San Pedro Neighborhood Council
5/25/2011	Wilmington Neighborhood Council
6/1/2011	San Pedro Chamber of Commerce
6/14/2011	Palisades Residents Association
6/14/2011	San Pedro Chamber of Commerce, Economic Policy Committee
6/15/2011	Rancho Palos Verdes Council of HOAs
6/22/2011	South Bay COG
6/27/2011	San Pedro and Peninsula Homeowners Coalition
6/27/2011	Environment Now
6/28/2011	Santa Monica Bay Restoration Commission
6/28/2011	7th Street Elementary School
6/29/2011	Heal the Bay
7/5/2011	Coalition for a Safe Environment
7/6/2011	Pacific Corridor Community Advisory Committee
7/11/2011	Northwest San Pedro Neighborhood Council

Table 5 (Continued)

Date	Agency/Organization
7/12/2011	Palos Verdes Peninsula Chamber of Commerce
7/12/2011	Sierra Club
7/14/2011	Wilmington Chamber of Commerce
7/18/2011	Coastal San Pedro Neighborhood Council
7/19/2011	Harbor City/Harbor Gateway Chamber of Commerce
7/20/2011	Central San Pedro Neighborhood Council
7/20/2011	Gulf Elementary School
7/28/2011	Harbor Association of Industry and Commerce
7/28/2011	Gateway Cities COG , Public Works Steering Committee
7/28/2011	San Gabriel Valley COG, EENR Committee
7/29/2011	Rancho San Pedro Residents Advisory Council
8/1/2011	Surfrider Foundation, Long Beach Chapter
8/17/2011	Harbor City Neighborhood Council
8/30/2011	Northwest San Pedro Neighborhood Council, Port Committee
9/6/2011	South Bay Association of Chambers of Commerce
9/26/2011	South Bay Latino Chamber of Commerce
9/27/2011	City of Los Angeles, Angels Gate Park
9/27/2011	Angels Gate Cultural Center
9/27/2011	Marine Mammal Care Center at Fort MacArthur
9/27/2011	Angels Gate Continuation School
9/27/2011	Los Angeles Unified School District, South Regional HS No. 15
10/13/2011	Royal Palms Beach Surfers
10/14/2011	Los Angeles Unified School District, District 8
10/18/2011	Port Community Advisory Committee
10/20/2011	San Gabriel Valley COG
10/24/2011	Rolling Hills Prep School
10/29/2011	Point Fermin Residents Association

Notice of Availability

CEQA requires issuance of a notice of availability (NOA) when the draft EIR is made available to the public for review. An NOA must describe the project and its potentially significant environmental impacts such that it enables responsible agencies and interested parties to provide meaningful input. At a minimum, the NOA must include:

- Project description
- Project location
- Probable significant environmental effects
- Specified public review period/deadline and address where written comments may be sent
- Date, time, and location of any public hearings
- Address where documents are available for review

The Sanitation Districts, as lead agency under CEQA, circulated the NOA for the draft EIR to approximately 4,000 stakeholders on February 10, 2012. The NOA specified that comments would be accepted through April 10, 2012, resulting in a 60-day review period, 15 days longer than the 45 days required by CEQA. The NOA included a description of the Clearwater Program goal and objectives. Additionally, the NOA described the specific need for a new JWPCP effluent tunnel and the areas under consideration for its construction. As required by CEQA, the NOA listed the probable significant environmental effects of the recommended alternative; announced the date, time, and location of the public hearings; and provided the locations where documents were available for review. A copy of the NOA for the draft EIR is included at the end of this report as Attachment 6.

The Corps, as lead agency under NEPA, published a NOA for the draft EIS in the Federal Register on February 13, 2012. The NOA for the draft EIS, which contained much of the same information as the NOA for the draft EIR, specified that comments would be accepted through April 10, 2012, resulting in a 57-day review period, 12 days longer than the 45 days required by NEPA. A copy of the NOA for the draft EIS is included at the end of this report as Attachment 7.

Notice of Completion

CEQA requires that the lead agency file a notice of completion (NOC) with the State Clearinghouse (SCH) at the same time as it provides the NOA. At a minimum, the NOC must include:

- Project description
- Project location
- Address where documents are available for review
- Public review period

The NOC for the draft EIR/EIS was filed as required (reference SCH# 20081010074) and is included at the end of this report as Attachment 8.

Public Review and Hearings

In accordance with NEPA, but not required by CEQA, the Sanitation Districts and Corps held a joint public hearing on the draft EIR/EIS. The Sanitation Districts held two additional public hearings during the comment period to provide the public with more opportunities to learn about the project and submit formal comments.

Notice of the public hearings was included in the NOAs for the draft EIR and draft EIS. A newspaper advertisement announcing the public hearings was also placed in The Beach Reporter, The Daily Breeze, Impacto, Inland Valley Daily Bulletin, Long Beach Press Telegram, Palos Verdes Peninsula News, Pasadena Star News, San Gabriel Valley Tribune, and Whittier Daily News. A copy of the text as well as copies of all nine advertisements as they actually ran in February 2012 are included at the end of this report as Attachment 9. Notification was also provided on the Clearwater Program website and by press releases to numerous Southern California media outlets. The public hearings were conducted in both English and Spanish. Complete transcripts of the public hearings are included in Appendix 28-A.

Details on the joint public hearing for the draft EIR/EIS are as follows:

Thursday, March 8, 2012 at 6:30 pm
Crowne Plaza Los Angeles Harbor Hotel Center
601 South Palos Verdes Street
San Pedro, California

Details on the public hearings for the draft EIR are as follows:

Tuesday, March 6, 2012 at 6:30 pm
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

Wednesday, March 7, 2012 at 6:30 pm
Carson Community Center
801 East Carson Street
Carson, California

Comments on Draft EIR/EIS

The Sanitation Districts and Corps accepted written and oral comments throughout the public review period, which ended on April 10, 2012; however, late comments were accepted as well. A total of 52 comments were received on the draft EIR/EIS. Chapter 28 includes a list of all agencies, organizations, and persons who submitted comments, as well as responses to all comments. Copies of all comments, including transcripts of the public hearings, are included in Appendix 28-A. Furthermore, in accordance with CEQA, responses were provided to all public agencies that submitted comments at least 10 days prior to certification of the final EIR.

Attachment 1

NOTICE OF PREPARATION

WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

STEPHEN R. MAGUIN
Chief Engineer and General Manager

October 10, 2008

File No.: 31-370.10

To: Mailing List

Subject: NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Project Title: Clearwater Program Master Facilities Plan

Project Location: Los Angeles County

Project Description: The project consists of the preparation of Clearwater Program Master Facilities Plan (MFP) for the Sanitation Districts of Los Angeles County's (Sanitation Districts) Joint Outfall System (JOS). The JOS encompasses 73 of the 78 cities in the Sanitation Districts' service area, as well as some unincorporated county areas. The MFP will assess the wastewater conveyance, wastewater treatment, solids processing, biosolids management, and effluent management needs of the JOS through the year 2050, and recommend specific improvements to meet those needs. A major component of the MFP will be the possible construction of a new tunnel and ocean outfall to convey treated wastewater from the Sanitation Districts' Joint Water Pollution Control Plant (JWPCP) in Carson to the Pacific Ocean, where it would be discharged 2-7 miles offshore at a depth of approximately 190 feet.

This Notice of Preparation (NOP) has been prepared in accordance with the California Environmental Quality Act (CEQA). Pursuant to CEQA, the Sanitation Districts will be the state lead agency and, due to the scope of the project, will prepare an Environmental Impact Report (EIR). The project description, location, and the potential environmental impacts are contained in the attached materials. The EIR will be prepared jointly with an Environmental Impact Statement (EIS), which will be prepared in accordance with the National Environmental Policy Act (NEPA) for project alternatives that would require any federal approval(s). The U.S. Army Corps of Engineers (Corps) will be the federal lead agency for the project and has concurrently issued a Notice of Intent (NOI) for the preparation of the EIS. It is anticipated that the draft MFP and the draft EIR/EIS will be completed by the end of 2009.

If you are a responsible agency or a trustee agency, the Sanitation Districts are soliciting written comments as to the scope and content of the environmental information, including alternatives, impacts, and mitigation measures, that may be relevant to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by the Sanitation Districts when considering any permits or other approvals for the project. Please provide the name and telephone number of a contact person in your agency with your comments.

If you are an interested party or property owner, you may submit written comments concerning any effects the project may have on your community or your property. Please share this notice with anyone else you feel may be interested in the project. The NOP is also available at www.ClearwaterProgram.org. In addition, the Sanitation Districts and the Corps will receive comments as to the scope of analysis and content of the proposed EIR/EIS at a joint public and agency scoping meeting conducted for both the NOP and NOI. This joint scoping meeting will be held on:

- Thursday, November 6, 2008, at 6:30 p.m., at the Crowne Plaza Los Angeles Harbor Hotel, 601 South Palos Verdes Street, San Pedro, California.

Recycled Paper

The Sanitation Districts will also be conducting one additional agency scoping meeting for the NOP on:

- Thursday, October 30, 2008, at 1:30 p.m., at the Sanitation Districts' Joint Administrative Office, 1955 Workman Mill Road, Whittier, California;

as well as three additional public scoping meetings for the NOP on:

- Wednesday, October 29, 2008, at 6:30 p.m., at the Carson Community Center, 801 East Carson Street, Carson, California;

- Thursday, October 30, 2008, at 6:30 p.m., at the Sanitation Districts' Joint Administrative Office, 1955 Workman Mill Road, Whittier, California; and

- Wednesday, November 5, 2008, at 6:30 p.m., at the Wilmington Senior Center, 1371 Eubank Avenue, Wilmington, California.

Based on the time limits established by CEQA, comments on the NOP must be received no later than 30 days after receipt of this notice. Please submit your written comments to the undersigned at the earliest possible date, but no later than November 14, 2008. If you have any questions regarding the NOP or the scoping meetings, you may call the Clearwater Program information line at (877) 300-WATER.

Date: October 10, 2008

Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601
shighter@lacsd.org

SANITATION DISTRICTS OF LOS ANGELES COUNTY

CLEARWATER Program

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

1.0 Introduction

The Sanitation Districts of Los Angeles County (Sanitation Districts) are in the planning stage of the Clearwater Program. The goal of the Clearwater Program is to ensure the continuation of a wastewater management system that is protective of public health and the environment. As part of the Clearwater Program, the Sanitation Districts will be preparing a new master facilities plan (MFP) for the Joint Outfall System (JOS). The MFP will serve to guide the management and development of the JOS through the year 2050 and may result in the implementation of one or more recommended projects.

This Notice of Preparation (NOP) has been prepared pursuant to the requirements of the California Environmental Quality Act (CEQA) to notify Responsible and Trustee Agencies that an Environmental Impact Report (EIR) will be prepared to assess potential impacts of the project. The EIR will be prepared jointly with an Environmental Impact Statement (EIS) that will meet the requirements of the National Environmental Policy Act (NEPA). The U.S. Army Corps of Engineers (Corps) will be the federal lead agency under NEPA, and a separate Notice of Intent has been prepared for the EIS.

2.0 Background

The Sanitation Districts function on a regional scale consisting of 24 independent special districts serving the wastewater and solid waste management needs of approximately 5.3 million people in Los Angeles County. The Sanitation Districts' service area covers approximately 800 square miles and encompasses 78 cities and unincorporated territory within the county (Figure 1, Regional Location). The 24 separate districts work cooperatively under a Joint Administration Agreement with one administrative staff headquartered near the city of Whittier.

Seventeen of the districts located in the metropolitan Los Angeles area participate in the Joint Outfall Agreement, which provides for combined investment in wastewater conveyance and treatment facilities. These 17 districts are collectively known as the Joint Outfall Districts, which provide for operation and maintenance of a regional, interconnected system of facilities called the Joint Outfall System (JOS). The service area of the JOS encompasses 73 of the 78 cities in the Sanitation Districts' service area, as well as some unincorporated county areas. Figure 2 shows the JOS service area, the Joint Outfall Districts' boundaries, and the location of wastewater treatment plants.

The Sanitation Districts currently utilize two onshore tunnels and four offshore ocean outfalls to convey effluent from their Joint Water Pollution Control Plant (JWPCP) in the city of Carson to the Pacific Ocean. The two tunnels were constructed in 1937 and 1958 and have not been inspected in over 50 years. Inspection of the tunnels is not possible due to their length, limited access, lack of separation between the tunnels, and constant flow through the tunnels.

Figure 1: Regional Location of Entire Service Area of the Sanitation Districts of Los Angeles County

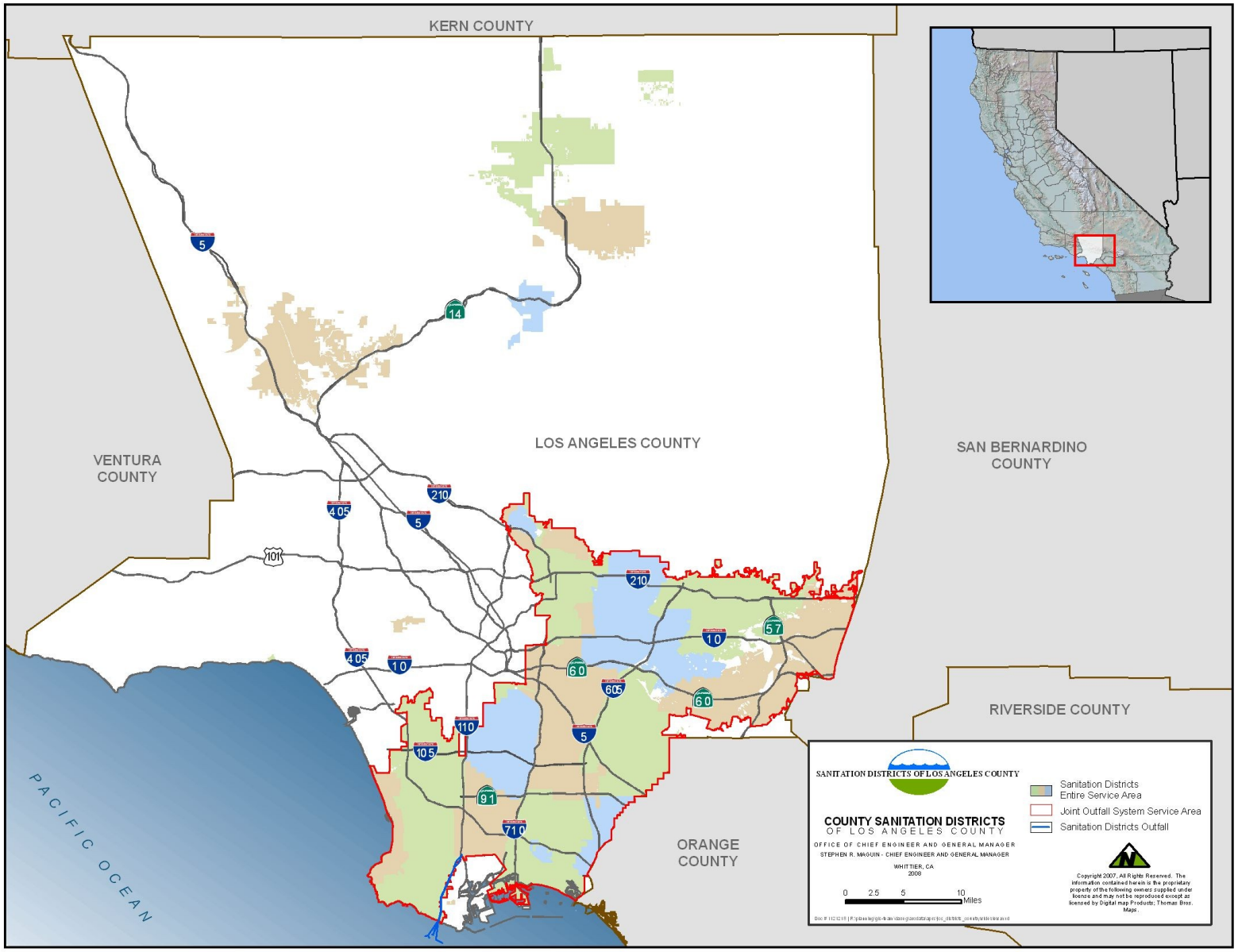
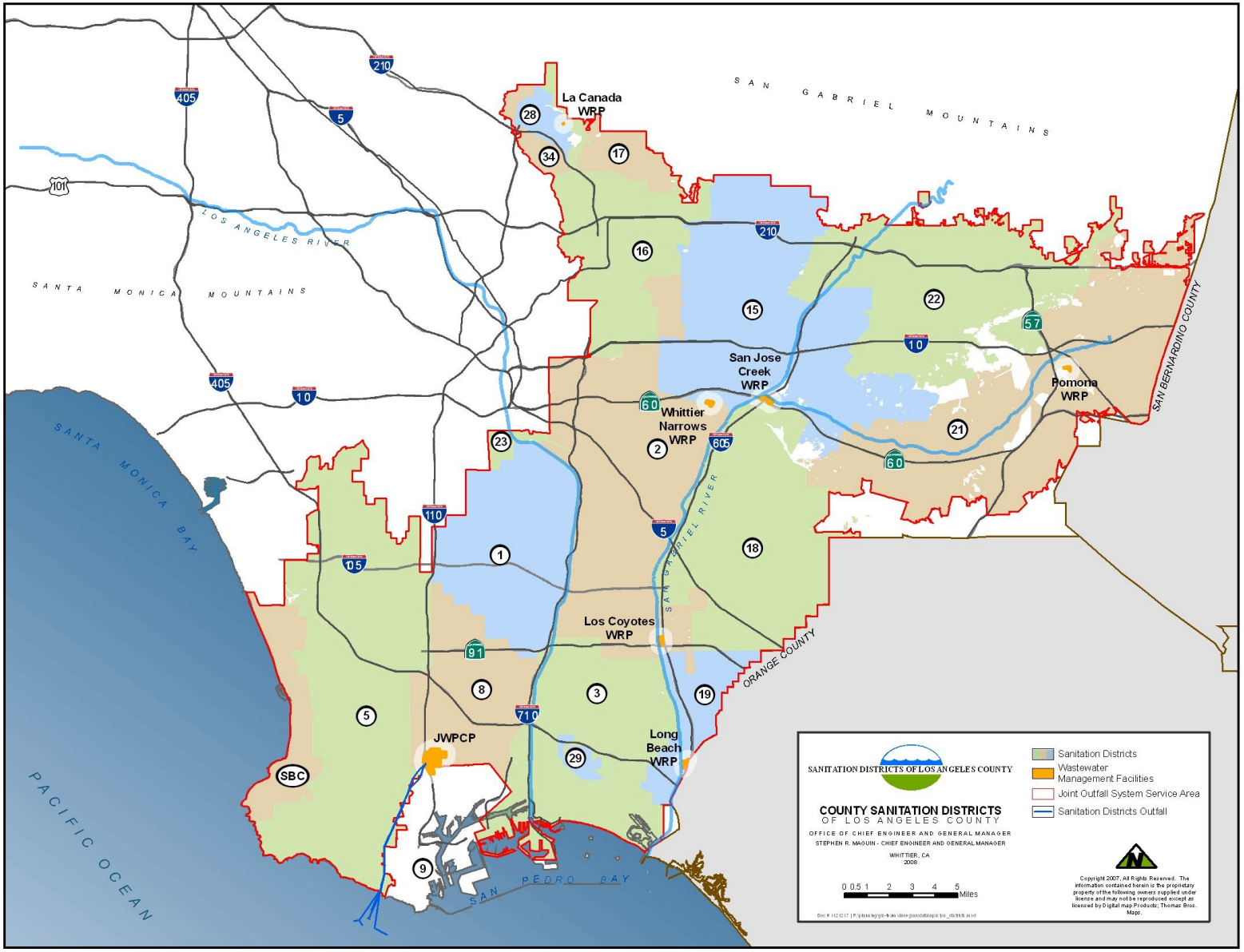


Figure 2: Existing Joint Outfall System Facilities



The Sanitation Districts are in the initial stages of preparing a new MFP for the wastewater management facilities in the JOS service area. The JOS facilities currently serve approximately 5 million people and treat an average of approximately 450 million gallons of wastewater per day. The MFP will address wastewater conveyance and treatment, solids processing, biosolids management, and effluent management. A major component of the MFP will be to evaluate, at a project level, the possible construction of a new tunnel and ocean outfall to discharge treated wastewater from the JWPCP.

3.0 Need for Project

The MFP is necessary to ensure adequate JOS wastewater system capacity and reliability through the year 2050. Specifically, the proposed plan in the MFP would meet the following needs and objectives:

- Provide adequate system capacity to meet the needs of the growing JOS population
- Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies
- Provide a means of inspecting, maintaining, repairing, rehabilitating, and replacing the aging infrastructure of the JOS to ensure overall reliability
- Provide a wastewater treatment and effluent management program that accommodates and promotes emerging recycled water reuse and biosolids beneficial use opportunities

4.0 The Clearwater Program Master Facilities Plan

4.1 Program-Level Components

The MFP and the associated EIR will be prepared concurrently. The MFP and EIR will include alternatives comprised of separate, individual components that together comprise a recommended plan of activities. The five individual components that will be examined in both the MFP and the EIR include:

- Wastewater conveyance and treatment
- Solids processing
- Biosolids management
- Water reclamation plant (WRP) effluent management
- JWPCP effluent management

4.1.1 Wastewater Conveyance and Treatment Component

Trunk sewers form the core of the Sanitation Districts' conveyance system within the JOS. These are typically large-diameter sewers specifically sized to transport wastewater from other Sanitation Districts' smaller trunk sewers and/or local sewers. These large trunk sewers convey the wastewater downstream toward a JOS wastewater treatment facility. Wastewater flows will generally increase proportionately as population increases; therefore, sections of the conveyance system may need to be relieved or enlarged to accommodate the future flows.

The conveyance system options under consideration in the MFP could include:

- Repair and rehabilitation of existing lines based upon current conditions

- Hydraulic relief based on projected flow increases
- New interceptors to convey flow between WRP tributary areas
- Changes to optimize flow distribution within the system

The JOS is comprised of six upstream WRPs (Pomona, Whittier Narrows, San Jose Creek, Los Coyotes, Long Beach, and La Cañada) and the downstream JWPCP that treat wastewater. The location of these facilities are shown on Figure 2. Potential treatment plant modifications related to projected future conditions are driven by improvements to (1) accommodate future flows generated within the JOS and (2) meet increasingly stringent regulatory requirements.

A variety of approaches could be employed to meet projected flow increases and comply with potential future regulations. These will be evaluated in the development of conceptual treatment options and the ultimate formulation of comprehensive alternatives. Options could include:

- Expansion of the JWPCP – all or a portion of future flow increases could be directed to the JWPCP
- Expansion of the WRPs – all or a portion of future flow increases could be directed to the WRPs
- New plant – the potential siting of a new treatment plant, which could be used to reduce the need for conveyance system improvements or to enhance the potential for reclamation within the system, will be evaluated

The conveyance system component will be interrelated with the wastewater treatment facilities component. This is because some decisions regarding the possible expansion of upstream WRPs and the possible expansion of the downstream JWPCP may impact certain hydraulic requirements of the conveyance system. The type of conveyance system options under consideration within the MFP could include:

- Additional interceptor sewers
- Flow equalization/storage systems
- Dedicated solids and brine transport lines
- Facilities to enhance flow diversion capabilities

4.1.2 Solids Processing Component

Solids are generated as a byproduct of wastewater treatment and purification. As the population within the JOS increases, the wastewater flows and solids generated by treatment will increase as well. Solids processing consists of stabilization using anaerobic digesters and thickening systems to change a pumpable liquid to a truckable solid material. Within the JOS, all solids generated by treatment are currently processed at the JWPCP. This includes the solids generated at the upstream WRPs. The MFP will evaluate future options for solids processing that could include:

- Continued centralized solids processing at JWPCP
- Solids processing at the WRPs
- Centralized solids processing at a facility other than the JWPCP

4.1.3 Biosolids Management Component

Biosolids are the finished product of solids processing. The biosolids represent a valuable organic material with the potential for reuse in a variety of applications. The Sanitation Districts' preferred approach is beneficial reuse of biosolids. Future biosolids reuse/disposal practices will be influenced by potentially more stringent regulatory requirements, new development taking place within areas that were considered remote and once acceptable for biosolids reuse, and future restrictions imposed by local jurisdictions. This will likely result in a decrease in the number of privately operated biosolids management facilities with which the Sanitation Districts could contract for services. In order to remedy this situation, the Sanitation Districts have taken steps to provide for a sufficient amount of long-term biosolids management capacity, which will be evaluated and discussed in the MFP. Some biosolids management options could include:

- Continuation of existing management – beneficial use and landfill disposal
- Landfill disposal – all biosolids
- Beneficial use – all biosolids

4.1.4 WRP Effluent Management Component

The term "effluent" refers to the treated product water from any of the six WRPs or the JWPCP. The options for managing effluent from the WRPs could include:

- Reclamation/reuse
- Inland discharge to a water body
- Combination of reclamation/reuse and inland discharge

It is anticipated that as water demands within the JOS service area continue to increase and the procurement of reliable, cost-effective new potable supplies becomes more challenging, the use of reclaimed water will continue to increase. It is likely that as the use of reclaimed water increases, the diversity of applications will similarly increase. The Sanitation Districts will continue to support and promote water-recycling programs and work cooperatively with water purveyors to meet future demands.

The six upstream WRPs produce more reclaimed water than is currently being reused. The demand for reclaimed water also varies throughout the course of a year with the highest quantities being reused in the spring and summer months. Reclaimed water that is not reused is discharged to inland water courses (e.g., the San Gabriel River). In the future, these inland discharges will continue to be an integral part of an overall strategy for effluent management.

4.1.5 JWPCP Effluent Management Component

Effluent from the JWPCP is more salty making it less desirable for reuse, but it is highly suitable for ocean discharge. The effluent is discharged to the ocean via the existing JWPCP tunnel and ocean outfall system, which consists of two tunnels and four outfall pipes/diffusers. The specific concerns relative to the existing tunnel and ocean outfall system include capacity, condition, and reliability. The MFP will provide for sufficient capacity to meet projected flows and provide for the ability to inspect and repair, as necessary, the existing tunnel and ocean outfall system.

Options for addressing capacity and/or allowing for the inspection and repair of the existing tunnel and ocean outfall system could include:

- Building a new ocean discharge system to convey some or all of the effluent flows
- Temporary discharge to points other than the existing tunnel and ocean outfall system
- Beneficial reuse of some or all of the effluent flow

4.2 Project-Level Components

Specific projects may result from the evaluation of the component areas identified above. These projects will be fully analyzed in the MFP and EIR. It is unknown how many projects may be identified in the MFP, but one project that will be evaluated is the need for a new tunnel and ocean outfall system as part of the JWPCP Effluent Management component area.

The two existing tunnels connecting the JWPCP and White Point were constructed in 1937 and 1958. The four ocean outfalls were constructed in 1937, 1947, 1956, and 1966. The tunnels have not been inspected in nearly 50 years. Inspection of the tunnels is not possible due to their length, limited access, lack of separation between the tunnels, and constant flow through the tunnels. The inability to inspect and repair, as necessary, this critical element of the JWPCP's effluent management system is a serious concern. The construction of a new tunnel and ocean outfall system will be evaluated at a project level within the MFP.

The MFP and EIR will evaluate the location, construction, and operation of a new tunnel and ocean outfall system. The Sanitation Districts and/or their consultants have begun performing technical feasibility and preliminary environmental analyses in order to develop specific alignment alternatives that will be included in the MFP and studied in detail in the EIR. The study area for a new tunnel and ocean outfall is shown on Figure 3.

The components of a new tunnel and ocean outfall that will be evaluated include:

- Onshore Alignments
- Tunnel Access/Construction Shaft Sites
- Marine Alignments
- Diffuser Locations

4.2.1 Onshore Alignments Component

Some of the considerations for establishing onshore alignments for a tunnel include, but are not limited to, the use of long continuous streets and public rights of way, a minimum turning radius of 1,000 feet, and the availability of a nearby construction shaft site – preferably near the coast. Streets that generally run north-south, such as Wilmington Boulevard, Frigate Avenue, Figueroa Street, Gaffey Street, Pacific Avenue, and Western Avenue, may be considered for alignments. Potential onshore alignments are shown on Figure 4. A tunnel would be constructed well below ground (up to approximately 200 feet) and would not require the streets to be taken out of service.

4.2.2 Tunnel Access/Construction Shaft Sites Component

Construction shaft sites would require approximately 4-8 acres of land that is relatively flat and not too irregularly shaped (e.g., extremely narrow). The construction shaft, approximately 60 feet in diameter, would be the place where equipment and supplies would be sent into a tunnel, and where excavated materials would be removed. The construction shaft site would require access to a road or other means of transport suitable for bringing materials in and taking excavated material away. In

order to minimize construction impacts to residences and businesses, public lands such as open space, government property, and port property would be preferred for construction shaft sites. Smaller shaft sites may be constructed to provide access for ventilation and labor. Fourteen locations have been identified as meeting the minimum requirements for a construction shaft site (Figure 4).

4.2.3 Marine Alignments Component

The marine alignment would consist of connecting the onshore alignment with the diffuser location up to 7 miles offshore. The marine alignment would consist of an extension of the onshore tunnel to the diffuser location or a combination of a tunnel and a seafloor pipeline to the diffuser location.

4.2.4 Diffuser Locations Component

The diffuser site, where effluent is discharged into the ocean, would be located at a distance and depth that equals or exceeds that of the Sanitation Districts' existing diffusers. The diffuser site must also be located on a seismically stable part of the continental shelf. Alignments for the ocean outfalls north and south of the study area were not considered due to the presence of existing large ocean sewer outfalls for the city of Los Angeles and Orange County, respectively. Three areas have been identified within the study area as meeting the minimum requirements for a diffuser location (Figure 5). The length of the diffusers will be determined by the amount of flow expected to pass through them. The length of a new diffuser could be as long as approximately 9,000 feet. To achieve comparable dilution of the effluent in the ocean as the existing diffusers, new diffusers would need to be at nearly the same depth as the existing diffusers, or a depth of approximately 190 feet.

4.3 Proposed Plan and Alternative Selection Process

The Sanitation Districts have not yet developed final alternatives for inclusion in the MFP or the EIR. A process will be used to develop, evaluate, and screen a broad range of alternatives to arrive at a reasonable range of alternatives that will be analyzed in the EIR.

Multiple options will first be developed for each of the component areas, which will then be screened for technical, cost, logistical, institutional, and environmental considerations. The component options that pass this screening will then be combined into logical, system-wide MFP alternatives that include both program-level and project-level options. These MFP alternatives will be analyzed in the EIR, which will also identify the recommended alternative. The EIR will result in the selection of a recommended plan of action, which the Sanitation Districts' Board of Directors will decide to approve or reject.

Figure 3: Project Study Area

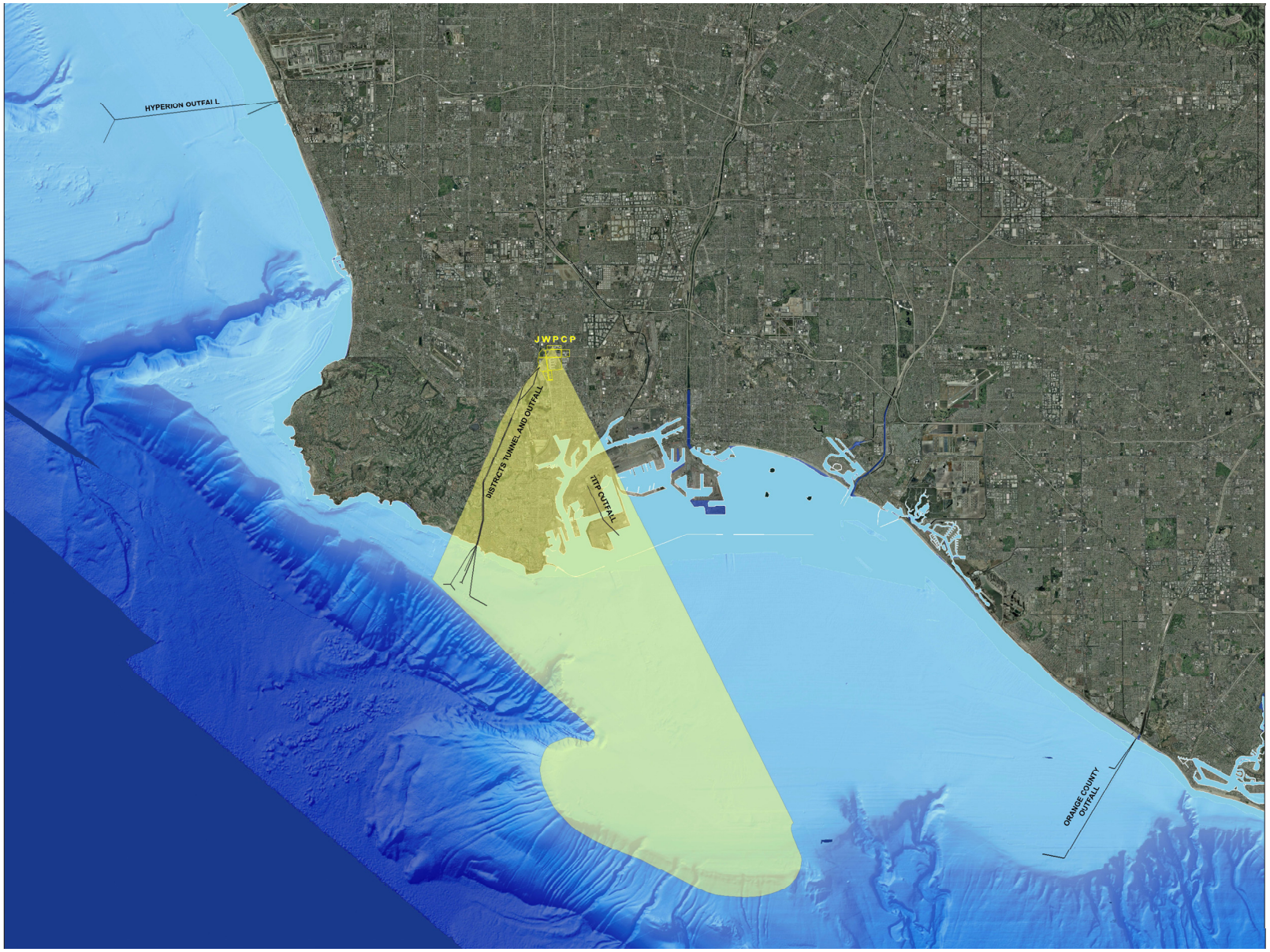


Figure 4: Potential Onshore Alignments and Shaft Sites

Figure 5: Potential Diffuser Locations

5.0 Environmental Issues

5.1 Overview

This section presents a preliminary listing of potential environmental issues to be addressed in the EIR. The environmental issues to be addressed will be finalized after comments on the NOP are received.

The summary below provides a general discussion of potential environmental impacts of the MFP components that will be addressed in the EIR and the approaches used to analyze the potential impacts. The EIR will determine whether these impacts could actually occur, their level of significance, and proposed feasible mitigation measures to reduce significant impacts.

5.2 Aesthetics

Issues

Potential impacts could occur both during construction and after facilities are built and operating. Issues associated with aesthetics in relation to constructing new or altering existing MFP components could include:

- Obstructing high-quality or important views of the landscape either during construction or operation of permanent MFP components
- Increasing to a noticeable level the amount of new light and glare visible from important viewing areas either during construction or operation of permanent MFP components
- Constructing permanent MFP components visually incongruous with their surroundings
- Constructing permanent MFP components in the landscape visible from and incongruous with recreation facilities or open space areas that may be accessible to the public presently or in the foreseeable future
- Potential impacts could occur during construction of a JWPCP tunnel and ocean outfall project. However, once the project is constructed, a tunnel would be below ground surface and the outfall would be on the bottom of the Pacific Ocean. Therefore, there would be no aesthetic impacts associated with operation of a JWPCP tunnel and ocean outfall system.

Approach

Established methods for visual impact assessment developed and used by the Sanitation Districts and the Corps will be used to identify potential visual impacts of the MFP components. One methodology would be to use the Federal Highway Administration (FHWA) Methodology for visual impact assessment. The FHWA visual assessment system uses a qualitative, descriptive approach that is based on identifying the relative levels of vividness, intactness, and unity in the surrounding landscape and assessing the levels of change of these components anticipated to result from proposed project features.

The methodology would assume that impacts occurring during construction would be relatively short term, with the exception of vegetation removal, and would end with repair of damaged areas and cleanup of construction areas, including the full removal of staging areas, equipment storage areas, and temporary structures. In addition, construction activities would introduce visual elements into

the landscape that would contrast with and possibly reduce visual quality and character; therefore, it will be assumed that no beneficial impacts would occur during construction.

Key elements of the approach to visual assessment could include:

- Identifying the viewshed of the proposed MFP through GIS-based elevation analysis refined by field surveys
- Identifying the visible physical changes to the natural and manmade environment including, the addition of new components into the viewshed (temporary and permanent), and the removal of other components from the view (i.e., blocking of views)
- Identifying the compatibility of the visible physical changes with the surrounding visual environment
- Identifying the visibility to viewers of physical changes within the viewshed, including types and relative number of viewers and their likely sensitivity to visual changes
- Identifying the significance of the aesthetic impact, based on the visibility of the physical changes, the compatibility of the changes with the existing visual environment, and the likely viewer reaction to the changes
- Identifying the visual impact on important visual resources
- Identifying the compatibility of visible physical changes with existing visual resource policies
- Identifying the effects of the project components on the existing light, glare, shadow, and shade environments

5.3 Agricultural Resources

Issues

Potential construction and operational impacts could relate to the operation of the biosolids management component of the MFP. In the past, the Sanitation Districts have had agreements with agricultural operators outside of Los Angeles County to beneficially reuse the biosolids on agricultural land. This method of biosolids management has potential agricultural impacts.

There would be no agricultural impacts related to the construction or operation of the proposed JWPCP tunnel and outfall project. This component of the MFP includes a below ground tunnel under existing urban land uses and an outfall and diffuser located on the bottom of the Pacific Ocean. These areas completely lack agricultural uses.

Approach

Agricultural impacts associated with biosolids management will be analyzed on a program-level because the management plan would be programmatic in nature. Existing data and information for each topic will be evaluated and issues and potential impacts will be described. MFP information and data will be compared with significance criteria to identify impacts that meet or exceed applicable criteria.

5.4 Air Quality

Issues

Potential air quality issues associated with the MFP involve both construction and operational air emissions and conformity with the South Coast Air Quality Control Board (SCAQMD) air quality management plan. These issues could include potential air emissions from:

- Construction equipment exhaust
- Construction employee commute travel
- Ground disturbance during construction
- Use of digester gas
- Vehicle trips associated with any increases in employment
- Release of volatile organic compounds (VOCs) from plant operations
- Increased JWPCP solids processing and biosolids management

Potential air quality issues associated with a JWPCP tunnel and ocean outfall project involve only construction air emissions and conformity with the SCAQMD air quality management plan. Once a JWPCP tunnel and ocean outfall are in place below the ground surface, there would be no additional operational emissions from this component of the MFP.

Approach

Analysis of construction and operational related emissions could include:

- Criteria pollutants of greatest concern in the South Coast Air Basin
- Greenhouse gases and climate change
- Estimates of the type and number of construction equipment
- Estimates of emission factors
- Comparison between the construction and operation emission estimates to the federal conformity thresholds established by the EPA for the South Coast Air Basin

The emission estimates and the determination of the significance and mitigation of those estimates will be prepared in accordance with the guidance contained in the SCAQMD *CEQA Air Quality Handbook* (as updated per the SCAQMD website), *Localized Significance Threshold Methodology for CEQA Evaluations*, and *Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology* guidance documents. In addition, the Port of Los Angeles Clean Air Action Plan will provide guidance to develop mitigation measures where necessary.

Existing air emissions reports, including prepared risk assessments for the MFP components, will be used if available. If air quality sampling or monitoring has been conducted specifically for a source, resulting data will be used to estimate emissions. If direct source testing data are unavailable, emissions factors developed by the Pooled Emissions Estimation Program (PEEP) and the Joint Emissions Inventory Program (JEIP) will be used to estimate air emissions based on influent water quality. If PEEP or JEIP emission factors are not available, published emission factors prepared by regulatory agencies such as SCAQMD and EPA will be used for sources in question.

5.5 Biological Resources (Terrestrial)

Issues

Refer to Section 5.11 for impacts to the marine biological environment.

The developed lands that characterize the JOS service area retain little to none of the natural biological communities that once existed. Issues regarding terrestrial biological resources during construction and operations could include:

- Changes to wildlife habitat, disruption of natural movement corridors, or fragmentation or isolation of wildlife habitats
- Disturbance or displacement of wildlife during construction
- Effects on federally listed or state-listed threatened or endangered wildlife species
- Effects on other special-status wildlife species, including state species of special concern and candidate species for federal listing as threatened or endangered
- Effects on wetland and riparian wildlife habitats, or other wildlife habitats that have declined regionally
- Effects on sensitive creek and water resources adjacent to the six WRPs
- Effects on nests of migratory birds protected under the Migratory Bird Treaty Act
- Effects on sensitive botanical species and/or critical habitat
- Effects on existing habitat conservation plans
- Construction in an Significant Ecological Area (Whittier Narrows WRP)

The majority of the facilities associated with a JWPCP tunnel and ocean outfall project would be constructed below ground. Therefore, the main concern with respect to terrestrial biology for this component of the MFP will be sensitive resources associated with the construction and access shaft sites for a tunnel at the JWPCP and other locations.

Approach

The following information will be reviewed and incorporated to analyze the effects of the proposed MFP components on sensitive terrestrial biological resources:

- Existing data from literature reviews
- Existing data on special-status wildlife locations and species (e.g., California Department of Fish and Game's Natural Diversity Database)
- Constraints-level surveys of the various MFP components

The effects of the MFP on botanical resources will be assessed based on the approximate extent of the resource affected. Because most of the wastewater treatment facilities are in developed landscapes, extensive sensitive botanical resources are not expected at these sites.

These same sources of information will be reviewed for a JWPCP tunnel and ocean outfall project; however, specific field surveys of the JWPCP and tunnel and ocean outfall shaft sites will be conducted for the more detailed analysis of the project-specific EIR/EIS. The construction and operational related impact analysis for the MFP components and a JWPCP tunnel and ocean outfall project could include:

- Identifying impacts from construction noise, light, dust, etc. on adjacent sensitive resources

- Identifying major constraints to the development or expansion of existing WRP facilities
- Identifying impacts through removal of species
- Identifying impacts through removal of sensitive or critical habitat
- Identifying impacts through removal of protected resources (e.g., wetlands)

5.6 Cultural Resources

Issues

Possible disturbances to terrestrial cultural resources could result from groundbreaking activities related to construction of new or alteration of existing JOS facilities. Issues regarding cultural resources during construction activities could include:

- Disturbance of known or unknown archeological sites, paleontological resources, and/or human remains where groundbreaking activities occur
- Disturbance or alteration of structures with historical importance

For the program EIR there will likely be no impacts to marine submerged cultural resources since the MFP components primarily exist on land.

Potential disturbances to cultural resources due to a JWPCP tunnel and ocean outfall project include terrestrial and marine disturbances. Disturbances to terrestrial cultural resources could result from groundbreaking activities related to alteration of structures with historical significance at the shaft sites to a tunnel at the JWPCP and other locations. Disturbances to marine cultural resources such as prehistoric sites, prehistoric artifacts, historic sites (e.g., shipwrecks, downed aircraft and other vessels), and historic artifacts (e.g., cargo, anchors) could result from construction of offshore tunnel risers, seafloor pipelines, or the diffuser structure. Potential disturbances specific to a new tunnel and ocean outfall could include:

- Direct damage or removal of prehistoric sites/artifacts or historic sites (e.g., shipwrecks, downed aircraft) and/or isolated historic artifacts

Approach

Information regarding terrestrial cultural resources will be obtained from:

- California archaeological inventory at the University of California, Los Angeles
- Archeological inventory
- National Register of Historic Places
- California historical landmarks
- Points of historical interests

The MFP is subject to compliance with the CEQA guidelines for cultural and historical resources. Additionally, any use of federal funding for a project, such as SRF loans (partially funded by the EPA), must comply with Section 106 of the federal National Historic Preservation Act (NHPA). Therefore, historical resources for the MFP will need to be evaluated under criteria for both federal and state designations, the National Register of Historical Places (NRHP) and the California Register of Historical Resources (CRHR).

Following the completion of background research and architectural inventory, a historical resource evaluation report will be prepared that will provide historic context, identify impacts, and evaluate significance. CEQA guidelines (Section 106), NEPA guidelines, and the Advisory Council on Historic Preservation Procedures for the Protection of Historic and Cultural Properties will be used to make management recommendations for any impacts.

Information regarding marine cultural resources will be obtained from:

- California state underwater archeologist
- National Oceanic and Atmospheric Administration's (NOAA) Automated Wreck and Obstruction Information System (AWOIS)
- California State Lands Commission (CSLC) database of shipwrecks
- Magnetometer and side scan sonar data for shipwrecks
- Review of previous cultural resource investigations and consultation with local informants

Federal status regarding the potential impact to submerged cultural resources include Section 106 of NHPA, NEPA, the Archaeological Resources Protection Act of 1987, the Advisory Council on Historic Preservation Procedures for the Protection of Historic and Cultural Properties, and the Abandoned Shipwreck Act of 1987. Submerged cultural resources will be identified within the general proximity of a JWPCP tunnel and ocean outfall project and a determination will be made as to site significance.

5.7 Geology and Soils

Issues

Issues associated with geologic, seismic, and soil hazards involve construction and operation of new or alteration of existing MFP components, including upgrading or increasing capacities of conveyance facilities, wastewater treatment plants, effluent management, solids processing, and biosolids management facilities, could expose people and property to geologic hazards (e.g., landslides, ground failure, earthquakes), as well as could affect:

- Soil stability conditions
- Soil erosion rates
- Topography
- Siltation or deposition in inland surface waters

A deep tunnel for a JWPCP tunnel and ocean outfall could encounter San Pedro Formation sands in the onshore reach between the JWPCP and the coast, and Repetto and Monterey Formations in the offshore reach. Therefore, a JWPCP tunnel and ocean outfall project could result in similar impacts as the MFP components to geology and soils. People and property could be exposed to geologic hazards (e.g., landslides, ground failure, and earthquakes). Additional issues associated with geologic and soil hazards regarding the construction and operation of a JWPCP tunnel and ocean outfall could include:

- Vibration
- Damage to tunnels from seismic activity
- Damage to tunnels from differential settling and expansive soils
- Seafloor instability

- Surface settlement
- Sinkhole formation
- Landslides

Approach

Data gathered by a geotechnical consultant will be reviewed and summarized. Based on this baseline data, impacts of the MFP components will be analyzed using CEQA criteria and thresholds. In addition, preliminary designs developed by the engineering team for a JWPCP tunnel and ocean outfall will be analyzed regarding alignment and specific geology and potential geologic hazards.

5.8 Hazards and Hazardous Materials

Issues

Potential issues related to hazards and hazardous materials associated with the MFP could include:

- Acts of terrorism
- Hazards in soils from previous land uses during construction and operation (i.e., maintenance) of JOS facilities
- Hazards in groundwater from previous land uses during construction and operation (i.e., maintenance) of JOS facilities
- Hazards associated with chemicals used to operate JOS facilities (e.g., chlorine)
- Accidental release of hazardous substances used by (e.g., chlorine) or originating from (e.g., untreated effluent) JOS facilities sites

A JWPCP tunnel and ocean outfall would include constructing vertical shafts to a tunnel at the JWPCP and other locations. Potential issues related to hazards and hazardous materials associated with JWPCP tunnel and ocean outfall construction could include:

- Hazards associated with stockpiling excavated tunnel material including soils
- Hazards associated with loading the excavated tunnel material
- Hazards associated with transporting the excavated tunnel material
- Hazards associated with treating, reusing, and disposing of the excavated tunnel material
- Hazards associated with known contamination plumes or contaminated sediment in the ocean (e.g., DDT)

Approach

Potential hazards will be evaluated and assessed by reviewing Phase I Environmental Site Assessments. The Phase I Assessments will be conducted in accordance with the ASTM International Standard E 1527-05 by the geotechnical consultant for a JWPCP tunnel and ocean outfall. In addition, an evaluation of potential impacts by hydrocarbon compounds or gases associated with the Wilmington Oil Field will be conducted by reviewing the data collected by the geotechnical consultant and/or from reviewing documents from the California Division of Oil, Gas, and Geothermal Resources, and site-specific reports.

5.9 Hydrology, Water Quality, and Public Health

Issues

Issues associated with hydrology, water quality, and public health could be related to the wastewater conveyance and treatment, effluent management, solids processing and biosolids management components of the MFP.

The potential hydrology issues associated with the MFP could include:

- FEMA-identified flood plains
- Existing stormwater infrastructure
- Alteration of surface water flow pre- and post-construction
- Changes in groundwater flow and recharge pre- and post-construction
- Potential impacts from mudflows or seiches
- Impacts on local surface water bodies

The potential water quality issues associated with the MFP could include:

- Possible surface water quality impacts from ammonia, algae blooms, or other causes in the San Gabriel River and its tributaries
- NPDES permit compliance
- Transport and fate of any toxic compounds if present in effluent and biosolids and potential impacts on groundwater or surface water quality
- Potential exposure to pathogens and toxic substances from activities associated with biosolids management

All potential issues regarding marine hydrology, water quality, and public health related to a JWPCP tunnel and ocean outfall are discussed under Section 5.11, "Marine Environment."

Potential non-marine hydrology issues related to a JWPCP tunnel and ocean outfall could include:

- Encounter contaminated groundwater while tunneling
- Changes in groundwater flow and recharge pre- and post-construction

Approach

The following existing information will be reviewed to analyze the impacts of the MFP to hydrology, water quality, and public health:

- Sanitation Districts' JOS 2010 Master Facilities Plan
- Los Angeles County General Plan
- Relevant reports from the RWQCB
- Relevant reports from the U.S. Geological Survey
- Relevant reports from the California Department of Water Resources

Relevant federal, state, and local regulations and agencies will be described including provisions of the federal CWA, the state Porter-Cologne Water Quality Control Act, and the permitting and regulatory authority of the RWQCB.

The hydrologic setting will be characterized by the following resources in or near the MFP area:

- Existing drainage patterns
- Existing National Park Service wild and scenic rivers
- Existing FEMA floodplains
- Local groundwater levels and flow patterns
- The general hydrology of local or potentially affected surface water bodies, including San Jose Creek, the San Gabriel River (and tidal prism), Coyote Creek, and the Los Angeles River
- The general water quality of local or potentially affected surface water bodies, including San Jose Creek, the San Gabriel River (and tidal prism), Coyote Creek, and the Los Angeles River

Field visits will be conducted as part of the evaluation. Surface and groundwater quality conditions will be characterized qualitatively, and, as necessary, quantitatively. Any existing water quality impairments in the local or potentially affected water bodies will be discussed.

Project activities associated with the construction and operation of a JWPCP tunnel and ocean outfall that could potentially result in upland hydrologic or water quality impacts will be described. Impacts will be determined based on the duration, extent, and type of project activity and through a comparison to the hydrology- or water quality-related existing conditions.

5.10 Land Use and Planning

Issues

Issues associated with land use and planning result from construction of new facilities related to the MFP components. Issues associated with these components could include:

- Compatibility with adjacent land uses or zoning designations
- Consistency with relevant land use policies
- Access to adjacent land during new construction or repairs of existing wastewater conveyance facilities

Other land use issues are associated with operation of new JOS facilities. For example, any increased solids processing and biosolids management, as well as any expansions of the wastewater treatment plants, will be examined for consistency with local land use policies.

Issues associated with land use and planning result from construction of a JWPCP tunnel and ocean outfall project, as well as some operational issues. Issues associated with this could include:

- Shaft site construction, operation, and maintenance

Approach

The evaluation will provide an analysis of the MFP components compatibility with nearby land uses and consistency with relevant local and regional plans and policies. It will include documentation of the MFP's consistencies with relevant plans and programs and any inconsistencies will be identified. Specific attention will be paid to impacts on the character and integrity of surrounding sensitive land uses. A plan-to-plan analysis will be conducted that will evaluate the MFP in terms of its respective goals and policies. Zoning inconsistencies will be identified.

5.11 Marine Environment (Marine Hydrology, Water Quality, Public Health, and Biological Resources)

Issues

Very few program components of the MFP have the potential to impact the marine environment. The effluent management component (i.e., releasing treated effluent into water bodies) is the component that could impact resources. Potential construction and operational marine environment impacts associated with effluent management could include:

- Changes in diversity or number of fish or shellfish species in the San Gabriel River tidal prism
- Deterioration of existing fish or shellfish habitat in the San Gabriel River tidal prism
- Reduction of the number of unique, rare, or endangered species in the San Gabriel River tidal prism

A JWPCP tunnel and ocean outfall project could result in construction and operational impacts on the marine environment. Construction of the project would take place via tunneling, and, therefore, marine-related construction impacts would be limited to the location of offshore tunnel risers, seafloor pipelines, and diffusers on the bottom of the Pacific Ocean. Furthermore, oceanographic processes, such as currents and temperature stratification, will influence the discharge of effluent once the outfall is operational. These processes may impact effluent dispersion and, consequently, water quality, sedimentation patterns, and possibly the benthic environment.

Therefore, potential issues regarding direct and indirect construction and operational impacts of a JWPCP tunnel and ocean outfall could include:

- Water quality
- Essential fish habitat (EFH)
- Interference with local bottom currents
- Sedimentation
- Bottom habitat and marine environment
- Commercial and recreational fisheries
- Navigation to/from Port of Los Angeles and Port of Long Beach
- Accidental spills of fuel or hazardous materials
- Palos Verdes Shelf Superfund Site

Approach

The following data will be reviewed for the analysis:

- Marine monitoring data gathered over the past three decades with respect to the history of effluent quality from the JWPCP
- Receiving water quality data identifying bacteriology, dissolved oxygen, and water clarity parameters
- Data and historical trends regarding kelp coverage, fin erosion, demersal fish and benthic populations, and bioaccumulation
- Effluent dispersion modeling results
- DDT-contaminated sediment data

The construction impact assessment will address the potential effects of construction activities on the marine environment, including the benthic habitat and local fisheries. The analysis will evaluate the potential impacts associated with the differences in location, time required for construction, construction methods, navigation restrictions, transit of equipment and material, and disposition of construction materials and spoils in relation to benthic habitat and fisheries. In addition, impact analysis will address accidental spills of fuel or hazardous materials during construction of an outfall and the measures that would be taken to minimize the potential for spills and quickly react and contain spills should they occur. Changes in habitat type, including the loss or gain of soft-bottom and hard-bottom substrate, will also be evaluated for potential long-term impacts on marine communities.

Operational impacts of a new JWPCP tunnel and ocean outfall will be evaluated, as will the effects of the anticipated discharges from the existing JWPCP and a new JWPCP tunnel and ocean outfall. Sediment deposition from the discharged effluent from a JWPCP tunnel and ocean outfall will be evaluated as part of the operation of the new outfall.

In addition, existing data on benthos, algae, fish, and other wildlife will be reviewed to determine potential operational impacts of the JOS effluent management system on marine species in the San Gabriel River tidal prism. The nutrient, metals, and organics loading and salinity changes in the saltwater prism resulting from operation of JOS facilities will be examined. Operational effects on flow discharged to the San Gabriel River will be determined.

5.12 Noise and Vibrations

Issues

Issues associated with noise and vibrations involve both construction and operational activities of the MFP components. Construction activities that could be a significant source of noise and vibrations include trucking operations, use of heavy construction equipment (e.g., graders, cranes, and front-end loaders), pile driving activities, and blasting.

Sources of operational noise related to transportation include traffic generated by facility workers, operation and maintenance vehicles, and waste transport trucks. Fixed sources of noise may include aeration equipment (i.e., pumps and motors at pump stations), backup emergency generators, fans, paging systems, and alarms.

It is likely that there would be more construction-related issues than operational-related issues associated with the noise and vibrations generated by a JWPCP tunnel and ocean outfall project. Construction-related issues could include construction noise and vibrations at construction shaft sites and access shaft sites. Uses such as truck operations, heavy construction equipment operations, and pile driving activities could cause noise and vibrations. Once a JWPCP tunnel and ocean outfall are built, the tunnel would be below ground surface and the ocean outfall would be on or below the seafloor, thus incapable of generating noise that would impact sensitive receptors.

Approach

Assessing the significance of potential noise effects associated with implementation of the multiple components of the MFP will require determining the physical and regulatory noise setting. Setting information will be based on:

- Previous noise studies conducted in the area(s)
- Noise elements of existing general plan documents

- Noise ordinances of local jurisdictions
- Location(s) of sensitive receptor(s)
- Field reconnaissance surveys

Construction noise and vibration impacts related to the MFP components will be evaluated using analysis methods recommended by the U.S. Department of Transportation and other agencies, as appropriate. Program-level construction and operational data will be used to complete the MFP components analysis.

Construction noise and vibration impacts related to a new JWPCP tunnel and ocean outfall will also be evaluated using analysis methods recommended by the U.S. Department of Transportation and other agencies, as appropriate. Project-level construction and operational data will be used to complete a JWPCP tunnel and ocean outfall noise analysis.

5.13 Population, Employment, and Housing/Environmental Justice

Issues

Issues associated with population, housing, employment, and environmental justice primarily involve construction of MFP components. Construction of new facilities or alteration of current facilities could lead to displacement or interruption of operation of businesses during construction. Operations of wastewater treatment plants and solids management programs could also affect population and housing. The following issues could be reviewed:

- Population, employment, or housing displacement associated with the components
- Additional population growth or concentration of population in the service area
- Additional residential housing units in the service area
- Additional jobs during construction and long-term operation of new facilities
- Shift in jobs/ housing balance
- Conflicts with adopted plans or goals for growth in the service area
- Disproportionate impacts to minority and disadvantaged populations

Issues associated with population, housing, employment, and environmental justice primarily involve the construction in contrast to operation of a new JWPCP tunnel and ocean outfall. Construction of new facilities or alteration of current facilities could lead to displacement or interruption of operation of businesses during construction. The following issues could be reviewed:

- Additional jobs during construction and long-term operation of new facilities
- Disproportionate impacts to minority and disadvantaged populations
- Temporary disruption to residents and businesses along construction traffic routes and at the shaft sites

Approach

Should any housing be affected, the appropriate Housing Element goals and policies, as well as local and regional growth projections identified in the general plan and identified by SCAG's Regional Comprehensive Plan (RCP), will be evaluated to determine the impacts on population and housing. The magnitude and potential growth inducement based on the MFP components that could have

implications on population and housing trends will be assessed. The number and types of jobs that could be added or impacted as a result of the proposed project will be estimated.

Direct impacts on the job/housing balance in the JOS service area and each treatment plant drainage area will be analyzed based on:

- The number of construction and operational jobs generated by MFP activities
- Housing demands associated with operational employment
- The location and number of residences and new businesses that could be displaced as a result of construction of additional JOS facilities

Information sources to be used in the analysis include:

- Los Angeles County General Plan and EIR
- Local city and community plans in the Sanitation Districts' service area
- SCAG RCP Growth Management Element, Land Use Element, and EIR
- Subregional Inputs for SCAG/Los Angeles County Planning Subregions, including the city of Los Angeles, Tri-City, southeast Los Angeles County cities, South Bay cities, San Gabriel Valley, and West Side Summit

In accordance with Executive Order 12898 (Federal Actions to address Environmental Justice in Minority and Low Income Populations), potential concentrations of minority and disadvantaged populations will be identified, including whether the MFP impacts could disproportionately affect these groups. This will include an evaluation of the demographic characteristics of the surrounding areas for the MFP components to determine whether the MFP or a JWPCP tunnel and ocean outfall project could result in disproportionate impacts on disadvantaged groups.

5.14 Public Services

Issues

Potential issues related to the construction and operation of the MFP and to the construction of a JWPCP tunnel and ocean outfall could include:

- The undue taxation of public service agencies (fire, police, schools, other emergency personnel) to respond to demands resulting from implementation of the MFP
- The need for additional services required to accommodate adequate fire, police, and other emergency services
- Disruption or impediment of fire, police, or other emergency services to areas/facilities where components of the MFP would be constructed or operated
- Need for additional government services or public facilities (e.g., roads)

Approach

Information regarding public services will be taken from the following areas:

- Public safety elements from relevant general plans of each local jurisdiction in which construction activities are proposed
- Personal communication with local fire, police, and other emergency departments of each local jurisdiction in which construction activities are proposed

Existing and projected regional supplies and demands for public services will be described along with any existing constraints, deficiencies, or other issues for the MFP components. For a new JWPCP tunnel and ocean outfall, regional and local supplies and demands for public services will be described along with any existing constraints, deficiencies, or other issues for a tunnel and ocean outfall. Existing facilities, service areas, user demands, capacities, planned or proposed expansions, and existing sufficiency issues will be analyzed.

5.15 Recreation

Issues

The MFP components may have the potential to impact the accessibility and use of recreational areas such as parks during construction and operation. This could include:

- Removing a recreational area from service during construction (short-term)
- Removing a recreational area from service during operation (long-term)
- Reducing recreational area accessibility during construction (short-term)
- Reducing recreational area accessibility during operation (long-term)

A new JWPCP tunnel and ocean outfall would require the construction of shaft sites for a tunnel at the JWPCP and other locations, an ocean diffuser, and possibly a seafloor pipeline. The construction of the access shaft sites and an ocean outfall may have the potential to impact the accessibility and use of recreational areas such as parks and various marine locations. In addition to those impacts listed above, construction of a new tunnel and ocean outfall could include:

- Exposing diving, fishing, and recreation boats to construction hazards (short-term)
- Interfering with anchorage and fishing nets (long-term)
- Exposing divers swimming near outfalls to health risks (long-term)

Approach

Information regarding recreation will be taken from the following areas:

- Los Angeles General Plan Recreational Element
- Relevant community planning area(s) plans (e.g., San Pedro Community Planning Area)
- Correspondence with Los Angeles Department of Recreation and Parks
- SCAG data regarding recreation
- Census data

The recreational area in the general vicinity of the project will be identified, described, and mapped. Impacts will be assessed including, but not limited to, the following:

- Reduction of general park service ratios based on acres and census data
- Reduction of recreational area access
- Length of time the recreational area will be out of service

5.16 Transportation and Traffic

Issues

Issues associated with transportation related to constructing or altering existing MFP components involved both construction-related and operational impacts.

The temporary construction-related issues could include:

- Additional trips occurring during transportation of the construction crew and materials
- Increase in traffic volume on the adjacent roadways resulting from road closures and detours
- Alteration of normal circulation patterns and interruption of traffic flow during construction resulting from road closures and detours
- Increased demand for parking to serve construction workers
- Increase in traffic hazards resulting from construction activities

Operational issues could include:

- Increased demand for parking to serve additional employees
- Safety and operational problems of the access roads used by the trucks transporting biosolids
- Traffic increases due to additional employees, material/supply deliveries, and truck traffic associated with increased biosolids disposal
- Additional use of rail transport

There are no marine transportation issues associated with the program components of the MFP, as none of these components would be constructed or operated in a marine environment.

Issues associated with transportation related to construction of a JWPCP tunnel and ocean outfall could include:

- Temporary increases in auto, truck, or rail trips to transport the construction crew and materials to and from work sites
- Temporary alteration of normal circulation patterns and interruption of traffic flow during construction that could result from any required road closures and/or detours, possibly including temporary increases in volume on nearby streets
- Increases in traffic, and bicycle and pedestrian hazards resulting from construction activities
- Disruption in marine transportation adversely affecting existing ship traffic to and from the Ports of Los Angeles and Long Beach
- Location of shaft site may consume space that might otherwise be used for port container operations
- Interference with shipping anchorage near outfall
- Navigational hazards to marine traffic

Issues associated with transportation related to the operation of a JWPCP tunnel and ocean outfall could include:

- Location of shaft site may consume space that might otherwise be used for port container operations
- Interference with shipping anchorage near outfall

Approach

A general regional setting of the MFP components area will be developed using the following sources of information:

- Caltrans' 2005 Traffic Volumes on California State Highways
- Information on relevant current projects being planned by Caltrans District 7
- Destination 2030 (regional transportation plan prepared by SCAG)
- Metro Long-Range Transportation Plan
- Route maps and information on planned service changes for public transit providers

Analysis of improvements in the existing conveyance system and water reclamation/treatment plants and other program elements will be on a programmatic level. The types of impacts that could occur with each program element will be identified, and their significance will be assessed.

The approach to analyzing the construction and operational terrestrial, or land-based, transportation issues of a new JWPCP tunnel and ocean outfall could involve:

- Conducting focused traffic impact studies using traffic count data in the vicinity of the JWPCP and any other construction location(s). The scope of these studies will be discussed with the relevant local jurisdictions and will include an evaluation of temporary short-term impacts associated with outfall and tunnel construction (construction workers and truck traffic) and an assessment of long-term impacts that may result from project-related increases in employment and biosolids generation at the JWPCP
- Reviewing regional traffic growth forecasts and information on locally planned development projects and street improvements to estimate cumulative background conditions at the time when construction activities are planned
- Estimating incremental trip generation associated with construction and operation of the project and assigning that traffic to the surrounding streets and highways on the basis of the project description information
- Estimating and assessing the significance of the increased demand for construction worker parking at each construction site and, potentially, the reduced supply during the construction period
- Evaluation of the potential temporary hazards to traffic, cyclists, and pedestrians in the vicinity of construction sites
- Development of appropriate mitigation measures

The approach to analyzing construction and operational marine transportation issues of a new JWPCP tunnel and ocean outfall construction and operational marine transportation issues could involve:

- Estimating increases in vessel traffic based on information from the design engineering team on possible construction and operation alternatives
- Assessing impacts on marine transportation from the proposed project based on a determination of whether the proposed JWPCP tunnel and ocean outfall would unduly tax the ability of U.S. Coast Guard and the Marine Exchange. The draft Los Angeles CEQA threshold guidelines will be used with respect to vessel traffic, which states that marine transportation impacts would normally be considered to have a significant impact if the potential disruption to existing ship traffic or vessel safety would be substantial

5.17 Utilities, Service Systems, and Energy

Issues

Potential issues related to the construction and operation of the MFP components and the construction and operation of a new JWPCP tunnel and ocean outfall could include:

- The undue taxation of service agencies to respond to MFP demands
- The need for additional services required to accommodate adequate service for the MFP
- The disruption or impediment of service to areas where the MFP would be constructed or operated
- Energy generation from the combustion of digester gas at the JWPCP will increase as a result of the digestion and stabilization of additional biosolids

Approach

Information regarding utilities/service systems/energy will be taken from the following areas:

- California Energy Commission
- Southern California Edison
- Los Angeles Department of Water and Power
- Metropolitan Water District of Southern California
- The Southern California Gas Company
- Sanitation Districts of Los Angeles County
- Local resources
- Personal communications

Existing and projected regional supplies, demands, and facilities will be described along with any existing constraints, deficiencies, or service issues for the MFP. Existing demands from each of these components will be described in terms of water supply, wastewater generation, energy and natural gas consumption, solid waste generation, and public service demands.

For a new JWPCP tunnel and ocean outfall, existing and future water, energy, and other public utilities within the vicinity of the proposed ocean outfall and tunnel construction that have the potential to be affected by the project will be described. Existing facilities, service areas, user demands, capacities, and planned or proposed expansions and existing sufficiency issues will be analyzed.

5.18 Cumulative and Growth-Inducing Impacts

Issues

Potential issues regarding the program components of the MFP as well as a new JWPCP tunnel and ocean outfall project include significant growth-inducing impacts to which implementation of the recommended MFP might contribute. Issues could include:

- The potential capacity addition to MFP components and their potential influence on growth
- The specific relationship between the Sanitation Districts' treatment and conveyance capacity to projected and planned growth

- The consistency of the MFP with projected growth
- The development policies of the county's and cities' general plans and whether the implementation of the MFP would eliminate a significant obstacle to growth in an area that would otherwise not be affected

Approach

A cumulative impact consists of significant effects that are the result of the combined effects of individual past, present, and probable future projects. A project's individual effect may be less than significant while still making a contribution to a significant cumulative effect. A cumulative impact analysis will be developed by the Sanitation Districts and will include build-out of the general plans for the cities and the county areas within the MFP area.

In addition, secondary growth-related impacts associated with the implementation of the MFP will be evaluated pursuant to the CEQA guidelines for growth inducement. The role that utilities, in general, and the Sanitation Districts, in particular, play in accommodating regional development will be objectively described. Other factors (e.g., economic growth and employment) influencing growth will also be described.

Attachment 2
NOTICE OF INTENT

BILLING CODE: 3710-KF-P

DEPARTMENT OF DEFENSE

Intent to prepare a Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for a permit application for the Sanitation Districts of Los Angeles County's (Sanitation Districts) Clearwater Program in Los Angeles County, California.

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent (NOI).

SUMMARY: In compliance with the National Environmental Policy Act (NEPA) of 1969,40 CFR 1508.22, and 33 CFR Parts 230 and 325, and in conjunction with the Sanitation Districts, the U.S. Army Corps of Engineers (Corps) is announcing its intent to prepare a DEIS/EIR for the Clearwater Program. The Clearwater Program is a strategic planning initiative to identify wastewater conveyance, wastewater treatment, effluent management, solids processing, and biosolids management needs for the Sanitation Districts' Joint Outfall System through the year 2050. The Clearwater Program will entail the preparation of a new Master Facilities Plan (MFP), which will guide the management, and upgrade/development of the Sanitation Districts' infrastructure. A major component of the MFP is the construction of a new ocean outfall structure extending from the coastline in the vicinity of White Point, Point Fermin, or the Port of Los Angeles up to approximately 7 miles seaward of San Pedro Bay in the Pacific Ocean. The construction of the structure would entail discharge of dredged and fill material in waters of the United States, work in navigable waters of the United States, and potentially the transport of dredged material for ocean disposal. Accordingly, the Sanitation Districts intend to submit a Department of Army application pursuant to Section 404 of the Clean Water Act (CWA), Section 10 of the Rivers an Harbors Act (RHA), and if necessary Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA).

FOR ADDITIONAL INFORMATION CONTACT: Kenneth Wong, Project Manager, at (213) 452-3290 (kenneth.wong@usace.army.mil), U.S. Army Corps of Engineers, Los Angeles District, P.O. Box 532711, Los Angeles, CA 90053-2325

SUPPLEMENTAL INFORMATION:

1. Project Purpose and Need: The Sanitation Districts currently utilize two tunnels and four ocean outfall structures to convey effluent from their Joint Water Pollution Control Plant (JWPCP) in the city of Carson to the Pacific Ocean. The two tunnels were constructed in 1937 and 1958 and have not been inspected in nearly 50 years. Inspection of the tunnels is not possible due to their overall length, limited access, lack of separation between the tunnels, and the overall flow through the tunnels. The project need is to inspect and upgrade aging infrastructure, and to accommodate the projected increase in wastewater flows. The project purpose is to improve existing infrastructure and increase wastewater treatment capacity to accommodate estimated 2050 flows, while complying with all applicable water quality standards. As a part of planned infrastructure improvements, the Sanitation Districts propose to construct a new tunnel and ocean outfall structure.

The new ocean outfall would be composed of onshore and offshore components. The onshore component would entail construction of a 4- to 7-mile long underground tunnel approximately up to 200 feet below ground from the JWPCP to one of three areas (White Point, Point Fermin, or the Port of Los Angeles) from where the tunnel will make the onshore-to-offshore transition. Once offshore, the tunnel may extend up to 7 miles seaward and connect to a diffuser via a riser. Alternatively, once offshore, the tunnel may transition to the ocean floor via a riser to seafloor pipeline(s), which would connect to the diffuser structure. Depending on the location of the diffuser, the seafloor pipeline(s) may extend up to 7 miles offshore.

2. Proposed Action: The offshore component of the new ocean outfall could entail excavation of an approximately 105-foot-wide trench up to 7 miles long requiring

dredging of approximately 950,000 cubic yards of sediment. Once excavated, outfall pipe(s), diffuser pipes, bedding, ballast, dredged material, and armor stone would be discharged into the trench. Dredged material not used for trench backfill could be designated for ocean disposal or beach nourishment depending on sediment chemistry.

Dredging, pipe laying, trenching, and other construction activities within the Pacific Ocean, a navigable water of the United States, would be subject to Section 10 of the Rivers and Harbors Act. The discharge of dredged and fill materials associated with pipe laying activities in the Pacific Ocean, a water of the United States, would also be subject to Section 404 of the Clean Water Act. The transportation and discharge of dredged material for the purpose of ocean disposal, if required, would be subject to Section 103 of the Marine Protection, Research, and Sanctuaries Act.

The geographic jurisdiction of Section 10 RHA and Section 404 CWA extends 3 geographic miles seaward (33 CFR Part 329.12 (a)). However, a wider zone of geographic jurisdiction out to the Outer Continental Shelf (200 miles seaward) is recognized when a project entails placement of devices on the seabed (33 CFR 322.3 (b)). Because the project entails placement of a pipeline up to 7 miles on the seabed, the entire length of the project is subject to both Section 10 RHA and Section 404 CWA jurisdictions.

3. Alternatives Considered: The feasibility of several alternatives is being considered and will be addressed in the DEIS/EIR. Those considered feasible will be analyzed in equal detail to the Proposed Action. Alternatives for the proposed project would evaluate alternate onshore and offshore tunnel alignments; alternate tunnel shaft site locations; and alternate diffuser locations. Furthermore, alternate offshore project designs would be evaluated. One design would extend the tunnel up to 7 miles offshore and connect to the diffuser via a riser. Alternatively, the tunnel may transition via a riser to seafloor pipeline(s), which would connect to a diffuser. Depending on the location of the diffuser, the seafloor pipeline(s) may extend up to 7 miles offshore. The No Federal Action Baseline Alternative would result in implementation of the recommended projects within

the MFP without the new ocean outfall and other infrastructure upgrades that require Department of Army permits. Under the No Action Alternative, there would be no upgrade and development of the Sanitation Districts' infrastructure, including the new ocean outfall, to accommodate wastewater management needs through 2050. These alternatives will be further formulated and developed during the scoping process. Additional alternatives that may be developed during the scoping process will also be considered in the DEIS/EIR.

5. Scoping Process: The Corps' scoping process for the DEIS/EIR will involve soliciting written comments and a public meeting. Potential significant issues to be addressed in the DEIS/EIR include aesthetics; air quality; biological resources; cultural resources; geology; hydrology; hazards and hazardous materials; water quality; public health; land use and planning; marine environment (marine hydrology, water quality, public health, and biological resources); noise; population, employment, and housing/environmental justice; public services; recreation; transportation and traffic; utilities, service systems, and energy; and cumulative and growth-inducing impacts. Additional environmental impacts may be identified during the scoping process. Furthermore, the DEIS/EIR will assess the consistency of the Proposed Action with the Coastal Zone Management Act and potential water quality impacts pursuant to Section 401 of the Clean Water Act. Comments are invited from the public and affected agencies, including, but not limited to, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Coast Guard, California Department of Fish and Game, California State Water Resources Control Board, California State Lands Commission, California Coastal Commission, and the city of Los Angeles.

PUBLIC MEETING: A public scoping meeting to receive input on the scope of the DEIS/EIR will be conducted on Thursday, November 6, 2008 at 6:30 p.m. at Crowne Plaza Hotel, 601 South Palos Verdes Street, San Pedro, California. If you have any questions regarding the meeting, please contact Steven Highter, Supervising Engineer, Sanitation Districts, at shighter@lacsd.org.

6. Availability of the Draft EIS: The DEIS/EIR is expected to be published and circulated in fall 2009, and a public meeting will be held after its publication.

Attachment 3

WRITTEN COMMENTS ON THE NOP/NOI

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

November 4, 2008

Mr. Kenneth Wong
Project Manager
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053

Subject: Scoping Comments for the October 6, 2008 Federal Register Notice of Intent (NOI) to Prepare a Draft Environmental Impact Statement (DEIS) for the County Sanitation Districts of Los Angeles County Clearwater Program Master Facilities Plan, Los Angeles County, California

Dear Mr. Wong:

The US Environmental Protection Agency (EPA) has reviewed the County Sanitation Districts of Los Angeles County (District) NOI to prepare a Draft Environmental Impact Statement (DEIS) for the Clearwater Program Master Facilities Plan (MFP) and the Joint Water Pollution Control Plant (JWPCP) ocean outfall for Los Angeles County, California. We previously provided detailed comments on the January 2, 2008 Draft NOI in our letter dated March 5, 2008. Based on our review of the NOI, our Draft NOI comments still apply to the development of the DEIS for the MFP and JWPCP. EPA's attached letter to the District dated July 30, 2008, clarifying Super Fund Program comments, also applies.

We look forward to coordinating with the Corps and the District during the development of the DEIS. When complete, please send two hard copies and one CD copy of the DEIS to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please call me at (415) 972-3847.

Sincerely,

Paul F. Amato
Environmental Protection Specialist
Environmental Review Office

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Enclosed:
EPA's July 30, 2008 letter

Cc:
David Castanon, Chief, Regulatory Branch, Los Angeles District, Corps of Engineers
Thomas J. LeBrun, Department Head, County Sanitation Districts of Los Angeles County
Steven Highter, Supervising Engineer, County Sanitation Districts of Los Angeles County
Joseph Gully, County Sanitation Districts of Los Angeles County

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

July 30, 2008

Thomas J. LeBrun, Department Head
Facilities Planning Department
County Sanitation Districts of Los Angeles
1955 Workman Mill Road
Whittier, CA 90607

Re: Draft Notice of Intent to prepare a
Draft Environmental Impact Statement for the
LACSD Clearwater Program, Master Facilities Plan
Los Angeles County, CA

Dear Mr. LeBrun:

This letter provides clarification requested by LACSD regarding the Superfund Program's comments in EPA's March 5th letter on the above-referenced project. EPA's letter pointed out that a Superfund site is located on the Palos Verdes Shelf and requested that EPA be given the opportunity to review any plans to build an outfall on the Shelf to assure that the layer of contaminated sediment (i.e., the "effluent-affected" sediment) on the Shelf is not disturbed.

As you know, the effluent-affected (EA) sediment deposit on Palos Verdes Shelf extends from the existing outfalls to the north past Pt. Vicente. Outfall construction in that area would be problematic with a high probability of causing a release of contaminants into the environment. However, sediment and oceanographic data collected by the U.S. Geological Survey, EPA, and your own Ocean Monitoring and Research Group suggest that the area south of the existing outfalls, i.e., south of LACSD's 9 transect, has returned substantially to its native state and contains little to no effluent-affected sediment.

Our analysis of existing oceanographic data indicates an outfall south of the 9 transect would be unlikely to disturb the EA deposit. If LACSD decides a Palos Verdes Shelf location warrants further consideration, EPA would request additional information about the location and construction. We would be interested in a full characterization (chemical as well as geotechnical data) of the surface and subsurface sediment in the area under consideration and would like additional information on the outfall design, e.g., location of trenching, estimated volume of cuttings, disposal plan, resuspension management plan, etc.

We realize LACSD is in the preliminary phase of outfall location selection. If the decision is made to seriously consider a Palos Verdes Shelf location, EPA would be available to meet with you and your staff to provide more detailed information on the kinds of studies requested and discuss how we could be involved in reviews of resulting data and design plans.

It is also worth noting that LACSD is a signatory to the Amended Consent Decree in the United States v. Montrose Chemical Corporation of California case. EPA suggests that LACSD consult with its legal counsel concerning any legal issues that could arise from construction activities within the boundaries of the Palos Verdes Shelf Superfund site.

Please feel free to contact me at (415) 972-3010 if you would like further clarification or additional discussion.

Sincerely,

Carmen White

Carmen White, EPA
Remedial Project Manager

cc: Roberta Blank, EPA-SFD
Taly Jolish, EPA-ORC
Brian Ross, EPA-WTR
David Smith, EPA-WTR
Paul Amato, EPA-CED
Steven John, EPA LA Field Office
Joseph Gully, LACSD
David Castanon, USACE, LA District

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

March 5, 2008

Thomas J. LeBrun, Department Head
Facilities Planning Department
County Sanitation Districts of Los Angeles
1955 Workman Mill Road
Whittier, CA 90607

Subject: Scoping Comments for the Draft Notice of Intent (NOI) to Prepare a Draft Environmental Impact Statement (DEIS) for the Los Angeles County Sanitation District Clearwater Program Master Facilities Plan, Los Angeles County, California

Dear Mr. LeBrun:

The US Environmental Protection Agency (EPA) has reviewed the Los Angeles County Sanitation District (District) Draft NOI to prepare a Draft Environmental Impact Statement (DEIS) for the Clearwater Program Master Facilities Plan (MFP) and the Joint Water Pollution Control Plant (JWPCP) ocean outfall for Los Angeles County, California. Our review is pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. These comments were also prepared under the authority of, and in accordance with the provisions of the Federal Guidelines promulgated at 40 CFR 230 under Section 404(b)(1) of the Clean Water Act.

EPA supports using a flexible approach for the development of alternatives for the MFP and JWPCP outfall that consider the unique environmental conditions in the project area. We strongly encourage the District consider alternatives that avoid impacts to the Palos Verdes DDT Superfund Site and the LA-2 Ocean Disposal Site for dredging material. Proposed alternatives should be assessed for potential impacts to the already degraded South Coast Air Basin and for conformity with local air quality plans. Water quality should be assessed for cumulative impacts from increased contributions of emerging contaminants to surface and groundwater. Because the DEIS is intended to provide the cumulative impacts analysis for the JWPCP outfall and for future projects under the MFP, the analysis must be rigorous and comprehensive.

We appreciate having had the opportunity to meet with you and your staff on December 10, 2007, to begin early coordination between the District and EPA. To assist in the scoping process, we have identified issues for your attention in the preparation of the DEIS. These

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detailed comments are enclosed. We look forward to continued coordination with the District and other relevant agencies to develop project alternatives and protect environmental resources prior to the release of the DEIS. Please send two hard copies and one CD copy of the DEIS to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please call me at (415) 972-3847.

Sincerely,

Paul F. Amato
Environmental Protection Specialist
Environmental Review Office
Communities and Ecosystems Division

Enclosed: Detailed EPA Scoping Comments

Cc: David Castanon, Chief, Regulatory Branch,
Los Angeles District, Corps of Engineers

DETAILED EPA SCOPING COMMENTS ON THE DRAFT NOI FOR THE CLEARWATER PROGRAM MASTER FACILITIES PLAN, LOS ANGELES COUNTY, CA, MARCH 5, 2008.

Purpose and Need

The US Environmental Protection Agency (EPA) understands that the federal lead agency (FLA) has not been identified for the proposed project. Following FLA determination, please be sure that the DEIS includes the purpose and need statement of the federal action in addition to the already identified purpose and need of the Clearwater Program. In addition, the District should consider whether expanding the existing biosolids program should be included as part of the purpose and need statement.

Thresholds of Significance

The DEIS should clearly describe the rationale used to determine whether impacts of an alternative are significant or not. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).

Alternatives Analysis

The DEIS should clearly describe the five individual components of the Master Facilities Plan (MFP) and the project level Joint Water Pollution Control Plant (JWPCP) ocean outfall, and evaluate a reasonable range of possible alternatives that satisfy the project purpose and need. EPA urges a creative and flexible approach be taken in the development of potential alternatives. Note that the National Environmental Policy Act (NEPA) requires evaluation of reasonable alternatives, including those that may not be within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). Alternatives analysis should assess the direct, indirect and cumulative impacts of each alternative in a comparative form. Furthermore, there should be a clear discussion of the reasons for the elimination of alternatives which were not evaluated in detail. The DEIS should describe how each alternative was developed, how it addresses the purpose and need, and how it will be implemented.

Both MFP and JWPCP outfall alternatives and potential impacts should be described relative to appropriate baseline conditions. Specific conditions to consider for the JWPCP outfall include the Palos Verdes Shelf DDT Superfund Site, the LA-2 Ocean Disposal Site for dredging materials, Essential Fisheries Habitat, commercial and recreational fisheries, air quality non-attainment in the South Coast Air Basin (SCAB), and ocean and beach recreational opportunities. Given the nature of the proposed project, we encourage the development of alternatives that avoid impacts to aquatic and terrestrial biological resources, hydrology and water quality, air quality, and the environmental justice community living in and near the project area. Lastly, EPA encourages the development or expansion of alternatives that maximize technologies to improve energy efficiency such as the existing cogeneration JWPCP Power Generation Facility.

EPA anticipates the DEIS will include more detailed descriptions of the JWPCP outfall alternatives than the MFP alternative components since it is a project-level NEPA analysis for the outfall and programmatic for the MFP. We also anticipate that future projects resulting from the MFP will be reviewed separately under NEPA as appropriate. The NOI mentions a process for alternatives selection for the DEIS alternatives that would first screen options for the five MFP components then combine them with alternatives for the JWPCP outfall. EPA encourages ongoing coordination with our agency and other appropriate federal, state, and local stakeholders during this process.

Impacts Analysis

In general, EPA finds the scope of the NOI program-level (MFP) and project-level (LWPCP outfall) impacts analysis, as well as the approach to assessing these impacts, to be reasonable, clear and comprehensive. Our recommendations for individual resource categories are provided in order to clarify what the DEIS scope should include in addition to what is already listed in the Draft NOI.

Air Quality

The DEIS should describe any applicable local, state, or federal requirements and ensure that the emissions from both the construction and the operational phases of the project conform to the approved State Implementation Plan and do not cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS). The DEIS should also include a detailed discussion of ambient air conditions (i.e., baseline or existing conditions), the area's attainment or nonattainment status for all NAAQS, and potential air quality impacts of the project (including cumulative and indirect impacts) for each fully evaluated alternative.

For areas that are nonattainment for PM_{10} and $PM_{2.5}$ (particulate matter smaller that 10 or 2.5 microns respectively), the responsible agency should include a Construction Emissions Mitigation Plan in the DEIS and adopt this plan in the Record of Decision (ROD). In addition to all applicable local, state, or federal requirements, EPA recommends that the following mitigation measures be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other toxics from construction-related activities:

Fugitive Dust Source Controls:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Reduce use, trips, and unnecessary idling from heavy equipment.
- Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. Engine certification data can be found at the EPA Engine Certification Data web page: http://www.epa.gov/OMS/certdata.htm.
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations
- If practicable, lease new, clean equipment meeting the most stringent of applicable Federal or State Standards. In general, only Tier 2 or newer engines should be employed in the construction phase.
- Utilize EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site.

Administrative controls:

- Identify all commitments to reduce construction emissions and update the air quality analysis to reflect additional air quality improvements that would result from adopting specific air quality measures.
- Identify where implementation of mitigation measures is rejected based on economic infeasibility.
- Prepare an inventory of all equipment prior to construction and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.) Utilize cleanest available fuel engines in construction equipment and identify opportunities for electrification. Use ultra low sulfur fuel (diesel with 15 parts per million or less) in engines where alternative fuels such as biodiesel and natural gas are not possible.
- Develop a construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow.
- Identify sensitive receptors in the project area, such as children, elderly, and infirm, and specify the means by which you will minimize impacts to these populations. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.

The DEIS should discuss potential impacts to air quality due to odor from operation of modified and/or expanded MFP facilities, including biosolids facilities. EPA has developed guidelines for control of odors at biosolids facilities titled Biosolids and Residuals Management Fact Sheet, found at http://www.epa.gov/OW-OWM.html/mtb/odor_control-biosolids.pdf.

Biological Resources

The DEIS should clearly describe the methods used for determining the presence or absence of sensitive species and their habitats in both terrestrial and aquatic environments. Potential direct, indirect, and cumulative impacts of the MFP and JWPCP outfall should be determined based on accurate and up to date population and distribution data from recognized sources and if appropriate, from field surveys to groundtruth these sources. This is especially important for construction projects where population and distribution data can help develop alternatives that avoid impacts to protected species and their habitats.

Hazards and Hazardous Materials

In addition to the potential sources of hazardous materials listed in the Draft NOI, the DEIS should also assess potential impacts from hazardous substances related to construction such as fuels and lubricants. A spill prevention, response and cleanup plan, including best management practices (BMPs) to prevent contamination should be described in the DEIS and can be provided as an appendix.

Hydrology and Water Quality

EPA supports including in the DEIS an analysis of the potential cumulative effects of the MFP on concentrations of emerging contaminants to surface and groundwater and to sensitive receptors in the environment. Based on activities mentioned in the Draft NOI, EPA believes there are at least three emerging contaminant pathways to surface and groundwater: use of recycled water, discharge into surface waters like the San Gabriel River, and use of biosolids for agricultural or other purposes. EPA supports the appropriate use of recycled water and biosolids but also recognizes the potential impacts from introducing emerging contaminants into the environment. EPA suggests the District refer to *A Guide to the Biosolids Risk Assessment for the EPA Part 503 Rule* found at http://www.epa.gov/owm/mtb/biosolids/503rule/index.htm and to EPA's *Guidelines for Water Reuse*, found at http://www.epa.gov/ord/NRMRL/pubs/625r04108/625r04108.htm. In addition, the DEIS should include a discussion of MFP consistency with EPA Standards for the Use or Disposal of Sewage Sludge and EPA's Review of Existing Sewage Sludge Regulations found at http://www.epa.gov/EPA-WATER/2003/December/Day-31/w32217.htm.

Impacts to both surface and groundwater quality could result from exposure to construction related pollutants, including sediments. EPA suggests the DEIS include a discussion of potential impacts to surface and groundwater quality due to construction related pollutants. In addition to the hydrology and water quality issues identified in the Draft NOI, the District should discuss the potential cumulative impacts due to increased emerging contaminants to surface and groundwater.

Cumulative Impacts

The DEIS is intended to serve as the cumulative effects analysis for all future projects under the MFP. As a result, it is critical that the effects analysis be comprehensive and rigorous, and that it consider an appropriate scope of activities, and spatial and temporal scales when assessing project effects. EPA suggests referring to the Council on Environmental Quality 1997, guidance *Considering Cumulative Effects Under the National Environmental Policy Act* found at http://www.nepa.gov/nepa/ccenepa/ccenepa.htm, and 1999 EPA guidance, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* found at http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf. In addition, we recommend referring to the EPA, California Department of Transportation, and Federal Highway Administration Guidance for Preparers of Cumulative Impact Analysis found at http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm. While this guidance was developed for transportation projects, the principles and the 8-step process in this guidance can be applied to other types of projects, both within and outside of California. We recommend the principles and steps in this guidance to other agencies as a systematic way to analyze cumulative impacts for their projects.

Mitigation Monitoring and Reporting

The DEIS should include a description of appropriate mitigation, monitoring and reporting elements for unavoidable impacts to environmental resources. For the MFP, the DEIS should identify potential mitigation measures that would be further analyzed in future project-specific NEPA documents. For the JWPCP, the DEIS should provide a detailed description of mitigation measures, how these measures will offset negative environmental effects, and a monitoring and reporting program with monitoring methods and timelines.

December 10, 2007, Early Coordination Meeting

As discussed at our early coordination meeting at EPA on December 10, 2007, the District should avoid alternatives that would locate the JWPCP outfall or diffuser close to the LA-2 Disposal Site for dredging material. The DEIS should evaluate the potential direct, indirect and cumulative impacts of construction and location of the JWPCP outfall and diffuser on water quality, sediment transport, aquatic species and habitats, currents, and shipping.

EPA also advised the District that dredged material for the JWPCP outfall may be approved for disposal at the LA-2 Disposal Site following the issuance of a Marine Protection, Research and Sanctuaries Act permit for transport of dredged material and a Clean Water Act Section 404 permit for ocean disposal from the US Army Corps of Engineers (Corps) and EPA. Only material dredged from the ocean floor will be considered for ocean disposal following a determination that the material meets EPA's screening criteria and that no beneficial use projects are available to receive clean sediments. The DEIS should include a discussion of applicable

regulations for dredging and disposal, describe screening methods to evaluate dredged sediments, and evaluate all feasible alternatives for reuse and disposal.

Concerns were raised over locating the JWPCP outfall and diffuser in the DDT Superfund Site. EPA advised the District that disturbances from effluent discharge, construction, and potential changes in currents cannot cause a release of DDT or raise DDT levels. EPA offered to assist with the development of a monitoring and modeling program for the project to help determine and monitor project impacts to the DDT Superfund Site. The DEIS should discuss potential environmental effects due to disturbance of DDT contaminated sediments that could result from effluent discharge, construction, and changes in currents as a result of the JWPCP outfall. A discussion of modeling and monitoring results used to determine environmental effects should be included.

The District should continue to coordinate with EPA to determine what criteria must be met prior to disposal of sediments at LA-2 and what potential impacts could occur from locating the JWPCP outfall in the DDT Superfund Site. Please contact Brian Ross at (415) 972-3475 and Allan Ota at (415) 972-3476 regarding dredging and ocean disposal, and Carmen White, (415) 972-3010, regarding the DDT Superfund Site. The DEIS should reflect and describe results of this coordination.

31-150.17.10

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

November 5, 2008

Steven W. Highter. P. E.
Supervising Engineer Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

Dear Mr. Highter:

This is in response to your request for comments on the Notice of Preparation of an Environmental Impact Report for the Clearwater Program Master Facilities Plan, Los Angeles County, California.

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the County of Los Angeles (Community Number 065043), Map revised September 26, 2008. Please note that the County of Los Angeles, California is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

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- All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The Los Angeles County floodplain manager can be reached by calling George De La O, Senior Civil Engineer, at (626) 458-7155.

If you have any questions or concerns, please do not hesitate to call Cynthia McKenzie of the Mitigation staff at (510) 627-7190.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
George De La O, Senior Civil Engineer, Los Angeles County
Garret Tam Sing/Salomon Miranda, State of California, Department of Water Resources, Southern District
Cynthia McKenzie, Senior Floodplanner, CFM, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

COUNTY OF LOS ANGELES

DEPARTMENT OF PARKS AND RECREATION

"Creating Community Through People, Parks and Programs"

Russ Guiney, Director

November 13, 2008

Sent via Email: SHighter@lacsd.org

Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

Dear Mr. Highter:

NOTICE OF PREPARATION (NOP) OF AN ENVIRONMENTAL IMPACT REPORT (EIR) –CLEARWATER PROGRAM MASTER FACILITIES PLAN

The Department of Parks and Recreation has reviewed the NOP of an EIR for the Clearwater Program Master Facilities Plan Project. A potential Shaft Site #8 is sited within the Deane Dana Friendship Park (1805 W. 9th Street, San Pedro 90732). Please provide more detailed information and assessment on how the development of the Shaft Site # 8 will impact Deane Dana Friendship Park.

Thank you for including this Department in the review of this notice. If we may be of further assistance, please contact me at (213) 351-5129 or jchien@parks.lacounty.gov

Sincerely,

Jui Ing Chien
Park Planner

c: Parks and Recreation (James Barber, Joan Rupert, Frank Moreno, Norma E. Garcia)

CITY OF LOS ANGELES
CALIFORNIA

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TEL: (213) 485-2210
FAX: (213) 485-2979

November 14, 2008

Los Angeles County Sanitation District
Steven W. Highter, P.E.
Supervising Engineer, Planning Section
1955 Workman Mill Road
Whittier, CA 90601

RE: NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Dear Mr. Highter,

This is in response to your Notice of Preparation of an Environmental Impact Report letter dated October 10, 2008 for the Clearwater Program Master Facilities Plan project.

The City of Los Angeles serves more than 4 million people and conveys its wastewater through more than 6500 miles of sewer lines. The raw wastewater is treated at four wastewater treatment facilities, one of which is located in the Terminal Island area of the City of Los Angeles. The Terminal Island Water Reclamation Plant (TIWRP), with an average flow of roughly 20 MGD receives and treats wastewater generated in the Harbor area of the City.

Currently TIWRP produces 5 MGD of recycled water using micro-filtration and reverse osmosis. The City is studying the possibility of increasing recycled water production to 12.5 MGD and is also developing a Recycled Water Master Plan. This plan will identify large industrial and irrigation customers in the Harbor area and maximize the use of recycled water generated at TIWRP.

In addition to evaluating this concept, the City is interested in the possibility of ocean discharge via LACSD's new outfall. In its NOP report, LACSD has identified several potential alignments (figure 4). One in particular runs close to TIWRP. The City is suggesting that for EIR purposes the potential of adding 20MGD of TIWRP's effluent to the outfall be considered for this report. This possibility has been discussed with the LACSD staff in the past.

I would like to take this opportunity and thank you for providing the City with the opportunity to be involved in this very important process. We would also be interested in commenting on the draft EIR once completed.

If there are any questions, please contact Ali Poosti at (323) 342-6228 for further information.

Sincerely,

ENRIQUE C. ZALDIVAR, Director
Bureau of Sanitation

ECZ:TJM:AP:cr

c: Traci Minamide, BOS/EXEC
Ali Poosti, BOS/WESD

H:ECZ279.CR

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

PAUL D. THAYER, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
Relay Service From TDD Phone **1-800-735-2929**
from Voice Phone **1-800-735-2922**

Contact Phone: **(916) 574-1814**
Contact FAX: **(916) 574-1885**

November 21, 2008

SCH#2008101074

Steven W. Highter
Los Angeles County
Sanitation Districts
1955 Workman Mill Road
Whittier, CA 90601

Subject: Notice of Preparation for Clearwater Program Master Facilities Plan Environmental Impact Report (EIR)

Dear Mr. Highter:

Staff of the California State Lands Commission (CSLC) has received the above referenced Notice of Preparation for Los Angeles County Sanitation Districts Clearwater Program Master Facilities Plan EIR. Under the California Environmental Quality Act (CEQA), the CSLC is a Responsible and/or Trustee Agency for any and all projects which could directly or indirectly affect sovereign lands, their accompanying Public Trust resources or uses, and the public easement in navigable waters.

The State acquired sovereign ownership of all tidelands and submerged lands and beds of navigable waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all the people of the State for statewide Public Trust purposes which include waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. The landward boundaries of the State's sovereign interests in areas that are subject to tidal action are generally based upon the ordinary high water marks of these waterways as they last naturally existed. Both the easement and fee-owned lands are under the jurisdiction of the State Lands Commission. The CSLC has certain residual and review authority over Public Trust Resources on tide and submerged lands legislatively granted in trust to local jurisdictions.

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Staff of the CSLC has not determined whether the project, or any potential alternatives, are located on sovereign versus granted lands. If the project or alternatives involve sovereign lands and result in changes, repairs, replacement or relocation of wastewater discharge pipelines (JWPCP Effluent Management Component) on such lands, a lease will need to be obtained from the CSLC.

Sincerely,

Gail Newton, Chief
Division of Environmental Planning
and Management

cc:

Tom Luster
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Barbara Dugal, CSLC

-----Original Message-----
From: Jane Smith [mailto:SMITHJ@slc.ca.gov]
Sent: Friday, December 05, 2008 4:04 PM
To: Highter, Steve
Cc: Judy Brown; Grace Kato; Jennifer Lucchesi
Subject: Clearwater Program Master Facilities Plan

Steve, per our phone conversation of yesterday, I was asked to review the Notice of Prep of an Environmental Impact Report for the Clearwater Program Master Facilities Plan. Comments on the NOP were due November 21. You indicated that an email concerning the SLC's jurisdiction would suffice.

As I understand it, a major component of the Plan will be the possible construction of a new tunnel and ocean outfall to convey treated wastewater from the Sanitation District's Joint Water Pollution Control Plant in Carson to the Pacific Ocean, where it would be discharged 2-7 miles offshore at a depth of approximately 190 feet.

Based on Figure 3 of the NOP, the new outfall alignment may extend onto state-owned sovereign lands that have been legislatively granted to the City of Los Angeles. If that is the case, the SLC would have no leasing jurisdiction. If, however, the outfall falls outside of the legislative grant, a lease from the SLC is required.

We will need a more detailed map in order to determine the extent of the state's sovereign interest and whether a lease will be required.

It was a pleasure talking with you. Feel free to contact me as necessary. Thanks.

jane

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

GAIL FARBER, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE REFER TO FILE: LD-1

December 8, 2008

Mr. Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

Dear Mr. Highter:

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT
CLEARWATER PROGRAM MASTER FACILITIES PLAN
COUNTY OF LOS ANGELES

Thank you for the opportunity to review the Notice of Preparation/Environmental Impact Report for the subject project. The Clearwater Program Master Facilities Plan for the Sanitation Districts of Los Angeles County's Joint Outfall System. The Joint Outfall System encompasses 73 of the 78 cities in the Sanitation Districts' service area as well as some unincorporated County areas.

The proposed Master Facilities Plan will assess the wastewater conveyance, wastewater treatment, solids processing, biosolids management, and effluent management needs for the Sanitation Districts of Los Angeles County's Joint Outfall System. A major component of the Master Facilities Plan will be the possible construction of a new tunnel and ocean outfall to convey treated wastewater from the Sanitation Districts' Joint Water Pollution Control Plant to the Pacific Ocean.

We do not have any specific comments at this time, although we would like the opportunity to review the necessary Environmental Impact Reports and Traffic Studies on a project-by-project basis for any potential traffic impacts on County and County/City roadways and intersections. The traffic impact study should also address the cumulative impacts generated by this and nearby developments including the level of service analysis for the affected roadways and intersections. Upon identifying an impact, the traffic study must propose feasible mitigation measures. A copy of Traffic Impact Analysis Report Guidelines may be obtained on the County of Los Angeles Department Public Works' website at http://dpw.lacounty.gov/traffic.

DEC 11 2008 MOCIOT

DOC # LeBrun T.

If you have any further questions regarding traffic comment, please contact Ms. Lindsay Sagorski of our Traffic Studies Section at (626) 300-4848.

If you have any other questions, please contact Mr. Toan Duong at (626) 458-4945.

Very truly yours,

GAIL FARBER
Director of Public Works

for DENNIS HUNTER, PLS PE
Assistant Deputy Director
Land Development Division

MA:ca
P:\ldpub\CEQA\CDM\Clearwater Program Master Facilities Plan_N0P/EIR.doc

THE PORT OF LOS ANGELES
425 S. Palos Verdes Street | Post Office Box 151 | San Pedro, CA 90733-0151 | TEL/TDD 310 SEA-PORT | www.portoflosangeles.org

Antonio R. Villaraigosa | Mayor, City of Los Angeles

Board of Harbor Commissioners: S. David Freeman, President; Jerilyn López Mendoza, Vice President; Kaylynn L. Kim; Douglas P. Krause; Joseph R. Radisich

Geraldine Knatz, Ph.D | Executive Director

November 18, 2008

Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill road
Whittier, CA 90601

SUBJECT: COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY – CLEARWATER PROGRAM MASTER FACILITIES PLAN: NOTICE OF PREPARATION

Dear Mr. Highter:

Thank you for the opportunity to review the Notice of Preparation (NOP) for the County Sanitation Districts of Los Angeles County – Clearwater Program Master Facilities Plan. The project consists of the preparation of Clearwater Program Master Facilities Plan (MFP) for the Sanitation Districts of Los Angeles County's (Sanitation Districts) Joint Outfall System (JOS). The Los Angeles Harbor Department is a proprietary Department of the City of Los Angeles and has jurisdiction over tidelands trust property the form the Harbor District, which is also called the Port of Los Angeles. We are commenting on your NOP since one or more outfall pipe alignments pass through or under Harbor District properties and have the potential to effect Port operations and/or effect the Harbor environment.

Project Description

The JOS encompasses 73 of the 78 cities in the Sanitation Districts' service area, as well as some unincorporated county areas. The MFP will assess the wastewater conveyance, wastewater treatment, solids processing, biosolids management, and effluent management needs of the JOS through the year 2050, and recommend specific improvements to meet those needs. A major component of the MFP will be the possible construction of a new tunnel and ocean outfall to convey treated wastewater from the Sanitation Districts' Joint Water Pollution Control Plant (JWPCP) in Carson to the Pacific Ocean, where it would be discharged offshore at a depth of approximately 190 feet. We further understand that there is the possibility of construction on Port of Los Angeles (POLA) property as a result of this project.

General Comments

We have the following general comments related to Harbor Department jurisdiction, alternatives and environmental analysis.

Jurisdictional Issues. One or more of the project alternative alignments will pass under/through Harbor District Property and may *require staging areas on* Department Property. Activities on Harbor District property will require Department approvals including issuance of a Coastal Development Permit and issuance of an Engineering Permit. Therefore, the EIR needs to identify the Harbor Department as a Responsible Agency. In this regard, the Department will need to utilize your EIR as the CEQA evaluation for our approvals and the content of the EIR must meet certain requirements including City of Los Angeles CEQA significance criteria. We also have CEQA Guidelines we can share with you. We would be happy to meet with you prior to your preparation of the Draft EIR to discuss specific requirements.

Alternative/Project Analysis. The document should include a robust alternatives analysis that supports selection of a preferred alignment based on feasibility and avoidance and reduction of environmental effects. The Draft EIR should identify the preferred/proposed alternative. Since it is our understanding this will be a combined CEQA/NEPA evaluation, the environmental analysis of a reasonable range of alternatives needs to be done on a coequal basis. The Project, or a Project alternative, needs to include consideration of removal of the TITP outfall from its discharge location within the Harbor.

Areas of Environmental Concerns. While we believe your checklist generally provides adequate coverage, we want to ensure that the environmental analysis in the DEIR addresses the following technical areas/issues.

- Effects of the project on water quality, sediments and hydrology of the harbor and outside the breakwater.
- Effects of the project on marine and sensitive biological resources within the harbor.
- Construction emissions in the Harbor District and application of appropriate controls on construction equipment consistent with our construction emission guidelines (see attached performance requirements).
- Effects of construction activities on traffic and transportation within the Harbor District.

- Handling and disposal of waste/hazardous materials and backfilling associated with preparation of laydown/staging areas and drilling activities within the Harbor District.
- Seismic design and safety and the potential for the project to exacerbate facility and personal loss in the event of an earthquake.
- Effects of the Harbor operations and environment in the event of upset.
- The document needs to include a robust cumulative analysis. We have provided a list of projects we currently address in our environmental documents.

Specific Comments

Section 4.2.2 (Page 7-8): It should be made clear that the construction shaft site is temporary in nature and the site would be returned to the owner (i.e. POLA in case the POLA shaft location alternative is selected) for use at the completion of the project.

- Section 5.2 (Page 12, paragraph 2): Clarify which methodology or combination of methodologies will be used. There are several listed in the previous paragraph.

- Section 5.4 (Page 14, paragraph 2): Please explain how, in the context of this project, air emissions estimates will correlate with influent water quality.

- Tenant concern (Page 20-22): How will all geological issues including, but not limited to, vibrations affect existing POLA tenants?

- Section 5.16 (Page 26-27): The approach should also consider relevant projects within the alignments that are going on at the same time (please see attached cumulative project list).

We are disappointed that you did not conform your public review period to that of the NOI issued by the federal agency. This creates an unnecessary burden and confusion upon agencies and the public and defeats the purpose of carrying out a combined document "in the interest of efficiency and to avoid duplication of effort." In this case our effort.

Finally, we understand that you have been conducting outreach to the local communities. If you have not already, we would recommend that at some time before you begin your analysis, that you conduct some outreach to the Port Community Advisory Committee and in particular their EIR Subcommittee. We would be able to enquire as to the subcommittee's interest and arrange a meeting if you would like.

If you have any questions or need any additional information, please contact Talitha Sweaney of my staff at (310) 732-7693 or by email at tsweany@portla.org.

Sincerely,

RALPH G. APPY, Ph.D.
Director of Environmental Management

Enclosures

PART 1 – GENERAL

1.1 WORK INCLUDED

A. SITE CONSTRUCTION PERFORMANCE REQUIREMENTS consists of specific measures and practices to protect the environment, be socially responsible, provide for the economic development of the Port and include air quality, materials management, energy use, health and safety, and labor sustainability measures.

1.2 RELATED WORK

A. REGULATORY REQUIREMENTS Section 01 41 00

1.3 REFERENCES

A. Board of Harbor Commissioners Resolution No. 6518

1.4 DEPARTMENT DIESEL FUEL REQUIREMENTS

A. Ships shall use low-sulfur fuel (maximum sulfur content of 0.2 percent) in auxiliary engines, main engines, and boilers within 40 nm of Point Fermin.

B. Other equipment shall use low-sulfur fuel (maximum sulfur content of 0.2 percent) in engines at all times.

1.5 DEPARTMENT DREDGING REQUIREMENTS

(Spec writer to include if power is available)

A. Dredging equipment shall be electric.

1.6 DEPARTMENT DIESEL-POWERED EQUIPMENT REQUIREMENTS

A. Vessels:

1. Ships and barges delivering construction materials to construction site shall comply with the expanded Vessel Speed Reduction Program (VSRP) of 12 knots within 40 nautical miles (nm) of Point Fermin to the Precautionary Area.

B. Harbor Craft:

(Spec writer to include the appropriate condition based upon anticipated NTP)

1. **(Through December 31, 2010):** Harbor craft with C1 and C2 marine engines shall achieve a minimum emission reduction equivalent to a U.S. Environmental Protection Agency (EPA) Tier-2 marine engine.

2. **(From January 1, 2011 on):** Harbor craft with C1 or C2 marine engines shall utilize a U.S. EPA Tier-3 engine, or cleaner.

C. On-Road Trucks

(Spec writer to include the appropriate condition based upon anticipated NTP)

1. **(Through December 31, 2011):** On-road diesel trucks with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater used on Project shall comply with EPA 2004 on-road emission standards for PM10 and NOx (0.10 g/bhp-hr PM10 and 2.0 g/bhp-hr NOx) and shall be equipped with a CARB verified Level 3 device.

2. **(From January 1, 2012 on):** On-road diesel trucks GVWR of 19,500 pounds or greater used on Project shall comply with EPA 2007 on-road emission standards for PM10 and NOx (0.01 g/bhp-hr and 0.20 g/bhp-hr.

D. Diesel powered off-road Construction Equipment:

1. Diesel powered off-road construction equipment is defined as any self-propelled land vehicle used for construction purposes, using diesel fuel, having a manufacturer's maximum gross vehicle weight rating of 6,000 lb (2,721.5 kg) or more, with a power rating greater than 50 hp.

2. High-pressure fuel injectors shall be installed on construction equipment engines.

3. Construction equipment shall be maintained in conformance with the manufacturers' specifications.

4. Engines on construction equipment shall be shut down when not in use more than 5 minutes.

(Spec writer to include the appropriate condition based upon anticipated NTP)

5. **(Through December 31, 2011):** Off-road diesel-powered construction equipment greater than 50 horsepower (hp), shall meet Tier-2 off-road emission standards, at a minimum and shall be retrofitted with a CARB-certified Level 3 diesel emissions control device.

6. **(From January 1, 2012 to December 31, 2014):** Off-road diesel-powered construction equipment greater than 50 hp, shall meet Tier-3 off-road emission standards, at a minimum and shall be retrofitted with a CARB certified Level 3 diesel emissions control device.

7. **(From January 1, 2015 on):** Off-road diesel-powered construction equipment greater than 50 hp, shall meet Tier-4 off-road emission standards and shall be retrofitted with a CARB certified Level 3 diesel emissions control device.

E. Exceptions to Harbor Craft, On-Road Truck, and Construction Equipment requirements.

1. The above measures shall be met, unless one of the following circumstances exists and the Contractor is able to provide proof that the circumstance exists:

   a. A piece of specialized equipment is unavailable in a controlled form, or within the required Tier level within the State of California, including through a leasing agreement.

   b. Contractor has applied for AQMD incentive funds to put controls on a piece of uncontrolled equipment planned for use on the Project, but the application process is not yet approved, or the application has been approved, but funds are not yet available.

c. Contractor has ordered a control device for a piece of equipment planned for use on the Project, or the Contractor has ordered a new piece of controlled equipment to replace the uncontrolled equipment, but that order has not been completed by the manufacturer or dealer. In addition, for this exemption to apply, Contractor shall attempt to lease controlled equipment to avoid using uncontrolled equipment, but no dealer within 200 miles of the project has the controlled equipment available for lease.

F. Fugitive Dust/Grading Activities:

1. Active grading sites shall be watered at least 3 times per day to control fugitive dust.

2. Apply approved non-toxic chemical soil stabilizers to inactive construction areas or replace groundcover in disturbed areas.

3. Provide temporary wind fencing around sites being graded or cleared.

4. Suspend soil disturbance activities when winds exceed 25 mph or when visible dust plumes emanate from a site. Stabilize disturbed areas if construction is delayed.

5. Cover open storage piles (greater than 3 feet tall and a total surface area of 150 square feet) with a plastic tarp or chemical dust suppressant.

6. Haul waste materials off-site in conformance with the minimum Water Quality Protection Requirements of the REGULATORY REQUIREMENTS Section.

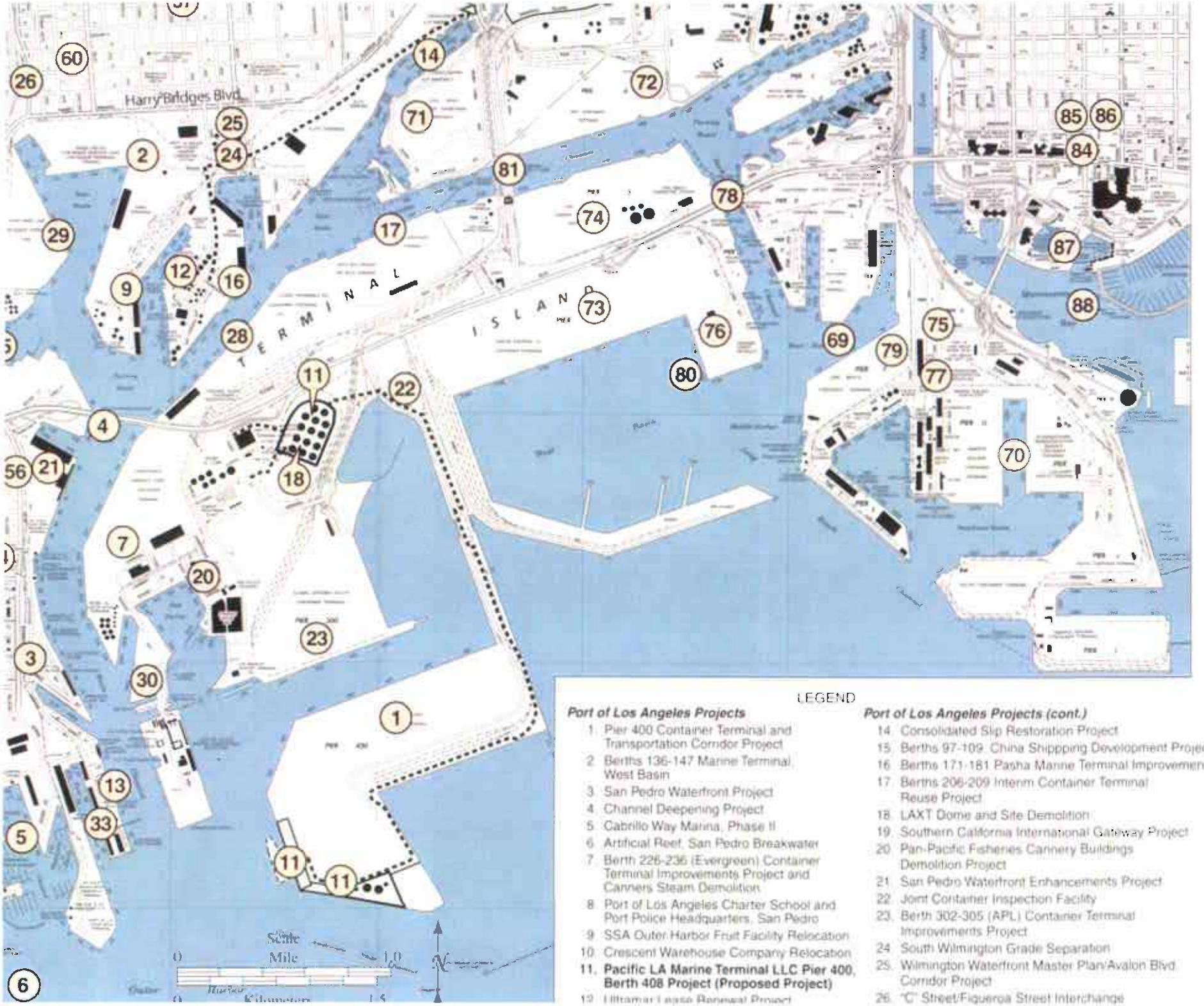
Part 2 – PRODUCTS

Not applicable

Part 3 – EXECUTION

Not applicable

END OF SECTION



LEGEND

Port of Los Angeles Projects

1. Pier 400 Container Terminal and Transportation Corridor Project
2. Berths 136-147 Marine Terminal, West Basin
3. San Pedro Waterfront Project
4. Channel Deepening Project
5. Cabrillo Way Marina, Phase II
6. Artificial Reef, San Pedro Breakwater
7. Berth 226-236 (Evergreen) Container Terminal Improvements Project and Canners Steam Demolition
8. Port of Los Angeles Charter School and Port Police Headquarters, San Pedro
9. SSA Outer Harbor Fruit Facility Relocation
10. Crescent Warehouse Company Relocation
11. **Pacific LA Marine Terminal LLC Pier 400, Berth 408 Project (Proposed Project)**
12. Ultramar Lease Renewal Project

Port of Los Angeles Projects (cont.)

14. Consolidated Slip Restoration Project
15. Berths 97-109 China Shippping Development Project
16. Berths 171-181 Pasha Marine Terminal Improvements
17. Berths 206-209 Interim Container Terminal Reuse Project
18. LAXT Dome and Site Demolition
19. Southern California International Gateway Project
20. Pan-Pacific Fisheries Cannery Buildings Demolition Project
21. San Pedro Waterfront Enhancements Project
22. Joint Container Inspection Facility
23. Berth 302-305 (APL) Container Terminal Improvements Project
24. South Wilmington Grade Separation
25. Wilmington Waterfront Master Plan/Avalon Blvd Corridor Project
26. "C" Street/Figueroa Street Interchange

Potential Port
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Table 4-1. Related and Cumulative Projects

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*[1]
		Port of Los Angeles Projects	
1	Pier 400 Container Terminal and Transportation Corridor Project, Port of Los Angeles	Element of the 2020 Deep Draft Navigation Improvements Plan: dredging, land filling, and marine terminal construction. The entire Pier 400 site is on a recently constructed landfill in the Port of Los Angeles Outer Harbor. The project is a two-phase development of Pier 400 into a 484-acre (196-hectare) container terminal with rail, highway, and utility access. Phase I consisted of construction of rail and highway access and the first 334 acres (135 hectares) of a marine container terminal, including buildings, a wharf, and an intermodal rail yard. Phase II consisted of construction of the remaining 150 acres (61 hectares) into a container terminal. The EIR certified for the project and the Final EIS identified significant air, transportation, and noise and vibration impacts.	Approved project. Phase I construction completed and terminal opened August 2002. Phase II construction started in April 2003 and was completed in September 2004.
2	Berths 136-147 (TraPac) Marine Terminal, West Basin, Port of Los Angeles	Element of the West Basin Transportation Improvement Projects. Reconfiguration of wharves and backlands. Expansion and redevelopment of the TraPac Terminal.	FEIR certified by Board of Harbor Commissioners December 2007. Construction expected mid/late 2008 to 2010 and 2015 to 2020.
3	San Pedro Waterfront Project, Port of Los Angeles	The "San Pedro Waterfront" Project is a 5 to 7 year plan to develop along the west side of the Main Channel, from the Vincent Thomas Bridge to the 22nd Street Landing Area Parcel up to and including Crescent Avenue. Key components of the project include construction of a North Harbor Promenade, construction of a Downtown Harbor Promenade, construction of a Downtown Water Feature, enhancements to the existing John S. Gibson Park, construction of a Town Square at the foot of 6th Street, construction of a 7th Street Pier, construction of a Ports O' Call Promenade, development of California Coastal Trail along the waterfront, construction of additional cruise terminal facilities, construction of a Ralph J. Scott Historic Fireboat Display, relocation of the Catalina Cruises Terminal and the SS Lane Victory, extension of the Red Car line, and related parking improvements.	An NOP/NOI was released in August 2005. A revised NOP/NOI was released in December 2006. Draft EIR/EIS being prepared. Construction expected 2010-2015.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Port of Los Angeles Projects (continued)	
4	Channel Deepening Project, Port of Los Angeles	Dredging and sediment disposal. This project deepened the Port of Los Angeles Main Channel to a maximum depth of –53 ft mean lower low water (MLLW; lesser depths are considered as project alternatives) by removing between approximately 3.94 million and 8.5 million cubic yards of sediments. The sediments were disposed at several sites for up to 151 acres (61 hectares) of landfill. The EIR/EIS certified for the project identified significant biology, air, and noise impacts. A Supplemental EIS/EIR is being prepared for new fill locations. The Additional Disposal Capacity Project would provide approximately 4 million cubic yards of disposal capacity needed to complete the Channel Deepening Project and maximize beneficial use of dredged material by constructing lands for eventual terminal development and provide environmental enhancements at various locations in the Port of Los Angeles.	SNOI/SNOP released in October 2005. SEIS/SEIR anticipated mid 2008. Construction expected 2009-2010.
5	Cabrillo Way Marina, Phase II, Port of Los Angeles	Redevelopment of the old marinas in the Watchorn Basin and development of the backland areas for a variety of commercial and recreational uses.	EIR certified December 2, 2003. Construction anticipated 2008-2009.
6	Artificial Reef, San Pedro Breakwater, Port of Los Angeles	Development of an artificial reef site south of the San Pedro Breakwater. Provides opportunity for suitable reuse of clean construction materials and creates bottom topography to promote local sport fishing.	Negative Declaration issued and certified. Project proceeding (2006-2010).
7	Berth 226-236 (Evergreen) Container Terminal Improvements Project and Canners Steam Demolition.	Proposed redevelopment of existing container terminal, including improvements to wharves, adjacent backland, crane rails, lighting, utilities, new gate complex, grade crossings and modification of adjacent roadways and railroad tracks. Project also includes demolition of two unused buildings and other small accessory structures at the former Canner's Steam Plant in the Fish Harbor area of the Port.	EIR/EIS to be prepared. NOP/NOI anticipated in 2008. Construction expected 2010-2013.
8	Port of Los Angeles Charter School and Port Police Headquarters, San Pedro, Port of Los Angeles	Proposal to lease property for the Port of Los Angeles Charter School and to construct/develop a Port Police Headquarters and office. 330 S. Centre Street, San Pedro.	EIR certified in August 2005. Construction began in 2008 and expected to be complete in 2010.
9	SSA Outer Harbor Fruit Facility Relocation, Port of Los Angeles	Proposal to relocate the existing fruit import facility at 22nd and Miner to Berth 153.	On hold.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Port of Los Angeles Projects (continued)	
10	Crescent Warehouse Company Relocation, Port of Los Angeles	Relocate the operations of Crescent Warehouse Company from Port Warehouses 1, 6, 9, and 10 to an existing warehouse at Berth 153. Relocate Catalina Freight operations from Berth 184 to same building at Berth 153.	MND to be prepared. Release anticipated in 2008.
11	**Pacific LA Marine Terminal (formerly Pacific Energy) Oil Marine Terminal, Pier 400, Port of Los Angeles**	**Proposal to construct a Crude Oil Receiving Facility on Pier 400 with tanks at Pier 400 and on Terminal Island, as well as construct new pipelines between berth, storage tanks, and existing pipeline systems.** ***(Project evaluated in this SEIS/SEIR)***	**NOI/NOP released in June 2004.**
12	Ultramar Lease Renewal Project, Port of Los Angeles	Proposal to renew the lease between the Port of Los Angeles and Ultramar Inc., for continued operation of the marine terminal facilities at Berths 163-164, as well as associated tank farms and pipelines. Project includes upgrades to existing facilities to increase the proposed minimum throughput to 10 million barrels per year (mby), compared to the existing 7.5 mby minimum.	Project EIR under preparation; Final EIR expected in 2008. NOP released for public review in April 2004.
13	Westway Decommissioning	Decommissioning of the Westway Terminal along the Main Channel (Berths 70-71). Work includes decommissioning and removing 136 storage tanks with total capacity of 593,000 barrels (bbl).	Remedial planning underway. Decommissioning anticipated 2009.
14	Consolidated Slip Restoration Project	Remediation of contaminated sediment at Consolidated Slip at Port of Los Angeles. Remediation may include capping sediment or removal/disposal to an appropriate facility. Work includes capping and/or treatment of approximately 30,000 cubic yards of contaminated sediments.	Remedial actions are being evaluated in conjunction with Los Angeles Regional Water Quality Control Board (LARWQCB) and U.S. Environmental Protection Agency (USEPA).
15	Berths 97-109, China Shipping Terminal Development Project	Development of the China Shipping Terminal Phase I, II, and III including wharf construction, land fill and terminal construction and backland development.	Draft EIR/EIS released August 2006. Phase I construction completed in 2004. Re-circulated Draft EIR/EIS released April 2008. Construction expected 2009-2015.
16	Berths 171-181, Pasha Marine Terminal Improvements Project, Port of Los Angeles	Redevelopment of existing facilities at Berths 171-181 as an omni (multi-use) facility.	Project EIR on hold.
17	Berths 206-209 Interim Container Terminal Reuse Project, Port of Los Angeles	Proposal to allow interim reuse of former Matson Terminal while implementing green terminal measures.	Final EIR certified. Construction on hold.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Port of Los Angeles Projects (continued)	
18	LAXT Dome and Site Demolition	Demolition and clean up of existing storage dome and associated buildings on LAXT property.	Demolition began in 2007.
19	Southern California International Gateway Project (SCIG), Port of Los Angeles	Construction and operation of a 157 acre dock rail yard intermodal container transfer facility (ICTF) and various associated components, including the relocation of an existing rail operation.	Project EIR under preparation. NOP released September 30, 2005. DEIR expected in Fall 2008.
20	Pan-Pacific Fisheries Cannery Buildings Demolition Project, Port of Los Angeles	Demolition of two unused buildings and other small accessory structures at the former Pan-Pacific Cannery in the Fish Harbor area of the Port.	NOP released October 2005. Draft EIR released July 2006. Final EIR under preparation. Demolition expected mid to late 2008.
21	San Pedro Waterfront Enhancements Project, Port of Los Angeles	Project includes improving existing and development of new pedestrian corridors along the waterfront (4 acres), landscaping, parking, increased waterfront access from upland areas, and creating 16 acres of public open space.	MND approved in April 2006. Construction to begin in early 2008 and will be completed in 2009.
22	Joint Container Inspection Facility, Port of Los Angeles and Port of Long Beach	Construction and operation of a facility to be used to search and inspect random and suspicious containers arriving at the Ports of Los Angeles and Long Beach.	In planning. EIR to be prepared.
23	Berth 302-305 (APL) Container Terminal Improvements Project	Container terminal and wharf improvements project including a terminal expansion area and new berth on the east side of Pier 300. Currently includes 40 acres of fill that was completed as part of the Channel Deepening Project (number 4 above).	EIR/EIS to be prepared. NOP/NOI anticipated in 2008. Construction expected 2010-2012.
24	South Wilmington Grade Separation	An elevated grade separation would be constructed along a portion of Fries Avenue or Marine Avenue, over the existing rail line tracks, to eliminate vehicular traffic delays that would otherwise be caused by trains using the existing rail line and the new ICTF rail yard. The elevated grade would include a connection onto Water Street. There would be a minimum 24.5-foot clearance for rail cars traveling under the grade separation.	Conceptual planning. Current planning indicates summer 2011 completion.
25	Wilmington Waterfront Master Plan (Avalon Blvd. Corridor Project)	Planned development intended to provide waterfront access and promoting development specifically along Avalon Boulevard.	NOP issued March 2008. Draft EIR anticipated Summer 2008. Construction expected early 2009.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Port of Los Angeles Projects (continued)	
26	"C" Street/Figueroa Street Interchange	The "C" Street/ Figueroa Street interchange would be redesigned to include an elevated ramp from Harry Bridges Boulevard to the I-110 Freeway, over John S. Gibson Blvd. There would be a minimum 15-foot clearance for vehicles traveling on John S. Gibson Boulevard. An additional extension would connect from Figueroa Street to the new elevated ramp, over Harry Bridges Blvd.	Conceptual planning. Caltrans approval obtained on Project Study Report.
27	Port Transportation Master Plan	Port-wide transportation master plan for roadways in and around its facilities. Present and future traffic improvement needs are being determined, based on existing and projected traffic volumes. Some improvements under consideration include: I-110/SR-47/Harbor Blvd. interchange improvements; south Wilmington grade separations; and additional traffic capacity analysis for the Vincent Thomas Bridge.	Conceptual planning completed by the end of 2006.
28	Berths 212-224 (YTI) Container Terminal Improvements Project	Wharf modifications at the YTI Marine Terminal Project involves wharf upgrades and backland reconfiguration, including new buildings.	EIR/EIS to be prepared. NOP/NOI anticipated in 2008. Construction expected 2010-2013.
29	Berths 121-131 (Yang Ming) Container Terminal Improvements Project	Reconfiguration of wharves and backlands. Expansion and redevelopment of the Yang Ming Terminal.	EIR/EIS to be prepared. NOP/NOI anticipated in 2008. Construction expected 2010-2013.
30	Southwest Marine Demolition Project	Demolition of buildings and other small accessory structures at the Southwest Marine Shipyard.	Draft EIR released September 2006. Final EIR under preparation. Demolition anticipated late 2008.
31	I-110 / SR 47 Connector Improvement Program	Program may include "C" Street/I-110 access ramp intersection improvements, I-110 NB Ramp/John S. Gibson Blvd. intersection improvements, and SR 47 On-and Off-Ramp at Front Street. These projects would reduce delays and emissions in the I-110/SR 47 area and improve safety and access.	Conceptual planning.
32	Inner Cabrillo Beach Water Quality Improvement Program	Phased improvements at Cabrillo Beach to reduce the wet and dry weather high concentrations of bacteria. Includes sewer and storm drain work, sand replacement, bird excluders, and circulation improvements (groin removal).	Sand replacement phase above high tide line completed in 2007. Additional sand replacement below high tide line anticipated in 2008.
33	Proposed Marine Research Center	Up to 28 acre site for potential marine research facility at City Dock No. 1.	Conceptual planning.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
Port of Los Angeles and/or Port of Long Beach Potential Port-Wide Operational Projects			
34	Terminal Free Time	Industry supported program to reduce container storage time and use gates at off-peak travel times.	Program in progress.
35	Extended Terminal Gates (Pier Pass)	Industry supported program to use economic incentives to encourage cargo owners to use terminal gates during off-peak hours.	Program in progress.
36	Shuttle Train/Inland Container Yard	Alameda Corridor Transportation Authority (ACTA) program to encourage rail shuttle service between the ports' on-dock rail facilities and a rail facility in Colton (in the Inland Empire). The pilot program will consist of a daily train to and from Colton. The containers will be trucked between the Colton rail facility and the beneficial cargo owners' facility.	Preliminary study in progress.
37	Origin/Destination and Toll Study	Joint study of the Ports of Los Angeles and Long Beach to identify the origin and destination of international containers in the Los Angeles area, to determine the location of warehouses and identify the routes truck drivers use to move containers to and from the Ports. The bridges serving Terminal Island (Vincent Thomas, Gerald Desmond and Heim Bridge) are not currently designed to handle the trade volumes projected at the San Pedro Bay Ports. In order to identify funding mechanisms to replace/enhance these bridges, the Ports are conducting a toll study to explore potential funding sources for bridge replacement and truck driver behavior if tolls were assessed on the bridges.	Study in progress.
38	Virtual Container Yard	Joint program of ACTA and the Ports of Los Angeles and Long Beach to explore implementing a system that would match an empty container from an import move to one from an empty export move.	Conceptual planning.
39	Increased On-Dock Rail Usage	Joint program of ACTA, the Ports of Los Angeles and Long Beach, shipping lines, and terminal operators to consolidate neighboring terminals' intermodal volume to create larger trains to interior points, thereby reducing need for truck transportation.	Conceptual planning.
40	Union Pacific Railroad ICTF Modernization Project	UP proposal to modernize existing intermodal yard four miles from the Port.	Conceptual planning. Application submitted and the EIR is being completed by the Joint Powers Authority.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
Port of Los Angeles and/or Port of Long Beach Potential Port-Wide Operational Projects (continued)			
41	Optical Character Recognition	Ports terminals have implemented OCR technology, which eliminates the need to type container numbers in the computer system. This expedites the truck driver through terminal gates.	Ongoing planning and implementation.
42	Truck Driver Appointment System	Appointment system that provides a pre-notification to terminals regarding which containers are planned to be picked up.	Conceptual planning.
Community of San Pedro Projects			
43	15th Street Elementary School, San Pedro	Los Angeles Unified School District construction of additional classrooms at 15th Street Elementary School.	Construction completed and school operating. Completed in 2006.
44	Pacific Corridors Redevelopment Project, San Pedro	Development of commercial/retail, manufacturing, and residential components. Construction underway of four housing developments and Welcome Park.	Project underway. Estimated 2032 completion year according to Community Redevelopment Agency of Los Angeles.
45	Cabrillo Marine Aquarium Expansion, San Pedro	Expansion of existing Cabrillo Marine Aquarium.	Construction complete.
46	Gas station and mini-mart	6-pump gas station and 1,390 sf mini-mart at 311 N. Gaffey Street, San Pedro (north of Sepulveda Street).	Project on hold. No construction has started.
47	Fast Food Restaurant w/drive-thru	Construct fast food restaurant with drive through (expand from existing 3000 sf to 4816 sf restaurant). 303 S. Gaffey Street (at 3rd Street), San Pedro.	Construction is complete and restaurant is operating.
48	Mixed use development, 407 Seventh Street	Construct 5,000 sf retail and 87-unit apartment complex. 407 W. Seventh Street (at Mesa St.), San Pedro.	In final stages of construction.
49	Condominiums, 28000 Western Ave.	Construct 140 condominium units. 28000 S. Western Avenue, San Pedro.	In final stages of construction. Building permit cleared March 2006; LADOT Planning Department has no estimated completion year.
50	Pacific Trade Center	Construct 220 housing unit apartments. 255 5th Street, San Pedro (near Centre Street).	In initial stage of construction. Building permit cleared August 2006, but LADOT Planning Department has no estimated completion year.
51	Single Family Homes (Gaffey Street)	Construct 135 single-family homes. About 2 acres. 1427 N. Gaffey St (at Basin St), San Pedro.	In construction. Estimated 2009 completion year according to LADOT Planning Department.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Community of San Pedro Projects (continued)	
52	Mixed-use development, 281 W 8th Street	Construct 72 condos & 7,000 sf retail. 281 West 8th Street (near Centre Street), San Pedro.	No construction started. LADOT Planning Department has no estimated completion year.
53	Target (Gaffey Street)	Construct 136,000 sf discount superstore. 1605 North Gaffey Street, San Pedro (at W. Capitol Drive).	No construction has started Estimated 2009 completion year, according to LADOT Planning Department.
54	Palos Verdes Urban Village	Construct 251 condos & 4,000 sf retail space. 550 South Palos Verdes Street, San Pedro.	No construction has started. Estimated 2011 completion year, according to LADOT Planning Department.
55	Temporary Little League Park	Construction of temporary baseball fields for the Eastview Little League at top of Knoll Hill in San Pedro; Knoll Hill Dog Park moved to bottom of Knoll Hill.	Construction completed in fall 2007.
56	Condos, 319 N Harbor Blvd	Construction of 94 unit residential condominiums, 319 N Harbor Blvd, San Pedro.	LADOT Planning Department has no estimated completion year.
		Community of Wilmington Projects	
57	Banning Elementary School #1, 500 North Island Avenue, Wilmington	Banning Elementary School No. 1 is a two-building elementary school consisting of one two-story classroom building with subterranean parking garage and a one-story multipurpose building. The school also provides about 2 acres of playground and green space.	Construction completed and school operating. Completed in 2006.
58	East Wilmington Greenbelt Community Center, Wilmington	9,800-square-foot community building, a 25-space parking lot, and landscaped areas.	Construction complete; center opened in 2006.
59	Distribution center and warehouse	135,000 sf distribution center and warehouse on 240,000 sf lot w/47 parking spaces at 755 East L Street, (at McFarland Avenue) in Wilmington.	No construction has started; lot is vacant and bare. LADOT Planning Department has no estimated completion year.
60	Dana Strand Public Housing Redevelopment Project	The existing facility is being torn down and redeveloped to provide a 116-unit affordable housing complex with multifamily rental units, senior units and affordable homes for sale. The plans also include a day care center, lifelong learning center, parks and landscaped open space.	Under construction (construction started in 2005).
61	Vermont Christian School Expansion	Private school expansion to accommodate 72 additional students, for a total of 222 students.	LADOT Planning Department has no estimated completion year.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Projects in Harbor City, Lomita, and Torrance	
62	1437 Lomita Boulevard Condominiums	Construct 160 condominium units and demolish existing closed hospital.1437 Lomita Boulevard (at Senator Avenue), Harbor City.	Construction is complete and in operation.
63	Harbor City Child Development Center	Conditional use permit to open 50-student pre-school at existing church building (25000 South Normandie Avenue, Harbor City, at Lomita Boulevard).	Public hearing in August 2006.
64	Kaiser Permanente South Bay Master Plan	Construct 303,000 sf medical office building, 42,500 sf records center / office / warehouse, 260 hospital beds. 25825 Vermont Street, Harbor City (at Pacific Coast Hwy).	In Construction. Estimated 2009 completion year, according to LADOT Planning Department.
65	Drive-through restaurant, Harbor City	Construct 2,448 sf fast food restaurant with drive-through. 1608 Pacific Coast Highway, Harbor City (at President Avenue).	In planning phase. Old building still in operation.
66	Ponte Vista	Construct 1725 condos, 575 senior housing units, and 4 baseball fields. 26900 Western Avenue (near Green Hills Park), Lomita. Rolling Hills Prep School being developed in an adjacent lot.	DEIR issued November 2006. LADOT Planning Department reports estimated 2012 completion year.
67	Warehouses, 1351 West Sepulveda Blvd	Construct warehouses with total capacity 400,000 sf. 1351 West Sepulveda Blvd. (at Western Ave.), Torrance.	Project building permit cleared 2/07. LADOT Planning Department estimates completion in 2007.
68	Sepulveda Industrial Park	Construct 154,105 sf industrial park (6 lots). Sepulveda Industrial Park (TT65665) 1309 Sepulveda Boulevard, Torrance (near Normandie Avenue).	No construction started. LADOT Planning Department has no estimated completion year.
		Port of Long Beach Projects	
69	Middle Harbor Terminal Redevelopment, Port of Long Beach	Expansion of an existing marine container terminal in the Middle Harbor area of the Port of Long Beach. The project will involve consolidation of two existing container terminals into one 345-acre (138-hectare) terminal. Construction will include approximately 48 acres (19 hectares) of landfill, dredging, wharf construction; construction of an intermodal rail yard; and reconstruction of terminal operations buildings. The Initial Study prepared for this project identified significant air, public health, transportation, biological, and water quality impacts.	Project EIS/EIR released May 2008. NOP/NOI released December 20, 2005. Anticipated construction 2008-2025.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Port of Long Beach Projects (continued)	
70	Piers G & J Terminal Redevelopment Project, Port of Long Beach	Redevelopment of two existing marine container terminals into one terminal. The Piers G and J redevelopment project is in the Southeast Harbor Planning District area of the Port of Long Beach. The project will develop a marine terminal of up to 315 acres by consolidating two existing terminals on Piers G and J and several surrounding parcels. Construction will occur in four phases and will include approximately 53 acres of landfills, dredging, concrete wharves, rock dikes, and road and railway improvements. The EIR prepared for this project identified potentially significant impacts to air quality and geologic resources.	Approved project. Construction underway (anticipated construction period is 2005-2015).
71	Pier A West Remediation Project, Port of Long Beach	Remediation of approximately 90 acres of oil production land, including remediation of soil and groundwater contamination, relocation of oil wells, filling, and paving.	Project EIR/EIS under preparation. NOP/NOI released January 26, 2006. Expected duration through 2011.
72	Pier A East, Port of Long Beach	Redevelopment of 32 acres of existing auto storage area into container terminal.	EIR to be prepared.
73	Pier T, TTI (formerly Hanjin) Terminal, Phase III, Port of Long Beach	Development of a container terminal, liquid bulk facility and satellite launch facility. The Port of Long Beach is redeveloping the former Long Beach Naval Complex on Terminal Island. The project consists of expanding a 300-acre marine container terminal to 375 acres, including a wharf, terminal operations buildings, utilities, and rail yard. Construction includes 22 acres of landfill. The SEIS/EIR certified for this project identified significant air quality, transportation, public health and safety, cultural resources, biological resources, and vibration impacts.	Approved project. Final phase of construction underway.
74	Pier S Marine Terminal, Port of Long Beach	Development of a 150-acre container terminal and construction of navigational safety improvements to the Back Channel.	EIS/EIR to be prepared. Assessment/ construction expected 2007-2012.
75	Administration Building Replacement Project, Port of Long Beach	Replacement of the existing Port Administration Building with a new facility on an adjacent site.	EIR being prepared. Assessment/ construction expected 2009-2012.
76	Sound Energy Solutions-Pier T, Long Beach Liquefied Natural Gas (LNG) Terminal, Port of Long Beach	Construction of a 25-acre (10-hectare) liquefied natural gas (LNG) import terminal facility including pipeline and wharf construction on a portion of Pier T on Terminal Island within the Port of Long Beach.	Final EIR/EIS completed. Project disapproved by Board of Harbor Commissioners January 2007; legal challenge underway.
77	San Pedro Bay Rail Study	Port-wide rail transportation plan with multiple projects in and around Harbor District.	EIR to be prepared.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		Port of Long Beach Projects (continued)	
78	Gerald Desmond Bridge Replacement Project, Port of Long Beach and Caltrans/FHWA	Replacement of the existing 4-lane Gerald Desmond highway bridge over the Port of Long Beach Back Channel with a new 6- to 8-lane bridge.	NOP/NOI released in 2005. EIR/EA released in 2005; Recirculated EIR/EA being prepared. Anticipated construction 2008-2013.
79	Chemoil Marine Terminal, Tank Installation, Port of Long Beach	Construction of two storage tanks for refined petroleum products and associated relocation of utilities and reconfiguration of adjoining marine terminal uses between Berths F210 and F211 on Pier F.	NOP released June 2007. EIR to be prepared.
80	Port of Long Beach Installation Restoration Site 7 (West Basin) Dredging Project	Removal of about 700,000 cubic yards of contaminated sediments at the Port of Long Beach, with beneficial/sustainable reuse of the material in the Pier G landfill.	In planning stages. Dredging is expected in 2008-2009.
		Alameda Corridor Transportation Authority and Caltrans Projects	
81	Schuyler Heim Bridge Replacement and State Route (SR) 47 Terminal Island Expressway	ACTA/Caltrans project to replace the Schuyler Heim Bridge with a fixed structure and improve the SR 47/Henry Ford Avenue/Alameda Street transportation corridor by constructing an elevated expressway from the Heim Bridge to SR 1 (Pacific Coast Highway) and flyover from eastbound Ocean Boulevard to northbound SR 47.	ACTA and Caltrans issued Draft EIS/EIR August 2007. Final EIS/EIR expected spring 2008. Anticipated construction 2009-2011 (for SR47 and bridge) and 2015-2017 (for flyover).
82	I-710 (Long Beach Freeway) Major Corridor Study	Develop multi-modal, timely, cost-effective transportation solutions to traffic congestion and other mobility problems along approximately 18 miles of the I-710, between the San Pedro Bay ports and State Route 60. Early Action Projects include: a) Port Terminus: Reconfiguration of SR 1 (Pacific Coast Highway) and Anaheim Interchange, and expansion of the open/green space at Cesar Chavez Park. b) Mid Corridor Interchange: Reconfigurations Project for Firestone Blvd. Interchange and Atlantic/Bandini Interchange.	Conceptual Planning.
83	Edison Avenue Closure	Close a short section of Edison Avenue between Ninth and Pier B streets to improve public safety and traffic by rerouting cars and trucks away from three rail lines that cross Edison at Pier B Street.	Initial Study and Negative Declaration released June 2007.
		City of Long Beach Projects	
84	Renaissance Hotel Project, City of Long Beach	Development of a 374-room hotel on the southeast corner of Ocean Boulevard and the Promenade.	Approved project. Construction complete.

Table 4-1. Related and Cumulative Projects (continued)

No. in Figure 4-1	*Project Title and Location*	*Project Description*	*Project Status*
		City of Long Beach Projects (continued)	
85	D'Orsay Hotel Project, City of Long Beach	Development of a hotel. The D'Orsay Project is a 162-room boutique style hotel on the northwest corner of Broadway and the Promenade.	Approved project. Construction underway. Anticipated completion in Fall 2008.
86	City Place Development, City of Long Beach	Development of commercial and residential space. The former Long Beach Plaza Mall, downtown between 3rd and 6th Streets and between Long Beach Boulevard and Pacific Avenue, is now under construction. The approved project will redevelop the former mall area and two blocks of vacant land east of Long Beach Boulevard with approximately 450,000 square feet of commercial space and up to 200 residential units. The EIR prepared for this project identified significant air quality impacts.	Construction complete. Completed in 2005.
87	The Pike at Rainbow Harbor, City of Long Beach	Commercial use development. This project site is south of Ocean Boulevard on the site of the former Pike Amusement Park between Pine and Magnolia Avenues in Long Beach. This approved project includes approximately 770 residential units, a 500-room hotel, and 25,000 square ft of commercial space. The EIR prepared for this project identified significant air quality, cultural resources, noise, public service, and transportation impacts.	Approved project. Construction complete.
88	Queensway Bay Master Plan, City of Long Beach	Construction of Long Beach Aquarium, new urban harbor, office building, and entertainment complex. This project, designed to create a major waterfront attraction in downtown Long Beach, includes a recreational harbor, 150,000-square-foot aquarium, 125,000-square-foot entertainment complex, 59,000 square feet of restaurant/retail space, an 800-room hotel, 95,000 square feet of commercial office space, and 487 boat slips in and around Queensway Bay. The recreational harbor and aquarium have been completed. The EIR certified for this project identified significant transportation impacts.	Approved project. Construction complete.
Note:	1. Construction date for Port projects based on an assumption that the project would be approved by the LAHD.		

San Gabriel & Lower Los Angeles
RIVERS AND MOUNTAINS CONSERVANCY

CALIFORNIA RESOURCES AGENCY

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LA County Public Works

Executive Officer
Belinda Faustinos

November 5, 2008

Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road2
Whittier, CA 90601

Re: Clearwater Program Master Facilities Plan NOP

Dear Mr. Highter,

The San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC) is grateful for the opportunity to provide comments on the Sanitation Districts' Clearwater Program Master Facilities Plan Notice of Preparation (NOP) of an Environmental Impact Report. The mission of the RMC, an independent agency within the Resources Agency of the State of California, is to preserve urban open space and habitats in order to provide for low-impact recreation and educational uses, wildlife and habitat restoration and protection, and watershed improvements within our jurisdiction. Our jurisdictional area overlaps roughly half of the Joint Outfall System's service area, and includes the service areas of the Pomona, San Jose Creek, Whittier Narrows, and Long Beach Water Reclamation Plants.

The goals of the RMC are described in *Common Ground*, the Conservancy's Watershed and Open Space Plan, which may be found at http://www.rmc.ca.gov/plan/intro.html). The Plan presents a simple vision for the future: ***restore balance between natural and human systems in the watersheds***. The centerpiece of the Plan is a series of Guiding Principles that cities, federal, state and local agencies, communities, groups and individuals can use to plan preservation, restoration and establishment of future open space, water resources, and habitat projects. More than 60 cities in Los Angeles County have adopted this document.

The University of Southern California's Center for Sustainable Cities and GIS Research Laboratory has created plans and practical planning tools for open space which you should add to your set of plans and tools for the EIR. The Center published the "The Green Visions Plan for 21st Century Southern California" which offers a

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guide to habitat conservation, watershed health and recreational open space for the Los Angeles metropolitan region. The Center has published a number of related reports which can be found at http://www.greenvisionsplan.net. In addition, the Center has created a set of online GIS planning tools that allow users to access geographic information about habitat, watershed, and recreational assets and opportunities. These resources are online at http://gv-server.usc.edu/GVWebTools_public_v2/imaps_test/app.asp. For more information about The Green Visions Plan and the planning tools, contact Dr. Jennifer Wolch, Director, Center for Sustainable Cities, at the USC Department of Geography; 413 Kaprelian Hall, Los Angeles, CA 90089 (wolch@usc.edu; 213-740-0521).

The RMC has reviewed the NOP for the Clearwater Program Master Facilities Plan and has the following comments primarily related to Water Reclamation Plant (WRP) effluent management:

1. The assumption that wastewater flows will increase proportionately with an increasing population should be reviewed carefully, in light of the potential for reduced imported water supplies available to the region, greater potable water use reductions through efficiency measures, and possible effects of an economic recession and distressed housing market on population trends.

2. In evaluating the need for added capacity in the wastewater collection system, the EIR should address the potential for wastewater flow reductions from an aggressive water recycling and potable water efficiency (conservation) program. Elements that could be considered in such a program include:
   - financial incentives offered by the Districts for potable water efficiency measures that would reduce wastewater flows;
   - partnerships with other public agencies targeting residential, commercial, and industrial sectors;
   - construction of new storage facilities and, where appropriate, new recycled water pipelines, for addressing seasonal fluctuations in recycled water demands; and
   - strategic placement of small, localized "package" treatment plants to relieve treatment and collection system capacity pressures, and to provide recycled water closer to opportunities for groundwater recharge, irrigation, and other typical uses.

   Although some treated wastewater currently gets discharged to inland water bodies such as the San Gabriel River, an enhanced program to facilitate and promote the reuse of this water should be explored. Where possible, the analysis should compare the environmental (and separately, financial) impacts and benefits of expanded reuse versus the proposed expansion of the ocean outfall system.

3. In general, the areas served by the Districts' Water Reclamation Plants upstream of the Joint Outfall System suffer from insufficient and limited opportunities for new open space, habitat for terrestrial, avian, and aquatic species, and low-impact recreation facilities such as trails and natural parks. The EIR should ensure that the MFP and specific projects to the greatest extent possible avoid negative on these opportunities –

or to the extent impacts are impossible to avoid, they should be fully mitigated and offset with increased opportunities and facilities within the impacted area.

Thank you for your consideration of these comments. If you have any questions, please contact the RMC's Director of Water Policy, Tim Worley at 626-815-1019, extension 107, or at tworley@rmc.ca.gov.

Sincerely,

Belinda V. Faustinos
Executive Officer

PALISADES RESIDENCE ASSOCIATION
P.O. BOX 5281
SAN PEDRO, CA 90733-5281

Dear Clearwater Program,

This letter is on the behalf of the Palisades Residence Association which encompasses the area north of Paseo del Mar, west of Gaffey Street, east of Western Avenue and south of 25th street. It also includes the Pacific Heights area. Due to the huge impact on our community in every aspect considered under the California Environmental Quality Act over a long period of time which will not benefit our community in any respect, we advocate locating the construction of the shaft site at Terminal Island. Our comments on the proposed Clearwater Program are listed below.

We begin by commenting on the Notice of Preparation of an Environmental Impact Report (NOP) in its totality. Essentially, it simply indicated what it was going to study without flushing out any details which would help the community understand the enormous undertaking of this project and the true impact it will have. The NOP only stated what is required of them pursuant to the California Environmental Quality Act, again failing to give the barest of details so that the community can begin to digest the nature of such a project. It is hard to operate in this arena of ambiguity and lack of information. Please thoroughly list the details of construction: number of trucks per day, route they will take, anticipated load they will have, types of construction equipment, their height/weight, number of employees who will work on site, etc. Please detail the anticipated business impact of the construction on local businesses. Please take into consideration the numerous schools that are near each proposed site, except for Terminal Island.

5.2: Aesthetics: without a complete description of the project, both in its construction phase and permanent phase, it is hard to make any comments. Please detail the exact nature of the construction and operation of the permanent MFP components. Please define "relatively short term" when determining impacts occurring during construction. Please do not limit "viewsheds" simply to ocean views; include the point of view of looking up into the hills. Please include how it is determined what are "important visual resources" and "likely viewer reaction to the changes." Please indicate your source for "existing visual resource policies."

5.4: Air Quality: please analyze the potential air quality issues involving both construction and operational air emissions with consideration to MATES II and III Studies. We also request that the document titled "Health Effects of Diesel Exhaust Air Pollution" and the medical literature reference therein, prepared by the Port of Los Angeles Community Advisory Committees Air Quality Subcommittee, be incorporated into your analysis. We also request that the cumulative effect of this construction is analyzed in relation to all of the proposed PORT projects: Trepac expansion, cruise ship

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expansion are most notable. Further, please analyze the effect of construction on the success of the Clean Trucks Program within the Port of Los Angeles. It has been suggested that there will 150 truck trips a day for 8 years. Please detail the types of trucks to be used and their compliance with the Clean Truck Program. Please utilize data from the air toxic sampling sites located at Port of Los Angeles and Port of Long Beach. Please discuss the "Diesel Death Zone" which surrounds the Ports in relation to your proposed project. We request that Section 3.2 "Air Quality and Meteorology" from the July 2008 DSEIS/SEIR for the POLA Channel Deepening Project be made a part of the record for the DEIR. Please identify the change in air quality due to dust from construction.

5.5: Biological Resources: Please detail the effect of the construction and permanent MFP components on wildlife habitat and natural movement corridors. We believe that the Cabrillo Beach area is a wetland area. Heal the Bay has given Cabrillo Beach water quality an "F" for its horrible state. White Point Nature Reserve is in the process of replanting and refurbishing its vegetation with indigenous species. Please consider that this area is prized for its almost rural like nature with few street lights and little ambient lighting. This is also true of noise: the area is sought out for its peace and serenity at all times of the day.

5.6: Cultural Resources: Please consider the impact on all cultural resources, including but not limited to: Peck Park: tennis courts, swimming pool, picnic areas, gymnasium, baseball fields, community meeting center; White Point: hiking trails, wildlife, future educational facility discussing natural habitat; Point Fermin Park: Shakespeare by the Sea, Sunday music festivals, Taste of San Pedro, family picnics, kite flying, Point Fermin Lighthouse (a historical treasure); Friendship Park: soccer fields, baseball fields, hiking, picnicking, nature museum, gymnasium; Cabrillo Beach: bathhouse, Cabrillo Beach museum, seasonal celebrations, family picnics, surfing, swimming, windsurfing, fishing, kayaking; Averill Park: frequent place to have an outdoor wedding, swans, mini waterfalls, ducks, geese, beautiful park; Field of Dreams: beautiful soccer fields with accessible parking; Angels Gate Park: Marine Mammal Center, Oiled Bird Center, the Catholic Church on site, Fort MacArthur Historical Museum, Angels Gate cultural Center, Korean Bell, and the hostel, with neighboring PFOEC and possibly the future South Region High School #15. The impact is not only on those living in San Pedro. These facilities are sought after by all of Los Angeles County.

5.9: Hydrology, Water Quality and Public Health: We are aware of the malfunction of current solid waste treatment facilities which caused raw sewage to empty into the ocean. Please describe how and why these systems will operate more efficiently. Describe how these catastrophes will be prevented. This is particularly important in relation to inner Cabrillo Beach which suffers from the lowest water quality rating in the county. Please consider the significant wind speed in this area often referred to as "Hurricane Lane". Please use measurements of wind speed from the Marine Exchange located on the Angel's Gate Property. Please look to year long wind speeds so as to incorporate those days that have had wind speeds up to 40 mph such as last week.

5.10: Land Use and Planning: Please incorporate the proposed updated San Pedro Master Plan currently in discussion. Also please discuss in relation to proposed projects: Port expansion, Cruise Terminal, SRHS #15, and the Clean Trucks Program.

5.11: Marine Environment: see 5.10.

5.12: Noise and Vibrations: Please describe noise and vibrations from trucking operations, use of heavy construction equipment, pile driving activities and blasting, in detail. Please be aware of the geography of this area which causes sound to be carried much further than in other areas, particularly with the significant wind that occurs and also caused by the canyons.
5.15: Recreation: see Cultural Resources above. Please advise why an 8 year construction project is considered "short-term." Please consider the proposed updated San Pedro Master Plan for recreational needs which services not only San Pedro, but all of Los Angeles County.

5.16: Transportation and Traffic: Please discuss the impact of this project on the only three main roads in/out of San Pedro: Western (and the needed side roads to get to the freeways), Gaffey and Pacific. Gaffey and Western are severely congested at this point and provide the only access to the freeways. Further, please discuss the cumulative impact of this project in light of other proposed projects: the Port expansion, Ponte Vista project, cruise terminal, SRHS#15, etc. A full and comprehensive list of proposed projects can be found in the DEIR's of these projects. What types of malfunctions can be anticipated whether common or remote; how will they be dealt with and how will this affect our only main thoroughfares out of this city?

5.18: Cumulative and Growth-Inducing Impacts: Please discuss thoroughly, particularly in light of proposed Port expansion projects, cruise terminal, SRHS #15, and the Ponte Vista project.

We further request that you consider in the Alternatives section reversing the direction of the flow: rather than dumping it into the ocean, direct this pure and clean water to areas where it can be reused; even back to the communities who created the waste in the first place.

We further request that our organization be included in any further notifications or distribution of information.

PALISADES RESIDENCE ASSOCIATION
pra@sanpedropalisades.org

NOP.clearwater.PRA

Sanitation Districts of Los Angeles County
CLEARWATER PROGRAM
Master Facilities Plan

Comment Form: Notice of Preparation of an Environmental Impact Report and Notice of Intent to Prepare an Environmental Impact Statement

(This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period for the Notice of Preparation and Notice of Intent, which ends on November 14, 2008.)

Name: PAT ROME

Company/Organization (optional): CONCERNED RESIDENT

Mailing Address: 25327 PINE CREEK LANE

City: WILMINGTON State: CA Zip: 90744

Email: pjwrome@yahoo.com

I would like the following potential environmental impact(s) to be addressed by the Environmental Impact Report and Environmental Impact Statement for the Clearwater Program Master Facilities Plan:

HOW DOES NEW CONSTRUCTION PERMITS RELATE TO WATER/SANITATION CONCERNS? WHY IS ONLY 40% OF reclaimed water USED?

☒ I would like to be placed on the mailing list to receive the Clearwater Program Newsletter and any future public notices regarding the project.

You may hand in this form during the scoping meeting or mail it to:

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

or

Kenneth Wong
Project Manager, Regulatory Branch
U.S. Army Corps of Engineers, L.A. District
P.O. Box 532711
Los Angeles, California 90053-2325

For information, please call 1-877-300-WATER (9283)

Sanitation Districts of Los Angeles County
CLEARWATER PROGRAM
Master Facilities Plan

Comment Form for Notice of Preparation of an Environmental Impact Report

(This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period for the Notice of Preparation, which ends on November 14, 2008.)

Name: JoAnn Wysocki

Company/Organization (optional): 1006 King Avenue

Mailing Address: Wilmington

City: Wilmington State: CA Zip: 90744

Email:

I would like the following potential environmental impact(s) to be addressed by the Environmental Impact Report for the Clearwater Program Master Facilities Plan:

Alternate Route
Sanitation — to Lomita Blvd
to Vermont Avenue
Through 5 points
After that — What?
Gaffey Western — Outfall
WANT TO HEAR WHAT ARMY CORP OF
ENGINEERS HAVE TO SAY TOMORROW
NIGHT.

☐ I would like to be placed on the mailing list to receive the Clearwater Program Newsletter and any future public notices regarding the project.

Hand form in during the scoping meeting or mail to:

Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

For information, please call 1-877-300-WATER (9283)

NOV 24 2008 AM11:23 DOC # Highter S

Sanitation Districts of Los Angeles County
CLEARWATER PROGRAM
Master Facilities Plan

Comment Form: Notice of Preparation of an Environmental Impact Report and Notice of Intent to Prepare an Environmental Impact Statement

(This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period for the Notice of Preparation and Notice of Intent, which ends on November 14, 2008.)

11/6/08

Name: Jo Ann Wysocki

Company/Organization (optional): Resident

Mailing Address: 1006 King Avenue.

City: Wilmington State: CA Zip: 90744

Email:

I would like the following potential environmental impact(s) to be addressed by the Environmental Impact Report and Environmental Impact Statement for the Clearwater Program Master Facilities Plan:

1. Is the Army Corp of Engineers primary concern: a) land environment; b) water environment; c) both?
2. Does the Los Angeles City Quimby fund apply to this project?
3. Proposed route: Sanitation Plant, West on Lomita Blvd; south on Vermont Ave. to 5 Points; to Gaffey; East on Channel; into the Harbor.

☐ I would like to be placed on the mailing list to receive the Clearwater Program Newsletter and any future public notices regarding the project.

4. Truck traffic from soil removal.

You may hand in this form during the scoping meeting or mail it to: 5.8 5.16

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

or

Kenneth Wong
Project Manager, Regulatory Branch
U.S. Army Corps of Engineers, L.A. District
P.O. Box 532711
Los Angeles, California 90053-2325

For information, please call 1-877-300-WATER (9283)

NOV 24 2008 AM 11:24 DOC # Wolster S

November 12, 2008

Chuck Boehmke
Sanitation Districts of Los Angeles County

Notice of Preparation of an Environmental Impact Report Clearwater Program

I U.S. Army Corp of Engineers
Is the U.S. Army Corp of Engineers primary concern in this matter
a) Land environment
b) Ocean - Harbor environment
c) Both ? Answered at San Pedro 11/6/08

II Figure 2
Discuss possible expansion of all existing joint out fall system facilities because of the expanded capabilities of this project.

III Need for Project Page 4
What is the total cost of this project? What is the potential for cost-over-runs on this project? Where does the money for this project come from?

IV Program - Level Components Page 4
What is the % involved of each

of the five individual components?

4.1.1. Wastewater Conveyance
What is the % of wastewater flows increase in relationship to the population increase?

What is the % of wastewater increase from industrial dischargers to residential dischargers?

Since the San Pedro - Wilmington residential communities do not discharge to this system, what industrial users discharge to this system and are in the City of Los Angeles?

What is the projected flow by year? PAGE 5.

4.1.2. Solids Processing Page 5
Does such a centralized solids processing facility exist

other than the JWPCP?

4.1.4 WRP Effluent page 6

Where would there be a water body for inland discharge? This report uses the San Gabriel River, Jose Creek, Coyote Creek rather than bodies of water close to this project. Pages 6, 20, 21

5.10 Land Use

What Carson City and Los Angeles City Zoning and relevant land uses apply to digging 150-200 feet under the earth? The Port of Los Angeles has its own master plan.

Shaft site locations need to be better identified than Figures 4 and 5. A need for direct addresses.

4.1.5 JWPCP

What % of salt makes JWPCP

"less desirable for reuse?" PAGE 6

How temporary is discharge to points other than the existing tunnel and outfall? PAGE 7

What other beneficial reuses of the effluent flow are possible? PAGE 7. People complain that only 40% of the effluent is reusable; but they do not give examples of possible reuse. What is the Sanitation system looking at for more reuse of effluent?

4.2 Project-Level Components Page 7

It is clear the final report will be in favor of a new tunnel and ocean outfall. The problem arises at 4.2.2.

4.2.2 Tunnel Access/Construction Page 7

The 3 Wilmington streets, that

new north-south are essentially residential, small businesses close to or located on schools, churches and Tana Strand Housing. Also there is the Port of Los Angeles plan for the first block of Wilmington Blvd north of John S. Gibson.

A consensus from community meetings may be to take the pipeline route into the Harbor, but the problem is how to get there to the Harbor.

* I propose a route designed to avoid residential in Wilmington and San Pedro.

JWPCP Plant on Carson
East on Lomita Blvd.
South on Vermont Avenue
Five Points
South on Gaffey Street
* BUSINESS PROTECTS THE RESIDENTIAL
East on Channel Street
Into the Harbor

The Sanitation District needs to hold meaningful discussions with the Port of Los Angeles on these three proposed routes. Dates and those contacted at these meetings need to be clearly identified.

I recommend avoiding Frigate Avenue as a proposed route. The Avenue is too narrow especially south of the JWPCP plant. I invited those attending the Nov. 5 and Nov. 6 hearings to walk the Avenue to see for themselves.

Figure 3 Page 9 Project Study Area

Cannot be easily read without a magnifying glass.

Figure 5 Page 11 Potential Diffuser Locations

Explain why no construction can take place in the Continental Shelf. San Pedro meeting 11/6/08

5.2 Aesthetics Issues Page 12

What Los Angeles City permits must be obtained for construction above and below ground? Discuss light and glare. Does this project interfer with the Port of Los Angeles plan or plans for the first block west of John S. Gibson Blvd?

Approach 1st paragraph, 5th line

Define in simple language VIVIDNESS, INTACTNESS, and UNITY.

5.4 Air Quality Issues Page 14

What is the estimated number of employees and their methods of transportation to and from any construction site/sites. Construction sites do not remain static.

Discuss release of volatile organic compounds from plant operations.

What is the increase of JWPCP "solids processing" and biosolids management"? Is it due to the completion of this project and the growth anticipated by 2050?

Approach page 14
Estimate type, number and emission of construction equipment. Where will the storage of the construction equipment be?

Will air quality samplings be based on monitoring or estimations? How old will the samplings be?
Does the SCAQMD hold a hearing on this project?

5.5. Biological Resources Issues Page 14

Effects of construction on the Harbor waters of the Los Angeles Port.
Effects of construction and effluent on birds at the Port of Los Angeles particularly the Least Tern.

Approach Page 15

Please use Port of Los Angeles sources also.

Again proposed project is not yet well thought out as 3 proposed routes in Wilmington go through schools, churches, small business areas, residential and Dana Strand and multi-unit areas.
Page 15.

5.6 Cultural Resources
Discuss earthquake faults along 3 proposed land routes and tsunami potential in the Harbor waters and on the land. 5.7 page 17.

Approach Use Port of Los Angeles information. Page 16.

5.7 Geology and Soils p. 17 Issues

Discuss vibration. Be prepare to give expert geological studies to proposed 3 area land routes in Wilmington.

5.8 Hazards Page 18 Issues
Discuss ground water potential in 3 proposed land sites in Wilmington.

What happens to the excavated tunnel material including the soil? Number of trucks, frequency per day trips, testing of excavated soil. Page 18.

Approach p.18 Please explore in detail any pipelines this project will uncover in excavation work.

5.9. Hydrology P.19 Issues

What is/are seiches?
Is there any impact/impacts on the Machado Lake, Wilmington Drain or Dominguez channel from this project?

Does the project anticipate finding any contaminated ground water in this project's excavation work, particularly on land?

Approach Please use available Los Angeles City Resources to analyze impacts of MTP to hydrology, water quality and public health.

Page 20 Detail effects of drainage patterns, groundwater levels and flow patterns to local water resources in Carson and Wilmington from this project.

5.10 Land Use Page 20
What, if any, land use hearings by the city of Carson and the City of Los Angeles are required by this project?

5.11 Marine Environment Issues Page 21
Include study of Los Angeles Harbor
- Water quality - silt
- Essential fish habitat EFH
- Interference with local bottom currents
- Bottom habitat and marine environment
- Navigation to/from Port of Los Angeles
- Accidential spills of fuel/hazardous material

Approach Page 21
Is the Palos Verdes Shelf Superfund Site / DDT, contaminated sediment, relevant to this study?

Page 22 Define "benthic" second line.

5.12 Noise Page 22

Describe noise and vibration from construction activity particularly pile driving activities.

Approach: Use Los Angeles City studies on noise particularly in residential areas: Wilmington if available.

What is a sensitive receptor when you can hear the trains all over Wilmington? p. 23

5.13 Population Issues P. 23

The residential population of 72 cities may benefit from this project, but what industries in Wilmington and San Pedro will empty their waste/wastes into this project?

What is the anticipated additional jobs to be added to construction and long term operations of new facilities?

The impacts, particularly to Wilmington, a "minority and disadvantaged community" are noted.

5.14 Public Services page 24

What contacts have been made with police, fire and hazmat services

in Los Angeles City (Harbor Division) and Los Angeles County Sheriff (Carson Station) concerning public safety related to this construction project?

5.15 Recreation Page 25
How does this project affect any Port of Los Angeles Plans for the first block north of John S. Gibson Blvd. on Wilmington Blvd?

approach Please consult Los Angeles Port Plans on recreation, rail and truck transportation for information on the Wilmington Blvd and Figueroa routes in particular. Page 25

5.16 Transportation and Traffic p. 26
Refer to 5.4 page 7 p. 27
5.8 pages 9 and 10
Is a traffic study planned for this project. If yes, who will do it? There are too many unknowns at present 11/12/08.

Please refer to any Los Angeles Port plans for John S. Gibson.

1) Where will construction workers park? Construction areas move.
2) number of construction workers and how they get to work.

3) Number of trucks, frequency of trips, route to remove soil from construction.
4) Impact on traffic particularly in Wilmington.
5) Possible impact/impacts at Figueroa Street and Pacific Coast Highway.

Page 29 Approach
2009-2050: only 41 years away. Will the Sanitation District have to come back for additional projects to accomodate growth in its mandated area?

OTHER
1) Need figures showing relationship to Carson and Wilmington and San Pedro communities to proposed construction. Figures 1, 2, 3, 4, 5 are not sufficient or clearly labeled.

2) The San Pedro meeting, Nov. 6, gave 4-8 years as the length of time for truck traffic to remove the excavated soil. Will an independent contractor be used?

3) Does the Los Angeles City Quimby fund apply to the project to benefit Wilmington or San Pedro?

4) Use charts to show dates of project from first notice of project to date of completion, and phases of construction.

5) Persons and qualification of those working on this report.

That my analysis may be of some assistance in final reports.

JoAnn Wysocki
1006 King Avenue
Wilmington 90744

(310) 834-5658

cc: file copy
15th District Council Office

Attachment 4

ORAL COMMENTS ON THE NOP/NOI

Clearwater Program
Whittier Scoping Meeting
10/30/08 1:30 PM

Ubiqus/Nation-Wide Reporting & Convention Coverage
2222 Martin Street, Suite 212 – Irvine, CA 92612
Phone: 949-477-4972 ◆ Fax: 949-553-1302

Whittier Scoping Meeting

[START Whittier Scoping Meeting.MP3]

INTERVIEWER: Thanks, Jeff. I don't want to put you on the spot, but you're our only appreciated invited guest. At this point, what we'd like is just your name and affiliation and we'll break it in two segments. You know if there are any questions you have regarding some aspect of the NOP in terms of clarification, we'll take those first. And then if you have comments, we'll take those after.

MR. CHINO CONSUNJI: My name is Chino Consunji [phonetic]. I'm with the city of Norwalk. I'm the city engineer, so my main concern would be on the impacts to the city of Norwalk. I've read in your notice of preparation that this may be done in different phases, and part of it is probably upsizing some lines or installing parallel lines to your trunk sewer lines. And my question is, or maybe some clarification if some of those alignments have been identified as far as maybe the city of Norwalk, if you pretty much know where you may have to upsize those lines?

INTERVIEWER: At this point in the meeting, we wanted to get ideas, I mean really in terms of what environment impacts we should really--I mean focusing on community input. I think we'll take that comment, but I don't know, are we at the point to answer that, Chuck?

CHUCK: I can answer that. We're still evaluating that. We're still working on the projections of the wastewater flow out to the year 2050. And once we have that finished, then we can look at which sewer lines the flow will be running in any relief needs into the future. But we haven't gotten that far yet.

MR. CONSUNJI: And part of that also, and the reason why I brought that up, you mentioned that construction will be somewhere around 2012.

CHUCK: That's for the tunnel and ocean outfall portion of the project.

MR. CONSUNJI: Okay, not necessarily the other parts upstream?

CHUCK: Right.

MR. CONSUNJI: Okay. I just wanted to bring to your attention that the I-5 will be widened sometime around that period, 2011, 2015. I think it's like a four or five-year project. So depending on where you upsize your lines, it may affect traffic and all that would have traffic impacts to the city of Norwalk.

Also, I think the high speed rail; they have another project that's proposed to go through the city of Norwalk. And it would be right around that time too. So I guess that would be considered in your traffic impact part of the environmental.

INTERVIEWER: I guess I failed to also mention that if you could also--we have your oral comment but we'd appreciate it if you could submit something in writing to ensure that we really get your comments and your concerns as accurately as possible.

MR. CONSUNJI: I can put something and maybe just mail that back to you.

INTERVIEWER: Or email it.

MALE VOICE: Whatever is easiest.

MR. CONSUNJI: And again, I'd just like to point out those two big projects that will probably--you know should be considered in the environmental traffic impact.

INTERVIEWER: And we appreciate that. Do you know if the I-5 widening plans are already available? Are they set or are they working on it?

MR. CONSUNJI: Right now the Carmenita portion, I think they're close to getting 100% PSE done. In fact, they're saying that construction will be late 2010. And that alone I think is like a three-year project. But simultaneous to that one will be the widening of I-5 between Carmenita and the 605. So that's a bigger project that goes through Norwalk, Santa Fe Springs, Downey and Commerce I think. And that would be another four or five years. It's going to be a lot of work in that area at that time.

MALE VOICE: That's good to know. We appreciate the heads-up.

INTERVIEWER: Thank you and we really appreciate it because it helps us do a better job with our facility and planning

process. Comment forms are available in the back of the room. And as Joe mentioned earlier, the comment period will remain open until November 14th. And then a draft facility plan and a draft environmental document should be completed and released at the end of 2009. And in between that, there will be many other opportunities to provide input.

We'll have additional group presentations to the community, newsletters will continue to be produced and mailed out. And the Clearwater website will be continually updated with new information. I think Joe might have mentioned you can provide input at any time through the website or the phone number at the website. Just look for the draft facility plan and the draft environmental document later next year and thank you for coming here.

MR. CONSUNJI: Just one more.

INTERVIEWER: Okay, I'm sorry.

MR. CONSUNJI: You mentioned that there would be one environmental document for the program.

INTERVIEWER: It'll be a joint document, environment impact statement, which is the NEPA [phonetic] equivalent and is combined with the environmental impact report, which is the CEQA [phonetic] state requirement in terms of environmental documentation.

MR. CONSUNJI: When you get to the point when you're doing your final design and you identify some of the sewer lines to be upsized, let's just say in the city of Norwalk, would that be a separate environmental?

INTERVIEWER: I would almost say that it's premature to answer those kinds of questions. Because you guys are working through the kind of machinations in terms of what the recommended project will look like. Because they're looking at a universe of alternatives. And they have to decide on a recommended project. And out of that you could answer that, or correct me if I'm wrong.

MALE VOICE: You know, I think that there's going to be some indication within the facilities plan as to what lines might need to be relieved between now and 2050. We're looking that though on more of a programmatic level, very big picture. And once we get closer to the construction of such relief

projects we're going to have to do a more detailed environmental evaluation. So there'll be some sort of subsequent CEQA documentation.

And just to help you understand, we're not anticipating having to--we're not seeing a whole lot growth in the area and we're not anticipating to have to relieve any of our treatment plants until maybe the year 2035-ish. So I think those are long-term projects. But we'll make our best effort to identify what they may be within the facilities plan.

MR. CONSUNJI: Thank you.

INTERVIEWER: All right. I think that closes this scoping meeting.

MALE VOICE: Thanks for coming.

INTERVIEWER: We really appreciate it.

[END Whittier Scoping Meeting.MP3]

Clearwater Program
Wilmington Scoping Meeting
11/05/08 6:30 PM

Ubiqus/Nation-Wide Reporting & Convention Coverage
2222 Martin Street, Suite 212 – Irvine, CA 92612
Phone: 949-477-4972 ◆ Fax: 949-553-1302

Wilmington Scoping Meeting

[START Wilmington Scoping Meeting.MP3]

MALE VOICE: Just for the record, if you could just give us your name and indicate any affiliation that you might have.

MS. JOANN WYCOWSKI: Joann Wycowski [phonetic], 1016 Avenue, which is right off of Wilmington Boulevard, two blocks from Frigate [phonetic] and two blocks from - - .

And I am left with an ungodly feeling that Wilmington Boulevard is going to be the route, because I'm looking at the map and I read what you said about straight lines and turns and into the Port of Los Angeles. I agree, put it into the Port of Los Angeles. But in one the previous letters that I have already submitted, I suggested that the tunnel come out of the - - sanitation district, go west on Lomita [phonetic] Boulevard to Vermont, turn and go south on Vermont to Five Points. You're missing the residential areas completely.

If you go through one of those three routes in Wilmington it's small businesses, schools, churches and a lot of homes. And I know that report says 200 feet, but I'm talking to the people who live in the - - Pass area and they say the residential area will still feel from the vibration of the construction. That is my great concern.

Now I do have one really bad comment of preparation, it's pages 20 and 21. You keep talking about Coyote Creek and Jose Creek and the San Gabriel River in several places. San Gabriel River on page 21. This concerns the South Bay area, why bring that geographical location into this report. I hope it can be eliminated for the final report.

You've given the schedule and I like that. And I would strongly suggest that in the final EIR you print that page so that everybody sees, okay, we were at this point and we had that opportunity to comment or go to a meeting. The company that you've hired, Jones and Stokes, I presume that the Army Corps of Engineer has signed off on that too.

2020, apparently that's when your construction will be completed, because that's 11 years from now. And remember, Wilmington is a part of the city of Los Angeles. The residential area does not use this but you are asking if you

choose one of those three routes for us to bear the burden in any problems in construction. And I think you're going to have to eliminate Frigate. Frigate is too narrow a street. Come down it sometime and see just exactly how narrow it is south of the plant.

I'd like to know how much contact you've had with the Port of Los Angeles since they're going to be asked for those outfalls. And the diffuser areas, I think that's a technical name for the outfall.

Now, I'm curious why the Continental Shelf cannot be used. It is a federal regulation? Is it the rate of construction, it's too dangerous to construct at such a depth?

I'd like to know the cost. I think it's going to be born by the cities that feed into this system. That's 3.0 page 4. And on 4.1, you had the individual components of 5 areas. I'd like to know the percentage of increase from now to say 2020 and 2050 to justify the construction and to include these five individual components.

On page 6, 4.1.4, it talks about inland body discharge. What inland body discharge? Is this project going to have any effect on Machato [phonetic] Lake or the Wilmington green.

Now, my route gets it to San Pedro. And I remember when you held the first hearing in San Pedro, a lady immediately wrote a letter to the Daily Brief and she was alerting all of San Pedro to what was coming, which means she doesn’t want it coming through McGuffey [phonetic]or Pacific or Western, all of which are heavy residential streets, particularly Western in San Pedro.

The tunnel shaft sites, could you be a little bit more specific that just a little yellow dot, you know give an address. I think the first one is at the sanitation plant. And again, how much contact have you had with the Port of Los Angeles? Okay, I have read this and I'm getting ready to comment. I misunderstood. I thought tonight was on Lomita Boulevard. But I will be commenting. Most of this will come in that and there'll be some other things that I think are more minor. Thank you very much. But my concern is take a look at an alternative other than Wilmington Boulevard, Frigate which I think is too narrow and Figarola.

What happens after it leaves Wilmington I don't know, but if we're going to have this project, let everyone share in this project that the residential area really does not benefit from. Yes, I understand our industry does dump into this system, but the residential area does not. And there has been some question raise about what Terminal Island, if it will be sharing its waste with this new system. Could you address that? Thank you, I will be commenting very fast on this now.

MALE VOICE: Thank you Joanna, you do have until November 14th to get the written comments to us. Good evening to the gentleman that just walked in. Did you wish to give us any comments this evening?

MR. ARTHUR HERNANDEZ: Yes.

MALE VOICE: If you could give us, when you step up the microphone, give us your name and any affiliation.

MR. ARTHUR HERNANDEZ: My name is Arthur Hernandez [phonetic]. I live at 1348 Hyatt Avenue. I represent the Wilmington Property Owners of Wilmington. I'm president and founder of that organization. Also, I'm president and founder of the Wilmington Senior Council of Wilmington. I'm the founder of the Allegra Club of Wilmington. I represent the Wilmington Neighborhood Council and I'm a Wilmington Neighborhood Council representative to the Port Advisory.

I just came from a meeting, the air quality meeting, and we made a lot of recommendations there with all the members and illustrious members. And today we just finished up but I thought I'd come down here and give some input on the processing for the sanitation department.

I know it's a big problem, it's going to be a problem in the future. And I know the city has provided money. I think at one time for clean water and the port, the east basin of Wilmington, and that, I don't know if there's any--there's not any development on that so far. I'm on the board with Mrs. Eppington [phonetic] to go forward with the filtration system on the Dominguez Channel and we hopefully think that that could come about maybe with proposals going the end of this year.

Along with that is the development of Anchorage Road and there is a need for a filtration system on the Dominguez

Channel. If the city can go forward with it, I think we had some EIRs and outreach on that, but somehow it died and now we have the sanitation department coming in and trying to put a pipeline I guess from Machato Lake forward or going down Gaffey [phonetic] or Western. I don't know which route they want to go. But the needs in the future are significant.

At one time there was recommendations to put a big pipeline through the west basin and taking it all the way over to Carillo [phonetic] Beach. And that was done but if they're going to spend $2 billion for the development of this, it's an idea, but to go through the west basin over and run it underground. I don't know how far out they want to go with this pipeline, but if it's a mile out there it's still a consideration. Whether you'd save money, I don't know. I don't have the statistical reports to save money right now. But I know that that they're going to require pipes and possibly two to three acres of land for the need of processing all this material.

It was mentioned that the bio-solids are going to be entered in that and there was going to be water reclamation and the wastewater would be a conveyance in treatment of solid processing. And that we need in this area, but how they're going to go about it I do not know. And whatever is recommended I would say that that would help this whole area and community. Whether economically we're going to save money, I don't think we're going to save money 'cause there's a lot of cost to it. But if they can solve it well then I'll be for it.

And this whole area needs to have a clean water program for our facility to go forward. Water is important to California, it always has been and the future needs of California are accumulative. If we don't do it now we're going to have to pay for it later. There's no remedy for this right now as far as I can see. In the future the taxpayers will be paying for it anyway 'cause it's a bond issue. We will still have to pay for it, so it's just a matter of time. And I thank you.

MALE VOICE: Thank you very much, Arthur. And again, you have until November 14th. We'd appreciate if you could pick up a comment form and send this written. We have recorded it, but just to make sure we get everything down correctly, we'd like to have it in writing as well.

With that I'd like to remind everybody that the draft facilities plan and the EIS/EIR should be available for public review towards the end of 2009. At that point we will have public hearings on that.

But there's going to be other chances. We will continue to hold meetings in the communities. There is the website. You can input by calling the number or going to the email address on our website. And all of that is welcome because we couldn’t - - without community citizens like yourself giving us input. And with that I'd like to thank you for coming this evening.

[END Wilmington Scoping Meeting.MP3]

CLEARWATER PROGRAM

SANITATION DISTRICTS OF LOS ANGELES COUNTY

CROWN PLAZA

SAN PEDRO, CALIFORNIA

NOVEMBER 6, 2008

6:00 P.M.

MR. SWENSON: Hi, everyone. My name is Dan Swenson. I'm with the U.S. Army Corps of Engineers and I'm acting chief of the Los Angeles Section with the Regulatory Division of the Army Corps of Engineers. It's my purpose in being here tonight, and the purpose of the meeting to start off the EIS process and we do that first by having a Notice of Intent which I will get into in a little bit, but we will also be having the scoping basically to get any information, comments from the public on the proposed project.

So we got people here from Sanitation Districts that will be speaking on the project that's being proposed. So I will let them get into the details on that. I'm here with the Army Corps and I have also got Ken Wong who is also with the Army Corps of Engineers right there, and so after we are all done speaking up here, if anybody has questions about the permitting process, feel free to either talk to myself or to Ken and hopefully we can answer those questions.

Just in brief, the contents of -- forgive me, I'm reading a little bit from these notes. The Corps will prepare a draft Environmental Impact Statement for the Sanitation District's proposed Clearwater Program. And then they will get into the details on that. We put out a Notice of Intent to the public of

that draft EIS, EIR and the Federal Register and that was done on October 6, 2008.

The purpose of this scoping meeting and us putting out that notice is, like I said, to solicit comments. So any comments that we receive from the public, you know, we fully consider those as part of our process. And we will be accepting those comments through November 21 of this month. So the main point there is feel free to submit your comments and we will be reviewing all comments that we get. We will consider them and they will become part of the record. So if anybody has questions about how that works, let me know.

A little bit about our permit programs. The Corps is responsible for regulating a variety of different activities. We regulate discharge of the fill under Section 404 of the Clean Water Act. We also regulate work in navigable waters in this area, generally the Pacific Ocean, Colorado River, so obviously we are talking about the Pacific Ocean. And that would be under section 10 of the Rivers and Harbors Act.

And finally we also regulate activities along with EPA under Section 103 of the Marine Protection Research and Sanctuaries Act and that generally involves discharging material at offshore disposal sites. And

that's also likely to be a component of this project.

Part of the proposed project in the Clearwater Program would be a new ocean outfall and so it is part of that. That would involve discharge in waters obviously that would involve work in navigable waters and likely would also involve taking material out to the two offshore disposal sites. So we would be involved in all three of those laws.

The reason that we decided to do a -- to prepare an Environmental Impact Statement, combined -- with an EIR is that we decided that the project, due to the nature of the project, had the possibility of having significant impacts on the environment. And in that case, under the Clean Water Act and the National Environmental Policy Act, NEPA, which some of you might have heard of, we are obligated to do an environmental study. So here we are.

Just a little bit about our decision-making process. I guess basically once we put out our draft EIS again we look for -- at this point in time we are kind of looking for a general comment, what we should we focus on. Are there any new or maybe issues that we didn't mention in our notice of intent that we should be looking at. So we are kind of looking for new information.

Once we put out our draft EIS at that time we also have a comment period for that with a public hearing, kind of repeat that, you know, looking for more detailed comments on the project, because when the EIS goes out it will be a lot more detailed information in that document. Once we get those and evaluate them, we will put out a final EIS and during that we go through our decision-making process.

Just a little bit about that process. There are three main components of our decision-making process, one is the 404(b)(1) guidelines of the Clean Water Act and as part of that we do an alternative analysis, look at different alternatives for achieving the project purpose.

We also do a public interest review. I think I'm missing a component here. We also basically as part of preparing those documents, the draft and final EIS, we are also complying with NEPA, the National Environment Policy Act. Basically what that's all about is disclosing all the information that is relevant to the project, so it's basically about getting that information out and sharing it with the public. So NEPA, 404(b)(1) guidelines and public interest review.

So, again, if people have questions about it, feel free to ask us afterwards. So once we have gone

through those processes and address any comments that we get, at that time we make a final permanent decision, and that's kind of our involvement in this Clearwater Program.

So just in conclusion, I guess I would say that right now at this scoping meeting, again, we are asking for public input, any information you think you might not have, please share that with us. Again, I want to emphasize that we do consider all the comments that we get. So with that, I'd like to introduce, I think, Mr. Don Avila of the Sanitation Districts and he will provide the Districts' opening remarks and introduce the Districts staff that will explain the Clearwater Program. Thank you.

MR. AVILA: Thank you. My name is Don Avila and I'm the information officer for the Sanitation Districts. First thing we are going to do is get out the really important stuff. If anybody needs to use the bathroom, it's outside that back door and straight across the hall. Plenty of water, coffee and tea on the table right outside.

I would like to welcome you to the scoping meeting for the Clearwater Program for the environmental impact statement and environmental impact report. Over the past two years, the Sanitation Districts have met

with many community and business leaders and organizations to discuss what the Clearwater Program is all about.

We have also formed four workshops in March of this year and at those workshops we addressed all aspects of the program. We sought public input on prioritizing program objectives, alternative screening and to look at potential sites for shafts and alignments for the possible tunnel and ocean outfall connecting our Joint Water Pollution Control Plant to the ocean that Dan spoke about.

Over the past two weeks we have held four additional scoping meetings to this one that were geared toward the environmental impacts of the Clearwater Program with relation to the California Environmental Quality Act also known as CEQA.

This is not a decision-making process this evening. This meeting will not result in a decision. We are here to receive your input, as Dan said, on the environmental impacts that will be used by both the Districts and the Corps as we address the environmental impacts of the Clearwater Program. The process will be ultimately result in a recommended project that will presented along with other alternatives for a draft facilities plan and a draft environmental impact

statement and impact report that we expect will be released to public review sometime late in 2009, the end of next year.

We have hired a consultant to do the EIS and EIR and that consultant is Jones and Stokes.

Now the format for tonight's meeting will start with a presentation by our staff and then we will open it up to receive comments from the public information seating on these environmental impacts and your concerns.

And I'd like to introduce two of our staff this evening. Chuck Boehmke is the head of our planning section and Joe Houghton is the senior engineer in our planning section. And Joe Houghton is the one that is going to give you the presentation this evening. And, Joe, I would like to turn the meeting over to you.

MR. HOUGHTON: Thank you, Don. As he said, I'm Joe Houghton, project engineer for the Sanitation Districts. And tonight I want to give you a brief overview for the Clearwater Program and the type of project that might be produced out of the Clearwater Program. I'm also going to talk about the environmental process and some of the environmental documents that will be produced from the Clearwater Program.

In the County of Los Angeles, there are two

major waste water systems. One is operated by the City of Los Angeles and you can see their service area in orange there. They have the Tillman, the Glendale, the Hyperion and the Terminal Island treatment plants.

The other is the Sanitation Districts of Los Angeles County. And our service area districts are those shown up on the screen with the green and the blue areas up there.

The Sanitation Districts function on a regional level and consist of 24 independent special districts. We provide the solid waste and waste water management needs for over 5.3 million people in Los Angeles County.

17 of the 24 districts in the greater Los Angeles area have joined together under agreement to provide a regional sewer system which we call the Joint Outfall System. So if we zoom in on the area in the greater Los Angeles area, you will see the Joint Outfall System here. The Joint Outfall System consists of 20 Joint Water Pollution Control Plant in Carson as well as six upstream water reclamation plants. The treatment plants are connected by a series of sewers which is over 1300 miles -- over 1300 miles of sewers in our system and these sewers convey over 450 million gallons of waste water each day.

From time to time the Sanitation Districts like to look at the system and find the needs of the system and we prepare facilities plans to meet those needs. The picture you see up here are covers from our last planning effort which was completed in 1995. We are in our current effort which we call the Clearwater Program. And under the Clearwater Program we are going to prepare a master facilities plan. And the facilities plan will guide the development of the Joint Outfall System for the next forty years.

We are going to look at major components for our system like the treatment plant, our conveyance systems. How we are going to manage the waste water, the treated waste water from both our joint plant in Carson as well as our upstream plants. We are going to look at biosolids management and solids processing.

So one of the first objectives that we have seen early in the Clearwater Program is that we have a growing population, so we need to meet the needs of a growing population. The Southern California Association of Government projects that the population in the joint outfall service area will increase from 5.1 to 6.3 million over the next 40 years. That's an increase of 1.2 million people or about 25 percent.

So what we see up here, this big blue area,

represents our current treatment capacity and the red line represents the projected waste water flow from the population.

Now, that red flow line considers conservation measures that are in place or will take place over the next 40 years. And even with these conservation measures, somewhere between the year 2030 and 2040 the flow will exceed our treatment plant capacity. By the year 2050 that shortfall is going to be about 30 mgd. So the facilities plan is going to look at a way to accommodate that shortfall of treatment capacity.

Another major need that we are going to look at, that the facilities plan will look at, is to accommodate and promote emerging recycled water readings. The Sanitation Districts have been marketing reclaimed water for over 40 years, and in that time we found over 500 reuse sites throughout Los Angeles County. And you can see some examples up here. Here, this is an industrial use, you can see the purple pipe. We also inject or put ground water or water into the ground for ground water spreading, spreading basins. And then on the right side you see different kinds of irrigation uses.

Despite the efforts of the Sanitation Districts only 40 percent of the available reclaimed water is

actually reused. The other 60 percent goes down rivers and streams and out to the ocean. So one of the objectives is to find a way to increase that amount of recyclable water reuse.

Another major need that we are going to address in the Clearwater master facilities plan is to evaluate our aging infrastructure. We want to be able to provide a means to inspect, repair and replace, if necessary, our aging infrastructure.

There are two tunnels that connect the joint plant to the Pacific Ocean and they were built in 1937 and 1958. So they are quite old, and this shows -- this -- the backdrop of this slide shows the schematic of our tunnel outfall system. And on the right you can see some photos when the tunnels were constructed.

The top of this picture shows a plan view of our system. On the right side here would be the Joint Water Pollution Control Plant. You can see the two tunnels that extend from the joint plant six miles under the Palos Verdes Peninsula to a manifold structure at Royal Palms Beach. At that point it transitions into four outfalls which go out into the Pacific Ocean.

On the bottom of this you can see a profile view of the tunnel outfall system. Again, the joint plant over here on the right. Six miles underneath the

Palos Verdes Peninsula. This represents the ground surface. There are some points where there are almost 600 feet below the ground.

We transition again at Royal Palms Beach to sea floor pipeline out to the ocean. What you will notice from here is that right around here is the coastline. We go out about a mile and a half and this is the water surface here. We are about 150 to 200 feet below surface. The tunnels, because of their length, because of the limited access and because of the constant flow that goes through there, we haven't been able to inspect these tunnels in almost 50 years.

One of projects that we will be evaluating to meet this need is to look at the construction of a new tunnel and new ocean outfall. So the first step in that process is to find an area where the new tunnel and new ocean outflow will go. And you can see that area highlighted in yellow here.

The study area was developed to maintain distance from the discharge from the City of Los Angeles Hyperion outfall in the north and maintain distance from the discharge from the Orange County outfall in the south. You can see our existing tunnel ocean outfall are on the western edge of the study area there. You also see another outfall on the right side of the study

area, which is the outfall from the Terminal Island treatment plant. The Terminal Island treatment plant is run by the City of Los Angeles and it discharges directly into Los Angeles Harbor within the breakwater.

So the first step in determining what alternatives we are going to look at is to find streets that run a direct route from the joint plant to the coastline. These are shown here in orange. And again I would like to remind you that the tunnel would be 200 feet, approximately 200 feet or so below ground surface.

Along these routes we have identified a series of shaft sites. The shaft sites are about four to eight acres in size, although the actual size of the tunnel shaft would only be about 30 to 60 feet in diameter. The shaft site is a location where equipment and labor would be brought into the tunnel and excavated materials will be brought out. I'd like to point out that we anticipate there will probably only be two shaft sites that will be identified as part of the recommended program. One would be at our joint plant and the other would be closer to the coast.

We anticipate that most of the environmental impact from this project is likely to occur at the shaft site. We shared these tunnel alignments and the shaft

sites at a public meeting in March, and based on the input from these meetings as well as the public outreach effort that we have had, the public strongly supports alignment that goes through the Port of Los Angeles.

While I showed you the onshore elements of the tunnel outfall system, here are the offshore elements. We have identified three areas for diffuser locations and the diffusers are essentially pipes with holes in them where the treated waste water is discharged into the ocean. The tunnels will go, we will find the end of the onshore alignment and they will tunnel out to the feasible or what would be selected diffuser area. So the tunnel would go to the diffuser area. There would be a riser or a pipe that would go from the tunnel to the sea floor and connected to the diffuser.

So how do we determine where these areas would be? We looked at our existing outfalls. Our existing outfalls are shown up here in orange color. And our outfalls go about -- the diffuser part of our outfalls are about a mile and a half offshore, and more importantly, about 150 to 200 feet deep.

The white lines that you see on this figure here represent contours of equal ocean depth, so the contours are of equal depth. And if we look at the 150-foot contour and 200-foot contour, you can see that

our diffuser areas are at least as deep as our existing outfall.

One other limiting factor that we have is the Continental Shelf and this is the point where the ocean floor drops off considerably and we can't construct past this point.

So if you look at the diagram, again you can see that we are at least as deep as the diffusers that are existing and are much further offshore. To give you a perspective, it's about a mile and a half offshore, and if we were to go somewhere out into area C, it would be about seven miles past the breakwater.

Because this project involves construction or may involve construction in the ocean, it will require federal permit, and because of that we are going to be subject to the National Environmental Policy Act, also known as NEPA. And as you know, the Army Corps has been decided to be the federal lead agency under NEPA. The Sanitation Districts will be the lead agency under the California Environmental Quality Act, also known as CEQA. Out of this process we are going to prepare a single joint document, joint environmental impact report, environmental impact statement, an EIR/EIS. And even though it is a single document, both the Sanitation Districts and the Army Corps of Engineers

will be responsible for approving this document.

I would like to talk a little bit about the environmental process. At the beginning of it under CEQA a notice of preparation, or NOP, is prepared and under NEPA a notice of intent or NOI is prepared. The Sanitation Districts mailed out the NOP on October 10 and the NOI was published in the Federal Register on October 6. Following that a draft EIR/EIS will be prepared. Following that you will have the final EIR/EIS following a public comment period, and the final EIR
EIS will ultimately be certified.

I would like to point out that there will be many points during this process where the public can provide input on the documents. Following the release of the NOP/NOI which is where we are at now, we have scoping meetings. The scoping meetings are to provide comment on the content and scope of the environmental documents.

Following the draft EIR/EIS will be a public comment period, which will include a public hearing. And following the final EIR/EIS the public will have a chance to input prior to the document certification and approval.

Now, this describes the public input for the

environmental documents, but as Don pointed out, we have been in a public outreach effort for the Clearwater Program since the Beginning of 2007. Our public outreach efforts have included the development of a website, the distribution of newsletters and establishing a telephone hotline. In addition to this, we have met with community leaders and groups and organizations. In fact, to date we have had over 250 meetings with community leaders and we have met with over 40 local groups and organizations.

On top of all of that, in March we had a series of four public workshops to get some input on the masters facilities plan.

Now you might have seen some of the dates on the top of the previous slide. Let me quickly run through the schedules again. From 2007 to the end of the planning process, which is about 2010 we will have our public outreach. We had a series of four public workshops in March. Right now we are in the NOP and NOI and the public scoping meetings.

The draft, the facilities plan draft EIR/EIS, will be available in late 2009 and then the final EIR/EIS and final facilities plan will be ready for approval and certification in mid to late 2010.

So tonight and through the rest of the NOP

and NOI comment period you will have an opportunity to provide comments on the contents and scope of the environmental documents.

The list you see here represents those areas that we have identified that will be covered in the environmental documents. This list -- I know there is a lot up there, but in the NOP, all of these are described in much further detail.

So how can you provide comments on the environmental documents? Well, in a few minutes you will have an opportunity to provide oral comments to us, and even though we will be recording these oral comments, we do encourage you also to provide us your comments in writing, which will allow us to make sure we have captured all of your thoughts.

Written comments can be provided in a couple of different manners. We have got comment forms that were available when you came in. You can also e-mail your comments to either Ken or to Steve, their addresses are on the screen up here. You can also provide letters or you can also send us letters in the mail with your comments and the address, our addresses for both the Army Corps and for the Sanitation Districts are on the bottom of the comment forms that were available.

Comments on the notice of preparation are

going to be due by November 14th and for the NOI will be November 21st.

If you want additional information on the Clearwater Program, you can visit our web site at www.ClearwaterProgram.org. At the website you can get general information on the Clearwater Program and obtain copies of both the NOP and the NOI, or, if you like, you can get some more information by calling our telephone hotline, which is 877-300-water.

At this point I would like to turn it back to Don.

MR. AVILA: Okay, ladies and gentlemen, this is the time where we would like you to come up and give us your comments. And I'm going to call out the names in the order that people signed up to comment. If somebody would like to comment and hasn't filled out a card, I would encourage you to do so. Otherwise, when we are done with the people who have signed up, I would welcome you to come up as well.

When you start, please begin with your name and your affiliation. And when you do give us your comments, if you could please walk up to the mic it would help so our court reporter can hear what is going on.

The first person would be JoAnn Wysocki.

MS. WYSOCKI: I'm short. JoAnn Wysocki, 106 King Avenue, and for Mr. Swenson's benefit, King is one block west of Wilmington Boulevard, our proposed route, and it then it is two more blocks order to Frigate, which is also a proposed route, and it is one more block over to Figueroa, which is also a proposed route.

Mr. Swenson, is the Army Corps of Engineers' primary concern in this project the land environment, the ocean, the harbor environment or both?

MR. SWENSON: So your question is: Is the Army Corps' concern the land environment, the ocean environment or both? In part of the process we make a determination on something called the scope of analysis, that's where we have federal control over it. So it's basically the areas where we would issue a permit or in any kind of area that is directly tied to that. So, for example, our main focus is going to be on the ocean areas. If the project, which as currently proposed involves construction on an outfall structure out in the ocean, that falls within our jurisdiction. And that's the primary activity that we would be issuing a permit for if that's the final decision, to issue a permit.

That being said, there may be certain activities that are directly tied to that construction, for example, let's say they needed to have all their

construction materials, you know, and they needed to store those on some land area some -- on land. Well, that's directly tied to that ocean activity and so we may have control over that as well.

So I guess the answer to your question is mostly, you know, we are concerned with the activity in the ocean, but there may be certain portions on land that we also have control over.

MS. WYSOCKI: The second question is both to sanitation and the Army Corps of Engineers. Does the Los Angeles city Quimby funds regulation apply to this project? Basically what that is is if a development cost is impacting the environment, certain fees have to be paid and in this case they will be paid to the communities of Wilmington and San Pedro. I'm not quite sure about the Harbor.

MR. BOEHMKE: JoAnn, this is the first time I've heard of that fund, so I'm not sure, but we will be meeting and scoping with the City of Los Angeles and I can ask them about that fund then.

MS. WYSOCKI: I have read this notice of preparation and I'm preparing to comment on it. So my question is mainly for the Army engineers. Do you want a separate copy of what I sent to the sanitation department or do you read what is sent to the sanitation

department?

MR. SWENSON: We will be getting copies. Any comments that get submitted to the Sanitation Districts we will be getting copies of those. But you can also, if you would -- you are also free to submit to both, so if you want to submit a copy and e-mail it to us or fax it, mail it, you are free to send copies to us also. We will get it either way.

MS. WYSOCKI: Would you and Mr. Wong provide business cards tonight, maybe leave them on the table?

MR. SWENSON: Sure. We can do that.

MS. WYSOCKI: Now, I do have an alternative route and I worked on it last night so I've got it into the harbor. Out of the sanitation plant in Carson, west on Lomita Boulevard to Vermont Avenue, south through Five Points, along Gaffey to Channel, make a left-hand turn on Channel and you are in the harbor. My intent is to provide all the schools, the churches, the multi-family units, another school, another school -- Dana Strand and a residential one in Wilmington on both sides. I think this will avoid a lot of upset in San Pedro also.

The Federal Register, one of my hats is that I'm a substitute librarian. The Federal Register is in certain libraries, but isn't it also published in one of the business newspapers in Los Angeles?

MR. SWENSON: I'm not sure about that. It is available online as well as, like you said, at certain libraries and whatnot.

MS. WYSOCKI: Now, because it would be very helpful if it was printed in the Los Angeles Times in the Thursday edition where the rest of the notice of the preparation and environmental impacts report and conditional use permits for the city are printed also.

MR. SWENSON: Another thing we do, I should mention is, when we issue a notice of intent in the Federal Register we usually accompany that with public notice. And that's what we have done in this case. And that public notice is mailed out to adjacent landowners and it also gets mailed out to anybody who has put themselves on our public notice mailing list, which they can do by going to our website. So if anybody wants to receive our public notices they can sign up on our website and get those directly. And usually, in this case, notice will be essentially the same materials that you would get in the Federal Register.

MS. WYSOCKI: Is that an open-ended sign up like it is for the Port of Los Angeles?

MR. SWENSON: Yes.

MS. WYSOCKI: They send you everything?

MR. SWENSON: Well, I don't know about that, but

public notices -- you get all public notices to that area.

MS. WYSOCKI: I would like you to very seriously evaluate Frigate Street in Wilmington as part of the route possibly, because it is an extremely narrow street and I invited everyone yesterday to cross over Lomita Boulevard and see how narrow Frigate is.

5.8 and 5.16 are my last comments. That's the truck traffic in the proposed soil removal. It's not just the number of trucks, it's just not the route, but it's the length of time that you would be disposing of this soil.

MR. BOEHMKE: Is the question how long will we be disposing of the material that's removed from the tunnels?

MS. WYSOCKI: Yes.

MR. BOEHMKE: It really depends on where the alignment is and how far out into the ocean it would be built, will depend how long construction time is. We estimated anywhere from four to eight years, and it depends on how many tunnel-boring machines we would actually be using, and that's going to be either one or two. If we go in two different directions, that will cut the construction time down considerably.

MS. WYSOCKI: Thank you.

MR. AVILA: Thank you, JoAnn. The next commenter will be Bill Lyte.

MR. LYTE: Thank you. My name is Bill Lyte. I'm the president of the Harbor Association of Industry and Commerce. I also serve on the Port of Los Angeles Community Advisory Committee and the San Pedro Chamber board of directors, and I'm here representing the Harbor Association tonight. We have 100 plus companies with several thousand employees in the local area.

The L.A. County Sanitation District took the time to meet with our governmental affairs committee. We appreciate that they gave a very detailed presentation and we are here to support the project, both because it provides the critical infrastructure necessary for our region on which we all rely. Secondly, it provides vital construction jobs and procurement opportunities to our local firms, which is particularly important in a very, very, very major recession.

We recommend choosing the excavation sites within the Port of Los Angeles. We think that that will minimize community impacts. We suggest use of electric trucks for any transfer of tunneling excavated debris from the project through the community, and, if possible, that clean excavated material could be used

internal to the port for any port construction projects and that it could potentially be transferred within the port on the interport railroad or by barge.

Thank you.

MR. AVILA: Thank you, Bill.

The next commenter will be Mark Wells.

MR. WELLS: Mark Wells, the publisher of many blogs, including sanpedroissuestoponder.blogspot.com.

My comments are, I'm sure you have all anecdotally heard for almost two years that site No. 6, the Terminal Island outfall source is the best. I don't need to go into that anymore.

One issue that may be thought of, if you are going to consider that, along with the Port of Los Angeles working together is placing into consideration the concept that Terminal Island would be connected to the mainland via a land bridge, because with four bridges, currently three vehicular bridges, one a train bridge. While that is all good, it may not be enough for the future. And I know you are probably going to start construction in 2012 so it's not a good lead time.

My question is: in noticing the map on the Power Point, it appears as though San Pedro, if you

will, the San Pedro part of the community and Wilmington, per se, would not use this outfall system; that the sewage is treated on Terminal Island. Is that a correct statement?

MR. BOEHMKE: The treated waste water comes from our treatment plant in the city of Carson, it’s located at Sepulveda and Figueroa.

MR. WELLS: Your waste waters. I saw in the Power Point that the San Pedro area itself are the Terminal Island and part of Wilmington was grey, when all the other places were yellow, just like the Hyperion treatment plant area and other treatment plant areas. I know where you serve, but is San Pedro served by your district?

MR. BOEHMKE: No. San Pedro --

MR. WELLS: No.

MR. BOEHMKE: -- and Wilmington are not served by the Sanitation Districts.

MR. WELLS: So that all of the proposed sites in San Pedro, including Royal Palms or the Angels Gate, other places in San Pedro, including Terminal Island would actually be placed in an area that you have no users. So in effect, wouldn't it be that you would be imposing upon the local residents something that they do not benefit from directly?

MR. BOEHMKE: Well, we would see it as they would benefit because our current tunnel and outfall system goes through that -- goes in that direction right now. And it hasn't been inspected in 50 years and we are not sure of the reliability into the future. So we will be building an infrastructure that would be more reliable for those communities so that there would be less possibility there would ever be failure and then have to be some kind of emergency repair work or other construction activity.

MR. WELLS: That's good for the last 53 years. I live five houses above Western Avenue, so I know where your existing tunnels go. I'm glad of that. Thank you very much.

MR. AVILA: Thank you, Mark.

The final person that has signed up is David Bard.

MR. BARD: Hi, thank you.

David Bard for Marine Animal Care Center at Ft. MacArthur. Forgive me, but I have multi-part questions as well.

You mentined that the public overwhelmingly supports the Port as your shaft site in your route. I would like to know is that the route that you are leaning toward? Also, if you could be a little more

specific on the shaft sites that are in and around the Angels Gate area, since that's where our facility is located as to whether those are being considered and how that would impact us.

And lastly, regarding the pipe, the outfall themselves. Will the new outfall take over for the old one, supplement it basically? Would the outfall load be split between the two? What is the ratio of treated outflow that we are talking about between the two lines? And has the EIR or will the EIR address an analysis of the effect of those outfalls on nutrient loads in the ocean or subsequent effects on the increase of algae and biotoxins and their effect on the marine life?

MR. BOEHMKE: Could you repeat that last part one more time?

MR. BARD: With the second outflow, will the EIR address the impact of that outflow on nutrient loads in the ocean water and its subsequent impact on biotoxins and algae which will subsequently affect marine life in the area?

MR. BOEHMKE: Thank you.

MR. AVILA: Thank you, David.

MR. BOEHMKE: I will go ahead and try to answer those. Hopefully, I have them written down correctly.

MR. BARD: I know there are a lot parts to it, but if you need me to repeat it.

MR. BOEHMKE: Dan, feel free to join in.

Are we leaning towards the Port? We have everything on the table still and we are just starting the environmental documentation right now and the analysis, so I wouldn't say we are leaning one way or another, but we certainly are going to be factoring in public acceptance of the construction locations and the tunnel alignments. As you mentioned, we did hear loud and clear from our public workshops and other meetings that the vast majority of the residential community prefer we go toward the Port and have our construction shaft site in the Port.

Angel Gate location, I'm not that familiar with the exact location that they identified. They were looking for areas that were four to eight acres in size and reasonable shape and slope. And I believe it's the area closer to the ocean, not near the community or the art community buildings that are out there. So, but I can look at a map with you after the meeting and I can kind of get you to the general location.

MR. BARD: Okay.

MR. BOEHMKE: If you give me your information, I can even show you later through e-mail or whatever.

How will the old outfalls be used? We won't we able to determine that until we inspect them. If a new tunnel and ocean outfall is built, it is likely to be sized to handle all the flows projected through the year 2050. At that point we would move the flow into the new tunnel and outfall and then we would dewater the existing ones and see what kind of shape they are in, what it would take if they need repair what it would take to repair them, and a determination won't be made until then.

And will the EIR address water quality issues out of the discharges located in the ocean? Absolutely for nutrient loading and all other constituents.

MR. BARD: Okay, thank you.

MR. AVILA: Thank you, David.

MR. SWENSON: Just to add to that from the U.S. Army Corps of Engineers standpoint, I guess I would just say at some point later in the process the Corps makes a determination on what its preferred alternative is and often that matches up with the applicant's proposed alternative, but not always. As part of the -- I mentioned this earlier, but as part of the -- usually it's part of the final environmental impact statement, we do our 404(b)(1) guidelines analysis and part of that is doing an alternatives analysis. Basically we look at every

different alternative that is proposed for analysis, that could be coming from the applicant -- it could be coming from the public, it could be coming from some agency or group. We look at those different alternatives and we make an assessment on which one is getting any kind of regulating, but basically we determine which one is the least environmentally damaging, practicable alternative.

So we look at the environmental effects and we also look at practicability. What is possible from the engineering standpoint, cost standpoint, and just kind of general logistics. So we look at all of those, make a determination on what -- ultimately what alternative we would issue a permit for.

So in terms of environmental effects, our main focus would be on the marine effects, but there may be some land effects, land impact that we would also be looking at as well.

MR. BARD: In recent years we have seen an increase in the advent of alterations due to natural occurring biohazards directly related to nutrient loads in the water. So I understand in the end all of the outflow is going to go out to the ocean. We are curious as to how it's going to be split up, what the prevailing currents are going to do and what impact it is going to have on

it and I would like to see that happen. Thanks.

MR. AVILA: Our next commenter is Richard Pawlowski. I hope I didn't butcher your name.

MR. PAWLOWSKI: You did fine.

I have got several questions, the first of which, what is the size of the pipe at the outflow going to be? If I understand this correctly, there are different diameters where it is dispersed at the outfall site. It's a 12- to 15- foot pipe and then it goes off in different directions and disperses the water. Did I understand that correctly?

MR. BOEHMKE: It could be sized differently as it's built out in the ocean depending on the hydraulics that are needed to keep the certain flow rates and velocities going through the ports or the pipe openings.

MR. PAWLOWSKI: Very good. So the velocity that the 450 million gallons a day comes out of this thing, have you thought of taking that and using that to generate energy and electricity?

MR. BOEHMKE: I'm not aware of --

MR. PAWLOWSKI: I mean, it's hydraulics. You are pushing this stuff out, rather than using energy to push it in one direction, but rather than capturing that energy as it comes out of the pipe, we feed the energy

back?

MR. BOEHMKE: We can look into that.

MR. PAWLOWSKI: You should, because this is green technology, and that kind of technology, right, Bill -- is what I think you are looking for in these kinds of situations to justify something like this. It's not just taking stuff and dumping it.

I would also like to suggest, and I don't know that you haven't thought of this, is that you -- have you thought of reversing the direction of this entirely, because, you know the snow pack is melting in the Sierras and the Colorado River, the watershed is shrinking. Why not think of taking and reversing the direction of this? If it's semi-clean water and putting it into places that might be able to use it in another way, other lakes, creating other lakes, some other place, even the Owens Valley they have a dust problem. So thinking of reversing some of this stuff or piping it backwards, it doesn't have to be that size, but maybe run some other pipe alongside of the freeways or something to get it out there. Reversing the direction of this thing rather than coming this way only (indicating). Again, the community doesn't really have any benefit, but putting energy thinking into this, how can you use that water being pushed somewhere. That takes a lot of

energy to do that. So use it some other way.

And also, if I understand this correctly, you got 150 trucks per day, 100 to 150 trucks per day removing this dirt that's dug up, someplace. We don't know where that is yet, but that is going to be an impact. And have you included those numbers in any of the 6 EIRs that the port has? Because that's a considerable amount of truck traffic every day for eight years. I mean it's a hell of a lot of trucks. And they have a clean truck program just put into effect in this particular kind of truck program has none of those constraints on it at all. So all the work that has been done on this clean trucks program has absolutely nothing to do with this. And there is a huge amount of pollutants coming right back to us from this. We just got rid of some of this stuff, and I don't think -- and again, I don't know, that this has or has not been thought of.

Let's see what else. Well, I would just leave you to take a look at -- I think that's the main point I would like to make, just consider the energy that you are putting out in the ocean. I used to teach scuba diving also and I understand what this is guy talking about, that this marine environment is pretty sensitive, and it's not just where you put it. You might have a gray

area over there, but it all over the place. So really consider pushing it, try to do it some other place. It's a little bit more -- a little harder to do, maybe even more green if you put it some other direction.

MR. AVILA: Thank you, Richard.

I don't have anybody else signed up to speak, but I would welcome anybody else who would like to come up to the microphone. Please step up, give us your name and if you have any affiliation.

MS. ROMAN: I'm Pat Roman, I'm just a concerned resident of Wilmington, new in the neighborhood. And I guess my No. 1 concern is why is only 40 percent of the water that we are reclaiming, why is only 40 percent of it being used? I think there is a big problem here.

My second, even bigger problem, is how much credence or how much in-depth thought is given to any new construction permit regarding water use and how they handle it. It just seems that we have got all kinds of projects that are potentially going to happen here and I don't hear anybody talking about the real infrastructure of how we are going to support these kind of things.

MR. AVILA: Thank you.

Does anybody else wish to comment? Yes, sir, please step up.

MR. STOLTE: I'm Ron Stolte, and I live on Paseo

Del Mar between Royal Palms and Point Fermin. So my vote is definitely for Terminal Island. My question is, will this environmental impact documentation cover all the choices for the tunneling and the shafts or will by the end of 2009, will you have selected the path for the tunnel and shaft?

MR. BOEHMKE: The environmental impact report will include the evaluation of all of the alternatives for the tunnel alignment and shaft sites and we do intend to have a recommended project when we release the draft EIR at the end of next year. That would include a recommended shaft site and alignment.

MR. STOLTE: Thank you.

MR. AVILA: Thank you. Does anybody else wish to comment this evening?

If not, I would like to thank you very much for coming. We could not do an environmental process like this without help from the community like yourself. Comment forms are available out at the table for anybody who would like to mail in comments still.

For the EIR the comment period goes until November 14th, and for the EIS with the Army Corps it goes until November the 21st. A draft facilities plan and a draft EIS/EIR we expect to release toward the end of next year for your review, but there will be other

opportunities for your input. We will continue group meetings in your community. We will continue newsletters. Our website will continually be updated and you can input through the website, either at the e-mail address or phone number that's listed there. And we would like to recommend that if you have any input that you please send it in to us.

And with that I would like to thank you again for coming this evening and good night.

TIME NOTED: 7:29 p.m.

STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

I, NANCI L. GRUBE, a Certified Shorthand Reporter for the County of Los Angeles and the State of California, do hereby certify:

That said proceedings was taken before me at the time and place therein set forth, and was taken down by me in shorthand and thereafter transcribed into typewriting under my direction and supervision; that the said transcript is a true record of the proceedings;

I further certify that I am neither counsel for nor related to any party to said action, nor in anywise interested in the outcome thereof.

IN WITNESS WHEREOF, I have subscribed my name this 24th day of November, 2008.

_____
Certified Shorthand Reporter
for the State of California

Attachment 5

ADVERTISEMENT FOR PUBLIC SCOPING MEETINGS

CLEARWATER Program

NOTICE OF PUBLIC SCOPING MEETINGS

The Sanitation Districts of Los Angeles County are in the planning stage of the Clearwater Program. The goal of the Clearwater Program is to ensure the continuation of a wastewater management system that is protective of public health and the environment. As part of the Clearwater Program, the Sanitation Districts will be preparing a new master facilities plan (MFP) for the Joint Outfall System (JOS). The JOS encompasses 73 of the 78 cities in the Sanitation Districts' service area, as well as some unincorporated county areas.

The MFP will guide the development of the JOS through the year 2050 and may result in the approval of one or more projects relating to wastewater management. A major component of the MFP will be the possible construction of a new tunnel and ocean outfall to convey treated wastewater from the Sanitation Districts' Joint Water Pollution Control Plant in Carson to the Pacific Ocean.

The Sanitation Districts have issued a Notice of Preparation (NOP) of an Environmental Impact Report (EIR). The EIR will be prepared jointly with an Environmental Impact Statement (EIS). The U.S. Army Corps of Engineers (Corps) has issued a separate Notice of Intent (NOI) for the EIS. It is anticipated that the draft MFP and draft EIR/EIS will be completed by the end of 2009.

The NOP and NOI, including detailed information about the project, are available at **www.ClearwaterProgram.org**. The Sanitation Districts and the Corps will be conducting a joint public scoping meeting for both the NOP and NOI to receive comments as to the scope of analysis and content of the proposed EIR/EIS.

This joint scoping meeting will be held on:

- **Thursday, November 6, 2008, at 6:30 p.m., at the Crowne Plaza Los Angeles Harbor Hotel, 601 South Palos Verdes Street, San Pedro, California.**

The Sanitation Districts will also be conducting four additional scoping meetings for the NOP on:

- **Wednesday, October 29, 2008, at 6:30 p.m., at the Carson Community Center, 801 East Carson Street, Carson, California;**
- **Thursday, October 30, 2008, at 1:30 p.m. and 6:30 p.m., at the Sanitation Districts' Joint Administrative Office, 1955 Workman Mill Road, Whittier, California; and**
- **Wednesday, November 5, 2008, at 6:30 p.m., at the Wilmington Senior Center, 1371 Eubank Avenue, Wilmington, California.**

For further information, call the Clearwater Program information line at **(877) 300-WATER.**

SANITATION DISTRICTS OF LOS ANGELES COUNTY

Attachment 6

NOTICE OF AVAILABILITY FOR DRAFT EIR

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

STEPHEN R. MAGUIN
Chief Engineer and General Manager

PUBLIC NOTICE OF AVAILABILITY

CLEARWATER PROGRAM DRAFT ENVIRONMENTAL IMPACT REPORT

To:	Mailing List
Lead Agency:	Sanitation Districts of Los Angeles County
State Clearinghouse Number:	2008101074
Project Title:	Clearwater Program Master Facilities Plan
Project Location:	Los Angeles County

1.0 Introduction

The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts of Los Angeles County (Sanitation Districts). Its purpose is to develop a long-range Master Facilities Plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas in Los Angeles County. The Clearwater Program MFP includes an evaluation of infrastructure needs and will serve to guide the management and development of the JOS through the year 2050. As required by the California Environmental Quality Act (CEQA), the Sanitation Districts have prepared a draft Environmental Impact Report (EIR) to assess the potential environmental impacts of the MFP.

Certain elements of the Clearwater Program MFP will require federal permits from the U.S. Army Corps of Engineers (Corps). Consequently, the Sanitation Districts partnered with the Corps in preparing a joint environmental document – the Clearwater Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) – to evaluate the potential environmental impacts of the plan recommended in the MFP and its alternatives. The Sanitation Districts are the lead agency for the EIR under CEQA, and the Corps is the federal lead agency for the EIS under the National Environmental Policy Act (NEPA). The Corps has prepared a separate Notice of Availability (NOA) for the draft EIS.

2.0 Background

The Sanitation Districts, a regional public agency, consist of 23 independent special districts that operate under a partnership agreement, sharing staff and administration, with the purpose of serving the wastewater and solid waste management needs of over 5.4 million people in Los Angeles County. The Sanitation Districts' service area covers approximately 820 square miles, encompassing 78 cities and unincorporated territory within the county. The Joint Administrative Office for the Sanitation Districts is located in the city of Whittier.

The JOS is a regional wastewater management system shared by 17 of the 23 Sanitation Districts under a partnership agreement, which provides for a combined investment to maintain and operate the conveyance system and treatment facilities. The JOS spans approximately 660 square miles (Figure 1). Wastewater from city- and county-owned local sewers flows, mainly by gravity, into large trunk sewers. The 1,230 miles of trunk sewers in the JOS are interconnected to seven wastewater treatment plants with a combined treatment capacity of 593 million gallons per day (MGD). Approximately one-third of the wastewater in the JOS system is treated at six water reclamation plants (WRPs), where high-quality recycled water is produced that is either beneficially reused (e.g., landscape irrigation and groundwater recharge) or discharged to rivers and streams. The remaining two-thirds is treated at the Joint Water Pollution Control Plant (JWPCP) located in the city of Carson. The solids removed at the WRPs during the treatment process are returned to the trunk sewers to be centrally processed at the JWPCP.

After the wastewater undergoes full secondary treatment at the JWPCP, it meets all regulatory standards for ocean discharge. From the JWPCP, the treated water (effluent) is transported by two 6-mile long tunnels under the Palos Verdes Peninsula to Royal Palms Beach, where an underground manifold structure connects the tunnels to four ocean outfalls. The outfalls consist of seafloor pipelines that extend up to one-and-one-half miles offshore and reach a depth of 200 feet. The treated effluent exits the outfall pipes through a series of diffuser portholes.

3.0 Clearwater Program Purpose and Needs

The overall goal of the Clearwater Program is to identify a plan that is protective of public health and best meets the needs of the JOS through the year 2050 in a cost-effective and environmentally sound manner. Specifically, the Clearwater Program has the following four objectives:

- Provide adequate system capacity to meet the needs of the growing population.
- Provide for overall system reliability by allowing for the inspection, maintenance, repair, and replacement of aging infrastructure.
- Provide support for emerging recycled water reuse and biosolids beneficial use opportunities.
- Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies.

One particular area of concern emerged during the planning process. Currently, the Sanitation Districts rely on two onshore tunnels and four offshore ocean outfall structures to convey effluent from the JWPCP, in the city of Carson, to the Pacific Ocean. The two tunnels were constructed in 1937 and 1958 and have not been inspected for over 50 years. Inspection of the tunnels is not possible due to their overall length, limited access, interconnections between the tunnels, and continuous flow through the tunnels. Furthermore, in January 1995, the JOS service area was inundated by two major back-to-back storm events. The resulting peak wastewater flows in the sewerage system from these storm events nearly exceeded the capacity of the JWPCP ocean discharge system. If the tunnels were to be damaged or the capacity of the ocean discharge system exceeded, treated JWPCP effluent would need to be bypassed into the Wilmington Drain, a stormwater channel that flows through Harbor Regional Park. If sufficient capacity were not available in the Wilmington Drain, the sewers tributary to the JWPCP could overflow and untreated wastewater could enter various water courses, such as the Dominguez Channel and the Los Angeles River. The project purpose and needs are to inspect and upgrade the aging ocean

discharge system, to provide sufficient capacity in the JOS to accommodate the estimated 2050 peak wastewater flows, and to comply with all applicable water quality standards, including regulations prohibiting sewer overflows. To meet these needs, the Clearwater Program MFP evaluates both modifying the existing ocean discharge system and constructing a new ocean discharge system.

4.0 Recommended Plan

The Clearwater Program MFP makes the following recommendations for the JOS:

4.1 JWPCP Effluent Management

The existing JWPCP ocean discharge system would be modified to accommodate projected flows and allow for the dewatering, inspection, and any necessary repairs/rehabilitation of the two existing effluent tunnels. A new tunnel would be constructed to convey effluent from the JWPCP to the existing ocean outfalls. Under the recommended plan, new ocean outfalls would not be required, but the existing outfalls would need to be rehabilitated (i.e., re-ballasting, joint repairs, and cathodic protection). The proposed tunnel alignment (Figure 2) would begin at the JWPCP West shaft site, continue approximately 2,600 feet south under Figueroa Street, 6,000 feet southwest under Harbor Regional Park, 8,000 feet south under North Gaffey Street, 5,300 feet southwest under Capitol Drive, 5,200 feet south under Western Avenue, 4,000 feet south under South Dodson Avenue, and 5,500 feet southwest under Western Avenue to the Royal Palms shaft site for a total distance of approximately 36,600 feet, or 6.9 miles. The tunnel would range from approximately 70 to 450 feet below ground surface, except at its connection to the existing outfalls, where it would be approximately 30 feet below ground surface. The tunnel would have an external diameter of about 22 feet and an internal finished diameter of about 18 feet.

The tunnel would be constructed with a tunnel boring machine (TBM), which would be placed underground at the JWPCP West shaft site, located near the corner of Lomita Boulevard and Figueroa Street. The TBM would be capable of excavating soil/rock and installing a pre-fabricated concrete tunnel liner as it advances. The excavated material would be removed at the JWPCP West shaft site for disposal or, where possible, beneficial use. Upon completion of tunnel construction, the TBM would be removed at the Royal Palms shaft site, which is located primarily on property owned by the Sanitation Districts at Royal Palms Beach. The beach parking area would be restored to its original configuration. There would be no permanent aboveground facilities at the shaft site, except ground-level access to the shaft and new manifold structure, vent pipes, and access lids.

4.2 Wastewater Conveyance and Treatment

Additional treatment plant capacity is required for the JOS by the 2050 planning horizon. The San Jose Creek Water Reclamation Plant (SJCWRP), located at 1965 Workman Mill Road near the city of Whittier, is the most suitable location for a treatment plant expansion. An expansion at the SJCWRP would make more recycled water available where demand for it is greatest. Therefore, it is recommended that the SJCWRP be expanded from its current permitted capacity of 100 MGD to 125 MGD. The unprecedented amount of water conservation being experienced in the JOS service area offsets the projected population growth such that it likely expansion of the SJCWRP will

not be necessary for another 30 years. The current SJCWRP property is large enough to accommodate the recommended expansion.

Process optimization (e.g. flow equalization) is recommended at the SJCWRP, Pomona Water Reclamation Plant (POWRP), Los Coyotes Water Reclamation Plant (LCWRP), and Long Beach Water Reclamation Plant (LBWRP). The POWRP is located at 295 Humane Way on a 14-acre site in the city of Pomona, the LCWRP is located at 16515 Piuma Avenue in the city of Cerritos, and the LBWRP is located at 7400 East Willow Street on a 17-acre site within the city of Long Beach. The current plant properties are large enough to accommodate the recommended process optimization facilities. Consequently, construction of the facilities would not require acquisition of additional land. Flow equalization facilities at the LCWRP can be built under the existing driving range for the Iron-Wood Nine Golf Course and thus not impact its long-term use.

Based on the projected wastewater flows for the year 2050 and a 25-MGD expansion at the SJCWRP, approximately 33 miles of Joint Outfall trunk sewers will require some type of relief (addition of parallel pipes for increased capacity). The Sanitation Districts would continue to closely monitor the JOS conveyance system throughout the planning period to determine actual relief needs. The future conveyance system improvement projects would be implemented on an as-needed basis.

4.3 Solids Processing

One byproduct of wastewater treatment and purification is residual solids, often referred to as sludge. It is recommended that solids processing continue to be centralized at the JWPCP using existing systems. Additional sludge stabilization capacity consisting of six new anaerobic digesters will be required at the JWPCP by 2050. The current JWPCP property is large enough to accommodate the additional digesters, so additional land would not be required. The timing for digester construction is dependent on future trending of sludge production at the JWPCP.

The JWPCP currently produces enough electricity from the biogas produced in the anaerobic digesters to be self-sufficient. Additional gas resulting from an increased number of digesters would be managed by the existing steam boilers and gas turbines. The turbines are currently supplemented with natural gas. As digester gas increases, it would be used in lieu of natural gas.

The capacity of the existing sludge dewatering system is anticipated to be sufficient to meet the projected quantities through 2050. Therefore, no additional sludge dewatering facilities would be required throughout the planning period. During this time, the Sanitation Districts would continue the current program of replacing aging centrifuges as needed.

4.4 Biosolids Management

Once stabilized and dewatered, the residual solids are converted into a material called biosolids that can be beneficially used. It is projected that the JOS biosolids generation rate will increase nearly 30 percent during the planning period. The continuation of the current biosolids management practices is recommended. The Sanitation Districts have a robust and diverse system in place that can handle the projected increase.

The Sanitation Districts currently co-dispose biosolids in landfills, but this option will be lost with the scheduled closure of the Puente Hills Landfill (near the city of Whittier) in 2013. However, the Westlake Farms Composting Facility (Kings County) should begin operations by the same year, and can be expanded in phases if and when future needs arise. Therefore, it is anticipated that there is no additional physical infrastructure required to accommodate future biosolids management. The Sanitation Districts will continue to explore options that provide for additional biosolids management diversity and further optimize the beneficial use of this material.

4.5 WRP Effluent Management

The continuation of current practices for WRP effluent management is recommended. The existing effluent management system effectively allows the Sanitation Districts to meet current reuse demands and discharge any excess recycled water to surface waterways. While the amount of reuse is likely to increase in the future, surface water discharge capabilities would be retained. The Sanitation Districts will continue to work cooperatively with water supply agencies to help them expand reuse. In addition, flow equalization at the SJCWRP, POWRP, LCWRP, and LBWRP may facilitate increased reuse by making more recycled water available during periods of the day when demands are greatest.

5.0 Potential Significant Environmental Effects

The draft EIR assesses environmental impacts for both the construction and operational elements of the recommended plan and identifies mitigation measures to avoid or reduce the significant impacts. The recommended plan would cause four significant and unavoidable impacts:

- Aesthetics impacts due to 20-foot high walls or barriers that would be temporarily erected at the JWPCP West and Royal Palms shaft sites to reduce noise impacts during construction.
- Air quality impacts due to construction-related equipment and vehicle exhaust.
- Greenhouse gas impacts due to construction-related equipment and vehicle exhaust.
- Cultural resource impacts due to the potential of disturbing or destroying unique paleontological resources or geological features during tunneling and shaft construction.

6.0 Public Review and Public Hearing

Pursuant to Section 21091 of the Public Resources Code, the draft EIR for the Clearwater Program MFP will be available for public review during an extended 60-day review period beginning on February 10, 2012 and closing on April 10, 2012. Comments on the draft EIR should be sent to the following address:

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601
shighter@lacsd.org

The draft EIR will be available for review online at www.ClearwaterProgram.org. Hardcopies will be available for review at the following locations:

Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

Carson Regional Library
151 East Carson Street
Carson, California

Los Angeles Public Library
San Pedro Branch
921 South Gaffey
San Pedro, California

Los Angeles Public Library
Wilmington Branch
1300 North Avalon
Wilmington, California

The Sanitation Districts and the Corps will be conducting a joint public hearing to receive comments on both the draft EIR and draft EIS on:

Thursday, March 8, 2012, at 6:30 pm
Crowne Plaza Los Angeles Harbor Hotel
601 South Palos Verdes Street
San Pedro, California

The Sanitation Districts will also be conducting two additional public hearings to receive comments on the draft EIR on:

Tuesday, March 6, 2012, at 6:30 pm
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

Wednesday, March 7, 2012, at 6:30 pm
Carson Community Center
801 East Carson Street
Carson, California

Please share this notice with anyone else you feel may be interested.

Date: 1/26/2012

Charles E. Boehmke
Assistant Head, Facilities Planning Department
Sanitation Districts of Los Angeles County

FIGURE 1

CLEARWATER Program

Existing Joint Outfall System

Source: Sanitation Districts of Los Angeles County 2011, Thomas Bros 2011, ESRI 2011

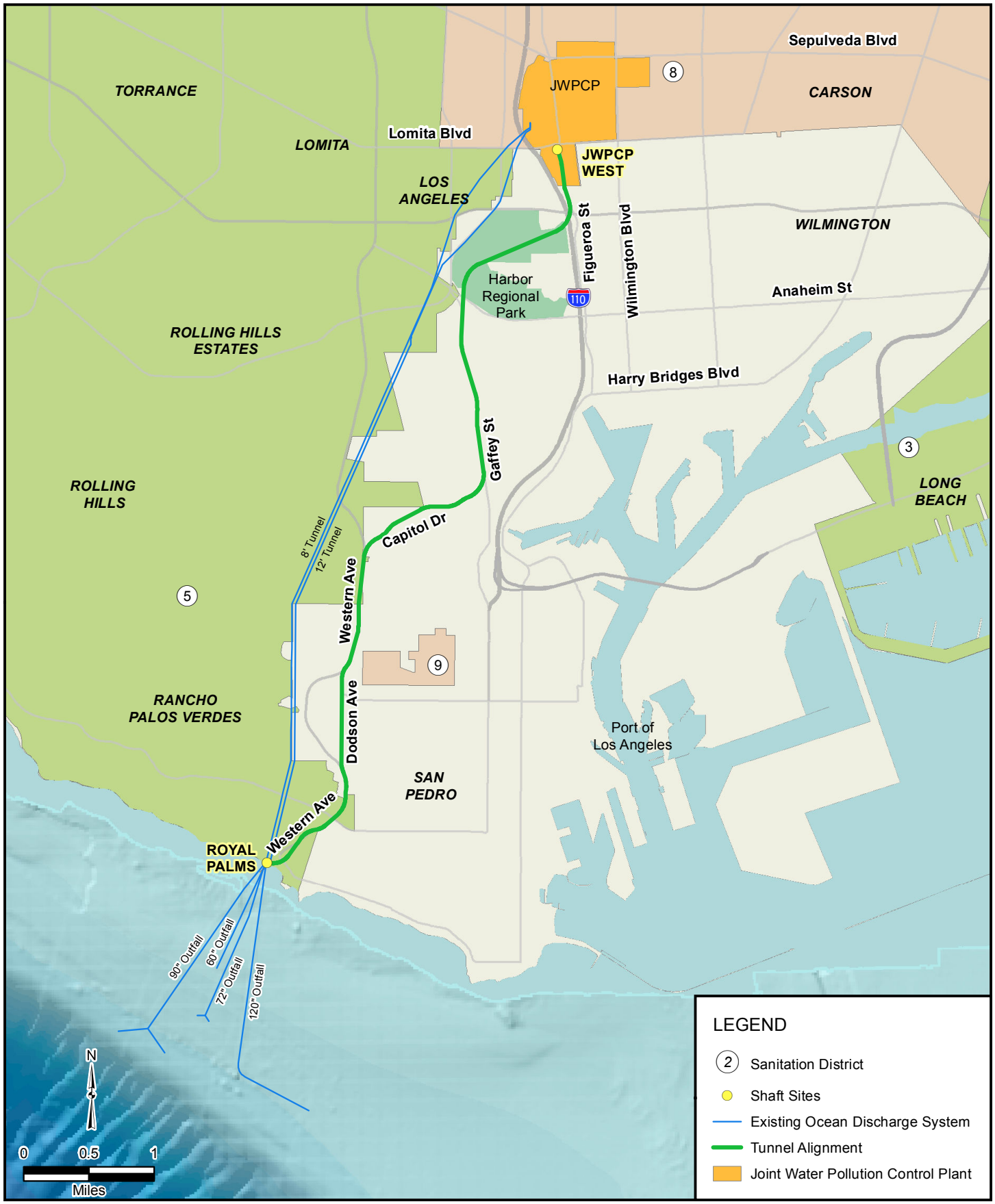

FIGURE 2

CLEARWATER Program

Recommended Tunnel Alignment

Source: Sanitation Districts of Los Angeles County 2011, Thomas Bros 2011, ESRI 2011

Attachment 7

NOTICE OF AVAILABILITY FOR DRAFT EIS

NOTICE OF AVAILABILITY

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

February 10, 2012

CLEARWATER PROGRAM DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

The U.S. Army Corps of Engineers, Los Angeles District (Corps) in conjunction with the Sanitation Districts of Los Angeles County (Sanitation Districts) has completed a Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Clearwater Program. The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts. Its purpose is to develop a long-range Master Facilities Plan for the Joint Outfall System, a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas in Los Angeles County. A major component of the Clearwater Program is the evaluation of alternatives for new ocean outfalls and rehabilitation of the existing ocean outfalls. Both activities would entail discharge of dredged and fill material in waters of the United States, work in navigable waters of the United States, and the transport of dredged material for ocean disposal. These activities would require authorization from the Corps pursuant to Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act, respectively.

Questions or comments concerning the Draft EIS/EIR should be directed to Dr. Aaron O. Allen, U.S. Army Corps of Engineers, Los Angeles District, Regulatory Division, Ventura Field Office, 2151 Alessandro Drive, Suite 110, Ventura, CA 93001, (805) 585-2148.

SUPPLEMENTAL INFORMATION: The Draft EIS/EIR is available for a 60-day review period from February 10, 2012 through April 10, 2012. The document is accessible via the World-Wide Web at www.ClearwaterProgram.org. Alternatively, printed copies are available at the following locations: Sanitation Districts of Los Angeles County, 1955 Workman Mill Road, Whittier, California; Carson Regional Library, 151 East Carson Street, Carson, California; Los Angeles Public Library, San Pedro Branch, 921 South Gaffey Street, San Pedro, California; Los Angeles Public Library, Wilmington Branch, 1300 North Avalon, Wilmington, California.

PUBLIC MEETING: The Sanitation Districts and the Corps will jointly hold a public hearing to receive public comments regarding the Draft EIS/EIR on March 8, 2012, 6:30 p.m., at the Crowne Plaza Hotel Los Angeles Harbor Hotel, 601 South Palos Verdes Street, San Pedro, California. Written comments will be accepted until the close of public review on April 10, 2012.

Regulatory Program Goals:

- To provide strong protection of the nation's aquatic environment, including wetlands.
- To ensure the Corps provides the regulated public with fair and reasonable decisions.
- To enhance the efficiency of the Corps' administration of its regulatory program.

BILLING CODE: 3710-KF-P

DEPARTMENT OF DEFENSE

AGENCY: Department of the Army, U.S. Army Corps of Engineers

ACTION: Notice of Availability

SUMMARY: The U.S. Army Corps of Engineers (Corps) in conjunction with the Sanitation Districts of Los Angeles County (Sanitation Districts) has completed a Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Clearwater Program. The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts. Its purpose is to develop a long-range Master Facilities Plan for the Joint Outfall System, a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas in Los Angeles County. A major component of the Clearwater Program is the evaluation of alternatives for new ocean outfalls and rehabilitation of the existing ocean outfalls. Both activities would entail discharge of dredged and fill material in waters of the United States, work in navigable waters of the United States, and the transport of dredged material for ocean disposal. These activities would require authorization from the Corps pursuant to Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act, respectively.

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24 Jan 2012
DATE

David J. Castanon
Chief, Regulatory Division
Corps of Engineers

Attachment 8
NOTICE OF COMPLETION

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2008101074

Project Title: Clearwater Program Master Facilities Plan

Lead Agency: Sanitation Districts of Los Angeles County — Contact Person: Steven W. Highter

Mailing Address: 1955 Workman Mill Road — Phone: (562) 908-4288 x2711

City: Whittier, CA — Zip: 90601 — County: Los Angeles

Project Location: County: Los Angeles County — City/Nearest Community: Carson

Cross Streets: Countywide — Zip Code: ____

Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W Total Acres: ____

Assessor's Parcel No.: n/a — Section: ____ Twp.: ____ Range: ____ Base: ____

Within 2 Miles: State Hwy #: ____ Waterways: ____

Airports: ____ Railways: ____ Schools: ____

Document Type:

CEQA:
- ☐ NOP
- ☐ Early Cons
- ☐ Neg Dec
- ☐ Mit Neg Dec
- ☒ Draft EIR
- ☐ Supplement/Subsequent EIR (Prior SCH No.) ____
- Other: ____

NEPA:
- ☐ NOI
- ☐ EA
- ☒ Draft EIS
- ☐ FONSI

Other:
- ☒ Joint Document
- ☐ Final Document
- ☐ Other: ____

Local Action Type:

- ☐ General Plan Update
- ☐ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☐ Site Plan
- ☐ Rezone
- ☐ Prezone
- ☐ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☐ Annexation
- ☐ Redevelopment
- ☒ Coastal Permit
- ☒ Other: Master Facilities

Development Type:

- ☐ Residential: Units ____ Acres ____
- ☐ Office: Sq.ft. ____ Acres ____ Employees ____
- ☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
- ☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
- ☐ Educational: ____
- ☐ Recreational: ____
- ☐ Water Facilities: Type ____ MGD ____
- ☐ Transportation: Type ____
- ☐ Mining: Mineral ____
- ☐ Power: Type ____ MW ____
- ☒ Waste Treatment: Type wastewater MGD 25
- ☐ Hazardous Waste: Type ____
- ☒ Other: Wastewater Conveyance & Effluent Management

Project Issues Discussed in Document:

- ☒ Aesthetic/Visual
- ☒ Agricultural Land
- ☒ Air Quality
- ☒ Archeological/Historical
- ☒ Biological Resources
- ☒ Coastal Zone
- ☒ Drainage/Absorption
- ☒ Economic/Jobs
- ☒ Fiscal
- ☒ Flood Plain/Flooding
- ☒ Forest Land/Fire Hazard
- ☒ Geologic/Seismic
- ☒ Minerals
- ☒ Noise
- ☒ Population/Housing Balance
- ☒ Public Services/Facilities
- ☒ Recreation/Parks
- ☒ Schools/Universities
- ☒ Septic Systems
- ☒ Sewer Capacity
- ☒ Soil Erosion/Compaction/Grading
- ☒ Solid Waste
- ☒ Toxic/Hazardous
- ☒ Traffic/Circulation
- ☒ Vegetation
- ☒ Water Quality
- ☒ Water Supply/Groundwater
- ☒ Wetland/Riparian
- ☒ Growth Inducement
- ☒ Land Use
- ☒ Cumulative Effects
- ☒ Other: GHG & Marine Env.

Present Land Use/Zoning/General Plan Designation:

Countywide

Project Description: *(please use a separate page if necessary)*

See attached

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

S	Air Resources Board	S	Office of Historic Preservation
S	Boating & Waterways, Department of		Office of Public School Construction
S	California Emergency Management Agency	S	Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
S	Caltrans District # 7	S	Public Utilities Commission
	Caltrans Division of Aeronautics	S	Regional WQCB # 4
	Caltrans Planning	S	Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
S	Coastal Commission	S	San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
S	Conservation, Department of	S	Santa Monica Mtns. Conservancy
	Corrections, Department of	S	State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of	S	SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
S	Fish & Game Region # 5		Tahoe Regional Planning Agency
S	Food & Agriculture, Department of		Toxic Substances Control, Department of
	Forestry and Fire Protection, Department of	S	Water Resources, Department of
	General Services, Department of		
	Health Services, Department of	S	Other: Department of Public Health
	Housing & Community Development	S & S	Other: SCAQMD & California EPA
S	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date February 10, 2012 Ending Date April 10, 2012

Lead Agency (Complete if applicable):

Consulting Firm: ICF International
Address: 1 Ada, Suite 100
City/State/Zip: Irvine, CA 92618
Contact: Donna McCormick
Phone: (949) 333-6622

Applicant: N/A
Address:
City/State/Zip:
Phone:

Signature of Lead Agency Representative: Steven W. Hight **Date:** 2/7/2012

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

NOTICE OF COMPLETION
PROJECT DESCRIPTION

The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts of Los Angeles County (Sanitation Districts) with the purpose of developing a long-range master facilities plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving over 5 million people in 73 cities and unicorporated areas of Los Angeles County. The Clearwater Program MFP includes an evaluation of infrastructure needs and will serve to guide the management and development of the JOS through the year 2050.

The JOS is a regional, interconnected wastewater management system shared by 17 of the 23 Sanitation Districts under a partnership agreement, which provides for a combined investment to maintain and operate the conveyance system and the treatment facilities. The JOS is located in the central, southern, and eastern portions of Los Angeles County.

The Clearwater Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) provides both program-level and project-level analysis. The Clearwater Program includes five program component areas:

- Wastewater Conveyance and Treatment
- Water Reclamation Plant (WRP) Effluent Management
- Solids Processing
- Biosolids Management
- Joint Water Pollution Control Plant (JWPCP) Effluent Management

The project-level analysis relates to the JWPCP effluent management component area, which includes a working shaft site at the JWPCP; an 18-foot-diameter, 6-mile-long onshore tunnel between the JWPCP and the existing ocean outfall manifold structure at Royal Palms Beach near White Point; an exit shaft site at Royal Palms Beach; and the rehabilitation of the existing ocean outfalls.

Areas of Controversy

Public outreach for the Clearwater Program began in January 2007 and continues today. Consequently, affected agencies and the general public have been made a part of the planning process and the alternatives screening process. This led to a recommended program and project that avoided many of the impacts that were of concern early in the process. Some of the concerns raised during the outreach included:

- Impacts on air qualitys
- Impacts on traffic
- Location of tunnel shaft sites
- Project location and tunnel alignments

- Impacts on parks
- Impacts on ocean nutrients and algal blooms

Issues to Be Resolved

Issues to be resolved for the Clearwater Program include the Sanitation Districts' choices among alternatives and whether or how to mitigate significant impacts.

Attachment 9

ADVERTISEMENT FOR PUBLIC HEARINGS

CLEARWATER Program

NOTICE OF PUBLIC HEARINGS

Draft Environmental Impact Report/ Environmental Impact Statement

As part of a comprehensive planning effort called the Clearwater Program, the Sanitation Districts of Los Angeles County (Sanitation Districts) have completed a draft Master Facilities Plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas of Los Angeles County. The MFP evaluates the infrastructure needs of the JOS through the year 2050 and makes recommendations on how to ensure the continuation of the JOS as a reliable and cost-effective wastewater management system that is protective of public health and the environment.

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The Sanitation Districts and the Corps will hold a joint public hearing to receive comments on both the draft EIR and draft EIS on:

Thursday, March 8, 2012, at 6:30 pm (Doors open at 6:00 pm)

Crowne Plaza Los Angeles Harbor Hotel
601 South Palos Verdes Street
San Pedro, California

The Sanitation Districts will be conducting two additional public hearings to receive comments on the draft EIR on:

Tuesday, March 6, 2012, at 6:30 pm (Doors open at 6:00 pm)

Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

Wednesday, March 7, 2012, at 6:30 pm (Doors open at 6:00 pm)

Carson Community Center
801 East Carson Street
Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

R086433

Stars

(Continued from page 25)

potency and the impact that those circling thoughts can make. The truth is the thoughts typically come first and then the emotions follow as a result of whatever thoughts are brewing in the brain. Once your emotions get activated, that is where you live and where you swim. As Mars retrogrades back through your house of the mind, you will be re-discovering the power of when the heart and mind are united, when they work for and with one another to keep you stable and sound. You are becoming more practical and aware versus allowing certain emotions to lead, and with Uranus in Aries now you are also becoming more objective within your emotional reality, which will help prevent you from getting consumed with certain emotions that have felt like they were holding you back. Venus is also in Aries in your house of control, and she is reaching out with intent to the North Node, the symbol for your destiny, in your house of habits. This symbolizes you taking charge of your future in a productive, passionate way. It reflects learning how to get the mind to work for you in order to help you get the results that your heart wants. You are in control now, direct the motion or it will direct you!

♌LEO

Often times all it takes is a warm fire after coming in from the cold, or a gentle cool breeze after a hot spell in the heat, to create relief or to calm the inner unrest. When the body is comfortable, far more is possible, and the emotions can stabilize too. I heard someone say somewhere, "There is nothing a warm bath and a good night's sleep can't fix." The same could be said about a supportive Venus transit. As we move into the weekend, loving Venus in fellow fire sign Aries reaches out to the North Node, the symbol for your destiny, in fellow fire sign Sagittarius, and a gesture of love or assistance at just the right time makes your day. You may also find a way to get what you need and even some of what you want as she works to improve your life. If nothing else, she will serve as "an usher with a flashlight" to show you your next step, or to shine the light on hope that lies ahead. Stay open to what your current situation can offer as there may be something you are still missing that is meant to serve you along the way. When the heart opens, doors open!

♍VIRGO

There is a clear advantage not only in having Mars, the planet of action and desire in your sign but also having Mars currently moving retrograde. I know that may sound a bit backward, but what the retrograde is giving you is time. It is taking the heat off of something so you can think before you do something that you otherwise might regret. It is helping you get your bearings straight, and it is helping you prepare yourself for this next leg in your journey, which reflects a new cycle of some sort. At the same time, on Fri., Feb. 17, Venus in your house of the soul reaches out to the North Node, the symbol for your destiny in your house of home, and the emotional body to usher in some support and to ease a certain burden. Mercury, your ruler is also moving through your house of relationships now, which may have you attracting all sorts of attention. You have the magic touch Virgo. "Ask and you shall receive!"

♎LIBRA

A great deal can happen in a week so I do what I can to search for the things that might give you a boost in the middle of a potentially long and drawn-out process. That has been the nature of the times for you, Libra, in the past few years with Saturn moving through your sign. It has been a long, drawn-out something that has required much more from your heart, body and soul than you thought you ever had in you. If you answered the call and you did the work, you may be currently benefiting from the discipline required. If you are still steeped in something, there is hope on the horizon. Venus, your ruler, is in your house of relationships and connects beautifully with the North Node, the symbol for your destiny on Fri., Feb. 17, in your house of communication. A conversation or meeting could prove to be fruitful whereby you finally feel like progress is near or here. All relationships have an opportunity to improve this week if you reach out with spontaneity, love, and adventure. One little spark could get a good loving fire going. Light the match!

♏SCORPIO

This week, if you bend your ear with someone you love, the added time, attention and effort will truly pay off. There will be far more that you will come to know and understand if you experience a bit more deeply another person's reality, which will have a way of immediately improving your connection with them and your mutual understanding of one another. Venus, the planet of listening, is in your house of improvements, so if you feel you are missing something, or not clear about how someone feels, or where they are coming from, sit and stay but don't speak - simply listen. Also, Venus in this position can help you find better ways to feel better across the board by removing some of those unhealthy habits and replacing them with something that nourishes the body. With Mercury in fellow water sign Pisces, you are going to be highly receptive and sensitive to the world around you, which can help you read the intentions of others as well as heightening your communicating ability will an effortlessly flow. It may feel as if someone in the ethers is speaking for you and through you. That is true teamwork!

♐SAGITTARIUS

If the tension is high today, it should easily break by Fri., Feb. 17, if not before as Venus, the planet of love, makes a pleasing alignment to the North Node, the symbol for your destiny, in your sign, Sag. You get a break and will feel some sweet relief from a current, pressing matter where you have previously felt helpless. The universe already knows what you need and you will soon see the truth of this knowing as the edge is taken off a certain nagging burden. With Mercury in Pisces in your house of home, there is a great deal of emotion that may be hidden that you are not addressing because you don't feel you have the energy to deal with it all, or you fear the reactions of others. In essence, it may feel as if there is far too much beyond your control. What you can control and influence is how you respond inwardly to all that is going on around you. You will get the help you need. Someone will show up well for you and your invisible guides are forever hovering near!

♑CAPRICORN

Letting go, easier said than done, especially for you Capricorn. Letting go, when it happens, the Capricorn wonders, "What in the heck took me so long?" There is an art in surrendering to the inevitable, an art in surrendering expectations for certain outcomes;

CLEARWATER Program

NOTICE OF PUBLIC HEARINGS

Draft Environmental Impact Report/ Environmental Impact Statement

As part of a comprehensive planning effort called the Clearwater Program, the Sanitation Districts of Los Angeles County (Sanitation Districts) have completed a draft Master Facilities Plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas of Los Angeles County. The MFP evaluates the infrastructure needs of the JOS through the year 2050 and makes recommendations on how to ensure the continuation of the JOS as a reliable and cost-effective wastewater management system that is protective of public health and the environment.

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Shootout hero is ID'd unofficially

LONG BEACH: ICE agent came running to assist colleague who was under attack.

By Tracy Manzer Staff Writer

An Immigration and Customs Enforcement agent was the hero who came to the rescue of an unarmed agent repeatedly shot by a colleague at close range last week in Long Beach, sources said Monday.

As Deputy Special Agent in Charge Kevin Kozak recuperated Monday from six gunshot wounds, sources close to the investigation who spoke on condition of anonymity identified the agent who came to Kozak's rescue as Perry Woo.

Woo intervened after Kozak was shot by Supervising Special Agent Ezequiel Garcia as the two had a heated discussion over Garcia's job performance Thursday, federal officials said.

Sources said Woo came running after the gunfire broke out and struggled to get Garcia's gun before opening fire with his own service weapon. Garcia was fatally shot in the exchange. Kozak wasn't wearing his firearm and was sitting behind his desk when Garcia shot him several times, sources said.

Kozak, who has nearly 30 years on the job, was hit in the hand, knee and stomach, ICE spokeswoman Virginia Kice said. He is recuperating at St. Mary Medical Center in Long Beach.

FBI spokeswoman Laura Eimiller said Monday the FBI was not identifying the third agent.

The investigation is being led by the FBI in cooperation with ICE and the Long Beach Police Department. Once the FBI completes its investigation, it will be turned over to the U.S. Attorney's Office for review, Eimiller said.

ICE Special Agent in Charge Claude Arnold, Kozak's direct supervisor, said Friday that Kozak was counseling Garcia on his job performance. Arnold also said he was unaware of rumors of ongoing tension between Kozak and Garcia, and he refused to discuss reports that Garcia had filed numerous complaints at work and had asked for a transfer.

Some sources described Kozak as a tough taskmaster who was hard to please. They also characterized Garcia as disgruntled.

Authorities said Kozak, 51, is one of two deputies in the Long Beach office who report directly to ICE's Los Angeles office, and he has been assigned to the Long Beach office since August 2004.

He began his career almost 30 years ago with the U.S. Customs Service in San Diego, transferred to the U.S. Customs office in Miami, where he served as a criminal investigator until 2001, and returned to California at that time to become a supervising investigator in Los Angeles.

Garcia, 46, supervised a Document and Benefit Fraud Task Force and answered to Kozak. He began his career in 1988 with INS and became a criminal investigator in 1991, when he transferred to Los Angeles.

In 2003, the INS was abolished and Garcia became part of the new ICE agency. In 2004, Garcia was promoted to supervisor and served in that capacity until his death.

tracy.manzer@presstelegram.com

Follow Tracy Manzer on Twitter at http://twitter.com/tracymanzer

911 call details may be more restricted

STATE: Demi Moore incident spurred the proposal by a former police dispatcher.

By Don Thompson
The Associated Press

SACRAMENTO — A state lawmaker upset over details revealed in a recent emergency call involving actress Demi Moore is seeking to restrict the sort of information that can be publicly disclosed in 911 tapes.

"Eyes rolling back, foaming at the mouth, bleeding from a body part — that's nobody's business but the medical personnel and the patient. I think it has crossed the line," said Assemblywoman Norma Torres, who was a Los Angeles Police Department emergency dispatcher for more than 18 years before her election to the Legislature in 2008.

Current law already allows law enforcement agencies to withhold personal details, but Torres' AB1275 would prohibit them from releasing medical or personal identifying information contained in emergency calls.

The measure by Torres, D-Pomona, is one of hundreds proposed by lawmakers ahead of a Friday deadline to introduce bills to be considered this year. This is the second year of a two-year session. Typically, it produces a few hundred bills less than the first year.

Last year, lawmakers introduced 2,381 bills and sent 870 of them to the governor, who signed 774 into law. In 2010, lawmakers considered 1,871 bills and sent 1,029 of them to the governor, of which 722 became law.

The bills being introduced for this year face months of committee hearings before the Legislature's scheduled adjournment Aug. 31.

The bill by Torres, D-Pomona, already is causing a stir.

She said her intent is to prevent only the disclosure of medical conditions, but her one-sentence bill contains a second restriction. It says that, "Notwithstanding any other law, a public agency shall not disclose any portion of a 911 emergency telephone call providing medical or personal identifying information."

Her spokeswoman, Catalina Martinez, said Torres intends a narrow interpretation: "Social Security number, home address, that type of personal information. That's what we mean by that."

Critics of the legislation said federal and state laws already provide enough protections.

"If she's overdosing, on drugs, that's fair game. What symptoms she has as a result of that overdose, none of your business."

— ASSEMBLYWOMAN NORMA TORRES, a former Los Angeles Police Department emergency dispatcher who wants to restrict the type of information that can be released publicly in 911 tapes

The media generally can obtain copies of emergency dispatch tapes under the California Public Records Act. The law already allows agencies to withhold information "that is medical or personal that if disclosed would cause an unwarranted invasion of privacy," said Jim Ewert, general counsel for the California Newspaper Publishers Association.

It's up to each agency to decide what qualifies.

In Moore's case, Los Angeles fire officials, acting on the advice of the city attorney's office, cited federal medical privacy rules in redacting details about the actress' medical condition and substances that witnesses said she might have ingested or smoked. Moore's publicists did not respond to requests for comment.

People could hesitate before calling 911 if they realize their conversations can be made public, said Peter Scheer, executive director of the First Amendment Coalition. But he said more restrictions could tip the balance too far in limiting the public's right to know how emergency workers respond.

Here are some of the other bills that have been introduced ahead of Friday's deadline:

- Pet groomers would have to get a license under a bill by Democratic Sen. Juan Vargas of San Diego.
- A year after successfully authoring a bill prohibiting the open carry of unloaded handguns, Assemblyman Anthony Portantino, D-La Canada Flintridge, proposes to ban the open display of unloaded rifles and shotguns as well.
- State and local public employees' pensions would be capped at $80,000 a year if the retiree also receives Social Security, and $100,000 if they do not, under a bill by Assemblyman Donald Wagner, R-Irvine.
- Rank-and-file state employees would get more protections when they face disciplinary action, under AB1655. The bill by Assemblyman Roger Dickinson, D-Sacramento, would create a Public Employee's Bill of Rights Act.
- Prison inmates could receive only medically necessary treatment under SB1079.
- Lenders would be prohibited from foreclosing on a home while the borrower is negotiating a mortgage modification under A bill by Assemblyman Mike Eng, D-Monterey Park.

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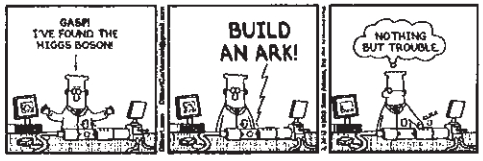

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CLEARWATER Program

NOTICE OF PUBLIC HEARINGS

Draft Environmental Impact Report/ Environmental Impact Statement

As part of a comprehensive planning effort called the Clearwater Program, the Sanitation Districts of Los Angeles County (Sanitation Districts) have completed a draft Master Facilities Plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas of Los Angeles County. The MFP evaluates the infrastructure needs of the JOS through the year 2050 and makes recommendations on how to ensure the continuation of the JOS as a reliable and cost-effective wastewater management system that is protective of public health and the environment.

The recommended project in the MFP includes the construction of a new 18-foot diameter, 7-mile long tunnel to convey treated wastewater effluent from the Joint Water Pollution Control Plant in Carson to the Pacific Ocean off of White Point. The new tunnel, which would tie into existing ocean outfalls at Royal Palms Beach, would allow for inspection and any necessary repairs of two existing tunnels that flow full every day and have not been inspected for over 50 years.

The Sanitation Districts and the U.S. Army Corps of Engineers (Corps) have prepared a joint draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Clearwater Program MFP pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Public hearings will be conducted during the extended public review period for the draft EIR/EIS, which ends on April 10, 2012. The Clearwater Program MFP and EIR/EIS can be viewed at www.ClearwaterProgram.org.

The Sanitation Districts and the Corps will hold a joint public hearing to receive comments on both the draft EIR and draft EIS on:

Thursday, March 8, 2012, at 6:30 pm (Doors open at 6:00 pm)
Crowne Plaza Los Angeles Harbor Hotel
601 South Palos Verdes Street
San Pedro, California

The Sanitation Districts will be conducting two additional public hearings to receive comments on the draft EIR on:

Tuesday, March 6, 2012, at 6:30 pm (Doors open at 6:00 pm)
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

Wednesday, March 7, 2012, at 6:30 pm (Doors open at 6:00 pm)
Carson Community Center
801 East Carson Street
Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

No todos son millonarios

BOXEADORES DEBERÍAN CONTAR CON PENSIÓN VITALICIA, CONSIDERA SULAIMÁN

Servicios de Impacto USA

Tiempo de recuerdos. De nombrar a los campeones más significativos en la historia y de enumerar los logros alcanzados por el Consejo Mundial de Boxeo (CMB) en 49 años.

El organismo mundial inició su año 50 de existencia, con un encuentro con algunos de los campeones del CMB y su presidente José Sulaimán. En este espacio, el dirigente se dio tiempo para reflexionar sobre los retos a futuro que tienen para mejorar el entorno del boxeo internacional.

"Lo que falta al boxeo actual es una pensión vitalicia para todos los pugilistas, porque es una pena que al final de sus vidas ellos solamente se acuerden del pasado, de las glorias de sus vidas, pero sin nada qué comer" dice Sulaimán.

El dirigente del Consejo Mundial, el cual fue fundado un 15 de febrero pero de 1963, recordó las reglas que ha impuesto el organismo para "humanizar" el boxeo. Tal es el caso de las peleas de campeonato a 12 rounds o los prepesajes un día antes del combate y no el mismo día de la pelea.

Con la presencia de campeones vigentes como Jhonny González o Mariana Juárez, más leyendas del boxeo como "Pipino" Cuevas, Ultiminio Ramos o el promotor estadounidense Don King, Sualimán expresó su deseo de unidad entre los organismos rectores del boxeo mundial. "Nos faltan muchas cosas por cambiar. Tal es el caso de que haya unidad entre todos los organismos para que nos respetemos los unos a los otros y así evitar que los promotores continúen haciendo lo que les da la gana", resalta el presidente del CMB. -Agencia El Universal.

El presidente del Consejo Mundial de Boxeo, José Sulaimán, acompañado por el promotor estadounidense Don King y boxeadores, en conferencia de prensa con motivo de la celebración de 49 años del CMB. Foto: Alma Moreno/CMB.

INGENIERO

Viene de la página A1

responsable de la formación de depósitos de lípidos en las paredes de las arterias (arteroesclerosis), y en la formación de aneurismas cerebrovasculares y abdominales aórticos.

Lasheras dijo que de joven su deseo de contribuir a la exploración del espacio fue una de sus inspiraciones para convertirse en científico, y reconoció como una de sus grandes influencias al también profesor español Amable Liñán Martínez, actualmente en las Universidades de Yale y Politécnica de Madrid.

"Comencé trabajando problemas de propulsión espacial y diseño de motores de cohetes para lanzamiento de satélites, en aspectos básicos de investigación con una aplicación práctica, desde los cuales mi trayectoria profesional me han llevado a la interfase de temas básicos multidisciplinares en áreas tradicionales de la ciencia, concretamente la biología y la medicina", indicó.

Actualmente, Lasheras trabaja en colaboración con los profesores Richard Firtel y Juan Carlos del Álamo en el estudio de la mecánica del movimiento migratorio de células y en los procesos de invasión celular que aparecen en ciertas enfermedades inflamatorias crónicas y en cánceres metastáticos.

"Busco entender la mecánica de la migración celular, cómo se mueven las células en tu organismo, células como los leucocitos del sistema inmune que para cubrir su función necesitan migrar, salir de las venas y atravesar tejido para ir al foco de la infección", explicó.

"Desgraciadamente, las cancerígenas, cuando adquieren un fenotipo que les permite moverse, conducen a la formación de metástasis en interacciones complejas que si se pueden entender nos permitirán desarrollar fármacos o métodos para controlar el movimiento migratorio de células específicas", añadió Lasheras.

Autor o coautor de más de 100 artículos científicos y 44 patentes en EE.UU. relacionadas con el diseño de instrumentos médicos, Lasheras dijo estar convencido de que el siglo veintiuno será el siglo de la biología y la medicina, por lo que alentó a jóvenes a que se preparen para participar de sus avances.

Asimismo, destacó que se debe enfatizar el papel transformador de movilidad social de la educación, atacando las causas complejas de este problema desde la educación primaria, para aumentar la graduación de jóvenes hispanos en las universidades de elite.

"Haciendo trabajo voluntario en secundarias y preparatorias con mayoría hispana en San Diego he visto que la calidad de educación que reciben es muy diferente de aquella en zonas afluentes. Intelectualmente los jóvenes son capaces de los mismos logros que cualquier otro grupo", dijo el investigador.

Además de mantener la cátedra como "Profesor Stanford y Beverly Penner de Ciencias Aplicadas" en la Escuela de Ingeniería Jacobs en UCSD, Lasheras también ocupa el puesto de "Profesor Distinguido de Ingeniería Mecánica Aeroespacial, y Bioingeniería", además de ser el director del Centro para Instrumentos Médicos e Instrumentación.

El profesor ha recibido numerosas distinciones profesionales, entre ellas el Premio F.N. Frenkiel para las Dinámicas de Fluidos de la Sociedad Física Americana en 1990 y la Innovación de Avance en Ciencias Médicas de BIOCOM en 2003.

Y desde el pasado 9 de febrero pertenece a la Academia Nacional de Ingeniería, el máximo honor de esta sociedad de investigación que es una de las tres científicas más importantes en EE.UU. y es el segundo español se convierte en miembro de derecho de esta academia, tras Sergio Verdú en 2007. EFE.

Regresan Vela y Jona al Tri, Nery sigue excluido

Servicios de Impacto USA

Nery Castillo fue el gran ausente de la lista que dio a conocer el técnico de la Selección Mexicana de Futbol, José Manuel de la Torre, de cara al choque que sostendrá el Tricolor el próximo 29 de marzo ante Colombia, duelo que se realizará en el Qualcomm Stadium de San Diego, California y que forma parte de la preparación de cara a las eliminatorias con miras a la Copa del Mundo 2014.

Aunque en algún momento se especuló el posible regreso del orlando de San Luis Potosí, por la mente del cuerpo técnico no pasó la opción de llamarlo, pese al buen momento futbolístico por el que atraviesa con el Aris Salónica de Grecia. Trascendió que dicha ausencia se debe a los problemas que tuvo en su última convocatoria, donde tuvo un enfrentamiento con los periodistas, además de contratiempos internos que se presentaron durante su estadía en el seno del equipo.

El último encuentro que disputó Nery con la casaca nacional, fue el 5 de septiembre de 2009. El cotejo ante Costa Rica, y que fue correspondiente al hexagonal final, fue ganado por los verdes por pizarra de 3-0. Castillo jugó los últimos 10 minutos del encuentro e ingresó de cambio por Giovani dos Santos.

Trascendió que "El Chepo" quiere disciplina total en el equipo, y no dudará en dejar fuera a los futbolistas que considera conflictivos. De hecho, ya habló con Rafael Márquez para que haga grupo con el resto de jugadores, y evitar diferencias que puedan provocar un mal ambiente en el plantel.

El que regresó a la convocatoria fue Carlos Vela. Después de la fiesta que hubieron en Monterrey en septiembre del 2010, y que le costó una suspensión de seis meses, el delantero de la Real Sociedad de España tuvo esporádicos llamados, en gran medida debido al irregular paso que tuvo por el viejo continente, pero en las últimas semanas ha recuperado su nivel.

Sobresale, de igual manera, el regreso de Jonathan Dos Santos. El jugador del Barcelona fue inhabilitado previo a la Copa América, por verse involucrado en una reunión en la que asistieron sexoservidoras. "Jona" se ha negado en varias ocasiones a vestir la casaca nacional aunque, en entrevista que se publicó en medios ibéricos, dijo que no tendría problema para representar a México.

Efraín Juárez, del Celtic y Pablo Barrera, del Zaragoza español, fueron ingresados en la lista pese a la poca actividad que han tenido en el viejo continente. Desde antes de que saliera Javier Aguirre del cuadro maño, Barrera no había tenido continuidad, mientras que Juárez tuvo más minutos, aún así, tuvo que regresar al futbol escocés.

La lista la completan: Giovani dos Santos del Tottenham de Inglaterra, Héctor Moreno del Espanyol del Barcelona; Andrés Guardado del Deportivo La Coruña, Javier Hernández del Manchester United, Guillermo Ochoa del Ajaccio de Francia; Francisco Javier Rodríguez del Stuttgart de Alemania; además de Rafael Márquez, quien defiende la casaca del New York de la MLS.

Esta semana, se dará a conocer el resto de jugadores que militan en equipos mexicanos. Se esperan 20 convocados para el duelo con Colombia. -Agencia El Universal.

CARNAVALES

Viene de la página A4

naval), cuando realizan una infatigable danza callejera desde la madrugada hasta el final de la noche, tiempo durante el cual no pueden sentarse en público.

Ese día, los guilles estrenan sus famosos sombreros realizados con trescientas plumas de avestruz y desfilan cubiertos con una máscara de cera que simboliza la igualdad entre las personas. Calzados con zuecos de madera, están vestidos con una blusa y un pantalón decorados con decenas de estrellas, leones y coronas. La blusa está forrada de paja lo que les confiere un aspecto tan caricaturesco.

En el Domingo de Carnaval los Guilles, marianes, pierrots y arlequines desfilan por las calles de la ciudad, bailan y exhiben sus espectaculares trajes. Todas las noches se realizan castillos de fuegos artificiales y las calles se llenan de confetis que la gente arroja.

El origen de estos personajes procede de una celebración en donde María de Hungría (Dama de Binche), con la intención de impresionar a su hermano Carlos V y a su hijo, Felipe II, organizó siete días de banquetes, fuegos artificiales, desfiles y bailes. La visita del monarca y su hijo estuvo acompañada por una misión de exploradores españoles tras el descubrimiento de América, por lo que, para celebrarlo, los caballeros de la corte española se disfrazaron de incas. EFE-REPORTAJES.

DN17-NBA

Viene de la página A6

Yao Ming nació en Shanghái, China y fue el jugador más alto de la liga, pese a la idea que se tiene de la baja estatura de los chinos.

A sus 13 años Ming ingresó a las fuerzas juveniles del equipo Sharks de Shanghai y practicaba más de 10 horas diarias.

Los Lakers de Los Angeles podrían dar otra sorpresa a la audiencia hispana local.

Al parecer hay interés en Gilbert Arenas y el domingo pasado fue su gerente general, Mitch Kupchak, el que lo observó durante una sesión privada de trabajo que realizó en Bel Air, de acuerdo a varias fuentes periodísticas.

Arenas regresó a su casa de Orlando y esperará a conocer la decisión que puedan tomar los Lakers, pero con la confianza que a nivel físico se encuentra completamente recuperado de los problemas de rodillas y caderas que le han afectado a través de todos los años de profesional.

Arenas, tres veces seleccionado al Partido de las Estrellas, tiene promedios de 21,2 puntos y 5,4 asistencias en los 10 años de carrera que lleva en la NBA.

Pero en la pasada temporada se quedó con un promedio de ocho puntos y un 34,4 por ciento de acierto en los tiros de campo después de haber disputado 49 partidos con los Magic de Orlando.

Si Arenas firma con los Lakers, el equipo angelino solo podría ofrecerle el mínimo del salario que corresponde a un jugador veterano, que es de 1,4 millones de dólares.

-Con datos de Agencia El Universal, EFE y Wikipedia.

CANCHAS

Viene de la página A6

2011 fue el líder general del torneo. En la Copa Libertadores, de la que fueron finalistas en 2010, Chivas registró un empate en casa en su primer partido contra el Deportivo Quito ecuatoriano. ¡Explicaciones!, si se trata de eso. "Lo más importante ahora es recuperar la alegría, que los jugadores adquieran nuevamente esa confianza, porque futbolísticamente estamos bien", declaró Ambriz el sábado pasado tras sumar la quinta derrota, por 2-1 contra el Monterrey. Para los Pumas, las cosas son solo un poco diferentes. Con tres derrotas en seis partidos, dos empates y un triunfo para cinco unidades, el equipo, campeón en el Clausura 2011, se ve desorientado y sin un líder en la cancha. Los 'felinos' son uno de los cuatros equipos mexicanos que jugarán los cuartos de final de la Liga de Campeones de la Concacaf junto al Morelia, el Santos y el Monterrey. Su serie la jugará contra el Isidro Metapán salvadoreño desde el próximo 8 de marzo... Cruz Azul no pudo cerrar una semana ganadora. Al final pidió la hora para lograr el empate a cero goles frente a los Xolos, en juego disputado en un repleto estadio Caliente de Tijuana... Jugaron una "cascarita" donde la vida es más sabrosa: México se impuso a Estados Unidos por 2-1 para adjudicarse el título del torneo de fútbol playa Cancún 2012 que se celebró con la participación de los equipos de El Salvador y de España. El Salvador derrotó por 3-2 a España en el primer juego de la jornada dominical para conquistar el segundo lugar del campeonato; España fue tercero y Estados Unidos, cuarto... Chimes sobre la cancha: Indignado, aturdido, sorprendido, Cuauhtémoc Blanco aún escucha los gritos provenientes de la tribuna del Sergio León Chávez, donde hace unos meses era ídolo y señor. "¡Ra-te-ro, ra-te-ro!", expresaron los fanáticos, el sábado pasado, cuando el ahora refuerzo de Dorados de Sinaloa visitó La Fresópolis, donde cayeron 1-0, en choque de la Liga de Ascenso. ¿La razón? Un día antes, la directiva del Irapuato manejó ante los medios locales que no existía ningún adeudo con él, y la afición se la reprochó a Temo su reclamo. "Tendré muchas cosas que me puedan criticar, menos la de ratero, como gritaban algunos aficionados en el estadio", estalló el futbolista, luego de revelar que el Irapuato le debe casi un año de salarios, más primas e intereses, suficiente para desactivar la franquicia fresera y dejarla sin futbol. "Es muy importante que sepa la afición de Irapuato, que este torneo el equipo está jugando, en cierta forma, por permitirles de mi parte diferir la deuda una semana más, ya que si hubiese dado mi negativa, no habrían podido participar en la Liga", aseguró "El Terno", molesto por el manejo que le ha dado la directiva al asunto... Luego de la suspensión de cinco partidos por mostrar dos tarjetas amarillas al mismo tiempo en la final del torneo pasado, el árbitro Marco Antonio "Chiquimarco" Rodríguez volvió a tomar su silbato y lució bien portadito. Su regreso a las canchas en el duelo Pumas-Puebla, disputado en Ciudad Universitaria, estuvo marcado por su buen desempeño, lejos de los arrebatos de protagonismo que lo suelen caracterizar. -Con datos de EFE y Agencia El Universal.

CLEARWATER Program

AVISO DE AUDIENCIAS PÚBLICAS
Informe del Proyecto de Impacto Ambiental / Declaración de Impacto Ambiental

Como parte de un esfuerzo de planificación integral llamado Programa Clearwater, los Distritos Sanitarios del Condado de Los Ángeles (Distritos Sanitarios) han completado un proyecto de Plan Maestro de Instalaciones (MFP, por sus siglas en inglés) para el Sistema de Desagüe Conjunto (JOS, por sus siglas en inglés), un sistema regional de manejo de aguas residuales que sirve a aproximadamente 4.8 millones de personas en 73 ciudades y áreas no incorporadas del Condado de Los Ángeles. El MFP evalúa las necesidades de infraestructura de JOS hasta el año 2050 y hace recomendaciones sobre cómo garantizar la continuación de JOS como un sistema de manejode aguas residuales seguroy economico, que proteja la salud pública y el medio ambiente.

El proyecto recomendado en el MFP incluye la construcción de un nuevo túnel de 7 millas de largo y 18 pies de diámetro para transportar las aguas residuales tratadas de efluentes de la Planta Conjunta de Control de la Contaminación del Agua en Carson hasta el Océano Pacífico de White Point. El nuevo túnel, que unirá a los desagües submarinos existentes en Royal Palms Beach, permitirá la inspección y reparaciones necesarias de los dos túneles ya existentes de flujo completo todos los días y que no han sido inspeccionadas en más de 50 años.

Los Distritos Sanitarios y el Cuerpo de Ingenieros de la Armada de los EE.UU. (Corps) han preparado un proyecto conjunto de Informe de Impacto Ambiental / Declaración de Impacto Ambiental (EIR/EIS) para el Programa Cleanwater del MFP de conformidad con la Ley de Calidad Ambiental de California (CEQA, por sus siglas en inglés) y la Ley de Política Ambiental Nacional (NEPA, por sus siglas en inglés).

Las audiencias públicas se llevarán a cabo durante un período prolongado de 60 días de revisión pública del proyecto EIR/EIS, que termina el 10 de abril de 2012. El Programa Clearwater del MFP y EIR/EIS pueden verse en www.ClearwaterProgram.org.

Los Distritos Sanitarios y Los Corps llevarán a cabo una audiencia pública conjunta para recibir comentarios tanto del proyecto EIR y el proyecto EIS el:

Jueves 8 de marzo de 2012, a las 6:30 pm (Las puertas se abren a las 6:00 pm)
Crowne Plaza Los Ángeles Harbor Hotel
601 South Palos Verdes Street
San Pedro, California

Los Distritos Sanitarios llevarán a cabo dos audiencias públicas adicionales para recibir comentarios sobre el proyecto EIR el:

Martes 6 de marzo de 2012, a las 6:30 pm (Las puertas se abren a las 6:00 pm)
Distritos Sanitarios del Condado de Los Ángeles
1955 Workman Mill Road
Whittier, California

Miércoles 7 de marzo de 2012, a las 6:30 pm (Las puertas se abren a las 6:00 pm)
Centro Comunitario Carson
801 East Carson Street
Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

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ALVAREZ

From A1

crime to falsely claim a military honor. And Alvarez, once he was exposed, was convicted and fined $5,000. Sentencing has been held up while the appeal continues.

Today Alvarez is in state prison but not for that conviction. He was later convicted of defrauding the Three Valleys district when he registered his ex-wife for health benefits.

In the Supreme Court brief, Alvarez's lawyers acknowledged their client sometimes has trouble telling the truth.

"Xavier Alvarez lied," they declare in the first sentence of their Supreme Court brief and go on to recount six separate lies in the next few lines.

He lied when he claimed he played hockey for the Detroit Red Wings, married a Mexican starlet who made paparazzi swoon, was an engineer, rescued the American ambassador during the Iranian hostage crisis and was shot when he went back for the U.S. flag. Alvarez also lied, they said, when he talked about his military service.

But the lies Alvarez told harmed no one, they said, so what he did couldn't be considered fraud.

His lies, "though surely offensive," are still protected as free speech. They were "not obscene, defamatory or libelous," they argued, and did not defraud anyone of money."

They also offered a fallback argument to spare their client. He was a politician, they said, and politicians are known to shade the truth. When Alvarez spoke at the water board meeting, he did so as "an elected official at a public meeting." They said the First Amendment has always given its broadest protection to "political speech."

In defense of the law, U.S. Solicitor General Donald Verrilli Jr. says it "prohibits a narrow category" of false statements that tarnish the special status of military awards. Medals "convey the nation's gratitude for acts of valor and sacrifice," he said, and falsely claiming to have won such a medal is not just an inconsequential "white lie."

A three-judge panel of the 9th U.S. Circuit Court of Appeals in San Francisco struck down the law as an unconstitutional restraint on free speech and said the government might instead invest in an awards database that would make it harder for people to lay claim to medals they never won.

However, last month, the 10th U.S. Circuit Court of Appeals in Denver upheld the law in a separate case, saying the First Amendment does not always protect false statements.

The Associated Press and Tribune News Service contributed to this report.

ROMERO

From A1

saddened by the unfortunate news of the passing of retired Police Chief Joe Romero. My thoughts and prayers go out to his family."

"He was the first Latino to make captain in the Pomona Police Department. He will be remembered for his life-long dedication and love for the city of Pomona," the statement said.

"He truly had a passion for our community and will be sorely missed."

In 2008, there was a controversy over the use of checkpoints that drew criticism from Councilwoman Cristina Carrizosa.

That same year, Romero objected to an account of his rise through the department in a campaign mailer for Mayor Elliott Rothman that gave the impression he had endorsed Rothman.

Rothman said Monday he had nothing to do with that mailer and had "a good professional relationship" with Romero.

There were times when they had saw things from different points of view.

"Those are minor disagreements that are gone and in the past," he said.

Romero's "career itself is stellar and speaks for itself," Rothman said.

"He was a dedicated officer who served the community for decades," Rothman said.

Romero, who retired in December 2008, was a popular police chief who was accessible and always willing to speak with residents.

People like former Mayor Eddie Cortez and Joe Romero "were men cut from the same cloth," said Pomona Unified School District Superintendent Richard Martinez.

"They are icons of Pomona. ... People who represent the best of our community. ... This is a huge loss."

Romero was someone who was interested in children and teens and was always available to support programs for youths, such as the department's Gang Resistance Education And Training Program, through which students learned problem-solving skills and ways to deal with challenging situations, Martinez said.

Romero had a way of quickly establishing relationships with children, even with the shy, introverted ones, said Virginia Madrigal, who began working with him in the mid-1990s and did so more intensely through the Community Engagement Group.

"He had a knack for talking to kids," she said.

"He felt they were our future. It was important to give them opportunities so they wouldn't end up dead in the streets."

He was also a supporter of the Boys & Girls Club of Pomona Valley, where he was a member of the board on various occasions.

At the time he fell ill last year, he was the club's vice president, said Victor Caceres, the executive director.

"He's someone who really cared about the kids," Caceres said.

Romero wanted the club's facilities to be the best they could for its young members and wanted the club to be operated in a professional and transparent manner, Caceres said.

"He was a great mentor for lots of kids and myself," Caceres said.

Romero wasn't afraid of doing what he felt was right, Caceres said.

"Sometimes people will get hung up on is (something) practical, or is it politically correct," Caceres said. Romero always looked at things differently.

He asked, "Is this the right thing to do? Is it the right thing for the kids? Is it the right thing for the community?" Caceres recalled.

As chief of police, Romero was well-regarded among the rank and file.

"He was loved and respected," said Sgt. Jaime Gutierrez, the president of the Pomona Police Officers Association.

He was open to new ideas, Gutierrez said. Sometimes they worked and sometimes they didn't, but he was always willing to try new ways of doing things.

Romero was also in favor of using technology whenever possible, Hunter said.

"He was the first who pushed technology to get information to the community," he said.

Romero was always willing to listen to his officers.

"He was very down-to-earth, and that helped with the lines of communication," Gutierrez said.

Even though he was chief, Romero was also willing to go out on sting operations and would dress as a homeless man or a drunk, which earned him the respect of personnel, he said.

"You usually didn't see management do that," Gutierrez said. "That was something only he did."

The rank and file saw that as a sign he was keeping up with what was going on on the streets and he knew what they faced, he said.

As a boss, Romero was fair, Gutierrez said.

"You knew where you stood with him. He expected the best of his officers," he said.

Romero was also creative.

It was his idea to turn the Civic Center Plaza into the scene of a campout in 2006 with the help of the Community Engagement Group, which consists of residents, members of law enforcement, business people, clergy and others.

The event drew 200 children for an evening of camping games, dancing, meeting young people from around the city and sleeping under the stars, all while interacting with members of the Police Department.

The free event has continued to take place every summer since, each year drawing hundreds of young campers.

"It was extremely important to him to be a chief that was active," Hunter said. "A lot of times chiefs have their hands full just being chief."

Yet somehow Romero found the time to develop a relationship between the community and the Police Department, he said.

Price said Romero was involved in various service organizations.

He was president of the Pomona Breakfast Optimist Club until becoming ill and as a member of Pomona Rotary was recognized as Rotarian of the Year in 2011, said Caceres.

Romero is survived by his wife, Carolyn Romero; two brothers, Michael and Timothy Romero; and a sister, Laurie Silva-Romero.

Funeral arrangements are pending.

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GAS

From A1

in Fontana, knows a thing or two about how gas relates to pizza.

"It's frustrating, definitely," he said of rising fuel costs.

The problem goes something like this: gas price rises; delivery guy has to pay more at the pump; Arvanitis has to raise cost for delivery; customers consume less (or maybe they just make their own pizza); Arvanitis has to cut down on hours for delivery workers because there's less deliveries.

That's no knock on his pizza. It's the reality of the marketplace when gasoline shoots up.

"It's a chain effect," he said. "These gas companies are screwing with us."

By Memorial Day, gas prices could exceed the region's record average high, which occurred on June 22, 2008, when the price for a gallon of regular unleaded gas hit $4.61. If trends continue, we're already on our way to significantly higher prices.

Adam Gottlieb, a spokesman for the California Energy Commission, said California's recent price hikes have been fueled in part by the downtime that's occurring as refineries in the state convert from winter-grade to summer-grade gasoline.

Gas prices in SB-Riverside-Ontario area

(for a gallon of regular unleaded)

- Monday: $4.034
- A week ago: $3.841
- A month ago: $3.717
- A year ago: $3.533
- Highest recorded average price: $4.614

Source: Automobile Club of Southern California

And the price of Alaska North Slope crude, which supplies about 14 percent of California's crude oil, rose about $4.50 over the past week.

"That alone translates to about 11 cents more for the price of gas," Gottlieb said.

It doesn't help that people — like commodities traders — are concerned about international events.

And right now they're fretting about a possible war in the Persian Gulf.

Oil prices are climbing after Iran said it will cut off crude exports to Europe in retaliation for a planned embargo later this year.

But even if nothing happens, the fear that something could happen may end up hiking oil prices anyway, said Ahmed Ispahani, a professor of business administration and economics at the University of La Verne.

"It has a psychological effect, so oil futures are bound to go up," Ispahani said.

Not exactly comforting news to Valerie Liese, who runs Jack Jones Trucking in Ontario.

She, too, is concerned about passing on rising costs of fuel to her customers, whose products travel long distances to get to the customer.

She'll walk into her business today and look at what the average price of diesel is in California and adjust accordingly.

"We have to pay like everybody else," she said.

So do her customers, who themselves are forced to adjust.

For instance, rather than ship out just a few orders in a truck from her fleet, they might hold on to the cargo for a day or two, so it won't cost as much to ship, she said.

Bottom line: The news of rising gas prices puts a dent in some recent good news about the economy.

Finally, Congress got around to passing a payroll tax credit. Too bad Liese's not going to see it.

"It's going to go into my tanks instead," she said.

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SAN DIMAS BENEFIT

Show will benefit HEROES

By Imani Tate Staff Writer

SAN DIMAS — Fritz Coleman, the KNBC-TV weatherman, will don his comedic hat on March 10 and raise money to help fund the San Dimas HEROES Veterans Monument.

Coleman will headline the benefit at the San Dimas Civic Center's Stanley Plummer Community Building.

It begins with a 6 p.m. social hour, followed by the 7 p.m. show.

Jeff and Kimberly Bornstein will open for Coleman.

Tickets are $25 per adult, and all proceeds benefit the Helping Establish a Remembrance Of Every Serviceperson Project.

Military veterans from San Dimas, dating as far back as the Civil War, will have their names inscribed on the monument designed by Eddie Martinez Jr. of EM3 Group and under construction at the northwest corner of San Dimas Avenue and Commercial Street.

Seats are limited. Tickets may be purchased at sandimasheroes.org or by mail order to SD Heroes, P.O. Box 4216, San Dimas 91773.

The social hour will feature free refreshments and no-host drinks.

The evening of comedy will additionally include a live auction.

Donated items for the auction include a certificate for two people to ride on the Goodyear blimp, a ride on the Anheuser-Busch wagon pulled by the brewing company's famous Clydesdale horses during their May 4 visit to San Dimas and four tickets to a taping of "The Tonight Show."

The latter also features a personal tour of KNBC-TV's Burbank studio led by Coleman.

The San Dimas HEROES Project, co-founded by community activist Gary Enderle and businesswoman Janie Graef and involving community, business and school representatives as well as veterans, spearheads the creation of the veterans monument. The nonprofit group operating as a division of the San Dimas

COLEMAN

Community Foundation also led the campaign to establish a military banner program for local residents in the armed forces.

"Fritz had said he'd do a benefit comedy show for the San Dimas veterans monument several months ago, but his busy schedule had prevented him from finalizing the date until recently," Enderle said.

"To say we are thrilled by his enthusiasm and willingness to help is an understatement. He's not just a nice guy. He's a funny guy, so this show should be quite entertaining."

Coleman has become an iconic media man since he joined the KNBC-TV staff in 1982 as a weekend weathercaster.

Since 1984, Coleman has forecast the weekday weather on the 5, 6 and 11 p.m. broadcasts of the Channel 4 news editions.

He worked as a disc jockey and comedian in Buffalo, N.Y., for several years before moving to Los Angeles in 1980.

He devoted his first two years in California to stand-up comedy, performing at such clubs as The Improv and The Ice House and on "The Tonight Show."

Coleman has won four Emmy awards for his work on the NBC comedy specials and series "What A Week," "It's Fritz," "Fritz and Friends" and "The Perils of Parenting."

His communication skills also extend to writing, producing and starring in three one-man plays. His first production, "It's Me! Dad!," won the Artistic Directors Award.

Coleman, 63, won two Humanitarian of the Year awards from Shelter Partnership and the California Hospital Medical Center, in 2004 for his philanthropic and community service.

A third humanitarian honor was given him by the House of Representatives for his fundraising effort for the American Red Cross.

Kimberly and Jeff Bornstein, billed as The Bornstein Experiment, have performed throughout the United States and for armed forces shows in Iraq, Kuwait, Bahrain, Saudi Arabia, Japan, Korea and Germany.

Jeff is an actor, comedian, stuntman and magician who has entertained audiences since he was 12.

An Army veteran who served as a communications specialist, he volunteers and performs at Veterans Affairs hospitals.

Enderle said the community support of the local veterans monument has been "overwhelming."

The 30 project volunteers and friends from every age group have raised $190,000 to date for the monument.

"We've raised $22,000 just standing on the corner of Bonita Avenue and Arrow Highway and conducting Fill the Helmet collections.

"People put coins and bills in the helmet. One woman stopped traffic, got out of her car and came over to hug Carl Harstine," he said, smiling.

"Carl is the World War II Marine who, dressed in full dress uniform during our collections on the street and at community events, has become a symbol of courage and commitment for the project and community.

"The public response has not been limited to adults," Enderle noted. "Students, teachers and staffs at elementary, middle and high schools in San Dimas have raised funds. One little kid's mother drove him to the Fill the Helmet site because he wanted to drop the money from his piggybank into the helmet."

Senior citizens calling themselves "Friends of Sunnyside" because they live in the local retirement complex, made snowman pins, sold them for $3 each and donated the $700 sales proceeds to the monument.

The San Dimas HEROES Project volunteers and supporters feel veterans "who've served our country and protected our freedom should have a fitting remembrance," Enderle concluded.

CLEARWATER
Program

NOTICE OF PUBLIC HEARINGS

Draft Environmental Impact Report/ Environmental Impact Statement

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Whittier, California

Wednesday, March 7, 2012, at 6:30 pm (Doors open at 6:00 pm)
Carson Community Center
801 East Carson Street
Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

R086433

THIS DAY IN HISTORY

Today is the 52nd day of 2012.
There are 314 days left in the year.

In 1862, Nathaniel Gordon, captured at sea with nearly 900 Africans aboard his ship, the Erie, became the first and only American slave-trader to be executed under the U.S. Piracy Law of 1820.

In 1885, the Washington Monument was dedicated.

In 1916, the World War I Battle of Verdun began in France as German forces attacked; the French were able to prevail after 10 months of fighting.

In 1928, The New Yorker magazine made its debut.

In 1945, during the World War II Battle of Iwo Jima, the escort carrier USS Bismarck Sea was sunk by kamikazes with the loss of 318 men.

In 1965, black Muslim leader and civil rights activist Malcolm X, 39, was shot to death inside the Audubon Ballroom in New York by assassins identified as members of the Nation of Islam.

In 1972, President Richard M. Nixon began his historic visit to China as he and his wife, Pat, arrived in Beijing.

In 1973, Israeli fighter planes shot down Libyan Arab Airlines Flight 114 over the Sinai Desert, killing all but five of the 113 people on board.

In 1992, Kristi Yamaguchi of the United States won the gold medal in ladies' figure skating at the Albertville Olympics; Nancy Kerrigan of the U.S. won the bronze.

Ten years ago: The State Department declared that Wall Street Journal reporter Daniel Pearl was dead, a month after he'd been abducted by Islamic extremists in Pakistan. President George W. Bush failed to persuade China to halt sales of missile technology. In Salt Lake City, U.S. figure skater Sarah Hughes jumped from fourth to first to win the gold after a near-flawless performance, leaving teammate Michelle Kwan to settle for a bronze.

Five years ago: British Prime Minister Tony Blair announced his country would withdraw around 1,600 troops from Iraq in the coming months.

— The Associated Press

LOTTERY

Info? Call 800-568-8379

MONDAY

Daily 3 Midday: 1, 0, 3

Daily 3 Evening: 6, 9, 7

Daily 4: 4, 1, 2, 0

Fantasy 5: 9, 14, 16, 25, 33

Daily Derby:
1st: 8, Gorgeous George
2nd: 1, Gold Rush
3rd: 12, Lucky Charms
Time: 1:47.83

SATURDAY

Super Lotto Plus: 1, 19, 32, 41, 42

Mega number: 11

Jackpot: $13 million
$14 million is up for grabs in Wednesday's game.

What's a ticket worth?

Five numbers:	$10,313
Four+mega:	$1,933
Four numbers:	$126
Three+mega:	$61
Three numbers:	$11
Two+mega:	$11
One+mega:	$2
Mega only:	$1

Sean Hiller Staff Photographer

LONG BEACH. SIBLING RIVALRY

Kaira Gaxiola, 12, left, watches her sisters Xochitl Castro, 10, center, and Karla Castro, 9, wield their rackets in a battle for the ball as they play at Recreation Park on Monday in Long Beach.

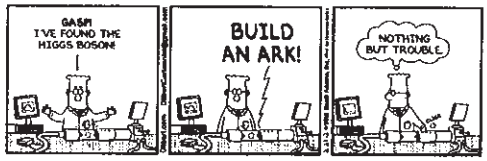
TODAY'S BIRTHDAYS

Zimbabwe President **Robert Mugabe** is 88. Movie director **Bob Rafelson** is 79. Actor **Gary Lockwood** is 75. Actor-director **Richard Baymer** is 73. Actor **Peter McEnery** is 72. U.S. Rep. **John Lewis**, D-Ga., is 72. Film/music company executive **David Geffen** is 69. Actor **Alan Rickman** is 66. Actress **Tyne Daly** is 66. Actor **Anthony Daniels** is 66. **Tricia Nixon Cox** is 66. Sen. **Olympia J. Snowe**, R-Maine, is 65. Rock musician **Jerry Harrison** (The Heads) is 63. Actress **Christine Ebersole** is 59. Actor **William Petersen** is 59. Actor **Kelsey Grammer** is 57. Country singer **Mary Chapin Carpenter** is 54. Actor **Jack Coleman** is 54. Actor **Christopher Atkins** is 51. Rock singer **Ranking Roger** is 51. Actor **William Baldwin** is 49. Rock musician **Michael Ward** is 45. Actress **Aunjanue Ellis** is 43. Blues musician **Corey Harris** is 43. Country singer **Eric Heatherly** is 42. Rock musician **Eric Wilson** is 42. Rock musician **Tad Kinchla** (Blues Traveler) is 39. Actress **Jennifer Love Hewitt** is 33. Singer **Charlotte Church** is 26. Actress **Ellen Page** is 25. Actor **Corbin Bleu** is 23.

— The Associated Press

TIM GROBATY
... has the day off.

DILBERT Scott Adams



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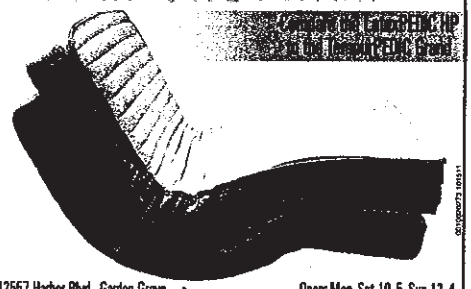

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SAN MANUEL SAT 20 30 6:15 PM 6:30 PM 7:30 PM 7:45 PM 8:00 PM
SPOTLIGHT 29 THU SAT SUN FRI SUN 20 35 6:15 PM 6:30 PM 7:15 PM

PALACE CASINO COMPTON Rite - Aid
EVENINGS
THU FRI SAT SUN 10 FREE $20 SLOT PLAY 7:00 PM
FANTASY SPRINGS SUNDAY 20 35 FREE PLAY
GARDENA BUS DEPOT 13810 S. Western 5:05 PM
LOS ANGELES 5:15 PM
CARSON 5:25 PM
LONG BEACH 6:00 PM
LAKEWOOD 6:30 PM
BUENA PARK 7:00 PM

CLEARWATER Program

NOTICE OF PUBLIC HEARINGS

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Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

CITY BEAT

£086433

ADVISORIES

*72 phone scam re-emerges

An old phone scam is new again, and is leaving consumers with high phone bills, according to the Los Angeles County Sheriff's Department. The scam begins when an unknown person calls a victim pretending to be a law-enforcement officer or medical personnel. The imposter tells the victim that his or her child or other loved one has been hurt in an accident or incarcerated. The imposter then tells the victim to call a law-enforcement agency or hospital for more information; the imposter gives a phone number that is preceded by *72.

By dialing *72 and the phone number, you have activated your call forwarding to the imposter's phone number. The imposter can then use your account to make collect or long-distance calls.

Do not make any calls to any phone number beginning with *72. If you do receive such a call, report it to your phone company or to the California Public Utilities Commission's consumer hotline at (800) 649-7570.

To check on your loved one, call the law-enforcement agency or medical facility directly.

Comment period open

The draft environmental impact report for the Clearwater Program's master facilities plan is available for review through April 10. The review period began Feb. 10. Comments on the draft plan can be sent to: Steven W. Highter, Supervising Engineer, Planning Section, Sanitation Districts of Los Angeles County, 1955 Workman Mill Road, Whittier, CA 90601.

The master plan is for the joint outfall system, a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas in L.A. County.

The plan includes repairs of two 6-mile-long tunnels that run from the Joint Water Pollution Control Plant in Carson to the Palos Verdes Peninsula and Royal Palms Beach, and construction of a third tunnel to the existing ocean outfalls.

Potential significant impacts are: aesthetic impact of 20-foot barriers temporarily erected at JWPCP and Royal Palms; air quality and greenhouse gas impacts during construction; and cultural resource impacts brought on by disturbing or destroying unique paleontological resources during tunneling and shaft construction.

PALOS VERDES LIBRARY DISTRICT

Trustees change meeting time

The Palos Verdes Library District board of trustees has decided to move the date of its regular monthly meeting to 7 p.m. on the third Thursday of each month beginning on March 19.

The change was suggested by newly elected trustee Debby Stegura, who noted that the only other elected body serving the Peninsula as a whole, the Board of Education, meets on the second and fourth Thursdays of each month creating a conflict for residents who might wish to attend the meetings of both bodies and making collaboration between the boards of the library and school districts more difficult.

Trustee meetings take place in the Community Room at Peninsula Center Library unless otherwise noticed. Agendas and minutes are available for viewing on the PVLD website at http://www.pvld.org/about/trustees/meetings.

Living history

The third annual Living History Museum of African-American Heroes will exhibit at the Peninsula Center Library Community Room on Tuesday, Feb. 28 at 6 p.m. The library and its co-sponsors invite first- through eighth-graders to celebrate Black History Month by joining the fun. Participants will tell their heroes' stories by researching their lives and accomplishments. Then, at the Living History Museum, participants become their idol by wearing a costume and speaking to visitors to the museum as if they were the hero themselves.

For more information or to sign up to be a hero, call Young Readers Librarian Laura Henry at (310) 377-9584, ext. 206.

PALOS VERDES PENINSULA UNIFIED SCHOOL DISTRICT

Decathlon's top scorer

The top individual scorer overall at the Los Angeles County Academic Decathlon was David Wang, a senior at Peninsula High School, who tallied 8,357 points out of a possible 10,000. He was followed by Lisa Beckmann, a West High School senior who scored 8,273 points, and Luke Murphy, a Redondo Union High School sophomore who scored 8,168.

Other top scorers from Peninsula were: Jessie Chen, second place, Honors; Rachel Tosney, third place, Honors; Moonul Choi, first place, Varsity; Amie Kim, second place, Scholastic. Wang also took first place, Honors.

The team also includes Isobel Farias, Simon Fung, Christine Jung, Brian Kim and Christine Rowghani.

CITYBEAT A3

The Bernina Express is train travel paradise for 45 minutes

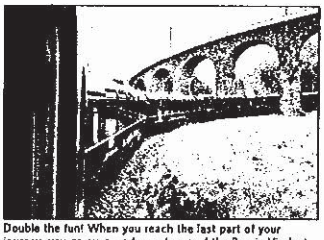
By John Clayton
Special to the News

JOHN CLAYTON
TRAVEL WITH A DIFFERENCE

What's the most magically memorable train trip you've ever taken?

Mine was a few years ago when I rode the Bernina Express in sunny, snow-laden Switzerland on the Bernina line section that runs from St. Moritz to the charming Italian town of Tirano. Although the entire journey is a train lover's nirvana, I thought the most mesmerizing section was the 45-minutes from Pontresina to Porshlavo. During the fascinating trip to the top of the Bernina Pass you'll discover a marvelous mix of landscapes that is bewitching and totally captivating. So much so, that it made me want to constantly jump off of the train and sample the beguiling beauty before me.

Some of the areas that slipped slowly by, reminded me of a Scottish Moor, where rocks are strewn here and there, as if thrown around higgledy piggeldy by some giant mad at the world — then, as all that seemed to disappear in a momentous moment, I got the feeling that it was as if this was a multi-scene stage play where there are constant scene changes in front of you — and you wonder how they do it so fast. To validate that, in the next second I saw a herd of sleepy looking brown cows grazing in a field so fresh, green and serene, I felt sure it must have been either a make-believe movie set, or that it had been painted by some great Italian artist. I'd hardly been able to digest all this peaceful serenity, when my eyes became riveted to the sight of seemingly countless rushing, crashing streams and waterfalls that dot the mountain scenery.



Double the fun! When you reach the last part of your journey, you go over, under and around the Brusio Viaduct. If you get your seat at the back of the Bernina Express, you'll be able to photograph the train as it doubles back on itself. Here, we are just about to go under a section of track that we passed seconds before.

The hilly, towering craggy peaks in the background were, the day I rode it, ablaze with whiter than white snow sparkling like a thousand and one diamonds in the morning sunlight. While all this stunning scenery *does* indeed captivate the senses, the other fact that amazes virtually everyone who enjoys this incredible train trip, is that as steep as it is, there are no rack and pinion sections of the track. Brilliant Swiss railroad engineers designed it so skillfully that this type of track was not needed. You appreciate that fact when you arrive at the 7,400-foot level and the train comes to a halt at the Alp Gum station. Should you wish to do something really different, get off and engage in some challenging and exciting hiking.

The train then descends into the Poshavio Valley on the other side, where sweeping vistas of lakes, snow and verdantly green and virgin-looking forests gripped my visual senses — and I wondered how Mother Nature was able to come up with so many amazing sights. Certainly the most eye-popping, is when the train twists and turns and doubles back on itself, as it traverses the Brusio Viaduct — a superb place for photo buffs to photograph this amazing train many times over. Just be sure you're in one of the carriages that allow you to open the window. See all this magic yourself at www.rhb.ch or visit Google and search Bernina Express for a variety of websites about this Swiss super train. Also visit My Switzerland.com.

When the train finally arrives in the Italian town of Tirano, you are suddenly confronted with the reality that the train ride of your lifetime has ended. If you never take another trip anywhere, I urge you to visit Switzerland and enjoy this most fantastic of all trains.

John Clayton is a freelance writer.

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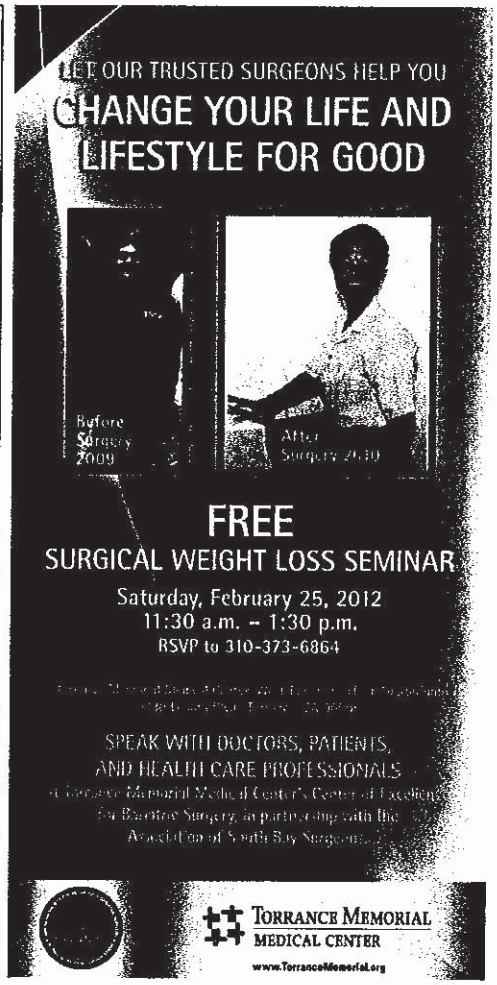
SANITATION DISTRICTS OF LOS ANGELES COUNTY



R036433

Montebello considers team-building deal

Personality conflicts on council spur idea to focus on goals

By Ben Baeder Staff Writer

MONTEBELLO — A City Council marked by shouting, 10-minute diatribes and bitter disagreements is considering hiring a team-building company to help council members get along.

The council is scheduled to decide on the proposal at Wednesday's meeting.

Personality conflicts aside, the city cannot afford to go without goals and a concrete economic strategy because of infighting, said Mayor Frank Gomez, who proposed hiring a team-building firm.

And while at least one council member is balking at the cost of the exercise — more than $7,000 — Gomez said city finances are a big reason greater cooperation is necessary.

"I don't think you should be living from paycheck to paycheck," Gomez said. "It's not good for a city to live that way."

If anything, the team-building will help the council take an honest look at the city's finances and move forward with spending priorities in mind, Gomez said.

"We need to make goals, stick to them and not let them get pushed aside," he said.

The team-building workshop would be designed to build trust, set goals, find common ground and identify obstacles, according to a report prepared for Wednesday's City Council meeting. It would be open to the public and take place within the next few months.

In general, the council votes 4-1 on controversial spending issues, with Councilwoman Christina Cortez dissenting.

But Gomez said the problems in Montebello go much deeper than any disagreements with Cortez.

"Our group of five, and previous councils, have found it difficult to work together," he said. "And it's kind of endemic to Montebello, and it has been for years."

The city's staff has recommended hiring RJA Management Services of Arcadia to coordinate team building and goal setting.

RJA's bid came in at $7,105.

Cortez in January voted in favor of taking bids for team-building, but on Monday she wondered if the council should be spending the money.

The city should stop all new spending and build up reserves, she said. After spending in deficits for years, Montebello this year is operating on a razor-thin $600,000 surplus in its $44 million budget.

The time would be better spent going over finances, instead of in a team-building workshop, Cortez said.

"Now I think we should just save our money," Cortez said. "And we should look at ourselves professionally as a council and start acting like professionals."

Cortez, who was re-elected in November after first winning a seat in a 2010 recall election, has become the odd woman out at council meetings.

On Feb. 8 Cortez, who is mayor pro tem, started a meeting while Gomez stood in the hallway talking with other city officials. Cortez said Gomez was taking too long to start the meeting.

A clearly flustered Gomez hustled to his seat and explained he was having an important conversation that couldn't wait.

Cortez a few minutes later said she wasn't comfortable with some of the discussions they were having in closed session regarding City Attorney Arnold Alvarez-Glasman.

Gomez tried to get her to be quiet, and then the rest of the City Council jumped into the Pledge of Allegiance while Cortez was still talking.

Cortez said she is frustrated by what she said are constantly changing budget numbers, pointing out that the Secretary of State, the U.S. Department of Housing and Urban Development and the FBI have all launched investigations into Montebello's finances.

RJA Management Services President Richard Garcia said there is no denying that lack of trust and fundamental disagreements are often part of city politics.

"You have to agree to disagree," Garcia said. "That's just respect."

But members of a council will likely have basic things in common, too, he said.

"You're going to find areas where they do agree," he said. "And you have to focus on that."

Ideally, a facilitator will diagnose the disagreements and then figure out what options are in play, he said.

As for Gomez, he said $7,105 is a small price to pay to start building a strategy.

"This has to be better," he said. "There really is no option."

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Making the town bike-friendly

Youth group helps with Baldwin Park's goal of safe streets

By Maritza Velazquez
Staff Writer

Watchara Phomicinda Staff Photographer
Eric Avila, left, Jorge Rodriguez, both 13, ride their bikes near the Danza Indigenas monument in Baldwin Park on Thursday evening. Cyclertopia, a youth leadership group, has been instrumental in bringing more bike-friendly policies to Baldwin Park.

BALDWIN PARK — A generation of children regularly choosing television, video games and computer screens over outdoor activities, contributes to a nationwide obesity epidemic.

But Baldwin Park officials want to change that. They say the first step is to create a safe environment for pedestrians and bicyclists.

The concerns prompted councilmembers in August to pass a Complete Streets policy, a comprehensive set of guidelines that ensure that all new construction and improvements to city streets are made to better accommodate those who bike and walk in Baldwin park. The policy was facilitated through a $240,000 federal grant. Now local youths are joining in on the effort.

The Baldwin Park Cycler Leadership Pilot Program, funded by the California Center for Public Health Advocacy, presented the City Council last week with results of a bike audit, which provided an assessment of unsafe biking conditions in the community.

As part of the assessment, the youths recommended various changes and upgrades to city streets that could be made in the implementation of the Complete Streets policy.

"In support of (the Complete Streets) policy, our goal was to have these kids get involved with a street assessment and street audit so they can provide their perspective on what should be upgraded, improved upon and how we can build upon the capacity of the streets," said Javier Hernandez, who leads the program.

City staff and roughly a dozen youths embarked on an 8.5-mile route through city streets to evaluate signage, road conditions and traffic challenges in the area, stopping at four different locations to log their findings.

"These kids gained empowerment," Hernandez said. "They now have an understanding of the process when a city takes into account community input. They also have a greater understanding of the rights of cyclists in general."

The group discovered that several bicycle route signs were covered by trees and bushes, that Olive Street doesn't have bike lanes, through it does have the space for them and Clark Street is too narrow for bicycles to safely travel alongside traffic.

Vanessa Escalante, 15, participated in the bicycle audit and said she hopes that one day Baldwin Park can be as bike-friendly as communities such as Long Beach, where bicycle lanes are wider and safer than in Baldwin Park.

"I hold Baldwin Park to that same standard," the Baldwin Park High School student said. "I enjoy going everywhere on my bike, but when there are no bike lanes, I'm kind of limited to where I can go."

City officials hope that the improvement of city streets will help improve the overall health of residents, especially amid an obesity epidemic that now classifies 17 percent of the nation's youth and 33 percent of the country's adults as obese, according to the Centers for Disease Control and Prevention.

"It's all based on encouraging residents to walk more, use bicycles to get to different destinations and to create safer routes for them and children to feel safe to use the streets for a transportation mode," City Councilwoman Marlen Garcia said.

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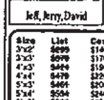

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CLEARWATER Program

NOTICE OF PUBLIC HEARINGS

Draft Environmental Impact Report/ Environmental Impact Statement

As part of a comprehensive planning effort called the Clearwater Program, the Sanitation Districts of Los Angeles County (Sanitation Districts) have completed a draft Master Facilities Plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas of Los Angeles County. The MFP evaluates the infrastructure needs of the JOS through the year 2050 and makes recommendations on how to ensure the continuation of the JOS as a reliable and cost-effective wastewater management system that is protective of public health and the environment.

The recommended project in the MFP includes the construction of a new 18-foot diameter, 7-mile long tunnel to convey treated wastewater effluent from the Joint Water Pollution Control Plant in Carson to the Pacific Ocean off of White Point. The new tunnel, which would tie into existing ocean outfalls at Royal Palms Beach, would allow for inspection and any necessary repairs of two existing tunnels that flow full every day and have not been inspected for over 50 years.

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Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

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Carson Community Center
801 East Carson Street
Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

R086433

Rusnak exec running for Assembly

Car dealership president enters 41st District race

By Brian Charles Staff Writer

RUSNAK

PASADENA — Victoria Rusnak, the president and chief counsel of the Rusnak car dealership, has thrown her hat in the ring for the 41st Assembly District race.

Rusnak, a Democrat who filed papers to run last week, said her campaign will focus on business growth and expanding educational opportunities for residents in the district, which stretches from Pasadena to Rancho Cucamonga and includes Monrovia, San Dimas and Claremont.

"As a business person, I want to offer some alternatives to what we are hearing in Sacramento, focusing on the economy, education and the environment," Rusnak said. "We have to find solutions to help business grow, so they can get capital ... expand and hire."

Rusnak, who has been involved in nonprofit work ranging from Ronald McDonald House to the Armory Center for the Arts, entered a crowded field seeking the seat.

Pasadena Councilman Chris Holden and South Pasadena Mayor Michael Cacciotti join Rusnak as Democrats in the race. On the Republican side, Tea Party activist Donna Lowe of Claremont has declared she is running.

All four will find themselves in an open primary battle in June. The top two candidates, regardless of party, will advance to the November general election.

Rusnak graduated USC, earned her law degree from Gonzaga University and has a master's degree from George Washington School of Law, has worked for the Sierra Club Legal Defense Club in Washington, D.C., and spent time with the National Oceanic and Atmospheric Administration.

Rusnak insists that her experiences "are not mutually exclusive" but remained tight-lipped about the exact point where her interests intersect.

"You have to balance the needs of business and the economy with protecting the environment," she said, promising to address the issue more specifically during her campaign.

As the region crawls back from the recession, Rusnak said educating residents will play a vital role in the recovery. Her emphasis remains on supporting teachers and not institutions.

"We need to make sure we are compensating our teachers," she said. "We need begin fueling teachers rather than bureaucracies."

Rusnak enters the race six months after Holden and nearly two months after Cacciotti but said she remains confident that she can perform well against the two seasoned politicians.

"I see mediocrity in the candidates and their unwillingness to make hard choices," Rusnak said. "They need to be willing to cut where necessary and be willing to spend where it will benefit the state in the long term."

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AROUND THE VALLEY

LA VERNE

Bonita High students will perform at Fox Theater

The Bonita High School Jazz Ensemble will bring the sounds of the Big Band Era to Pomona's Fox Theater next month as part of a fundraising effort.

The Jazz Ensemble will be accompanied by the Bonita High Chamber Singers for their annual "Swingin' with the Big Bands" gala March 3.

The event begins at 6 p.m. with a social hour and a non-alcoholic bar, followed by a catered dinner, and then music and dancing.

A silent auction and raffle drawings will be held throughout the evening.

Tickets to the event can be purchased online at shop.lvbba.org. Prices start at $25. All proceeds benefit the Bonita High School band and color guard.

DIAMOND BAR

Public invited to take tour of new City Hall

The community is invited today to take a tour of Diamond Bar's new City Hall, which officially opened for business last month.

The opening marked the first time in its 22-year history that the city is operating from its own building.

Employees formerly worked out of a South Coast Air Quality Management District complex that the city shared with the agency.

Diamond Bar purchased its new building at 21810 Copley Drive in September 2010 with the dual goal of addressing space needs for city operations and creating a new home for the nearly 40-year-old library branch.

The building's first floor and future library site will not be open for tours today because it is still under construction. Completion is expected this summer.

With 27,000 square feet of space, the second floor houses all city government service functions, a team of Los Angeles County Sheriff's Department personnel and an Emergency Operations Center. It also features a large public service counter and several meeting rooms.

City Hall's open house will take place from 4 to 6:30 p.m. today. For more information, contact Diamond Bar's public information office at 909-839-7055.

ROSEMEAD

Talent show auditions scheduled for youths

Youths ages 12 to 18 are invited to audition for the 11th Annual Got Skills! Talent Show set for May 11. The event serves to promote the idea that youths can have fun without alcohol, tobacco and other drugs.

Auditions for musicians, dancers, actors, poets and other artists will be held from 3:30 to 5 p.m. March 14 and from 3:30 to 6 p.m. March 20 and 29. They will be held at the Asian Pacific Family Center clubhouse, at 9353 E. Valley Blvd.

There will be raffle prizes for attendees and cash prizes for contestants — First Place $200; Second Place $100; Third Place $50.

To register for an audition date or for more information, contact Nancy Trinh at 626-287-2988, ext.154 or sgvandyouthcouncil@yahoo.com.

From staff reports

Tribune on vacation

Beulah Graham and Barbara Roddy of West Covina take the Tribune to Lunenburg, Nova Scotia, part of which is an UNESCO World Heritage Site.

Take a photo with the San Gabriel Valley Tribune at a landmark. Identify those pictured by name and hometown. Mail to 1210 N. Azusa Canyon Road, West Covina, CA 91790, or email the image in JPEG format to news.tribune@sgvn.com. Send a copy, because photos can't be returned.

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SANITATION DISTRICTS OF LOS ANGELES COUNTY

R086433

AROUND WHITTIER

MONTEBELLO

Lecture today will cover heart health

Beverly Hospital is offering a free lecture about heart health at 2 p.m. today in the hospital's Tower Basement Rooms, 309 W. Beverly Blvd.

The discussion will cover heart disease, risk factors and lifestyle changes necessary to lower risk.

Learn how to boost your metabolism while lowering blood pressure and cholesterol.

The presentation will be given by Gary P. Rivas, a clinical dietitian at the hospital.

For information or reservations, call 800-618-6664.

WHITTIER

Granada Middle School sets fundraiser at KFC

Granada Middle School will host a KFC fundraiser from 4 to 9 p.m. today at KFC, 16161 Leffingwell Road.

Granada will receive 20 percent of all pre-tax sales when KFC is presented with a fundraiser flier.

To download a flier, visit www.facebook.com/kfcsocal or http://ewcsd.org/schools/granada.

For more information, contact Lorie Bliss at nicsroom@verizon.net or Richard Hopkins at rhopkins03@verizon.net.

WHITTIER

Public library sets silent book auction

Whittier Public Library is conducting its silent book auction for the month of February.

The following books are available:

- "The Beth Book" by Sarah Grand
- "Whittier's Poems" by John Greenleaf Whittier
- "Citas del Presidente Mao Tsetung"
- "The Song of Our Syrian Guest" by William Allen Knight
- "The Bumble Bee Prince" by Saul Lancourt
- "The Second World War," six volumes by Winston S. Churchill, minimum bid: $50
- "The Complete Tales of Winnie-the-Pooh" by A.A. Milne, minimum bid: $15

The books are displayed in the library's entrance and bidding will close Feb. 29.

Auction proceeds are used for the purchase of library materials, equipment and activities, such as special children's programs and after-school activities.

For information, call the library at 562-567-9900.

PICO RIVERA

American Legion will serve dinner fundraiser

American Legion Auxiliary Unit 341 will host a fish fry dinner at 4 p.m. Thursday at its post, 4909 S. Durfee Ave.

Dinner will include creamed spinach, corn, salad and dessert.

The cost is $6 per plate.

Live entertainment will be provided by DJ Carlos.

For more information, call the post at 562-695-1558.

LONG BEACH

Whittier resident receives Cal State scholarship

Whittier resident Amanda Erin Aguilar, a nursing major at Cal State Long Beach, won a $2,000 scholarship for an essay in "BrainTrack," a worldwide university and college directory.

Her essay gives advice about studying, entering a nursing program, and preparing for a nursing career.

For information, call CSULB's office of public affairs at 562-985-4134.

WHITTIER

AAUW to honor 'Las Distinguidas'

Nominations are being sought by the Greater Whittier Branch of the American Association of University Women for the Las Distinguidas award, to be presented in April.

The awards are given to women who have made significant contributions in business, the arts, education, community service, politics or a profession.

The deadline for nominations is Feb. 29.

For information, contact Gwen Woirhaye at 562-696-6405 or gwen@woirhaye.com.

Send submissions for "Around Whittier" to news.wdn@sgvn.com.

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Daily News on vacation

Top row, from left, Dawn McCaffer, Nick McCaffer, Chuck Giesler, Carolyn Giesler, Amy Abell, Joe Abell and Grady Abell, and, bottom row, Ryan Abell, Gavin McCaffer and Austin Abell of Whittier take their hometown newspaper to The Polar Express in Williams, Ariz.

Take a photo with the Whittier Daily News at a landmark. Identify those pictured by name and hometown. Mail to Tim Traeger, 7612 Greenleaf Ave., Whittier, CA 90602, or email the image in JPEG format to news.wdn@sgvn.com. Send a copy, because photos can't be returned.

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SENIOR NOTES

REGION

Complimentary activities on behalf of CareMore

Enjoy a complimentary movie from noon to 3 p.m. today at La Mirada Starplex, 15269 Rosecrans Ave.

Complimentary haircuts will be given from 11 a.m. to 3 p.m. Wednesday at Haircrafters, 2070 W. La Habra Blvd.

Ivy Nails, 10255 Colima Road #1 in Whittier, will offer complimentary hand spas from 10 a.m. to 1 p.m. Wednesday, Feb. 29.

Friendly Hills Barber Shop, 15236 Whittier Blvd., will give haircuts Thursday.

For information, call CareMore at 877-211-6614 or visit www.caremore.com.

WHITTIER

Coffee, bingo offered for seniors at St. Gregory's

St. Gregory's Senior Center, 13935 Telegraph Road, meets from 9:30 a.m. to 1:30 p.m. Mondays.

Meetings include coffee and doughnuts, five games of bingo, five games of 50-50, a raffle, and birthday and anniversary celebrations.

Once a month, the senior center offers a potluck.

Membership is open to seniors 55 years and older.

For more information, contact Manuel Guerena, president, at 562-946-2098 or Gil Aguinaga, chairman, at 562-698-4450.

WHITTIER

Palm Park seniors scheduled to take trips

Palm Park seniors presents its 2012 Pac N Go tours beginning with "Gastronomy and Gaming" on March 7.

The event includes a Grandiose Gourmet luncheon, deluxe transportation to Santa Barbara and a trip to Chumash Casino.

The cost is $60 per person.

The club is also offering "Rail Fest at Fillmore" on March 24.

The event will include a ride aboard a vintage Fillmore and Western Railway, lunch and arts-and-crafts booths.

The cost is $70 per person.

Reservations are required.

For information or registration, contact Lydia Juarez at 323-728-3881 or Delia Romero at 323-728-7748.

LA MIRADA

Half Century Club will visit San Manuel Casino

The La Mirada Half Century Club will visit San Manuel Casino on March 14.

The cost is $8 per person.

The club will also visit Laughlin from April 10-12.

The cost is $108 per person, double occupancy; or $125 per person, single occupancy.

Two buffets are included with payment.

Trips are scheduled to leave from La Mirada Activity Center, 13810 La Mirada Blvd.

For information, contact Pam Shields at 562-947-7064.

Send submissions for "Senior Notes" to news.wdn@sgvn.com

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4'x4'	$470	$220	$75	$295
5'x3'	$461	$205	$75	$280
5'x4'	$504	$240	$75	$315
6'x3'	$560	$230	$75	$305
6'x4'	$585	$270	$75	$345
6'x5'	$661	$310	$75	$385
		$1,878 +	$676 =	$2,650

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CLEARWATER Program

NOTICE OF PUBLIC HEARINGS

Draft Environmental Impact Report/ Environmental Impact Statement

As part of a comprehensive planning effort called the Clearwater Program, the Sanitation Districts of Los Angeles County (Sanitation Districts) have completed a draft Master Facilities Plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas of Los Angeles County. The MFP evaluates the infrastructure needs of the JOS through the year 2050 and makes recommendations on how to ensure the continuation of the JOS as a reliable and cost-effective wastewater management system that is protective of public health and the environment.

The recommended project in the MFP includes the construction of a new 18-foot diameter, 7-mile long tunnel to convey treated wastewater effluent from the Joint Water Pollution Control Plant in Carson to the Pacific Ocean off of White Point. The new tunnel, which would tie into existing ocean outfalls at Royal Palms Beach, would allow for inspection and any necessary repairs of two existing tunnels that flow full every day and have not been inspected for over 50 years.

The Sanitation Districts and the U.S. Army Corps of Engineers (Corps) have prepared a joint draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Clearwater Program MFP pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Public hearings will be conducted during the extended public review period for the draft EIR/EIS, which ends on April 10, 2012. The Clearwater Program MFP and EIR/EIS can be viewed at www.ClearwaterProgram.org.

The Sanitation Districts and the Corps will hold a joint public hearing to receive comments on both the draft EIR and draft EIS on:

Thursday, March 8, 2012, at 6:30 pm (Doors open at 6:00 pm)
Crowne Plaza Los Angeles Harbor Hotel
601 South Palos Verdes Street
San Pedro, California

The Sanitation Districts will be conducting two additional public hearings to receive comments on the draft EIR on:

Tuesday, March 6, 2012, at 6:30 pm (Doors open at 6:00 pm)
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California

Wednesday, March 7, 2012, at 6:30 pm (Doors open at 6:00 pm)
Carson Community Center
801 East Carson Street
Carson, California

SANITATION DISTRICTS OF LOS ANGELES COUNTY

Appendix 3-A

PROJECT CONSTRUCTION EQUIPMENT LIST

Appendix 3-A
PROJECT CONSTRUCTION EQUIPMENT LIST

Table 1. Project Equipment List

Equipment	Description/Function
Shaft Construction	
Crane	A hoisting device used to lift, lower, and move laterally the heavy equipment and supplies into and out of the shaft
Excavator	A machine used to dig out and transport loose soils
Loader	Equipment used to load excavated soils, debris, and supplies into other machinery
Grader	Vehicle used to create a wide flat terrain surface
Water truck	Vehicle used to transport and diffuse water for dust control and soil compaction
Worker truck	Vehicle used to transport workers, parts, and equipment in and out of the shaft site
Concrete truck	Vehicle used to transport and mix the cement and aggregate used to form concrete
Dump truck	Vehicle used to transport excavated soils, debris, and other materials out of the site
Street sweeper	Vehicle used to for road cleaning and trash removal
Tunnel Boring Machine Assembly	
Crane	A hoisting device used to lift, lower, and move laterally the heavy equipment and supplies into and out of the assembly site
Fork lift	Vehicle used to transport heavier equipment and other supplies around the assembly site
Worker truck	Vehicle used to transport workers, parts, and equipment in and out of the assembly site
Tunnel Construction	
Crane	A hoisting device used to lift, lower, and move laterally the heavy equipment and supplies into and out of the construction site
Loader	Equipment used to load excavated soils, debris, and supplies into other machinery
Forklift	Vehicle used to transport heavier equipment and other supplies around the project site
Street sweeper	Vehicle used to for road cleaning and trash removal
Water truck	Vehicle used to transport and diffuse water for dust control and soil compaction
Worker truck	Vehicle used to transport workers, parts, and equipment in and out of the project site
Supply truck	Vehicle used to transport tunnel liner segments and other construction material to the site
Dump truck	Vehicle used to transport out and dispose the excavated and cut material resulting from tunnel construction and site preparation out of the site
Tunnel boring machine	A machine used to excavate tunnels through a variety of soils
Locomotive and railcar	Railway vehicle used to transport excavated soil, workers, and supplies through the tunnel
Riser/Diffuser Assembly and Construction	
Crane	A hoisting device used to lift, lower, and move laterally the heavy equipment and supplies into and out of the construction site
Forklift	Vehicle used to transport heavier equipment and other supplies around the assembly site
Worker truck	Vehicle used to transport workers, parts, and equipment in and out of the project site
Supply truck	Vehicle used to transport tunnel liner segments and other construction material to the site

Appendix 5-A

FEDERAL CONFORMITY EVALUATION

Appendix 5-A
FEDERAL CONFORMITY EVALUATION

Introduction

This conformity evaluation is in response to Impact AQ-5, which asks if the program/project would conform to the United States Environmental Protection Agency (EPA) -approved state implementation plan (SIP) and thus not exceed de minimis thresholds.

The general conformity rule ensures that federal actions comply with the national ambient air quality standards (NAAQS). In order to meet Section 176(c) of the Clean Air Act (CAA), a federal agency must demonstrate that every action that it undertakes, approves, permits, or supports will conform to the appropriate state implementation plan (SIP). The conformity evaluation ensures that projects using federal funds or requiring federal approval not (1) cause or contribute to any new violation of a NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone.

The conformity evaluation is required for Alternative 4 (Project), the recommended alternative, for which a Department of Army permit from the United States Army Corps of Engineers (Corps) would be required (Corps 2011). A conformity analysis is not applicable to Alternative 4 (Program) because none of the program elements would require federal action. Both direct and indirect emissions must be considered in the conformity evaluation. The EPA considers direct emissions as emissions that are reasonably foreseeable and indirect emissions as those emissions that the federal agency can practically control and for which the agency has continuing program responsibility.

Figure 1 indicates in red those project elements that are subject to the Corps permitting authority. Based on guidance for the implementation of the General Conformity Rule for regulatory permits, dated April 20, 1994 (Attachment A), the Corps concluded that emissions from the construction of these elements would be considered as direct emissions in the general conformity evaluation. Under Alternative 4, project elements subject to the conformity evaluation include rehabilitation of the existing ocean outfalls, which are located seaward of the proposed Royal Palms shaft site. Once these project elements are rehabilitated, they in and of themselves would not generate additional air emissions as their sole purpose is to convey treated effluent into the marine environment. Therefore, there would be no indirect emissions associated with these project elements. Furthermore, the Corps permit is only applicable to construction activities. Upon completion of the rehabilitation, the Corps would not maintain a continuing program responsibility over these project elements.

The conformity evaluation process is subdivided into three phases: applicability analysis, conformity determination, and review process (Code of Federal Regulations [CFR] Title 40, Parts 51 and 93).

Applicability

Applicability of the conformity programs is limited to areas designated as nonattainment under Section 107 of the CAA and maintenance areas established under Section 175A of the CAA. Therefore, only actions that cause emissions in designated nonattainment and maintenance areas are subject to the regulations. In the applicability analysis phase, the federal agency determines the following:

- Whether the action will occur in a nonattainment or maintenance area
- Whether one or more of the specific exemptions apply to the action
- Whether the federal agency has included the action on its list of "presumed to conform" actions
- Whether the total direct and indirect emissions are below or above the de minimis levels
- Where the facility has an emissions budget approved by the state as part of the SIP, whether the emissions from the proposed action are within the budget

40 Code of Federal Regulations (CFR) 93.153 defines de minimis levels for criteria pollutants based on area attainment status as presented in Table 1.

Table 1. De Minimis Levels for Criteria Pollutants

Pollutant	Designation	Tons/Year
Ozone (precursors: VOC or NO_X)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Carbon monoxide, SO_2 and NO_2	All nonattainment and maintenance areas	100
PM10	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
PM2.5	Direct emissions	100
Lead	All nonattainment and maintenance	25
Lead emissions were not evaluated in this assessment. Lead is not a chemical of concern for activities associated with this federal action.		

The federal action will occur in the South Coast Air Basin (SCAB), which is currently in extreme nonattainment for ozone, in serious nonattainment for particulate matter less than 10 microns in diameter (PM10), and in nonattainment for particulate matter less than 2.5 microns in diameter (PM2.5). Based on the present NAAQS attainment status of the SCAB, a federal action would conform to the SIP if its annual emissions remain below 100 tons of carbon monoxide (CO), 70 tons of PM10, and 10 tons of nitrogen oxides (NO_X) or volatile organic compounds (VOCs) (40 CFR 93.153). Since operation of the proposed project would not generate emissions of criteria pollutants, the de minimis thresholds apply to the proposed construction activities pertaining to the federal action for the preferred alternative. If the proposed action exceeds one or more of the de minimis thresholds, a more rigorous conformity determination is the next step in the conformity evaluation process.

Based on guidance for the implementation of the General Conformity Rule for regulatory permits, dated April 20, 1994 (Attachment A), the Corps concluded that construction activities subject to the conformity evaluation consist of construction activities associated with the rehabilitation of the existing ocean

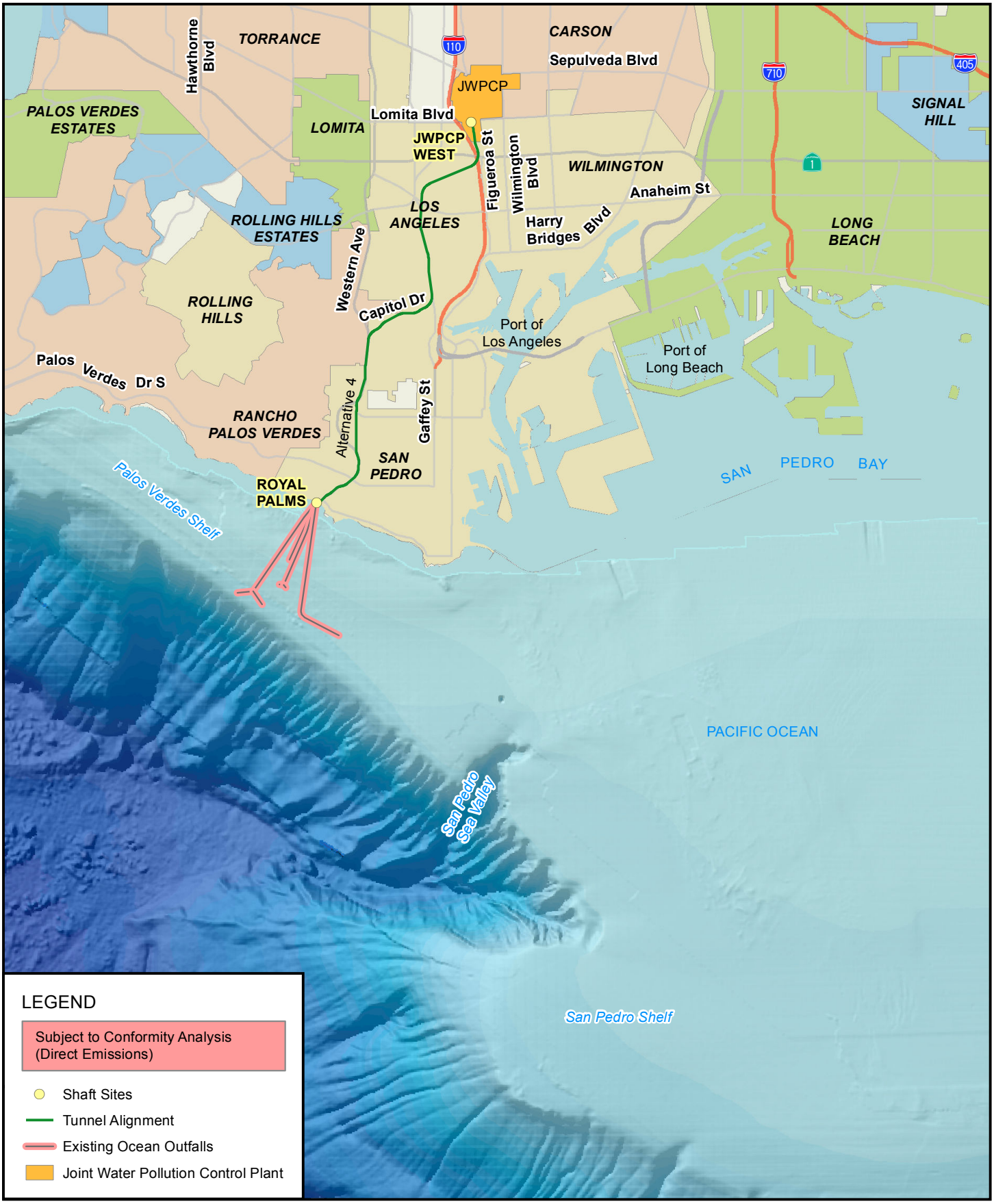

FIGURE 1

CLEARWATER Program

General Conformity Scope of Analysis

Source: Sanitation Districts of Los Angeles County 2011

outfalls. The Corps has determined that all underwater and in-water activities are subject to conformity evaluation as these activities constitute actions subject to the Corp's permitting authority. The Corps has also determined that land-side construction activities at the Royal Palms shaft site are not subject to the conformity evaluation as these activities do not constitute actions subject to the Corps' permitting authority. Therefore, the conformity evaluation is limited to the underwater and in-water activities associated with rehabilitation of the existing ocean outfalls.[1]

Rehabilitation of the existing outfalls is scheduled for the 3rd and 4th quarters of 2019 and the 1st quarter of 2020. Exhaust emissions from tugboats, crew boats, and a service vessel comprise emissions associated with rehabilitation of the existing ocean outfalls. Chapter 5 discusses the methodology used to quantify emissions associated with these sources. Emissions associated with these sources are presented in Table 2.

Table 2. Preferred Alternative: Criteria Pollutant Emissions Without Mitigation

	Annual Emissions (tons per year)					
Year	**VOC**	**CO**	**NO_X**	**SO_2**	**PM10**	**PM2.5**
2019	0.0	1.0	0.8	0.0	0.0	0.0
2020	0.1	1.9	1.5	0.0	0.0	0.0
Maximum Annual Emissions	0.1	1.9	1.5	0.0	0.0	0.0
De Minimis Thresholds	10	100	10	100	70	100
Exceeds De Minimis Threshold?	No	No	No	NA	No	No

Conformity Determination

The applicability analysis shows that the action would not exceed de minimis thresholds and as such is not required to undergo a conformity determination.

Review Process

As public entities, federal agencies must make their conformity determinations through a public process. This determination will undergo public review as part of the public review of the environmental impact report/environmental impact statement for the Clearwater Program.

Conformity Statement

The applicability analysis shows that the proposed federal action would result in emissions of criteria pollutants below the de minimis thresholds. Actions that result in emissions below the de minimis thresholds are not considered by the EPA to cause or contribute to any new violation of a NAAQS, increase the frequency or severity of any existing violation, or delay the timely attainment of any

[1] Although the EPA excludes emissions over which the federal agency does not have a continuing program responsibility from the general conformity evaluation, this is not the case for National Environmental Policy Act (NEPA) review. The NEPA review in Chapter 5 considers actions underwater, in-water, and on land.

standard, interim emission reduction, or other milestone. Therefore, the proposed federal action will comply with the general conformity regulation.

References

Corps (U.S. Army Corps of Engineers). 2011. Re: Clearwater EIS/EIR, Corps guidance on the General Conformity Analysis, e-mail to Steve Highter from Ken Wong, June 2, 2011.

Attachment A

GUIDANCE FOR THE IMPLEMENTATION OF THE GENERAL CONFORMITY RULE FOR REGULATORY PERMITS

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

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REPLY TO
ATTENTION OF:

CECC-E

20 APR 1994

MEMORANDUM FOR ALL MAJOR SUBORDINATE COMMANDERS, AND DISTRICT COMMANDERS

SUBJECT: EPA's Clean Air Act (CAA) General Conformity Rule

1. In the Federal Register of November 30, 1993, the U.S. Environmental Protection Agency (EPA) published its final General Conformity Rule to implement Section 176(c) of the Clean Air Act (CAA) for geographic areas designated as "nonattainment" and "maintenance" areas under the CAA. EPA's final rule addresses how Federal agencies are to demonstrate that activities in which they engage conform with applicable, Federally-approved CAA state implementation plans. Because these agency conformity determinations can sometimes take considerable time and cost thousands of dollars to produce, and because failure to produce and sign an adequate conformity determination where one is required can create a serious legal vulnerability for a Corps project or permit, the Corps must ensure full and careful compliance with the new EPA Final Rule.

2. The enclosed guidance document has been prepared to assist Corps Divisions and Districts in understanding and complying with the subject rule. This guidance document is introductory in nature, and cannot be considered a substitute for careful reading of and compliance with the rule itself. (See 58 Fed.Reg. 63214 et seq.)

3. One of the primary subjects discussed in the enclosed guidance document is how the General Conformity Rule relates to the Corps regulatory program under Sections 9 and 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and Section 103 of the Ocean Dumping Act. As soon as practicable I intend to promulgate another guidance document providing more detailed instructions on how Corps personnel should deal with CAA conformity considerations regarding Corps Civil Works projects during the planning process, including preparation of CAA conformity determinations where that is necessary.

4. Although the attached document is rather "legalistic" in nature, it should be broadly distributed within the Corps family (e.g., counsel, regulatory, planning, operations, etc.). This guidance also contains important policy considerations, and thus has been fully coordinated with the Office of the Assistant Secretary of the Army (Civil Works) and with the Director of Civil Works.

5. My points of contact for this guidance are Lance Wood and Bill Sapp, CECC-E; their telephone number is (202) 272-0035.

FOR THE COMMANDER:

Lester Edelman

Encl

LESTER EDELMAN
Chief Counsel

CECC-E

EPA'S FINAL CLEAN AIR ACT GENERAL CONFORMITY RULE

I. INTRODUCTION.

In the Federal Register of November 30, 1993, the U.S. Environmental Protection Agency (EPA) published its final General Conformity Rule[1] to implement section 176(c) of the Clean Air Act (CAA)[2] for geographic areas designated as "nonattainment" and "maintenance" areas under the CAA. EPA's final rule addresses how Federal agencies are to demonstrate that activities in which they engage conform with applicable, Federally approved CAA state implementation plans.[3] Because these agency conformity determinations can sometimes take considerable time and cost thousands of dollars to produce[4], and because failure to produce and sign an adequate conformity determination where one is required can create a serious legal vulnerability for a Corps project or permit, the Corps must ensure full and careful compliance with the new EPA final rule.

EPA's final rule was promulgated to implement CAA section 176(c), which was added to the Clean Air Act in 1977[5] to require that Federal agencies assure that activities they engage in are in conformance with Federally-approved CAA state implementation plans.[6] This requirement is clearly triggered whenever a Federal

---

[1] 58 Fed. Reg. 63214 (November 30, 1993).

[2] Clean Air Act § 176(c), 42 U.S.C. § 7506 (1993).

[3] 58 Fed. Reg. 63214 (November 30, 1993). Section 110 of the Clean Air Act requires that all states and the District of Columbia develop state implementation plans for EPA approval that provide detailed accounts of how the state will attain the National Ambient Air Quality Standards throughout the state. 42 U.S.C. § 7410 (1993).

[4] The EPA estimated in its proposed rule that a conformity determination would cost approximately $5,000, whereas an extensive conformity determination would cost $50,000. 58 Fed. Reg. 13848 (March 15, 1993). Department of Defense estimates double the figures supplied by the EPA.

[5] Pub. L. 95-95, § 176(c) (1977).

[6] Section 176(c)(1) provides in relevant part that:

> No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve,

(continued...)

agency engages in a Federal project, but it is also triggered whenever a Federal agency permits, licenses, funds, or approves a non-Federal undertaking. The Corps' Clean Water Act (CWA) section 404 permits, Rivers and Harbors Act of 1899 Section 10 permits, and Ocean Dumping Act Section 103 permits fall under this latter category.

II. APPLICABILITY.

A. EXEMPTIONS AND PRESUMPTIONS. As you study the final rule and its preamble, the first general subject to consider is the "applicability" of the rule. The new rule applies generally to Federal actions except for those covered by EPA's transportation conformity rule[7], actions with associated emissions below the de minimis levels specified at 40 CFR 91.853, certain classes of actions designated at 40 CFR 91.853 as exempted or presumed to conform, and actions that the new rule "grandfathers" at 40 CFR 91.850. A number of Corps activities may fit within the long list of "exempted" or "presumed to conform" activities. For example, note the specific exemption provided for maintenance dredging and debris disposal actions.

B. GRANDFATHER CLAUSE. As you consider the "grandfather provision", remember that it describes the specific circumstances where a Federal action need not comply with the new general conformity rule, but the Corps might nevertheless have to create and sign a CAA conformity determination to show compliance with the statutory mandate of CAA Section 176(c). However, that conformity determination would not have to comply with the specific procedural requirements of the new EPA regulation. Also note that the second basis provided in the rule for grandfathering, i.e., the three-part requirement of 40 CFR 93.150(c)(2), requires that an environmental analysis had to be commenced prior to January 31, 1994, or that a contract to develop a specific environmental analysis was awarded prior to January 31, 1994. The reference in that section to the date of December 30, 1993, was an error. The EPA has since corrected that date to January 31, 1994, by publishing the correction in the Federal Register, i.e., January 31, 1994. Moreover, that same section requires that a CAA conformity

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[6](...continued)
any activity which does not conform to an implementation plan after it has been approved or promulgated under section 110. . . . The assurance of conformity to such an implementation plan shall be an affirmative responsibility of the head of such department, agency or instrumentality.

C.A.A. § 176(c)(1), 42 U.S.C. § 7506 (1993).

[7]See 40 CFR Part 51, subpart T.

determination demonstrating compliance with the statutory mandate of CAA Section 176(c) be signed by March 15, 1994.

C. ATTAINMENT VERSUS NON-ATTAINMENT AREAS. Also regarding applicability, note that the new CAA General Conformity Rule applies only to Federal actions in CAA non-attainment areas and in those attainment areas subject to maintenance plans required by CAA Section 175A (i.e., "maintenance areas"; see 58 Fed. Reg. 13841) . EPA has announced its intentions to do another rulemaking at a later date describing how CAA Section 176(c) will be applied to CAA attainment areas, in general.

III. REQUIREMENTS OF THE NEW RULE.

To fully understand the requirements of the rule, you must carefully study both the rule itself and the explanatory guidance provided in the preamble. In the near future, the Office of the Chief Counsel expects to provide additional guidance that will assist Corps personnel who must prepare CAA conformity determinations, especially for Corps planning studies, feasibility reports, and the like. In this guidance, I only wish to emphasize a few important aspects of the rule, to ensure understanding of those matters throughout the Corps, for both our projects and our regulatory responsibilities.

A. CONFORMITY DETERMINATIONS. The basic requirement of the General Conformity Rule is stated at 40 CFR 93.150(b): "A Federal agency must make a determination that a Federal action conforms to the applicable implementation plan in accordance with the requirements of this subpart before the action is taken." (emphasis added). Obviously, to implement that mandate we must turn to the definition of "Federal action" provided at 40 CFR 93.152:

> **Federal action** means any activity engaged in by a[n] ... agency ... of the Federal Government, or any activity that a[n] ... agency ... supports in any way, provides financial assistance for, licenses, permits, or approves.... Where the Federal action is a permit, license, or other approval for some aspect of a non-Federal undertaking, the relevant activity is the part, portion, or phase of the non-Federal undertaking that requires the Federal permit, license, or approval."

B. DIRECT EMISSIONS. Regarding what air emissions must be considered in a CAA conformity determination, the rule defines two classes: direct emissions, and indirect emissions. The definition of "direct emissions" is straightforward: "Direct emissions" means those emissions of a criteria pollutant or its precursors that are caused or initiated by the Federal action and occur at the same time and place as the action." (40 CFR 93.152)

C. INDIRECT EMISSIONS. In contrast, the definition of "indirect emissions" needs careful study: "indirect emissions"

means those emissions of a criteria pollutant or its precursors that: (1) Are caused by the Federal action but may occur later in time and/or may be further removed in distance from the action itself but are still reasonably foreseeable; and (2) The Federal agency can practicably control and will maintain control over due to a continuing program responsibility of the Federal agency." (40 CFR 93.152; emphasis added.) Note that the second, limiting part of that definition is crucial, since the underlined words provide essential restrictions on how far the Corps' responsibilities extend regarding documenting and controlling indirect emissions. Those restrictions from the rule's definition of "indirect emissions" are especially important, given the General Conformity Rule's broad, "but for" definition of the term "caused by": "Caused by, as used in the terms 'direct emissions' and 'indirect emissions,' means emissions that would not otherwise occur in the absence of the Federal action."[8] This definition of the term "caused by" can be characterized as a "but for" approach to the concept of causation, because, standing alone, it would require the Corps to take responsibility for all indirect emissions that would not occur without (i.e., "but for") the Corps permit or project. If the General Conformity Rule did not contain the various limiting provisions discussed herein, that "but for" approach to defining "caused by" would have made the Corps responsible for dealing with potential emissions that might not occur "but for" the Corps project or permit, but which might be substantially removed in time and/or distance from the Corps action; those emissions would be almost impossible for the Corps to predict, document, or control through mitigation measures.

Consequently, it is of considerable importance to the Corps Civil Works program that everyone understand and make proper use of the restrictions noted above in the definition of "indirect emissions" when deciding whether or how we need to prepare a CAA conformity determination. Of course, the Corps must consider the "direct emissions" caused by our proposed project or activity, or by the specific activity requiring a Corps permit. However, the final General Conformity Rule does not require the Corps to document or analyze any "indirect emissions" unless we determine that it would be practicable for the Corps to control them, and that the Corps would maintain control over them due to a continuing Corps program responsibility. As we shall discuss later, we expect that the Corps will not be legally required under the General Conformity Rule to analyze, document, and seek mitigation measures for indirect emissions for many Corps project-related actions, and for the vast majority of actions requiring Corps permit authorization, since often it will not be practicable for the Corps to control such emissions, and frequently the Corps will not have a continuing program responsibility to maintain control over them.

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[8] 40 CFR 913.152 (1994).

The logic behind the limitation on what "indirect emissions" the Corps must analyze, document, and seek mitigation measures to reduce, is explained in the preamble to EPA's rule, as follows:

> The EPA does not believe that it is reasonable to conclude that a Federal agency "supports" an activity by third persons over whom the agency has no practicable control--or "supports" emissions over which the agency has no practicable control, based on the mere fact that, if one inspects the "causal" chain of events, the activity or emissions can be described as being a "reasonably foreseeable" result of the agency's actions.
>
> In fact, achievement of the clean air goals is not primarily the responsibility of the Federal government. Instead, Congress assigned that responsibility to the State and local agencies.... Where the Federal control over the resultant emissions is relatively minor, the problem is likely caused by multiple pollution sources and a solution may be impossible unless it is directed at all the contributing sources. This role is given to the State and local agencies by Congress and should not be interpreted as the Federal agencies' role under section 176(c).[9]

IV. CORPS IMPLEMENTATION OF THE EPA GENERAL CONFORMITY RULE.

A. CORPS PROJECTS VERSUS NON-FEDERAL ACTIVITIES NEEDING CORPS PERMIT AUTHORIZATION.

From a legal point of view, many of the limitations on Corps responsibilities for documenting and mitigating for indirect emissions (as discussed above) apply to both Corps Civil Works projects and to Corps regulatory program actions regulating non-Federal activities. Nevertheless, there are some significant distinctions that must be made, as a practical matter, regarding how often and in what circumstances the Corps will voluntarily choose to go beyond our strict legal obligations under the General Conformity Rule regarding CAA analyses of indirect emissions. As we explain at some length hereinafter, for practical reasons, policy reasons, and legal reasons, we are not required to, and thus we will not, prepare CAA conformity determinations for the vast majority of the approximately 100,000 activities that we must authorize yearly through the Corps regulatory program. We intend to assert and make full use of the various exemptions and limitations written into the General Conformity Rule that apply to our regulatory program, which exemptions and limitations will usually lead us to conclude that the emissions we are responsible for fall below the de mimimis exemption level. Among the many reasons why this approach is necessary and appropriate is the fact

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[9] 58 Fed. Reg. 63220 (November 30, 1993)

that we must provide relatively expeditious decisions for non-Federal activities that require Corps permit authorization, and because all of the non-Federal activities that require Corps permits are fully subject to the CAA authorities of the U.S. EPA and of the state and local governments.

In contrast, some Corps water resource development projects go through lengthy planning processes, with full-scale NEPA Environmental Impact Statements, coordination with numerous state and Federal agencies, etc. Moreover, many of our water resource development projects are subject to litigation brought by project opponents. Consequently, wherever it is practicable and appropriate, the Corps will go beyond our strict legal obligations under the General Conformity Rule, and we will prepare CAA conformity determinations that consider indirect emissions that would follow from our project, even where it is debatable whether we could "practicably" control those indirect emissions, and even where it is debatable whether the Corps has a continuing program responsibility to control those indirect emissions. In other words, we should err on the side of caution in writing CAA conformity determinations for large-scale Corps projects, and in coordinating those determinations with the U.S. EPA and with state and local clean air agencies. However, whenever the Corps does voluntarily choose to go beyond our obligations under the General Conformity Rule while preparing a CAA conformity determination, the fact that we are voluntarily going beyond our understanding of our legal obligations must be clearly stated in our public documentation.

When the Corps prepares a CAA conformity determination for a Corps project in the planning stage, and in that conformity determination we voluntatily address all indirect emissions that would be "caused by" our project, that will provide us the valuable opportunity to demonstrate that any short-term increase in emissions from project construction will be entirely or partially offset by decreases in long-term, "without project condition" emissions, due to increased efficiencies (for example, through more efficient port operations from a port improvement project). Also, when we prepare a CAA conformity determination that deals with all indirect emissions that can reasonably be said to be "caused by" our project, our project can be presented to the state CAA authority and specifically approved as part of the state implementation plan, along with any necessary state revisions to that SIP necessary to accommodate the Federal project and all associated indirect emissions. Development and coordination of our CAA conformity determination should be undertaken as early as possible in the planning stage for a large-scale or litigation-prone Corps project. The resulting documentation will be extremely useful to help defend our project from potential litigation challenging compliance with the CAA. On the other hand, for small-scale Corps projects, covered only by environmental assessments and findings of no significant impact, and where no CAA-related litigation can be anticipated, we can probably rely only on the

exemptions found in the General Conformity Rule, and need not necessarily prepare a full-blown CAA conformity determination voluntarily addressing various indirect emissions. Please feel free to consult the points of contact provided in this guidance if you are in doubt about whether a particular Civil Works activity should be covered by a CAA conformity determination voluntarily covering indirect emissions.

B. THE CORPS REGULATORY PROGRAM.

One crucial aspect of this guidance involves how we expect all Corps offices to implement the CAA General Conformity Rule regarding non-Federal activities requiring authorization under the Corps regulatory program. Of course, if another Federal agency requires a Corps permit for one of its activities or projects, that Federal agency is fully responsible for ensuring compliance with CAA Section 176(c), and the Corps can adopt and rely upon that agency's conformity determination, or upon whatever waiver or presumption under the CAA General Conformity Rule that agency believes will satisfy CAA Section 176(c). However, for non-Federal activities, the Corps must take responsibility for whatever CAA conformity determination may be necessary. Nevertheless, for the reasons explained hereinafter, the new rule and its preamble clearly indicate that the vast majority of activities needing Corps permit authorization will not require a CAA conformity determination, because practically all of those activities will fall below the de minimis threshold levels for emissions specified at 40 CFR 93.153.

C. SCOPE OF ANALYSIS. One feature of EPA's final General Conformity Rule that clearly demonstrates that the Corps will not have to perform many conformity determinations is the rule's definition of the term "Federal action". The final rule's definition clearly distinguishes between large Federal projects, such as a Federally funded and Federally controlled military base, versus non-Federal undertakings that simply require a Federal permit. Oftentimes in the latter case, the Federal agency only has to permit a minor part, portion, or phase of a much larger non-Federal undertaking. To reflect the limited Federal responsibility under the CAA derived from such Federal permits, the EPA definition of "Federal action" indicates that, in complying with section 176(c), Federal regulatory agencies are only responsible for analyzing the emissions resulting from the "part, portion, or phase" of the non-Federal undertaking that they permit. To deal with this important point, the EPA added the following sentence to the final rule's definition of "Federal action":

> Where the Federal action is a permit, license, or other approval for some aspect of a non-Federal undertaking, the relevant activity is the part, portion, or phase of

the non-Federal undertaking that requires the Federal permit, license, or approval.[10]

As you can see, the legal principle behind the quoted sentence is the same principle that supports the "narrow scope of analysis" approach for our NEPA documents reflected at Appendix B of 33 CFR Part 325, paragraph 7.b. and the "permit area" approach used to limit Corps responsibilities in Appendix C, implementing the National Historic Preservation Act.[11] The rule of administrative law and practice created by the sentence just quoted from EPA's definition of "Federal action" is that, for the limited and particular purposes of the CAA Conformity Rule and for every Corps CAA conformity determination for a Corps regulatory action under this rule, the Corps will always use a narrow "scope of analysis" for purposes of CAA Section 176(c), even if we choose to use a broader scope of analysis for purposes of NEPA, the public interest review, or the 404(b)(1) analysis for that same permit case.

This narrow scope of analysis for purposes of the CAA conformity analysis is always appropriate, for several reasons. For example, the Corps regulators have no expertise or authority allowing them to evaluate or control air emissions from the larger, overall projects, such as a shopping center, that may require a Corps permit for one phase or portion of that larger project (e.g., placement of fill material on which part of the shopping center will later be constructed and operated). In contrast, the state and EPA clean air authorities have broad, general authority, expertise, and responsibility to evaluate and control air emissions from the larger, overall projects, such as shopping centers, regardless of whether part of all of such a shopping center happens to be constructed on fill material permitted by the Corps of Engineers.

D. CONFORMITY DETERMINATIONS FOR CORPS PERMITS CASES WILL BE NECESSARY VERY RARELY. The sentence quoted above from EPA's definition of "Federal action" may well be the most important provision of the General Conformity Rule relating to the Corps regulatory program, because this provision, in conjunction with the restrictive language discussed above from the definition of "indirect emissions", means that very rarely will the Corps have to prepare a CAA conformity determination document for a Corps regulatory action. The reasons for this conclusion are reflected in the following case example, provided by EPA in the preamble of the final General Conformity Rule. In this example, the EPA shows the close relationship between the sentence quoted above from the definition of "Federal action" and the restrictive language from the definition of "indirect emissions", as follows:

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[10] 58 Fed. Reg. 63248 (November 30, 1993).

[11]. 55 Fed. Reg. 27000 (June 29, 1990)

> [In the final rule] the definition of "Federal action" is revised by adding the following sentence to the end of the definition in the [proposed rule]: Where the Federal action is a permit, license, or other approval for some aspect of a nonfederal undertaking, the relevant activity is the part, portion, or phase of the nonfederal undertaking that requires the Federal permit, license or approval. The following examples illustrate the meaning of the revised definition.
>
> Assume, for example, that the [Corps] issues a permit and that permitted fill activity represents one phase of a larger nonfederal undertaking; i.e., the construction of an office building by a nonfederal entity. Under the conformity rule, the [Corps] would be responsible for addressing all emissions from that one phase of the overall office development undertaking that the [Corps] permits; i.e., the fill activity at the wetland site. However, the [Corps] is not responsible for evaluating all emissions from later phases of the overall office development (the construction, operation, and use of the office building itself), because later phases generally are not within the [Corps'] continuing program responsibility and generally cannot be practicably controlled by the [Corps].[12]

The conclusion to be drawn regarding the preamble's case example is that the Corps almost certainly would not have to prepare a CAA conformity determination for that permit action described in the preamble, because the direct emissions from the fill activity would be relatively minor, and thus in all probability they would fall below the de minimis levels exempted by 40 CFR 93.153. Moreover, in this example one cannot identify any indirect emissions for which the Corps would be responsible.

E. "PART, PORTION, OR PHASE" OF A LARGER UNDERTAKING. The preamble for the final rule provides several other important explanatory passages that accurately describe the limited nature of the responsibilities the Corps must fulfill as we operate our regulatory program in compliance with EPA's General Conformity Rule. As the EPA states in the preamble, the "inclusive definition" that EPA had published for public comment in the proposed rule to define the term "indirect emissions" would have been overly burdensome and inappropriate for regulatory programs that might have to "document the air quality affects from tens of thousands of public and private business activities each year, even where the associated Federal action in extremely minor."[13] The EPA

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[12] 58 Fed. Reg. 63227 (November 30, 1993).

[13] 58 Fed. Reg. 63219 (November 30, 1993).

goes on to use the Corps in an illustration of this point by explaining that:

> [T]he Army Corps of Engineers estimates that 65,000 of their regulatory actions would have required a conformity review in 1992 under the inclusive definition. The [Corps] permits are often limited to a small portion of a much larger project and, thus, may not be the best mechanism to review the larger project: e.g., one river crossing for a 500 mile gas pipeline or a half-acre wetland fill for a twenty acre shopping mall.[14]

As the EPA explains here, it would be impractical to force a Federal regulatory agency like the Corps to do potentially time-consuming and costly air quality analyses when the activity that agency permits may be a very minor aspect of a much larger non-Federal undertaking, and when that specific activity needing a Corps permit may have little or no effect on air quality.

F. CONTINUING PROGRAM RESPONSIBILITY. The EPA also used the Corps in an illustration to explain the phrase "continuing program responsibility" in the definition of the term "indirect emissions". In their example the EPA explains that only if the Corps were to impose conditions on a permit as part of its responsibilities under its regulatory program and these permit conditions, in and of themselves, would lead to an increase in the air emissions caused by the activity, would the Corps be required to include the air emissions caused by its permit conditions in our CAA conformity analysis.[15] However, the preamble to EPA's rule makes clear that normally the Corps is not responsible for indirect emissions related to activities needing Corps permits:

> j. Exclusive definition [for the term "indirect emissions"]--types of Federal actions not covered. The following types of Federal actions, among others, are not covered by the conformity rule under the exclusive definition approach [i.e., the approach adopted in the final rule]....(3) Certain indirect emissions related to a [Corps of Engineers] permit for the discharge of dredged or fill material. The indirect emissions from development activities related to [Corps] permit actions are not subject to the continuing program responsibility of the [Corps], or cannot be practicably controlled by the [Corps].[16]

The EPA preamble also recognizes that the Corps has an explicit exemption from the conformity rule where:

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[14] 58 Fed. Reg. 63219 (November 30, 1993).

[15] 58 Fed. Reg. 63220 (November 30, 1993).

[16] 58 Fed. Reg. 63224 (November 30, 1993).

> The indirect emissions from development activities related to [Corps] permit actions are not covered where such emissions are not subject to the continuing program responsibility of the [Corps], or cannot be practicably controlled by the [Corps].[17]

The EPA then goes on in the preamble to explain the changes in the definition for the term "indirect emissions" that EPA adopted in its final General Conformity Rule (i.e., the "exclusive" definition). Again it uses the Corps in an illustration. The EPA points out that conformity analyses are not required when Federal actions are incidental to later development by private parties. As the EPA states:

> ...this approach would not require a conformity analysis for certain Federal actions that are necessary for, but incidental to, subsequent development by private parties. For example, the exclusive definition does <u>not</u> generally require that a [Corps] fill permit needed for a relatively minor part, portion, or phase of a twenty acre development on private land would somehow require the [Corps] to evaluate all emissions from the construction, operation, and use of that larger development.[18] (emphasis added)

Here the EPA explains that the "activity" contemplated under section 176(c) in many cases is properly limited to the particular "part, portion, or phase" of a non-Federal action that is actually permitted by the regulatory agency (i.e., the Corps). As the EPA goes on to explain:

> The person's [i.e., permit applicant's] activities that fall outside the Federal agency's continuing program responsibility to control are subject to control by state and local agencies.[19]

As indicated above, generally speaking the Corps does not have a continuing program responsibility to measure, monitor, control, or mitigate for air emissions that may result from the construction or operation of a non-Corps facility (such as a shopping center, factory, <u>or non-Federal port)</u>, even though some part, portion, or phase of that facility requires a permit from the Corps. Under the CAA, the state and local clean air authorities have full responsibility and authority to deal with those emissions, and to prevent or condition the construction of the non-Federal facility as necessary to deal with those air emissions. Under the General

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[17] 58 <u>Fed. Reg.</u> 63224 (November 30, 1993).

[18] 58 <u>Fed. Reg.</u> 63222 (November 30, 1993).

[19] 58 <u>Fed. Reg.</u> 63222 (November 30, 1993)

Conformity Rule the Corps (1) must consider direct emissions from only the particular part, portion, or phase of the larger, non-Federal facility that we permit; and (2) we must consider indirect emissions from that same part, portion, or phase, and then only to the extent that we can practicably control them, and have a continuing program responsibility to control them.

G. CORPS DOCUMENTATION OF COMPLIANCE WITH CAA SECTION 176(C)

For any permit case where the Corps reasonably determines that the emissions from the particular "part, portion, or phase" of a larger, non-Federal undertaking, needing a Corps permit, would fall below the de minimis threshold levels of 40 CFR 93.153, the Corps will not have to conduct a technical analysis to document that the emissions from the proposed undertaking would not exceed the de minimis thresholds. This conclusion is supported by the following example taken from EPA's preamble to the General Conformity Rule:

> Example 4: Where a [Corps of Engineers] permit is needed to fill a wetland so that a shopping center can be built on the fill, generally speaking, the [Corps] could not practicably maintain control over and would not have a continuing program responsibility to control indirect emissions from subsequent construction, operation, or use of that shopping center. Therefore, only those emissions from the equipment and motor vehicles used in the filling operation, support equipment, and emissions from movement of the fill material itself would be included in the analysis. If such emissions are below the de minimis levels described below for applicability purposes (section 51.858), no conformity determination ... would be required for the issuance of the ... permit.[20]

The same point is made elsewhere in the preamble to the General Conformity Rule, as follows:

> Most Federal actions result in little or no direct or indirect air emissions. The EPA intends such actions to be exempted under the de minimis levels specified in the rule and, thus, no further analysis by the Federal agency is required to demonstrate that such actions conform.... Further, the EPA believes that Federal actions which are de minimis should not be required by this rule to make an applicability analysis. A different interpretation could result in an extremely wasteful process which generates vast numbers of useless conformity statements. Paragraphs (c)(1) and (2) of Section 51.853 are added to the final rule to provide that de minimis actions are exempt from the requirements of this rule. Therefore, it is

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[20] 58 Fed. Reg. 63223 (November 30, 1993).

not necessary for a Federal agency to document emissions levels for a de minimis action.[21]

Although we expect that the vast majority of activities needing Corps permits will not need CAA conformity determinations for the reasons explained above, nevertheless, for any permit case where litigation can be anticipated if the Corps issues the permit, the permit administrative record should explain our limited CAA responsibilities under the CAA General Conformity Rule, and the basis for our conclusion that the relevant emissions would be de minimis. That explanation often may need to include a discussion of why it would not be "practicable" for the Corps to control certain specified indirect emissions, and why the Corps does not have a continuing program responsibility to control such indirect emissions, and why our CAA responsibilities are limited to the particular "part, portion, or phase" of a larger undertaking requiring Corps permit authorization.

V. CONCLUSION.

Because of the various provisions discussed above, we expect that very few Corps permit actions will require CAA conformity analyses, and that our CAA conformity determinations will normally conclude that the air emissions relevant to our permit action are safely below the final rule's de minimis levels. It seems that the only time that the Corps will have to do a full-scale CAA conformity determination in a permit case is when the emissions associated with the particular activity needing the Corps permit, or the particular activity required by Corps permit conditions (e.g., the placement of the fill, or the construction of the structure in the water, or the actual dredging and disposal operation, or implementation of the required mitigation plan) are so substantial that those emissions would exceed the de minimis thresholds by themselves. This conclusion flows logically from the provisions discussed above from EPA's final rule and preamble, based in part on the principle of limited Corps responsibilities under the CAA.

Nevertheless, the practical necessity that the Corps will use a "narrow scope of analysis" to limit our requirements under the CAA conformity rule must not lead the Corps necessarily to use such a narrow scope of analysis for purposes of the Corps' other responsibilities under other aspects of the public interest review or the 404(b)(1) Guidelines. Because the Corps has ample discretion to adopt and use a broader scope of analysis for purposes of NEPA, the Endangered Species Act, etc., we will not use the CAA conformity determination as an excuse or occasion to reduce our more wide-ranging reviews and responsibilities under those other statutes and regulations.

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[21] 58 Fed. Reg. 63228-63229 (November 30, 1993).

The Corps' very limited expertise, authority, and continuing program responsibilities regarding air emissions fully justifies our using a narrow scope of analysis for purposes of compliance with CAA Section 176(c). In contrast, our broader, traditional responsibility, authority, and expertise to regulate activities affecting aquatic resources will often justify our using a broader scope of analysis to consider effects of a proposed undertaking on aquatic resources, endangered species, etc. Thus, for any particular permit case, the Corps will implement the CAA General Conformity Rule by focusing on only the specific part, portion, or phase of the larger undertaking that requires our permit authorization. Nevertheless, we often will consider all direct and indirect effects of the larger undertaking when evaluating effects on the aquatic environment.

Corps Headquarters points of contact for this guidance are Lance Wood and Bill Sapp of the Office of the Chief Counsel (CECC-E); their telephone number is (202) 272-0035. However, non-counsel Corps employees should only contact them in conjunction with district/division counsel to ensure proper coordination.

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Appendix 5-B

AIR QUALITY CALCULATIONS

Program Construction Calculations

URBEMIS EMISISONS SUMMARY FOR ONSITE AND REGIONAL CONSTRUCTION ACTIVITIES

JWPCP Solids Processing

UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Excavation Work							
On-site Total	4.35	30.96	23.35	-	20.83	5.35	5,101.66
Fugitive Dust	-	-	-	-	19.43	4.06	-
Off-Road Diesel	4.35	30.96	23.35	-	1.40	1.29	5,101.66
Off-site Total	1.08	11.04	5.46	0.04	0.53	0.40	4,182.74
On-Road Diesel	1.05	10.99	4.42	0.04	0.51	0.39	3,965.26
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**5.43**	**42.00**	**28.81**	**0.04**	**21.36**	**5.75**	**9,284.40**
Digester Install							
On-site Total	1.21	8.40	7.54	-	19.84	4.44	1,655.97
Fugitive Dust					19.43	4.06	
Off-Road Diesel	1.21	8.40	7.54	-	0.41	0.38	1,655.97
Off-site Total	0.02	0.04	0.74	-	0.01	0.01	155.35
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.04	0.74	-	0.01	0.01	155.35
Grand Total	**1.23**	**8.44**	**8.28**	**-**	**19.85**	**4.45**	**1,811.32**
On-site Emissions Totals							
Excavation Work	4.4	31.0	23.4	-	20.8	5.4	5,101.7
Digester Install	1.2	8.4	7.5	-	19.8	4.4	1,656.0
Maximum On-site Emissions	**4**	**31**	**23**	**-**	**21**	**5**	**5,102**
Localized Significance Threshold	--	66	1,982	--	58	18	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Excavation Work	5.4	42.0	28.8	0.0	21.4	5.8	9,284.4
Digester Install	1.2	8.4	8.3	-	19.9	4.5	1,811.3
Maximum Regional Emissions	**5**	**42**	**29**	**0**	**21**	**6**	**9,284**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

MITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Excavation Work							
On-site Total	0.64	5.18	23.35	-	20.05	4.64	5,101.66
Fugitive Dust	-	-	-	-	19.43	4.06	-
Off-Road Diesel	0.64	5.18	23.35	-	0.62	0.58	5,101.66
Off-site Total	1.08	11.04	5.46	0.04	0.53	0.40	4,182.74
On-Road Diesel	1.05	10.99	4.42	0.04	0.51	0.39	3,965.26
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**1.72**	**16.22**	**28.81**	**0.04**	**20.58**	**5.04**	**9,284.40**
Digester Install							
On-site Total	1.21	8.40	7.54	-	19.84	4.44	1,655.97
Fugitive Dust	-	-	-	-	19.43	4.06	-
Off-Road Diesel	1.21	8.40	7.54	-	0.41	0.38	1,655.97
Off-site Total	0.02	0.04	0.74	-	0.01	0.01	155.35
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.04	0.74	-	0.01	0.01	155.35
Grand Total	**1.23**	**8.44**	**8.28**	**-**	**19.85**	**4.45**	**1,811.32**
On-site Emissions Totals							
Excavation Work	0.6	5.2	23.4	-	20.1	4.6	5,101.7
Digester Install	1.2	8.4	7.5	-	19.8	4.4	1,656.0
Maximum On-site Emissions	**1**	**8**	**23**	**-**	**20**	**5**	**5,102**
Localized Significance Threshold[b]	--	66	1,982	--	58	18	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Excavation Work	2	16	29	0	21	5	9,284
Digester Install	1	8	8	0	20	4	1,811
Maximum Regional Emissions	**2**	**16**	**29**	**0**	**21**	**5**	**9,284**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\San Diego\10_Staff\Air Quality Staff\clearwater\Analysis_URBEMIS runs\JWPCP Solids Processing.urb924

Project Name: Joint Water PCP Process Optimization

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (lbs/day unmitigated)	5.43	42.00	28.81	0.04	61.24	1.79	63.03	12.81	1.64	14.45	9,284.40

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2018-1/1/2018 Active Days: 1	**5.43**	**42.00**	**28.81**	**0.04**	**61.24**	**1.79**	**63.03**	**12.81**	**1.64**	**14.45**	**9,284.40**
Mass Grading 01/01/2018-01/01/2018	5.43	42.00	28.81	0.04	61.24	1.79	63.03	12.81	1.64	14.45	9,284.40
Mass Grading Dust	0.00	0.00	0.00	0.00	61.10	0.00	61.10	12.76	0.00	12.76	0.00
Mass Grading Off Road Diesel	4.35	30.96	23.35	0.00	0.00	1.40	1.40	0.00	1.29	1.29	5,101.66
Mass Grading On Road Diesel	1.05	10.99	4.42	0.04	0.13	0.38	0.51	0.04	0.35	0.39	3,965.26
Mass Grading Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48

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Time Slice 1/2/2018-1/2/2018 Active Days: 1	1.23	8.44	8.29	0.00	61.11	0.42	61.52	12.76	0.38	13.15	1,811.32
Mass Grading 01/02/2018-01/02/2018	1.23	8.44	8.29	0.00	61.11	0.42	61.52	12.76	0.38	13.15	1,811.32
Mass Grading Dust	0.00	0.00	0.00	0.00	61.10	0.00	61.10	12.76	0.00	12.76	0.00
Mass Grading Off Road Diesel	1.21	8.40	7.54	0.00	0.00	0.41	0.41	0.00	0.38	0.38	1,655.97
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	155.35

Phase Assumptions

Phase: Mass Grading 1/1/2018 - 1/1/2018 - Excavation work

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 5

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 935.56

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/2/2018 - 1/2/2018 - Digester install

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 5

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

URBEMIS EMISISONS SUMMARY FOR ONSITE AND REGIONAL CONSTRUCTION ACTIVITIES

LBWRP Process Optimization

UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	4.35	30.96	23.35	-	5.43	2.13	5,101.66
Fugitive Dust	-	-	-	-	4.03	0.84	-
Off-Road Diesel	4.35	30.96	23.35	-	1.40	1.29	5,101.66
Off-site Total	0.85	8.60	4.47	0.03	0.42	0.32	3,299.94
On-Road Diesel	0.82	8.55	3.43	0.03	0.40	0.31	3,082.46
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**5.20**	**39.56**	**27.82**	**0.03**	**5.85**	**2.45**	**8,401.60**
Tank Installation							
On-site Total	4.50	31.61	20.05	-	5.35	2.06	5,567.33
Fugitive Dust					4.03	0.84	
Off-Road Diesel	4.50	31.61	20.05	-	1.32	1.22	5,567.33
Off-site Total	0.02	0.05	0.89	-	0.01	0.01	186.41
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.05	0.89	-	0.01	0.01	186.41
Grand Total	**4.52**	**31.66**	**20.94**	**-**	**5.36**	**2.07**	**5,753.74**
On-site Emissions Totals							
Site Prep	4.4	31.0	23.4	-	5.4	2.1	5,101.7
Tank Installation	4.5	31.6	20.1	-	5.4	2.1	5,567.3
Maximum On-site Emissions	**5**	**32**	**23**	**-**	**5**	**2**	**5,567**
Localized Significance Threshold[b]	--	32	585	--	61	26	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Site Prep	5.2	39.6	27.8	0.0	5.9	2.5	8,401.6
Tank Installation	4.5	31.7	20.9	-	5.4	2.1	5,753.7
Maximum Regional Emissions	**5**	**40**	**28**	**0**	**6**	**2**	**8,402**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

MITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	0.63	5.18	23.35	-	4.67	1.43	5,101.66
Fugitive Dust	-	-	-	-	4.03	0.84	-
Off-Road Diesel	0.63	5.18	23.35	-	0.64	0.59	5,101.66
Off-site Total	0.85	8.60	4.47	0.03	0.42	0.32	3,299.94
On-Road Diesel	0.82	8.55	3.43	0.03	0.40	0.31	3,082.46
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**1.48**	**13.78**	**27.82**	**0.03**	**5.09**	**1.75**	**8,401.60**
Tank Installation							
On-site Total	0.66	5.28	20.05	-	4.58	1.35	5,567.33
Fugitive Dust	-	-	-	-	4.03	0.84	-
Off-Road Diesel	0.66	5.28	20.05	-	0.55	0.51	5,567.33
Off-site Total	0.02	0.05	0.89	-	0.01	0.01	186.41
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.05	0.89	-	0.01	0.01	186.41
Grand Total	**0.68**	**5.33**	**20.94**	**-**	**4.59**	**1.36**	**5,753.74**
On-site Emissions Totals							
Demolition	0.6	5.2	23.4	-	4.7	1.4	5,101.7
Site Grading	0.7	5.3	20.1	-	4.6	1.4	5,567.3
Maximum On-site Emissions	**1**	**5**	**23**	**-**	**5**	**1**	**5,567**
Localized Significance Threshold[b]	--	32	585	--	61	26	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Demolition	1.5	13.8	27.8	0.0	5.1	1.7	8,401.6
Site Grading	0.7	5.3	20.9	-	4.6	1.4	5,753.7
Maximum Regional Emissions	**1**	**14**	**28**	**0**	**5**	**2**	**8,402**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\San Diego\10_Staff\Air Quality Staff\clearwater\Analysis\URBEMIS\Process Optimization\Long Beach wrp.urb924

Project Name: Long Beach WRP Process Optimization

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (lbs/day unmitigated)	5.20	39.56	27.82	0.03	16.37	1.70	18.07	3.43	1.57	5.00	8,401.60

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2018-1/1/2018 Active Days: 1	**5.20**	**39.56**	**27.82**	**0.03**	**16.37**	**1.70**	**18.07**	**3.43**	**1.57**	**5.00**	**8,401.60**
Mass Grading 01/01/2018-01/01/2018	5.20	39.56	27.82	0.03	16.37	1.70	18.07	3.43	1.57	5.00	8,401.60
Mass Grading Dust	0.00	0.00	0.00	0.00	16.25	0.00	16.25	3.39	0.00	3.39	0.00
Mass Grading Off Road Diesel	4.35	30.96	23.35	0.00	0.00	1.40	1.40	0.00	1.29	1.29	5,101.66
Mass Grading On Road Diesel	0.82	8.55	3.43	0.03	0.10	0.30	0.40	0.03	0.27	0.31	3,082.46
Mass Grading Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48

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Time Slice 1/2/2018-1/2/2018 Active Days: 1	4.53	31.66	20.94	0.00	16.26	1.33	17.59	3.40	1.22	4.62	5,753.75
Mass Grading 01/02/2018-01/02/2018	4.53	31.66	20.94	0.00	16.26	1.33	17.59	3.40	1.22	4.62	5,753.75
Mass Grading Dust	0.00	0.00	0.00	0.00	16.25	0.00	16.25	3.39	0.00	3.39	0.00
Mass Grading Off Road Diesel	4.50	31.61	20.05	0.00	0.00	1.32	1.32	0.00	1.22	1.22	5,567.33
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.02	0.05	0.89	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.41

Phase Assumptions

Phase: Mass Grading 1/1/2018 - 1/1/2018 - Tank Site Work

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 1.33

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 727.27

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/2/2018 - 1/2/2018 - Tank Installation

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 1.33

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

URBEMIS EMISISONS SUMMARY FOR ONSITE AND REGIONAL CONSTRUCTION ACTIVITIES

POWRP Process Optimization

UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	2.76	19.32	15.25	-	2.72	1.20	3,308.97
Fugitive Dust	-	-	-	-	1.83	0.38	-
Off-Road Diesel	2.76	19.32	15.25	-	0.89	0.82	3,308.97
Off-site Total	0.92	9.44	4.52	0.03	0.45	0.35	3,546.07
On-Road Diesel	0.90	9.40	3.78	0.03	0.44	0.34	3,390.72
Worker Trips	0.02	0.04	0.74	-	0.01	0.01	155.35
Grand Total	**3.68**	**28.76**	**19.77**	**0.03**	**3.17**	**1.55**	**6,855.04**
Tank Installation							
On-site Total	3.32	22.44	15.19	-	2.78	1.25	4,321.74
Fugitive Dust					1.83	0.38	
Off-Road Diesel	3.32	22.44	15.19	-	0.95	0.87	4,321.74
Off-site Total	0.02	0.04	0.74	-	0.01	0.01	155.35
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.04	0.74	-	0.01	0.01	155.35
Grand Total	**3.34**	**22.48**	**15.93**	**-**	**2.79**	**1.26**	**4,477.09**
On-site Emissions Totals							
Site Prep	2.8	19.3	15.3	-	2.7	1.2	3,309.0
Tank Installation	3.3	22.4	15.2	-	2.8	1.3	4,321.7
Maximum On-site Emissions	**3**	**22**	**15**	**-**	**3**	**1**	**4,322**
Localized Significance Threshold[b]	--	72	911	--	57	18	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Site Prep	3.7	28.8	19.8	0.0	3.2	1.6	6,855.0
Tank Installation	3.3	22.5	15.9	-	2.8	1.3	4,477.1
Maximum Regional Emissions	**4**	**29**	**20**	**0**	**3**	**2**	**6,855**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

MITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	0.40	3.23	15.25	-	2.24	0.76	3,308.97
Fugitive Dust	-	-	-	-	1.83	0.38	-
Off-Road Diesel	0.40	3.23	15.25	-	0.41	0.38	3,308.97
Off-site Total	0.92	9.44	4.52	0.03	0.45	0.35	3,546.07
On-Road Diesel	0.90	9.40	3.78	0.03	0.44	0.34	3,390.72
Worker Trips	0.02	0.04	0.74	-	0.01	0.01	155.35
Grand Total	**1.32**	**12.67**	**19.77**	**0.03**	**2.69**	**1.11**	**6,855.04**
Tank Installation							
On-site Total	0.49	3.75	15.19	-	2.23	0.75	4,321.74
Fugitive Dust	-	-	-	-	1.83	0.38	-
Off-Road Diesel	0.49	3.75	15.19	-	0.40	0.37	4,321.74
Off-site Total	0.02	0.04	0.74	-	0.01	0.01	155.35
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.04	0.74	-	0.01	0.01	155.35
Grand Total	**0.51**	**3.79**	**15.93**	**-**	**2.24**	**0.76**	**4,477.09**
On-site Emissions Totals							
Demolition	0.4	3.2	15.3	-	2.2	0.8	3,309.0
Site Grading	0.5	3.8	15.2	-	2.2	0.8	4,321.7
Maximum On-site Emissions	**0**	**4**	**15**	**-**	**2**	**1**	**4,322**
Localized Significance Threshold[b]	--	72	911	--	57	18	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Demolition	1.3	12.7	19.8	0.0	2.7	1.1	6,855.0
Site Grading	0.5	3.8	15.9	-	2.2	0.8	4,477.1
Maximum Regional Emissions	**1**	**13**	**20**	**0**	**3**	**1**	**6,855**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\Clearwater\Analysis\URBEMIS\Process Optimization\pomona wrp.urb924

Project Name: Pomona WRP Process Optimization

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (lbs/day unmitigated)	3.68	28.76	19.77	0.03	7.33	1.22	8.55	1.55	1.13	2.67	6,855.04

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2018-1/1/2018 Active Days: 1	**3.68**	**28.76**	**19.77**	**0.03**	**7.33**	**1.22**	**8.55**	**1.55**	**1.13**	**2.67**	**6,855.04**
Mass Grading 01/01/2018-01/01/2018	3.68	28.76	19.77	0.03	7.33	1.22	8.55	1.55	1.13	2.67	6,855.04
Mass Grading Dust	0.00	0.00	0.00	0.00	7.21	0.00	7.21	1.51	0.00	1.51	0.00
Mass Grading Off Road Diesel	2.76	19.32	15.25	0.00	0.00	0.89	0.89	0.00	0.82	0.82	3,308.97
Mass Grading On Road Diesel	0.90	9.40	3.78	0.03	0.11	0.33	0.44	0.04	0.30	0.34	3,390.72
Mass Grading Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	155.35

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Time Slice 1/2/2018-1/2/2018 Active Days: 1	3.34	22.48	15.93	0.00	7.22	0.96	8.17	1.51	0.88	2.39	4,477.08
Mass Grading 01/02/2018-01/02/2018	3.34	22.48	15.93	0.00	7.22	0.96	8.17	1.51	0.88	2.39	4,477.08
Mass Grading Dust	0.00	0.00	0.00	0.00	7.21	0.00	7.21	1.51	0.00	1.51	0.00
Mass Grading Off Road Diesel	3.32	22.44	15.19	0.00	0.00	0.95	0.95	0.00	0.87	0.87	4,321.74
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	155.35

Phase Assumptions

Phase: Mass Grading 1/1/2018 - 1/1/2018 - Tank Site Work

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0.59

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 800

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/2/2018 - 1/2/2018 - Tank Installation

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0.59

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

URBEMIS EMISISONS SUMMARY FOR ONSITE AND REGIONAL CONSTRUCTION ACTIVITIES

LCWRP Process Optimization

UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	4.35	30.96	23.35	-	5.31	2.11	5,101.66
Fugitive Dust	-	-	-	-	3.91	0.82	-
Off-Road Diesel	4.35	30.96	23.35	-	1.40	1.29	5,101.66
Off-site Total	0.93	9.45	4.82	-	0.46	0.35	3,608.20
On-Road Diesel	0.90	9.40	3.78	-	0.44	0.34	3,390.72
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**5.28**	**40.41**	**28.17**	**-**	**5.77**	**2.46**	**8,709.86**
Tank Installation							
On-site Total	4.50	31.61	20.05	-	5.23	2.04	5,567.33
Fugitive Dust					3.91	0.82	
Off-Road Diesel	4.50	31.61	20.05	-	1.32	1.22	5,567.33
Off-site Total	0.02	0.05	0.89	-	0.01	0.01	186.41
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.05	0.89	-	0.01	0.01	186.41
Grand Total	**4.52**	**31.66**	**20.94**	**-**	**5.24**	**2.05**	**5,753.74**
On-site Emissions Totals							
Site Prep	4.4	31.0	23.4	-	5.3	2.1	5,101.7
Tank Installation	4.5	31.6	20.1	-	5.2	2.0	5,567.3
Maximum On-site Emissions	**5**	**32**	**23**	**-**	**5**	**2**	**5,567**
Localized Significance Threshold[b]	--	45	735	--	27	4	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Site Prep	5.3	40.4	28.2	-	5.8	2.5	8,709.9
Tank Installation	4.5	31.7	20.9	-	5.2	2.1	5,753.7
Maximum Regional Emissions	**5**	**40**	**28**	**-**	**6**	**2**	**8,710**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

MITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	0.63	5.18	23.35	-	4.55	1.41	5,101.66
Fugitive Dust	-	-	-	-	3.91	0.82	-
Off-Road Diesel	0.63	5.18	23.35	-	0.64	0.59	5,101.66
Off-site Total	0.93	9.45	4.82	-	0.46	0.35	3,608.20
On-Road Diesel	0.90	9.40	3.78	-	0.44	0.34	3,390.72
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**1.56**	**14.63**	**28.17**	**-**	**5.01**	**1.76**	**8,709.86**
Tank Installation							
On-site Total	0.66	5.28	20.05	-	4.46	1.33	5,567.33
Fugitive Dust	-	-	-	-	3.91	0.82	-
Off-Road Diesel	0.66	5.28	20.05	-	0.55	0.51	5,567.33
Off-site Total	0.02	0.05	0.89	-	0.01	0.01	186.41
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.05	0.89	-	0.01	0.01	186.41
Grand Total	**0.68**	**5.33**	**20.94**	**-**	**4.47**	**1.34**	**5,753.74**
On-site Emissions Totals							
Site Prep	0.6	5.2	23.4	-	4.5	1.4	5,101.7
Tank Installation	0.7	5.3	20.1	-	4.5	1.3	5,567.3
Maximum On-site Emissions	**1**	**5**	**23**	**-**	**5**	**1**	**5,567**
Localized Significance Threshold[b]	--	45	735	--	27	4	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Site Prep	1.6	14.6	28.2	-	5.0	1.8	8,709.9
Tank Installation	0.7	5.3	20.9	-	4.5	1.3	5,753.7
Maximum Regional Emissions	**2**	**15**	**28**	**-**	**5**	**2**	**8,710**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\San Diego\10_Staff\Air Quality Staff\clearwater\Analysis\URBEMIS\Process Optimization\LCWRP.urb924

Project Name: LCWRP Process Optimization

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (lbs/day unmitigated)	5.28	40.41	28.17	0.03	15.89	1.73	17.62	3.33	1.59	4.93	8,709.86

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2018-1/1/2018 Active Days: 1	**5.28**	**40.41**	**28.17**	**0.03**	**15.89**	**1.73**	**17.62**	**3.33**	**1.59**	**4.93**	**8,709.86**
Mass Grading 01/01/2018-01/01/2018	5.28	40.41	28.17	0.03	15.89	1.73	17.62	3.33	1.59	4.93	8,709.86
Mass Grading Dust	0.00	0.00	0.00	0.00	15.76	0.00	15.76	3.29	0.00	3.29	0.00
Mass Grading Off Road Diesel	4.35	30.96	23.35	0.00	0.00	1.40	1.40	0.00	1.29	1.29	5,101.66
Mass Grading On Road Diesel	0.90	9.40	3.78	0.03	0.11	0.33	0.44	0.04	0.30	0.34	3,390.72
Mass Grading Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48

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Time Slice 1/2/2018-1/2/2018 Active Days: 1	4.53	31.66	20.94	0.00	15.77	1.33	17.10	3.30	1.22	4.52	5,753.75
Mass Grading 01/02/2018-01/02/2018	4.53	31.66	20.94	0.00	15.77	1.33	17.10	3.30	1.22	4.52	5,753.75
Mass Grading Dust	0.00	0.00	0.00	0.00	15.76	0.00	15.76	3.29	0.00	3.29	0.00
Mass Grading Off Road Diesel	4.50	31.61	20.05	0.00	0.00	1.32	1.32	0.00	1.22	1.22	5,567.33
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.02	0.05	0.89	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.41

Phase Assumptions

Phase: Mass Grading 1/1/2018 - 1/1/2018 - Tank Site Work

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 1.29

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 800

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/2/2018 - 1/2/2018 - Tank Installation

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 1.29

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

4/27/2010 8:32:52 AM

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

URBEMIS EMISISONS SUMMARY FOR ONSITE AND REGIONAL CONSTRUCTION ACTIVITIES

SJCWRP Process Optimization

UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	4.35	30.96	23.35	-	8.24	2.72	5,101.66
Fugitive Dust	-	-	-	-	6.84	1.43	-
Off-Road Diesel	4.35	30.96	23.35	-	1.40	1.29	5,101.66
Off-site Total	1.05	10.73	5.33	0.04	0.52	0.39	4,070.57
On-Road Diesel	1.02	10.68	4.29	0.04	0.50	0.38	3,853.09
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**5.40**	**41.69**	**28.68**	**0.04**	**8.76**	**3.11**	**9,172.23**
Tank Installation							
On-site Total	4.50	31.61	20.05	-	8.16	2.65	5,567.33
Fugitive Dust					6.84	1.43	
Off-Road Diesel	4.50	31.61	20.05	-	1.32	1.22	5,567.33
Off-site Total	0.02	0.05	0.89	-	0.01	0.01	186.41
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.05	0.89	-	0.01	0.01	186.41
Grand Total	**4.52**	**31.66**	**20.94**	**-**	**8.17**	**2.66**	**5,753.74**
On-site Emissions Totals							
Site Prep	4.4	31.0	23.4	-	8.2	2.7	5,101.7
Tank Installation	4.5	31.6	20.1	-	8.2	2.7	5,567.3
Maximum On-site Emissions	**5**	**32**	**23**	**-**	**8**	**3**	**5,567**
Localized Significance Threshold[b]	--	46	673	--	13	5	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Site Prep	5.4	41.7	28.7	0.0	8.8	3.1	9,172.2
Tank Installation	4.5	31.7	20.9	-	8.2	2.7	5,753.7
Maximum Regional Emissions	**5**	**42**	**29**	**0**	**9**	**3**	**9,172**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

MITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	0.63	5.18	23.35	-	7.48	2.02	5,101.66
Fugitive Dust	-	-	-	-	6.84	1.43	-
Off-Road Diesel	0.63	5.18	23.35	-	0.64	0.59	5,101.66
Off-site Total	1.05	10.73	5.33	0.04	0.52	0.39	4,070.57
On-Road Diesel	1.02	10.68	4.29	0.04	0.50	0.38	3,853.09
Worker Trips	0.03	0.05	1.04	-	0.02	0.01	217.48
Grand Total	**1.68**	**15.91**	**28.68**	**0.04**	**8.00**	**2.41**	**9,172.23**
Tank Installation							
On-site Total	0.66	5.28	20.05	-	7.39	1.94	5,567.33
Fugitive Dust	-	-	-	-	6.84	1.43	-
Off-Road Diesel	0.66	5.28	20.05	-	0.55	0.51	5,567.33
Off-site Total	0.02	0.05	0.89	-	0.01	0.01	186.41
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	0.02	0.05	0.89	-	0.01	0.01	186.41
Grand Total	**0.68**	**5.33**	**20.94**	**-**	**7.40**	**1.95**	**5,753.74**
On-site Emissions Totals							
Demolition	0.6	5.2	23.4	-	7.5	2.0	5,101.7
Site Grading	0.7	5.3	20.1	-	7.4	1.9	5,567.3
Maximum On-site Emissions	**1**	**5**	**23**	**-**	**7**	**2**	**5,567**
Localized Significance Threshold[b]	--	46	673	--	13	5	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Demolition	1.7	15.9	28.7	0.0	8.0	2.4	9,172.2
Site Grading	0.7	5.3	20.9	-	7.4	2.0	5,753.7
Maximum Regional Emissions	**2**	**16**	**29**	**0**	**8**	**2**	**9,172**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\Clearwater\Analysis\URBEMIS\Process Optimization\san jose creek wrp.urb924

Project Name: SJCWRP Process Optimization

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (lbs/day unmitigated)	5.40	41.69	28.68	0.04	27.39	1.78	29.17	5.74	1.63	7.37	9,172.23

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2018-1/1/2018 Active Days: 1	**5.40**	**41.69**	**28.68**	**0.04**	**27.39**	**1.78**	**29.17**	**5.74**	**1.63**	**7.37**	**9,172.23**
Mass Grading 01/01/2018-01/01/2018	5.40	41.69	28.68	0.04	27.39	1.78	29.17	5.74	1.63	7.37	9,172.23
Mass Grading Dust	0.00	0.00	0.00	0.00	27.25	0.00	27.25	5.69	0.00	5.69	0.00
Mass Grading Off Road Diesel	4.35	30.96	23.35	0.00	0.00	1.40	1.40	0.00	1.29	1.29	5,101.66
Mass Grading On Road Diesel	1.02	10.68	4.29	0.04	0.13	0.37	0.50	0.04	0.34	0.38	3,853.09
Mass Grading Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48

3/30/2010 11:10:18 PM

Time Slice 1/2/2018-1/2/2018 Active Days: 1	4.53	31.66	20.94	0.00	27.26	1.33	28.59	5.69	1.22	6.92	5,753.75
Mass Grading 01/02/2018-01/02/2018	4.53	31.66	20.94	0.00	27.26	1.33	28.59	5.69	1.22	6.92	5,753.75
Mass Grading Dust	0.00	0.00	0.00	0.00	27.25	0.00	27.25	5.69	0.00	5.69	0.00
Mass Grading Off Road Diesel	4.50	31.61	20.05	0.00	0.00	1.32	1.32	0.00	1.22	1.22	5,567.33
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.02	0.05	0.89	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.41

Phase Assumptions

Phase: Mass Grading 1/1/2018 - 1/1/2018 - Tank Site Work

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 2.23

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 909.09

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/2/2018 - 1/2/2018 - Tank Installation

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 2.23

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

3/30/2010 11:10:18 PM

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

URBEMIS EMISISONS SUMMARY FOR ONSITE AND REGIONAL CONSTRUCTION ACTIVITIES

SJCWRP Plant Expansion

UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	3.43	23.53	17.93	-	11.73	3.15	4,715.67
Fugitive Dust	-	-	-	-	10.75	2.25	-
Off-Road Diesel	3.43	23.53	17.93	-	0.98	0.90	4,715.67
Off-site Total	0.75	6.44	3.12	0.05	0.36	0.23	5,272.48
On-Road Diesel	0.74	6.42	2.75	0.05	0.35	0.22	5,086.08
Worker Trips	0.01	0.02	0.37	-	0.01	0.01	186.40
Grand Total	**4.18**	**29.97**	**21.05**	**0.05**	**12.09**	**3.38**	**9,988.15**
Install							
On-site Total	0.31	1.97	2.93	-	10.86	2.35	458.26
Fugitive Dust					10.75	2.25	
Off-Road Diesel	0.31	1.97	2.93	-	0.11	0.10	458.26
Off-site Total	-	0.01	0.12	-	-	-	62.13
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	-	0.01	0.12	-	-	-	62.13
Grand Total	**0.31**	**1.98**	**3.05**	**-**	**10.86**	**2.35**	**520.39**
On-site Emissions Totals							
Site Prep	3.4	23.5	17.9	-	11.7	3.2	4,715.7
Install	0.3	2.0	2.9	-	10.9	2.4	458.3
Maximum On-site Emissions	**3**	**24**	**18**	**-**	**12**	**3**	**4,716**
Localized Significance Threshold[b]	--	53	1,113	--	29	9	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Site Prep	4.2	30.0	21.1	0.1	12.1	3.4	9,988.2
Install	0.3	2.0	3.1	-	10.9	2.4	520.4
Maximum Regional Emissions	**4**	**30**	**21**	**0**	**12**	**3**	**9,988**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

MITIGATED CONSTRUCTION EMISSIONS (pounds per day)

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Site Prep							
On-site Total	0.50	3.93	17.93	-	11.18	2.65	4,715.67
Fugitive Dust	-	-	-	-	10.75	2.25	-
Off-Road Diesel	0.50	3.93	17.93	-	0.43	0.40	4,715.67
Off-site Total	0.75	6.44	3.12	0.05	0.36	0.23	5,272.48
On-Road Diesel	0.74	6.42	2.75	0.05	0.35	0.22	5,086.08
Worker Trips	0.01	0.02	0.37	-	0.01	0.01	186.40
Grand Total	**1.25**	**10.37**	**21.05**	**0.05**	**11.54**	**2.88**	**9,988.15**
Install							
On-site Total	0.04	0.33	2.93	-	10.81	2.31	458.26
Fugitive Dust	-	-	-	-	10.75	2.25	-
Off-Road Diesel	0.04	0.33	2.93	-	0.06	0.06	458.26
Off-site Total	-	0.01	0.12	-	-	-	62.13
On-Road Diesel	-	-	-	-	-	-	-
Worker Trip	-	0.01	0.12	-	-	-	62.13
Grand Total	**0.04**	**0.34**	**3.05**	**-**	**10.81**	**2.31**	**520.39**
On-site Emissions Totals							
Demolition	0.5	3.9	17.9	-	11.2	2.6	4,715.7
Site Grading	0.0	0.3	2.9	-	10.8	2.3	458.3
Maximum On-site Emissions	**1**	**4**	**18**	**-**	**11**	**3**	**4,716**
Localized Significance Threshold[b]	--	53	1,113	--	29	9	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Regional Emissions Totals							
Demolition	1.3	10.4	21.1	0.1	11.5	2.9	9,988.2
Site Grading	0.0	0.3	3.1	-	10.8	2.3	520.4
Maximum Regional Emissions	**1**	**10**	**21**	**0**	**12**	**3**	**9,988**
Regional Significance Threshold	75	100	550	150	150	55	--
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\San Diego\10_Staff\Air Quality Staff\LACSD Clearwater\Construction\Construction_URBEMIS runs\SJCWRP Plant Expansion_year 2035.urb924

Project Name: SJCWRP Plant Expansion

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2035 TOTALS (lbs/day unmitigated)	4.18	29.97	21.05	0.05	10.93	1.17	12.10	2.30	1.07	3.38	9,988.15

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

6/2/2011 2:40:31 PM

Time Slice 1/1/2035-1/1/2035 Active Days: 1	**4.18**	**29.97**	**21.05**	**0.05**	**10.93**	**1.17**	**12.10**	**2.30**	**1.07**	**3.38**	**9,988.15**
Mass Grading 01/01/2035-01/01/2035	4.18	29.97	21.05	0.05	10.93	1.17	12.10	2.30	1.07	3.38	9,988.15
Mass Grading Dust	0.00	0.00	0.00	0.00	10.75	0.00	10.75	2.25	0.00	2.25	0.00
Mass Grading Off Road Diesel	3.43	23.53	17.93	0.00	0.00	0.98	0.98	0.00	0.90	0.90	4,715.67
Mass Grading On Road Diesel	0.74	6.42	2.75	0.05	0.17	0.18	0.35	0.06	0.17	0.22	5,086.08
Mass Grading Worker Trips	0.01	0.02	0.37	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.40
Time Slice 1/2/2035-1/2/2035 Active Days: 1	0.31	1.98	3.05	0.00	10.76	0.11	10.87	2.25	0.10	2.35	520.39
Mass Grading 01/02/2035-01/02/2035	0.31	1.98	3.05	0.00	10.76	0.11	10.87	2.25	0.10	2.35	520.39
Mass Grading Dust	0.00	0.00	0.00	0.00	10.75	0.00	10.75	2.25	0.00	2.25	0.00
Mass Grading Off Road Diesel	0.31	1.97	2.93	0.00	0.00	0.11	0.11	0.00	0.10	0.10	458.26
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.13

Phase Assumptions

Phase: Mass Grading 1/1/2035 - 1/1/2035 - Site Prep

Total Acres Disturbed: 3.54

Maximum Daily Acreage Disturbed: 0.88

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 1200

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

6/2/2011 2:40:31 PM

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/2/2035 - 1/2/2035 - Install

Total Acres Disturbed: 3.54

Maximum Daily Acreage Disturbed: 0.88

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Program Construction

OFFROAD Emission Reductions

JWPCP Solids Processing

Phase I

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
2	Excavators	168	336	18%	72%	86%	44%	13%	16%	8%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	9%	72%	86%	44%	7%	8%	4%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equipment	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipment	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	39%	72%	85%	61%	28%	33%	24%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
1	Scrapers	313	313	17%	72%	85%	61%	12%	15%	10%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	6%	72%	86%	44%	4%	5%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	10%	72%	85%	62%	7%	9%	6%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
8	**Piece(s) of Equipment**	**Total HP**	**1834**	**100%**				**72%**	**85%**	**55%**

Phase II

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
1	Cranes	399	399	44%	72%	85%	61%	32%	38%	27%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
2	Forklifts	145	290	32%	72%	86%	44%	23%	28%	14%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
0	Graders	174	0	0%	72%	86%	44%	0%	0%	0%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equipment	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipment	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
0	Rubber Tired Dozers	357	0	0%	72%	85%	61%	0%	0%	0%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
2	Tractors/Loaders/Backhoes	108	216	24%	72%	86%	44%	17%	20%	11%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
0	Water Trucks	189	0	0%	72%	85%	62%	0%	0%	0%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
5	**Piece(s) of Equipment**	**Total HP**	**905**	**100%**				**72%**	**86%**	**52%**

Source for reductions: http://www.aqmd.gov/ceqa/handbook/mitigation/offroad/TableII.xls

Program Construction

OFFROAD Emission Reductions

LBWRP Process Optimization

Phase I

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
2	Excavators	168	336	22%	72%	86%	44%	16%	19%	10%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	11%	72%	86%	44%	8%	10%	5%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equipment	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipment	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	47%	72%	85%	61%	34%	40%	29%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	7%	72%	86%	44%	5%	6%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	12%	72%	85%	62%	9%	11%	8%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
7	**Piece(s) of Equipment**	**Total HP**	**1521**	**100%**				**72%**	**85%**	**54%**

Phase II

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	10%	72%	86%	44%	8%	9%	5%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
1	Off Highway Trucks	479	479	29%	72%	85%	61%	21%	25%	17%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equipment	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipment	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	43%	72%	85%	61%	31%	37%	26%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	6%	72%	86%	44%	5%	6%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	11%	72%	85%	62%	8%	10%	7%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
6	**Piece(s) of Equipment**	**Total HP**	**1664**	**100%**				**72%**	**85%**	**58%**

Program Construction

OFFROAD Emission Reductions

POWRP Process Optimization

Phase I

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
1	Excavators	168	168	17%	72%	86%	44%	12%	14%	7%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	17%	72%	86%	44%	13%	15%	8%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
1	Rubber Tired Dozers	357	357	36%	72%	85%	61%	26%	31%	22%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	11%	72%	86%	44%	8%	9%	5%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	19%	72%	85%	62%	14%	16%	12%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
5	**Piece(s) of Equipment**	**Total HP**	**996**	**100%**				**72%**	**85%**	**54%**

Phase II

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	13%	72%	86%	44%	10%	11%	6%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
1	Off Highway Trucks	479	479	37%	72%	85%	61%	26%	31%	22%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
1	Rubber Tired Dozers	357	357	27%	72%	85%	61%	20%	23%	17%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	8%	72%	86%	44%	6%	7%	4%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	14%	72%	85%	62%	10%	12%	9%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
5	**Piece(s) of Equipment**	**Total HP**	**1307**	**100%**				**72%**	**85%**	**57%**

Program Construction

OFFROAD Emission Reductions

LCWRP Process Optimization

Phase I

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
2	Excavators	168	336	22%	72%	86%	44%	16%	19%	10%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	11%	72%	86%	44%	8%	10%	5%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	47%	72%	85%	61%	34%	40%	29%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	7%	72%	86%	44%	5%	6%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	12%	72%	85%	62%	9%	11%	8%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
7	**Piece(s) of Equipment**	**Total HP**	**1521**	**100%**				**72%**	**85%**	**54%**

Phase II

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	10%	72%	86%	44%	8%	9%	5%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
1	Off Highway Trucks	479	479	29%	72%	85%	61%	21%	25%	17%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	43%	72%	85%	61%	31%	37%	26%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	6%	72%	86%	44%	5%	6%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	11%	72%	85%	62%	8%	10%	7%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
6	**Piece(s) of Equipment**	**Total HP**	**1664**	**100%**				**72%**	**85%**	**58%**

Program Construction

OFFROAD Emission Reductions

SJCWRP Process Optimization

Phase I

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
2	Excavators	168	336	22%	72%	86%	44%	16%	19%	10%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	11%	72%	86%	44%	8%	10%	5%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	47%	72%	85%	61%	34%	40%	29%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	7%	72%	86%	44%	5%	6%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	12%	72%	85%	62%	9%	11%	8%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
7	**Piece(s) of Equipment**	**Total HP**	**1521**	**100%**				**72%**	**85%**	**54%**

Phase II - Site Grading

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	10%	72%	86%	44%	8%	9%	5%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
1	Off Highway Trucks	479	479	29%	72%	85%	61%	21%	25%	17%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
2	Rubber Tired Dozers	357	714	43%	72%	85%	61%	31%	37%	26%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	6%	72%	86%	44%	5%	6%	3%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	11%	72%	85%	62%	8%	10%	7%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
6	**Piece(s) of Equipment**	**Total HP**	**1664**	**100%**				**72%**	**85%**	**58%**

Program Construction

OFFROAD Emission Reductions

SJCWRP Plant Expansion

Phase I

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
0	Forklifts	145	0	0%	72%	86%	44%	0%	0%	0%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
1	Graders	174	174	14%	72%	86%	44%	10%	12%	6%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
1	Rubber Tired Dozers	357	357	29%	72%	85%	61%	21%	24%	17%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
1	Scrapers	313	313	25%	72%	85%	61%	18%	21%	15%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
2	Tractors/Loaders/Backhoes	108	216	17%	72%	86%	44%	12%	15%	8%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
1	Water Trucks	189	189	15%	72%	85%	62%	11%	13%	9%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
6	**Piece(s) of Equipment**	**Total HP**	**1249**	**100%**				**72%**	**85%**	**56%**

Phase II

Quantity	Equipment	Unit HP	Total HP	Weighting	Actual Emissions Reductions (percent)			Weighted Emissions Reductions (percent)		
					NOx	ROG	PM	NOx	ROG	PM
0	Aerial Lifts	60	0	0%	72%	90%	50%	0%	0%	0%
0	Air Compressors	106	0	0%	72%	86%	44%	0%	0%	0%
0	Bore/Drill Rigs	291	0	0%	72%	85%	62%	0%	0%	0%
0	Cement and Mortar Mixers	10	0	0%	72%	90%	50%	0%	0%	0%
0	Concrete/Industrial Saws	10	0	0%	72%	90%	50%	0%	0%	0%
0	Cranes	399	0	0%	72%	85%	61%	0%	0%	0%
0	Crawler Tractor	147	0	0%	72%	86%	44%	0%	0%	0%
0	Crushing/Processing Equip	142	0	0%	72%	86%	44%	0%	0%	0%
0	Dumpers/Tenders	16	0	0%	72%	90%	50%	0%	0%	0%
0	Excavators	168	0	0%	72%	86%	44%	0%	0%	0%
1	Forklifts	145	145	57%	72%	86%	44%	41%	49%	25%
0	Generator Sets	49	0	0%	72%	90%	50%	0%	0%	0%
0	Graders	174	0	0%	72%	86%	44%	0%	0%	0%
0	Off Highway Tractors	267	0	0%	72%	85%	62%	0%	0%	0%
0	Off Highway Trucks	479	0	0%	72%	85%	61%	0%	0%	0%
0	Other Equipment	190	0	0%	72%	85%	62%	0%	0%	0%
0	Other General Light Industrial Equi	238	0	0%	72%	85%	62%	0%	0%	0%
0	Other Material Handling Equipmen	191	0	0%	72%	85%	62%	0%	0%	0%
0	Pavers	100	0	0%	72%	86%	44%	0%	0%	0%
0	Paving Equipment	104	0	0%	72%	86%	44%	0%	0%	0%
0	Plate Compactors	8	0	0%	72%	90%	50%	0%	0%	0%
0	Pressure Washers	1	0	0%	72%	90%	50%	0%	0%	0%
0	Pumps	53	0	0%	72%	90%	50%	0%	0%	0%
0	Rollers	95	0	0%	72%	86%	44%	0%	0%	0%
0	Rough Terrain Forklifts	93	0	0%	72%	86%	44%	0%	0%	0%
0	Rubber Tired Dozers	357	0	0%	72%	85%	61%	0%	0%	0%
0	Rubber Tired Loaders	164	0	0%	72%	86%	44%	0%	0%	0%
0	Scrapers	313	0	0%	72%	85%	61%	0%	0%	0%
0	Signal Boards	15	0	0%	72%	90%	50%	0%	0%	0%
0	Skid Steer Loaders	44	0	0%	72%	90%	50%	0%	0%	0%
0	Surfacing Equipment	362	0	0%	72%	85%	61%	0%	0%	0%
0	Sweepers/Scrubbers	91	0	0%	72%	90%	50%	0%	0%	0%
1	Tractors/Loaders/Backhoes	108	108	43%	72%	86%	44%	31%	37%	19%
0	Trenchers	63	0	0%	72%	90%	50%	0%	0%	0%
0	Water Trucks	189	0	0%	72%	85%	62%	0%	0%	0%
0	Welders	45	0	0%	72%	90%	50%	0%	0%	0%
2	**Piece(s) of Equipment**	**Total HP**	**253**	**100%**				**72%**	**86%**	**44%**

Program Operations Calculations

Program Operations

JWPCP STATIONARY SOURCE CALCULATIONS

Methodology

Emission Factors for stationary sources from LACSD for 2008 and per SCAQMD rules in future years
future year emission factors are assumed to be the same, except for NOx emission factors, which are lower to abide by SCAQMD BACT's
Existing emissions based on 2008 AER, divided by 365.25 days to get average daily emissions

Scaling

4.73 MGD capacity of anaerobic digestion system - EXISTING
5.82 MGD capacity of anaerobic digestion system - 2050
23% increase in solids handling

3,178.87 mmscf gas used in 2008
3,910.01 mmscf projected based on increase in flow
731.14 net increase in gas, all sent to flares

constants	
days per year	365.25
PM10 of PM	0.994
PM2.5 of PM	0.992
for flares	
PM2.5 of PM	1.00

Emissions from the Annual Emissions Report for JWPCP (from the AER, to get Baseline

	Device Description	Annual Usage	2008 AER Emissions pounds per year Organic Gases	NOx	SOx	CO	PM
B1 - Permitted Annual Emissions from Fuel Combustion in Boilers, Ovens, Furnaces, and Heaters	Digester Gas Boilers	534.58	5,757	9,777	1,924	91	4,956
	Flare Stations	1.05	2	38	4	7	5
	Standby Boiler	2.16	12	47	1	16	16
	Laboratory Boilers	11.91	66	105	7	412	91
	Portable Pressure Washer - Diesel	0.6	0	1	0	0	0
B1U - Non-permitted Annual Emissions from Fuel Combustion in Boilers, Ovens, Furnaces, and Heaters	Hot Water Heater - nat. gas	2.96	16	296	2	249	23
B2 - Permitted Annual Emissions from Fuel Combustion - Internal Combustion Engines and Turbines	Stationary Turbines	2851.7	4,933	146,463	9,639	104,372	37,899
	SIPS	155.93	917	352	94	10,605	1,559
	PEPS	1.52	35	205	5	242	17
	Stationary Diesel Engines	0.08	3	39	0	8	3
	Stationary Diesel Engines Lab Annex	0.01	0	2	0	1	0
B2U - Non-permitted Annual Emissions from Fuel Combustion - Internal Combustion Engines and Turbines	Portable Diesel Engines	2.82	106	1,323	1	288	95
	Portable Gasoline Powered Engines	2.85	587	291	15	11,229	19
B3 - Permitted Annual Emissions from the Use of Organics	All Organics	NA	815	0	0	0	0
B4 - Permitted Annual Equipment Emissions from Miscellaneous Sources	Sewage and wastewater treatment	108167.74	35,555	0	21,201	0	0
	Gasoline Storage and Dispensing	44.19	80	0	0	0	0
B4U - Non-permitted Annual Equipment Emissions from Miscellaneous Sources	Laboratory Solvents	2000	297	0	0	0	0
	Cooling Towers	0.05	0	0	0	0	343
	Diesel Storage and Dispensing	53	1	0	0	0	0
	Total		**49,181**	**158,940**	**32,893**	**127,520**	**45,024**

Emissions from Increased Digester Gas

23% increase in solids handling
3,178.87 mmscf gas used in 2008
3,910.01 mmscf projected based on increase in flow
731.14 net increase in gas, all assumed to be combusted using worst-case flare or boiler emission factors

Emission Factors in lb/mmcf for JWPCP Digester Gas
(From 2008 Emissions Report Unless Otherwise Noted)

	VOC	NOx	SOx	CO	PM	
Boilers	10.77	11.79	3.6	0.17	9.27	NOx EF from Rule 1146
Flares	1.72	36.23	3.6	7.13	4.93	
worse case	10.77	36.23	3.6	7.13	9.27	(multiply worst-case EF by net increase in digester gas)
Emissions (pounds/yr)	7874.4	26489.2	2632.1	5213.0	6737.0	6737.0
Emissions (pounds/day)	21.6	72.5	7.2	14.3	18.4	18.4

Emissions from other stationary sources

Form	Existing (pounds per day) VOC	CO	NOx	SOx	PM10	PM2.5	scale?	Project 2050 (pounds per day) VOC	CO	NOx	SOx	PM10	PM2.5
Digester Gas Boilers	15.8	0.2	26.8	5.3	13.5	13.4	No	15.8	0.2	26.8	5.3	13.5	13.4
Flare Stations	0.0	0.0	0.1	0.0	0.0	0.0	No	0.0	0.0	0.1	0.0	0.0	0.0
Standby Boiler	0.0	0.0	0.1	0.0	0.0	0.0	No	0.0	0.0	0.1	0.0	0.0	0.0
Laboratory Boilers	0.2	1.1	0.3	0.0	0.2	0.2	No	0.2	1.1	0.3	0.0	0.2	0.2
Portable Pressure Washer - Diesel	0.0	0.0	0.0	0.0	0.0	0.0	No	0.0	0.0	0.0	0.0	0.0	0.0
Hot Water Heater - nat. gas	0.0	0.7	0.8	0.0	0.1	0.1	No	0.0	0.7	0.8	0.0	0.1	0.1
Stationary Turbines	13.5	285.8	401.0	26.4	103.1	102.3	No	13.5	285.8	401.0	26.4	103.1	102.3
SIPS	2.5	29.0	1.0	0.3	4.2	4.2	No	2.5	29.0	1.0	0.3	4.2	4.2
PEPS	0.1	0.7	0.6	0.0	0.0	0.0	No	0.1	0.7	0.6	0.0	0.0	0.0
Stationary Diesel Engines	0.0	0.0	0.1	0.0	0.0	0.0	No	0.0	0.0	0.1	0.0	0.0	0.0
Stationary Diesel Engines Lab Annex	0.0	0.0	0.0	0.0	0.0	0.0	No	0.0	0.0	0.0	0.0	0.0	0.0
Portable Diesel Engines	0.3	0.8	3.6	0.0	0.3	0.3	No	0.3	0.8	3.6	0.0	0.3	0.3
Portable Gasoline Powered Engines	1.6	30.7	0.8	0.0	0.1	0.1	No	1.6	30.7	0.8	0.0	0.1	0.1
All Organics	2.2	0.0	0.0	0.0	0.0	0.0	No	2.2	0.0	0.0	0.0	0.0	0.0
Sewage and wastewater treatment	-	0.0	0.0	58.0	0.0	0.0	Yes	-	0.0	0.0	71.4	0.0	0.0
Gasoline Storage and Dispensing	0.2	0.0	0.0	0.0	0.0	0.0	No	0.2	0.0	0.0	0.0	0.0	0.0
Laboratory Solvents	0.8	0.0	0.0	0.0	0.0	0.0	No	0.8	0.0	0.0	0.0	0.0	0.0
Cooling Towers	0.0	0.0	0.0	0.0	0.9	0.9	No	0.0	0.0	0.0	0.0	0.9	0.9
Diesel Storage and Dispensing	0.0	0.0	0.0	0.0	0.0	0.0	No	0.0	0.0	0.0	0.0	0.0	0.0
total from above	37.3	349.1	435.2	90.1	122.5	121.6		37.3	349.1	435.2	103.4	122.5	121.6
Extra Digester Gas								21.6	14.3	72.5	7.2	18.4	18.4
Wastewater VOCs	**98.3**							100.1					
Total	**135.6**	**349.1**	**435.2**	**90.1**	**122.5**	**121.6**		**158.9**	**363.4**	**507.7**	**110.6**	**141.0**	**140.0**

Program Operations

JWPCP WASTEWATER TREATMENT ROG/VOC EMISSION CALCULATIONS

Process	1993 Partial Secondary Facility JEIP lb/yr	2008 Full Secondary Facility Estimate lb/yr	notes	Scale to 2050?	2050	
Headworks - Ducted	7195.23	7307	1	No	7,307	
Septage Dumping Facility	162.19	164.7	1	No	164.7	
Grit Removal - Aerated	1223.08	1242	1	No	1,242	
Primary Sed. Tanks	1877	1906	1	No	1,906	
Skimmings Concentration	22.97	23.3	1	No	23.3	
Secondary Influent Channel		317.5	2	No	317.5	
Pure Oxygen Reactors		16005	2	No	16,005	
Mixed Liquor Channel		753.9	2	No	753.9	
Secondary Clarifiers	1446.17	5286.7	2	No	5,286.7	net
DAF	69.02	**136.6**	3	Yes	**168.0**	*31*
Digester Leaks	4.2	**5.0**	4	Yes	**6.1**	*1*
Centrifuges	285.07	**337.3**	4	Yes	**414.9**	*78*
Conveyor Belts	1.52	**1.8**	4	Yes	**2.2**	*0*
Cake Storage	258.28	**305.6**	4	Yes	**375.9**	*70*
Truck Loading Operations	2.37	**2.8**	4	Yes	**3.4**	*1*
Digester Cleanings Storage	54.25	**64.2**	4	Yes	**78.9**	*15*
Digester Cleaning Buildings	138.84	**164.3**	4	Yes	**202.1**	*38*
Sludge Screening	1577.36	**1866**	4	Yes	**2,295**	*429*
						663
Plant Flow During Testing	291	296	MGD			
Plant Secondary Flow	200	296	MGD			
Average Number of Secondary Treatment Reactors in Service:		6.33				
Full Secondary Base Year Sum:		**35,891**	**lb/yr**		**36,554 lb/yr**	
		98.3	**lbs/day**		**100.1 lbs/day**	
2005 factor:		121.4	lb/mgy			
Full Secondary Emission Factor:		**0.3327**	lb/MG			

Notes:

1 - Simple ratio of **full** plant flows for full secondary / partial secondary
2 - Result of direct field measurement
3 - Simple ratio of TWAS flows only secondary applied to solids processes
4 - Simple ratio of TOTAL sludge flows

days per year	365.25
scaling	23%

Program Operations

SJCWRP STATIONARY SOURCE CALCULATIONS

Methodology

Emission Factors for stationary sources from LACSD for 2008 and per SCAQMD rules in future years
Future year emission factors are assumed to be the same, except for NOx emission factors, which are lower to abide by SCAQMD BACT's
Existing emissions based on 2008 AER, divided by 365.25 days to get average daily emissions

Scaling

28803.3	MG in 2008
365.25	*days per year*
78.86	MGD Average in 2008
125	MGD Capacity in 2050
59%	% increase based on 2050 capacity

Emission Factors

		lbs/mmscf				
		VOCs	NOx	SO2	CO	PM
2008	Central Plant Hot Water Heaters	1.00	27.09	0.60	27.55	7.60
2050	Central Plant Hot Water Heaters	1.00	11.473	0.60	27.55	7.60

1) The two existing Natural Gas Boilers will be replaced with three smaller new boilers by 2013 to comply with up-coming NOx requirements of 9 ppm, boilers will meet BACT standards for all pollutants.
New NOx Emission Factor to Comply with 1146 would then be 11.473 lb NOx / mmcf natural g *-58%*

Emissions from the Annual Emissions Report for SJCWRP (from the 2008 AER)			2008 AER Emissions				
			pounds per year				
	Device Description	**Annual Usage**	**Organic Gases**	**NOx**	**SOx**	**CO**	**PM**
B1 - Permiitted Annual Emissions from Fuel Combusiton in Boilers, Ovens, Furnaces, and Heaters	Central Plant Hot Water Heaters	15	15	397	9	403	111
B1U - Non-permitted Annual Emissions from Fuel Combustion in Boilers, Ovens, Furnaces, and Heaters	Hot Water Heater	1	4	74	0	62	6
B2 - Permitted Annual Emissions from Fuel Combustion - Internal Combustion Engines and Turbines	Standby Stationary Emergency Generator	4	163	2,040	1	444	146
B2U - Non-permitted Annual Emissions from Fuel Combustion - Internal Combustion	Portable Diesel Powered Equipment	0	5	56	0	12	4
	Portable Gasoline Powered Equipment	1	89	86	4	3,325	5
B3U - Non-Permitted Annual Emissions from the Use of Organics	(Summed all sources of organics)	NA	446	0	0	0	0
B4 - Permitted Annual Equipment Emissions from Miscellanseous Sources	Sewage and wastewater treatment (east)	18475	5,288	0	0	0	0
	Sewage and wastewater treatment (west)	10328	2,956	0	0	0	0
	Gasoline Storage and Dispensing	108	195	0	0	0	0
B4U - Non-permitted Annual Equipment Emissions from Miscellanseous Sources	Laboratory Activities	16000	419	0	0	0	0
			9,579	**2,653**	**15**	**4,246**	**272**

Daily emission calcs

	Existing (pounds per day, average)							Project 2050 (pounds per day, PEAK)					
Source	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**scale?**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Central Plant Hot Water Heaters	0.04	1.10	1.09	0.02	0.303	0.3010	No	0.04	1.10	0.63	0.02	0.30	0.30
Hot Water Heater	0.01	0.17	0.20	0.00	0.015	0.0151	No	0.01	0.17	0.20	0.00	0.02	0.02
Standby Stationary Emergency Generator	0.45	1.21	5.59	0.00	0.383	0.3677	No	0.45	1.21	5.59	0.00	0.38	0.37
Portable Diesel Powered Equipment	0.01	0.03	0.15	0.00	0.011	0.0105	No	0.01	0.03	0.15	0.00	0.01	0.01
Portable Gasoline Powered Equipment	0.24	9.10	0.24	0.01	0.015	0.0149	No	0.24	9.10	0.24	0.01	0.01	0.01
(Summed all sources of organics)	1.22	0.00	0.00	0.00	0.000	0.0000	No	1.22	0.00	0.00	0.00	0.00	0.00
Sewage and wastewater treatment (east)	14.48	0.00	0.00	0.00	0.000	0.0000	No	14.48	0.00	0.00	0.00	0.00	0.00
Sewage and wastewater treatment (west)	8.09	0.00	0.00	0.00	0.000	0.0000	Yes	12.83	0.00	0.00	0.00	0.00	0.00
Gasoline Storage and Dispensing	0.53	0.00	0.00	0.00	0.000	0.0000	No	0.53	0.00	0.00	0.00	0.00	0.00
Laboratory Activities	1.15	0.00	0.00	0.00	0.000	0.0000	No	1.15	0.00	0.00	0.00	0.00	0.00
total	26.2	11.6	7.3	0.0	0.7	0.7		31.0	11.6	6.8	0.0	0.7	0.7

Program Operations

SJCWRP EMERGENCY GENERATOR EMISSION CALCULATIONS

Assumes a Tier 4 2000 HP generator

Emsision standards from EPA420-P-03-002: http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf
ROG converted from HC using a 1.053 multiplier
CO2 and SO2 emission factors calculated using equations 6 and 7 on page 24 of EPA420-P-03-002

Emission Standards

						1.053				
		grams per hp-hr								
		CO	NOX	PM10	PM2.5	ROG	SO2	CO2	HC	BSCF
Tier 4 Final	>1200 HP gen set	0.7642	0.46	0.069	-	0.2964195	0.048733651	530.1334357	0.2815	0.367

Emission Calculations

Equipment	Number	Equipment Model Year	Annual Hours Use	Load Factor	Engine (hp)	Daily HP-HR		ROG	CO	NOX	SO2	PM10	PM2.5	N2O	CH4	CO2	CO2e
							Emission Factor (lb/hp-hr)	6.53E-04	1.68E-03	1.01E-03	1.07E-04	1.52E-04	1.40E-04	2.97623E-05	6.63929E-05	1.17E+00	--
Generator	1	2035 (Tier 4)	50	0.74	2000	1480	lbs/day (if run for 1 hr)	1.0	2.5	1.5	0.2	0.2	0.2	0.0	0.1	1729.7	--
							MTs/yr (assuming 50 hours of testing per year)							0.001	0.002	39	40

Conversions	
grams per pound	453.59237
PM2.5 fraction of PM	0.92
lbs to MT	0.000453592
tons to MT	0.90718474
GWP	
CO2	1
CH4	21
N2O	310

Emission Factors from Tier 4 Emission Standards
Emission Factor for N20 and CH4 based on ratio of N2O and CH4 to CO2 per gallon of diesel fuel in the GRP (CR 2011)

	kg/gallon	g/gallon	ratio
CO2	10.21	10210	
N2O		0.26	2.54652E-05
Ch4		0.58	5.68071E-05

SO2 Calculation for EF's

based on: http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf
g hp/hr or SO2 = (BSFC * 453.6 * (1-soxcnv)) - HC) * 0.01 * soxdsl * 2 *(equation 7, pg 24)*

Where:
BSFC = Brake Speci 0.408 *Table A4 for all HPs*
of fuel sulfur 0.02247 *Page C5*
HC = in-use adjuste from above
soxdsl = episodic
weight percent of 0.015
453.59
0.01
2

CO2 Calculation for EF's

based on: http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf
CO2 = (BSFC * 453.6 - HC) * 0.87 * (44/12) *(equation 6, pg 24)*

Where:
BSFC = Brake Specific Fuel 0.408 *Table A4 for all HPs*
HC = in-use adjusted hc er from above
carbon mass fraction of
diesel 0.87
ratio of CO2 to carbon ma 3.666666667
453.59

BIOSOLID HAULING EMISSION CALCULATIONS

Biosolids Hauling Emissions

Methodology

Biosolids hauling assumes an additional 20 hauling trips by 205
Increase in truck hauling trips is scaled linearly assuming 20 additional trucks over the next 42 year perio
Exhaust emission factors from EMFAC2007 - BURDEN mode was used for regional hauling emissions and on-site idling calculations (lbs per mile and lbs per trip). EMFAC mode was used assuming 5mph travel for onsite emissions.

Road Dust from EPA AP-42 Section 13.2.1 (2006)

Truck trips

20 more daily truck trips over 42 years
0.48 more trucks per year

Distances

5 mph ONSITE - Heavy-duty trucks travel on site
0.59 ONSITE - Miles traveled on-site per truck
119.2 REGIONAL - one-way miles to landfills (existing)
164.8 REGIONAL - one-way miles to landfills (project

VMT

Years to analyze	Truck Trips	REGIONAL Daily VMT (roundtrip)	ONSITE Daily VMT
2008	55	13110	32
2020	61	20007	36
2030	65	21577	39
2040	70	23146	41
2050	75	24715	44

Regional Emissions

	Criteria Pollutants						Greenhouse Gases							
			Pounds Per Day				Pounds per Day				Metric Tons Per Year			
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO2	N20	CH4	CO2e	CO2	N20	CH4	CO2e
2008 (baseline)														
Idling Emissions	0.6	2.0	4.3	0.1	0.1	0.1	268.5	0.0	0.0	269	44	0.0001	0.0001	45
VMT Emissions	41.0	154.2	520.3	0.5	27.0	23.9	53,118.2	0.1	0.1	53,164	8,800	0.0230	0.0244	8,808
Road Dust	--	--	--	--	284.8	42.7	--	--	--	--	--	--	--	--
Total	**41.6**	**156.3**	**524.6**	**0.6**	**311.8**	**66.7**	**53,386.6**	**0.1**	**0.1**	**53,433.0**	**8,844.8**	**0.0231**	**0.0245**	**8,852.5**
2020														
Idling Emissions	0.4	1.9	5.4	0.1	0.0	0.0	296.4	0.0	0.0	297	49	0.0001	0.0001	49
VMT Emissions	18.1	83.5	196.7	0.8	12.4	9.8	81,274.1	0.2	0.2	81,344	13,465	0.0351	0.0373	13,477
Road Dust	--	--	--	--	434.6	65.2	--	--	--	--	--	--	--	--
Total	**18.5**	**85.4**	**202.1**	**0.9**	**447.1**	**75.0**	**81,570.5**	**0.2**	**0.2**	**81,641.1**	**13,514.2**	**0.0352**	**0.0374**	**13,525.9**
2030														
Idling Emissions	0.4	2.3	6.8	0.1	0.0	0.0	365.9	0.0	0.0	366	61	0.0002	0.0002	61
VMT Emissions	11.7	61.7	121.2	0.9	8.9	6.4	87,526.7	0.2	0.2	87,603	14,501	0.0378	0.0402	14,514
Road Dust	--	--	--	--	468.7	70.3	--	--	--	--	--	--	--	--
Total	**12.1**	**64.0**	**128.0**	**1.0**	**477.6**	**76.7**	**87,892.6**	**0.2**	**0.2**	**87,968.8**	**14,561.6**	**0.0380**	**0.0404**	**14,574.2**
2040														
Idling Emissions	0.4	2.1	6.4	0.1	0.0	0.0	342.7	0.0	0.0	343	57	0.0001	0.0002	57
VMT Emissions	11.9	62.0	120.5	0.9	8.9	6.2	94,216.7	0.2	0.3	94,298	15,609	0.0406	0.0431	15,623
Road Dust	--	--	--	--	502.8	75.4	--	--	--	--	--	--	--	--
Total	**12.3**	**64.1**	**126.9**	**1.0**	**511.7**	**81.6**	**94,559.4**	**0.2**	**0.3**	**94,641.1**	**15,666.1**	**0.0407**	**0.0433**	**15,679.6**
2050														
Idling Emissions	0.4	2.3	6.8	0.1	0.0	0.0	365.9	0.0	0.0	366	61	0.0002	0.0002	61
VMT Emissions	12.7	66.2	128.7	1.0	9.5	6.6	100,604.3	0.3	0.3	100,691	16,668	0.0433	0.0460	16,682
Road Dust	--	--	--	--	536.9	80.5	--	--	--	--	--	--	--	--
Total	**13.1**	**68.5**	**135.5**	**1.1**	**546.3**	**87.2**	**100,970.2**	**0.3**	**0.3**	**101,057.4**	**16,728.2**	**0.0435**	**0.0462**	**16,742.7**
Max Daily with Program	**18.5**	**85.4**	**202.1**	**1.1**	**546.3**	**87.2**	**100,970.2**	**0.3**	**0.3**	**101,057.4**	**16,728.2**	**0.0**	**0.0**	**16,742.7**

On-site Emissions

			Pounds Per Day				Pounds per Day				Metric Tons Per Year			
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO2	N20	CH4	CO2e	CO2	N20	CH4	CO2e
2008 (baseline)														
VMT Emissions	0.97	2.12	3.20	0.00	0.23	0.21	271.10	0.00	0.00	271	45	0.0001	0.0001	45
Road Dust	--	--	--	--	0.70	0.11	--	--	--	--	--	--	--	--
Total	**0.97**	**2.12**	**3.20**	**0.00**	**0.93**	**0.31**	**271.10**	**0.00**	**0.00**	**271.22**	**44.91**	**0.00**	**0.00**	**44.93**
2020														
VMT Emissions	0.33	0.76	0.99	0.00	0.04	0.03	302.15	0.00	0.00	302	50	0.0001	0.0001	50
Road Dust	--	--	--	--	0.78	0.12	--	--	--	--	--	--	--	--
Total	**0.33**	**0.76**	**0.99**	**0.00**	**0.82**	**0.15**	**302.15**	**0.00**	**0.00**	**302.28**	**50.06**	**0.00**	**0.00**	**50.08**
2030														
VMT Emissions	0.22	0.53	0.64	0.00	0.01	0.01	326.28	0.00	0.00	326	54	0.0001	0.0001	54
Road Dust	--	--	--	--	0.84	0.13	--	--	--	--	--	--	--	--
Total	**0.22**	**0.53**	**0.64**	**0.00**	**0.85**	**0.14**	**326.28**	**0.00**	**0.00**	**326.42**	**54.06**	**0.00**	**0.00**	**54.08**
2040														
VMT Emissions	0.22	0.54	0.63	0.00	0.01	0.01	350.07	0.00	0.00	350	58	0.0001	0.0001	58
Road Dust	--	--	--	--	0.90	0.14	--	--	--	--	--	--	--	--
Total	**0.22**	**0.54**	**0.63**	**0.00**	**0.91**	**0.14**	**350.07**	**0.00**	**0.00**	**350.21**	**58.00**	**0.00**	**0.00**	**58.02**
2050														
VMT Emissions	0.23	0.57	0.68	0.00	0.02	0.01	373.80	0.00	0.00	374	62	0.0001	0.0001	62
Road Dust	--	--	--	--	0.96	0.14	--	--	--	--	--	--	--	--
Total	**0.23**	**0.57**	**0.68**	**0.00**	**0.98**	**0.15**	**373.80**	**0.00**	**0.00**	**373.96**	**61.93**	**0.00**	**0.00**	**61.96**

Program Operations

BIOSOLIDS HAULING - SUMMARY PER BASIN

Total Emissions

	TOTAL Emissions					
	ROG	**CO**	**NOx**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
CEQA Baseline	43	158	528	1	313	67
2020	19	86	203	1	448	75
2030	12	65	129	1	478	77
2040	12	65	128	1	513	82
2050	13	69	136	1	547	87
max	19	86	203	1	547	87
	-24	-72	-325	1	235	20

days per year	365.25
lbs to ton conversion	0.0005

% VMT per Basin

	% of miles in each air basin			
	SCAB	SDAB	SJVAB	SSAB
Baseline	58.51%	11.88%	19.47%	9.13%
Project	55.06%	10.18%	26.08%	7.82%

(see "distance to landfill" sheet)

Results

Pounds per Day

	SCAB					
	ROG	CO	NOx	SO_X	PM_{10}	$PM_{2.5}$
Project	10	47	112	1	301	48
CEQA Baseline	**25**	**93**	**309**	**0**	**183**	**39**
Increment	-15	-45	-197	0	118	9
regional thresholds	55	550	55	150	150	55
Significant?	No	No	No	No	No	No

	SDAB					
	ROG	CO	NOx	SO_X	PM_{10}	$PM_{2.5}$
Project	2	9	21	0	56	9
CEQA Baseline	**5**	**19**	**63**	**0**	**37**	**8**
Increment	-3	-10	-42	0	19	1
regional thresholds	75	550	250	250	100	55
Significant?	No	No	No	No	No	No

	SSAB					
	ROG	CO	NOx	SO_X	PM_{10}	$PM_{2.5}$
Project	1	7	16	0	43	7
CEQA Baseline	**4**	**14**	**48**	**0**	**29**	**6**
Increment	-2	-8	-32	0	14	1
regional thresholds	55	550	55	150	150	55
Significant?	No	No	No	No	No	No

	SJVAB						in tons per year **SJVAB**					
	ROG	CO	NOx	SO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NOx	SO_X	PM_{10}	$PM_{2.5}$
Project	5	22	53	0	143	23	1	4	10	0	26	4
CEQA Baseline	**8**	**31**	**103**	**0**	**61**	**13**	**2**	**6**	**19**	**0**	**11**	**2**
Increment	-3	-8	-50	0	82	10	-1	-2	-9	0	15	2
regional thresholds	55	55	-	-	-	-	10	10				
Significant?	No	No	No	No	No	No	No	No	No	No	No	No

DISTANCE TO BIOSOLID MANAGEMENT LOCATIONS

Methodology

Calculated a weighted mean to the biosolid management locations using the following equation

Assumptions

25 ton haul truck capacity
365.25 days per year

Future Biosolids Management Locations (Chapter 3)					Quantity (wtpy)		Quantity (wtpd)			truck trips per day			using low		using high		using avg		
Facility	Management Practice	Status	Location	Distance From JWPCP (miles)	low	high	Low	High	avg	low	high	avg	% of trips		% of trips		% of trips		
Westlake Farms	Composting	Expected in 2012	Kings County, CA	200	300,000	500,000	821.36	1,368.93	1,095.14	33	55	44	67%	133	33%	67	41%	82	
EnerTech	Renewable Fuel	Operating	Rialto, CA	75	50,000	150,000	136.89	410.68	273.79	5	16	11	11%	8	10%	8	10%	8	
South Kern Industrial Center	Composting	Operating	Kern County, CA	131	50,000	150,000	136.89	410.68	273.79	5	16	11	11%	15	10%	13	10%	13	
Inland Empire Regional Composting Facility	Composting	Operating	Rancho Cucamonga, CA	59	50,000	150,000	136.89	410.68	273.79	5	16	11	11%	7	10%	6	10%	6	
San Joaquin Composting Facility	Composting	Operating	Kern County, CA	170	0	150,000	0.00	410.68	205.34	0	16	8	0%	0	10%	17	8%	13	
Desert Ridge Farms	Land Application	Operating	Yuma County, AZ	300	0	150,000	0.00	410.68	205.34	0	16	8	0%	0	10%	30	8%	23	
Honey Bucket Farms	Land Application w/ Lime Stabilization	Operating	Kern County, CA	160	0	150,000	0.00	410.68	205.34	0	16	8	0%	0	10%	16	8%	12	
Mitsubishi Cement Corp	Injection for NO_x Control	Operating	San Bernardino County, CA	129	0	100,000	0.00	273.79	136.89	0	11	5	0%	0	7%	9	5%	7	
			total		450,000	1,500,000	1,232	4,107	2,669	49	164	107		**163**		**165**		**164**	**Miles (Weighted Mean)**

Existing Biosolids Management Practices (Chapter 2)					Quantity (wtpy)		Quantity (wtpd)			truck trips per day			using low		using high		using avg		
Facility	Management Practice	Status	Location	Distance From JWPCP (miles)	low	high	low	high	avg	low	high	avg	% of trips		% of trips		% of trips		
San Joaquin Composting Facility	Composting	Operating	Kern County, CA	170	50,000	150,000	136.89	410.68	273.79	5	16	11	18%	30	20%	34	20%	33	
South Kern Industrial Center	Composting	Operating	Kern County, CA	131	50,000	75,000	136.89	205.34	171.12	5	8	7	18%	23	10%	13	12%	16	
Inland Empire Regional Composting Facility	Composting	Operating	Rancho Cucamonga, CA	59	50,000	75,000	136.89	205.34	171.12	5	8	7	18%	11	10%	6	12%	7	
Honey Bucket Farms	Land Application w/ Lime Stabilization	Operating	Kern County, CA	160	25,000	75,000	68.45	205.34	136.89	3	8	5	9%	14	10%	16	10%	16	
Desert Ridge Farms	Land Application	Operating	Yuma County, AZ	300	25,000	75,000	68.45	205.34	136.89	3	8	5	9%	27	10%	30	10%	29	
EnerTech	Renewable Fuel	Operating	Rialto, CA	75	25,000	75,000	68.45	205.34	136.89	3	8	5	9%	7	10%	8	10%	7	
Mitsubishi Cement Corp	Injection for NO_x Control	Operating	San Bernardino County, CA	129	5,000	15,000	13.69	41.07	27.38	1	2	1	2%	2	2%	3	2%	3	
Puente Hills Landfill	Landfill Co-disposal	Operating	Los Angeles County, CA	27	50,000	200,000	136.89	547.57	342.23	5	22	14	18%	5	27%	7	25%	7	
				total	280,000	740,000	767	2,026	1,396	31	81	56		**119**		**118**		**118**	**Miles (Weighted Mean)**

Biosolid Hauling - VMT in each basin

Methodology

used Google Earth to map the distance traveled from JWPCP to the various landfills within each basin

output GIS shapefiles into kml file for use

Assumed Distances

scab north	86.5 miles
scab south	56.1 miles
sdab to ssab	123 miles
ssab to AZ	94.5 miles

			Miles Per Basin per trip			
			Future			
Future Facility	Basin of Facility	Distance From JWPCP (miles)	SCAB	SJV	SDAB	SSAB
Westlake Farms	SJV	200	86.5	113.5	--	--
EnerTech	SCAB	75	75	--	--	--
South Kern Industrial Center	SJV	131	86.5	44.5	--	--
Inland Empire Regional Composting Facility	SCAB	59	59	--	--	--
San Joaquin Composting Facility	SJV	170	86.5	83.5	--	--
Desert Ridge Farms	AZ	300	56.1	--	123	94.5
Honey Bucket Farms	SJV	160	86.5	73.5	--	--
Mitsubishi Cement Corp	SCAB	129	129	--	--	--
		1208	665.1	315	123	94.5
		> weighted distances in each basi	55.06%	26.08%	10.18%	7.82%

			Existing			
Existing Facility	Basin of Facility	Distance From JWPCP (miles)	SCAB	SJV	SDAB	SSAB
San Joaquin Composting Facility	SJV	170	86.5	83.5	--	--
South Kern Industrial Center	SJV	131	86.5	44.5	--	--
Inland Empire Regional Composting Facility	SCAB	59	59	--	--	--
Honey Bucket Farms	SJV	160	86.5	73.5	--	--
Desert Ridge Farms	AZ	300	56.1		123	94.5
EnerTech	SCAB	75	75	--	--	--
Mitsubishi Cement Corp	SCAB	129	129	--	--	--
Puente Hills Landfill	SCAB	27	27	--	--	--
		1035	605.6	201.5	123	94.5
		> weighted distances in each basi	58.51%	19.47%	11.88%	9.13%

Program Operations

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS ONSITE TRAVEL (5mph)

EMFAC 2007 on-site hauling emission factor - 2008

Title : South Coast AQMD Subarea Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 6/10/2010 10:30:42
Scen Year: 2008 -- All model years in the range 1965 to 2008 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2008 -- Model Years 1965 to 2008 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average South Coast AQMD

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	13.564	0	0	13.564

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	29.699	0	0	29.699

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	44.8	0	0	44.8

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3789.508	0	0	3789.508

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.036	0	0	0.036

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3.127	0	0	3.127

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.035	0	0	0.035

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.028	0	0	0.028

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3.088	0	0	3.088

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.621	0	0	2.621

Program Operations

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS
ONSITE TRAVEL (5mph)

EMFAC 2007 on-site hauling emission factor - 2020

Title : South Coast AQMD Subarea Annual 5 CYrs 2008 to 2040 Default
Version : Emfac2007 V2.3 Nov 1 2006 Title
Run Date : 6/10/2010 10:30:42
Scen Year: 2020 -- All model years in the range 1976 to 2020
Season : Annual selected
Area : South Coast AQMD

****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average South Coast AQMD

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	4.219	0	0	4.219

Pollutant Name: Carbon Monoxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	9.641	0	0	9.641

Pollutant Name: Oxides of Nitrogen Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	12.504	0	0	12.504

Pollutant Name: Carbon Dioxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3826.031	0	0	3826.031

Pollutant Name: Sulfur Dioxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.037	0	0	0.037

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.424	0	0	0.424

Pollutant Name: PM10 - Tire Wear Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.036	0	0	0.036

Pollutant Name: PM10 - Brake Wear Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.028	0	0	0.028

Pollutant Name: Gasoline - mi/gal Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3.182	0	0	3.182

Pollutant Name: Diesel - mi/gal Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.621	0	0	2.621

Program Operations

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS
ONSITE TRAVEL (5mph)

EMFAC 2007 on-site hauling emission factor - 2030

Title : South Coast AQMD Subarea Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 6/10/2010 10:30:42
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : South Coast AQMD

****

Year: 2030 -- Model Years 1986 to 2030 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average South Coast AQMD

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.553	0	0	2.553

Pollutant Name: Carbon Monoxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	6.275	0	0	6.275

Pollutant Name: Oxides of Nitrogen Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	7.488	0	0	7.488

Pollutant Name: Carbon Dioxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3831.069	0	0	3831.069

Pollutant Name: Sulfur Dioxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.037	0	0	0.037

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.111	0	0	0.111

Pollutant Name: PM10 - Tire Wear Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.036	0	0	0.036

Pollutant Name: PM10 - Brake Wear Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.028	0	0	0.028

Pollutant Name: Gasoline - mi/gal Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3.254	0	0	3.254

Pollutant Name: Diesel - mi/gal Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.621	0	0	2.621

Program Operations

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS ONSITE TRAVEL (5mph)

EMFAC 2007 on-site hauling emission factor - 2040

Title : South Coast AQMD Subarea Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 6/10/2010 10:30:42
Scen Year: 2040 -- All model years in the range 1996 to 2040 selected
Season : Annual
Area : South Coast AQMD

****

Year: 2040 -- Model Years 1996 to 2040 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average South Coast AQMD

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.371	0	0	2.371

Pollutant Name: Carbon Monoxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	5.859	0	0	5.859

Pollutant Name: Oxides of Nitrogen Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	6.931	0	0	6.931

Pollutant Name: Carbon Dioxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3831.709	0	0	3831.709

Pollutant Name: Sulfur Dioxide Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.037	0	0	0.037

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.09	0	0	0.09

Pollutant Name: PM10 - Tire Wear Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.036	0	0	0.036

Pollutant Name: PM10 - Brake Wear Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.028	0	0	0.028

Pollutant Name: Gasoline - mi/gal Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3.269	0	0	3.269

Pollutant Name: Diesel - mi/gal Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.621	0	0	2.621

Program Operations

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS
REGIONAL TRAVEL

EMFAC 2007 regional hauling emission factors - 2008
Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2008 -- All model years in the range 1965 to 2008 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	49391				
VMT/1000	9028	9028000			
Trips	249946				
Reactive Organic Gas Emissions					
Run Exh	14.12		28240	0.003128046	
Idle Exh	1.27		2540		0.010162195
Start Ex	0				

Total Ex	15.39				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	15.39				
Carbon Monoxide Emissions					
Run Exh	53.11		106220	0.011765618	
Idle Exh	4.6		9200		0.036807951
Start Ex	0				

Total Ex	57.71				
Oxides of Nitrogen Emissions					
Run Exh	179.14		358280	0.039685423	
Idle Exh	9.79		19580		0.078336921
Start Ex	0				

Total Ex	188.93				
Carbon Dioxide Emissions (000)					
Run Exh	18.29		36580000	4.051838724	
Idle Exh	0.61		1220000		4.881054308
Start Ex	0				

Total Ex	18.9				
PM10 Emissions					
Run Exh	8.73		17460	0.001933983	
Idle Exh	0.2		400		0.001600346
Start Ex	0				

Total Ex	8.93				
TireWear	0.36		720	7.97519E-05	
BrakeWr	0.28		560	6.20292E-05	

Total	9.57				
Lead	0				
SOx	0.18		360	3.98759E-05	0.001440311
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	1700.79				

EMFAC 2007 regional hauling emission factors - 2020
Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	65570				
VMT/1000	13761	13761000			
Trips	331816				
Reactive Organic Gas Emissions					
Run Exh	6.23		12460	0.000905457	
Idle Exh	1.04		2080		0.006268534
Start Ex	0				

Total Ex	7.28				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.28				
Carbon Monoxide Emissions					
Run Exh	28.7		57400	0.004171208	
Idle Exh	5.21		10420		0.031402946
Start Ex	0				

Total Ex	33.92				
Oxides of Nitrogen Emissions					
Run Exh	67.65		135300	0.009832134	
Idle Exh	14.76		29520		0.088964969
Start Ex	0				

Total Ex	82.41				
Carbon Dioxide Emissions (000)					
Run Exh	27.95		55900000	4.062204782	
Idle Exh	0.81		1620000		4.882223883
Start Ex	0				

Total Ex	28.76				
PM10 Emissions					
Run Exh	3.3		6600	0.000479616	
Idle Exh	0.06		120		0.000361646
Start Ex	0				

Total Ex	3.36				
TireWear	0.55		1100	7.99361E-05	
BrakeWr	0.43		860	6.24955E-05	

Total	4.33				
Lead	0				
SOx	0.27		540	3.92413E-05	0.001627408
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2588.03				

Program Operations

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS
REGIONAL TRAVEL

EMFAC 2007 regional hauling emission factors - 2030
Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	82364				
VMT/1000	17044	17044000			
Trips	416803				
Reactive Organic Gas Emissions					
Run Exh	4.62		9240	0.000542126	
Idle Exh	1.19		2380		0.005710132
Start Ex	0				

Total Ex	5.81				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	5.81				
Carbon Monoxide Emissions					
Run Exh	24.37		48740	0.002859657	
Idle Exh	6.37		12740		0.030565999
Start Ex	0				

Total Ex	30.75				
Oxides of Nitrogen Emissions					
Run Exh	47.87		95740	0.005617226	
Idle Exh	18.87		37740		0.090546373
Start Ex	0				

Total Ex	66.74				
Carbon Dioxide Emissions (000)					
Run Exh	34.57		69140000	4.056559493	
Idle Exh	1.01		2020000		4.846414253
Start Ex	0				

Total Ex	35.58				
PM10 Emissions					
Run Exh	2.3		4600	0.00026989	
Idle Exh	0.03		60		0.000143953
Start Ex	0				

Total Ex	2.32				
TireWear	0.68		1360	7.97935E-05	
BrakeWr	0.53		1060	6.2192E-05	

Total	3.53				
Lead	0				
SOx	0.34		680	3.98967E-05	0.001631466
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	3202.33				

EMFAC 2007 regional hauling emission factors - 2040
Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2040 -- All model years in the range 1996 to 2040 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	104492				
VMT/1000	21594	21594000			
Trips	528782				
Reactive Organic Gas Emissions					
Run Exh	5.54		11080	0.000513105	
Idle Exh	1.49		2980		0.005635593
Start Ex	0				

Total Ex	7.03				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.03				
Carbon Monoxide Emissions					
Run Exh	28.92		57840	0.002678522	
Idle Exh	8.05		16100		0.03044733
Start Ex	0				

Total Ex	36.98				
Oxides of Nitrogen Emissions					
Run Exh	56.22		112440	0.005207002	
Idle Exh	24		48000		0.090774648
Start Ex	0				

Total Ex	80.22				
Carbon Dioxide Emissions (000)					
Run Exh	43.95		87900000	4.07057516	
Idle Exh	1.29		2580000		4.879137338
Start Ex	0				

Total Ex	45.23				
PM10 Emissions					
Run Exh	2.61		5220	0.000241734	
Idle Exh	0.02		40		7.56455E-05
Start Ex	0				

Total Ex	2.64				
TireWear	0.86		1720	7.96518E-05	
BrakeWr	0.67		1340	6.20543E-05	

Total	4.17				
Lead	0				
SOx	0.43		860	3.98259E-05	0.001626379
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	4070.99				

Program Operations

SUMMARY OF EMISSION FACTORS FOR BIOSOLID HAULING TRUCKS

from EMFAC BURDEN mode, for regional hauling and idling

	Criteria Pollutants						GHGs		
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	N20	CH4
Pounds per mile									
2008	0.0031	0.0118	0.0397	0.0000	0.0021	0.0018	4.0518	0.000011	0.000011
2020	0.0009	0.0042	0.0098	0.0000	0.0006	0.0005	4.0622	0.000011	0.000011
2030	0.0005	0.0029	0.0056	0.0000	0.0004	0.0003	4.0566	0.000011	0.000011
2040	0.0005	0.0027	0.0052	0.0000	0.0004	0.0003	4.0706	0.000011	0.000011
2050	0.0005	0.0027	0.0052	0.0000	0.0004	0.0003	4.0706	0.000011	0.000011
Pounds per idle trip									
2008	0.0102	0.0368	0.0783	0.0014	0.0016	0.0015	4.8811	0.000013	0.000014
2020	0.0063	0.0314	0.0890	0.0016	0.0004	0.0003	4.8822	0.000013	0.000014
2030	0.0057	0.0306	0.0905	0.0016	0.0001	0.0001	4.8464	0.000013	0.000013
2040	0.0056	0.0304	0.0908	0.0016	0.0001	0.0001	4.8791	0.000013	0.000014
2050	0.0056	0.0304	0.0908	0.0016	0.0001	0.0001	4.8791	0.000013	0.000014

from EMFAC, 5mph, for onsite travel

	Criteria Pollutants						GHGs		
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	N20	CH4
Pounds per mile									
2008	0.0299	0.0655	0.0988	0.0001	0.0070	0.0064	8.3544	0.000011	0.000011
2020	0.0093	0.0213	0.0276	0.0001	0.0011	0.0009	8.4350	0.000011	0.000011
2030	0.0056	0.0138	0.0165	0.0001	0.0004	0.0003	8.4461	0.000011	0.000011
2040	0.0052	0.0129	0.0153	0.0001	0.0003	0.0002	8.4475	0.000011	0.000011
2050	0.0052	0.0129	0.0153	0.0001	0.0003	0.0002	8.4475	0.000011	0.000011

N2O and CH4 emission factors from General Reporting Protocol, Version 3.1. (Jan 2009)

	grams/mi	lbs/mile	GHG ratio to CO2 for idling calcs
CH4	0.0051	1.12436E-05	2.77495E-06
N2O	0.0048	1.05822E-05	2.61171E-06

(Table C.4)

grams per pound *453.59*

Road Dust (EPA AP-42, Section 13.2.1 Paved Roads, November 2006)

	PM10	PM2.5
pounds per mile	0.021722332	0.00325835

ON-ROAD DUST MITIGATION METHODOLOGY AND EMISISON FACTOR

Methodology

EPA AP-42, Section 13.2.1, Paved Road (November 2006) http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201_2006.pdf

For the daily basis, Equation 1 becomes:

$$E_{ext} = \left[k \left(\frac{sL}{2} \right)^{0.65} \left(\frac{W}{3} \right)^{1.5} - C \right] \left(1 - \frac{P}{4N} \right) \qquad (2)$$

where k, sL, W, *and* C are as defined in Equation 1 and

E_{ext} = annual or other long-term average emission factor in the same units as k,
P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, and
N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly).

Calculation

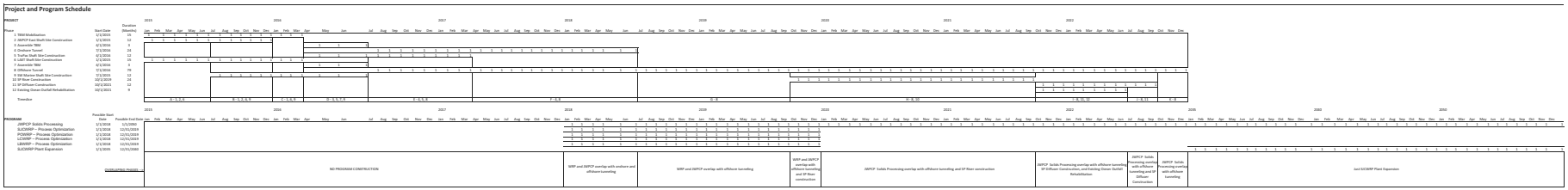
Pollutant	Variables					Emission Factor (lbs/VMT)
	k	sL	W	P	N	E
PM_{10}	0.016	0.02	27.5	35	365.25	0.0217223
$PM_{2.5}$	0.0024	0.02	27.5	35	365.25	0.0032583

E = particulate emission factor (lbs of particulate matter/VMT)		
k = particle size multiplier (lb/VMT)	0.016 for PM10, 0.0024 for PM2.5	
sL = roadway silt loading (g/m2)	0.02	(freeway, SC portion of LA County)
W = average weight of vehicles on the road (tons)	27.5	average weight of hauling trucks (tons) - assuming 15 ton trucks, 1/2 of trips are full (15+25 tons) and 1/2 are empty (15 tons)
P = number of wet days with at least 0.254mm of precipitation	35	LA County http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/prcpdays.html
	37	Bakersfield http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/prcpdays.html
N = number of days in the averaging period	365.25	

Project Construction Calculations

Alternative 1

PROJECT AND PROGRAM CONSTRUCTION OVERLAP



Project Construction

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 1 — TBM Mobilization — Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.6	3.8	4.3	0.0	0.3	0.3	568.3	0.1	0.0
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.9	0.0	0.0
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.9	0.0	0.0
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.5	1.8	4.0	0.0	0.2	0.1	549.6	0.0	0.0
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.5	3.3	4.0	0.0	0.2	0.2	568.3	0.0	0.0
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.9	0.0	0.0
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.4	1.2	2.8	0.0	0.1	0.1	568.3	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.4	1.2	3.2	0.0	0.1	0.1	568.3	0.0	0.0
Loader	offroad	349	0	349	0.54	0	6	0.00	g/hp-hr	0.4	1.4	3.4	0.0	0.1	0.1	568.3	0.0	0.0
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.4	1.3	3.9	0.0	0.1	0.1	568.3	0.0	0.0
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.9	0.0	0.0
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.9	0.0	0.0
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.9	0.0	0.0
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.9	0.0	0.0
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.9	0.0	0.0
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.9	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.9	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.9	0.0	0.0
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.9	0.0	0.0
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.6	3.8	4.2	0.0	0.3	0.3	568.3	0.1	0.0
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.9	0.0	0.0
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.9	0.0	0.0
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.9	0.0	0.0
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.4	1.3	3.4	0.0	0.1	0.1	568.3	0.0	0.0
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.9	0.0	0.0
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.2	1.0	1.9	0.0	0.1	0.1	568.3	0.0	0.0
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.5	1.4	5.3	0.0	0.2	0.1	568.3	0.0	0.0
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.4	1.3	4.0	0.0	0.1	0.1	568.3	0.0	0.0
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.4	1.3	3.5	0.0	0.1	0.1	568.3	0.0	0.0
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.3	2.6	4.7	0.0	0.1	0.1	35.0	0.0	0.0
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.4	1.3	4.0	0.0	0.1	0.1	568.3	0.0	0.0
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.3	1.2	3.3	0.0	0.1	0.1	568.3	0.0	0.0

Equipment	Unmitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Item	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	0	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				0.00	lbs/ton					0.000166	0.0000249			

Item	Unmitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Item	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Item	Unmitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase 2 — JWPCP East — Start Date 2015

Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	2	6	3840.00	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	1	8	957.60	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	0	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	0	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.8	14.9	5.1	0.0	0.7	0.6	4652.6	0.1	0.0	4654.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.5	9.4	3.3	0.0	0.4	0.4	4439.1	0.0	0.0	4440.1
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.2	2.6	1.0	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.4	6.9	2.5	0.0	0.3	0.3	2833.4	0.0	0.0	2834.1
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.2	2.8	1.2	0.0	0.2	0.1	1187.6	0.0	0.0	1188.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.1	2.4	1.0	0.0	0.1	0.1	1079.8	0.0	0.0	1080.1
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Item	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250.00	lbs/ton					0.000166	0.0000249			

Item	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.54	0.08				
On Site Total	**11.9**	**40.1**	**97.2**	**0.2**	**4.0**	**3.1**	**15550.2**	**1.1**	**0.0**	**15572.4**	**2.4**	**40.1**	**17.0**	**0.2**	**2.4**	**1.8**	**15550.2**	**0.2**	**0.0**	**15554.2**

Item	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Item	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	**25**	**94**	**244**	**0**	**12**	**10**	**48047**	**1**	**0**	**48109**	**8**	**68**	**81**	**0**	**5**	**4**	**48047**	**0**	**0**	**48091**

Project Construction

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 3 — Assemble TBM
Start Date 2016

Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	0	349	0.54	0	6	0.00	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
On-Road Truck - Idle	onroad	0	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0.00	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase 4 — Onshore Tunnel
Start Date 2016

Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	0	16	16	1.00	1	24	384.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	1	12	4800.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	0	145	0.60	2	6	1044.00	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	0	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	0	56	56	1.00	1	24	1344.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	1	24	3360.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	1	8	640.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	1	12	720.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	1	6	360.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	1	24	192.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	1	12	59520.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	1	12	28800.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	1	19	60800.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	1	12	734.40	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	1	12	26880.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	1	24	71040.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	0	28	28	1.00	1	3	84.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	5	12	11100.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.0	0.0	0.0	0.0	0.0	0.0	261.5	0.0	0.0	262.5
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.0	0.0	0.0	0.0	0.0	0.0	3268.8	0.1	0.0	3280.9
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.2	7.6	1.2	0.0	0.4	0.3	1308.0	0.0	0.0	1308.4
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.0	0.0	0.0	0.0	0.0	0.0	326.9	0.0	0.0	328.1
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.3	6.7	2.3	0.0	0.3	0.3	2833.4	0.0	0.0	2834.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.0	0.0	0.0	0.0	0.0	0.0	915.3	0.0	0.0	918.7
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.0	0.0	0.0	0.0	0.0	0.0	2288.2	0.1	0.0	2296.6
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.0	0.0	0.0	0.0	0.0	0.0	435.8	0.0	0.0	437.5
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.0	0.0	0.0	0.0	0.0	0.0	490.3	0.0	0.0	492.1
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.0	0.0	0.0	0.0	0.0	0.0	245.2	0.0	0.0	246.1
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.0	0.0	0.0	0.0	0.0	0.0	130.8	0.0	0.0	131.2
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.0	0.0	0.0	0.0	0.0	0.0	40533.0	1.7	0.4	40683.3
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.0	0.0	0.0	0.0	0.0	0.0	19612.8	0.8	0.2	19685.5
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.0	0.0	0.0	0.0	0.0	0.0	41404.7	1.7	0.4	41558.3
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.1	6.1	1.0	0.0	0.3	0.2	920.1	0.0	0.0	920.3
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.0	0.0	0.0	0.0	0.0	0.0	18305.2	0.8	0.2	18373.1
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.0	0.0	0.0	0.0	0.0	0.0	1634.4	0.1	0.0	1640.5
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.0	0.0	0.0	0.0	0.0	0.0	48378.1	2.0	0.4	48557.5
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.0	0.0	0.0	0.0	0.0	0.0	57.2	0.0	0.0	57.4
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.6	63.6	7.3	0.1	0.4	0.4	855.4	0.0	0.0	863.2
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550.00	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.92	0.14				
On Site Total	**10.7**	**85.7**	**148.2**	**0.2**	**5.9**	**5.0**	**184474.9**	**7.8**	**1.7**	**185151.2**	**4.7**	**85.7**	**16.7**	**0.2**	**2.2**	**1.3**	**184474.9**	**7.5**	**1.7**	**185145.1**

Equipment	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	**32**	**183**	**371**	**1**	**18**	**15**	**243611**	**8**	**2**	**244480**	**16**	**147**	**125**	**1**	**8**	**5**	**243611**	**8**	**2**	**244474**

Project Construction

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 5 — TraPac Shaft — Start Date 2016

Equipment	Type	Equipment Specs: HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	Emission Factor: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	2	6	3840.00	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	1	12	3543.12	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	1	8	957.60	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	0	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	0	259	0.61	1	6	947.94	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	1	8	861.84	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	3.92	14.12	31.41	0.05	1.20	1.07	4652.56	0.35	0.00	4659.98	0.7	14.1	4.7	0.0	0.7	0.6	4652.6	0.1	0.0	4653.9
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	2.84	9.21	19.54	0.04	0.70	0.62	4439.05	0.26	0.00	4444.44	0.5	9.2	2.9	0.0	0.4	0.3	4439.1	0.0	0.0	4440.0
Hydaulic Excavator - Medium	0.80	2.56	5.99	0.01	0.20	0.18	1199.74	0.07	0.00	1201.26	0.1	2.6	0.9	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.3	6.7	2.3	0.0	0.3	0.3	2833.4	0.0	0.0	2834.0
Motor Grader	0.87	2.71	7.27	0.01	0.25	0.22	1187.64	0.08	0.00	1189.28	0.2	2.7	1.1	0.0	0.1	0.1	1187.6	0.0	0.0	1187.9
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.77	2.37	5.67	0.01	0.19	0.17	1079.77	0.07	0.00	1081.22	0.1	2.4	0.9	0.0	0.1	0.1	1079.8	0.0	0.0	1080.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				3250.00	lbs/ton					0.000166	0.0000249			

	Daily: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.54	0.08				
On Site Total	**11.3**	**38.7**	**87.8**	**0.2**	**3.6**	**2.8**	**15550.2**	**1.0**	**0.0**	**15571.2**	**2.3**	**38.7**	**15.6**	**0.2**	**2.2**	**1.6**	**15550.2**	**0.2**	**0.0**	**15554.0**

	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		20			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

	Daily: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	10.66	44.92	121.07	0.31	7.05	5.84	31697.93	0.09	0.08	31725.36	4.88	24.36	53.53	0.30	2.93	2.04	31697.93	0.09	0.08	31725.36
On-Road Truck	0.91	4.22	11.31	0.00	0.08	0.08	629.25	0.00	0.00	629.25	0.73	3.95	11.81	0.00	0.00	0.00	629.25	0.00	0.00	629.25
On-Road Crew Vehicle	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08
On-Road Crew Vehicle	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15
Total	**23**	**88**	**217**	**0**	**11**	**9**	**48069**	**1**	**0**	**48130**	**8**	**67**	**78**	**0**	**5**	**4**	**48069**	**0**	**0**	**48113**

Phase 6 — LAXT Shaft Site — Start Date 2015

Equipment	Type	Equipment Specs: HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	Emission Factor: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	2	6	3840.00	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	1	8	957.60	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	0	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	0	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.8	14.9	5.1	0.0	0.7	0.6	4652.6	0.1	0.0	4654.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.5	9.4	3.3	0.0	0.4	0.4	4439.1	0.0	0.0	4440.1
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.2	2.6	1.0	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.4	6.9	2.5	0.0	0.3	0.3	2833.4	0.0	0.0	2834.1
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.2	2.8	1.2	0.0	0.2	0.1	1187.6	0.0	0.0	1188.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.1	2.4	1.0	0.0	0.1	0.1	1079.8	0.0	0.0	1080.1
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250.00	lbs/ton					0.000166	0.0000249			

	Daily: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.54	0.08				
On Site Total	**11.9**	**40.1**	**97.2**	**0.2**	**4.0**	**3.1**	**15550.2**	**1.1**	**0.0**	**15572.4**	**2.4**	**40.1**	**17.0**	**0.2**	**2.4**	**1.8**	**15550.2**	**0.2**	**0.0**	**15554.2**

	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

	Daily: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	**25**	**94**	**244**	**0**	**12**	**10**	**48047**	**1**	**0**	**48109**	**8**	**68**	**81**	**0**	**5**	**4**	**48047**	**0**	**0**	**48091**

Project Construction

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 7 — Assemble TBM — Start Date 2016

Equipment	Type	Equipment Specs							E.F. Units	Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power	LF	Number	Equipment	Daily Hp-hr		ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	offroad	349	0	349	0.54	0	6	0.00	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	0	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0.00	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
On Site Total															0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total																0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 8 — Offshore Tunnel — Start Date 2016

Equipment	Type	Equipment Specs							E.F. Units	Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power	LF	Number	Equipment	Daily Hp-hr		ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	0	16	16	1.00	1	24	384.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.0	0.0	0.0	0.0	0.0	0.0	261.5	0.0	0.0	262.5
Compressor (2000 cfm)	offroad	0	400	400	1.00	1	12	4800.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.0	0.0	0.0	0.0	0.0	0.0	3268.8	0.1	0.0	3280.9
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	offroad	145	0	145	0.60	2	6	1044.00	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.2	7.6	1.2	0.0	0.4	0.3	1308.0	0.0	0.0	1308.4
Gantry Crane	offroad		160	160	1.00	1	3	480.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.0	0.0	0.0	0.0	0.0	0.0	326.9	0.0	0.0	328.1
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	offroad	349	0	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.3	6.7	2.3	0.0	0.3	0.3	2833.4	0.0	0.0	2834.0
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	offroad	0	56	56	1.00	1	24	1344.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.0	0.0	0.0	0.0	0.0	0.0	915.3	0.0	0.0	918.7
Shaft and Tunnel Lighting	offroad	0	200	200	1.00	1	24	4800.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.0	0.0	0.0	0.0	0.0	0.0	3268.8	0.1	0.0	3280.9
Shaft Pump	offroad	0	80	80	1.00	1	8	640.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.0	0.0	0.0	0.0	0.0	0.0	435.8	0.0	0.0	437.5
Shop (mechanical)	offroad	0	60	60	1.00	1	12	720.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.0	0.0	0.0	0.0	0.0	0.0	490.3	0.0	0.0	492.1
Shop (welding)	offroad	0	60	60	1.00	1	6	360.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.0	0.0	0.0	0.0	0.0	0.0	245.2	0.0	0.0	246.1
Site Lighting	offroad	0	8	8	1.00	1	24	192.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.0	0.0	0.0	0.0	0.0	0.0	130.8	0.0	0.0	131.2
Slurry Circuit Pumps (discharge)	offroad	0	8000	8000	1.00	1	12	96000.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29	0.0	0.0	0.0	0.0	0.0	0.0	65375.9	2.7	0.6	65618.3
Slurry Circuit Pumps (feed)	offroad	0	3760	3760	1.00	1	12	45120.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60	0.0	0.0	0.0	0.0	0.0	0.0	30726.7	1.3	0.3	30840.6
Slurry Separation Plant	offroad	0	3200	3200	1.00	1	19	60800.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.0	0.0	0.0	0.0	0.0	0.0	41404.7	1.7	0.4	41558.3
Street Sweeper	offroad	90	0	90	0.68	1	12	734.40	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.1	6.1	1.0	0.0	0.3	0.2	920.1	0.0	0.0	920.3
TBM & Trailing gear	offroad	0	2240	2240	1.00	1	12	26880.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.0	0.0	0.0	0.0	0.0	0.0	18305.2	0.8	0.2	18373.1
Tower Crane	offroad		240	240	1.00	1	10	2400.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.0	0.0	0.0	0.0	0.0	0.0	1634.4	0.1	0.0	1640.5
Tunnel Ventilation Fans	offroad	0	3600	3600	1.00	1	24	86400.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46	0.0	0.0	0.0	0.0	0.0	0.0	58838.3	2.4	0.5	59056.5
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	offroad	0	28	28	1.00	1	3	84.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.0	0.0	0.0	0.0	0.0	0.0	57.2	0.0	0.0	57.4
Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	offroad	185	0	185	1.00	5	12	11100.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.6	63.6	7.3	0.1	0.4	0.4	855.4	0.0	0.0	863.2
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Idle Time	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	282	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82
Fugitive Dust				7050.00	lbs/ton					0.000166	0.0000249								1.17	0.18									1.17	0.18				
On Site Total															10.8	86.2	149.5	0.2	6.2	5.0	231945.3	9.8	2.1	232797.4	4.8	86.2	18.0	0.2	2.5	1.4	231945.3	9.5	2.1	232791.4

Equipment	Type	Miles /	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	282	16920		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	23.12	97.45	262.63	0.68	15.30	12.66	68760.13	0.19	0.18	68819.63	10.58	52.84	116.11	0.64	6.36	4.42	68760.13	0.19	0.18	68819.63
On-Road Truck	onroad		282			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.97	9.15	24.53	0.00	0.18	0.17	1364.98	0.00	0.00	1364.98	1.58	8.57	25.62	0.00	0.00	0.00	1364.98	0.00	0.00	1364.98
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total																37.04	206	432	1	22	18	305929	10	3	306986	18	161	155	1	9	6	305929	10	3	306980

Project Construction

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase			Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
9 SW Marine	Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Start Date	Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Crawler Crane	offroad	500	0	500	0.64	2	6	3840.00	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.8	14.9	5.1	0.0	0.7	0.6	4652.6	0.1	0.0	4654.0
	Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hydaulic Excavator - Large	offroad	518	0	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.5	9.4	3.3	0.0	0.4	0.4	4439.1	0.0	0.0	4440.1
	Hydaulic Excavator - Medium	offroad	210	0	210	0.57	1	8	957.60	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.2	2.6	1.0	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
	Loader	offroad	349	0	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.4	6.9	2.5	0.0	0.3	0.3	2833.4	0.0	0.0	2834.1
	Motor Grader	offroad	259	0	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.2	2.8	1.2	0.0	0.2	0.1	1187.6	0.0	0.0	1188.0
	Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Water Truck	offroad	189	0	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.1	2.4	1.0	0.0	0.1	0.1	1079.8	0.0	0.0	1080.1
	Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tugboats	offroad	1300	0	1300	0.31	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tugboat - Aux	offroad	57	0	57	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Crew Boats	offroad	400	0	400	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Crew Boats - Aux	offroad	25	0	25	0.43	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Service Vessel	offroad	500	0	500	0.45	0	2	0.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Daily Trips	Idle Time		Tons Soil																																	
	On-Road Truck - Idle	onroad	130	5						g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
	Fugitive Dust					3250.00				lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
																			On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.4	40.1	17.0	0.2	2.4	1.8	15550.2	0.2	0.0	15554.2
				Miles /	Daily Trips		Miles / Day	Acres Disturbed																															
	On-Road Truck	onroad		60	130		7800			g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
	On-Road Truck	onroad			130					g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
	On-Road Crew Vehicle	onroad		20	20		400			g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
	On-Road Crew Vehicle	onroad			20					g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
																			Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase			Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
10 SP Riser	Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Start Date	Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2019	Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Loader	offroad	349	0	349	0.54	0	6	0.00	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tugboats	offroad	1300	0	1300	0.31	3	2	2418.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77	1.2	26.7	21.8	0.0	0.6	0.5	4882.5	0.0	0.2	4951.8
	Tugboat - Aux	offroad	57	0	57	0.43	3	2	147.06	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16	0.1	1.6	1.3	0.0	0.0	0.0	296.9	0.0	0.0	301.2
	Crew Boats	offroad	400	0	400	0.45	3	2	1080.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71	0.5	11.9	9.7	0.0	0.3	0.2	2180.8	0.0	0.1	2211.7
	Crew Boats - Aux	offroad	25	0	25	0.43	3	2	64.50	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09	0.0	0.7	0.6	0.0	0.0	0.0	130.2	0.0	0.0	132.1
	Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Service Vessel	offroad	500	0	500	0.45	1	2	450.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.2	5.0	0.6	0.0	0.1	0.1	908.6	0.0	0.0	921.5
	Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Daily Trips	Idle Time		Tons Soil																																	
	On-Road Truck - Idle	onroad	16	5						g/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45
	Fugitive Dust					400.00				lbs/ton					0.000166	0.0000249								0.07	0.01									0.07	0.01				
																			On Site Total	2.1	46.0	37.8	0.1	1.1	0.9	8418.5	0.0	0.4	8537.7	2.1	46.0	34.4	0.1	1.0	0.9	8418.5	0.0	0.4	8537.6
				Miles /	Daily Trips		Miles / Day	Acres Disturbed																															
	On-Road Truck	onroad		60	16		960			g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	0.96	4.30	10.46	0.04	0.65	0.52	3899.45	0.01	0.01	3902.82	0.60	3.02	6.30	0.04	0.37	0.26	3899.45	0.01	0.01	3902.82
	On-Road Truck	onroad			16					g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.10	0.51	1.42	0.00	0.01	0.01	77.47	0.00	0.00	77.47	0.09	0.49	1.45	0.00	0.00	0.00	77.47	0.00	0.00	77.47
	On-Road Crew Vehicle	onroad		20	30		600			g/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23
	On-Road Crew Vehicle	onroad			30					g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69
																			Total	3	52	49	0	2	1	12898	0	0	13037	3	51	42	0	1	1	12898	0	0	13037

Project Construction

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 11 SP Diffuser — Start Date 2021

Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000
Loader	offroad	349	0	349	0.54	0	6	0.00	g/hp-hr	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	2	2	1612.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	1	2	360.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	1	2	21.50	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	1	8	2580.00	g/hp-hr	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000
Pipe Barge	offroad	2000	0	2000	0.59	1	8	9440.00	g/hp-hr	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Generator	offroad	500	0	500	0.74	2	8	5920.00	g/hp-hr	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000
Service Vessel	offroad	500	0	500	0.45	1	2	450.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	1	4	510.00	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Pump	offroad	500	0	500	0.74	1	8	2960.00	g/hp-hr	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000
		Daily Trips	Idle Time		Tons Soil													
On-Road Truck - Idle	onroad	16	5						g/idle-hr	8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000
Fugitive Dust					400.00				lbs/ton					0.000166	0.0000249			
			Miles /	Daily Trips		Miles / Day	Acres Disturbed											
On-Road Truck	onroad		60	16		960			g/mile	0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005
On-Road Truck	onroad			16					g/trip	2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000
On-Road Crew Vehicle	onroad		20	30		600			g/mile	0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035
On-Road Crew Vehicle	onroad			30					g/trip	0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.8	17.8	14.5	0.0	0.4	0.4	3255.0	0.0	0.1	3301.2
Tugboat - Aux	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.0	1.1	0.9	0.0	0.0	0.0	198.0	0.0	0.0	200.8
Crew Boats	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.2	4.0	3.2	0.0	0.1	0.1	726.9	0.0	0.0	737.2
Crew Boats - Aux	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.0	0.2	0.2	0.0	0.0	0.0	43.4	0.0	0.0	44.0
Crane Barge	0.86	5.70	3.38	0.03	0.10	0.09	3232.39	0.08	0.00	3234.03	0.2	5.7	0.5	0.0	0.1	0.1	3232.4	0.0	0.0	3232.7
Pipe Barge	7.35	24.46	76.05	0.12	1.82	1.62	11827.05	0.66	0.00	11840.97	1.3	24.5	11.4	0.1	1.0	0.9	11827.1	0.1	0.0	11829.6
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	3.85	14.31	22.92	0.07	0.84	0.75	7416.97	0.35	0.00	7424.26	0.7	14.3	3.4	0.1	0.5	0.4	7417.0	0.1	0.0	7418.3
Service Vessel	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.2	5.0	0.6	0.0	0.1	0.1	908.6	0.0	0.0	921.5
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.33	1.27	2.20	0.01	0.07	0.07	638.96	0.03	0.00	639.58	0.1	1.3	0.3	0.0	0.0	0.0	639.0	0.0	0.0	639.1
Pump	1.30	6.65	10.84	0.04	0.36	0.32	3708.48	0.12	0.00	3710.94	0.2	6.7	1.6	0.0	0.2	0.2	3708.5	0.0	0.0	3708.9
On-Road Truck - Idle	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust					0.07	0.01									0.07	0.01				
On Site Total	**15.0**	**80.5**	**138.6**	**0.3**	**3.9**	**3.4**	**31975.2**	**1.3**	**0.2**	**32074.0**	**3.8**	**80.5**	**37.1**	**0.3**	**2.4**	**2.1**	**31975.2**	**0.3**	**0.2**	**32052.7**
On-Road Truck	0.80	3.75	8.59	0.04	0.55	0.42	3909.79	0.01	0.01	3913.16	0.60	3.00	6.17	0.04	0.38	0.27	3909.79	0.01	0.01	3913.16
On-Road Truck	0.10	0.50	1.43	0.00	0.01	0.01	78.10	0.00	0.00	78.10	0.09	0.49	1.45	0.00	0.00	0.00	78.10	0.00	0.00	78.10
On-Road Crew Vehicle	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32
On-Road Crew Vehicle	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67
Total	**16**	**86**	**148**	**0**	**4**	**4**	**36467**	**1**	**0**	**36585**	**5**	**85**	**44**	**0**	**3**	**2**	**36467**	**0**	**0**	**36564**

Phase 12 Existing Ocean — Start Date 2021

Equipment	Type	HP	kW	Power	LF	Number	Equipment	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	0	120	0.55	0	18	0.00	g/hp-hr	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000
Change House	offroad	0	16	16	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	0	400	400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	0	500	0.64	0	6	0.00	g/hp-hr	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000
Forklift	offroad	145	0	145	0.60	0	6	0.00	g/hp-hr	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	0	518	0.57	0	12	0.00	g/hp-hr	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000
Hydaulic Excavator - Medium	offroad	210	0	210	0.57	0	8	0.00	g/hp-hr	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000
Loader	offroad	349	0	349	0.54	0	6	0.00	g/hp-hr	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000
Motor Grader	offroad	259	0	259	0.61	0	6	0.00	g/hp-hr	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000
Office Trailers	offroad	0	56	56	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	0	140	140	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	0	80	80	1.00	0	8	0.00	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	0	60	60	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	0	60	60	1.00	0	6	0.00	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	0	8	8	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	0	4960	4960	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	0	2400	2400	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	0	3200	3200	1.00	0	19	0.00	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	0	90	0.68	0	12	0.00	g/hp-hr	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000
TBM & Trailing gear	offroad	0	2240	2240	1.00	0	12	0.00	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0.00	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	0	2960	2960	1.00	0	24	0.00	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	0	189	0.57	0	8	0.00	g/hp-hr	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000
Worker Hoist	offroad	0	28	28	1.00	0	3	0.00	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1300	0	1300	0.31	2	2	1612.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	0	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	0	400	0.45	1	2	360.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	0	25	0.43	1	2	21.50	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	0	750	0.43	0	8	0.00	g/hp-hr	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000
Pipe Barge	offroad	2000	0	2000	0.59	0	8	0.00	g/hp-hr	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000
Dump Barge	offroad	250	0	250	0.51	0	8	0.00	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Generator	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000
Service Vessel	offroad	500	0	500	0.45	1	2	450.00	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	0	185	1.00	0	12	0.00	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	0	250	0.51	0	4	0.00	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Pump	offroad	500	0	500	0.74	0	8	0.00	g/hp-hr	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000
		Daily Trips	Idle Time		Tons Soil													
On-Road Truck - Idle	onroad	0	5						g/idle-hr	8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000
Fugitive Dust					0.00				lbs/ton					0.000166	0.0000249			
			Miles /	Daily Trips		Miles / Day	Acres Disturbed											
On-Road Truck	onroad		60	0		0			g/mile	0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005
On-Road Truck	onroad			0					g/trip	2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000
On-Road Crew Vehicle	onroad		20	20		400			g/mile	0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035
On-Road Crew Vehicle	onroad			20					g/trip	0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.8	17.8	14.5	0.0	0.4	0.4	3255.0	0.0	0.1	3301.2
Tugboat - Aux	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.0	1.1	0.9	0.0	0.0	0.0	198.0	0.0	0.0	200.8
Crew Boats	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.2	4.0	3.2	0.0	0.1	0.1	726.9	0.0	0.0	737.2
Crew Boats - Aux	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.0	0.2	0.2	0.0	0.0	0.0	43.4	0.0	0.0	44.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.2	5.0	0.6	0.0	0.1	0.1	908.6	0.0	0.0	921.5
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**1.3**	**28.0**	**22.9**	**0.0**	**0.6**	**0.6**	**5131.9**	**0.0**	**0.2**	**5204.8**	**1.3**	**28.0**	**19.4**	**0.0**	**0.6**	**0.5**	**5131.9**	**0.0**	**0.2**	**5204.7**
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21
On-Road Crew Vehicle	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12
Total	**1**	**29**	**23**	**0**	**1**	**1**	**5481**	**0**	**0**	**5564**	**1**	**29**	**20**	**0**	**1**	**1**	**5481**	**0**	**0**	**5564**

Project Construction - Alternative 1

EMISSIONS BY PHASE

PROJECT

			Unmitigated Localized Daily Emission Rates (lbs/day)										Mitigated Localized Daily Emission Rates (lbs/day)									
Phase	Start Date	Duration (Months)	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP East Shaft Site Construction	1/1/2015	12	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	24	11	86	148	0	6	5	184,475	8	2	185,151	5	86	17	0	2	1	184,475	8	2	185,145
5 TraPac Shaft Site Construction	4/1/2016	12	11	39	88	0	4	3	15,550	1	-	15,571	2.257	39	16	0	2	2	15,550	0	-	15,554
6 LAXT Shaft Site Construction	1/1/2015	15	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
7 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Offshore Tunnel	7/1/2016	79	11	86	149	0	6	5	231,945	10	2	232,797	5	86	18	0	2	1	231,945	9	2	232,791
9 SW Marine Shaft Site Construction	7/1/2015	12	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
10 SP Riser Construction	10/1/2019	24	2	46	38	0	1	1	8,419	0	0	8,538	2	46	34	0	1	1	8,419	0	0	8,538
11 SP Diffuser Construction	10/1/2021	12	15	81	139	0	4	3	31,975	1	0	32,074	4	81	37	0	2	2	31,975	0	0	32,053
12 Existing Ocean Outfall Rehabilitation	10/1/2021	9	1	28	23	0	1	1	5,132	0	0	5,205	1	28	19	0	1	1	5,132	0	0	5,205

			Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
Phase	Start Date	Duration (Months)	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP East Shaft Site Construction	1/1/2015	12	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	24	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	8	2	244,474
5 TraPac Shaft Site Construction	4/1/2016	12	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
6 LAXT Shaft Site Construction	1/1/2015	15	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
7 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Offshore Tunnel	7/1/2016	79	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
9 SW Marine Shaft Site Construction	7/1/2015	12	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
10 SP Riser Construction	10/1/2019	24	3	52	49	0	2	1	12,898	0	0	13,037	3	51	42	0	1	1	12,898	0	0	13,037
11 SP Diffuser Construction	10/1/2021	12	16	86	148	0	4	4	36,467	1	0	36,585	5	85	44	0	3	2	36,467	0	0	36,564
12 Existing Ocean Outfall Rehabilitation	10/1/2021	9	1	28.906	23	0	1	1	5,481	0	0	5,564	1	29	20	0	1	1	5,481	0	0	5,564

Project Construction - Alternative 1

EMISSIONS BY DAY

		Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
Timeslice	Phase	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
A	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**49**	**188**	**488**	**1**	**24**	**20**	**96,094**	**2**	**0**	**96,218**	**16**	**137**	**163**	**1**	**10**	**7**	**96,094**	**1**	**0**	**96,181**
B	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**74**	**282**	**732**	**1**	**36**	**29**	**144,140**	**4**	**0**	**144,327**	**24**	**205**	**244**	**1**	**16**	**11**	**144,140**	**1**	**0**	**144,272**
C	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
D	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**48**	**182**	**461**	**1**	**23**	**19**	**96,116**	**2**	**0**	**96,239**	**16**	**136**	**159**	**1**	**10**	**7**	**96,116**	**1**	**0**	**96,204**
E	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	8	2	244,474
	5	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**92**	**477**	**1,020**	**2**	**51**	**42**	**597,610**	**20**	**5**	**599,596**	**41**	**375**	**358**	**2**	**22**	**15**	**597,610**	**19**	**5**	**599,566**
F	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	8	2	244,474
	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**69**	**389**	**802**	**2**	**40**	**33**	**549,540**	**19**	**5**	**551,466**	**34**	**308**	**279**	**2**	**17**	**11**	**549,540**	**18**	**5**	**551,454**
G	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**37**	**206**	**432**	**1**	**22**	**18**	**305,929**	**10**	**3**	**306,986**	**18**	**161**	**155**	**1**	**9**	**6**	**305,929**	**10**	**3**	**306,980**
H	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	10	3	52	49	0	2	1	12,898	0	0	13,037	3	51	42	0	1	1	12,898	0	0	13,037
	Total	**40**	**258**	**481**	**1**	**24**	**19**	**318,827**	**11**	**3**	**320,023**	**21**	**211**	**197**	**1**	**11**	**7**	**318,827**	**10**	**3**	**320,017**
I	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	11	16	86	148	0	4	4	36,467	1	0	36,585	5	85	44	0	3	2	36,467	0	0	36,564
	12	1	29	23	0	1	1	5,481	0	0	5,564	1	29	20	0	1	1	5,481	0	0	5,564
	Total	**54**	**321**	**603**	**1**	**27**	**22**	**347,877**	**12**	**3**	**349,135**	**24**	**275**	**219**	**1**	**13**	**9**	**347,877**	**11**	**3**	**349,107**
J	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	11	16	86	148	0	4	4	36,467	1	0	36,585	5	85	44	0	3	2	36,467	0	0	36,564
	Total	**53**	**292**	**580**	**1**	**26**	**22**	**342,396**	**12**	**3**	**343,571**	**23**	**246**	**199**	**1**	**12**	**8**	**342,396**	**10**	**3**	**343,543**
K	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**37**	**206**	**432**	**1**	**22**	**18**	**305,929**	**10**	**3**	**306,986**	**18**	**161**	**155**	**1**	**9**	**6**	**305,929**	**10**	**3**	**306,980**
Maximum Daily Emissions		**92**	**477**	**1,020**	**2**	**51**	**42**	**597,610**	**20**	**5**	**599,596**	**41**	**375**	**358**	**2**	**22**	**15**	**597,610**	**19**	**5**	**599,566**

Project Construction - Alternative 1

GHG EMISSIONS BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP East Shaft Site Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	24	59,073	2	1	59,284	59,073	2	1	59,283
5	TraPac Shaft Site Construction	4/1/2016	12	5,820	0	0	5,828	5,820	0	0	5,825
6	LAXT Shaft Site Construction	1/1/2015	15	7,272	0	0	7,281	7,272	0	0	7,278
7	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
8	Offshore Tunnel	7/1/2016	79	241,584	8	2	242,419	241,584	8	2	242,414
9	SW Marine Shaft Site Construction	7/1/2015	12	5,833	0	0	5,841	5,833	0	0	5,839
10	SP Riser Construction	10/1/2019	24	3,132	0	0	3,166	3,132	0	0	3,166
11	SP Diffuser Construction	10/1/2021	12	4,415	0	0	4,430	4,415	0	0	4,427
12	Existing Ocean Outfall Rehabilitation	10/1/2021	9	496	0	0	503	496	0	0	503
	Total						334,576				334,558
	Amortized Total						11,153				11,152

Emission Factors and Mitigation Reductions for all Project Construction Phases and Alternatives

Project Construction

OFFROAD EMISSION FACTORS

								OFFROAD Output (tons per day)									Emission Factors (g/hp-hr)								
CY	Season	Equipment	Fuel	MaxHP	AveHP	Class	Activity	ROG Exhaust	CO Exhaust	NOX Exhaust	CO2 Exhaust	SO2 Exhaust	PM Exhaust	N2O Exhaust	CH4 Exhaust	LoadFactor	ROG	CO	NOX	SO2	PM10	PM25	CO2	CH4	N2O
2014	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	6.78E+01	4.00E-03	1.18E-02	3.44E-02	5.37E+00	6.05E-05	1.13E-03	0.00E+00	3.61E-04	0.57	0.423	1.246	3.642	0.006	0.120	0.107	568.300	0.038	0.000
2014	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	4.89E+01	4.05E-03	1.25E-02	3.22E-02	5.71E+00	5.60E-05	1.13E-03	0.00E+00	3.66E-04	0.57	0.403	1.239	3.206	0.006	0.113	0.100	568.300	0.036	0.000
2014	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.03E+01	2.13E-03	6.31E-03	1.96E-02	2.60E+00	2.93E-05	6.75E-04	0.00E+00	1.92E-04	0.61	0.465	1.377	4.270	0.006	0.147	0.131	568.300	0.042	0.000
2014	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.24E+01	7.91E-04	4.49E-03	6.08E-03	7.74E-01	8.71E-06	3.34E-04	0.00E+00	7.14E-05	0.60	0.581	3.299	4.466	0.006	0.245	0.218	568.300	0.052	0.000
2014	Annual	Loader	D	500	350	Construction and Mining Equipment	2.71E+01	2.39E-03	8.20E-03	2.10E-02	3.20E+00	3.14E-05	7.49E-04	0.00E+00	2.16E-04	0.54	0.425	1.455	3.732	0.006	0.133	0.118	568.300	0.038	0.000
2014	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.50E+02	1.12E-02	6.13E-02	7.46E-02	9.04E+00	1.06E-04	5.95E-03	0.00E+00	1.01E-03	0.55	0.704	3.853	4.694	0.007	0.374	0.333	568.300	0.064	0.000
2014	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.67E+01	3.22E-03	1.18E-02	2.75E-02	3.45E+00	3.39E-05	1.06E-03	0.00E+00	2.90E-04	0.64	0.512	1.873	4.383	0.005	0.169	0.150	549.583	0.046	0.000
2014	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.16E+01	1.41E-03	7.92E-03	9.63E-03	1.19E+00	1.39E-05	7.68E-04	0.00E+00	1.27E-04	0.68	0.676	3.798	4.616	0.007	0.368	0.328	568.300	0.061	0.000
2014	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.53E+01	1.02E-03	2.88E-03	8.52E-03	1.28E+00	1.44E-05	2.83E-04	0.00E+00	9.18E-05	0.57	0.453	1.283	3.796	0.006	0.126	0.112	568.299	0.041	0.000
2014	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	4.26E-03	1.30E-02	4.79E-02	4.78E+00	4.69E-05	1.42E-03	0.00E+00	3.85E-04	0.59	0.507	1.550	5.697	0.006	0.168	0.150	568.300	0.046	0.000
2014	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	1.27E-05	5.39E-05	1.20E-04	3.05E-02	3.00E-07	3.93E-06	0.00E+00	1.14E-06	0.43	0.235	1.003	2.233	0.006	0.073	0.065	568.300	0.021	0.000
2014	Annual	Hoist	D	250	213	Dredging	2.31E+00	1.18E-04	3.58E-04	1.23E-03	1.57E-01	1.77E-06	3.98E-05	0.00E+00	1.07E-05	0.51	0.428	1.295	4.446	0.006	0.144	0.128	568.300	0.039	0.000
2014	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	6.16E-05	2.48E-04	7.39E-04	1.14E-01	1.12E-06	2.29E-05	0.00E+00	5.55E-06	0.74	0.307	1.238	3.685	0.006	0.114	0.102	568.300	0.028	0.000
2014	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	4.03E-04	1.29E-03	3.83E-03	5.54E-01	5.44E-06	1.32E-04	0.00E+00	3.64E-05	0.74	0.413	1.323	3.924	0.006	0.136	0.121	568.300	0.037	0.000
2014	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	9.70E-06	2.93E-05	1.01E-04	1.29E-02	1.45E-07	3.26E-06	0.00E+00	8.75E-07	0.51	0.428	1.295	4.446	0.006	0.144	0.128	568.300	0.039	0.000
2015	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	6.87E+01	3.84E-03	1.18E-02	3.09E-02	5.45E+00	6.13E-05	1.02E-03	0.00E+00	3.47E-04	0.57	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
2015	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	4.96E+01	3.91E-03	1.23E-02	2.89E-02	5.79E+00	5.68E-05	1.03E-03	0.00E+00	3.53E-04	0.57	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
2015	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.07E+01	2.04E-03	6.20E-03	1.79E-02	2.64E+00	2.97E-05	6.15E-04	0.00E+00	1.84E-04	0.61	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
2015	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.26E+01	7.43E-04	4.55E-03	5.54E-03	7.85E-01	8.84E-06	3.03E-04	0.00E+00	6.70E-05	0.60	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
2015	Annual	Loader	D	500	350	Construction and Mining Equipment	2.74E+01	2.30E-03	7.96E-03	1.93E-02	3.25E+00	3.19E-05	6.85E-04	0.00E+00	2.08E-04	0.54	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
2015	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.54E+02	1.03E-02	6.17E-02	6.89E-02	9.16E+00	1.07E-04	5.26E-03	0.00E+00	9.31E-04	0.55	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
2015	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.70E+01	3.10E-03	1.12E-02	2.57E-02	3.50E+00	3.43E-05	9.86E-04	0.00E+00	2.80E-04	0.64	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
2015	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.26E+01	1.28E-03	8.09E-03	8.93E-03	1.22E+00	1.43E-05	6.66E-04	0.00E+00	1.15E-04	0.68	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
2015	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.56E+01	9.74E-04	2.87E-03	7.69E-03	1.29E+00	1.46E-05	2.56E-04	0.00E+00	8.79E-05	0.57	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
2015	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	3.99E-03	1.19E-02	4.47E-02	4.78E+00	4.69E-05	1.29E-03	0.00E+00	3.60E-04	0.59	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
2015	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	1.20E-05	5.39E-05	1.03E-04	3.05E-02	3.00E-07	3.37E-06	0.00E+00	1.08E-06	0.43	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
2015	Annual	Hoist	D	250	213	Dredging	2.31E+00	1.12E-04	3.49E-04	1.12E-03	1.57E-01	1.77E-06	3.62E-05	0.00E+00	1.01E-05	0.51	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
2015	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	5.74E-05	2.37E-04	6.67E-04	1.14E-01	1.12E-06	2.08E-05	0.00E+00	5.18E-06	0.74	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000
2015	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	3.85E-04	1.23E-03	3.45E-03	5.54E-01	5.44E-06	1.20E-04	0.00E+00	3.47E-05	0.74	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
2015	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	9.17E-06	2.85E-05	9.14E-05	1.29E-02	1.45E-07	2.96E-06	0.00E+00	8.28E-07	0.51	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
2016	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	6.97E+01	3.68E-03	1.18E-02	2.76E-02	5.52E+00	6.22E-05	9.18E-04	0.00E+00	3.32E-04	0.57	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
2016	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	5.03E+01	3.76E-03	1.22E-02	2.58E-02	5.87E+00	5.76E-05	9.22E-04	0.00E+00	3.39E-04	0.57	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
2016	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.11E+01	1.95E-03	6.12E-03	1.64E-02	2.68E+00	3.01E-05	5.60E-04	0.00E+00	1.76E-04	0.61	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
2016	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.28E+01	6.95E-04	4.62E-03	5.01E-03	7.97E-01	8.96E-06	2.72E-04	0.00E+00	6.27E-05	0.60	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
2016	Annual	Loader	D	500	350	Construction and Mining Equipment	2.78E+01	2.22E-03	7.76E-03	1.76E-02	3.29E+00	3.23E-05	6.26E-04	0.00E+00	2.00E-04	0.54	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
2016	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.59E+02	9.50E-03	6.21E-02	6.36E-02	9.28E+00	1.09E-04	4.60E-03	0.00E+00	8.57E-04	0.55	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
2016	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.74E+01	2.98E-03	1.08E-02	2.39E-02	3.54E+00	3.48E-05	9.14E-04	0.00E+00	2.69E-04	0.64	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
2016	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.32E+01	1.15E-03	8.20E-03	8.22E-03	1.24E+00	1.46E-05	5.66E-04	0.00E+00	1.03E-04	0.68	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
2016	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.58E+01	9.31E-04	2.88E-03	6.89E-03	1.31E+00	1.48E-05	2.30E-04	0.00E+00	8.40E-05	0.57	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
2016	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	3.79E-03	1.13E-02	4.20E-02	4.78E+00	4.69E-05	1.18E-03	0.00E+00	3.42E-04	0.59	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
2016	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	1.13E-05	5.39E-05	8.73E-05	3.05E-02	3.00E-07	2.84E-06	0.00E+00	1.02E-06	0.43	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
2016	Annual	Hoist	D	250	213	Dredging	2.31E+00	1.06E-04	3.40E-04	1.00E-03	1.57E-01	1.77E-06	3.26E-05	0.00E+00	9.56E-06	0.51	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
2016	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	5.35E-05	2.27E-04	5.98E-04	1.14E-01	1.12E-06	1.88E-05	0.00E+00	4.82E-06	0.74	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000
2016	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	3.67E-04	1.18E-03	3.09E-03	5.54E-01	5.44E-06	1.09E-04	0.00E+00	3.31E-05	0.74	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
2016	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	8.67E-06	2.78E-05	8.22E-05	1.29E-02	1.45E-07	2.67E-06	0.00E+00	7.82E-07	0.51	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
2017	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	7.07E+01	3.51E-03	1.18E-02	2.44E-02	5.60E+00	6.30E-05	8.17E-04	0.00E+00	3.16E-04	0.57	0.356	1.200	2.477	0.006	0.083	0.074	568.300	0.032	0.000
2017	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	5.10E+01	3.60E-03	1.21E-02	2.30E-02	5.95E+00	5.84E-05	8.23E-04	0.00E+00	3.25E-04	0.57	0.344	1.157	2.193	0.006	0.079	0.070	568.300	0.031	0.000
2017	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.16E+01	1.87E-03	6.06E-03	1.49E-02	2.71E+00	3.05E-05	5.09E-04	0.00E+00	1.68E-04	0.61	0.391	1.270	3.127	0.006	0.107	0.095	568.300	0.035	0.000
2017	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.30E+01	6.44E-04	4.68E-03	4.47E-03	8.09E-01	9.10E-06	2.41E-04	0.00E+00	5.81E-05	0.60	0.453	3.289	3.142	0.006	0.169	0.151	568.300	0.041	0.000
2017	Annual	Loader	D	500	350	Construction and Mining Equipment	2.82E+01	2.14E-03	7.61E-03	1.60E-02	3.34E+00	3.28E-05	5.72E-04	0.00E+00	1.93E-04	0.54	0.364	1.296	2.722	0.006	0.097	0.087	568.300	0.033	0.000
2017	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.64E+02	8.75E-03	6.26E-02	5.87E-02	9.41E+00	1.10E-04	3.98E-03	0.00E+00	7.89E-04	0.55	0.528	3.783	3.547	0.007	0.241	0.214	568.300	0.048	0.000
2017	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.77E+01	2.87E-03	1.04E-02	2.22E-02	3.59E+00	3.52E-05	8.45E-04	0.00E+00	2.59E-04	0.64	0.439	1.591	3.405	0.005	0.129	0.115	549.583	0.040	0.000
2017	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.38E+01	1.06E-03	8.33E-03	7.64E-03	1.27E+00	1.49E-05	4.91E-04	0.00E+00	9.59E-05	0.68	0.476	3.732	3.422	0.007	0.220	0.196	568.300	0.043	0.000
2017	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.60E+01	8.87E-04	2.88E-03	6.13E-03	1.33E+00	1.50E-05	2.05E-04	0.00E+00	8.00E-05	0.57	0.379	1.230	2.617	0.006	0.088	0.078	568.300	0.034	0.000
2017	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	3.62E-03	1.08E-02	3.96E-02	4.78E+00	4.69E-05	1.08E-03	0.00E+00	3.27E-04	0.59	0.431	1.289	4.705	0.006	0.129	0.115	568.300	0.039	0.000
2017	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	1.06E-05	5.39E-05	7.29E-05	3.05E-02	3.00E-07	2.31E-06	0.00E+00	9.57E-07	0.43	0.197	1.003	1.357	0.006	0.043	0.038	568.300	0.018	0.000
2017	Annual	Hoist	D	250	213	Dredging	2.31E+00	1.00E-04	3.32E-04	8.96E-04	1.57E-01	1.77E-06	2.93E-05	0.00E+00	9.03E-06	0.51	0.362	1.201	3.237	0.006	0.106	0.094	568.300	0.033	0.000
2017	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	5.01E-05	2.19E-04	5.36E-04	1.14E-01	1.12E-06	1.70E-05	0.00E+00	4.52E-06	0.74	0.250	1.092	2.676	0.006	0.085	0.076	568.300	0.023	0.000
2017	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	3.50E-04	1.14E-03	2.77E-03	5.54E-01	5.44E-06	9.85E-05	0.00E+00	3.16E-05	0.74	0.359	1.171	2.842	0.006	0.101	0.090	568.300	0.032	0.000
2017	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	8.20E-06	2.72E-05	7.33E-05	1.29E-02	1.45E-07	2.40E-06	0.00E+00	7.40E-07	0.51	0.362	1.201	3.237	0.006	0.106	0.094	568.300	0.033	0.000
2018	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	7.18E+01	3.34E-03	1.19E-02	2.15E-02	5.69E+00	6.40E-05	7.23E-04	0.00E+00	3.01E-04	0.57	0.334	1.189	2.146	0.006	0.072	0.064	568.300	0.030	0.000
2018	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	5.18E+01	3.45E-03	1.21E-02	2.04E-02	6.04E+00	5.93E-05	7.34E-04	0.00E+00	3.12E-04	0.57	0.325	1.139	1.916	0.006	0.069	0.061	568.300	0.029	0.000
2018	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.20E+01	1.79E-03	6.04E-03	1.36E-02	2.75E+00	3.10E-05	4.62E-04	0.00E+00	1.61E-04	0.61	0.369	1.247	2.804	0.006	0.095	0.085	568.300	0.033	0.000
2018	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.32E+01	5.99E-04	4.75E-03	3.98E-03	8.21E-01	9.24E-06	2.12E-04	0.00E+00	5.40E-05	0.60	0.414	3.288	2.759	0.006	0.146	0.130	568.300	0.037	0.000
2018	Annual	Loader	D	500	350	Construction and Mining Equipment	2.86E+01	2.06E-03	7.50E-03	1.45E-02	3.39E+00	3.32E-05	5.21E-04	0.00E+00	1.86E-04	0.54	0.346	1.259	2.438	0.006	0.087	0.078	568.300	0.031	0.000
2018	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.69E+02	8.06E-03	6.32E-02	5.43E-02	9.54E+00	1.12E-04	3.41E-03	0.00E+00	7.27E-04	0.55	0.480	3.765	3.233	0.007	0.203	0.181	568.300	0.043	0.000
2018	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.81E+01	2.75E-03	1.01E-02	2.06E-02	3.64E+00	3.57E-05	7.78E-04	0.00E+00	2.48E-04	0.64	0.416	1.522	3.117	0.005	0.118	0.105	549.583	0.038	0.000
2018	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.45E+01	1.00E-03	8.47E-03	7.12E-03	1.29E+00	1.52E-05	4.29E-04	0.00E+00	9.06E-05	0.68	0.442	3.727	3.133	0.007	0.189	0.168	568.300	0.040	0.000
2018	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.62E+01	8.44E-04	2.89E-03	5.41E-03	1.35E+00	1.52E-05	1.83E-04	0.00E+00	7.61E-05	0.57	0.355	1.218	2.277	0.006	0.077	0.068	568.300	0.032	0.000
2018	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	3.47E-03	1.05E-02	3.73E-02	4.78E+00	4.69E-05	9.95E-04	0.00E+00	3.13E-04	0.59	0.413	1.252	4.432	0.006	0.118	0.105	568.300	0.037	0.000
2018	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	9.88E-06	5.39E-05	5.97E-05	3.05E-02	3.00E-07	1.81E-06	0.00E+00	8.92E-07	0.43	0.184	1.003	1.111	0.006	0.034	0.030	568.300	0.017	0.000
2018	Annual	Hoist	D	250	213	Dredging	2.31E+00	9.46E-05	3.26E-04	7.93E-04	1.57E-01	1.77E-06	2.62E-05	0.00E+00	8.54E-06	0.51	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000
2018	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	4.72E-05	2.13E-04	4.80E-04	1.14E-01	1.12E-06	1.54E-05	0.00E+00	4.26E-06	0.74	0.236	1.064	2.395	0.006	0.077	0.068	568.300	0.021	0.000
2018	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	3.34E-04	1.11E-03	2.48E-03	5.54E-01	5.44E-06	8.90E-05	0.00E+00	3.01E-05	0.74	0.342	1.142	2.542	0.006	0.091	0.081	568.300	0.031	0.000
2018	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	7.75E-06	2.67E-05	6.49E-05	1.29E-02	1.45E-07	2.14E-06	0.00E+00	6.99E-07	0.51	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000
2019	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	7.28E+01	3.18E-03	1.20E-02	1.88E-02	5.77E+00	6.50E-05	6.39E-04	0.00E+00	2.87E-04	0.57	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000
2019	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	5.25E+01	3.31E-03	1.21E-02	1.81E-02	6.13E+00	6.02E-05	6.53E-04	0.00E+00	2.99E-04	0.57	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000
2019	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.24E+01	1.71E-03	6.03E-03	1.23E-02	2.79E+00	3.14E-05	4.19E-04	0.00E+00	1.55E-04	0.61	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000
2019	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.33E+01	5.62E-04	4.82E-03	3.56E-03	8.32E-01	9.37E-06	1.87E-04	0.00E+00	5.08E-05	0.60	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000
2019	Annual	Loader	D	500	350	Construction and Mining Equipment	2.90E+01	1.99E-03	7.41E-03	1.31E-02	3.43E+00	3.37E-05	4.73E-04	0.00E+00	1.79E-04	0.54	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000
2019	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.75E+02	7.45E-03	6.39E-02	5.03E-02	9.68E+00	1.14E-04	2.89E-03	0.00E+00	6.72E-04	0.55	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000
2019	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.85E+01	2.64E-03	9.80E-03	1.91E-02	3.68E+00	3.62E-05	7.15E-04	0.00E+00	2.38E-04	0.64	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000
2019	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.51E+01	9.55E-04	8.62E-03	6.65E-03	1.32E+00	1.54E-05	3.74E-04	0.00E+00	8.62E-05	0.68	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000
2019	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.65E+01	8.06E-04	2.91E-03	4.77E-03	1.37E+00	1.54E-05	1.62E-04	0.00E+00	7.27E-05	0.57	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000
2019	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	3.32E-03	1.03E-02	3.51E-02	4.78E+00	4.69E-05	9.09E-04	0.00E+00	3.00E-04	0.59	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000
2019	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	9.16E-06	5.39E-05	4.77E-05	3.05E-02	3.00E-07	1.34E-06	0.00E+00	8.26E-07	0.43	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000
2019	Annual	Hoist	D	250	213	Dredging	2.31E+00	8.95E-05	3.21E-04	7.00E-04	1.57E-01	1.77E-06	2.34E-05	0.00E+00	8.08E-06	0.51	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
2019	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	4.46E-05	2.09E-04	4.28E-04	1.14E-01	1.12E-06	1.38E-05	0.00E+00	4.02E-06	0.74	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000
2019	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	3.18E-04	1.09E-03	2.21E-03	5.54E-01	5.44E-06	7.99E-05	0.00E+00	2.87E-05	0.74	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000
2019	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	7.33E-06	2.63E-05	5.73E-05	1.29E-02	1.45E-07	1.91E-06	0.00E+00	6.61E-07	0.51	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
2020	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	7.38E+01	3.04E-03	1.21E-02	1.65E-02	5.85E+00	6.58E-05	5.65E-04	0.00E+00	2.75E-04	0.57	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000
2020	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	5.32E+01	3.18E-03	1.22E-02	1.60E-02	6.22E+00	6.10E-05	5.80E-04	0.00E+00	2.87E-04	0.57	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000
2020	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.29E+01	1.64E-03	6.04E-03	1.11E-02	2.82E+00	3.18E-05	3.79E-04	0.00E+00	1.48E-04	0.61	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000
2020	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.35E+01	5.32E-04	4.88E-03	3.18E-03	8.44E-01	9.50E-06	1.66E-04	0.00E+00	4.80E-05	0.60	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000
2020	Annual	Loader	D	500	350	Construction and Mining Equipment	2.94E+01	1.91E-03	7.36E-03	1.19E-02	3.48E+00	3.41E-05	4.29E-04	0.00E+00	1.73E-04	0.54	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000
2020	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.80E+02	6.95E-03	6.46E-02	4.68E-02	9.82E+00	1.15E-04	2.45E-03	0.00E+00	6.27E-04	0.55	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000
2020	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.88E+01	2.54E-03	9.58E-03	1.76E-02	3.73E+00	3.66E-05	6.57E-04	0.00E+00	2.29E-04	0.64	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000
2020	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.57E+01	9.07E-04	8.77E-03	6.18E-03	1.34E+00	1.57E-05	3.18E-04	0.00E+00	8.19E-05	0.68	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000
2020	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.67E+01	7.72E-04	2.93E-03	4.20E-03	1.39E+00	1.56E-05	1.44E-04	0.00E+00	6.97E-05	0.57	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000
2020	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.29E+01	3.17E-03	1.01E-02	3.30E-02	4.78E+00	4.69E-05	8.25E-04	0.00E+00	2.86E-04	0.59	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000
2020	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	8.64E-06	5.39E-05	3.92E-05	3.05E-02	3.00E-07	1.14E-06	0.00E+00	7.79E-07	0.43	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000
2020	Annual	Hoist	D	250	213	Dredging	2.31E+00	8.48E-05	3.17E-04	6.17E-04	1.57E-01	1.77E-06	2.08E-05	0.00E+00	7.65E-06	0.51	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
2020	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	4.21E-05	2.07E-04	3.78E-04	1.14E-01	1.12E-06	1.24E-05	0.00E+00	3.80E-06	0.74	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000
2020	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	3.03E-04	1.08E-03	1.95E-03	5.54E-01	5.44E-06	7.12E-05	0.00E+00	2.73E-05	0.74	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000
2020	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	6.94E-06	2.60E-05	5.05E-05	1.29E-02	1.45E-07	1.70E-06	0.00E+00	6.27E-07	0.51	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
2021	Annual	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	7.48E+01	2.92E-03	1.22E-02	1.45E-02	5.93E+00	6.67E-05	4.98E-04	0.00E+00	2.63E-04	0.57	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000
2021	Annual	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	5.40E+01	3.06E-03	1.23E-02	1.41E-02	6.30E+00	6.18E-05	5.14E-04	0.00E+00	2.76E-04	0.57	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000
2021	Annual	Motor Grader	D	250	225	Construction and Mining Equipment	3.33E+01	1.58E-03	6.06E-03	1.00E-02	2.86E+00	3.22E-05	3.43E-04	0.00E+00	1.42E-04	0.61	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000
2021	Annual	Forklift	D	175	166	Construction and Mining Equipment	1.37E+01	5.05E-04	4.95E-03	2.83E-03	8.56E-01	9.63E-06	1.46E-04	0.00E+00	4.55E-05	0.60	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000
2021	Annual	Loader	D	500	350	Construction and Mining Equipment	2.98E+01	1.85E-03	7.31E-03	1.07E-02	3.53E+00	3.46E-05	3.88E-04	0.00E+00	1.66E-04	0.54	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000
2021	Annual	Backhoe/Loader	D	120	75	Construction and Mining Equipment	3.85E+02	6.54E-03	6.53E-02	4.37E-02	9.96E+00	1.17E-04	2.07E-03	0.00E+00	5.90E-04	0.55	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000
2021	Annual	Crawler Crane	D	500	334	Construction and Mining Equipment	2.92E+01	2.44E-03	9.39E-03	1.63E-02	3.78E+00	3.71E-05	6.04E-04	0.00E+00	2.20E-04	0.64	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000
2021	Annual	Street Sweeper	D	120	88	Industrial Equipment	3.74E+01	8.76E-04	9.13E-03	5.93E-03	1.40E+00	1.65E-05	2.71E-04	0.00E+00	7.90E-05	0.68	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000
2021	Annual	Water Truck	D	250	233	Construction and Mining Equipment	1.69E+01	7.42E-04	2.95E-03	3.70E-03	1.41E+00	1.58E-05	1.28E-04	0.00E+00	6.70E-05	0.57	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000
2021	Annual	Pipe Barge	D	9999	1002	Industrial Equipment	1.31E+01	3.02E-03	1.01E-02	3.13E-02	4.87E+00	4.78E-05	7.48E-04	0.00E+00	2.73E-04	0.59	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000
2021	Annual	Crane Barge	D	750	668	Dredging	1.70E-01	8.14E-06	5.39E-05	3.19E-05	3.05E-02	3.00E-07	9.84E-07	0.00E+00	7.35E-07	0.43	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000
2021	Annual	Hoist	D	250	213	Dredging	2.31E+00	8.04E-05	3.14E-04	5.40E-04	1.57E-01	1.77E-06	1.83E-05	0.00E+00	7.25E-06	0.51	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
2021	Annual	Pump (Dredging)	D	500	386	Dredging	6.37E-01	3.98E-05	2.04E-04	3.33E-04	1.14E-01	1.12E-06	1.10E-05	0.00E+00	3.59E-06	0.74	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000
2021	Annual	Generator (Dredging)	D	500	401	Dredging	2.98E+00	2.87E-04	1.07E-03	1.71E-03	5.54E-01	5.44E-06	6.28E-05	0.00E+00	2.59E-05	0.74	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000
2021	Annual	Dump Barge	D	250	218	Dredging	1.85E-01	6.58E-06	2.57E-05	4.42E-05	1.29E-02	1.45E-07	1.50E-06	0.00E+00	5.94E-07	0.51	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000

Project Construction

OFFROAD EQUIPMENT EMISSION REDUCTIONS BY TIER

TABLE II-C
PERCENTAGE REDUCTION
FROM UNCONTROLLED TO TIERS 1, 2, 3 & 4

Model	Engine		Uncontrolled to Tier 1			Uncontrolled to Tier 2			Uncontrolled to Tier 3			Uncontrolled to Tier 4		
Year	Size (hp)		NOx	ROG	PM	NOx	ROG	PM	NOx	ROG	PM	NOx	ROG	PM
1988+	75 - 99		15%	0%	0%	35%	76%	40%	59%	85%	40%	69%	88%	97%
1987+	100 - 174		9%	0%	0%	39%	70%	20%	63%	82%	20%	67%	83%	95%
1987+	175 - 299		9%	0%	0%	39%	70%	45%	63%	82%	45%	80%	83%	95%
1987+	300 - 600		9%	0%	0%	40%	71%	45%	63%	82%	45%	80%	83%	95%

TABLE II-C
PERCENTAGE REMAINING
FROM UNCONTROLLED TO TIERS 1, 2, 3 & 4 with Oxidation Catalyst

Model	Engine		Uncontrolled to Tier 1			Uncontrolled to Tier 2			Uncontrolled to Tier 3			Uncontrolled to Tier 4		
Year	Size (hp)		NOx	ROG	PM	NOx	ROG	PM	NOx	ROG	PM	NOx	ROG	PM
1988+	0	99	34%	100%	100%	26%	24%	60%	16%	15%	60%	12%	12%	3%
1987+	100	174	36%	100%	100%	25%	30%	80%	15%	18%	80%	13%	17%	5%
1987+	175	299	36%	100%	100%	25%	30%	55%	15%	18%	55%	8%	17%	5%
1987+	300	600	36%	100%	100%	24%	29%	55%	15%	18%	55%	8%	17%	5%

Source: Carl Moyer Table B-12 > > > **http://www.arb.ca.gov/msprog/moyer/guidelines/2005_Carl_Moyer_Guidelines_Part4.pdf**

Source: ARB Table 1 > > **http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road Diesel Stds.xls**

Nox Reduction

40%

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,075,410				
VMT/1000	205,698				
Trips	38,142,600				
Reactive Organic Gas Emissions					
Run Exh	7.93	15,860	7,193,977	0.03497	
Idle Exh	0	-	-		-
Start Ex	11.31	22,620	10,260,262		0.26900

Total Ex	19.24	38,480	17,454,239		
Diurnal	3.67	7,340	3,329,369	0.01619	
Hot Soak	6.44	12,880	5,842,271	0.02840	
Running	14.84	29,680	13,462,625	0.06545	
Resting	2.71	5,420	2,458,471	0.01195	

Total	46.91				
Carbon Monoxide Emissions					
Run Exh	338.41	676,820	307,000,476	1.49248	
Idle Exh	0	-	-		-
Start Ex	143.45	286,900	130,135,688		3.41182

Total Ex	481.86	963,720	437,136,164		
Oxides of Nitrogen Emissions					
Run Exh	28.69	57,380	26,027,138	0.12653	
Idle Exh	0	-	-		-
Start Ex	9.57	19,140	8,681,760		0.22761

Total Ex	38.26	76,520	34,708,898		
Carbon Dioxide Emissions (000)					
Run Exh	89.11	178,220	80,839,255	392.99971	
Idle Exh	0	-	-		-
Start Ex	3.01	6,020	2,730,627		71.58995

Total Ex	92.12	184,240	83,569,882		
PM10 Emissions					
Run Exh	2.81	5,620	2,549,190	0.01239	
Idle Exh	0	-	-		-
Start Ex	0.26	520	235,868		0.00618

Total Ex	3.07	6,140	2,785,058		
TireWear	1.81	3,620	1,642,005	0.00798	
BrakeWr	2.84	5,680	2,576,405	0.01253	

Total	7.73	15,460	7,012,540		
Lead	0				
SOx	0.89	1,780	807,395	0.00393	
Fuel Consumption (000 gallons)					
Gasoline	9515.69				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,157,280				
VMT/1000	207,520				
Trips	38,595,500				
Reactive Organic Gas Emissions					
Run Exh	7.27	14,540	6,595,235	0.03178	
Idle Exh	0	-	-		-
Start Ex	10.3	20,600	9,344,006		0.24210

Total Ex	17.57	35,140	15,939,240		
Diurnal	3.53	7,060	3,202,363	0.01543	
Hot Soak	6.4	12,800	5,805,984	0.02798	
Running	14.38	28,760	13,045,320	0.06286	
Resting	2.68	5,360	2,431,256	0.01172	

Total	44.56				
Carbon Monoxide Emissions					
Run Exh	316.52	633,040	287,142,196	1.38368	
Idle Exh	0	-	-		-
Start Ex	133.15	266,300	120,791,683		3.12968

Total Ex	449.68	899,360	407,942,951		
Oxides of Nitrogen Emissions					
Run Exh	26.45	52,900	23,995,043	0.11563	
Idle Exh	0	-	-		-
Start Ex	8.76	17,520	7,946,941		0.20590

Total Ex	35.21	70,420	31,941,984		
Carbon Dioxide Emissions (000)					
Run Exh	89.72	179,440	81,392,638	392.21587	
Idle Exh	0	-	-		-
Start Ex	3.04	6,080	2,757,842		71.45502

Total Ex	92.76	185,520	84,150,481		
PM10 Emissions					
Run Exh	2.86	5,720	2,594,549	0.01250	
Idle Exh	0	-	-		-
Start Ex	0.27	540	244,940		0.00635

Total Ex	3.13	6,260	2,839,489		
TireWear	1.83	3,660	1,660,149	0.00800	
BrakeWr	2.87	5,740	2,603,621	0.01255	

Total	7.83	15,660	7,103,259		
Lead	0				
SOx	0.9	1,800	816,467	0.00393	
Fuel Consumption (000 gallons)					
Gasoline	9575.19				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2016 -- All model years in the range 1972 to 2016 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,220,690				
VMT/1000	208,546				
Trips	38,927,800				
Reactive Organic Gas Emissions					
Run Exh	6.77	13,540	6,141,642	0.02945	
Idle Exh	0	-	-		-
Start Ex	9.38	18,760	8,509,395		0.21859

Total Ex	16.15	32,300	14,651,038		
Diurnal	3.39	6,780	3,075,357	0.01482	
Hot Soak	6.33	12,660	5,742,481	0.02767	
Running	13.94	27,880	12,646,159	0.06094	
Resting	2.65	5,300	2,404,040	0.01158	

Total	42.47				
Carbon Monoxide Emissions					
Run Exh	297.52	595,040	269,905,681	1.29423	
Idle Exh	0	-	-		-
Start Ex	123.39	246,780	111,937,557		2.87552

Total Ex	420.91	841,820	381,843,238		
Oxides of Nitrogen Emissions					
Run Exh	24.48	48,960	22,207,889	0.10649	
Idle Exh	0	-	-		-
Start Ex	7.99	15,980	7,248,408		0.18620

Total Ex	32.47	64,940	29,456,297		
Carbon Dioxide Emissions (000)					
Run Exh	90.45	180,900	82,054,883	393.46179	
Idle Exh	0	-	-		-
Start Ex	3.06	6,120	2,775,986		71.31115

Total Ex	93.51	187,020	84,830,869		
PM10 Emissions					
Run Exh	2.94	5,880	2,667,124	0.01279	
Idle Exh	0	-	-		-
Start Ex	0.28	560	254,012		0.00653

Total Ex	3.22	6,440	2,921,136		
TireWear	1.84	3,680	1,669,220	0.00800	
BrakeWr	2.88	5,760	2,612,693	0.01253	

Total	7.94	15,880	7,203,049		
Lead	0				
SOx	0.9	1,800	816,467	0.00392	
Fuel Consumption (000 gallons)					
Gasoline	9647.24				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,284,290				
VMT/1000	209,938				
Trips	39,265,500				
Reactive Organic Gas Emissions					
Run Exh	6.26	12,520	5,678,978	0.02705	
Idle Exh	0	-	-		-
Start Ex	8.55	17,100	7,756,432		0.19754

Total Ex	14.81	29,620	13,435,410		
Diurnal	3.27	6,540	2,966,495	0.01429	
Hot Soak	6.25	12,500	5,669,906	0.02732	
Running	13.52	27,040	12,265,141	0.05910	
Resting	2.6	5,200	2,358,681	0.01137	

Total	40.45				
Carbon Monoxide Emissions					
Run Exh	278.67	557,340	252,805,244	1.20419	
Idle Exh	0	-	-		-
Start Ex	114.19	228,380	103,591,455		2.63823

Total Ex	392.86	785,720	356,396,699		
Oxides of Nitrogen Emissions					
Run Exh	22.65	45,300	20,547,740	0.09788	
Idle Exh	0	-	-		-
Start Ex	7.26	14,520	6,586,163		0.16773

Total Ex	29.91	59,820	27,133,903		
Carbon Dioxide Emissions (000)					
Run Exh	90.91	181,820	82,472,188	392.84069	
Idle Exh	0	-	-		-
Start Ex	3.08	6,160	2,794,130		71.15992

Total Ex	93.99	187,980	85,266,318		
PM10 Emissions					
Run Exh	2.99	5,980	2,712,483	0.01292	
Idle Exh	0	-	-		-
Start Ex	0.28	560	254,012		0.00647

Total Ex	3.27	6,540	2,966,495		
TireWear	1.85	3,700	1,678,292	0.00799	
BrakeWr	2.9	5,800	2,630,837	0.01253	

Total	8.02	16,040	7,275,624		
Lead	0				
SOx	0.91	1,820	825,538	0.00393	
Fuel Consumption (000 gallons)					
Gasoline	9691.48				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,347,850				
VMT/1000	211,564				
Trips	39,607,000				
Reactive Organic Gas Emissions					
Run Exh	5.8	11,600	5,261,673	0.02487	
Idle Exh	0	-	-		-
Start Ex	7.8	15,600	7,076,043		0.17866

Total Ex	13.6	27,200	12,337,716		
Diurnal	3.14	6,280	2,848,561	0.01373	
Hot Soak	6.13	12,260	5,561,044	0.02680	
Running	13.13	26,260	11,911,339	0.05740	
Resting	2.55	5,100	2,313,322	0.01115	

Total	38.54				
Carbon Monoxide Emissions					
Run Exh	261.22	522,440	236,974,866	1.12011	
Idle Exh	0	-	-		-
Start Ex	105.54	211,080	95,744,305		2.41736

Total Ex	366.76	733,520	332,719,171		
Oxides of Nitrogen Emissions					
Run Exh	21	42,000	19,050,885	0.09005	
Idle Exh	0	-	-		-
Start Ex	6.59	13,180	5,978,349		0.15094

Total Ex	27.59	55,180	25,029,234		
Carbon Dioxide Emissions (000)					
Run Exh	91.44	182,880	82,952,996	392.09410	
Idle Exh	0	-	-		-
Start Ex	3.1	6,200	2,812,274		71.00446

Total Ex	94.54	189,080	85,765,270		
PM10 Emissions					
Run Exh	3.02	6,040	2,739,699	0.01295	
Idle Exh	0	-	-		-
Start Ex	0.29	580	263,084		0.00664

Total Ex	3.31	6,620	3,002,782		
TireWear	1.87	3,740	1,696,436	0.00802	
BrakeWr	2.93	5,860	2,658,052	0.01256	

Total	8.1	16,200	7,348,199		
Lead	0				
SOx	0.91	1,820	825,538	0.00390	
Fuel Consumption (000 gallons)					
Gasoline	9742.85				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2019 -- All model years in the range 1975 to 2019 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,411,000				
VMT/1000	213,354				
Trips	39,951,600				
Reactive Organic Gas Emissions					
Run Exh	5.39	10,780	4,889,727	0.02292	
Idle Exh	0	-	-		-
Start Ex	7.11	14,220	6,450,085		0.16145

Total Ex	12.5	25,000	11,339,813		
Diurnal	3.02	6,040	2,739,699	0.01320	
Hot Soak	6	12,000	5,443,110	0.02623	
Running	12.74	25,480	11,557,537	0.05569	
Resting	2.49	4,980	2,258,891	0.01089	

Total	36.76				
Carbon Monoxide Emissions					
Run Exh	245.27	490,540	222,505,265	1.04289	
Idle Exh	0	-	-		-
Start Ex	97.5	195,000	88,450,538		2.21394

Total Ex	342.77	685,540	310,955,802		
Oxides of Nitrogen Emissions					
Run Exh	19.52	39,040	17,708,251	0.08300	
Idle Exh	0	-	-		-
Start Ex	5.97	11,940	5,415,894		0.13556

Total Ex	25.49	50,980	23,124,146		
Carbon Dioxide Emissions (000)					
Run Exh	92.05	184,100	83,506,379	391.39824	
Idle Exh	0	-	-		-
Start Ex	3.12	6,240	2,830,417		70.84615

Total Ex	95.17	190,340	86,336,796		
PM10 Emissions					
Run Exh	3.06	6,120	2,775,986	0.01301	
Idle Exh	0	-	-		-
Start Ex	0.29	580	263,084		0.00659

Total Ex	3.35	6,700	3,039,070		
TireWear	1.88	3,760	1,705,508	0.00799	
BrakeWr	2.95	5,900	2,676,196	0.01254	

Total	8.18	16,360	7,420,773		
Lead	0				
SOx	0.92	1,840	834,610	0.00391	
Fuel Consumption (000 gallons)					
Gasoline	9803.49				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,473,030				
VMT/1000	215,241				
Trips	40,296,400				
Reactive Organic Gas Emissions					
Run Exh	4.99	9,980	4,526,853	0.02103	
Idle Exh	0	-	-		-
Start Ex	6.49	12,980	5,887,631		0.14611

Total Ex	11.48	22,960	10,414,484		
Diurnal	2.89	5,780	2,621,765	0.01263	
Hot Soak	5.84	11,680	5,297,960	0.02553	
Running	12.34	24,680	11,194,663	0.05394	
Resting	2.42	4,840	2,195,388	0.01058	

Total	34.97				
Carbon Monoxide Emissions					
Run Exh	230.3	460,600	208,924,706	0.97065	
Idle Exh	0	-	-		-
Start Ex	89.96	179,920	81,610,363		2.02525

Total Ex	320.26	640,520	290,535,068		
Oxides of Nitrogen Emissions					
Run Exh	18.15	36,300	16,465,408	0.07650	
Idle Exh	0	-	-		-
Start Ex	5.4	10,800	4,898,799		0.12157

Total Ex	23.55	47,100	21,364,207		
Carbon Dioxide Emissions (000)					
Run Exh	92.72	185,440	84,114,193	390.79076	
Idle Exh	0	-	-		-
Start Ex	3.14	6,280	2,848,561		70.69021

Total Ex	95.86	191,720	86,962,754		
PM10 Emissions					
Run Exh	3.09	6,180	2,803,202	0.01302	
Idle Exh	0	-	-		-
Start Ex	0.29	580	263,084		0.00653

Total Ex	3.38	6,760	3,066,285		
TireWear	1.9	3,800	1,723,652	0.00801	
BrakeWr	2.98	5,960	2,703,411	0.01256	

Total	8.26	16,520	7,493,348		
Lead	0				
SOx	0.93	1,860	843,682	0.00392	
Fuel Consumption (000 gallons)					
Gasoline	9869.77				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS
EMPLOYEE COMMUTE

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2021 -- All model years in the range 1977 to 2021 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,506,540				
VMT/1000	215,640				
Trips	40,460,100				
Reactive Organic Gas Emissions					
Run Exh	4.68	9,360	4,245,626	0.01969	
Idle Exh	0	-	-		-
Start Ex	5.92	11,840	5,370,535		0.13274

Total Ex	10.6	21,200	9,616,161		
Diurnal	2.77	5,540	2,512,902	0.01211	
Hot Soak	5.67	11,340	5,143,739	0.02479	
Running	11.93	23,860	10,822,717	0.05215	
Resting	2.34	4,680	2,122,813	0.01023	

Total	33.32				
Carbon Monoxide Emissions					
Run Exh	217.96	435,920	197,730,043	0.91695	
Idle Exh	0	-	-		-
Start Ex	83.03	166,060	75,323,571		1.86168

Total Ex	300.99	601,980	273,053,613		
Oxides of Nitrogen Emissions					
Run Exh	16.94	33,880	15,367,714	0.07127	
Idle Exh	0	-	-		-
Start Ex	4.9	9,800	4,445,207		0.10987

Total Ex	21.84	43,680	19,812,920		
Carbon Dioxide Emissions (000)					
Run Exh	93.25	186,500	84,595,001	392.29735	
Idle Exh	0	-	-		-
Start Ex	3.15	6,300	2,857,633		70.62842

Total Ex	96.4	192,800	87,452,634		
PM10 Emissions					
Run Exh	3.15	6,300	2,857,633	0.01325	
Idle Exh	0	-	-		-
Start Ex	0.3	600	272,156		0.00673

Total Ex	3.44	6,880	3,120,716		
TireWear	1.9	3,800	1,723,652	0.00799	
BrakeWr	2.98	5,960	2,703,411	0.01254	

Total	8.33	16,660	7,556,851		
Lead	0				
SOx	0.93	1,860	843,682	0.00391	
Fuel Consumption (000 gallons)					
Gasoline	9921.23				
Diesel	0				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2014 -- All model years in the range 2007 to 2014 selected
Season : Annual
Area : Los Angeles
****
Year: 2014 -- Model Years 2007 to 2014
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.134

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2015 -- All model years in the range 2007 to 2015 selected
Season : Annual
Area : Los Angeles
****
Year: 2015 -- Model Years 2007 to 2015
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.134

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2016 -- All model years in the range 2007 to 2016 selected
Season : Annual
Area : Los Angeles
****
Year: 2016 -- Model Years 2007 to 2016
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.134

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2017 -- All model years in the range 2007 to 2017 selected
Season : Annual
Area : Los Angeles
****
Year: 2017 -- Model Years 2007 to 2017
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.133

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2018 -- All model years in the range 2007 to 2018 selected
Season : Annual
Area : Los Angeles
****
Year: 2018 -- Model Years 2007 to 2018
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.133

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2019 -- All model years in the range 2007 to 2019 selected
Season : Annual
Area : Los Angeles
****
Year: 2019 -- Model Years 2007 to 2019
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.134

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2020 -- All model years in the range 2007 to 2020 selected
Season : Annual
Area : Los Angeles
****
Year: 2020 -- Model Years 2007 to 2020
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.133

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 17:29:12
Scen Year: 2021 -- All model years in the range 2007 to 2021 selected
Season : Annual
Area : Los Angeles
****
Year: 2021 -- Model Years 2007 to 2021
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles

Table 1: Running Exhaust Emissions (grams/mile; gram

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	7.652

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	41.429

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	123.519

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.133

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.11

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2014 -- Model Years 1970 to 2014 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	10.302

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	45.288

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	116.253

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.133

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	1.135

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2015 -- Model Years 1971 to 2015 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	9.875

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	44.682

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	117.427

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.137

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.995

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2016 -- All model years in the range 1972 to 2016 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2016 -- Model Years 1972 to 2016 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	9.518

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	44.171

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	118.404

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.136

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.873

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2017 -- Model Years 1973 to 2017 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	9.207

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	43.725

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	119.252

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.764

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2018 -- Model Years 1974 to 2018 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.947

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	43.349

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	119.963

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.669

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2019 -- All model years in the range 1975 to 2019 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2019 -- Model Years 1975 to 2019 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.727

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	43.027

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	120.566

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.585

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2020 -- Model Years 1976 to 2020 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.541

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	42.753

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	121.076

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.512

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS IDLING- UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2021 -- All model years in the range 1977 to 2021 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2021 -- Model Years 1977 to 2021 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.384

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	42.52

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	121.509

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.134

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.447

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 15:54:45
Scen Year: 2014 -- All model years in the range 2007 to 2014 selected
Season : Annual
Area : Los Angeles County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	11,643				
VMT/1000	3,694				
Trips	58,920				
Reactive Organic Gas Emissions					
Run Exh	1.16	2,320	1,052,335	0.28488	
Idle Exh	0.17	340	154,221		2.61747
Start Ex	0	-	-		-

Total Ex	1.33	2,660	1,206,556		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	1.33				
Carbon Monoxide Emissions					
Run Exh	5.71	11,420	5,180,026	1.40228	
Idle Exh	0.9	1,800	816,467		13.85720
Start Ex	0	-	-		-

Total Ex	6.61	13,220	5,996,493		
Oxides of Nitrogen Emissions					
Run Exh	13.78	27,560	12,501,009	3.38414	
Idle Exh	2.67	5,340	2,422,184		41.10971
Start Ex	0	-	-		-

Total Ex	16.46	32,920	14,932,265		
Carbon Dioxide Emissions (000)					
Run Exh	7.62	15,240	6,912,750	1,871.34534	
Idle Exh	0.14	280	127,006		2,155.56517
Start Ex	0	-	-		-

Total Ex	7.77	15,540	7,048,827		
PM10 Emissions					
Run Exh	0.39	780	353,802	0.09578	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.4	800	362,874		
TireWear	0.15	300	136,078	0.03684	
BrakeWr	0.11	220	99,790	0.02701	

Total	0.66	1,320	598,742		
Lead	0				
SOx	0.07	140	63,503	0.01719	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	699.09				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2010/10/14 15:54:45

Scen Year: 2015 -- All model years in the range 2007 to 2015 selected
Season : Annual
Area : Los Angeles County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	13722				
VMT/1000	4277				
Trips	69440				
Reactive Organic Gas Emissions					
Run Exh	1.34	2,680	1,215,628	0.28422	
Idle Exh	0.2	400	181,437		2.61286
Start Ex	0	-	-		-

Total Ex	1.53	3,060	1,387,993		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	1.53				
Carbon Monoxide Emissions					
Run Exh	6.59	13,180	5,978,349	1.39779	
Idle Exh	1.06	2,120	961,616		13.84816
Start Ex	0	-	-		-

Total Ex	7.64	15,280	6,930,893		
Oxides of Nitrogen Emissions					
Run Exh	15.14	30,280	13,734,781	3.21131	
Idle Exh	3.15	6,300	2,857,633		41.15255
Start Ex	0	-	-		-

Total Ex	18.29	36,580	16,592,414		
Carbon Dioxide Emissions (000)					
Run Exh	8.83	17,660	8,010,444	1,872.91175	
Idle Exh	0.17	340	154,221		2,220.93102
Start Ex	0	-	-		-

Total Ex	9	18,000	8,164,665		
PM10 Emissions					
Run Exh	0.47	940	426,377	0.09969	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.47	940	426,377		
TireWear	0.17	340	154,221	0.03606	
BrakeWr	0.13	260	117,934	0.02757	

Total	0.77	1,540	698,532		
Lead	0				
SOx	0.09	180	81,647	0.01909	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	809.61				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2010/10/14 15:54:45

Scen Year: 2016 -- All model years in the range 2007 to 2016 selected

Season : Annual

Area : Los Angeles County Average

I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)

Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
HHDT-DSL					
Vehicles	15484				
VMT/1000	4733				
Trips	78359				
Reactive Organic Gas Emissions					
Run Exh	1.48	2,960	1,342,634	0.28368	
Idle Exh	0.22	440	199,581		2.54700
Start Ex	0	-	-		-

Total Ex	1.7	3,400	1,542,215		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	1.7				
Carbon Monoxide Emissions					
Run Exh	7.39	14,780	6,704,097	1.41646	
Idle Exh	1.19	2,380	1,079,550		13.77698
Start Ex	0	-	-		-

Total Ex	8.58	17,160	7,783,647		
Oxides of Nitrogen Emissions					
Run Exh	16.24	32,480	14,732,684	3.11276	
Idle Exh	3.56	7,120	3,229,579		41.21516
Start Ex	0	-	-		-

Total Ex	19.8	39,600	17,962,263		
Carbon Dioxide Emissions (000)					
Run Exh	9.76	19,520	8,854,126	1,870.72166	
Idle Exh	0.19	380	172,365		2,199.68542
Start Ex	0	-	-		-

Total Ex	9.95	19,900	9,026,491		
PM10 Emissions					
Run Exh	0.55	1,100	498,952	0.10542	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.55	1,100	498,952		
TireWear	0.19	380	172,365	0.03642	
BrakeWr	0.15	300	136,078	0.02875	

Total	0.89	1,780	807,395		
Lead	0				
SOx	0.09	180	81,647	0.01725	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	895.37				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 15:54:45
Scen Year: 2017 -- All model years in the range 2007 to 2017 selected
Season : Annual
Area : Los Angeles County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	17181				
VMT/1000	5134				
Trips	86945				
Reactive Organic Gas Emissions					
Run Exh	1.61	3,220	1,460,568	0.28449	
Idle Exh	0.24	480	217,724		2.50416
Start Ex	0	-	-		-

Total Ex	1.85	3,700	1,678,292		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	1.85				
Carbon Monoxide Emissions					
Run Exh	8.05	16,100	7,302,839	1.42245	
Idle Exh	1.32	2,640	1,197,484		13.77289
Start Ex	0	-	-		-

Total Ex	9.38	18,760	8,509,395		
Oxides of Nitrogen Emissions					
Run Exh	17.29	34,580	15,685,229	3.05517	
Idle Exh	3.95	7,900	3,583,381		41.21434
Start Ex	0	-	-		-

Total Ex	21.24	42,480	19,268,609		
Carbon Dioxide Emissions (000)					
Run Exh	10.59	21,180	9,607,089	1,871.26785	
Idle Exh	0.21	420	190,509		2,191.14210
Start Ex	0	-	-		-

Total Ex	10.8	21,600	9,797,598		
PM10 Emissions					
Run Exh	0.61	1,220	553,383	0.10779	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.61	1,220	553,383		
TireWear	0.2	400	181,437	0.03534	
BrakeWr	0.16	320	145,150	0.02827	

Total	0.98	1,960	889,041		
Lead	0				
SOx	0.1	200	90,719	0.01767	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	971.76				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 15:54:45
Scen Year: 2018 -- All model years in the range 2007 to 2018 selected
Season : Annual
Area : Los Angeles County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	18809				
VMT/1000	5484				
Trips	95182				
Reactive Organic Gas Emissions					
Run Exh	1.72	3,440	1,560,358	0.28453	
Idle Exh	0.27	540	244,940		2.57339
Start Ex	0	-	-		-

Total Ex	1.99	3,980	1,805,298		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	1.99				
Carbon Monoxide Emissions					
Run Exh	8.62	17,240	7,819,935	1.42595	
Idle Exh	1.45	2,900	1,315,418		13.82003
Start Ex	0	-	-		-

Total Ex	10.07	20,140	9,135,353		
Oxides of Nitrogen Emissions					
Run Exh	18.21	36,420	16,519,839	3.01237	
Idle Exh	4.32	8,640	3,919,039		41.17416
Start Ex	0	-	-		-

Total Ex	22.53	45,060	20,438,878		
Carbon Dioxide Emissions (000)					
Run Exh	11.31	22,620	10,260,262	1,870.94499	
Idle Exh	0.23	460	208,653		2,192.14295
Start Ex	0	-	-		-

Total Ex	11.54	23,080	10,468,915		
PM10 Emissions					
Run Exh	0.67	1,340	607,814	0.11083	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.67	1,340	607,814		
TireWear	0.22	440	199,581	0.03639	
BrakeWr	0.17	340	154,221	0.02812	

Total	1.06	2,120	961,616		
Lead	0				
SOx	0.11	220	99,790	0.01820	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	1038.5				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2010/10/14 15:54:45

Scen Year: 2019 -- All model years in the range 2007 to 2019 selected
Season : Annual
Area : Los Angeles County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	20373				
VMT/1000	5788				
Trips	103100				
Reactive Organic Gas Emissions					
Run Exh	1.82	3,640	1,651,077	0.28526	
Idle Exh	0.29	580	263,084		2.55173
Start Ex	0	-	-		-

Total Ex	2.11	4,220	1,914,160		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	2.11				
Carbon Monoxide Emissions					
Run Exh	9.11	18,220	8,264,455	1.42786	
Idle Exh	1.57	3,140	1,424,280		13.81455
Start Ex	0	-	-		-

Total Ex	10.68	21,360	9,688,736		
Oxides of Nitrogen Emissions					
Run Exh	18.99	37,980	17,227,443	2.97641	
Idle Exh	4.68	9,360	4,245,626		41.17969
Start Ex	0	-	-		-

Total Ex	23.67	47,340	21,473,069		
Carbon Dioxide Emissions (000)					
Run Exh	11.93	23,860	10,822,717	1,869.85436	
Idle Exh	0.25	500	226,796		2,199.76964
Start Ex	0	-	-		-

Total Ex	12.19	24,380	11,058,585		
PM10 Emissions					
Run Exh	0.72	1,440	653,173	0.11285	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.72	1,440	653,173		
TireWear	0.23	460	208,653	0.03605	
BrakeWr	0.18	360	163,293	0.02821	

Total	1.13	2,260	1,025,119		
Lead	0				
SOx	0.12	240	108,862	0.01881	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	1096.69				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2010/10/14 15:54:45

Scen Year: 2020 -- All model years in the range 2007 to 2020 selected

Season : Annual

Area : Los Angeles County Average

I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)

Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	21857				
VMT/1000	6047				
Trips	110605				
Reactive Organic Gas Emissions					
Run Exh	1.9	3,800	1,723,652	0.28504	
Idle Exh	0.31	620	281,227		2.54263
Start Ex	0	-	-		-

Total Ex	2.21	4,420	2,004,879		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	2.21				
Carbon Monoxide Emissions					
Run Exh	9.5	19,000	8,618,258	1.42521	
Idle Exh	1.68	3,360	1,524,071		13.77940
Start Ex	0	-	-		-

Total Ex	11.18	22,360	10,142,328		
Oxides of Nitrogen Emissions					
Run Exh	19.62	39,240	17,798,970	2.94344	
Idle Exh	5.02	10,040	4,554,069		41.17417
Start Ex	0	-	-		-

Total Ex	24.65	49,300	22,362,110		
Carbon Dioxide Emissions (000)					
Run Exh	12.47	24,940	11,312,597	1,870.77839	
Idle Exh	0.27	540	244,940		2,214.54681
Start Ex	0	-	-		-

Total Ex	12.74	25,480	11,557,537		
PM10 Emissions					
Run Exh	0.77	1,540	698,532	0.11552	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.77	1,540	698,532		
TireWear	0.24	480	217,724	0.03601	
BrakeWr	0.19	380	172,365	0.02850	

Total	1.2	2,400	1,088,622		
Lead	0				
SOx	0.12	240	108,862	0.01800	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	1146.46				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - MITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/10/14 15:54:45
Scen Year: 2021 -- All model years in the range 2007 to 2021 selected
Season : Annual
Area : Los Angeles County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	23326				
VMT/1000	6291				
Trips	118043				
Reactive Organic Gas Emissions					
Run Exh	1.98	3,960	1,796,226	0.28552	
Idle Exh	0.33	660	299,371		2.53612
Start Ex	0	-	-		-

Total Ex	2.31	4,620	2,095,597		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	2.31				
Carbon Monoxide Emissions					
Run Exh	9.84	19,680	8,926,700	1.41896	
Idle Exh	1.8	3,600	1,632,933		13.83337
Start Ex	0	-	-		-

Total Ex	11.63	23,260	10,550,562		
Oxides of Nitrogen Emissions					
Run Exh	20.23	40,460	18,352,353	2.91724	
Idle Exh	5.36	10,720	4,862,512		41.19271
Start Ex	0	-	-		-

Total Ex	25.59	51,180	23,214,864		
Carbon Dioxide Emissions (000)					
Run Exh	13	26,000	11,793,405	1,874.64711	
Idle Exh	0.29	580	263,084		2,228.71030
Start Ex	0	-	-		-

Total Ex	13.28	26,560	12,047,417		
PM10 Emissions					
Run Exh	0.8	1,600	725,748	0.11536	
Idle Exh	0	-	-		-
Start Ex	0	-	-		-

Total Ex	0.81	1,620	734,820		
TireWear	0.25	500	226,796	0.03605	
BrakeWr	0.2	400	181,437	0.02884	

Total	1.25	2,500	1,133,981		
Lead	0				
SOx	0.13	260	117,934	0.01875	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	1195.45				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	58,324				
VMT/1000	11,439				
Trips	295,146				
Reactive Organic Gas Emissions					
Run Exh	9.95	19,900	9,026,491	0.78910	
Idle Exh	1.12	2,240	1,016,047		3.44252
Start Ex	0	-	-		-

Total Ex	11.07	22,140	10,042,538		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	11.07				
Carbon Monoxide Emissions					
Run Exh	40.32	80,640	36,577,699	3.19763	
Idle Exh	4.91	9,820	4,454,278		15.09178
Start Ex	0	-	-		-

Total Ex	45.23	90,460	41,031,978		
Oxides of Nitrogen Emissions					
Run Exh	116.86	233,720	106,013,639	9.26774	
Idle Exh	12.61	25,220	11,439,603		38.75913
Start Ex	0	-	-		-

Total Ex	129.47	258,940	117,453,242		
Carbon Dioxide Emissions (000)					
Run Exh	23.23	46,460	21,073,908	1,842.28582	
Idle Exh	0.72	1,440	653,173		2,213.05117
Start Ex	0	-	-		-

Total Ex	23.94	47,880	21,718,009		
PM10 Emissions					
Run Exh	5.7	11,400	5,170,955	0.45205	
Idle Exh	0.12	240	108,862		0.36884
Start Ex	0	-	-		-

Total Ex	5.82	11,640	5,279,817		
TireWear	0.45	900	408,233	0.03569	
BrakeWr	0.36	720	326,587	0.02855	

Total	6.63	13,260	6,014,637		
Lead	0				
SOx	0.23	460	208,653	0.01824	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2154.97				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	60,159				
VMT/1000	12,042				
Trips	304,434				
Reactive Organic Gas Emissions					
Run Exh	9.22	18,440	8,364,246	0.69459	
Idle Exh	1.1	2,200	997,904		3.27790
Start Ex	0	-	-		-

Total Ex	10.32	20,640	9,362,149		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	10.32				
Carbon Monoxide Emissions					
Run Exh	38.14	76,280	34,600,036	2.87328	
Idle Exh	5	10,000	4,535,925		14.89953
Start Ex	0	-	-		-

Total Ex	43.14	86,280	39,135,961		
Oxides of Nitrogen Emissions					
Run Exh	106.67	213,340	96,769,424	8.03599	
Idle Exh	13.14	26,280	11,920,411		39.15598
Start Ex	0	-	-		-

Total Ex	119.81	239,620	108,689,835		
Carbon Dioxide Emissions (000)					
Run Exh	24.45	48,900	22,180,673	1,841.94264	
Idle Exh	0.74	1,480	671,317		2,205.13116
Start Ex	0	-	-		-

Total Ex	25.19	50,380	22,851,990		
PM10 Emissions					
Run Exh	5.22	10,440	4,735,506	0.39325	
Idle Exh	0.11	220	99,790		0.32779
Start Ex	0	-	-		-

Total Ex	5.33	10,660	4,835,296		
TireWear	0.48	960	435,449	0.03616	
BrakeWr	0.37	740	335,658	0.02787	

Total	6.18	12,360	5,606,403		
Lead	0				
SOx	0.24	480	217,724	0.01808	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2266.95				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2016 -- All model years in the range 1972 to 2016 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	61,237				
VMT/1000	12,456				
Trips	309,889				
Reactive Organic Gas Emissions					
Run Exh	8.51	17,020	7,720,144	0.61979	
Idle Exh	1.08	2,160	979,760		3.16165
Start Ex	0	-	-		-

Total Ex	9.59	19,180	8,699,904		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	9.59				
Carbon Monoxide Emissions					
Run Exh	35.87	71,740	32,540,726	2.61245	
Idle Exh	5.03	10,060	4,563,141		14.72508
Start Ex	0	-	-		-

Total Ex	40.9	81,800	37,103,867		
Oxides of Nitrogen Emissions					
Run Exh	96.67	193,340	87,697,574	7.04059	
Idle Exh	13.48	26,960	12,228,854		39.46205
Start Ex	0	-	-		-

Total Ex	110.15	220,300	99,926,428		
Carbon Dioxide Emissions (000)					
Run Exh	25.31	50,620	22,960,852	1,843.35680	
Idle Exh	0.75	1,500	680,389		2,195.58858
Start Ex	0	-	-		-

Total Ex	26.06	52,120	23,641,241		
PM10 Emissions					
Run Exh	4.75	9,500	4,309,129	0.34595	
Idle Exh	0.1	200	90,719		0.29275
Start Ex	0	-	-		-

Total Ex	4.85	9,700	4,399,847		
TireWear	0.49	980	444,521	0.03569	
BrakeWr	0.39	780	353,802	0.02840	

Total	5.73	11,460	5,198,170		
Lead	0				
SOx	0.25	500	226,796	0.01821	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2345.42				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	62,310				
VMT/1000	12,833				
Trips	315,319				
Reactive Organic Gas Emissions					
Run Exh	7.84	15,680	7,112,330	0.55422	
Idle Exh	1.07	2,140	970,688		3.07843
Start Ex	0	-	-		-

Total Ex	8.9	17,800	8,073,947		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	8.9				
Carbon Monoxide Emissions					
Run Exh	33.77	67,540	30,635,637	2.38725	
Idle Exh	5.07	10,140	4,599,428		14.58659
Start Ex	0	-	-		-

Total Ex	38.84	77,680	35,235,065		
Oxides of Nitrogen Emissions					
Run Exh	87.86	175,720	79,705,274	6.21096	
Idle Exh	13.82	27,640	12,537,297		39.76068
Start Ex	0	-	-		-

Total Ex	101.68	203,360	92,242,571		
Carbon Dioxide Emissions (000)					
Run Exh	26.07	52,140	23,650,313	1,842.92940	
Idle Exh	0.77	1,540	698,532		2,215.31988
Start Ex	0	-	-		-

Total Ex	26.84	53,680	24,348,845		
PM10 Emissions					
Run Exh	4.31	8,620	3,909,967	0.30468	
Idle Exh	0.09	180	81,647		0.25893
Start Ex	0	-	-		-

Total Ex	4.4	8,800	3,991,614		
TireWear	0.51	1,020	462,664	0.03605	
BrakeWr	0.4	800	362,874	0.02828	

Total	5.31	10,620	4,817,152		
Lead	0				
SOx	0.26	520	235,868	0.01838	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2415.45				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	63,391				
VMT/1000	13,176				
Trips	320,790				
Reactive Organic Gas Emissions					
Run Exh	7.24	14,480	6,568,019	0.49848	
Idle Exh	1.05	2,100	952,544		2.96937
Start Ex	0	-	-		-

Total Ex	8.29	16,580	7,520,564		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	8.29				
Carbon Monoxide Emissions					
Run Exh	31.89	63,780	28,930,130	2.19567	
Idle Exh	5.11	10,220	4,635,715		14.45093
Start Ex	0	-	-		-

Total Ex	37	74,000	33,565,845		
Oxides of Nitrogen Emissions					
Run Exh	80.18	160,360	72,738,093	5.52050	
Idle Exh	14.14	28,280	12,827,596		39.98752
Start Ex	0	-	-		-

Total Ex	94.33	188,660	85,574,761		
Carbon Dioxide Emissions (000)					
Run Exh	26.77	53,540	24,285,342	1,843.14985	
Idle Exh	0.78	1,560	707,604		2,205.81782
Start Ex	0	-	-		-

Total Ex	27.55	55,100	24,992,947		
PM10 Emissions					
Run Exh	3.93	7,860	3,565,237	0.27059	
Idle Exh	0.08	160	72,575		0.22624
Start Ex	0	-	-		-

Total Ex	4	8,000	3,628,740		
TireWear	0.52	1,040	471,736	0.03580	
BrakeWr	0.41	820	371,946	0.02823	

Total	4.94	9,880	4,481,494		
Lead	0				
SOx	0.26	520	235,868	0.01790	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2479.14				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2019 -- All model years in the range 1975 to 2019 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	64,480				
VMT/1000	13,486				
Trips	326,300				
Reactive Organic Gas Emissions					
Run Exh	6.71	13,420	6,087,211	0.45137	
Idle Exh	1.05	2,100	952,544		2.91923
Start Ex	0	-	-		-

Total Ex	7.75	15,500	7,030,684		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.75				
Carbon Monoxide Emissions					
Run Exh	30.2	60,400	27,396,987	2.03151	
Idle Exh	5.16	10,320	4,681,075		14.34592
Start Ex	0	-	-		-

Total Ex	35.36	70,720	32,078,062		
Oxides of Nitrogen Emissions					
Run Exh	73.47	146,940	66,650,882	4.94223	
Idle Exh	14.46	28,920	13,117,895		40.20195
Start Ex	0	-	-		-

Total Ex	87.93	175,860	79,768,777		
Carbon Dioxide Emissions (000)					
Run Exh	27.39	54,780	24,847,797	1,842.48830	
Idle Exh	0.79	1,580	716,676		2,196.37190
Start Ex	0	-	-		-

Total Ex	28.19	56,380	25,573,545		
PM10 Emissions					
Run Exh	3.59	7,180	3,256,794	0.24149	
Idle Exh	0.07	140	63,503		0.19462
Start Ex	0	-	-		-

Total Ex	3.66	7,320	3,320,297		
TireWear	0.54	1,080	489,880	0.03633	
BrakeWr	0.42	840	381,018	0.02825	

Total	4.61	9,220	4,182,123		
Lead	0				
SOx	0.27	540	244,940	0.01816	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2536.81				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	65,570				
VMT/1000	13,761				
Trips	331,816				
Reactive Organic Gas Emissions					
Run Exh	6.23	12,460	5,651,763	0.41071	
Idle Exh	1.04	2,080	943,472		2.84336
Start Ex	0	-	-		-

Total Ex	7.28	14,560	6,604,307		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.28				
Carbon Monoxide Emissions					
Run Exh	28.7	57,400	26,036,210	1.89203	
Idle Exh	5.21	10,420	4,726,434		14.24414
Start Ex	0	-	-		-

Total Ex	33.92	67,840	30,771,715		
Oxides of Nitrogen Emissions					
Run Exh	67.65	135,300	61,371,065	4.45978	
Idle Exh	14.76	29,520	13,390,051		40.35384
Start Ex	0	-	-		-

Total Ex	82.41	164,820	74,761,116		
Carbon Dioxide Emissions (000)					
Run Exh	27.95	55,900	25,355,821	1,842.58562	
Idle Exh	0.81	1,620	734,820		2,214.54014
Start Ex	0	-	-		-

Total Ex	28.76	57,520	26,090,641		
PM10 Emissions					
Run Exh	3.3	6,600	2,993,711	0.21755	
Idle Exh	0.06	120	54,431		0.16404
Start Ex	0	-	-		-

Total Ex	3.36	6,720	3,048,142		
TireWear	0.55	1,100	498,952	0.03626	
BrakeWr	0.43	860	390,090	0.02835	

Total	4.33	8,660	3,928,111		
Lead	0				
SOx	0.27	540	244,940	0.01780	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2588.03				

Project Construction

EMFAC2007 EMISSION FACTORS HAUL TRUCKS - UNMITIGATED

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2021 -- All model years in the range 1977 to 2021 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	67,200				
VMT/1000	14,128				
Trips	340,066				
Reactive Organic Gas Emissions					
Run Exh	5.92	11,840	5,370,535	0.38013	
Idle Exh	1.05	2,100	952,544		2.80106
Start Ex	0	-	-		-

Total Ex	6.97	13,940	6,323,079		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	6.97				
Carbon Monoxide Emissions					
Run Exh	27.59	55,180	25,029,234	1.77160	
Idle Exh	5.31	10,620	4,817,152		14.16535
Start Ex	0	-	-		-

Total Ex	32.9	65,800	29,846,387		
Oxides of Nitrogen Emissions					
Run Exh	63.24	126,480	57,370,379	4.06076	
Idle Exh	15.18	30,360	13,771,068		40.49528
Start Ex	0	-	-		-

Total Ex	78.42	156,840	71,141,448		
Carbon Dioxide Emissions (000)					
Run Exh	28.77	57,540	26,099,712	1,847.37489	
Idle Exh	0.83	1,660	752,964		2,214.16887
Start Ex	0	-	-		-

Total Ex	29.59	59,180	26,843,604		
PM10 Emissions					
Run Exh	3.04	6,080	2,757,842	0.19520	
Idle Exh	0.06	120	54,431		0.16006
Start Ex	0	-	-		-

Total Ex	3.1	6,200	2,812,274		
TireWear	0.56	1,120	508,024	0.03596	
BrakeWr	0.44	880	399,161	0.02825	

Total	4.1	8,200	3,719,459		
Lead	0				
SOx	0.28	560	254,012	0.01798	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2663.52				

Project Construction

HARBOR CRAFT EMISSION FACTORS

The NOX, ROG, and PM emission factors for both the unmitigated and mitigated scenarios are based on Tier 3 emission standards for marine vessels
Emission factors use a 95%/5% for NOX + HC, and a conversion factor of 1.053
CO emission factors do not change from Tier 2 to Tier 3. Thus, the CO emission factor is the Tier 2 emission standard
SO2, CO2 based on fuel consumption. N2O and CH4 from POLB inventory.

Calendar Year 2010

					Unmitigated and Mitigated Criteria Pollutant Emission Factors (g/hp-hr) [2]						GHG Emission Factors (g/hp-hr) [3]		
Equipment	**Fuel**	**Number of Engines per Craft**	**Hp**	**Load Factor (%)[1]**	**NOx**	**CO**	**HC**	**ROG [4]**	**PM**	**SO2**	**CO2**	**N2O**	**CH4**
Work / Crew Boat (main engine)	diesel	1	400	0.45	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Work / Crew Boat (auxiliary engine)	diesel	1	25	0.43	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Tug Boat (main engine)	diesel	2	1,300	0.31	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Tug Boat (auxiliary engine)	diesel	2	57	0.43	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Push Tug/Tender (main engine)	diesel	2	800	0.31	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Push Tug/Tender (auxiliary engine)	diesel	2	138	0.43	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
1	2	4	5	11	12	13	14	15	16	17	18	19	20

Reference:

[1]: POLB 2008 Inventory, Chapter 3, Emission Factors for Harbor Craft
[2] Emission factors are adjusted for California diesel UL fuel (15 ppm sulfur).
[3] Cooper, David, and Tomas Gustafsson. *Methodology for Calculating Emissions from Ships: 1. Update of Emission Factors.* Swedish Environmental Protection Agency; Swedish Methodology for Environmental Data. Norrsköping, Sweden. 2004. http://www.smed.se. This is the same source as used by Starcrest Consulting for the Port of Los Angeles emissions inventory.
(4): ROG/HC conversion factor for diesel engines: http://www.epa.gov/otaq/models/nonrdmdl/p03002.pdf

Equation 3: SOx Emission Factor

SOx (gms/hp-hr) = (S content in X/1,000,000) x (MW SO2/ MW S) x BSF 0.00552

Where:

X = S content in parts per million (ppm)	15	ppm
BSFC = Brake Specific Fuel Consumption (184 g/bhp-hr per CARB 2007 Harbor Craft	184	(g/hp-hr)
MW = Molecular Weight	32	S
	64	SO2

Project Construction

LOCOMOTIVE EMISSION FACTORS

EPA Tier 1-4 Nonroad Diesel Engine Emission Standards, g/bhp-hr

Engine Power	Tier	Year	CO	HC	NMHC + NOx	NOx	PM
130 ≤ kW < 225 (175 ≤ hp < 300)	Tier 1	1996	8.5	1	-	6.9	0.4
	Tier 2	2003	2.6	-	4.9	-	0.15
	Tier 3	2006	2.6	-	3	-	0.15
	Tier 4	2011-2014[d]	2.6	0.14	-	0.3	0.015

EPA Tier 1-4 Nonroad Diesel Engine Emission Standards, g/bhp-hr

Tier	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
1	1.05	8.50	6.90	0.01	0.39	0.39	114.28	0.01	0.00
2	0.26	2.60	4.66	0.01	0.15	0.15	34.96	0.00	0.00
3	0.16	2.60	2.85	0.01	0.15	0.15	34.96	0.00	0.00
4	0.15	2.60	0.30	0.01	0.01	0.01	34.96	0.00	0.00

NMHC/NOx Ratios	
NMHC/NMHC+NOx	0.05
NOx/NMHC+NOx	0.95
PM Ratios	
PM10/PM	0.98
PM2.5/PM	0.97
Hydrocarbon Ratios	
NMHC/HC	0.98
VOC/HC	1.05

Fuel Based Factors

Conversion Factor (gal/hp-hr)
0.05

SO2 Fuel Content (g/gal)	SO2 EF (g/hp-hr)
0.09	0.01

C Fuel Content (g/gal)	CO2 Fuel Content (g/gal)	CO2 EF (g/hp-hr)
0.18	2,079.86	114.28
0.05	636.19	34.96
0.05	636.19	34.96
0.05	636.19	34.96

Project Construction

FUGITIVE DUST EMISSION FACTOR METHODOLOGY AND CALCULATION

Overview	
Source Category	Materials Handling
Source Description	Conveyor transfer point
Location	Western US

Emission Factors	
PM10 Emission Factor Equation (lb/ton)	$EF=0.35(0.0032)\{[(U/5)^{1.3}]/[(M/2)^{1.4}]\}$
Reference for PM10 EF Equation	AP-42, Section 13.2.4
PM2.5/PM10 Ratio	0.15
Reference for PM2.5/PM10 Rato	MRI, 2006

Emission Factor Parameters	
U--mean wind speed (mph)	4.9
M--moisture content (%) before water spray	3
M--moisture content (%) after water spray	7

Control Methods and Efficiencies - for Unmitigated Scenario	
Control Measure	Water spray located at conveyor transfer point
Control application/frequency	Continuous
Control Efficiency (from emission factor equation)	68%
Reference	SCAQMD Rule 403

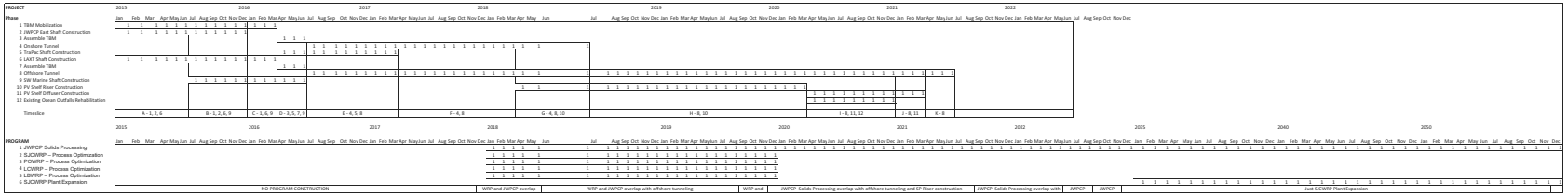
Uncontrolled PM10 Emission Factor (lbs/ton)	0.0005190192
Uncontrolled PM10 Emission Factor (lbs/ton)	0.0000778529

Project Construction Calculations

Alternative 2

Project Construction - Alternative 2

PROJECT AND PROGRAM CONSTRUCTION OVERLAP



Project Construction - Alternative 2

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase

1 TBM Mobilization

Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Unmitigated Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase

2 JWPCP East Shaft Construction

Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.54	0.08				
On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	2.4	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Project Construction - Alternative 2

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase

3 Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase

4 Onshore Tunnel

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.01	0.02	2294.94
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	0.25	0.37	40653.18
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.12	0.18	19670.89
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	0.30	0.44	48521.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.31	1.69	5.04	0.00	0.00	0.00	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.92	0.14				
On Site Total	10.7	85.7	148.2	0.2	5.9	5.0	184474.9	7.8	1.7	185151.2	4.6	85.6	16.9	0.2	2.2	1.3	184474.9	1.2	1.7	185012.5

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	32	183	371	1	18	15	243611	8	2	244480	16	147	125	1	8	5	243611	2	2	244341

Project Construction - Alternative 2

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase

5 TraPac Shaft Construction

Start Date 2016

Equipment	Type	Equipment Specs							E.F. Units	Emission Factor								
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr		ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	3.92	14.12	31.41	0.05	1.20	1.07	4652.56	0.35	0.00	4659.98	0.72	14.12	4.71	0.05	0.66	0.58	4652.56	0.06	0.00	4653.91
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	2.84	9.21	19.54	0.04	0.70	0.62	4439.05	0.26	0.00	4444.44	0.52	9.21	2.93	0.04	0.38	0.34	4439.05	0.05	0.00	4440.04
Hydaulic Excavator - Medium	0.80	2.56	5.99	0.01	0.20	0.18	1199.74	0.07	0.00	1201.26	0.15	2.56	0.90	0.01	0.11	0.10	1199.74	0.01	0.00	1200.02
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.87	2.71	7.27	0.01	0.25	0.22	1187.64	0.08	0.00	1189.28	0.16	2.71	1.09	0.01	0.14	0.12	1187.64	0.01	0.00	1187.94
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.77	2.37	5.67	0.01	0.19	0.17	1079.77	0.07	0.00	1081.22	0.14	2.37	0.85	0.01	0.10	0.09	1079.77	0.01	0.00	1080.03
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NOx	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.3	38.7	87.8	0.2	3.6	2.8	15550.2	1.0	0.0	15571.2	2.2	38.6	15.7	0.2	2.2	1.6	15550.2	0.2	0.0	15554.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NOx	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	10.66	44.92	121.07	0.31	7.05	5.84	31697.93	0.09	0.08	31725.36	4.88	24.36	53.53	0.30	2.93	2.04	31697.93	0.09	0.08	31725.36
On-Road Truck	onroad		130			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.91	4.22	11.31	0.00	0.08	0.08	629.25	0.00	0.00	629.25	0.73	3.95	11.81	0.00	0.00	0.00	629.25	0.00	0.00	629.25
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08
On-Road Crew Vehicle	onroad		20			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15
															Total	23	88	217	0	11	9	48069	1	0	48130	8	67	78	0	5	4	48069	0	0	48113

Phase

6 LAXT Shaft Construction

Start Date 2015

Equipment	Type	Equipment Specs							E.F. Units	Emission Factor								
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr		ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NOx	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	2.4	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NOx	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15

Project Construction - Alternative 2

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase

7 Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	EF ROG	EF CO	EF NO_x	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	EF ROG	EF CO	EF NO_x	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
														On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	EF CO	EF NO_x	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase

8 Offshore Tunnel

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	EF ROG	EF CO	EF NO_x	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	200	200	1.00	1	24	4800	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	8,000	8,000	1.00	1	12	96000	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	3,760	3,760	1.00	1	12	45120	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	3,600	3,600	1.00	1	24	86400	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	0.40	0.60	65569.65
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	0.19	0.28	30817.74
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	0.36	0.54	59012.68
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	EF ROG	EF CO	EF NO_x	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	282	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82	0.40	2.15	6.40	0.00	0.01	0.01	342.82	0.00	0.00	342.82
Fugitive Dust				7050	lbs/ton					0.000166	0.0000249								1.17	0.18									1.17	0.18				
														On Site Total	10.8	86.2	149.5	0.2	6.2	5.0	231945.3	9.8	2.1	232797.4	4.7	86.1	18.2	0.2	2.4	1.3	231945.3	1.5	2.1	232623.4

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	EF CO	EF NO_x	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	282	16920		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	23.12	97.45	262.63	0.68	15.30	12.66	68760.13	0.19	0.18	68819.63	10.58	52.84	116.11	0.64	6.36	4.42	68760.13	0.19	0.18	68819.63
On-Road Truck	onroad		282			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.97	9.15	24.53	0.00	0.18	0.17	1364.98	0.00	0.00	1364.98	1.58	8.57	25.62	0.00	0.00	0.00	1364.98	0.00	0.00	1364.98
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
															Total	37	206	432	1	22	18	305929	10	3	306986	18	161	155	1	9	6	305929	2	3	306812

Project Construction - Alternative 2

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 9 — SW Marine Shaft Construction — Start Date 2015

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	2.4	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase 10 — PV Shelf Riser Construction — Start Date 2018

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.480	3.765	3.233	0.007	0.203	0.181	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.416	1.522	3.117	0.005	0.118	0.105	549.583	0.038	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.414	3.288	2.759	0.006	0.146	0.130	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.325	1.139	1.916	0.006	0.069	0.061	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.334	1.189	2.146	0.006	0.072	0.064	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.346	1.259	2.438	0.006	0.087	0.078	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.369	1.247	2.804	0.006	0.095	0.085	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.442	3.727	3.133	0.007	0.189	0.168	568.300	0.040	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.355	1.218	2.277	0.006	0.077	0.068	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	3	2	2418	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77
Tugboat - Aux	offroad	57	-	57	0.43	3	2	147.06	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16
Crew Boats	offroad	400	-	400	0.45	3	2	1080	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71
Crew Boats - Aux	offroad	25	-	25	0.43	3	2	64.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.184	1.003	1.111	0.006	0.034	0.030	568.300	0.017	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.413	1.252	4.432	0.006	0.118	0.105	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.342	1.142	2.542	0.006	0.091	0.081	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.236	1.064	2.395	0.006	0.077	0.068	568.300	0.021	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.947	43.349	119.963	0.063	0.669	0.615	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.000166	0.0000249								0.07	0.01									0.07	0.01				
														On Site Total	2.1	46.0	37.8	0.1	1.1	0.9	8418.5	0.0	0.4	8537.7	2.1	46.0	37.8	0.1	1.1	0.9	8418.5	0.0	0.4	8537.7

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.498	2.196	5.520	0.018	0.335	0.270	1843.150	0.005	0.005	1.05	4.65	11.68	0.04	0.71	0.57	3900.85	0.01	0.01	3904.22	0.60	3.02	6.38	0.04	0.37	0.26	3900.85	0.01	0.01	3904.22
On-Road Truck	onroad		16			g/trip	2.969	14.451	39.988	0.000	0.226	0.208	2205.818	0.000	0.000	0.10	0.51	1.41	0.00	0.01	0.01	77.81	0.00	0.00	77.81	0.09	0.49	1.45	0.00	0.00	0.00	77.81	0.00	0.00	77.81
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.134	1.120	0.090	0.004	0.034	0.019	392.094	0.042	0.039	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71
On-Road Crew Vehicle	onroad		30			g/trip	0.179	2.417	0.151	0.000	0.007	0.006	71.004	0.000	0.000	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70
															Total	3	53	51	0	2	2	12901	0	0	13041	3	51	45	0	1	1	12901	0	0	13041

Project Construction - Alternative 2

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 11 — PV Shelf Diffuser Construction

Start Date 2020

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	Emission Factor ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	1	8	2580	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	1	8	9440	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
Generator	offroad	500	-	500	0.74	2	8	5920	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	1	4	510	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
Pump	offroad	500	-	500	0.74	1	8	2960	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	0.91	5.70	4.15	0.03	0.12	0.11	3232.39	0.08	0.00	3234.12	0.17	5.70	0.62	0.03	0.07	0.06	3232.39	0.02	0.00	3232.71
Pipe Barge	7.83	24.96	81.49	0.12	2.04	1.82	11827.05	0.71	0.00	11841.89	1.43	24.96	12.22	0.12	1.12	0.99	11827.05	0.13	0.00	11829.77
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	4.05	14.46	26.09	0.07	0.95	0.85	7416.97	0.37	0.00	7424.64	0.74	14.46	3.91	0.07	0.52	0.46	7416.97	0.07	0.00	7418.37
Service Vessel	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.34	1.29	2.51	0.01	0.08	0.08	638.96	0.03	0.00	639.61	0.06	1.29	0.38	0.01	0.05	0.04	638.96	0.01	0.00	639.08
Pump	1.37	6.72	12.32	0.04	0.40	0.36	3708.48	0.12	0.00	3711.08	0.25	6.72	1.85	0.04	0.22	0.20	3708.48	0.02	0.00	3708.96

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	EF ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.03	0.13	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.000166	0.0000249								0.07	0.01									0.07	0.01				
														On Site Total	15.8	81.3	149.8	0.3	4.3	3.8	31975.2	1.3	0.2	32075.6	3.9	81.3	42.2	0.3	2.7	2.3	31975.2	0.3	0.2	32053.1

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.87	4.00	9.44	0.04	0.60	0.47	3899.65	0.01	0.01	3903.03	0.60	3.02	6.23	0.04	0.38	0.27	3899.65	0.01	0.01	3903.03
On-Road Truck	onroad		16			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.10	0.50	1.42	0.00	0.01	0.01	78.11	0.00	0.00	78.11	0.09	0.49	1.45	0.00	0.00	0.00	78.11	0.00	0.00	78.11
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88
On-Road Crew Vehicle	onroad		30			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68
															Total	17	87	160	0	5	4	36455	1	0	36575	5	86	50	0	3	3	36455	0	0	36552

Phase 12 — Existing Ocean Outfalls Rehabilitation

Start Date 2020

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	Emission Factor ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	EF ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
														On Site Total	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25
On-Road Crew Vehicle	onroad		20			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
															Total	1	29	23	0	1	1	5480	0	0	5563	1	29	23	0	1	1	5480	0	0	5563

Project Construction - Alternative 2

EMISSIONS BY PHASE

Phase	Start Date	Duration (Months)	Unmitigated Localized Daily Emission Rates (lbs/day)										Mitigated Localized Daily Emission Rates (lbs/day)									
			ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP East Shaft Construction	1/1/2015	12	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	24	11	86	148	0	6	5	184,475	8	2	185,151	5	86	17	0	2	1	184,475	1	2	185,012
5 TraPac Shaft Construction	4/1/2016	12	11	39	88	0	4	3	15,550	1	-	15,571	2	39	16	0	2	2	15,550	0	-	15,554
6 LAXT Shaft Construction	1/1/2015	15	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
7 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Offshore Tunnel	7/1/2016	61	11	86	149	0	6	5	231,945	10	2	232,797	5	86	18	0	2	1	231,945	1	2	232,623
9 SW Marine Shaft Construction	7/1/2015	12	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
10 PV Shelf Riser Construction	4/1/2018	24	2	46	38	0	1	1	8,419	0	0	8,538	2	46	38	0	1	1	8,419	0	0	8,538
11 PV Shelf Diffuser Construction	4/1/2020	12	16	81	150	0	4	4	31,975	1	0	32,076	4	81	42	0	3	2	31,975	0	0	32,053
12 Existing Ocean Outfalls Rehabilitation	4/1/2020	9	1	28	23	0	1	1	5,132	0	0	5,205	1	28	23	0	1	1	5,132	0	0	5,205

Phase	Start Date	Duration (Months)	Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
			ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP East Shaft Construction	1/1/2015	12	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	24	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
5 TraPac Shaft Construction	4/1/2016	12	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
6 LAXT Shaft Construction	1/1/2015	15	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
7 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Offshore Tunnel	7/1/2016	61	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
9 SW Marine Shaft Construction	7/1/2015	12	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
10 PV Shelf Riser Construction	4/1/2018	24	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
11 PV Shelf Diffuser Construction	4/1/2020	12	17	87	160	0	5	4	36,455	1	0	36,575	5	86	50	0	3	3	36,455	0	0	36,552
12 Existing Ocean Outfalls Rehabilitation	4/1/2020	9	1	28.96	23	0	1	1	5,480	0	0	5,563	1	29	23	0	1	1	5,480	0	0	5,563

Project Construction - Alternative 2

EMISSONS BY DAY

		Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
Timeslice	Phase	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
A	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**49**	**188**	**488**	**1**	**24**	**20**	**96,094**	**2**	**0**	**96,218**	**16**	**137**	**163**	**1**	**10**	**7**	**96,094**	**1**	**0**	**96,181**
B	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**74**	**282**	**732**	**1**	**36**	**29**	**144,140**	**4**	**0**	**144,327**	**24**	**205**	**244**	**1**	**16**	**11**	**144,140**	**1**	**0**	**144,272**
C	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
D	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**48**	**182**	**461**	**1**	**23**	**19**	**96,116**	**2**	**0**	**96,239**	**16**	**136**	**159**	**1**	**10**	**7**	**96,116**	**1**	**0**	**96,204**
E	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
	5	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	Total	**92**	**477**	**1,020**	**2**	**51**	**42**	**597,610**	**20**	**5**	**599,596**	**41**	**375**	**358**	**2**	**22**	**15**	**597,610**	**4**	**5**	**599,266**
F	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	Total	**69**	**389**	**802**	**2**	**40**	**33**	**549,540**	**19**	**5**	**551,466**	**34**	**308**	**279**	**2**	**17**	**11**	**549,540**	**4**	**5**	**551,153**
G	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	10	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
	Total	**72**	**441**	**853**	**2**	**42**	**35**	**562,441**	**19**	**5**	**564,506**	**37**	**359**	**325**	**2**	**18**	**12**	**562,441**	**4**	**5**	**564,194**
H	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	10	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
	Total	**40**	**258**	**482**	**1**	**24**	**20**	**318,830**	**11**	**3**	**320,027**	**21**	**212**	**200**	**1**	**11**	**7**	**318,830**	**2**	**3**	**319,853**
I	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	11	17	87	160	0	5	4	36,455	1	0	36,575	5	86	50	0	3	3	36,455	0	0	36,552
	12	1	29	23	0	1	1	5,480	0	0	5,563	1	29	23	0	1	1	5,480	0	0	5,563
	Total	**55**	**322**	**615**	**1**	**28**	**23**	**347,864**	**12**	**3**	**349,124**	**24**	**276**	**227**	**1**	**13**	**9**	**347,864**	**3**	**3**	**348,927**
J	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	11	17	87	160	0	5	4	36,455	1	0	36,575	5	86	50	0	3	3	36,455	0	0	36,552
	Total	**54**	**293**	**592**	**1**	**27**	**22**	**342,384**	**12**	**3**	**343,561**	**23**	**247**	**204**	**1**	**12**	**9**	**342,384**	**2**	**3**	**343,364**
K	8	37	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	2	3	306,812
	Total	**37**	**206**	**432**	**1**	**22**	**18**	**305,929**	**10**	**3**	**306,986**	**18**	**161**	**155**	**1**	**9**	**6**	**305,929**	**2**	**3**	**306,812**
Maximum Daily Emissions		**92**	**477**	**1,020**	**2**	**51**	**42**	**597,610**	**20**	**5**	**599,596**	**41**	**375**	**358**	**2**	**22**	**15**	**597,610**	**4**	**5**	**599,266**

Project Construction - Alternative 2

GHG EMISSIONS BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP East Shaft Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	24	59,073	2	1	59,284	59,073	0	1	59,250
5	TraPac Shaft Construction	4/1/2016	12	5,820	0	0	5,828	5,820	0	0	5,825
6	LAXT Shaft Construction	1/1/2015	15	7,272	0	0	7,281	7,272	0	0	7,278
7	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
8	Offshore Tunnel	7/1/2016	61	185,717	6	2	186,358	185,717	1	2	186,253
9	SW Marine Shaft Construction	7/1/2015	12	5,833	0	0	5,841	5,833	0	0	5,839
10	PV Shelf Riser Construction	4/1/2018	24	3,133	0	0	3,167	3,133	0	0	3,167
11	PV Shelf Diffuser Construction	4/1/2020	12	4,414	0	0	4,428	4,414	0	0	4,426
12	Existing Ocean Outfalls Rehabilitation	4/1/2020	9	499	0	0	507	499	0	0	507
	Total						278,519				278,368
	Amortized Total						9,284				9,279

Project Construction Calculations

Alternative 3

Project Construction - Alternative 3

PROJECT AND PROGRAM CONSTRUCTION OVERLAP

Project Construction - Alternative 3

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 1 — TBM Mobilization — Start Date 2015

		Equipment Specs								Emission Factor									Unmitigated Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000	0.000								0.00	0.00									0.00	0.00				
														On Site Tota	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 2 — JWPCP West Shaft Construction — Start Date 2015

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000	0.000								0.00	0.00									0.00	0.00				
														On Site Tota	11.9	40.1	97.2	0.2	3.4	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	1.9	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	25	94	244	0	11	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Project Construction - Alternative 3

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 3 — Assemble TBM

Start Date 2016

Equipment	Type	Equipment Specs: HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	Emission Factor: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.00017	0.000025								0.00	0.00									0.00	0.00				
														On Site Tota	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 4 — Onshore Tunnel

Start Date 2016

Equipment	Type	Equipment Specs: HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	Emission Factor: ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day): ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.01	0.02	2294.94
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	0.25	0.37	40653.18
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.12	0.18	19670.89
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	0.30	0.44	48521.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.31	1.69	5.04	0.00	0.00	0.00	269.88	0.00	0.00	269.88
Fugitive Dust				5550	lbs/ton					0.00017	0.000025								0.92	0.14									0.46	0.07				
														On Site Tota	10.7	85.7	148.2	0.2	5.9	5.0	184474.9	7.8	1.7	185151.2	4.6	85.6	16.9	0.2	1.7	1.2	184474.9	1.2	1.7	185012.5

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
															Total	32	183	371	1	18	15	243611	8	2	244480	16	147	125	1	7	5	243611	2	2	244341

Project Construction - Alternative 3

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 5 — **Angels Gate Shaft Construction**

Start Date 2019

Equipment	Type	Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000	3.34	12.38	24.11	0.05	0.90	0.80	4652.56	0.30	0.00	4658.88	0.61	12.38	3.62	0.05	0.49	0.44	4652.56	0.06	0.00	4653.71
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000	2.40	8.79	13.07	0.04	0.47	0.42	4439.05	0.22	0.00	4443.59	0.44	8.79	1.96	0.04	0.26	0.23	4439.05	0.04	0.00	4439.88
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000	0.66	2.49	3.92	0.01	0.13	0.12	1199.74	0.06	0.00	1201.00	0.12	2.49	0.59	0.01	0.07	0.06	1199.74	0.01	0.00	1199.97
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000	1.64	6.12	10.85	0.03	0.39	0.35	2833.38	0.15	0.00	2836.49	0.30	6.12	1.63	0.03	0.21	0.19	2833.38	0.03	0.00	2833.95
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000	0.73	2.57	5.24	0.01	0.18	0.16	1187.64	0.07	0.00	1189.02	0.13	2.57	0.79	0.01	0.10	0.09	1187.64	0.01	0.00	1187.89
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000	0.63	2.29	3.76	0.01	0.13	0.11	1079.77	0.06	0.00	1080.97	0.12	2.29	0.56	0.01	0.07	0.06	1079.77	0.01	0.00	1079.99
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.21	1.03	2.88	0.00	0.01	0.01	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.00017	0.000025								0.54	0.08									0.27	0.04				
														On Site Tota	**9.6**	**35.7**	**63.8**	**0.2**	**2.8**	**2.1**	**15550.2**	**0.8**	**0.0**	**15568.0**	**1.9**	**35.6**	**12.1**	**0.2**	**1.5**	**1.1**	**15550.2**	**0.2**	**0.0**	**15553.4**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	7.76	34.93	84.99	0.31	5.26	4.19	31683.00	0.09	0.08	31710.43	4.91	24.55	51.18	0.32	3.05	2.15	31683.00	0.09	0.08	31710.43
On-Road Truck	onroad		130			g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.84	4.11	11.52	0.00	0.06	0.05	629.47	0.00	0.00	629.47	0.73	3.96	11.80	0.00	0.00	0.00	629.47	0.00	0.00	629.47
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16
On-Road Crew Vehicle	onroad		20			g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
															Total	**18**	**75**	**158**	**0**	**8**	**6**	**48053**	**1**	**0**	**48109**	**7**	**64**	**72**	**0**	**5**	**3**	**48053**	**0**	**0**	**48095**

Phase 6 — **PV Shelf Riser Construction**

Start Date 2018

Equipment	Type	Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.480	3.765	3.233	0.007	0.203	0.181	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.416	1.522	3.117	0.005	0.118	0.105	549.583	0.038	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.414	3.288	2.759	0.006	0.146	0.130	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.325	1.139	1.916	0.006	0.069	0.061	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.334	1.189	2.146	0.006	0.072	0.064	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.346	1.259	2.438	0.006	0.087	0.078	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.369	1.247	2.804	0.006	0.095	0.085	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.442	3.727	3.133	0.007	0.189	0.168	568.300	0.040	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.355	1.218	2.277	0.006	0.077	0.068	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	3	2	2418	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77
Tugboat - Aux	offroad	57	-	57	0.43	3	2	147.06	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16
Crew Boats	offroad	400	-	400	0.45	3	2	1080	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71
Crew Boats - Aux	offroad	25	-	25	0.43	3	2	64.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.184	1.003	1.111	0.006	0.034	0.030	568.300	0.017	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.413	1.252	4.432	0.006	0.118	0.105	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.342	1.142	2.542	0.006	0.091	0.081	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.236	1.064	2.395	0.006	0.077	0.068	568.300	0.021	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.947	43.349	119.963	0.063	0.669	0.615	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.00017	0.000025								0.07	0.01									0.03	0.00				
														On Site Tota	**2.1**	**46.0**	**37.8**	**0.1**	**1.1**	**0.9**	**8418.5**	**0.0**	**0.4**	**8537.7**	**2.1**	**46.0**	**37.8**	**0.1**	**1.0**	**0.9**	**8418.5**	**0.0**	**0.4**	**8537.7**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.498	2.196	5.520	0.018	0.335	0.270	1843.150	0.005	0.005	1.05	4.65	11.68	0.04	0.71	0.57	3900.85	0.01	0.01	3904.22	0.60	3.02	6.38	0.04	0.37	0.26	3900.85	0.01	0.01	3904.22
On-Road Truck	onroad		16			g/trip	2.969	14.451	39.988	0.000	0.226	0.208	2205.818	0.000	0.000	0.10	0.51	1.41	0.00	0.01	0.01	77.81	0.00	0.00	77.81	0.09	0.49	1.45	0.00	0.00	0.00	77.81	0.00	0.00	77.81
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.134	1.120	0.090	0.004	0.034	0.019	392.094	0.042	0.039	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71
On-Road Crew Vehicle	onroad		30			g/trip	0.179	2.417	0.151	0.000	0.007	0.006	71.004	0.000	0.000	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70
															Total	**3**	**53**	**51**	**0**	**2**	**2**	**12901**	**0**	**0**	**13041**	**3**	**51**	**45**	**0**	**1**	**1**	**12901**	**0**	**0**	**13041**

Project Construction - Alternative 3

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase			Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
7 PV Shelf Diffuser Construction	Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Start Date	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
	Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
	Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
	Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
	Crane Barge	offroad	750	-	750	0.43	1	8	2580	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.91	5.70	4.15	0.03	0.12	0.11	3232.39	0.08	0.00	3234.12	0.17	5.70	0.62	0.03	0.07	0.06	3232.39	0.02	0.00	3232.71
	Pipe Barge	offroad	2,000	-	2,000	0.59	1	8	9440	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	7.83	24.96	81.49	0.12	2.04	1.82	11827.05	0.71	0.00	11841.89	1.43	24.96	12.22	0.12	1.12	0.99	11827.05	0.13	0.00	11829.77
	Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Generator	offroad	500	-	500	0.74	2	8	5920	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	4.05	14.46	26.09	0.07	0.95	0.85	7416.97	0.37	0.00	7424.64	0.74	14.46	3.91	0.07	0.52	0.46	7416.97	0.07	0.00	7418.37
	Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
	Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hoist	offroad	250	-	250	0.51	1	4	510	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.34	1.29	2.51	0.01	0.08	0.08	638.96	0.03	0.00	639.61	0.06	1.29	0.38	0.01	0.05	0.04	638.96	0.01	0.00	639.08
	Pump	offroad	500	-	500	0.74	1	8	2960	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	1.37	6.72	12.32	0.04	0.40	0.36	3708.48	0.12	0.00	3711.08	0.25	6.72	1.85	0.04	0.22	0.20	3708.48	0.02	0.00	3708.96
			Daily Trips	Idle Time (min)[a]		Tons Soil																																	
	On-Road Truck - Idle	onroad	16	5						g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.03	0.13	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
	Fugitive Dust					400				lbs/ton					0.00017	0.000025								0.07	0.01									0.03	0.00				
																			On Site Tota	15.8	81.3	149.8	0.3	4.3	3.8	31975.2	1.3	0.2	32075.6	3.9	81.3	42.2	0.3	2.6	2.3	31975.2	0.3	0.2	32053.1
				Miles / Trip	Daily Trips		Miles / Day	Acres Disturbed																															
	On-Road Truck	onroad		60	16		960			g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.87	4.00	9.44	0.04	0.60	0.47	3899.65	0.01	0.01	3903.03	0.60	3.02	6.23	0.04	0.38	0.27	3899.65	0.01	0.01	3903.03
	On-Road Truck	onroad			16					g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.10	0.50	1.42	0.00	0.01	0.01	78.11	0.00	0.00	78.11	0.09	0.49	1.45	0.00	0.00	0.00	78.11	0.00	0.00	78.11
	On-Road Crew Vehicle	onroad		20	30		600			g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88
	On-Road Crew Vehicle	onroad			30					g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68
																			Total	17	87	160	0	5	4	36455	1	0	36575	5	86	50	0	3	3	36455	0	0	36552

Phase			Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
8 Existing Ocean Outfalls Rehabilitation	Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Start Date	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
	Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
	Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
	Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
	Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
	Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Daily Trips	Idle Time (min)[a]		Tons Soil																																	
	On-Road Truck - Idle	onroad	-	5						g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fugitive Dust					0				lbs/ton					0.00017	0.000025								0.00	0.00									0.00	0.00				
																			On Site Tota	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8
				Miles / Trip	Daily Trips		Miles / Day	Acres Disturbed																															
	On-Road Truck	onroad		60	0		0			g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Truck	onroad			0					g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Crew Vehicle	onroad		20	20		400			g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25
	On-Road Crew Vehicle	onroad			20					g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
																			Total	1	29	23	0	1	1	5480	0	0	5563	1	29	23	0	1	1	5480	0	0	5563

Project Construction - Alternative 3

EMISSIONS BY PHASE

Phase	Start Date	Duration (Months)	Unmitigated Localized Daily Emission Rates (lbs/day)										Mitigated Localized Daily Emission Rates (lbs/day)									
			ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP West Shaft Construction	1/1/2015	12	12	40	97	0	3	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	61	11	86	148	0	6	5	184,475	8	2	185,151	5	86	17	0	2	1	184,475	1	2	185,012
5 Angels Gate Shaft Construction	4/1/2019	9	10	36	64	0	3	2	15,550	1	-	15,568	2	36	12	0	1	1	15,550	0	-	15,553
6 PV Shelf Riser Construction	4/1/2018	24	2	46	38	0	1	1	8,419	0	0	8,538	2	46	38	0	1	1	8,419	0	0	8,538
7 PV Shelf Diffuser Construction	4/1/2020	12	16	81	150	0	4	4	31,975	1	0	32,076	4	81	42	0	3	2	31,975	0	0	32,053
8 Existing Ocean Outfalls Rehabilitation	4/1/2020	9	1	28	23	0	1	1	5,132	0	0	5,205	1	28	23	0	1	1	5,132	0	0	5,205

Phase	Start Date	Duration (Months)	Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
			ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP West Shaft Construction	1/1/2015	12	25	94	244	0	11	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	61	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
5 Angels Gate Shaft Construction	4/1/2019	9	18	75	158	0	8	6	48,053	1	0	48,109	7	64	72	0	5	3	48,053	0	0	48,095
6 PV Shelf Riser Construction	4/1/2018	24	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
7 PV Shelf Diffuser Construction	4/1/2020	12	17	87	160	0	5	4	36,455	1	0	36,575	5	86	50	0	3	3	36,455	0	0	36,552
8 Existing Ocean Outfalls Rehabilitation	4/1/2020	9	1	29	23	0	1	1	5,480	0	0	5,563	1	29	23	0	1	1	5,480	0	0	5,563

Project Construction - Alternative 3

EMISSIONS BY DAY

		Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
Timeslice	Phase	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
A	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	11	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**25**	**94**	**244**	**0**	**11**	**10**	**48,047**	**1**	**0**	**48,109**	**8**	**68**	**81**	**0**	**5**	**4**	**48,047**	**0**	**0**	**48,091**
B	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
C	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
D	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	Total	**32**	**183**	**371**	**1**	**18**	**15**	**243,611**	**8**	**2**	**244,480**	**16**	**147**	**125**	**1**	**7**	**5**	**243,611**	**2**	**2**	**244,341**
E	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	6	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
	Total	**35**	**236**	**421**	**1**	**20**	**17**	**256,512**	**9**	**3**	**257,520**	**18**	**198**	**170**	**1**	**9**	**6**	**256,512**	**2**	**3**	**257,382**
F	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	5	18	75	158	0	8	6	48,053	1	0	48,109	7	64	72	0	5	3	48,053	0	0	48,095
	6	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
	Total	**53**	**310**	**579**	**1**	**28**	**23**	**304,565**	**10**	**3**	**305,630**	**26**	**263**	**242**	**1**	**13**	**9**	**304,565**	**2**	**3**	**305,476**
G	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	6	3	53	51	0	2	2	12,901	0	0	13,041	3	51	45	0	1	1	12,901	0	0	13,041
	Total	**35**	**236**	**421**	**1**	**20**	**17**	**256,512**	**9**	**3**	**257,520**	**18**	**198**	**170**	**1**	**9**	**6**	**256,512**	**2**	**3**	**257,382**
H	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	7	17	87	160	0	5	4	36,455	1	0	36,575	5	86	50	0	3	3	36,455	0	0	36,552
	8	1	29	23	0	1	1	5,480	0	0	5,563	1	29	23	0	1	1	5,480	0	0	5,563
	Total	**50**	**299**	**554**	**1**	**24**	**20**	**285,546**	**10**	**3**	**286,618**	**22**	**263**	**197**	**1**	**11**	**8**	**285,546**	**2**	**3**	**286,457**
I	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	7	17	87	160	0	5	4	36,455	1	0	36,575	5	86	50	0	3	3	36,455	0	0	36,552
	Total	**49**	**270**	**531**	**1**	**23**	**20**	**280,066**	**10**	**3**	**281,055**	**20**	**234**	**174**	**1**	**10**	**8**	**280,066**	**2**	**3**	**280,893**
J	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	2	2	244,341
	Total	**32**	**183**	**371**	**1**	**18**	**15**	**243,611**	**8**	**2**	**244,480**	**16**	**147**	**125**	**1**	**7**	**5**	**243,611**	**2**	**2**	**244,341**
Maximum Daily Emissions		**53**	**310**	**579**	**1**	**28**	**23**	**304,565**	**10**	**3**	**305,630**	**26**	**263**	**242**	**1**	**13**	**9**	**304,565**	**2**	**3**	**305,476**

Project Construction - Alternative 3

GHG EMISSIONS BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP West Shaft Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	61	147,886	5	1	148,413	147,886	1	1	148,329
5	Angels Gate Shaft Construction	4/1/2019	9	4,380	0	0	4,385	4,380	0	0	4,383
6	PV Shelf Riser Construction	4/1/2018	24	3,133	0	0	3,167	3,133	0	0	3,167
7	PV Shelf Diffuser Construction	4/1/2020	12	4,414	0	0	4,428	4,414	0	0	4,426
8	Existing Ocean Outfalls Rehabilitation	4/1/2020	9	499	0	0	507	499	0	0	507
9	0	1/0/1900	0	-	-	-	-	-	-	-	-
10	0	1/0/1900	0	-	-	-	-	-	-	-	-
11	0	1/0/1900	0	-	-	-	-	-	-	-	-
12	0	1/0/1900	0	-	-	-	-	-	-	-	-
	Total						166,725				166,635
	Amortized Total						5,558				5,554

Project Construction Calculations

Alternative 4

Project Construction - Alternative 4

PROJECT AND PROGRAM CONSTRUCTION OVERLAP

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 1 — TBM Mobilization — Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Equipment Specs									Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90		90	0.48	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad		28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	36.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

		Daily Trips	Idle Time (min)*	Tons Soil
On-Road Truck - Idle	onroad	-	5	
Fugitive Dust				0

		E.F. Units	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck - Idle	onroad	g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust		lbs/hrs					0.0002	0.00002			

	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed
On-Road Truck	60	0	0	
On-Road Truck		0		
On-Road Crew Vehicle	20	0	0	
On-Road Crew Vehicle		0		

		E.F. Units	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck	onroad	g/mile	0.691	2.879	6.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad	g/trip	3.278	14.900	39.156	0.000	0.128	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad	g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Unmitigated Daily Emission Rates (lbs/day)

	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
On-Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0	0	0	0	0	0	0	0	0	0

Mitigated Daily Emission Rates (lbs/day)

	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
On-Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0	0	0	0	0	0	0	0	0	0

Phase 2 — JWPCP West Shaft Site Construction — Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Equipment Specs									Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	917.4	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90		90	0.48	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	36.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

		Daily Trips	Idle Time (min)*	Tons Soil
On-Road Truck - Idle	onroad	130	5	
Fugitive Dust				3250

		E.F. Units	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck - Idle	onroad	g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust		lbs/hrs					0.0002	0.00002			

	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed
On-Road Truck	60	130	7800	
On-Road Truck		130		
On-Road Crew Vehicle	20	20	600	
On-Road Crew Vehicle		20		

		E.F. Units	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck	onroad	g/mile	0.691	2.879	6.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad	g/trip	3.278	14.900	39.156	0.000	0.128	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad	g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Daily Emission Rates (lbs/day)

	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
On-Site Total	11.9	48.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4
Total	23	94	248	1	12	10	48047	1	0	48109

Mitigated Daily Emission Rates (lbs/day)

	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	CO2e
On-Site Total	2.3	48.0	17.1	0.2	2.6	1.7	15550.2	0.2	0.0	15554.2
Total	8	58	81	0	5	4	48047	0	0	48091

Project Construction - Alternative 4

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase

3 Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.0002	0.00002			

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase

4 Tunneling

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.01	0.02	2294.94
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	0.25	0.37	40653.18
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.12	0.18	19670.89
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	0.30	0.44	48521.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550	lbs/ton					0.0002	0.00002			

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.31	1.69	5.04	0.00	0.00	0.00	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.92	0.14				
On Site Total	**10.7**	**85.7**	**148.2**	**0.2**	**5.9**	**5.0**	**184474.9**	**7.8**	**1.7**	**185151.2**	**4.6**	**85.6**	**16.9**	**0.2**	**2.2**	**1.3**	**184474.9**	**1.2**	**1.7**	**185012.5**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	**32**	**183**	**371**	**1**	**18**	**15**	**243611**	**8**	**2**	**244480**	**16**	**147**	**125**	**1**	**8**	**5**	**243611**	**2**	**2**	**244341**

Project Construction - Alternative 4

ON AND OFFROAD EMISSION CALCULATIONS BY PHASE

Phase 5 — Royal Palms Shaft Site Construction — Start Date 2019

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000	3.34	12.38	24.11	0.05	0.90	0.80	4652.56	0.30	0.00	4658.88	0.61	12.38	3.62	0.05	0.49	0.44	4652.56	0.06	0.00	4653.71
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000	2.40	8.79	13.07	0.04	0.47	0.42	4439.05	0.22	0.00	4443.59	0.44	8.79	1.96	0.04	0.26	0.23	4439.05	0.04	0.00	4439.88
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000	0.66	2.49	3.92	0.01	0.13	0.12	1199.74	0.06	0.00	1201.00	0.12	2.49	0.59	0.01	0.07	0.06	1199.74	0.01	0.00	1199.97
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000	1.64	6.12	10.85	0.03	0.39	0.35	2833.38	0.15	0.00	2836.49	0.30	6.12	1.63	0.03	0.21	0.19	2833.38	0.03	0.00	2833.95
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000	0.73	2.57	5.24	0.01	0.18	0.16	1187.64	0.07	0.00	1189.02	0.13	2.57	0.79	0.01	0.10	0.09	1187.64	0.01	0.00	1187.89
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000	0.63	2.29	3.76	0.01	0.13	0.11	1079.77	0.06	0.00	1080.97	0.12	2.29	0.56	0.01	0.07	0.06	1079.77	0.01	0.00	1079.99
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Daily Trips	Idle Time (min)[a]	Tons Soil																																		
On-Road Truck - Idle	onroad	130	5						g/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.21	1.03	2.88	0.00	0.01	0.01	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250					lbs/ton					0.0002	0.00002								0.54	0.08									0.54	0.08				
																	On Site Total		9.6	35.7	63.8	0.2	2.8	2.1	15550.2	0.8	0.0	15568.0	1.9	35.6	12.1	0.2	1.8	1.2	15550.2	0.2	0.0	15553.4

			Miles / Trip	Daily Trips		Miles / Day	Acres Disturbed																															
On-Road Truck	onroad		60	130		7800			g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	7.76	34.93	84.99	0.31	5.26	4.19	31683.00	0.09	0.08	31710.43	4.91	24.55	51.18	0.32	3.05	2.15	31683.00	0.09	0.08	31710.43
On-Road Truck	onroad			130					g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.84	4.11	11.52	0.00	0.06	0.05	629.47	0.00	0.00	629.47	0.73	3.96	11.80	0.00	0.00	0.00	629.47	0.00	0.00	629.47
On-Road Crew Vehicle	onroad		20	20		400			g/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16
On-Road Crew Vehicle	onroad			20					g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
																		Total	18	75	158	0	8	6	48053	1	0	48109	7	64	72	0	5	3	48053	0	0	48095

Phase 6 — Existing Ocean Outfalls Rehabilitation — Start Date 2020

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Daily Trips	Idle Time (min)[a]	Tons Soil																																		
On-Road Truck - Idle	onroad	-	5						g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0					lbs/ton					0.0002	0.00002								0.00	0.00									0.00	0.00				
																	On Site Total		1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8

			Miles / Trip	Daily Trips		Miles / Day	Acres Disturbed																															
On-Road Truck	onroad		60	0		0			g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad			0					g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		20	20		400			g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25
On-Road Crew Vehicle	onroad			20					g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
																		Total	1	29	23	0	1	1	5480	0	0	5563	1	29	23	0	1	1	5480	0	0	5563

Project Construction - Alternative 4

EMISSIONS BY PHASE

Phase	Unmitigated Localized Daily Emission Rates (lbs/day)										Mitigated Localized Daily Emission Rates (lbs/day)									
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
1 TBM Mobilization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP West Shaft Site Construction	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
3 Assemble TBM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Tunneling	11	86	148	0	6	5	184,475	8	2	185,151	5	86	17	0	2	1	184,475	1	2	185,012
5 Royal Palms Shaft Site Construction	10	36	64	0	3	2	15,550	1	-	15,568	2	36	12	0	2	1	15,550	0	-	15,553
6 Existing Ocean Outfalls Rehabilitation	1	28	23	0	1	1	5,132	0	0	5,205	1	28	23	0	1	1	5,132	0	0	5,205

Phase	Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
1 TBM Mobilization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP West Shaft Site Construction	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
3 Assemble TBM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Tunneling	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
5 Royal Palms Shaft Site Construction	18	75	158	0	8	6	48,053	1	0	48,109	7	64	72	0	5	3	48,053	0	0	48,095
6 Existing Ocean Outfalls Rehabilitation	1	29	23	0	1	1	5,480	0	0	5,563	1	29	23	0	1	1	5,480	0	0	5,563

Project Construction - Alternative 4

EMISSIONS BY DAY

		Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
Timeslice	Phase	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
A	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**25**	**94**	**244**	**0**	**12**	**10**	**48,047**	**1**	**0**	**48,109**	**8**	**68**	**81**	**0**	**5**	**4**	**48,047**	**0**	**0**	**48,091**
B	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
C	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
D	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
	Total	**32**	**183**	**371**	**1**	**18**	**15**	**243,611**	**8**	**2**	**244,480**	**16**	**147**	**125**	**1**	**8**	**5**	**243,611**	**2**	**2**	**244,341**
E	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
	5	18	75	158	0	8	6	48,053	1	0	48,109	7	64	72	0	5	3	48,053	0	0	48,095
	6	1	29	23	0	1	1	5,480	0	0	5,563	1	29	23	0	1	1	5,480	0	0	5,563
	Total	**51**	**287**	**551**	**1**	**27**	**22**	**297,144**	**9**	**3**	**298,152**	**24**	**241**	**220**	**1**	**13**	**9**	**297,144**	**2**	**3**	**297,999**
F	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	8	5	243,611	2	2	244,341
	5	18	75	158	0	8	6	48,053	1	0	48,109	7	64	72	0	5	3	48,053	0	0	48,095
	Total	**50**	**258**	**528**	**1**	**27**	**22**	**291,664**	**9**	**2**	**292,589**	**23**	**212**	**197**	**1**	**12**	**8**	**291,664**	**2**	**2**	**292,436**
G	5	18	75	158	0	8	6	48,053	1	0	48,109	7	64	72	0	5	3	48,053	0	0	48,095
	Total	**18**	**75**	**158**	**0**	**8**	**6**	**48,053**	**1**	**0**	**48,109**	**7**	**64**	**72**	**0**	**5**	**3**	**48,053**	**0**	**0**	**48,095**
Maximum Daily Emissions		**51**	**287**	**551**	**1**	**27**	**22**	**297,144**	**9**	**3**	**298,152**	**24**	**241**	**220**	**1**	**13**	**9**	**297,144**	**2**	**3**	**297,999**

Project Contruction - Alternative 4

GHG EMISSIONS BY PHASE

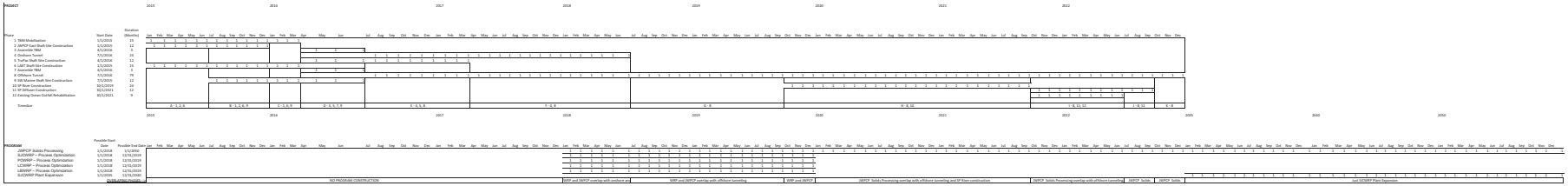
Phase			Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
					CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization		1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP West Shaft Site Construction		1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM		4/1/2016	3	-	-	-	-	-	-	-	-
4	Tunneling		7/1/2016	49	118,309	4	1	118,731	118,309	1	1	118,663
5	Royal Palms Shaft Site Construction		4/1/2019	9	4,380	0	0	4,385	4,380	0	0	4,383
6	Existing Ocean Outfalls Rehabilitation		4/1/2020	9	499	0	0	507	499	0	0	507
7		0	1/0/1900	0	-	-	-	-	-	-	-	-
8		0	1/0/1900	0	-	-	-	-	-	-	-	-
9		0	1/0/1900	0	-	-	-	-	-	-	-	-
10		0	1/0/1900	0	-	-	-	-	-	-	-	-
11		0	1/0/1900	0	-	-	-	-	-	-	-	-
12		0	1/0/1900	0	-	-	-	-	-	-	-	-
	Total							129,447				129,377
	Amortized Total							4,315				4,313

Project Construction Calculations

Alternative 5

Project Construction - Alternative 5

PROJECT AND PROGRAM CONTRUCTION OVERLAP



ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 1 TBM Mobilization, Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0
Change House	offroad	-	16	16	1.00	0	24	0
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0
Crawler Crane	offroad	500	-	500	0.64	0	6	0
Forklift	offroad	145	-	145	0.60	0	6	0
Gantry Crane	offroad	-	160	160	1.00	0	3	0
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0
Loader	offroad	349	-	349	0.54	0	6	0
Motor Grader	offroad	259	-	259	0.61	0	6	0
Office Trailers	offroad	-	56	56	1.00	0	24	0
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0
Shaft Pump	offroad	-	80	80	1.00	0	8	0
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0
Shop (welding)	offroad	-	60	60	1.00	0	6	0
Site Lighting	offroad	-	8	8	1.00	0	24	0
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0
Street Sweeper	offroad	90	-	90	0.68	0	12	0
TBM & Trailing gear	offroad	-	2,240	1,240	1.00	0	12	0
Tower Crane	offroad	-	240	240	1.00	0	10	0
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0
Water Truck	offroad	189	-	189	0.57	0	8	0
Worker Hoist	offroad	-	28	28	1.00	0	3	0
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0
Crew Boats	offroad	400	-	400	0.45	0	2	0
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0
Crane Barge	offroad	750	-	750	0.43	0	8	0
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0
Dump Barge	offroad	250	-	250	0.51	0	8	0
Generator	offroad	500	-	500	0.74	0	8	0
Service Vessel	offroad	500	-	500	0.45	0	2	0
Locomotives	offroad	185	-	185	1.00	0	12	0
Hoist	offroad	250	-	250	0.51	0	4	0
Pump	offroad	500	-	500	0.74	0	8	0

Equipment	Daily Trips	Idle Time (min)[a]	Tons Soil
On-Road Truck - Idle	-	5	
Fugitive Duet			0

Equipment	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed
On-Road Truck	60	0	0	
On-Road Truck		0		
On-Road Crew Vehicle	20	0	0	
On-Road Crew Vehicle		0		

Equipment	E.F. Units	RDG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
Backhoe/Loader	g/hp-hr	0.6	3.8	4.3	0.0	0.3	0.3	548.3	0.1	0.0
Change House	g/kW-hr							308.9	0.0	0.0
Compressor (2000 cfm)	g/kW-hr							308.9	0.0	0.0
Crawler Crane	g/hp-hr	0.5	1.8	4.0	0.0	0.2	0.1	548.6	0.0	0.0
Forklift	g/hp-hr	0.5	3.3	4.0	0.0	0.2	0.2	548.3	0.0	0.0
Gantry Crane	g/kW-hr							308.9	0.0	0.0
Hydaulic Excavator - Large	g/hp-hr	0.4	1.2	2.8	0.0	0.1	0.1	548.3	0.0	0.0
Hydaulic Excavator - Medium	g/hp-hr	0.4	1.2	3.2	0.0	0.1	0.1	548.3	0.0	0.0
Loader	g/hp-hr	0.4	1.4	3.4	0.0	0.1	0.1	548.3	0.0	0.0
Motor Grader	g/hp-hr	0.4	1.3	3.9	0.0	0.1	0.1	548.3	0.0	0.0
Office Trailers	g/kW-hr							308.9	0.0	0.0
Shaft and Tunnel Lighting	g/kW-hr							308.9	0.0	0.0
Shaft Pump	g/kW-hr							308.9	0.0	0.0
Shop (mechanical)	g/kW-hr							308.9	0.0	0.0
Shop (welding)	g/kW-hr							308.9	0.0	0.0
Site Lighting	g/kW-hr							308.9	0.0	0.0
Slurry Circuit Pumps (discharge	g/kW-hr							308.9	0.0	0.0
Slurry Circuit Pumps (feed)	g/kW-hr							308.9	0.0	0.0
Slurry Separation Plant	g/kW-hr							308.9	0.0	0.0
Street Sweeper	g/hp-hr	0.6	3.8	4.2	0.0	0.3	0.3	548.3	0.1	0.0
TBM & Trailing gear	g/kW-hr							308.9	0.0	0.0
Tower Crane	g/kW-hr							308.9	0.0	0.0
Tunnel Ventilation Fans	g/kW-hr							308.9	0.0	0.0
Water Truck	g/hp-hr	0.4	1.3	3.4	0.0	0.1	0.1	548.3	0.0	0.0
Worker Hoist	g/kW-hr							308.9	0.0	0.0
Tugboats	g/hp-hr	0.6	2.2	7.5	0.0	0.4	0.3	915.9	0.0	0.0
Tugboat - Aux	g/hp-hr	1.0	3.9	9.0	0.0	0.6	0.5	915.9	0.0	0.0
Crew Boats	g/hp-hr	0.7	2.4	10.7	0.0	0.4	0.4	915.9	0.0	0.0
Crew Boats - Aux	g/hp-hr	2.3	6.9	6.7	0.0	0.6	0.5	915.9	0.0	0.0
Crane Barge	g/hp-hr	0.2	1.0	1.9	0.0	0.1	0.1	548.3	0.0	0.0
Pipe Barge	g/hp-hr	0.5	1.4	5.3	0.0	0.2	0.1	548.3	0.0	0.0
Dump Barge	g/hp-hr	0.4	1.3	4.0	0.0	0.1	0.1	548.3	0.0	0.0
Generator	g/hp-hr	0.4	1.3	3.5	0.0	0.1	0.1	548.3	0.0	0.0
Service Vessel	g/hp-hr	0.7	2.4	10.7	0.0	0.4	0.4	915.9	0.0	0.0
Locomotives	g/hp-hr	0.3	2.6	4.7	0.0	0.1	0.1	35.0	0.0	0.0
Hoist	g/hp-hr	0.4	1.3	4.0	0.0	0.1	0.1	548.3	0.0	0.0
Pump	g/hp-hr	0.3	1.2	3.3	0.0	0.1	0.1	548.3	0.0	0.0
On-Road Truck - Idle	g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Duet	lbs/veh					0.000166	0.0000249			

Equipment	E.F. Units	CH4	N2O	CO2e
On-Road Truck	g/mile	0.695	2.873	8.036
On-Road Truck	g/trip	3.278	14.900	39.156
On-Road Crew Vehicle	g/mile	0.150	1.384	0.116
On-Road Crew Vehicle	g/trip	0.242	3.130	0.206

Equipment	RDG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Backhoe/Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fugitive Duet				0.00		0.00	0.00			
On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0

Equipment	RDG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Backhoe/Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Duet					0.54	0.08				
On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	21673.62	0.09	0.08	21701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	25	94	246	0	12	10	38267	1	0	38328

Equipment	RDG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	21673.62	0.09	0.08	21701.05
On-Road Truck	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	8	68	91	0	5	4	38267	0	0	38291

Project Construction - Alternative 5

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase			Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
3 Assemble TBM	Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Start Date	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Daily Trips	Idle Time (min)[a]		Tons Soil																																	
	On-Road Truck - Idle	onroad	-	5						g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fugitive Dust					0				lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
																			On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Miles / Trip	Daily Trips		Miles / Day	Acres Disturbed																															
	On-Road Truck	onroad		60	0		0			g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Truck	onroad			0					g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Crew Vehicle	onroad		20	0		0			g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-Road Crew Vehicle	onroad			0					g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																			Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase			Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
4 Onshore Tunnel	Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Start Date	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016	Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47
	Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
	Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
	Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09
	Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
	Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66
	Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64
	Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46
	Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14
	Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07
	Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24
	Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34
	Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49
	Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25
	Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
	TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12
	Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46
	Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54
	Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42
	Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
	Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Daily Trips	Idle Time (min)[a]		Tons Soil																																	
	On-Road Truck - Idle	onroad	222	5						g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88
	Fugitive Dust					5550				lbs/ton					0.000166	0.0000249								0.92	0.14									0.46	0.07				
																			On Site Total	10.7	85.7	148.2	0.2	5.9	5.0	184474.9	7.8	1.7	185151.2	4.7	85.7	16.7	0.2	1.8	1.3	184474.9	7.5	1.7	185145.1
				Miles / Trip	Daily Trips		Miles / Day	Acres Disturbed																															
	On-Road Truck	onroad		60	222		13320			g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
	On-Road Truck	onroad			222					g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
	On-Road Crew Vehicle	onroad		20	240		4800			g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
	On-Road Crew Vehicle	onroad			240					g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
																			Total	32	183	371	1	18	15	243611	8	2	244480	16	147	125	1	7	5	243611	8	2	244474

Project Construction - Alternative 5

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 5 — TraPac Shaft Site Construction — Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	Daily CO	Daily NOx	Daily SO2	Daily PM10	Daily PM2.5	Daily CO2	Daily CH4	Daily N2O	Daily CO2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO2	Mitigated PM10	Mitigated PM2.5	Mitigated CO2	Mitigated CH4	Mitigated N2O	Mitigated CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	3.92	14.12	31.41	0.05	1.20	1.07	4652.56	0.35	0.00	4659.98	0.72	14.12	4.71	0.05	0.66	0.58	4652.56	0.06	0.00	4653.91
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	2.84	9.21	19.54	0.04	0.70	0.62	4439.05	0.26	0.00	4444.44	0.52	9.21	2.93	0.04	0.38	0.34	4439.05	0.05	0.00	4440.04
Hydaulic Excavator - Medium	0.80	2.56	5.99	0.01	0.20	0.18	1199.74	0.07	0.00	1201.26	0.15	2.56	0.90	0.01	0.11	0.10	1199.74	0.01	0.00	1200.02
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.87	2.71	7.27	0.01	0.25	0.22	1187.64	0.08	0.00	1189.28	0.16	2.71	1.09	0.01	0.14	0.12	1187.64	0.01	0.00	1187.94
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.77	2.37	5.67	0.01	0.19	0.17	1079.77	0.07	0.00	1081.22	0.14	2.37	0.85	0.01	0.10	0.09	1079.77	0.01	0.00	1080.03
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck - Idle	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.27	0.04				
On Site Total	**11.3**	**38.7**	**87.8**	**0.2**	**3.6**	**2.8**	**15550.2**	**1.0**	**0.0**	**15571.2**	**2.3**	**38.7**	**15.6**	**0.2**	**2.0**	**1.6**	**15550.2**	**0.2**	**0.0**	**15554.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck	onroad	60	130	7800		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		20			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	Daily CO	Daily NOx	Daily SO2	Daily PM10	Daily PM2.5	Daily CO2	Daily CH4	Daily N2O	Daily CO2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO2	Mitigated PM10	Mitigated PM2.5	Mitigated CO2	Mitigated CH4	Mitigated N2O	Mitigated CO2e
On-Road Truck	10.66	44.92	121.07	0.31	7.05	5.84	31697.93	0.09	0.08	31725.36	4.88	24.36	53.53	0.30	2.93	2.04	31697.93	0.09	0.08	31725.36
On-Road Truck	0.91	4.22	11.31	0.00	0.08	0.08	629.25	0.00	0.00	629.25	0.73	3.95	11.81	0.00	0.00	0.00	629.25	0.00	0.00	629.25
On-Road Crew Vehicle	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08
On-Road Crew Vehicle	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15
Total	**23**	**88**	**217**	**0**	**11**	**9**	**48069**	**1**	**0**	**48130**	**8**	**67**	**78**	**0**	**5**	**4**	**48069**	**0**	**0**	**48113**

Phase 6 — LAXT Shaft Site Construction — Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
		Equipment Specs								Emission Factor								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	Daily CO	Daily NOx	Daily SO2	Daily PM10	Daily PM2.5	Daily CO2	Daily CH4	Daily N2O	Daily CO2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO2	Mitigated PM10	Mitigated PM2.5	Mitigated CO2	Mitigated CH4	Mitigated N2O	Mitigated CO2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.27	0.04				
On Site Total	**11.9**	**40.1**	**97.2**	**0.2**	**4.0**	**3.1**	**15550.2**	**1.1**	**0.0**	**15572.4**	**2.4**	**40.1**	**17.0**	**0.2**	**2.2**	**1.7**	**15550.2**	**0.2**	**0.0**	**15554.2**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	Daily ROG	Daily CO	Daily NOx	Daily SO2	Daily PM10	Daily PM2.5	Daily CO2	Daily CH4	Daily N2O	Daily CO2e	Mitigated ROG	Mitigated CO	Mitigated NOx	Mitigated SO2	Mitigated PM10	Mitigated PM2.5	Mitigated CO2	Mitigated CH4	Mitigated N2O	Mitigated CO2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	**25**	**94**	**244**	**0**	**12**	**10**	**48047**	**1**	**0**	**48109**	**8**	**68**	**81**	**0**	**5**	**4**	**48047**	**0**	**0**	**48091**

Project Construction - Alternative 5

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase

7 Assemble TBM

Start Date 2016

Equipment Specs

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr

Emission Factor

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House							308.901	0.013	0.003
Compressor (2000 cfm)							308.901	0.013	0.003
Crawler Crane	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane							308.901	0.013	0.003
Hydaulic Excavator - Large	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers							308.901	0.013	0.003
Shaft and Tunnel Lighting							308.901	0.013	0.003
Shaft Pump							308.901	0.013	0.003
Shop (mechanical)							308.901	0.013	0.003
Shop (welding)							308.901	0.013	0.003
Site Lighting							308.901	0.013	0.003
Slurry Circuit Pumps (discharge							308.901	0.013	0.003
Slurry Circuit Pumps (feed)							308.901	0.013	0.003
Slurry Separation Plant							308.901	0.013	0.003
Street Sweeper	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear							308.901	0.013	0.003
Tower Crane							308.901	0.013	0.003
Tunnel Ventilation Fans							308.901	0.013	0.003
Water Truck	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist							308.901	0.013	0.003
Tugboats	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Daily Emission Rates (lbs/day)

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Mitigated Daily Emission Rates (lbs/day)

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase

8 Offshore Tunnel

Start Date 2016

Equipment Specs

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr
Shaft and Tunnel Lighting	offroad	-	200	200	1.00	1	24	4800	g/kW-hr
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr
Slurry Circuit Pumps (discharge	offroad	-	8,000	8,000	1.00	1	12	96000	g/kW-hr
Slurry Circuit Pumps (feed)	offroad	-	3,760	3,760	1.00	1	12	45120	g/kW-hr
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr
Tunnel Ventilation Fans	offroad	-	3,600	3,600	1.00	1	24	86400	g/kW-hr
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr

Emission Factor

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House							308.901	0.013	0.003
Compressor (2000 cfm)							308.901	0.013	0.003
Crawler Crane	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane							308.901	0.013	0.003
Hydaulic Excavator - Large	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers							308.901	0.013	0.003
Shaft and Tunnel Lighting							308.901	0.013	0.003
Shaft Pump							308.901	0.013	0.003
Shop (mechanical)							308.901	0.013	0.003
Shop (welding)							308.901	0.013	0.003
Site Lighting							308.901	0.013	0.003
Slurry Circuit Pumps (discharge							308.901	0.013	0.003
Slurry Circuit Pumps (feed)							308.901	0.013	0.003
Slurry Separation Plant							308.901	0.013	0.003
Street Sweeper	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear							308.901	0.013	0.003
Tower Crane							308.901	0.013	0.003
Tunnel Ventilation Fans							308.901	0.013	0.003
Water Truck	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist							308.901	0.013	0.003
Tugboats	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Daily Emission Rates (lbs/day)

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10.31									

Mitigated Daily Emission Rates (lbs/day)

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25
Street Sweeper	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	282	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				7050	lbs/ton					0.000166	0.0000249			

	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82
Fugitive Dust					1.17	0.18									0.59	0.09				
On Site Total	21.1	86.2	149.5	0.2	6.2	5.0	231945.3	9.8	2.1	232797.4	4.8	86.2	18.0	0.2	1.9	1.3	231945.3	9.5	2.1	232791.4

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	282	16920		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		282			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	23.12	97.45	262.63	0.68	15.30	12.66	68760.13	0.19	0.18	68819.63	10.58	52.84	116.11	0.64	6.36	4.42	68760.13	0.19	0.18	68819.63
On-Road Truck	1.97	9.15	24.53	0.00	0.18	0.17	1364.98	0.00	0.00	1364.98	1.58	8.57	25.62	0.00	0.00	0.00	1364.98	0.00	0.00	1364.98
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	47.35	206	432	1	22	18	305929	10	3	306986	18	161	155	1	9	6	305929	10	3	306980

Project Construction - Alternative 5

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 9 — SW Marine Shaft Site Construction — Start Date 2015

		Equipment Specs							Emission Factor									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.27	0.04				
														On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.4	40.1	17.0	0.2	2.2	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase 10 — SP Riser Cosntruction — Start Date 2019

		Equipment Specs							Emission Factor									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	3	2	2418	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	3	2	147.06	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	3	2	1080	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	3	2	64.5	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000

	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	3.07	11.50	39.98	0.03	1.93	1.77	4882.47	0.03	0.22	4951.77	0.90	11.50	9.60	0.03	1.05	0.97	4882.47	0.01	0.22	4951.35
Tugboat - Aux	0.32	1.28	2.92	0.00	0.19	0.18	296.95	0.00	0.01	301.16	0.08	1.28	0.76	0.00	0.12	0.11	296.95	0.00	0.01	301.13
Crew Boats	1.61	5.66	25.58	0.01	1.06	0.98	2180.76	0.01	0.10	2211.71	0.47	5.66	6.14	0.01	0.58	0.54	2180.76	0.00	0.10	2211.52
Crew Boats - Aux	0.32	0.98	0.96	0.00	0.08	0.08	130.24	0.00	0.01	132.09	0.08	0.98	0.25	0.00	0.05	0.05	130.24	0.00	0.01	132.08
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.67	2.36	10.66	0.01	0.44	0.41	908.65	0.01	0.04	921.55	0.12	2.36	1.60	0.01	0.24	0.22	908.65	0.00	0.04	921.45
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.000166	0.0000249								0.07	0.01									0.03	0.00				
														On Site Total	6.0	21.9	80.4	0.1	3.8	3.4	8418.5	0.0	0.4	8537.7	1.7	21.9	18.7	0.1	2.1	1.9	8418.5	0.0	0.4	8537.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily ROG	Daily CO	Daily NO_x	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_x	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	0.96	4.30	10.46	0.04	0.65	0.52	3899.45	0.01	0.01	3902.82	0.60	3.02	6.30	0.04	0.37	0.26	3899.45	0.01	0.01	3902.82
On-Road Truck	onroad		16			g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.10	0.51	1.42	0.00	0.01	0.01	77.47	0.00	0.00	77.47	0.09	0.49	1.45	0.00	0.00	0.00	77.47	0.00	0.00	77.47
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23
On-Road Crew Vehicle	onroad		30			g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69
															Total	7	28	92	0	4	4	12898	0	0	13037	3	27	26	0	2	2	12898	0	0	13037

Project Construction - Alternative 5

ON AND OFFROAD CONSTRUCTION CALCULATIONS BY PHASE

Phase 11 — SP Diffuser Construction — Start Date 2021

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042	2.05	7.67	26.65	0.02	1.28	1.18	3254.98	0.02	0.15	3301.18	0.60	7.67	6.40	0.02	0.70	0.65	3254.98	0.01	0.15	3300.90
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042	0.22	0.85	1.95	0.00	0.13	0.12	197.96	0.00	0.01	200.77	0.05	0.85	0.51	0.00	0.08	0.07	197.96	0.00	0.01	200.76
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.54	1.89	8.53	0.00	0.35	0.33	726.92	0.00	0.03	737.24	0.16	1.89	2.05	0.00	0.19	0.18	726.92	0.00	0.03	737.17
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042	0.11	0.33	0.32	0.00	0.03	0.03	43.41	0.00	0.00	44.03	0.03	0.33	0.08	0.00	0.02	0.02	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	1	8	2580	g/hp-hr	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000	0.86	5.70	3.38	0.03	0.10	0.09	3232.39	0.08	0.00	3234.03	0.16	5.70	0.51	0.03	0.06	0.05	3232.39	0.01	0.00	3232.69
Pipe Barge	offroad	2,000	-	2,000	0.59	1	8	9440	g/hp-hr	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000	7.35	24.46	76.05	0.12	1.82	1.62	11827.05	0.66	0.00	11840.97	1.34	24.46	11.41	0.12	1.00	0.89	11827.05	0.12	0.00	11829.60
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	2	8	5920	g/hp-hr	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000	3.85	14.31	22.92	0.07	0.84	0.75	7416.97	0.35	0.00	7424.26	0.70	14.31	3.44	0.07	0.46	0.41	7416.97	0.06	0.00	7418.30
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.67	2.36	10.66	0.01	0.44	0.41	908.65	0.01	0.04	921.55	0.12	2.36	1.60	0.01	0.24	0.22	908.65	0.00	0.04	921.45
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	1	4	510	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.33	1.27	2.20	0.01	0.07	0.07	638.96	0.03	0.00	639.58	0.06	1.27	0.33	0.01	0.04	0.04	638.96	0.01	0.00	639.07
Pump	offroad	500	-	500	0.74	1	8	2960	g/hp-hr	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000	1.30	6.65	10.84	0.04	0.36	0.32	3708.48	0.12	0.00	3710.94	0.24	6.65	1.63	0.04	0.20	0.17	3708.48	0.02	0.00	3708.93

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.000166	0.0000249								0.07	0.01									0.03	0.00				
														On Site Total	17.3	65.6	163.8	0.3	5.5	4.9	31975.2	1.3	0.2	32074.0	3.5	65.6	28.3	0.3	3.0	2.7	31975.2	0.2	0.2	32052.4

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005	0.80	3.75	8.59	0.04	0.55	0.42	3909.79	0.01	0.01	3913.16	0.60	3.00	6.17	0.04	0.38	0.27	3909.79	0.01	0.01	3913.16
On-Road Truck	onroad		16			g/trip	2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000	0.10	0.50	1.43	0.00	0.01	0.01	78.10	0.00	0.00	78.10	0.09	0.49	1.45	0.00	0.00	0.00	78.10	0.00	0.00	78.10
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32
On-Road Crew Vehicle	onroad		30			g/trip	0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67
															Total	18	71	174	0	6	5	36467	1	0	36585	4	70	36	0	3	3	36467	0	0	36563

Phase 12 — Existing Ocean Outfall Rehabilitation — Start Date 2021

		Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042	2.05	7.67	26.65	0.02	1.28	1.18	3254.98	0.02	0.15	3301.18	0.60	7.67	6.40	0.02	0.70	0.65	3254.98	0.01	0.15	3300.90
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042	0.22	0.85	1.95	0.00	0.13	0.12	197.96	0.00	0.01	200.77	0.05	0.85	0.51	0.00	0.08	0.07	197.96	0.00	0.01	200.76
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.54	1.89	8.53	0.00	0.35	0.33	726.92	0.00	0.03	737.24	0.16	1.89	2.05	0.00	0.19	0.18	726.92	0.00	0.03	737.17
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042	0.11	0.33	0.32	0.00	0.03	0.03	43.41	0.00	0.00	44.03	0.03	0.33	0.08	0.00	0.02	0.02	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.67	2.36	10.66	0.01	0.44	0.41	908.65	0.01	0.04	921.55	0.12	2.36	1.60	0.01	0.24	0.22	908.65	0.00	0.04	921.45
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
														On Site Total	3.6	13.1	48.1	0.0	2.2	2.1	5131.9	0.0	0.2	5204.8	1.0	13.1	10.6	0.0	1.2	1.1	5131.9	0.0	0.2	5204.3

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21
On-Road Crew Vehicle	onroad		20			g/trip	0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12
															Total	4	14	48	0	2	2	5481	0	0	5564	1	14	11	0	1	1	5481	0	0	5564

Project Construction - Alternative 5

EMISSIONS BY PHASE

PROJECT

Phase	Start Date	Duration (Months)	Unmitigated Localized Daily Emission Rates (lbs/day)										Mitigated Localized Daily Emission Rates (lbs/day)									
			ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP East Shaft Site Construction	1/1/2015	12	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	24	11	86	148	0	6	5	184,475	8	2	185,151	5	86	17	0	2	1	184,475	8	2	185,145
5 TraPac Shaft Site Construction	4/1/2016	12	11	39	88	0	4	3	15,550	1	-	15,571	2	39	16	0	2	2	15,550	0	-	15,554
6 LAXT Shaft Site Construction	1/1/2015	15	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
7 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Offshore Tunnel	7/1/2016	79	21	86	149	0	6	5	231,945	10	2	232,797	5	86	18	0	2	1	231,945	9	2	232,791
9 SW Marine Shaft Site Construction	7/1/2015	12	12	40	97	0	4	3	15,550	1	-	15,572	2	40	17	0	2	2	15,550	0	-	15,554
10 SP Riser Cosntruction	10/1/2019	24	6	22	80	0	4	3	8,419	0	0	8,538	2	22	19	0	2	2	8,419	0	0	8,537
11 SP Diffuser Construction	10/1/2021	12	17	66	164	0	5	5	31,975	1	0	32,074	3	66	28	0	3	3	31,975	0	0	32,052
12 Existing Ocean Outfall Rehabilitation	10/1/2021	9	4	13	48	0	2	2	5,132	0	0	5,205	1	13	11	0	1	1	5,132	0	0	5,204

Phase	Start Date	Duration (Months)	Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
			ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
1 TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 JWPCP East Shaft Site Construction	1/1/2015	12	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
3 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Onshore Tunnel	7/1/2016	24	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	8	2	244,474
5 TraPac Shaft Site Construction	4/1/2016	12	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
6 LAXT Shaft Site Construction	1/1/2015	15	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
7 Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Offshore Tunnel	7/1/2016	79	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
9 SW Marine Shaft Site Construction	7/1/2015	12	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
10 SP Riser Cosntruction	10/1/2019	24	7	28	92	0	4	4	12,898	0	0	13,037	3	27	26	0	2	2	12,898	0	0	13,037
11 SP Diffuser Construction	10/1/2021	12	18	71	174	0	6	5	36,467	1	0	36,585	4	70	36	0	3	3	36,467	0	0	36,563
12 Existing Ocean Outfall Rehabilitation	10/1/2021	9	4	14	48	0	2	2	5,481	0	0	5,564	1	14	11	0	1	1	5,481	0	0	5,564

Project Construction - Alternative 5

EMISSIONS BY DAY

		Unmitigated Regional Daily Emission Rates (lbs/day)										Mitigated Regional Daily Emission Rates (lbs/day)									
Timeslice	Phase	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
A	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**49**	**188**	**488**	**1**	**24**	**20**	**96,094**	**2**	**0**	**96,218**	**16**	**137**	**163**	**1**	**10**	**7**	**96,094**	**1**	**0**	**96,181**
B	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**74**	**282**	**732**	**1**	**36**	**29**	**144,140**	**4**	**0**	**144,327**	**24**	**205**	**244**	**1**	**15**	**11**	**144,140**	**1**	**0**	**144,272**
C	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
D	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	25	94	244	0	12	10	48,047	1	0	48,109	8	68	81	0	5	4	48,047	0	0	48,091
	Total	**48**	**182**	**461**	**1**	**23**	**19**	**96,116**	**2**	**0**	**96,239**	**16**	**136**	**159**	**1**	**10**	**7**	**96,116**	**1**	**0**	**96,204**
E	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	8	2	244,474
	5	23	88	217	0	11	9	48,069	1	0	48,130	8	67	78	0	5	4	48,069	0	0	48,113
	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**102**	**477**	**1,020**	**2**	**51**	**42**	**597,610**	**20**	**5**	**599,596**	**41**	**375**	**358**	**2**	**21**	**14**	**597,610**	**19**	**5**	**599,566**
F	4	32	183	371	1	18	15	243,611	8	2	244,480	16	147	125	1	7	5	243,611	8	2	244,474
	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**79**	**389**	**802**	**2**	**40**	**33**	**549,540**	**19**	**5**	**551,466**	**34**	**308**	**279**	**2**	**16**	**11**	**549,540**	**18**	**5**	**551,454**
G	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**47**	**206**	**432**	**1**	**22**	**18**	**305,929**	**10**	**3**	**306,986**	**18**	**161**	**155**	**1**	**9**	**6**	**305,929**	**10**	**3**	**306,980**
H	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	10	7	28	92	0	4	4	12,898	0	0	13,037	3	27	26	0	2	2	12,898	0	0	13,037
	Total	**55**	**234**	**524**	**1**	**26**	**22**	**318,827**	**11**	**3**	**320,023**	**21**	**187**	**181**	**1**	**11**	**8**	**318,827**	**10**	**3**	**320,017**
I	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	11	18	71	174	0	6	5	36,467	1	0	36,585	4	70	36	0	3	3	36,467	0	0	36,563
	12	4	14	48	0	2	2	5,481	0	0	5,564	1	14	11	0	1	1	5,481	0	0	5,564
	Total	**69**	**291**	**653**	**1**	**30**	**25**	**347,877**	**12**	**3**	**349,135**	**23**	**245**	**201**	**1**	**13**	**10**	**347,877**	**10**	**3**	**349,107**
J	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	11	18	71	174	0	6	5	36,467	1	0	36,585	4	70	36	0	3	3	36,467	0	0	36,563
	Total	**66**	**277**	**605**	**1**	**28**	**23**	**342,396**	**12**	**3**	**343,571**	**22**	**231**	**190**	**1**	**12**	**9**	**342,396**	**10**	**3**	**343,543**
K	8	47	206	432	1	22	18	305,929	10	3	306,986	18	161	155	1	9	6	305,929	10	3	306,980
	Total	**47**	**206**	**432**	**1**	**22**	**18**	**305,929**	**10**	**3**	**306,986**	**18**	**161**	**155**	**1**	**9**	**6**	**305,929**	**10**	**3**	**306,980**
Maximum Daily Emissions		**102**	**477**	**1,020**	**2**	**51**	**42**	**597,610**	**20**	**5**	**599,596**	**41**	**375**	**358**	**2**	**21**	**14**	**597,610**	**19**	**5**	**599,566**

Project Construction - Alternative 5

GHG EMISSIONS BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP East Shaft Site Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	24	59,073	2	1	59,284	59,073	2	1	59,283
5	TraPac Shaft Site Construction	4/1/2016	12	5,820	0	0	5,828	5,820	0	0	5,825
6	LAXT Shaft Site Construction	1/1/2015	15	7,272	0	0	7,281	7,272	0	0	7,278
7	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
8	Offshore Tunnel	7/1/2016	79	241,584	8	2	242,419	241,584	8	2	242,414
9	SW Marine Shaft Site Construction	7/1/2015	12	5,833	0	0	5,841	5,833	0	0	5,839
10	SP Riser Cosntruction	10/1/2019	24	3,132	0	0	3,166	3,132	0	0	3,166
11	SP Diffuser Construction	10/1/2021	12	4,415	0	0	4,430	4,415	0	0	4,427
12	Existing Ocean Outfall Rehabilitation	10/1/2021	9	496	0	0	503	496	0	0	503
	Total						334,576				334,558
	Amortized Total						11,153				11,152

Appendix 6-A

LOCAL TREE PROTECTION ORDINANCES

Appendix 6-A
LOCAL TREE PROTECTION ORDINANCES

Introduction

This appendix provides information regarding local tree protection ordinances applicable to the Clearwater Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The environmental analysis conducted for terrestrial biological resources (Chapter 6 of the EIR/EIS) required the program and project be evaluated to determine compliance with local ordinances protecting biological resources, including local tree protection ordinances. The following is a summary of tree protection ordinances for the cities where program and/or project elements would be located. As discussed in Chapter 6, if any program elements conflict with these ordinances the Sanitation Districts will address such conflicts through project-level review and permitting. None of the project elements would conflict with these ordinances.

City

City of Walnut Oak and Walnut Tree Preservation Policy

The City regulates the preservation and removal of trees. The City's tree policy requires the preservation of all healthy trees unless compelling reasons justify the removal of such trees. This policy shall apply to the removal, pruning, cutting, and/or encroachment into the protected zone of the trees. The community development department shall have the primary and overall responsibility to administer, evaluate, and monitor this policy to assure strict compliance. Trees protected by the City include the genus *Quercus* including, but not limited to blue oak (*Quercus douglasii*), California black oak (*Quercus lobata*), California live oak (*Quercus agrifolia*), canyon oak (*Quercus chrysolepis*), interior live oak (*Quercus wislizeni*), scrub oak (*Quercus dumosa*), and California black walnut (*Juglans californica*).

The City of Walnut defines a heritage oak/walnut tree as any tree measuring forty inches or more in circumference or, in the case of a multiple trunk tree, two or more trunks measuring thirty inches or greater in circumference, measured three feet above the natural grade surrounding such tree. In addition, the planning commission and/or city council may classify a tree, regardless of size, as a heritage oak/walnut if it is determined by a majority vote thereof that such tree has exceptional historic, aesthetics and/or prominence in the community.

City of Carson Tree Preservation and Protection Ordinance

The purpose of the City of Carson Tree Preservation and Protection Ordinance is to preserve and protect city parkway trees that are of aesthetic importance and to provide for the replacement of trees in order to maintain the community's natural environment. Trees are an important natural resource, and it is essential to the public peace, health, and welfare that such trees be protected from random removal, trimming, or damage. Tree is defined as any woody plant, including a palm, which has the potential of attaining a minimum height of 15 feet and has its canopy of foliage borne normally on a single trunk. Removal of a tree within the city parkway easement requires a permit.

City of Cerritos Tree Ordinance

The City of Cerritos Tree Ordinance seeks to protect the "urban forest" character and park-like community. It prohibits "topping" of city trees and removal of street trees unless they are diseased, dead, or dying, or pose a threat to public health or safety. The ordinance also allows the City of Cerritos Property Preservation Commission to designate heritage trees with historical significance.

City of Long Beach Tree Maintenance Policy

The City of Long Beach Tree Maintenance Policy recognizes the importance of trees and urban forestry and seeks to preserve trees for future generations. This policy applies to street trees located in the public rights-of-way. One aspect of the city's Tree Maintenance Policy provides rules for the removal of street trees to accommodate construction. Such removal requires a Permit to Remove Street Trees. The party removing the tree must replace it with one 15-gallon tree in an appropriate area of the parkway and also pay for one 15-gallon tree to be planted elsewhere in the city. The property owner must notify the City Council District Office and any formally recognized neighborhood associations in writing of the request to remove the tree and send a copy to the Department of Public Works. A posting will be placed at the tree by the City and all property owners within 300 feet of the tree will be issued 10-day notices. If the tree is within a designated historical area, the Neighborhood and Historic Preservation Office must also be notified.

City of Los Angeles Protected Tree Relocation and Replacement Policy

Protected tree species include any of the following southern California native tree species that measure 4 inches or more in cumulative diameter 4.5 feet above the ground level at the base of the tree: southern California black walnut (*Juglans californica* var. *californica*), western sycamore (*Platanus racemosa*), California bay (*Umbellularia californica*), and oaks (*Quercus* sp.) indigenous to California but excluding the scrub oak (*Quercus dumosa*). No protected tree may be relocated or removed except as provided in the relocation and replacement policy or Article 6 of Chapter IV of the policy code. The term "removed" or "removal" includes any act that will cause a protected tree to die, including but not limited to acts that inflict damage upon the root system or other parts of the tree by fire, application of toxic substances, operation of equipment or machinery, or by changing the natural grade of land by excavation or filling the drip line area around the trunk.

City of Pasadena Tree Protection Ordinance

In recognition of the significant aesthetic, environmental, and economic benefits to the community provided by trees, and to increase the tree canopy in Pasadena, the City Council adopted measures to protect public trees, landmark trees, native trees, and specimen trees in certain areas of the city. Public trees are those trees located on property under ownership or control of the city. A landmark tree is a tree designated under Chapter 2.75 (Cultural Heritage) because it is one of the largest or oldest species located in the city; it has a historic significance due to an association with a historic building, site, street, person, or event; or it is a defining landmark or significant outstanding feature of a neighborhood. A specimen tree is a tree of a species and size established on a list adopted by the city council and is thereby presumed to possess distinctive form, size, or age, and to be an outstanding specimen of a desirable species. There are 63 species listed on the specimen tree list. A native tree is a tree with a trunk size of more than 8 inches in diameter and is one of thirteen listed species.

City of Pomona Tree Protection and Preservation Program

The City of Pomona has established the tree program to preserve and protect trees in historic districts. A certificate of appropriateness is required for removal or trimming of any character-defining landscaping on any historic site, unless there is an emergency. Character-defining landscaping includes mature significant trees, designated specimen (heritage) trees, and street trees. Heritage trees within the existing historic districts (Lincoln Park and Wilton Heights) are all trees currently designated by the city. In proposed historic districts, applicants are required to identify mature significant trees and specimen (heritage) trees as part of the application process. Specimen (heritage) trees can be located on public or private property and are defined consistent with City Council Resolution No. 73–68 as any rare or endangered species or any tree considered outstanding because of size, age, appearance, or relationship to a historic event. Mature significant trees can be located on public or private property and include oak trees with trunks more than 8 inches in diameter at breast height and other trees with trunks more than 10 inches in diameter at breast height, or multi-trunk trees with a total circumference of 38 inches or more at breast height. Street trees are any trees planted by the city on a city easement, parkway, or dedicated land. This does not include trees or landscaping planted by adjacent property owners. Minor projects requiring review under the Historic Preservation Ordinance include trimming of mature significant trees, trimming of specimen (heritage) trees, trimming of street trees not in compliance with the City of Pomona Street Tree Policy Manual or accepted standards and planting, and relocating trees on public property within a historic district. Major projects requiring review under the Historic Preservation Ordinance include removal of mature significant trees, removal of specimen (heritage) trees, and removal of street trees.

City of San Gabriel Tree Preservation Program

In February of 1991, the San Gabriel City Council enacted a tree preservation ordinance to protect and preserve trees. The ordinance protects specific types of mature trees in an effort to ensure that the next generation of San Gabriel residents will reap the benefits of a mature urban forest. A permit is required to cut, trim, or remove a class 1 tree, a mature tree, and/or a landmark or historically significant trees or stand of trees.

City of San Marino Tree Preservation Ordinance

This ordinance protects trees and shrubs in the R-1 and C-1 Zones of the City. This Section does not apply to trees in the Historical and Cultural Zone (H&C) and the Parks and Recreational Zone (P&R) or in the public parkways adjacent to the R-1 and C-1 Zones. The removal of any established tree on private property requires a permit. An established tree is defined as any variety of tree or shrub that is at least fifteen feet (15') in height and is twenty four inches (24") or more in circumference when measured at a point four feet six inches (4'6") above the natural grade, or if the tree or shrub has multiple trunks, the total circumference of each individual trunk at a point four feet six inches (4'6") above the natural grade is thirty six inches (36") or more.

County

Los Angeles County Oak Tree Ordinance

Portions of the project within unincorporated areas of Los Angeles County are subject to regulations under the Los Angeles County Oak Tree Ordinance. The Los Angeles County Oak Tree Ordinance has

been established to recognize oak trees as significant historical, aesthetic, and ecological resources. The goal of the ordinance is to create favorable conditions for the preservation and propagation of healthy oak trees.

Under the Los Angeles County Oak Tree Ordinance, a person should not cut, destroy, remove, relocate, inflict damage, or encroach into the protected zone of any tree of the oak tree genus that is 8 inches or more in diameter 4.5 feet above the mean natural grade without first obtaining a permit. In the case of oaks with multiple trunks, a permit is required if the combined diameter of the two largest trucks is 12 inches or more.

Appendix 7-A

CULTURAL RESOURCES EVALUATION OF THE SANITATION DISTRICTS OF LOS ANGELES COUNTY WHITE POINT OCEAN OUTFALL SYSTEM

A CULTURAL RESOURCES EVALUATION OF THE SANITATION DISTRICTS OF LOS ANGELES COUNTY WHITES POINT OCEAN OUTFALL SYSTEM, OFFSHORE OF ROYAL PALMS BEACH, SAN PEDRO, LOS ANGELES COUNTY

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August 12, 2011

NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

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Prepared for:	Planning Section Los Angeles County Sanitation Districts 1955 Workman Mill Road Whittier, CA 90601
Contact:	Steven Highter, Supervising Engineer
USGS Quadrangle:	San Pedro 7.5', California
Study Area:	Unsectioned, Township 5 South, Range 14 West, SBBM
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MANAGEMENT SUMMARY

At the request of the Sanitation Districts of Los Angeles County (Sanitation Districts), John Minch and Associates, Inc. (JMA) has undertaken a cultural resources evaluation of the Sanitation Districts' Whites Point Ocean Outfall System. The outfalls comprise four reinforced concrete pipes of varying diameters and lengths that convey treated effluent into the Pacific Ocean. The outfalls are located immediately offshore of Royal Palms Beach, below Whites Point on the Palos Verdes Peninsula in San Pedro. Three of the pipelines are over 50 years of age; the fourth is 45 years old. This evaluation is unique in that all four outfalls are underwater and access to the outfalls is difficult. Consequently, no field surveys were conducted in conjunction with this evaluation.

The purpose of this study was to identify all potentially significant cultural resources situated within the boundaries of the Area of Potential Effects (APE). This information is needed since adoption of the proposed rehabilitation plan could result in adverse effects upon locations of archaeological or historical importance.

The results of the records search conducted at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton indicated that no prehistoric or historic archaeological sites have been recorded within the boundaries of the APE. Research has indicated that portions of the APE have been previously disturbed during construction of the outfalls. A review of a shipwreck data base search conducted independently of this evaluation has indicated that three shipwrecks lie near the APE. However, it is anticipated that none of the three will be impacted by the proposed undertaking.

Application of both National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) criteria resulted in the opinion that none of the outfalls appear significant at the federal, state or local levels. Therefore, no further work in conjunction with cultural resources is recommended or warranted. As a matter of course, the outfalls have been recorded on the appropriate DPR 523 series forms and submitted to the SCCIC at California State University, Fullerton for assignment of a Primary Number.

I. INTRODUCTION

The following report was prepared for the Sanitation Districts by JMA. It describes the results of a cultural resources evaluation of the Sanitation Districts' Whites Point Ocean Outfall System located offshore of Royal Palms Beach in San Pedro, Los Angeles County (figs. 1 and 2). Presently, the Sanitation Districts plans to rehabilitate the existing outfall pipes that are used to discharge secondary treated wastewater offshore. The technical report is a component to the environmental impact report/environmental impact statement (EIR/EIS) for the Clearwater Program Master Facilities Plan.

In compliance with the National Environmental Policy Act (NEPA) of 1969, 40 CFR 1508.22, and 33 CFR Parts 230 and 325, and in conjunction with the Sanitation Districts, the U.S. Army Corps of Engineers (CoE) will be preparing the associated EIS for the project (Federal Register 2008). The joint EIR/EIS will be used to identify potential impacts associated with the proposed rehabilitation project. Therefore, this document is written in compliance with: (1) Section 106 of the National Historic Preservation Act of 1966 (NHPA) as amended, which includes criteria for eligibility to the NRHP; and (2) the California Environmental Quality Act (CEQA), as amended in 1992, which includes criteria for eligibility to the CRHR. The report format has been prepared according to the *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* contained within the State's Preservation Planning Bulletin Number 4(a) (California Department of Parks and Recreation 1989).

The purpose of this study is to identify all historic resources within the APE and to determine whether the proposed undertaking will have an effect on such properties. "Historic properties" include prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior (36 CFR 800.16(1)). According to 36 CFR 800.2(d), the APE is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist."

Our assessment consisted of: (1) a comprehensive records search conducted at the SCCIC at California State University, Fullerton to determine whether any previously recorded historic or prehistoric material is located on or adjacent to the APE (existing offshore ocean outfall alignments), (2) a review of shipwreck database information, (3) extensive literature review, and (4) archival research including historical records, technical engineering data, and period photographs. In

addition, scoping was conducted with the Native American Heritage Commission (NAHC) in Sacramento and local Native Americans. As the whole of the outfall lies underwater, no cultural resource surveys were undertaken in conjunction with the evaluation.

II. SETTING

A. Location

The coastal landmark historically known as Whites Point has been labeled on various maps and listed in several texts as Whites Point, White's Point, or White Point. The different spellings will appear throughout the text where applicable. The study area or APE is situated off the Los Angeles County coast near Whites Point. The Palos Verdes Hills lie to northwest as does the Upper Reservation of Fort MacArthur and the urban core of San Pedro to the northeast. Additionally, Point Fermin lies approximately 1/2-mile to the east as does Portuguese Bend 3-miles to the west (fig 1). More specifically, the APE is located immediately offshore from Royal Palms Beach which lies below and just southwest of White Point Bluff Park in San Pedro. Legally, the area containing the outfalls is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian as shown on a portion of the *San Pedro* 7.5' USGS Topographic Quadrangle (fig. 2).

B. General Prehistory of Southern California

Most scholars believe that sea level was considerably lower at the end of the last ice age (the "Pleistocene") than it is today. Traditional scholars hold that at that time, a "bridge" of land, which corresponded to the modern Aleutian Island chain, connected northeastern Asia with Alaska. It is generally believed that the earliest human inhabitants of southern California were descendants of hunters who had crossed this bridge following big game such as mastadon.

On the other hand, recent archaeological evidence from San Clemente Island suggests that prehistoric man was fishing on the island as early as 10,000 or more years ago (Big Dog Cave; Salls 1990:39). Since San Clemente has always been an island, even at the end of the last ice age, humans would have needed boats to reach that location. If they had boats at such an early date, they would not have needed a "land bridge" to reach Alaska from Asia.

Figure 1. Regional location of the project area as indicated on a portion of the *Long Beach* USGS 1:100,000 scale Topographic Map.

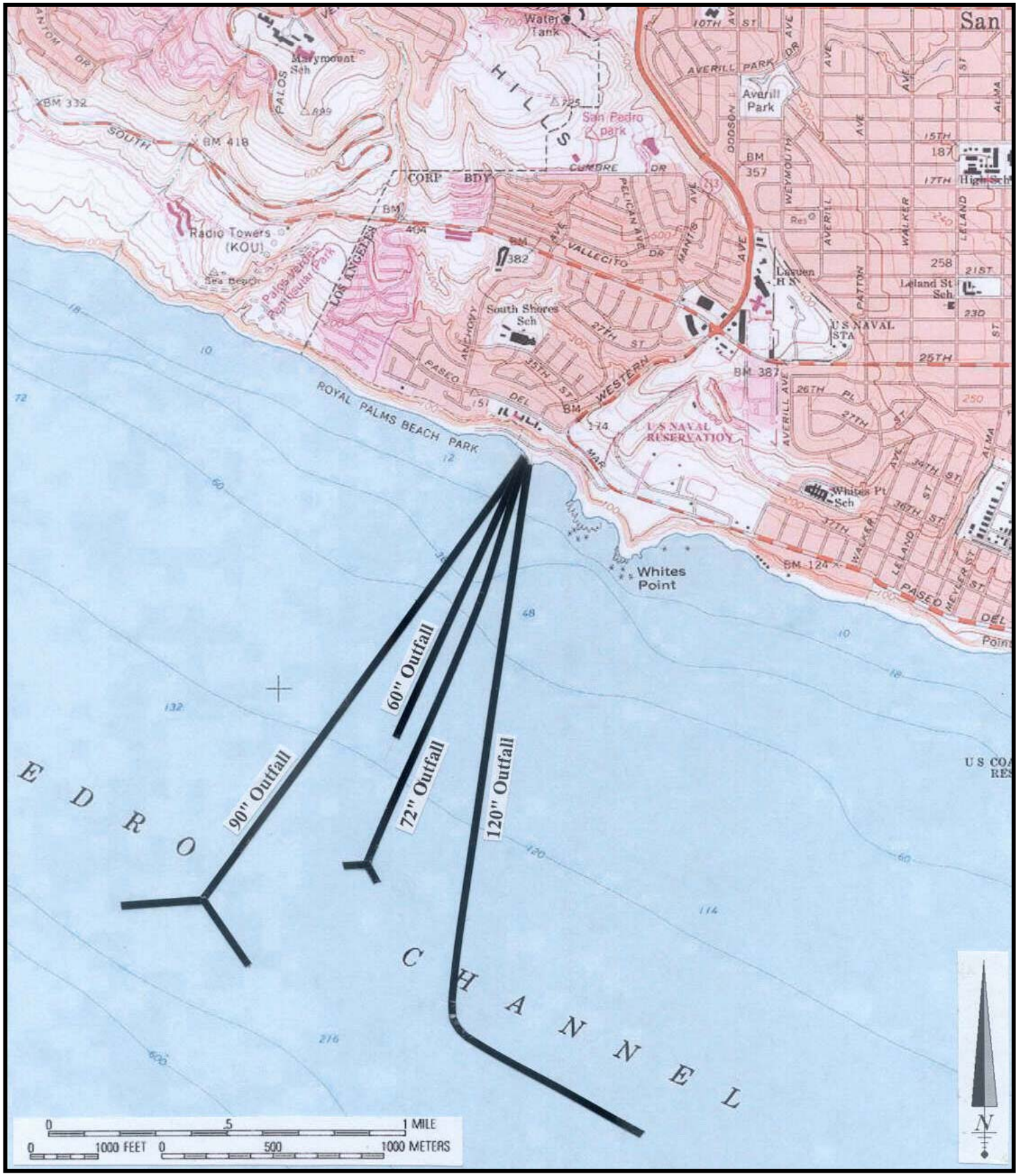


Figure 2. Sanitation Districts' Whites Point Ocean Outfall System as shown on a portion of the *San Pedro* 7.5' USGS Topographic Quadrangle.

Southern California in general has had a relatively long chronology of human habitation based on such dates as the 23,000 B.P. (Before Present) age for "Los Angeles Man" and the 9,000 ±80 B.P. date for the La Brea Woman Skeleton (Moratto 1984). Some archaeologists have referred to this time period, especially its later Post-Pleistocene era (i.e. after 11,000 B.P.) as the "Archaic Period" (e.g. Wallace 1978). Most archaeologists in California assume that ancient populations during that time period underwent economic changes from small communities based on hunting to food collecting societies (cf. Chartkoff and Chartkoff 1984; Moratto 1984).

The pioneering research of Wallace (1955), Warren (1968) and others shows that the Early Systems Period (or Early Period) was apparently followed by several stages of cultural development, including what they termed the "Millingstone Period" (7,000 to 1,500 B.C.). There are site data which seem to indicate that there was a shift from hunting economies to those that emphasized seed collecting. The emphasis on food collecting and harvesting of wild seeds, as opposed to hunting, is evidenced by the apparent abundance of millingstones or "metates" and hand stones or mullers called "manos"and a relative absence of projectile points at sites dating to this period. These implements were used to grind seeds into flour. Stickel has characterized the economy during the Millingstone Period as follows:

> The people of the Milling Stone Period were primarily plant food collectors (as evidenced by the manos and metates); hunting and fishing were secondary activities. The ecology of these people was not only oriented to collecting seeds, such as seeds of sages, but also to collecting shellfish. Hunting and fishing seem to have been less important, as evidenced by the few projectile points [i.e. spear or dart points] and fish and mammal bones. (Stickel 1978:7).

Most habitation sites seem to have been small hamlets or villages, but some coastal settlements increased in size over time and by the end of the period some coastal villages may have had populations of several hundred people. The "Intermediate Period" (1,500 B.C. to A.D. 500) saw the development of more broad based economies exploiting both marine resources along the coast (e.g. sea mammal, fish and shellfish) and terrestrial resources, including plant foods such as the acorn crop being emphasized. Corresponding to the exploitation of the acorn crop was the introduction of the mortar and pestle complex as food processors for the acorns and other hard seed

crops. Up until this time, the technology to leach the acrid tannic acid from acorns was unknown. Thus, the nuts had been inedible. It would be difficult to over-emphasize the importance of the introduction of acorn technology since this event opened the door to gathering of a foodstuff which was more versatile, abundant, and reliable than any known before.

Arrowheads first appear in Los Angeles County at the end of the Intermediate Period (circa A.D. 500; Heizer and Hester 1978). This event is believed to have facilitated the ability to hunt. Thus, great inroads into problems of food gathering were made during the Intermediate period, setting the stage for the floruit of California Indian culture which was to occur in the Late Prehistoric period.

Although the point is controversial, there is some reason to believe that Los Angeles County witnessed a large influx of desert peoples at the outset of the Late Prehistoric era about 1500 years ago (Kroeber 1925). These people, who spoke a Shoshonean dialect, rapidly assimilated the native population. It was the Shoshoneans who were the ancestors of the "Gabrieliño" people whom the mission padres found occupying Los Angeles County at the end of the 18th century.

The “Late Prehistoric Period” is thought to have dated between A.D. 500-1769. This period was one of expanding population accompanied by the growth of relatively complex social and political institutions. Archaeological sites of the Late Prehistoric Horizon are characterized by a great wealth of finds in comparison to sites representing earlier cultures. Finds include many finely flaked arrowheads of various styles, ground stone bowls, gamestones, smoking pipes, beads and pendants, and, rarely, model canoes and carved figurines in addition to most of the types of materials known from the earlier peoples. All indications are that the Late Prehistoric peoples were capable of exploiting natural resources more comfortably and efficiently than any of southern California's earlier occupants.

C. Culture History of the Gabrieliño

When Juan Cabrillo sailed the coast of California in 1542, Los Angeles and most of Orange County were inhabited by prehistoric people who occupied scattered villages. Although these people had no political institutions beyond the village level, they spoke a common dialect, and when the Mission San Gabriel was established, came to be known to the Spanish as “Gabrieliño.”

Linguistic and archaeological evidence strongly suggest that the Gabrieliño represented a branch of desert dwellers, or Shoshoneans, who moved to coastal southern California during the first

millennium A.D. At that time, they supplanted or absorbed an earlier group about which relatively little is known.

The Gabrieliño were a stone-age people whose subsistence was based upon hunting and gathering. They did not know metallurgy nor did they practice agriculture. Yet, the population was relatively small, few villages comprising more than 100 souls, and agriculture was unnecessary. The staple food was acorns which normally grew in such abundance that there were more than enough to go around. The acorn meats were leached, dried, and ground into flour which could be used to make a great variety of dishes. Small animals, principally rodents and rabbits, furnished much of the protein. However, deer were also hunted. Marine fishes and shellfish were very important in the diets of coastal inhabitants.

Technology comprised principally manufacture of tools and containers from stone, bone, leather, and plant fiber. Most implements requiring a hard, sharp edge were manufactured from chipped stone. These included such items as arrow points, knives, scrapers, and so forth. Implements for milling, such as manos, metates, mortars and pestles were made from ground stone. Traditional containers consisted of finely woven baskets which were lined with tar when water-proofing was required. Pottery was also known during the final centuries of Gabrieliño prehistory although it seems that baskets never lost their prominent role in daily lives.

The Gabrieliño lived in villages ranging in size from only an extended family or two up to several hundred people. Houses consisted of thatch huts built over sunken earthen floors. Aside from dwellings, villages also had sweathouses which were used daily by the men and seem to have represented important male social centers. Political and social organization was based on groupings called moieties, one practical function of which was to prevent family intra-marriage. Leadership at the larger villages seems to have consisted of a chief, whose position was hereditary, and one or more shamans who tended to religious and medical affairs.

Relatively little is know about traditional Gabrieliño religion which may have been fundamentally pantheistic. However, very late in time, perhaps after contact with the Spanish, a deity called *Chinigchinich* appeared. Most of what we know about the *Chinigchinich* cult was recorded by Padre Boscana of the Mission San Juan Capistrano. Evidence indicates that *Chinigchinich* was an omnipotent, omnipresent deity who superseded all others. Thus, the latest Gabrieliño religion was fundamentally monotheistic.

It was the intent of the Spanish government to convert the Gabrieliño to Christianity and the padres met with a great deal of success in their early efforts. Many Gabrieliño voluntarily moved to the mission where they were taught farming and received rudimentary education in European technology. Unfortunately, the Spanish efforts soon led to some devastating side effects, the most well-known of which was the spread of European diseases to which the Gabrieliño had no hereditary immunity.

The missionaries lost control when California was secularized under Mexican rule and the surviving Gabrieliño found themselves immersed in a competitive economy in which they were ill-equipped to compete. Many became virtual slaves while others worked on ranches where they lost touch with their traditional culture.

When the Bureau of Indian Affairs compiled its role of Mission Indians in 1929, only four individuals claimed to be full-blooded Gabrieliño and only about thirty listed themselves as at least one-half Gabrieliño. The reader is referred to the works of Kroeber (1925), Johnston (1962), Heizer (1968), Bean and Smith (1978), and LaLone (1980) for more in-depth information on the Gabrieliño.

D. History of the Palos Verdes Peninsula

The first European to set eyes on the shores of the Palos Verdes Peninsula was Juan Rodríguez Cabrillo in 1542. At the request of the viceroy of Mexico, Cabrillo was sent to explore the coast of New Spain and to find the elusive Strait of Anian. In conjunction with his historic voyage, Cabrillo sailed into San Pedro Bay (Los Angeles Harbor) and skirted the peninsula as he headed north along the coast. Sixty years later, a similar expedition of the California coast was conducted by Sebastian Viscaino while exploring Alta California for safe harbors (Hoover *et al.* 1966).

The Palos Verdes Peninsula was once a part of the 75,000 acre Rancho San Pedro. It was one of the oldest of the eight hundred land grants made by the Spanish in the early days of California. Grazing rights to the rancho were granted to Juan José Domínguez by Pedro Fages (Spanish governor of Alta California) in 1784 (Gillingham 1961). It included the present day cities of Redondo, Torrance, Compton, Gardena, Lomita, Harbor City, San Pedro, Wilmington, the western portion of Long Beach, and Palos Verdes (Fink 1966).

In 1827, the Rancho de los Palos Verdes (Rancho of the Green Trees) was carved out of the Rancho San Pedro and placed under the control of José Dolores Sepúlveda (Robinson 1939:20f.).

It included land extending from south of Redondo Beach to San Pedro. However, title to the peninsula portion of the grant was clouded from the very beginning by bitter disputes between the Domínguez and Sepúlveda families (for more details see Thacker 1923).

In 1841, Governor Alvardo upheld the Sepúlvedas claims to the land and issued a new decree. This action resulted in the Domínguez family transferring ownership of 31,626 acres comprising the Rancho de los Palos Verdes to the Sepúlvedas (Gillingham 1961:166). Governor Pio Pico finalized the matter in 1846 and issued José and Juan Sepúlveda a grant to the Rancho de los Palos Verdes (Robinson 1939:22f.). The land continued to be used primarily for cattle grazing.

Although a land patent for the Rancho de los Palos Verdes had been issued to the Sepúvedas in 1882 by the U.S. government, various individuals had absorbed the vast majority of the original lands. One of these individuals was Jotham Bixby who began buying into the rancho as early as 1872. By 1882, at the time of the patent and the partition, Bixby owned 17,031.91 acres of which the subject property was once a part. In 1913, the Bixby family sold all but 1,000 acres of what is today Harbor City to Walter Fundenburg. However, Fundenburg was unable to raise sufficient funds for the purchase which forced the Bixby family to foreclose on the mortgage. After considerable litigation, it was ruled that the acting real estate firm of Schader and Adams had 90 days to find a buyer for the property (Fink 1966:107f.).

E. Whites Point Area

Today, the bluff and beach area known as Whites Point is occupied by both White Point Bluff Park and Royal Palms Beach. North of Paseo del Mar, the general location also includes the 102-acre White Point Nature Preserve. This is the former site of the 1950s Whites Point Nike Missile site. Remnants of the military installation (headquartered at Fort MacArthur) can still be seen today.

Originally part of José Sepúlveda's Rancho de los Palos Verdes, the name "White Point" occurred in lease agreements signed around the turn of the 20th century by then owner, Ramón D. Sepúlveda (son of José Diego Sepúlveda). In addition to Japanese immigrants farming his White Point land, Ramón leased beachfront property to several Japanese-American fishermen for the purpose of establishing abalone fisheries. They lived on the shore at White Point in structures built by Sepúlveda. As the fisheries began to thrive, a cannery was opened. However, the business was short lived. In less than a decade, abalone beds had been over-fished and new restrictive laws

resulted in a decline of the industry. Therefore, the abalone operation closed (Gnerre 2010; Palisades Residents Association 2011).

It was the discovery of sulfur hot springs at the base of the bluffs that brought Ramón Sepúlveda and Tamiji Tagami together as partners in the development of a spa (bathhouse) at White Point about 1917. After exposing the hot springs and constructing roads, a resort (complete with hotel, restaurant, cabins, saltwater swimming pools and enclosed boating area) was built. The resort was especially popular with Japanese-American. Several years later in 1933, the Long Beach earthquake sealed off the sulphur springs and the resort suffered heavy damage. Unable to recover from the disaster, the resort was forced to close. Today, remains of concrete walls from the resort can still be seen (Gnerre 2010; Megowan 2010; Waugh 1988).

III. DEVELOPMENT OF THE APE

The APE for the ocean outfall evaluation was defined by Laura S. White, M.A., an RPA certified archaeologist (see Appendix A). The APE boundary is configured to include only those portions of the 72-inch, 90-inch, and 120-inch outfalls subject to rehabilitation (fig. 3). The APE comprises the following:

1. 72-inch outfall - 8.5 feet on either side of the outfall for a total area of approximately 49,980 sq. ft.

2. 90-inch outfall - 9.6 feet on either side of the outfall for a total area of approximately 69,590 sq. ft.

3. 120-inch outfall - 11.5 feet on either side of the outfall for a total area of approximately 31,120 sq. ft. (Haug 2011:pers. comm).

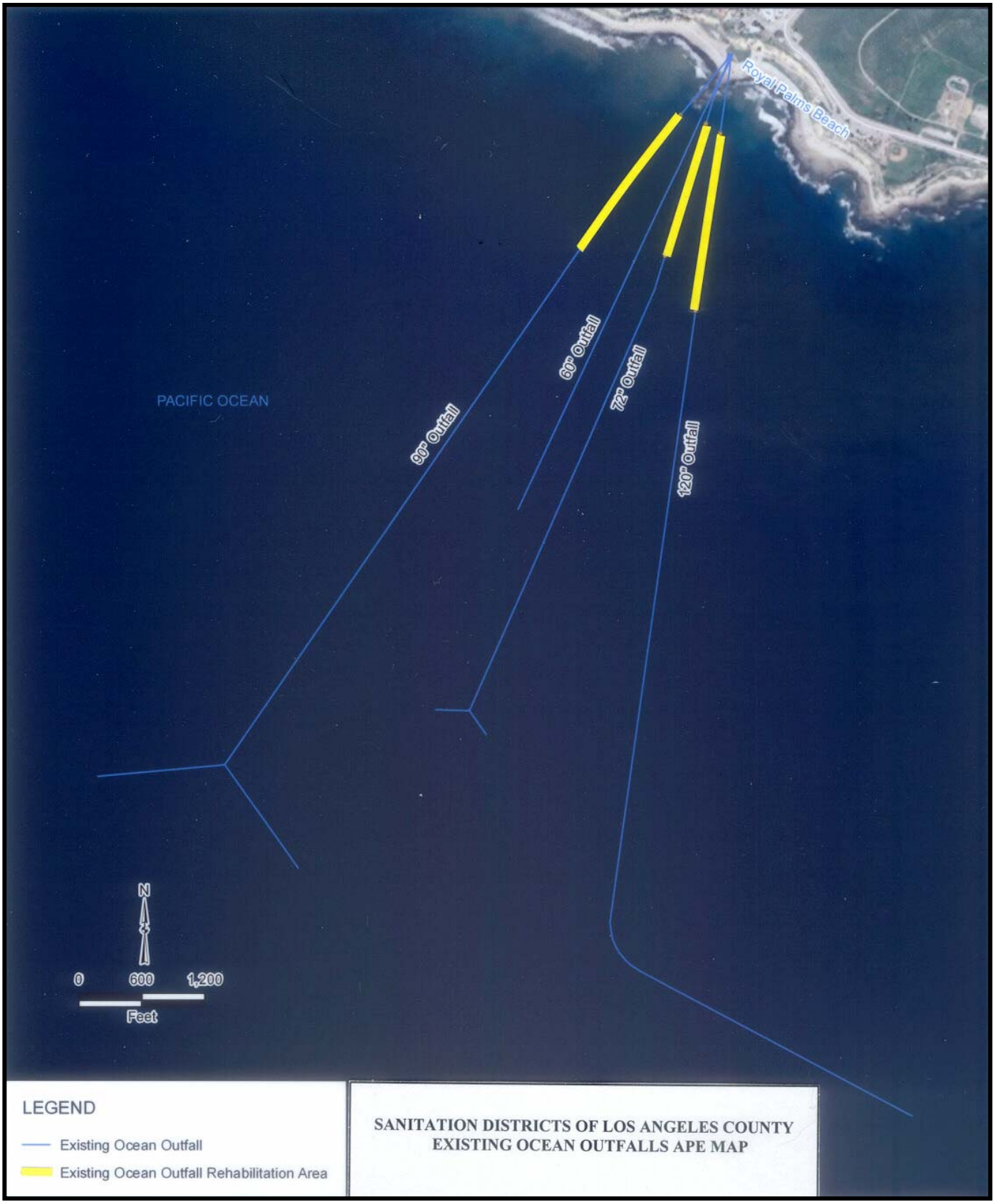


Figure 3. APE boundary map.

IV. JOINT OUTFALL SYSTEM OVERVIEW

A. Introduction

The Sanitation Districts consist of 23 independent special districts which together serve the wastewater and solid waste management needs of the approximately 5.5 million people residing in Los Angeles County. The 23 separate districts work collectively under a Joint Administration Agreement. Seventeen of the districts located in the metropolitan area of Los Angeles participate in the Joint Outfall Agreement, which provides for combined investment in wastewater conveyance and treatment facilities. Collectively, these districts (known as the Joint Outfall Districts), provide for operation and maintenance of a regional, interconnect system of facilities called the Joint Outfall System (JOS). The JOS service area includes 73 cities located within the Sanitation Districts service area. In addition, it encompasses some unincorporated areas as well as parts of the City of Los Angeles (LACSD 2008).

The JOS operates seven wastewater treatment plants. The Joint Water Pollution Control Plant (JWPCP) in Carson, which has a permitted capacity of 400 million gallons per day (MGD), is the largest of the JOS wastewater treatment plants and treats approximately 300 MGD (Dubnewych *et al.* 2007). The JWPCP facility provides secondary treatment and disinfection to all influent wastewater. The effluent, or treated wastewater, is then conveyed from the plant through two, 6-mile tunnels to Royal Palms Beach. Here a subterranean manifold structure (reinforced concrete vault) directs the effluent to the ocean outfalls for disposal into the Pacific Ocean.

B. The Ocean Outfalls

The Sanitation Districts operate and maintains four ocean outfalls off the Whites Point shoreline in San Pedro (pl. I:top & pl. II:bottom). They comprise: (1) a 60-inch diameter pipe constructed in 1937, (2) a 72-inch diameter pipe constructed in 1947, extended in 1953, (3) a 90-inch diameter pipe constructed in 1957, and (4) a 120-inch diameter pipe constructed in 1966 (LACSD 1995; Parkhurst, Haug, and Whitt 1967). The two continuous outfalls are the 90- and 120-inch diameter outfalls. The other two outfalls (60- and 72-inch) are used to provide additional hydraulic capacity during periods of heavy flows. In January of 1995, a severe storm in the southern portion Los Angeles County resulted in the outfall system reaching its maximum hydraulic capacity (Dubnewych *et al.* 2007).

Each of the ocean outfalls extend seaward from a subterranean manifold located at Royal Palms Beach (Pl. I:bottom & Pl. III: top). According to the Sanitation Districts Clearwater Program Overview:

> Approximately 1,400 feet seaward, the ocean outfalls change from underground pipelines to seafloor pipelines...The effluent is discharged through diffusers (i.e., the section of the outfall pipelines containing open portholes) up to one and a half miles offshore at a depth of about 200 feet below sea level.
>
> The 72-inch outfall was modified/extended in 1953, including removal of the original diffusers and adding new diffusers/ports at the end of the extension in a "Y" configuration. The 60-inch outfall was modified/extended in 1954, including removal of the original diffusers and coring new ports in the original outfall pipe. The 90-inch outfall was re-ballasted in 1997, and the 72-inch, 90-inch, and 120-inch outfalls were re-ballasted in 1999 (Sanitation Districts 2011).

A more detailed description of each outfall is presented in the section below.

1. 60-inch Diameter Ocean Outfall (1937)

This outfall is used for standby capacity to provide additional hydraulic relief during high flow conditions. When used, it discharges off the Whites Point shoreline between the 90-inch and 72-inch diameter ocean outfalls at about 110 feet below the ocean surface. The outfall is approximately 5,000 feet long, which includes the approximate 400 foot long diffuser (Haug 2011:pers. comm.).

2. 72-inch Diameter Ocean Outfall (1947)

This outfall is used for standby capacity to provide additional hydraulic relief during high flow conditions. When used, it discharges off the Whites Point shoreline between the 60-inch and the 120-inch diameter ocean outfalls. The outfall is approximately 6,480 feet long with a Y-shaped diffuser section. The diffuser section contains two 225-foot long legs. The outfall discharges at a depth of approximately 160 feet (ibid.)

3. 90-inch Diameter Ocean Outfall (1957)

During normal flow conditions, this outfall routinely discharges approximately 35% of the effluent from the JWPCP. It discharges southwest of the shoreline off Whites Point, San Pedro. The outfall is 7,982 feet long to the beginning of a Y-shaped diffuser with two legs. Each leg is 1,208 feet long. The depth at the beginning of the diffusers is 196 feet and 210 feet at the end of the diffuser (from Table 5- California Regional Water Quality Control Board 2011).

4. 120-inch Diameter Ocean Outfall (1966)

During normal flow conditions, the outfall routinely discharges approximately 65% of the effluent from the JWPCP. It discharges south of the shoreline off Whites Point, San Pedro. The outfall is 7,440 feet long to the beginning of a single L-shaped diffuser leg which is 4,440 feet long. The depth at the beginning of the diffuser is 167 feet and 190 feet at the end of the diffuser (ibid).

C. Proposed Outfall Rehabilitation Program

Rehabilitation of the outfalls would entail joint repair and re-ballasting with rock to ensure that each of the outfalls remain connected and in place. Per the Sanitation Districts Clearwater Program Overview:

> The re-ballasting work would occur on the existing 72-, 90-, and 120-inch outfalls in water depths ranging from approximately 20-50 feet. A small derrick barge would be used to place the ballast rock around the outfalls and support the joint repair work. Joint repairs would involve temporarily removing some of the existing ballast rock from around the outfall to fully expose the joint being repaired. A coupling, which is a giant clamp that wraps around the joint, would be installed and the annular space filled with concrete. The existing ballast rock would be replaced around the pipe (Sanitation Districts 2011).

Scarification of the sea bed beneath the pipelines due to ocean currents and other currents induced by effluent rising to the ocean surface can contribute to settling of the pipe sections leading to breeches in the joints (Rawn and Bowerman 1950:190). One unanticipated action that resulted in damaging the 60 and 72-inch outfalls entailed U.S. Army personnel "...exploding obsolete ammunition over and near the outfall as a means of securing fish" (Rawn 1965:96, Haug 2011:pers.

comm).

D. Design and Construction

The design and construction of all four outfalls is similar in nature. The sections consist of reinforced concrete pipes, 8 and 24 feet in length. They are all prefabricated from concrete placed over iron forms (Pl. III). The pipes were placed on the sea floor using a floating crane (Pl. IV). The pipe sections have gasketed bell and spigot joints. The 60-inch and 72-inch outfalls have a lead packing gasket in each joint. The 90-inch outfall has both a lead packing and rubber gasket. The 120-inch outfall joints have neoprene gaskets (ibid.).

Pipe sections within the breaker line are placed in shallow trenches that were excavated using explosive charges. This portion of each outfall is thoroughly ballasted with rock. Outside the breaker line, the pipe sections lie upon the sea floor.

V. RESEARCH DESIGN

A. Introduction

As the whole of the APE lies underwater, and no field studies were conducted in conjunction with the evaluation, little if any potential exists within the APE for the discovery of prehistoric resources. The history of the Palos Verdes Peninsula was drawn from Gillingham's *The Rancho San Pedro* (1961) and Fink's *Time and the Terraced Land* (1966).

B. Research Goals

The goals of our research were to identify known locations of potential significance resources situated within the APE. Our hypotheses were as follows:

(1) Although not unknown along the coast of southern California, prehistoric sites have a low potential for occurring underwater. None have been previously documented within the APE or surrounding underwater area. Both the beach and the sea floor have been previously disturbed during construction of the outfalls.

(2) Terrestrial sites in the region are connected with early (Mexican Period) ranching as well as late 19th and early 20th century Japanese farming. Offshore there are shipwrecks within the APE and the sewer outfalls.

VI. METHODS

A. Archaeological Records Search

An in-person records search of the APE was conducted by Ms. Laura S. White at the SCCIC at California State University, Fullerton. The search entailed a review of all previously recorded prehistoric and historic archaeological sites situated on or within a one-mile radius of the project area. Additionally, the NRHP, California Historical Landmarks (CHL), California Points of Historical Interest (CPHI), and the California Directory of Properties (DOP, aka the Historic Resources Inventory [HRI]) were reviewed for the purpose of identifying historic properties (see Appendix B).

1. Previously Recorded Archaeological Sites Within the APE

The results of the records search indicated that no prehistoric or historic archaeological sites have been previously recorded within the boundaries of the APE.

2. Previously Recorded Archaeological Sites Within a One-Mile Radius

Outside the APE, 14 archaeological sites (12 prehistoric, 2 historic) have been recorded within a one-mile radius of the outfalls. The vast majority of these prehistoric sites comprise lithic and shell scatters. Each site is listed and characterized in Table 1 by their official state recording # (Primary # 19-xxxxxx) followed by the corresponding County site trinomial (CA-LAN-xxxx).

Of the 14 sites, Primary #19-002211/LAN-2211 is the closest to the APE. It lies approximately 350 feet atop the vertical cliff in White Point Bluff Park. The site comprises the former location of a restaurant associated with the White Point resort which operated from the 1920s until WWII.

Phase II testing of LAN-2211 was conducted by James Brock of Archaeological Advisory Group in 1994. The test program included surface collection as well as the excavation of postholes and three (3) test units. Artifacts recovered included thousands of glass fragments representing primarily bottles but also some glassware and ceramics (terra-cotta flower pot, vitreous creamery, porcelain sherds, as well as earthenware sherds). Other finds included miscellaneous metal fragments and construction material. A concrete pad with a fountain also lies within the boundaries of the site.

Table 1. Cultural Resources Located Within a One-Mile Radius of the APE.

Primary # 19-/ LAN-	Site Description
19-000105/LAN-105	Artifact area including a large mortar and pestle. Site recorded by F.H. Racer in 1939. Information presented in 1939 manuscript by F.H. Racer entitled "Indian Camp Sites in the Harbor District". Site revisited in 1980 by M. Boxt and S. Dahan and described as a scatter of lithic artifacts and shell remains comprising a mano, chert core, ten banded and non-banded chert waste flakes, fire-cracked rock, abalone, clam, mussel and oyster shells. Mayor portion of site covered by baseball field, paved road, and 2 parking lots. Site tested by Westec Services (Cooley et al. 1986a).
19-000109/LAN-109	Unknown site recorded by H. Eberhart in 1952 based on information from D.L. True.
19-000142/LAN-142	A deposit (refuse heap)on side of a creek. Material observed included stone artifacts, shell and animal bone. Site recorded by N.C. Nelson (1912a) and later tested by Westec Services (Cooley et al. 1986b).
19-000143/LAN-143	Site described as "traces of a campsite" composed of fragments of obsidian and quartz amongst marine shell. Site recorded by N.C. Nelson (1912b).
19-000145/LAN-152	A deposit (refuse heap) located on opposite side of creek from LAN-142. Site recorded by N.C. Nelson (1912c) and tested by Westec Services (Cooley et al. 1986b).
19-000291/LAN-291	Village or campsite area with midden and some shell. Cultural material observed included blades, scrapers, worked fragments of steatite, etc. Steatite whale effigies reportedly found here. Site recorded by D.L. True (1960) and subsequently tested by Westec Service (Cooley et al. 1986a).
19-000849/LAN-849	Lithic scatter (approx. 50 x 100 m.) comprising flakes and cores of local chert. Some chalcedony flakes, one chalcedony scraper. Possible sandstone pigment grinding bowl. No marine shell. Site recorded by Whitley/Ivie in 1976 and later tested by Singer et al. in 1994.
19-000850/LAN-850	Large shell midden measuring approximately 250 m. in diameter. Site recorded by Whitley/Ivie in 1976. Site test excavated by Singer et al. in 1994.
19-001144/LAN-1144	Lithic and shell scatter (200 x 110 m) consisting of chert debitage, chalcedony and fused shale. Marine shell includes chione, haliotis, and mytilus. Site recorded by E. Weil et al. 1984 and later tested by Westec (Cooley et al. 1986b).

19-001269/LAN-1269	One or more temporary camps measuring 190 x 170 m. Surface material consists of marine shell. Subsurface material includes flaked lithic tools, tool production debris, animal bone and marine shell. Site recorded by H. Eberhart and W. Wasson in 1974. Test excavated by Westec Services in 1986 (Cooley et al. 1986a).
19-001522/LAN-1522	Lithic scatter (120 x 100 m.) comprising 25+ chert and chalcedony flakes, a core, and angular wastes. Site recorded by P. Jertberg in 1988. Site revisited by R. Bissell in 1989.
19-002211/LAN-2211/H	Former location of a restaurant associated with the White Point Resort. It operated from the 1920s until WWII when the property was taken over by the U.S. military for defensive purposes at which point the restaurant was demolished. Site recorded by J. Brock in 1994.
19-120002	Three (ship to shore) radio towers estimated to date to the late 1950s. Site recorded by B. MacDougall 1985.
19-120003	Temporary camp(s) comprising sparse scatter of marine shell. No artifacts observed. Site recorded by H. Eberhart and W. Wasson in 1974. Site was subsequently tested by Westec Services in 1986 and found to be significantly disturbed by both cut and fill. A few pieces of lithic material were evident but minimal and thought to be from a secondary deposit (Cooley et al. 1986).

3. Heritage Properties

No NRHP, CRHR, CHL, or CPHI listed properties have been recorded within the boundaries of the APE. However, one CRHR listed district has been identified within a one-mile radius. It comprises the Whites Point Nike Launcher Area Missile Site 43L Historic District identified as Primary # 19-186694D. The District, covering approximately 142 acres at Whites Point in San Pedro, was formerly an extensive military installation with headquarters at Fort MacArthur. On August 11, 2000, the District was listed as a CRHR by the State Historical Resources Commission (Schechter 2000). It was determined significant under criterion 1 for its association with events that made a significant contribution to local, state, and national military and cultural history between 1956 and 1975. The District is made up of several buildings and structures. Each of these resources is identified in Table 2.

The DOP lists one building within a one-mile radius of the APE that has been evaluated for historical significance. The building includes the Good Shepherd Lutheran Church constructed between 1954 and1955 at 1350 West 25th Street in San Pedro. Two other buildings located on the property include the Pastorage (built in 1957) and the Sunday school annex (constructed in 1968).

The property was evaluated for historical/architectural significance by Galvin & Associates in 2005 (Taniguchi 2005). The church was assigned a NR status code of 6Y (Determined ineligible for NR by consensus through Section 106 process).

4. Previous Surveys

The results of the search indicated that the APE has not been previously surveyed for cultural resources. However, outside the project area, a minimum of 34 archaeological investigations (including survey and excavation reports) have been conducted within a one-mile radius of the APE. These studies include cellular phone sites and both small (less than 40) and large (40 or more) acreage surveys.

The largest investigation conducted within a one-mile radius of the APE was performed by RMW Paleo Associates, Inc. in 1989. The study included a 455-acre survey of a portion of the Palos Verdes Hills situated approximately 3/4-miles to the northwest of the APE. The investigation resulted in the discovery of two archaeological sites (Bissell 1989).

Table 2. Individual District Resources Included Within the Whites Point Nike Launcher Area Missile Site 43L Historic District.

Primary Number (19-)	Site Description
19-186695	1950 Tank Repair Building (destroyed, only floor remains; Military Bldg. # 1008).
19-186696	1954 Nike-Ajax Liquid Propellant Storage Shed (Military Bldg. # 1018).
19-186697	1954 Underground Missile Storage Magazines (Military Bldgs. # 1019 and 1020).
19-186698	1954 Generator Building (removed; Military Bldg. # 1021).
19-186699	1961 Sentry Station (Exclusion Area; Military Bldg. # 1024).
19-186700	1961 Sentry Station (Access Area; Military Bldg. # 1025).
19-186701	1961 Nike-Hercules Missile Warheading (Military Bldg. # 1026).
19-186702	1962 Nike-Hercules Assembly & Service B1dg. (Military Bldg. # 1027).
19-186703	1961 Sentry Dog Kennel (removed; Military Bldg. # 1029).
----------	1961 Sentry Dog Training Area (removed; Military bldg. # 1034).

19-186704	1965 Sentry Dog Equipment Storage Bldg. (removed, only floor remains; Military Bldg. # 1028).
19-186705	1957 Ready Room with Latrine, Office Room (Military bldg. # 1030).
19-186706	1942 Underground Gun Fortification (Battery Paul Bunker; Military bldg. # 1031).
19-186707	1955 Nike-Ajax Liquid Fuel Station (Military bldg. # 1032).
----------	1959 Flammable Storage Shed (removed; Military bldg. # 1033).
19-186708	1964 General Purpose Administrative Bldg. (removed, floor remains; Military bldg. # 1050).
19-186709	1956 Nike-Ajax Launcher Control Trailer Pad (Military bldg. # unassigned).
19-186710	1961 Nike-Hercules Launcher Control Group Pad (Military bldg. # unassigned).

B. Historic Map Research

In addition to the records search, historic USGS maps of the Palos Verdes Peninsula were reviewed for the project. Topographic maps examined included the 1896 *San Pedro* 15' USGS Sheet (surveyed 1894), the 1928 *San Pedro Hill* 7.5' USGS Quadrangle, and the 1944 *San Pedro* 15' U.S. Army Corps of Engineer (War Department) Quadrangle. Information gleaned from each of these maps is presented in the following paragraphs.

1. 1896 San Pedro 15' USGS Sheet (surveyed 1894)

A review of the 1896 map indicates the presence of Paseo del Mar, Pacific Avenue, Point Fermin Lighthouse, and the Ramón Sepúlveda residence at White Point. The well-established street grid of lower San Pedro and the San Pedro Branch Railroad are also shown. With the exception of the Ramón Sepúlveda on the Whites Point Nike Missle property, the surrounding area is devoid of other residences.

2. 1928 San Pedro Hills 7.5' USGS Quadrangle

An inspection of the 1928 map shows the ever-expanding urban grid of San Pedro and Fort McArthur Upper Military Reservation. White Point Hot Springs resort is also indicated at Royal Palms and numerous scattered residences are now depicted in the White Point area.

3. 1944 San Pedro 15' U.S. Army Corps of Engineers (War Department) Quadrangle

This map illustrates the well-established San Pedro Street grid. The developed Los Angeles Harbor, Point Fermin Lighthouse, and arterial roads through the Palos Verde Peninsula. Main circulation roads through San Pedro such as Western Avenue, Paseo del Mar, Gaffey Street and Pacific Avenue are also depicted. Several scattered residences are shown in the vicinity of Whites Point. The map also includes the location of the Outlet Pier for the first outfall and notation of the White Point Hot Springs (fig. 4).

C. Shipwreck Database Review Summary

Shipwreck information provided by the Sanitation Districts Clearwater Program indicated that four shipwreck databases were searched. These included: (1) the National Oceanic and Atmospheric Administration's (NOAA) Automated Wreck and Obstruction Information System (AWOIS), (2) the California State Lands Commission (CSLC) database of shipwrecks, (3) the Minerals Management Service (MMS), and (4) the Global Maritime Wrecks Database (GMWD). Database results revealed that there are three shipwrecks near the APE. These comprise the *San Ubaldo* (construction date unknown, sunk 1926), the *Saint Joseph* (construction date unknown, sunk 1975), and the *Melrose* (constructed in 1902, sunk 1938). The *San Ubaldo* lies at a depth of approximately 30 feet and the *Saint Joseph* at 20 feet. The *Melrose* appears to have run aground and broken up.

An analysis of the shipwreck data by the Sanitation Districts resulted in the conclusion that it is unlikely that the rehabilitation of the existing outfalls will have an impact on existing submerged resources. However, it is acknowledged that no underwater cultural resource surveys have been conducted within or near the APE. Consequently, it is noted that the potential exists to encounter significant historic resources in the general area. For a more thorough discussion of the shipwreck database review, the reader is referred to Chapter 7 of the Clearwater Program EIR/EIS. The coordinates of the three shipwrecks are as follows:

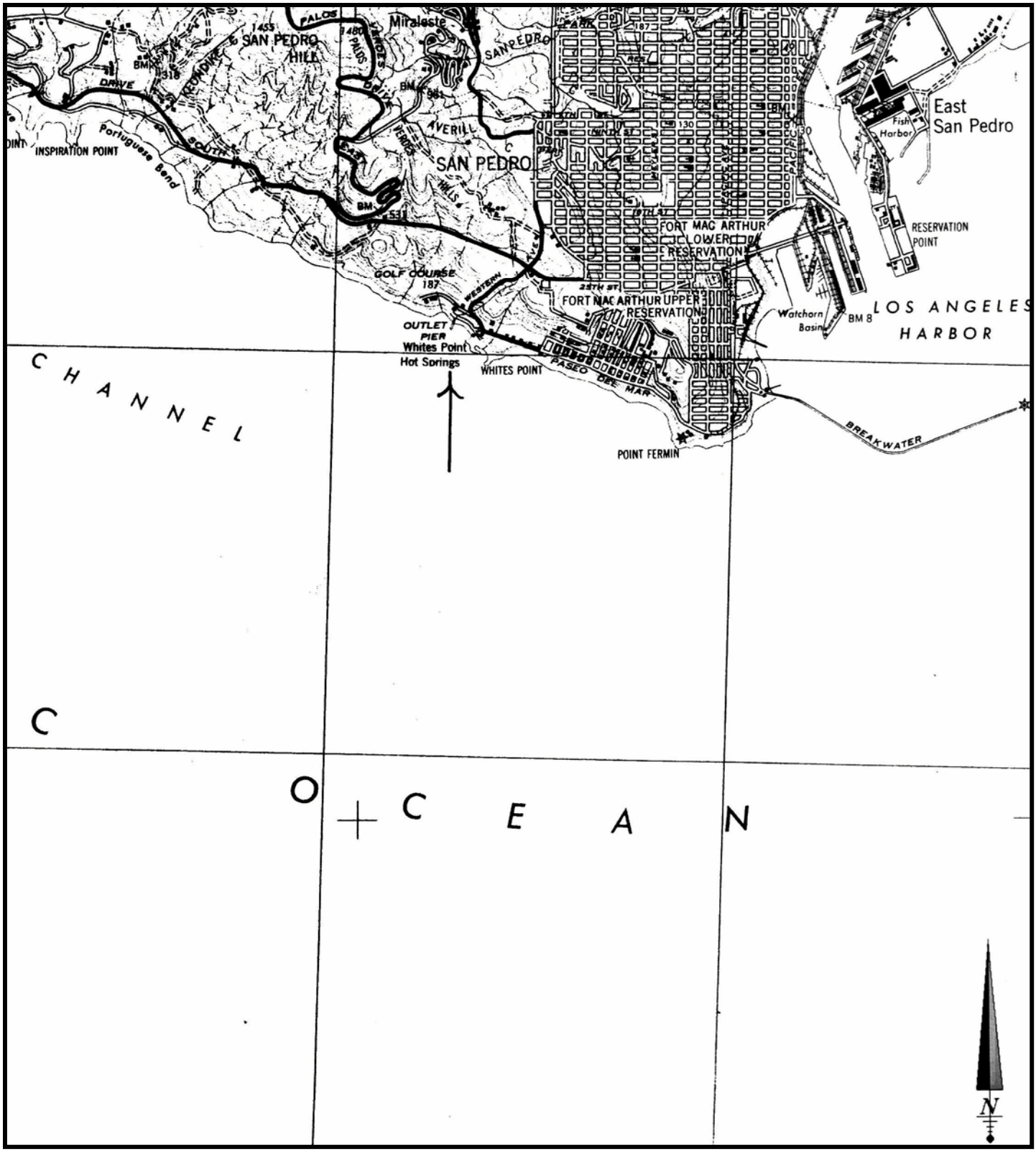


Figure 4. Location of Outfall Outlet Pier as shown on a portion of the 1944 *San Pedro* 15' U.S. Army Corps of Engineers (War Department) Quadrangle.

1. *San Ubaldo* (33deg 42'00'N, 118deg 20'00'W)
2. *Saint Joseph* (33deg 42'00'N 118deg 19'00'W)
3. *Melrose* (33deg 42'00'N 118deg 17'00'W)

D. Sacred Lands File Check

On May 19, 2011, a Sacred Lands File Check for the project area was requested by Ms. Laura S. White, M.A. The search was conducted on May 24, 2011 by Mr. Dave Singleton, Program Analyst for the NAHC in Sacramento. The results of the search indicated that no sacred Native American sites have been recorded within the APE. A list of both individual and Native American groups was also provided for further consultation (see Appendix C).

E. Native American Scoping

In order to learn more about the potential archaeological sensitivity of the project area, letters of inquiry were sent to all nine Native American contacts (individuals and tribes) provided by the NAHC. To date, only one written response has been received. Follow-up phone calls were placed on July 28, 2011. The reader is referred to Appendix D for all correspondence.

F. Field Survey

The evaluation of the ocean outfall was based solely on historical records, technical engineering data, and period photographs. As the whole of the outfall lies underwater, no cultural resource surveys were undertaken in conjunction with the evaluation.

VII. REPORT OF FINDINGS

A. Prehistoric Resources

The results of the records search conducted at the SCCIC at California State University, Fullerton failed to identify any prehistoric resources within the APE boundary. No prehistoric resources of any kind were identified during the course of the research phase of the investigation. However, no underwater surveys of the APE were undertaken in conjunction with prehistoric resources.

B. Historic Resources

The records search also failed to identify any historic resources within the APE boundaries.

Archival research has indicated that three of the four ocean outfalls (60-, 72-, and 90-inch diameter outfalls) within the APE are over 50 years. The fourth outfall (120-inch diameter outfall) is 45 years of age and therefore is considered modern pursuant to both NRHP and CEQA criteria. Of the three shipwrecks near the APE, two of the vessels were constructed over 50 years ago and therefore considered historic. The third is unknown. No underwater surveys were undertaken in conjunction with historical resources.

VIII. RESOURCE EVALUATION

The ocean outfall structures were evaluated for significance under criteria based on two separate but overlapping legislative sources: (1) NHPA of 1966, which includes criteria for eligibility to the NRHP; and (2) CEQA, as amended in 1992, which includes criteria for eligibility to the CRHR.

A. NRHP Evaluation

In order for an historic resource to be significant pursuant to Federal law, it must be eligible for listing in the NRHP. Requirements for listing a property in the National Register are explained in detail in *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. Generally, listing in the NRHP requires that a building or structure be at least 50 years old and that it possess "The quality of significance in American history, architecture, archaeology, engineering, and culture ... present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association..." and ...

(A) That are associated with events that have made a significant contribution to the broad patterns of our history or

(B) That are associated with the lives of persons significant in our past; or

(C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(D) That have yielded, or may be likely to yield, information important in prehistory or history."

Criterion A

The outfalls are not associated with any event important in the history of United States. Sewage outfalls into oceans are a common method of disposing of treated effluent for metropolitan areas located near the coast. That is, these outfalls are not unique in their role of conveying effluent into the sea.

Criterion B

The outfalls are not associated with the lives of any individual important to national history.

Criterion C

All of the outfalls comprise prefabricated sections of pipe that is constructed of concrete over a metal form. They are of robust construction but of standard design. None of the outfalls exhibit any significant architectural features. None are considered the work of a master and there is no evidence that unique methods or materials were utilized in their construction.

Criterion D

Given the utilitarian uses of these structures, it is highly unlikely that any has the potential to yield additional information pertinent to national history. Consequently, none of the outfalls, including the 120-inch that is less than 50 years of age, appear significant pursuant to NHRP criteria.

B. CRHR Evaluation

All four outfalls were also evaluated for significance under the CEQA. CEQA, as amended in 1992, includes criteria for CRHR eligibility. Resources eligible for listing include buildings, sites, structures, objects, or historic districts that retain historic integrity and are historically significant at the local, state or national level under one or more of the following four criteria:

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

(2) It is associated with the lives of persons important to local, California, or national history;

(3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

(4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Criterion 1

These outfalls are not associated with any event important in the local/regional history of California. They are not the only treated effluent outfalls in the region. The City of Los Angeles maintains an outfall in San Pedro Harbor and a second in Santa Monica Bay. Additionally, the Orange County Sanitation District maintains two outfalls located off the Newport Beach coast. No unique uses other than conveying effluent into the sea has been identified with these outfalls.

Criterion 2

None of the outfalls is associated with the lives of any individual important to local or California history.

Criterion 3

The concrete over iron frame sections of pipeline are well-designed and built to withstand the ravages of time. However, they were prefabricated at a factory off-site and are of standard design. None of the outfalls exhibit any unique architectural or design features. That is, they were designed and constructed to be purely utilitarian in design and function. None of the four outfalls is considered the work of a master and there is no evidence that unique methods or materials were utilized in their construction.

Criterion 4

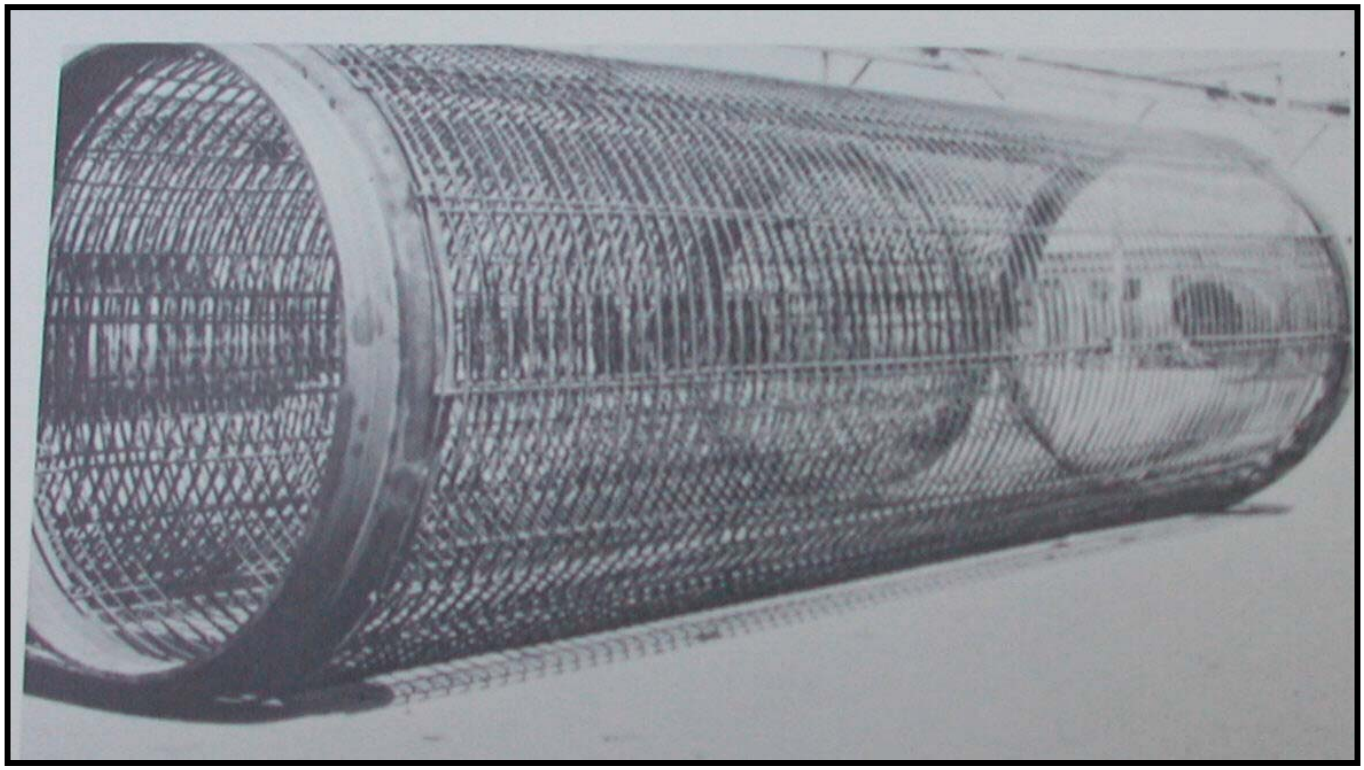
Given the utilitarian uses of these structures, it is highly unlikely that they have the potential to yield any additional information pertinent to the history of the local area or the State of California or the nation. Consequently, none of the outfalls, including the 120-inch that is less than 50 years of age, appear significant pursuant to CRHR criteria.

IX. CONCLUSIONS AND RECOMMENDATIONS

The results of the evaluation indicate that none of the outfalls appear to meet the threshold criteria for significance at the national or state levels. Project plans call for rehabilitation of three of the four outfalls which would entail re-ballasting and repair of section joints on an as needed basis. The proposed program will have minimal impact if any on the alignments or the pipelines themselves. The shipwreck database search which was prepared independently of this evaluation concluded that it is unlikely that the undertaking will have an impact on existing (submerged) resources. Therefore, no further work in conjunction with cultural resources is recommended or warranted. As a matter of course, the outfalls have been recorded on the appropriate DPR 523 series forms and submitted to the SCCIC at California State, University at Fullerton for assignment of a Primary Number.

Plate I. Top: Looking west from White Point Bluff Park above Royal Palms County Beach toward beginning of outfall. **Bottom:** Looking west at location of outfall manifold (fenced grassy area). **Photo courtesy of LACSD.**

Plate II. Top: Looking down upon outfall manifold location from bluff above. Photo courtesy of LACSD. **Bottom:** Looking south/southwest out to sea from shoreline adjacent to manifold area. **Top photo courtesy of LACSD.**



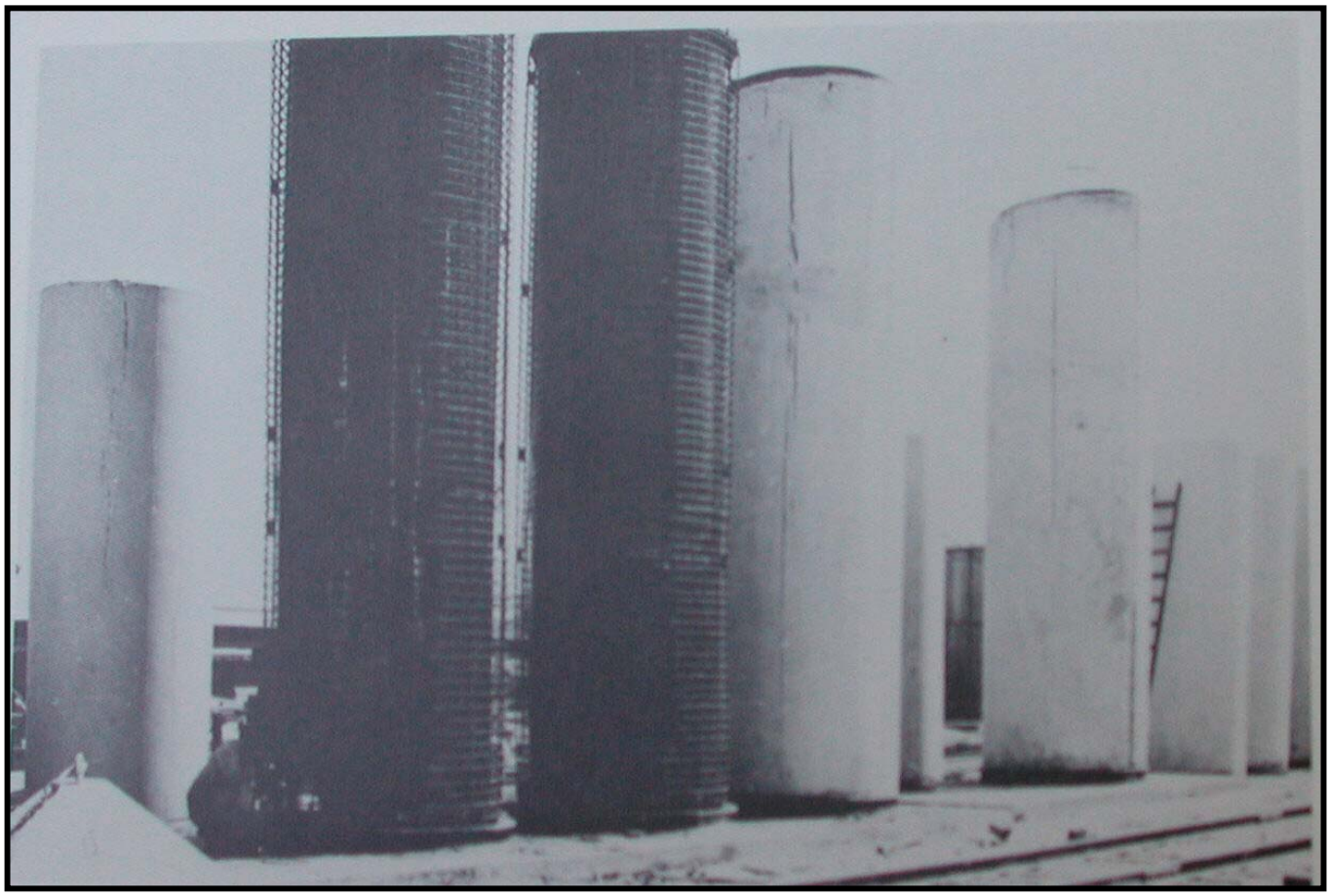
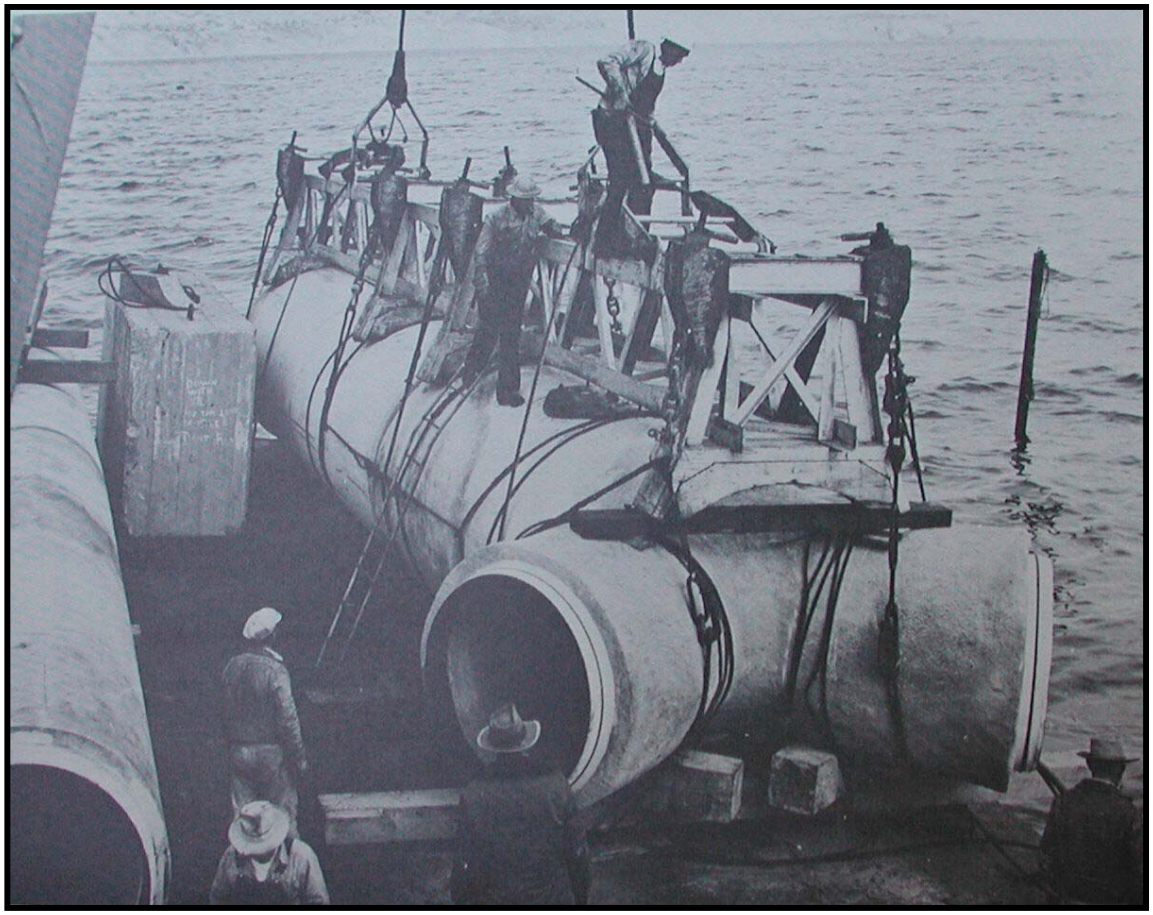


Plate III. Top: Close-up of metal reinforcing cage with cast iron end rings as used in the 24 foot sections of the 72-inch outfall. **Bottom:** Various sections of metal reinforced concrete pipe under construction (**photos from Rawn 1965**).



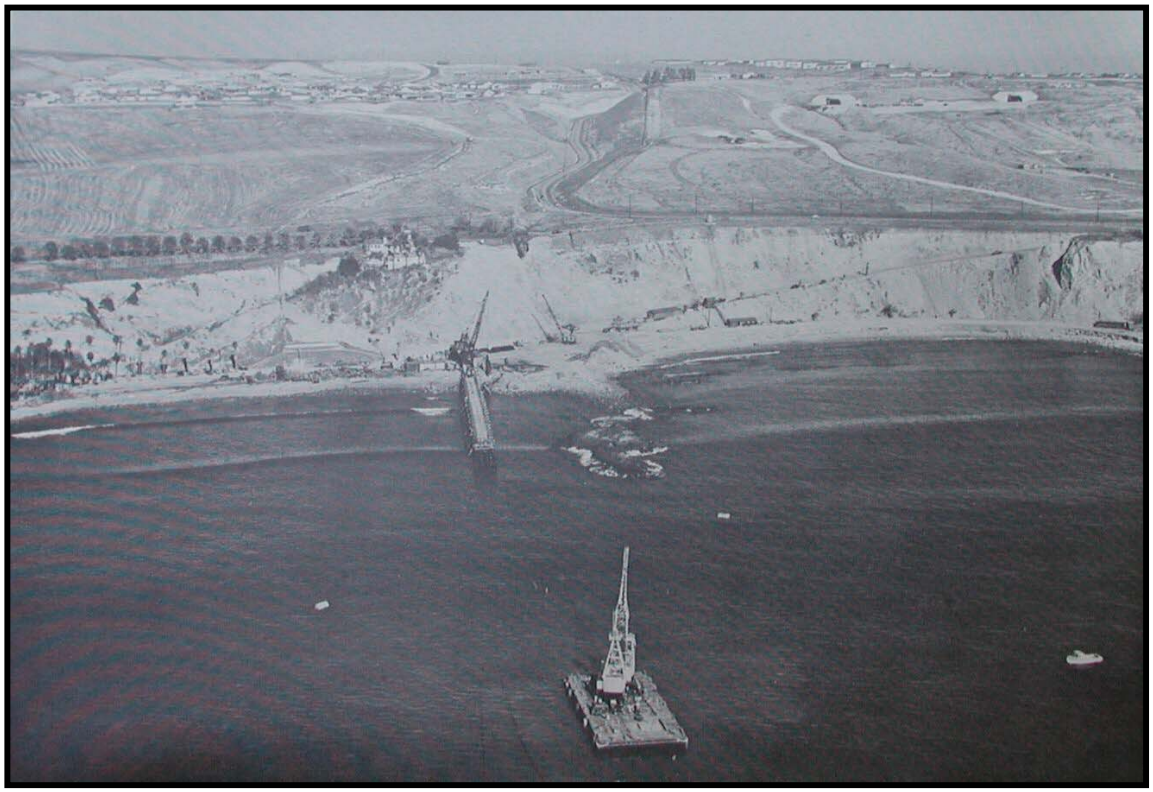


Plate IV. Top: Close-up of prefabricated section of outfall with "Y" attached on barge ready for launching. **Bottom:** Aerial view looking north towards Royal Palms Beach showing temporary pier and floating barge used for launching pipe sections (**photos from Rawn 1965**).

REFERENCES CITED

BEAN, JOHN LOWELL, and CHARLES R. SMITH

1978 Gabrieliño. In: *Handbook of North American Indians*, Vol. 8: California. Smithsonian Institution. Washington, D.C.

BISSELL, RONALD M.

1989 Cultural Resources Reconnaissance of Approximately 455 acres in the Palos Verdes Peninsula, Los Angeles County. RMW Paleo Associates, Inc. Unpublished report (LA-1840) on file with the South Central Coastal Information Center, California State University, Fullerton.

BROCK, JAMES

1994 Site record form of LAN-2211 on file with the South Central Coastal Information Center, California State University, Fullerton.

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

1989 *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*. California Office of Historic Preservation. Sacramento.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (LOS ANGELES REGION)

2011 Waste Discharge Requirements for the Joint Outfall System, Joint Water Pollution Control Plant Discharge to the Pacific Ocean (Tentative Version).

CHARTKOFF, J. L. and KERRY KONA CHARTKOFF

1984 *The Archaeology of California*. Stanford University Press. Stanford.

DUBNEWYCH, STEVE, JON KANESHIRO, and CALVIN JIN

2007 Joint Water Pollution Control Plant Tunnel and Ocean Outfall Project.

FEDERAL REGISTER

2008 Intent to Prepare a Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for a Permit Application for the Sanitation Districts of Los Angeles County's (Sanitation Districts) Clearwater Program in Los Angeles County, CA. Volume 73, Number 194, Notices, Page 58213-58214.

FINK, AUGUSTA

1966 *Time and the Terraced Land*. Howell North Books. Berkeley.

GILLINGHAM, ROBERT C.

1961 *The Rancho San Pedro*. Cole-Holmquist Press.

GNERRE, SAM

2010 White Point Hot Spring Hotel. South Bay History. Daily Breeze. San Pedro.

HAUG, DAVID, P.E. BCEE
2011 Personal communication. Senior Engineer. Sanitation Districts of Los Angeles County.

HEIZER, ROBERT F. (editor)
1968 *The Indians of Los Angeles County: Hugo Reid's Letters of 1852.* Southwest Museum. Los Angeles.

HEIZER, ROBERT F. and THOMAS R. HESTER
1978 Great Basin Projectile Points: Forms and Chronology. Ballena Press. Socorro.

HOOVER, MILDRED B., HERO E. RENSCH, and ETHEL G. RENSCH
1932 *Historic Spots in California*. Stanford University Press. Stanford.

JOHNSTON, BERNICE E.
1962 *The Gabrieliño Indians*. Southwest Museum. Los Angeles.

KROEBER, ALFRED E.
1925 *Handbook of The Indians of California*. Bureau of American Ethnology, Bulletin No. 78. Smithsonian Institution. Washington, D.C.

LALONE, MARY
1980 *Gabrieliño Indians of Southern California: An Annotated Ethnohistoric Bibliography*. Occasional Paper 6. Institute of Archaeology, University of California. Los Angeles.

MEGOWAN, MAUREEN
2010 History of San Pedro. Private.

MORATTO, MICHAEL J.
1984 *California Archaeology*. Academic Press. San Diego.

PALISADES RESIDENTS ASSOCIATION
2011 History. White Point.

PARKHURST, JOHN D., LESTER A. HAUG, and MALCOLM L. WHITT
1967 Ocean Outfall Design for Economy of Construction. Water Pollution Control Federation. Vol 39, No. 6, pp. 987-993.

RAWN, A.M.
1965 Narrative-C.S.D.: The Formative and Growth Years for the County Sanitation Districts of Los Angeles County, 1923-1961.

RAWN, A.M. and F.R. BOWERMAN
1950 Chapter 21: Factors Influencing and Limiting the Location of Sewer Ocean Outfalls. Proceedings of First Conference on Coastal Engineering. Long Beach.

ROBINSON, W.W.
1939 *Ranchos become Cities.* San Pasqual Press. Pasadena.

SALLS, ROY A.
1990 Return to Big Dog Cave: The Last Evidence of a Prehistoric Fishery on the Southern California Bight. *Pacific Coast Archaeological Society Quarterly*, Vol. 26, Nos. 2 & 3, pp. 38-60. Costa Mesa.

SANITATION DISTRICTS OF LOS ANGELES COUNTY
2011 Clearwater Program Overview.

2010 Board of Directors Regular Meeting, County Sanitation District No. 2 of Los Angeles County. Consent Agenda dated June 23, 2010.

2008 Clearwater Program Notice of Preparation of an Environmental Impact Report.

1995 Final Joint Outfall System 2010 Masters Facilities Plan.

SCHECHTER, SUE
2000 State Historical Resources Commission Findings. California Register of Historical Resources. White's Point Nike Launcher Area Missile Site 43L Historic District, San Pedro Los Angeles County.

STICKEL, E. G.
1978 Los Angeles-Long Beach Harbor Areas Cultural Resources Survey, Los Angeles County, California. L. J. Weinman and E.G. Stickel eds., U.S. Army Corps of Engineers, Los Angeles.

TANIGUCHI, CHRISTEEN
2005 Primary record 19-188185 on file with the South Central Coastal Information Center, California State University, Fullerton.

THACKER, MARY EVA
1923 *History of Los Palos Verdes Rancho, 1542-1923.* M.A. thesis, Department of History, University of Southern California, Los Angeles.

WALLACE, WILLIAM J.
1978 Post-Pleistocene Archaeology, 9000 to 2000 B.C. In: *Handbook of North American Indians, California Vol. 8*, pp. 535-537, R.F. Heizer, ed. Smithsonian Institution. Washington, D.C.

1955 A Suggested Chronology for Southern California Coastal Archaeology. *Journal of Southwestern Anthropology* 11(3):214-230.

WARREN, CLAUDE N.

1968 Cultural Traditions and Ecological Adaptations on the Southern California Coast. In: Archaic Prehistory in the Western United States, C. Irwin-Williams ed. Eastern New Mexico University Contributions in Anthropology, Vol. 1 (3): 1-14. Portales.

WAUGH, ISAMI ARIFUKU, Ph.D.

1988 Japanese Americans in California. In: Five Views: An Ethnic Historic Site Survey for California. National Park Service.

APPENDIX A: Personnel Qualifications

LAURA S. WHITE, PRINCIPAL INVESTIGATOR

* 1989 M.A. in Anthropology with emphasis in Archaeology, San Diego State University, San Diego.

* 1981 B.A. in Anthropology, University of San Diego, San Diego.

* 1999-Present Member of the Register of Professional Archaeologists (RPA) Certification: Archaeologist (I.D. # 10452)

* 1990-1998 Member of the Society of Professional Archaeologists (SOPA) Certification: Field Research

* Riverside County Certified Archaeologist

* Orange County Certified Archaeologist

* San Diego County Certified Archaeologist

* Holds a "blanket" Cultural Resource Use Permit on the supervisory level with the Bureau of Land Management (BLM) for the Ridgecrest, Barstow, Palm Springs, El Centro, and Needles desert resources areas.

* 25 years of full-time experience conducting cultural resource management projects in southern California.

ROBERT S. WHITE, PROJECT DIRECTOR

* 1987 B.A. in Liberal Studies with emphasis in Anthropology, California State University, Long Beach.

* 1977 A.A. Degree in Liberal Arts, Los Angeles Harbor College.

* Riverside County Certified Archaeologist

* Orange County Certified Archaeologist

* Holds a "blanket" Cultural Resource Use Permit on the supervisory level with the Bureau of Land Management (BLM) for the Ridgecrest, Barstow, Palm Springs, El Centro, and Needles desert resources areas.

* 26 years of full-time experience conducting cultural resource management projects in southern California.

APPENDIX B: Records Search Results

ARCHAEOLOGICAL RECORDS SEARCH

An in-person archaeological records search was conducted by Laura S. White, M.A. at the South Central Coastal Information Center (SCCIC) at California State University Fullerton on May 16, 2011. Consequently, there is no official letter from the Information Center to attach here. The in-person search included a review of all previously recorded prehistoric and historic archaeological sites situated within a one-mile radius of the study area. Additionally, the National Register of Historic Places (NRHP), California Historic Landmarks (CHL), and California Points of Historical Interest (CPHI) were reviewed for the purpose of identifying any historic properties. Copies of site record forms were obtained for those resources situated within a one-mile radius of the APE. Additional survey/excavation reports were re reviewed and all relevant information was incorporated into the study.

APPENDIX C. Sacred Lands File Check

ARCHAEOLOGICAL ASSOCIATES

May 19, 2011

Mr. Dave Singleton
Associate Governmental Program Analyst
Native American Heritage Commission
915 Capital Mall, Room 364
Sacramento, CA 95814

RE: Sacred Lands File Check for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Singleton:

I am writing to you to request a Sacred Lands File Check for the above-referenced project. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle).

We look forward to hearing from you. In the meantime, if you have any questions or desire additional information, please do not hesitate to contact me at (951) 244-1783.

Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:file;nahc.com
by fax

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

May 24, 2011

Ms. Laura S. White, M.A., Direld Director
ARCHAEOLOGICAL ASSOCIATES
P.O. Box 180
Sun City, CA 92586

Sent by FAX to: 951-244-0084
No. of Pages: 4

Re: Sacred Lands File Search and Native American Contacts list for the **"Los Angeles County Sanitation District Clearwater Joint Outfall System Project;"** located in the San Pedro Area; Los Angeles County, California,

Dear Ms. White:

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File search of the 'areas of potential effect,' (APEs) based on the USGS coordinates provided and found **Native American cultural resources** **were not identified** in the locations you specified. However, the NAHC Sacred Lands Inventory is not exhaustive; Native American cultural resources may be inadvertently discovered during ground-breaking activity.

The California Environmental Quality Act (CEQA – CA Public Resources Code §§ 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. CA Government Code §65040.12(e) defines "environmental justice" provisions and is applicable to the environmental review processes.

Early consultation, even during Initial Study or First Phase surveys with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Local Native Americans may have knowledge of the religious and cultural significance of the historic properties of the proposed project for the area (e.g. APE). Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). We urge consultation with those tribes and interested Native Americans on the list of Native American Contacts we attach to this letter in order to see if your proposed project might impact Native American cultural resources. Lead agencies should consider avoidance as defined in §15370 of the CEQA Guidelines when significant cultural resources as defined by the CEQA Guidelines §15064.5 (b)(c)(f) may be affected by a proposed project. If so, Section 15382 of the CEQA Guidelines defines a

significant impact on the environment as "substantial," and Section 2183.2 which requires documentation, data recovery of cultural resources.

Partnering with local tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation.

Also, California Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery', another important reason to have Native American Monitors on board with the project.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. An excellent way to reinforce the relationship between a project and local tribes is to employ Native American Monitors in all phases of proposed projects including the planning phases.

Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Contact List

Native American Contact List
Los Angeles County
May 24, 2011

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net
(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
6515 E. Seaside Walk, #C Gabrielino
Long Beach , CA 90803
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dormae, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
(760) 721-0371-work
(310) 428-7720 - cell
(310) 587-0170 - FAX
bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Shoshoneon Gabrieleno Band of Mission Indians
Andy Salas, Chairperson
PO Box 393 Gabrieleno
Covina , CA 91723
(626) 926-4131
gabrielenoindians@yahoo.com
(213) 688-0181 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Los Angeles County Sanitation District Clearwater Joint Outfall System; located in the San Pedro Area; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

Native American Contact List
Los Angeles County
May 24, 2011

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Park East, Suite 1500
Los Angeles , CA 90067 Gabrielino
lcandelaria1@gabrielinoTribe.org
626-676-1184- cell
(310) 587-0170 - FAX
760-904-6533-home

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Los Angeles County Sanitation District Clearwater Joint Outfall System; located in the San Pedro Area; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

APPENDIX D. Native American Scoping

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Ron Andrade, Director
LA City/County Native American Indian Commission
3175 West 6th Street, Room 403
Los Angeles, CA 90020

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Andrade:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

We are seeking input from the tribe with regards to places of importance that may or may not have been previously identified. In particular, if the tribe is aware of the presence of prehistoric or historic resources within or adjacent to the project area, we would very much like to hear from you. In the meantime, if you have any questions or desire additional information, please do not hesitate to contact me at (951) 244-1783.

Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Cindi Alvitre
Ti'At Society
6515 E. Seaside Walk, #C
Long Beach, CA 90803

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Ms. Alvitre:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDcleawater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

John Tommy Rosas
Tribal Administrator
Tongva Ancestral Territorial Tribal Nation

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Rosas:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084 Email aa@inland.net

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Anthony Morales, Chairperson
Gabrielino/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, CA 91778

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Morales:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Sam Dunlap, Tribal Secretary
Gabrielino Tongva Nation
P.O. Box 86908
Los Angeles, CA 90086

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Dunlap:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Robert Dorame, Tribal Chair/Cultural Resources
Gabrielino Tongva Indians of California Tribal Council
P.O. Box 490
Bellflower, CA 90707

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Dorame:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely unferwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Bernie Acuna
Gabrielino-Tongva Tribe
1875 Century Park East, Suite 1500
Los Angeles, CA 90067

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Acuna:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Andy Salas, Chairperson
Shoshoneon Gabrielino Band of Mission Indians
P.O. Box 393
Covina, CA 91723

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Mr. Salas:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

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Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084

Andrew Salas
Chairman

Nadine Salas
Vice-Chairman

Christina Swindall-Martinez
Secretary

Albert Perez
Treasurer I

Martha Gonzalez-Lemos
Treasurer II

Albert Acuna, Jr
Chairman of the
Council of Elders

Ernest P. Salas Tautimez
Chief and Spiritual Leader

GABRIELEÑO BAND OF MISSION INDIANS

Historically known as The San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

Laura White, Field Director
Archaeology Associates
PO Box 180
Sun City, CA 92586

Dear Mrs. White,

June 15, 2011

This letter is in response to your letter dated May 25, 2011 in regards to the Clearwater Joint Outfall System – *San Pedro*. The proposed project is within a culturally sensitive area. San Pedro was a central area to our tribe's trade with the Channel Islands. Also in the Spanish era, it was a focal area of commerce between the San Gabriel Mission and other countries. In order to protect our resources we're requesting one of our experienced & certified Native American monitors to be on site during all ground disturbance.

For your information, when the NAHC states there are "no records of sacred sites" in the subject area, they will always refer the contractors back to the Native American Tribes whose tribal territory the project area is in. This is due to the fact that the NAHC is only aware of general information on each California Native American Tribe. They are not the experts on our Tribe, our historic and prehistoric village sites or our culturally sensitive areas. Our Elder Committee & Tribal historians are the experts and is the reason why the NAHC will always refer contractors to the local tribes.

You may contact me anytime at the email, phone or address below. Thank you.

Sincerely,

Andrew Salas, Chairman

P.O. Box 393 • Covina, California 91723 • 626.926.4131 • www.gabrielenoindians.org

ARCHAEOLOGICAL ASSOCIATES

May 25, 2011

Linda Candelaria, Chairwoman
Gabrielino-Tongva Tribe
1875 Century Park East, Suite 1500
Los Angeles, CA 90067

RE: Native American Consultation for the Los Angeles County Sanitation District Clearwater Joint Outfall System, located offshore of Royal Palms in the White Point area of San Pedro, Los Angeles County.

Dear Ms. Candelaria:

Archaeological Associates has been requested to provide information with regard to prehistoric resources in the vicinity of the project. Thus, the reason for contacting your organization. Presently, the Los Angeles County Sanitation District plans to repair/rehabilitate several existing sewer outfalls that lie completely underwater offshore from Royal Palms Park in San Pedro. Each of the outfalls is approximately 1400 feet in length, constructed of concrete pipe and covered with rock ballast. The project involves underwater inspection of the outfalls, repair of any breeches in the pipes or joints, and the replacement of the rock ballast as needed. It is to emphasized that this project is completely under the water. No land based improvements are anticipated at this time. Legally, the project is situated within an unsectioned portion of Township 5 South, Range 14 West, San Bernardino Base Meridian (*San Pedro* 7.5' USGS Topographic Quadrangle- see attached map).

We are seeking input from the tribe with regards to places of importance that may or may not have been previously identified. In particular, if the tribe is aware of the presence of prehistoric or historic resources within or adjacent to the project area, we would very much like to hear from you. In the meantime, if you have any questions or desire additional information, please do not hesitate to contact me at (951) 244-1783.

Very truly yours,

Laura S. White

Laura S. White, M.A.
Field Director

LSW:LACSDclearwater
attachment

P.O. Box 180 Sun City, CA 92586 Tel: (951) 244-1783 Fax (951) 244-0084 Email aa@inland.net

Native American Phone Log Summary				
CALLER	**PERSON**	**DATE**	**TIME**	**RESULT**
Laura White	Ron Andrade	07/28/11	3:45 p.m.	Out of office. Left message with secretary to return call.
Laura White	Cindi Alvitre	07/28/11	3:50 p.m.	No answer. Left message to return call.
Laura White	Anthony Morales	07/28/11	3:55 p.m.	No concerns as long as standard discovery clause is incorporated into report.
Laura White	Sam Dunlap	07/28/11	4:00 p.m.	No answer. Left message to return call.
Laura White	Robert Dorame	07/28/11	4:05 p.m.	No answer. Left message to return call.
Laura White	Bernie Acuna	07/28/11	4:10 p.m.	No answer on cell phone. Unable to leave a message. Tribal office mailbox full, unable to leave a message.
Laura White	Linda Candelaria	07/28/11	4:25 p.m.	No answer on cell phone. Unable to leave a message. Tribal office mailbox full, unable to leave a message.
Robert White	John Tommy Rosas	07/28/11	N/A	No response.

APPENDIX E. Primary Record for Outfall-1

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # 19- HRI # Trinomial **NRHP Status Code:** 6Z Other Listings Review Code Reviewer Date

***Resource Name or #:** Outfall-1 **Caltrans Map Reference No.:** N/A

P1. Other Identifier: Whites Point Outfall

***P2. Location: *a. County** Los Angeles **County/Route/Postmile:** N/A

b. Address

City **Zip**

***c. UTM: USGS Quad:** San Pedro 7.5' **d. UTM:** 60" Outfall **Beach Point**-377598mE/3731437mN,

***e. Other Locational Data (APN #)** Offshore of Royal Palms Beach (1799 W. Paseo del Mar, San Pedro)

***P3a. Description:** (Briefly describe resource below)

The Sanitation Districts of Los Angeles County operates and maintains four ocean outfalls off the Whites Point shoreline in San Pedro. They comprise: (1) a 60-inch diameter pipe constructed in 1937, (2) a 72-inch diameter pipe constructed in 1947, (3) a 90-inch diameter pipe constructed in 1954, and (4) a 120-inch diameter pipe constructed in 1966. From the Joint Water Pollution Control Plant (JWPCP) in Carson, effluent, or treated wastewater, is conveyed through two, 6-mile tunnels to Royal Palms Beach. Here a subterranean manifold structure (reinforced concrete vault) directs the effluent into the four ocean outfalls for disposal into the Pacific Ocean. (see continuation sheet for further description)

***P3b. Resource Attibutes:** HP20- Canal/Aqueduct

****P4. Resources Present:** ___ Building X Structure ___ Object ___ Site ___ District ___ Elements of District ___ Other

P5b. Description of Photo: S/SW view out to sea from shoreline manifold.

***P6. Date Constructed/Age:** 1937-1966 (factual)

X Historic ___ Prehistoric ___ Both

***P7. Owner and Address:**
Sanitation Districts of
Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

***P8. Recorded by:**
Laura S. White
Archaeological Associates
P.O. Box 180
Sun City, CA 92586

***P9. Date Recorded:** August 1, 2011

***P10. Type of Survey:** ___ Intensive ___ Reconnaissance X Other

Describe: Evaluation only--Site is offshore under water

***P11. Report Citation:** A Cultural Resources Evaluation of the Sanitation Districts of Los Angeles County Whites Point Ocean Outfall System, Offshore of Royal Palms Beach, San Pedro, Los Angeles County by Laura and Robert White (August 2011).

***Attachments:** ___ NONE X Map Sheet X Continuation Sheet X Building, Structure and Object Record
___ Linear Resource Record ___ Archaeological Record ___ District Record ___ Milling Station Record ___ Rock Art Record
___ Artifact Record ___ Photograph Record ___ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

See Office of Historic Preservation Recording Historical Resources for instructions.

Map Reference No.: N/A

***Resource Identifier:** Outfall-1 ***NRHP Status Code:** 6Z

B1. Historic Name: Whites Point Outfall

B2. Common Name: Sanitation Districts Ocean Outfall **County/Route/Postmile:** N/A

B3. Original Use: Sewer Outfall **B4. Present Use:** Sewer Outfall

***B5. Architectural Style:**

***B6. Construction History:** 72-inch oufall modified /extended in 1953, including removal of the (see continuation sheet)

***B7. Moved?** X No ___ Yes ___ Unknown **Date:** **Original Location:**

***B8. Related Features** (describe below)**:**

None.

B9a. Architect: **B9b. Builder:** Los Angeles County Sanitation District

***B10. Significance: Theme:** Sanitary Sewer **Area:** Los Angeles County

Period of Significance: 1937-present **Property Type:** Sewer outfall **Applicable Criteria:** N/A

The ocean outfall structures were evaluated for significance using both NRHP and CEQA criteria. As for Criterion A of the NRHP, the outfalls are not associated with any event important in the history of United States. Sewage outfalls into oceans are a common method of disposing of treated effluent for metropolitan areas located near coastline. That is, these outfalls are not unique in their role of conveying effluent into the sea. As for Criterion B, the outfalls are not associated with the lives of any individual important to national history. As for Criterion C, all of the outfalls comprise prefabricated sections of pipe that is constructed of concrete over a metal form. They are of robust construction but of standard design. None of the outfalls exhibit any significant architectural features. None are considered the work of a master and there is no evidence that unique methods or materials were utilized in their construction. As per Criterion D, given the utilitarian uses of these structures, it is highly unlikely that any has the potential to yield additional information pertinent to national history. Consequently, none of the outfalls, including the 120-inch that is less than 50 years of age, appear significant pursuant to NHRPcriteria.

B11. Additional Resource Attributes:

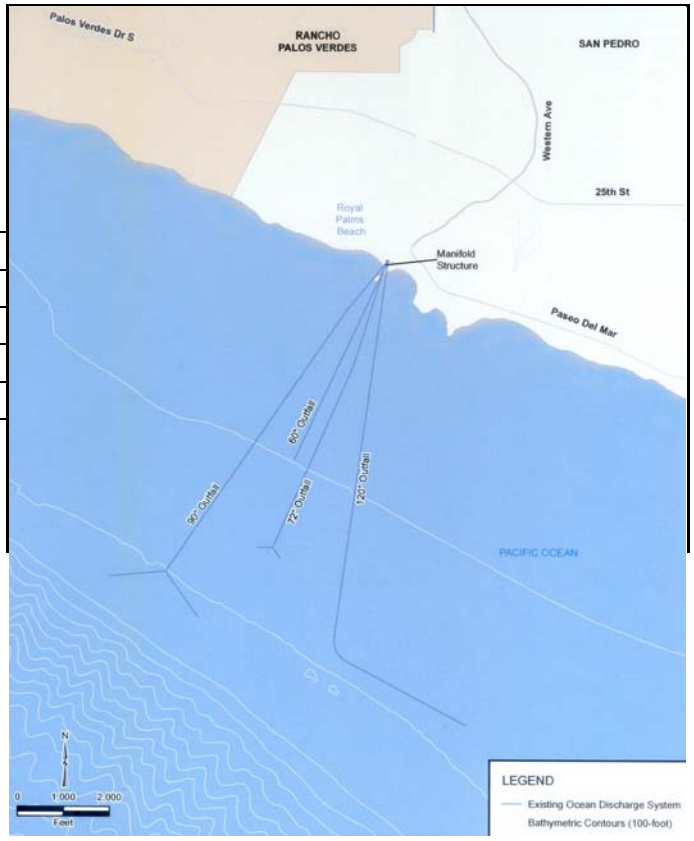
B12. References:

Sanitation Districts of Los Angeles County

B13. Remarks:

B14. Evaluator: Laura S. White
Archaeological Associates
P.O. Box 180
Sun City, CA 92586

Date of Evaluation: August 1, 2011



CONTINUATION SHEET

See Office of Historic Preservation Recording Historical Resources for instructions. X Continuation ___ Update

Caltrans Map Reference No.: N/A

Resource Identifier: Outfall-1 **County/Route/Postmile:** N/A

Primary Record-P2. Location: d. UTM
60" Outfall **End Point**- 376970mE/ 3730217mN.

72" Outfall **Beach Point**-377598mE/ 3731437mN, 72" Outfall **End Point**- 376833mE/ 3729655mN, 72" Outfall **West "Y" Point**-376746mE/ 3729618mN, 72" Outfall **East "Y" Point**- 376881mE/ 3728578mN.

90" Outfall **Beach Point**-377598mE/ 3731437mN, 90" Outfall **End Point**- 376078mE/ 3729486mN, 90" Outfall **West "Y" Point**-375748mE/ 3729447mN, 90" Outfall **East "Y" Point**-376286mE/ 3729196mN.

120" Outfall **Beach Point**- 377598mE/ 3731437mN, 120" Outfall **Beginning Curve Point**- 377216mN/ 3729103mN, 120" Outfall **Ending Curve Point**- 377219mE/ 3728913mN, 120" Outfall **End Point**- 378036mE/ 3728414 mN.

P3a. Description:
The design and construction of all four outfalls is similar in nature. The sections consist of reinforced concrete pipes, 8 and 24 feet in length. They are all prefabricated from concrete placed over iron forms. The pipes were placed on the sea floor using a floating crane. The pipe sections have gasketed bell and spigot joints. The 60-inch and 72-inch outfalls have a lead packing gasket in each joint. The 90-inch outfall has both a lead packing and rubber gasket. The 120-inch outfall joints have neoprene gaskets. Pipe sections within the breaker line are placed in shallow trenches that were excavated using explosive charges. This portion of each outfall is thoroughly ballasted with rock. Outside the breaker line, the pipe sections lie upon the sea floor. Each outfall terminates in one or more diffusers fitted with multiple small openings to facilitate the dispersion of the treated effluent. The maximum depth of the discharge points ranges from 110 to 210 feet below sea level. Outfall lengths as measured from the onshore manifold vary from 5,000 to 11,880 feet.

Building , Structure and Object Record-B.6: Construction History
original diffusers and adding new diffusers/ports at the end of the extension in a "Y" configuration. The 60-inch outfall was modified/extended in 1954, including removal of the original diffusers and coring new ports in the original outfall pipe. The 90-inch outfall was re-ballasted in 1997. The 72-inch, 90-inch, and 120-inch outfalls were re-ballasted in 1999.

B.12: Significance
In applying Criterion 1 of the CRHR, these outfalls are not associated with any event important in the local/regional history of California. They are not the only treated effluent outfalls in the region. The City of Los Angeles maintains an outfall in San Pedro Harbor and a second in Santa Monica Bay. Additionally, the Orange County Sanitation District maintains two outfalls located off the Newport Beach coast. No unique uses other than conveying effluent into the sea has been identified with these outfalls. Per Criterion 2, none of the outfalls is associated with the lives of any individual important to local or California history. In the application of Criterion 3, it is to be noted that the concrete over iron frame sections of pipeline is well designed and built to withstand the ravages of time. However, they are prefabricated at a factory off-site and are of standard design. None of the outfalls exhibit any unique architectural or design features. That is, they were designed and constructed to be purely utilitarian in design and function. None of the four outfalls is considered the work of a master and there is no evidence that unique methods or materials were utilized in their construction. Per Criterion 4, given the utilitarian uses of these structures, it is highly unlikely that they have the potential to yield any additional information pertinent to the history of the local area or the State of California. Consequently, none of the outfalls, including the 120-inch that is less than 50 years of age, appear significant pursuant to CRHR criteria.

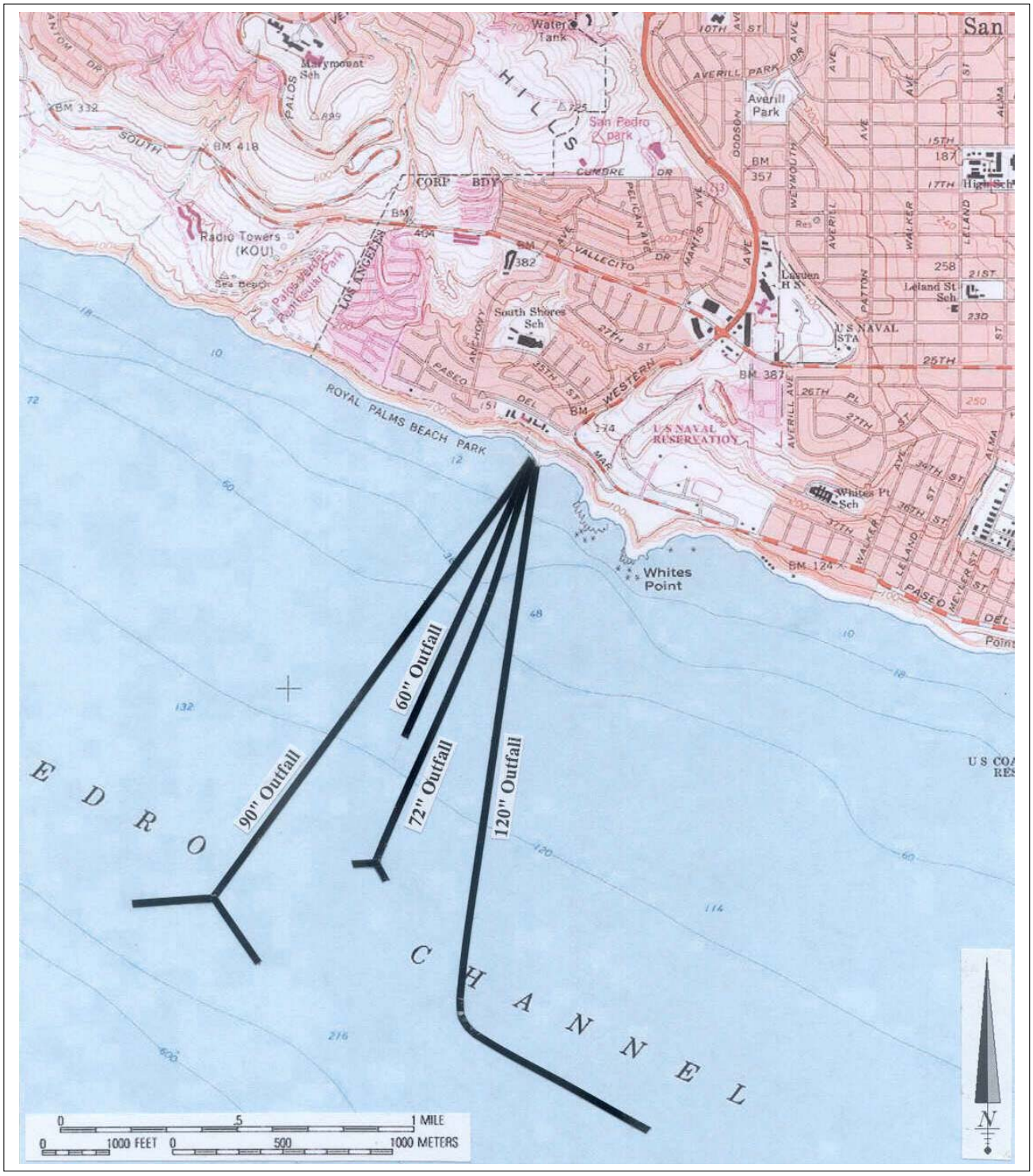
State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	Primary # 19- HRI# Trinomial

See Office of Historic Preservation Recording Historical Resources for instructions.

Resource Identifier: Outfall-1 **Caltrans Map Reference No.:** N/A

County/Route/Postmile: N/A

Map Name: San Pedro 7.5' USGS Topographic Map *Scale: 1-inch = 2000 ft *Date of Map: 1979, PR 1981



Appendix 8-A

LETTER REGARDING POTENTIAL FOR ALTERNATIVE 4 TUNNEL ALIGNMENT TO AFFECT SLOPE STABILITY, ROYAL PALMS STATE BEACH AREA

FUGRO CONSULTANTS, INC.

4820 McGrath Street, Suite 100
Ventura, California 93003-7778
Tel: (805) 650-7000
Fax: (805) 650-7010

November 9, 2011
Project No. 04.B3387004

Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

Attention: Mr. Calvin Jin, P.E.

Subject: Potential for the Proposed Alternative 4 Tunnel Alignment to Affect Slope Stability, Royal Palms State Beach Area, Los Angeles County

Dear Mr. Jin:

Recent landslide activity on Paseo del Mar near White Point State Beach has raised concern regarding the potential for proposed tunneling activities to affect the stability of the existing slopes (Figure 1). The Sanitation Districts of Los Angeles County (Districts) have requested Fugro to evaluate local geologic conditions and provide an opinion on the potential for the proposed tunnel construction to impact the existing slope stability. This letter summarizes our opinions of the potential for proposed tunnel construction of Alignment 4 along Western Avenue and at the manifold structure at Royal Palms Beach to affect the stability of the adjacent slopes and if the integrity of a tunnel (newly constructed or existing) would be compromised should a landslide occur.

SITE CONDITIONS

The shoreline and bluffs in the project vicinity trend northwest-southeast and are composed of the Altamira Shale member of the Miocene Monterey Formation. The geologic structure of the Monterey Formation can be intensely folded and highly variable over short distances (Figure 2) and contains weak bentonitic layers that have resulted in the large-scale landslides (South Shores, Abalone Cove, Portuguese Bend, etc.) near the project area shown on Plate 1 - Dibblee Geologic Map. The Alternative 4 alignment option is located about 2,000 to 3,000 feet west of the recent landslide activity on Paseo del Mar near White Point State Beach (Figure 1 and Plate 1). The large-scale landslides and the recent landslide near White Point State Beach likely have occurred along weak bedding planes in areas where the bedrock dips unfavorably (out of slope). Published geologic mapping by Dibblee (1999[1]) indicates that the bedding near White Point dips about 36 to 50 degrees to the southwest as shown on Plate 1.

In contrast, Dibblee indicates that the bedding in the vicinity of the proposed tunnel alignment dips favorably into the slope at inclinations of about 50 to 75 degrees to the northeast. Plate 2 - Cross Section G-H' depicts the interpreted geologic structure in the project area and shows the favorably oriented bedding mapped by Dibblee. This cross section parallels the existing 8-foot-diameter tunnel and is consistent with interpretations made by Schultz (1937[2]) during excavation of the existing tunnel (see Plates 3 and 4). The slope instabilities that have occurred near White Point State Beach and to the northwest of the project site are less likely to occur along favorably oriented geologic bedding such as what has been mapped by Dibblee in the project area.

---

[1] Dibblee, T.W., (1999), Geologic map of the Palos Verdes Peninsula and vicinity, Redondo Beach, Torrance and San Pedro quadrangles, Los Angeles County, California: Dibblee Geological Foundation Map DF-70.

[2] Schultz, J.R. (1937), Geology of the Whites Point Outfall Sewer Tunnel: Ph.D. Dissertation, California Institute of Technology, Pasadena, California, 43 p.

DOC #
REC'D LACSD
NOV 14 '11 AM 10:51
Jin C

Preliminary tunnel design for the Alternative 4 alignment is proposed to extend to a minimum depth of about 30 to 50 feet below the toe of the bluff. The proposed tunnel construction process is unlikely to result in significant amounts of settlement, disturbance, or weakness of the overlying materials.

Slope failures in bluff areas underlain by favorably-oriented bedding are anticipated to be related to natural processes such as wave-cut erosion resulting in undercutting of the slope or possibly scouring of the slope face from surface water runoff (e.g. culverts depositing water on the slope as seen in Figure 2). Resulting instabilities or deformations likely will be limited to areas above the toe of the slope and not extend to depths of the existing or proposed tunnels. The reinforced concrete tunnel may improve local slope stability; however, additional geotechnical analyses using site specific geologic and geotechnical data would need to be performed as part of final design to confirm this assumption.

OPINIONS

On the basis of the favorably-oriented geologic bedding indicated by Dibblee (1999) and Schultz (1937) and on the depth of the tunnel profile, in our opinion it appears unlikely that tunnel construction will impact the stability of the existing slopes in the vicinity of the proposed alignment. Further, based on the depth of the proposed tunnel profile, surficial slope instability occurring above the toe of the bluff is not anticipated to affect a tunnel installed about 30 to 50 feet below the toe of the bluff.

We recommend that a more detailed slope stability evaluation be made as part of the final design of Alternative 4 should it be selected as the preferred alternative. In addition, the slopes should be instrumented and monitored in advance and during construction activities as a precautionary measure.

CLOSURE

Thank you for the opportunity to continue to provide geotechnical input on the LACSD Outfall Project. Please contact us if you have any questions on the information provided herein.

Sincerely,

FUGRO CONSULTANTS, INC.

REGISTERED PROFESSIONAL ENGINEER PATRICK McINTOSH SMITH No. 2660 Exp. 9/30/13 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED GEOLOGIST LORI E. PRENTICE EG NO. 2312 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

Patrick M. Smith, Ph.D., G.E.
Associate Engineer

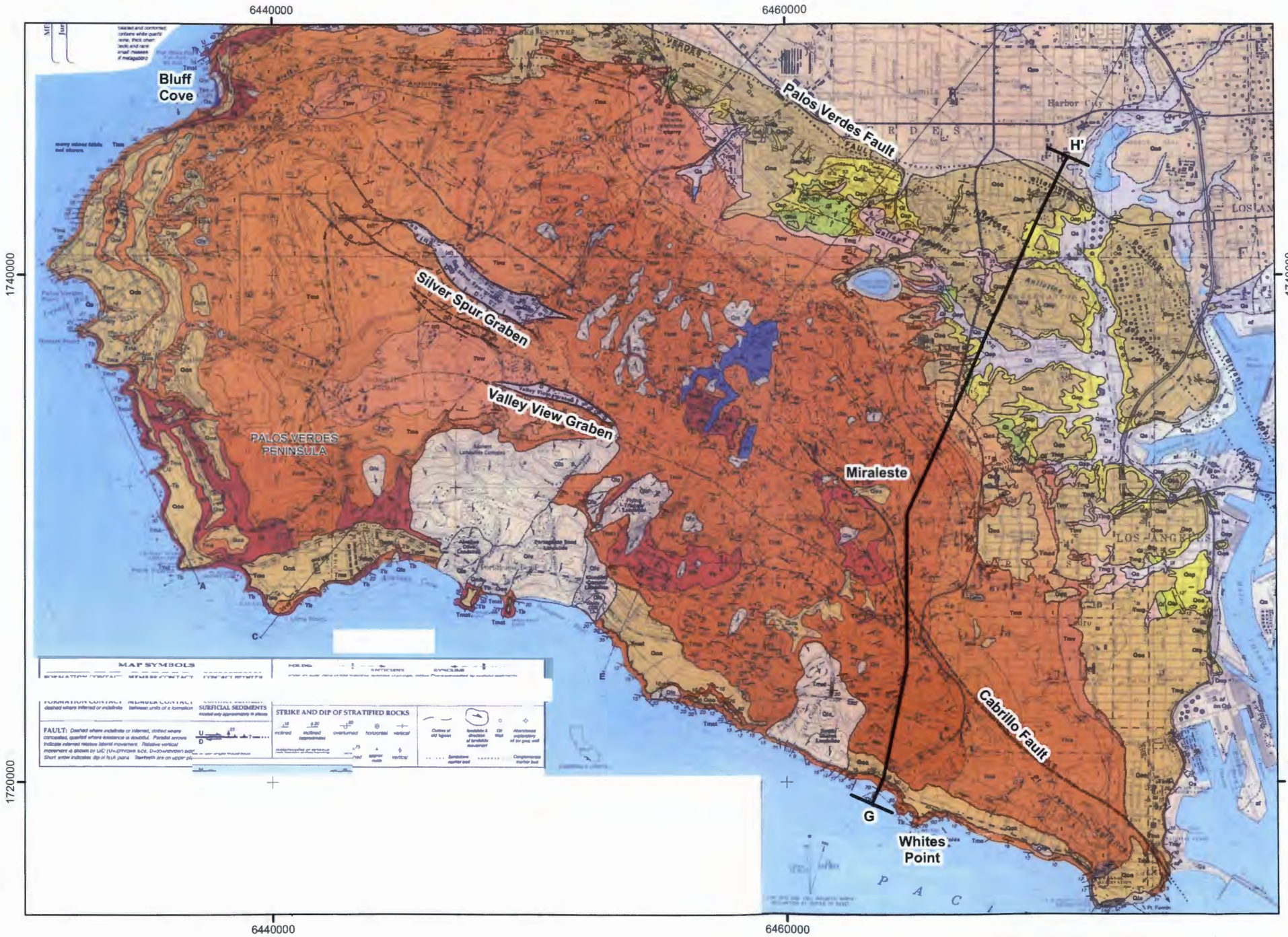
Lori E. Prentice, C.E.G.
Principal Engineering Geologist

Copies Submitted: (2) Addressee
(1) Mr. David Haug, P.E., Districts

Attachments: Figures
Plates

Figure 1. Area of recent landslide activity near White Point State Beach.

Figure 2. Recumbent fold above Royal Palms Beach.



Legend

G — H' Dibblee Cross Section G-H' (See Plate 2)

Geologic Units Along Section

- Qa Quaternary Alluvium
- Qae Quaternary Alluvium, Slightly Elevated
- Qoa Quaternary Older Alluvium
- Qsp Quaternary San Pedro Sand
- Ql Quaternary Lomita Marl
- Tfp Pliocene Fernando Formation, Pico Member
- Tfr Pliocene Fernando Formation, Siltstone-Claystone
- Tmg Miocene Malaga Mudstone
- Tmv Miocene Monterey Formation, Valmonte Diatomite
- Tmad Miocene Monterey Formation, Diatomite
- Tma Miocene Monterey Formation, Altamira Shale, Upper
- Tmal Miocene Monterey Formation, Altamira Shale, Lower
- Miocene Basalt, Mafic Extrusive and Intrusive
- SC Jurassic Catalina Schist

Source: Dibblee, 1999

Coordinate Grid: CA State Plane, Zone 5, NAD83, Feet

N

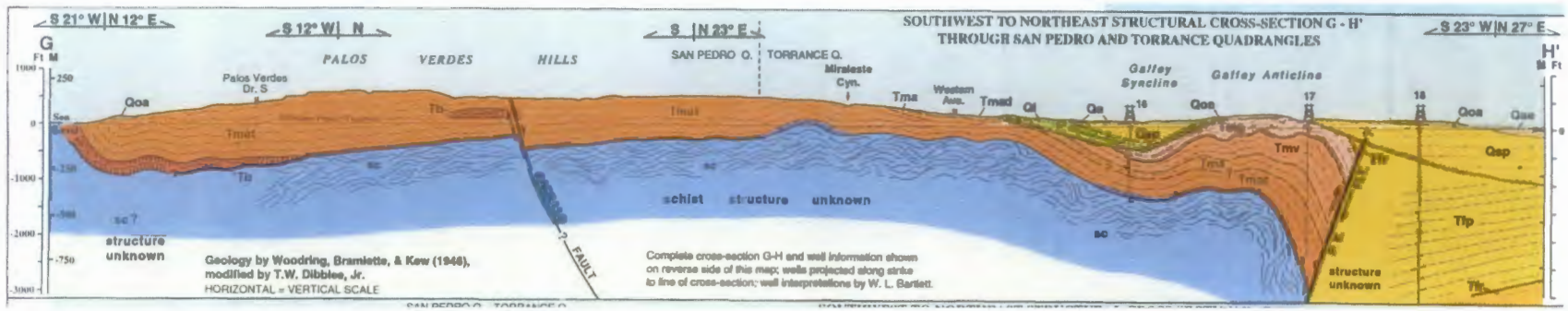
HORIZONTAL SCALE = 1:48,000

0 2,000 4,000 8,000 Feet

DIBBLEE GEOLOGIC MAP

JWPCP Tunnel and Ocean Outfall Project
Los Angeles, California

N:\Projects\3387_LACSD\3387-004_LACSDTunnel\Outputs\Reports\2011_06_Phase1C_Final_Report\MXD\Figures\Section_02\Plate3_Dibblee_RegGeoMap_SSLetter.mxd, 10/26/11, jgreenwald



SOURCE: Modified from Dibblee, 1999

NOTES:

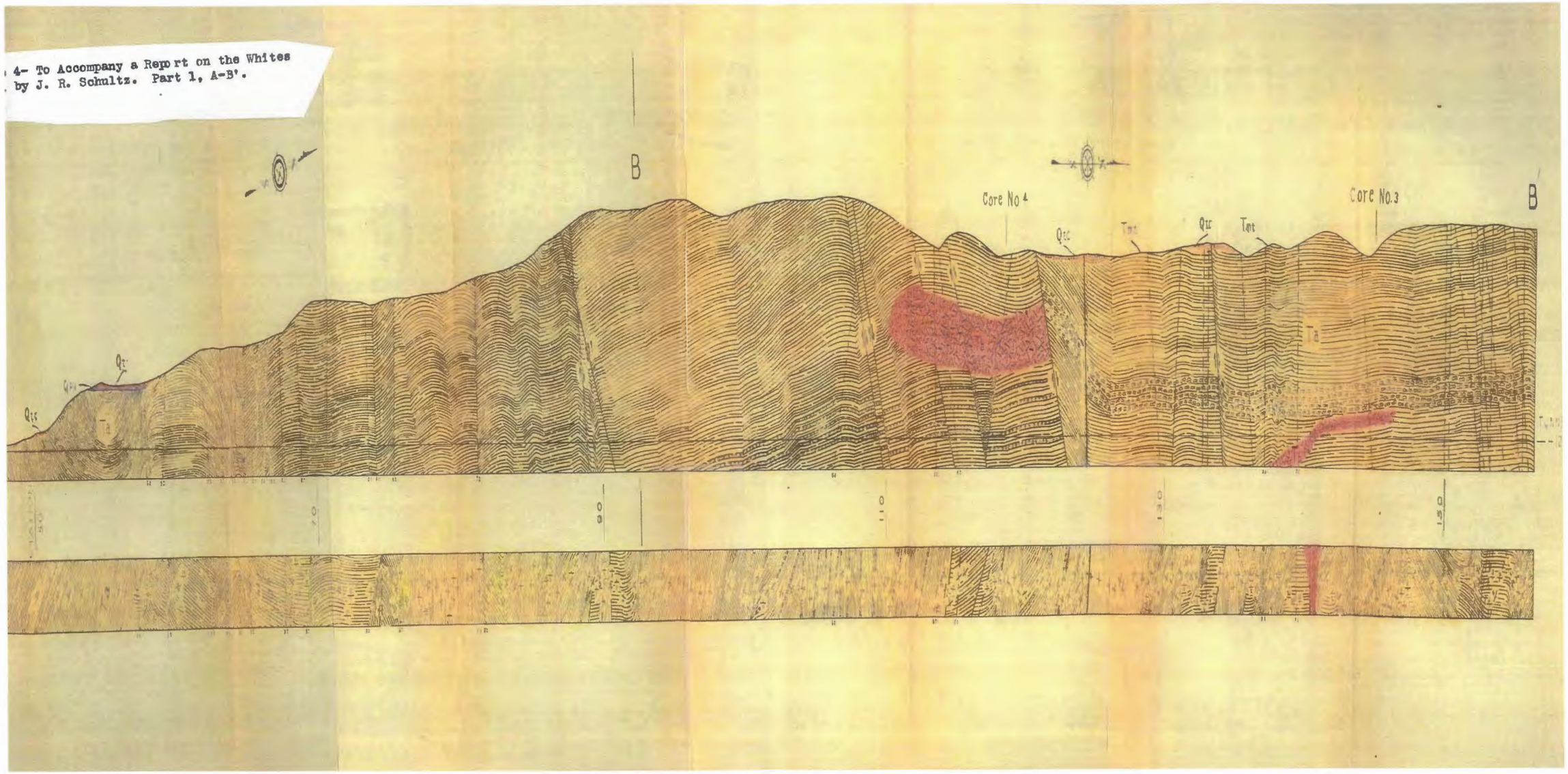
1) Cross Section Parallels Whites Point Tunnel Outfall and was generated based on data from that project.

2) See Plate 1 for cross section location.

GEOLOGIC STRUCTURAL CROSS SECTION G-H'
JWPCP Tunnel and Ocean Outfall Project
Los Angeles, California

SCHULTZ GEOLOGIC MAP AND CROSS SECTION LOCATION
JWPCP Tunnel and Ocean Outfall Project
Los Angeles, California

PLATE 3



SCHULTZ GEOLOGIC CROSS SECTION A-B'
JWPCP Tunnel and Ocean Outfall Project
Los Angeles, California

APPENDIX 9-A
GREENHOUSE GAS EMISSIONS CALCULATIONS

Program Greenhouse Gas Calculations

GHG CONSTRUCTION CH4 AND N20

**CO_2 emissions are summed from the URBEMIS outputs for the individual construction components (see "URBEMIS Summary" tab)*

UNMITIGATED

	Input Emissions						
	Off Road Emissions			On road Emissions			
Construction Element	**CO2 (metric tons/yr)**	**CH4 (metric tons/yr)**	**N2O (metric tons/yr)**	**CO2 (metric tons/yr)**	**Other (metric tons/yr)**	**CO2e (metric tons/yr)**	
Process Optimization - POWRP	1,000.7	0.057	0.025	152.2	8.013	1,161.0	
Process Optimization - LBWRP	1,317.6	0.075	0.034	150.3	7.910	1,475.9	
Process Optimization - SJCWRP	1,976.3	0.112	0.050	264.6	13.929	2,255.1	
Process Optimization - LCWRP	1,317.6	0.075	0.034	160.7	8.460	1,486.9	
SJCWRP Plant Expansion	237.2	0.013	0.006	170.7	8.982	416.9	
JWPCP Solids Processing	938.7	0.053	0.024	457.7	24.090	1,420.6	
Total Construction Emissions	***6,788.1***	***0.4***	***0.2***	***1,356.3***	***71.4***	**8,216.3**	**total GHG emissions**
Sources: URBEMIS 2007; CCAR 2009.						273.9	annual GHGs, amortized over 30 year project life

Methodology:
Calculated ratio of CO2 emissions per gallon diesel fuel to CH4 and N2O to determine CH4 and N2O emissions from construction equipment

Diesel Fuel	**CO2**	**CH4**	**N2O**
kg CO2/gal diesel	10.21	0.00058	0.00026
g/gal diesel construction equip		0.58	0.26
ratio	1	5.68071E-05	2.54652E-05

Percent other GHGs	(on road)(http://www.epa.gov/climatechange/emissions/downloads06/03ES.pdf)
5.00%	(assumes 50/50 N20/CH4 as "other")

N2O	CH4	percent other with CH4 reductions
2.50%	0.37%	2.87%

Sources:
GRP, May 2011 update: http://www.theclimateregistry.org/downloads/2009/05/2011-Emission-Factors.pdf
CO2 emission factor - Table 13.1
N20 and CH4 - Table 13.6

GAS	GWP
N2O	21
CH4	310

MITIGATED

	Input Emissions						
	Off Road Emissions			On road Emissions			
Construction Element	**CO2 (metric tons/yr)**	**CH4 (metric tons/yr)**	**N2O (metric tons/yr)**	**CO2 (metric tons/yr)**	**Other (metric tons/yr)**	**CO2e (metric tons/yr)**	**average ROG reductions**
Process Optimization - POWRP	1,000.7	0.00831	0.025	152.2	8.013	1,160.9	85%
Process Optimization - LBWRP	1,317.6	0.01096	0.034	150.3	7.910	1,475.8	85%
Process Optimization - LCWRP	1,976.3	0.01645	0.050	264.6	13.929	2,254.9	85%
Process Optimization - SJCWRP	1,317.6	0.01096	0.034	160.7	8.460	1,486.8	85%
SJCWRP Plant Expansion	237.2	0.00194	0.006	170.7	8.982	416.8	86%
JWPCP Solids Processing	938.7	0.00775	0.024	457.7	24.090	1,420.5	85%
Total Construction Emissions	***6,788.1***	***0.1***	***0.2***	***1,356.3***	***71.4***	**8,215.7**	**total GHG emissions**
Sources: URBEMIS 2007; CCAR 2009.						273.9	annual GHGs, amortized over 30 year project life

GHG - daily to annual calculations

			CO2 Pounds per day (from URBEMIS)		Time to Complete		Total Pounds of CO2 to Complete (daily CO2 x total days)		MT CO2 Total	
					assumption	Days				
Process Optimization			Off-Road	On-Road			Off-Road	On-Road	Off-Road	On-Road
	PWRP	excavation	3,308.97	3,546.07	3.4 months	74.8	247,510.96	265,246.04	112.27	120.31
		install	4,321.74	155.35	20.6 months	453.2	1,958,612.57	70,404.62	888.41	31.93
	LBWRP	excavation	5,101.66	3,299.94	3.4 months	74.8	381,604.17	246,835.51	173.09	111.96
		install	5,567.33	186.41	20.6 months	453.2	2,523,113.96	84,481.01	1,144.47	38.32
	SJCWRP	excavation	5,101.66	4,070.57	5.1 months	112.2	572,406.25	456,717.95	259.64	207.16
		install	5,567.33	186.41	30.9 months	679.8	3,784,670.93	126,721.52	1,716.70	57.48
	LCWRP	excavation	5,101.66	3,608.20	3.4 months	74.8	381,604.17	269,893.36	173.09	122.42
		install	5,567.33	186.41	20.6 months	453.2	2,523,113.96	84,481.01	1,144.47	38.32
SJWRP Plant Expansion										
		site demo	4,715.67	5,272.48	3 months	66	311,234.22	347,983.68	141.17	157.84
		Install	458.26	61.13	21 months	462	211,716.12	28,242.06	96.03	12.81
JWPCP Solids Processing										
		Excavation	5,101.66	4,182.74	10 months	220	1,122,365.20	920,202.80	509.10	417.40
		Install	1,655.97	155.35	26 months	572	947,214.84	88,860.20	429.65	40.31
							14,965,167.34	2,990,069.76	6,788.09	1,356.27

based on similar projects (see "program assumptions" workbook)

conversions

22 working days/month

0.000453592 pounds to MT

GHG SUMMARY FROM OPERATIONS

CEQA Baseline	**CO2**	**CH4**	**N2O**	**CO2e**	**% of total**
N2O from Nitrification	--	--	7.657	2374	19.82%
Purchased Electricity	609	0.025	0.006	612	5.11%
CH4 from Combustion of Digester Gas	--	1.559	0.201	95	0.79%
Biosolids Hauling	8,890	0.023	0.025	8897	74.28%
sum	**9,499**	**1.6**	**7.9**	**11,978**	75.08%

With Program	**CO2**	**CH4**	**N2O**	**CO2e**	**% of total**
N2O from Nitrification	--	--	9.597	2975	13.91%
Purchased Electricity	1,439	0.060	0.013	1444	6.75%
CH4 from Combustion of Digester Gas	--	1.918	0.247	117	0.55%
Biosolids Hauling	16,790	0.044	0.046	16805	78.60%
Generator at SJCWRP	39	0.002	0.001	40	0.19%
sum	**18,268**	**2**	**10**	**21,380**	100.00%

Net change	**CO2**	**CH4**	**N2O**	**CO2e**	**% of total**
N2O from Nitrification	--	--	1.940	601	6.40%
Purchased Electricity	829	0.034	0.008	833	8.85%
CH4 from Combustion of Digester Gas	--	0.359	0.046	22	0.23%
Biolsolids Hauling	7,900	0.020	0.022	7907	84.10%
Generator at SJCWRP	39	0.002	0.001	40	0.42%
sum	**8,769**	**0**	**2**	**9,402**	100.00%

Operations - GHG Emissions from Wastewater Processes

Methods:

Obtained emission factors from LACSD.
CH4 was based on source test information
N2O was based on default factor from CARB Mandatory Reporting Rule Table 6
Net increase in Digester Gas based on 23% increase over existing digester gas production, which is 3178.87 mmscf

Emission Factors

Device	Emission Factor	Factor (MT-N_2O/mmcf[2,]
boiler	0.0000686	0.0000631
flare	0.0004905	0.0000631
worst case	0.0004905	0.0000631

MT = metric tons
mmcf = million cubic feet of fuel
GWP of CH4 *21*
GWP of N2O *310*

1 - Based on site-specific source test information
2 - Default emission factor from CARB Mandatory Reporting Rule, Table 6
3 - BTU content of digester gas needed for the conversion, 631 BTU/f[3]

Scaling 23%

Emissions

JWPCP Emissions - CH4 and N2O from incomplete combustion of digester gas

		Emission Factors (Metric Tons per MMCF)		Metric Tons per Year		
	Digest Gas Increase (mmcf)	CH4	N2O	CH4	N2O	**CO2e**
Baseline	3178.87	0.0004905	0.0000631	1.559	0.201	**94.93**
Project	3910.01	0.0004905	0.0000631	1.918	0.247	**116.76**
increment	*731.14*	*0.0004905*	*0.0000631*	*0.359*	*0.046*	***21.83***

net change in CO2e over project life	21.83
project life (years, from 2012-2050)	42
annual average change	0.52

	Baseline (2008)	***2020***	***2030***	***2040***	***2050***
years since baseline	-	*12*	*22*	*32*	*42*
net over baseline		6.237982885	11.436302	16.63462103	21.8329401
TOTAL	*94.93*	*101.16*	*106.36*	*111.56*	*116.76*

SJCWRP Emissions - N2O from Nitrification/Denitrification

	Service Population	Emission Facotor (MT N_2O) /person./yr	Conversion Factor (MT/g)	Metric Tons per Year: N2O Emissions from NDN (MT)	**CO2e**
Baseline	1,093,849	7	0.000001	7.656943	**2373.65**
Project	1,370,949	7	0.000001	9.596643	**2974.96**
increment	*277,100*	*7*	*0.000001*	*1.9397*	***601.31***

net change in N2O over project life	601
project life (years, from 2012-2050)	42
annual average change	14.32

	Baseline (2008)	***2020***	***2030***	***2040***	***2050***
years since baseline	-	*12*	*22*	*32*	*42*
net over baseline		171.802	314.97033	458.1386667	601.307
TOTAL	*2373.65*	*2545.45*	*2688.62*	*2831.79*	*2974.96*

Operations - GHGs from Electricity Purchases

SUMMARY	Baseline	With Project	Increment
SJCWRP Plant Expansion	612	963	351
SJCWRP Process Optimization	0	42	42
POWRP Process Optimization	0	296	296
LCWRP Process Optimization	0	84	84
LBWRP Process Optimization	0	59	59
total GHGs from additional Electricity	**612**	**1,444**	**833**

Sources:

CO2, CH4, N2O emission factors are from the updated eGRID2010 emission factors, Table 14.1 of:
www.theclimateregistry.org/downloads/2009/05/2011-Emission-Factors.pdf
Electricity consumption information from the Client (email from Glenn Acosta to Nicole Williams, 05/25/2010 at 9:59am)

Emission factors:

CO2	681.01	lbs/MWh	Table 14.1
CH4	0.02829	lbs/MWh	Table 14.1
N2O	0.00623	lbs/MWh	Table 14.1

Electricty Consumption Calcs	units	Existing	With Project
SJCWRP Plant Expansion	daily MWh	5.4	8.5
	annual MWh	1,972	3,105
Pomona Flow Equalization	daily kwh	0	373
	annual MWh	0	136
SJC Flow Equalization	kwh	0	2,611
	annual MWh	0	954
Los Coyotes Flow Equalization	kwh	0	746
	annual MWh	0	272
Long Beach Flow Equalization	kwh	0	522
	annual MWh	0	191

MWh/yr = MWh * 365.25 days per year
MWh/yr = Kwh * 365.25 days per year / 1000 KW per MW

GHG Calcs

CEQA BASELINE		lbs/yr			MT/yr				
	electricity (MWH)	CO2	CH4	N2O	CO2	CH4	N2O	CO2e	
SJCWRP Plant Expansion	1,972	1,343,190	56	12	609	0.03	0.01	612	
Pomona Flow Equalization	0	0	0	0	0	0.00	0.00	0	
SJC Flow Equalization	0	0	0	0	0	0.00	0.00	0	
Los Coyotes Flow Equalization	0	0	0	0	0	0.00	0.00	0	
Long Beach Flow Equalization	0	0	0	0	0	0.00	0.00	0	
	1,972	*1,343,190*	*56*	*12*	*609*	*0.03*	*0.01*	*612*	MT CO2e/yr

With Project		k							
	electricity (MWH)	CO2	CH4	N2O	CO2	CH4	N2O	CO2e	
SJCWRP Plant Expansion	3,105	2,114,281	88	19	959	0.04	0.01	963	
Pomona Flow Equalization	136	92,780	4	1	42	0.00	0.00	42	
SJC Flow Equalization	954	649,457	27	6	295	0.01	0.00	296	
Los Coyotes Flow Equalization	272	185,559	8	2	84	0.00	0.00	84	
Long Beach Flow Equalization	191	129,842	5	1	59	0.00	0.00	59	
	4,658	*3,171,918*	*132*	*29*	*1,439*	*0.06*	*0.01*	*1,444*	MT CO2e/yr

Increment									
	electricity (MWH)	CO2	CH4	N2O	CO2	CH4	N2O	CO2e	
SJCWRP Plant Expansion	1,132	771,091	32	7	350	0	0	351	
Pomona Flow Equalization	136	92,780	4	1	42	0	0	42	
SJC Flow Equalization	954	649,457	27	6	295	0	0	296	
Los Coyotes Flow Equalization	272	185,559	8	2	84	0	0	84	
Long Beach Flow Equalization	191	129,842	5	1	59	0	0	59	
	2,685	*1,828,728*	*76*	*17*	*829*	*0.03*	*0.01*	*833*	MT CO2e/yr

Conversions

CO2	1
CH4	21
N2O	310
days per year	365.25
kwh to mwh	0.001
lbs to MT	0.000453592

net change in CO2e from electricity purchases over project life	833
project life (years, from 2012-2050)	42
annual average change in CO2e from rom electricity purchases	19.82

	Baseline (2008)	***2020***	***2030***	***2040***	***2050***
years since baseline	-	*12*	*22*	*32*	*42*
net over baseline		237.8780801	436.1098135	634.3415468	832.57328
TOTAL	*611.52*	*849.40*	*1047.63*	*1245.86*	*1444.09*

SJCWRP Emergency Generator Emission Calculations

Assumes a Tier 4 2000 HP generator

Emsision standards from EPA420-P-03-002: http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf
ROG converted from HC using a 1.053 multiplier
CO2 and SO2 emission factors calculated using equations 6 and 7 on page 24 of EPA420-P-03-002

Emission Standards

							1.053				
		grams per hp-hr									
		CO	NOX	PM10	PM2.5	ROG	SO2	CO2	HC	BSCF
Tier 4 Final	>1200 HP gen set	0.7642	0.46	0.069	-	0.2964195	0.048733651	530.1334357	0.2815	0.367

Emission Calculations

Equipment	Number	Equipment Model Year	Annual Hours Use	Load Factor	Engine (hp)	Daily HP-HR		ROG	CO	NOX	SO2	PM10	PM2.5	N2O	CH4	CO2	CO2e
							Emission Factor (lb/hp-hr)	6.53E-04	1.68E-03	1.01E-03	1.07E-04	1.52E-04	1.40E-04	2.97623E-05	6.63929E-05	1.17E+00	--
Generator	1	2035 (Tier 4)	50	0.74	2000	1480	lbs/day (if run for 1 hr)	1.0	2.5	1.5	0.2	0.2	0.2	0.0	0.1	1729.7	--
							MTs/yr (assuming 50 hours of testing per year)							0.001	0.002	39	40

Conversions	
grams per pound	453.59237
PM2.5 fraction of PM	0.92
lbs to MT	0.000453592
tons to MT	0.90718474
GWP	
CO2	1
CH4	21
N2O	310

Emission Factors from Tier 4 Emission Standards
Emission Factor for N20 and CH4 based on ratio of N2O and CH4 to CO2 per gallon of diesel fuel in the GRP (CR 2011)

	kg/gallon	g/gallon	ratio
CO2	10.21	10210	
N2O		0.26	2.54652E-05
Ch4		0.58	5.68071E-05

SO2 Calculation for EF's

based on: http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf
g hp/hr or SO2 = (BSFC * 453.6 * (1-soxcnv)) - HC) * 0.01 * soxdsl * 2 *(equation 7, pg 24)*

Where:

BSFC = Brake Specif	0.408	*Table A4 for all HPs*
of fuel sulfur	0.02247	*Page C5*
HC = in-use adjuste	from above	
soxdsl = episodic		
weight percent of	0.015	
	453.59	
	0.01	
	2	

CO2 Calculation for EF's

based on: http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf
CO2 = (BSFC * 453.6 - HC) * 0.87 * (44/12) *(equation 6, pg 24)*

Where:

BSFC = Brake Specific Fuel	0.408	*Table A4 for all HPs*
HC = in-use adjusted hc en	from above	
carbon mass fraction of		
diesel	0.87	
ratio of CO2 to carbon ma	3.666666667	
	453.59	

Biosolids Hauling Emissions

Methodology

Biosolids hauling assumes an additional 20 hauling trips by 2050
Increase in truck hauling trips is scaled linearly assuming 20 additional trucks over the next 42 year period
Exhaust emission factors from EMFAC2007 - BURDEN mode was used for regional hauling emissions and on-site idling calculations (lbs per mile and lbs per trip). EMFAC mode was used assuming 5mph travel for onsite emissions.

Road Dust from EPA AP-42 Section 13.2.1 (2006)

Truck trips

20 more daily truck trips over 42 years
0.48 more trucks per year

Distances

5 mph ONSITE - Heavy-duty trucks travel on site
0.59 ONSITE - Miles traveled on-site per truck
119.2 REGIONAL - one-way miles to landfills (existing)
164.8 REGIONAL - one-way miles to landfills (project)

VMT

Years to analyze	Truck Trips	REGIONAL Daily VMT (roundtrip)	ONSITE Daily VMT
2008	55	13110	32
2020	61	20007	36
2030	65	21577	39
2040	70	23146	41
2050	75	24715	44

Regional Emissions

	Criteria Pollutants						Greenhouse Gases							
			Pounds Per Day					Pounds per Day				Metric Tons Per Year		
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO2	N20	CH4	CO2e	CO2	N20	CH4	CO2e
2008 (baseline)														
Idling Emissions	0.6	2.0	4.3	0.1	0.1	0.1	268.5	0.0	0.0	269	44	0.0001	0.0001	45
VMT Emissions	41.0	154.2	520.3	0.5	27.0	23.9	53,118.2	0.1	0.1	53,164	8,800	0.0230	0.0244	8,808
Road Dust	--	--	--	--	284.8	42.7	--	--	--	--	--	--	--	--
Total	**41.6**	**156.3**	**524.6**	**0.6**	**311.8**	**66.7**	**53,386.6**	**0.1**	**0.1**	**53,433.0**	**8,844.8**	**0.0231**	**0.0245**	**8,852.5**
2020														
Idling Emissions	0.4	1.9	5.4	0.1	0.0	0.0	296.4	0.0	0.0	297	49	0.0001	0.0001	49
VMT Emissions	18.1	83.5	196.7	0.8	12.4	9.8	81,274.1	0.2	0.2	81,344	13,465	0.0351	0.0373	13,477
Road Dust	--	--	--	--	434.6	65.2	--	--	--	--	--	--	--	--
Total	**18.5**	**85.4**	**202.1**	**0.9**	**447.1**	**75.0**	**81,570.5**	**0.2**	**0.2**	**81,641.1**	**13,514.2**	**0.0352**	**0.0374**	**13,525.9**
2030														
Idling Emissions	0.4	2.3	6.8	0.1	0.0	0.0	365.9	0.0	0.0	366	61	0.0002	0.0002	61
VMT Emissions	11.7	61.7	121.2	0.9	8.9	6.4	87,526.7	0.2	0.2	87,603	14,501	0.0378	0.0402	14,514
Road Dust	--	--	--	--	468.7	70.3	--	--	--	--	--	--	--	--
Total	**12.1**	**64.0**	**128.0**	**1.0**	**477.6**	**76.7**	**87,892.6**	**0.2**	**0.2**	**87,968.8**	**14,561.6**	**0.0380**	**0.0404**	**14,574.2**
2040														
Idling Emissions	0.4	2.1	6.4	0.1	0.0	0.0	342.7	0.0	0.0	343	57	0.0001	0.0002	57
VMT Emissions	11.9	62.0	120.5	0.9	8.9	6.2	94,216.7	0.2	0.3	94,298	15,609	0.0406	0.0431	15,623
Road Dust	--	--	--	--	502.8	75.4	--	--	--	--	--	--	--	--
Total	**12.3**	**64.1**	**126.9**	**1.0**	**511.7**	**81.6**	**94,559.4**	**0.2**	**0.3**	**94,641.1**	**15,666.1**	**0.0407**	**0.0433**	**15,679.6**
2050														
Idling Emissions	0.4	2.3	6.8	0.1	0.0	0.0	365.9	0.0	0.0	366	61	0.0002	0.0002	61
VMT Emissions	12.7	66.2	128.7	1.0	9.5	6.6	100,604.3	0.3	0.3	100,691	16,668	0.0433	0.0460	16,682
Road Dust	--	--	--	--	536.9	80.5	--	--	--	--	--	--	--	--
Total	**13.1**	**68.5**	**135.5**	**1.1**	**546.3**	**87.2**	**100,970.2**	**0.3**	**0.3**	**101,057.4**	**16,728.2**	**0.0435**	**0.0462**	**16,742.7**
Max Daily with Program	**18.5**	**85.4**	**202.1**	**1.1**	**546.3**	**87.2**	**100,970.2**	**0.3**	**0.3**	**101,057.4**	**16,728.2**	**0.0**	**0.0**	**16,742.7**

On-site Emissions

			Pounds Per Day					Pounds per Day				Metric Tons Per Year		
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO2	N20	CH4	CO2e	CO2	N20	CH4	CO2e
2008 (baseline)														
VMT Emissions	0.97	2.12	3.20	0.00	0.23	0.21	271.10	0.00	0.00	271	45	0.0001	0.0001	45
Road Dust	--	--	--	--	0.70	0.11	--	--	--	--	--	--	--	--
Total	**0.97**	**2.12**	**3.20**	**0.00**	**0.93**	**0.31**	**271.10**	**0.00**	**0.00**	**271.22**	**44.91**	**0.00**	**0.00**	**44.93**
2020														
VMT Emissions	0.33	0.76	0.99	0.00	0.04	0.03	302.15	0.00	0.00	302	50	0.0001	0.0001	50
Road Dust	--	--	--	--	0.78	0.12	--	--	--	--	--	--	--	--
Total	**0.33**	**0.76**	**0.99**	**0.00**	**0.82**	**0.15**	**302.15**	**0.00**	**0.00**	**302.28**	**50.06**	**0.00**	**0.00**	**50.08**
2030														
VMT Emissions	0.22	0.53	0.64	0.00	0.01	0.01	326.28	0.00	0.00	326	54	0.0001	0.0001	54
Road Dust	--	--	--	--	0.84	0.13	--	--	--	--	--	--	--	--
Total	**0.22**	**0.53**	**0.64**	**0.00**	**0.85**	**0.14**	**326.28**	**0.00**	**0.00**	**326.42**	**54.06**	**0.00**	**0.00**	**54.08**
2040														
VMT Emissions	0.22	0.54	0.63	0.00	0.01	0.01	350.07	0.00	0.00	350	58	0.0001	0.0001	58
Road Dust	--	--	--	--	0.90	0.14	--	--	--	--	--	--	--	--
Total	**0.22**	**0.54**	**0.63**	**0.00**	**0.91**	**0.14**	**350.07**	**0.00**	**0.00**	**350.21**	**58.00**	**0.00**	**0.00**	**58.02**
2050														
VMT Emissions	0.23	0.57	0.68	0.00	0.02	0.01	373.80	0.00	0.00	374	62	0.0001	0.0001	62
Road Dust	--	--	--	--	0.96	0.14	--	--	--	--	--	--	--	--
Total	**0.23**	**0.57**	**0.68**	**0.00**	**0.98**	**0.15**	**373.80**	**0.00**	**0.00**	**373.96**	**61.93**	**0.00**	**0.00**	**61.96**

Biosolid Hauling Distance to Management Locations

Methodology

Calculated a weighted mean to the biosolid management locations using the following equation

Assumptions

25 ton haul truck capacity
365.25 days per year

Future Biosolids Management Locations (Chapter 3)

Facility	Management Practice	Status	Location	Distance From JWPCP (miles)	Quantity (wtpy) low	Quantity (wtpy) high	Quantity (wtpd) Low	Quantity (wtpd) High	Quantity (wtpd) avg	truck trips per day low	truck trips per day high	truck trips per day avg	using low % of trips	using low	using high % of trips	using high	using avg % of trips	using avg	
Westlake Farms	Composting	Expected in 2012	Kings County, CA	200	300,000	500,000	821.36	1,368.93	1,095.14	33	55	44	67%	133	33%	67	41%	82	
EnerTech	Renewable Fuel	Operating	Rialto, CA	75	50,000	150,000	136.89	410.68	273.79	5	16	11	11%	8	10%	8	10%	8	
South Kern Industrial Center	Composting	Operating	Kern County, CA	131	50,000	150,000	136.89	410.68	273.79	5	16	11	11%	15	10%	13	10%	13	
Inland Empire Regional Composting Facility	Composting	Operating	Rancho Cucamonga, CA	59	50,000	150,000	136.89	410.68	273.79	5	16	11	11%	7	10%	6	10%	6	
San Joaquin Composting Facility	Composting	Operating	Kern County, CA	170	0	150,000	0.00	410.68	205.34	0	16	8	0%	0	10%	17	8%	13	
Desert Ridge Farms	Land Application	Operating	Yuma County, AZ	300	0	150,000	0.00	410.68	205.34	0	16	8	0%	0	10%	30	8%	23	
Honey Bucket Farms	Land Application w/ Lime Stabilization	Operating	Kern County, CA	160	0	150,000	0.00	410.68	205.34	0	16	8	0%	0	10%	16	8%	12	
Mitsubishi Cement Corp	Injection for NO_x Control	Operating	San Bernardino County, CA	129	0	100,000	0.00	273.79	136.89	0	11	5	0%	0	7%	9	5%	7	
			total		450,000	1,500,000	1,232	4,107	2,669	49	164	107		**163**		**165**		**164**	**Miles (Weighted Mean)**

Existing Biosolids Management Practices (Chapter 2)

Facility	Management Practice	Status	Location	Distance From JWPCP (miles)	Quantity (wtpy) low	Quantity (wtpy) high	Quantity (wtpd) low	Quantity (wtpd) high	Quantity (wtpd) avg	truck trips per day low	truck trips per day high	truck trips per day avg	using low % of trips	using low	using high % of trips	using high	using avg % of trips	using avg	
San Joaquin Composting Facility	Composting	Operating	Kern County, CA	170	50,000	150,000	136.89	410.68	273.79	5	16	11	18%	30	20%	34	20%	33	
South Kern Industrial Center	Composting	Operating	Kern County, CA	131	50,000	75,000	136.89	205.34	171.12	5	8	7	18%	23	10%	13	12%	16	
Inland Empire Regional Composting Facility	Composting	Operating	Rancho Cucamonga, CA	59	50,000	75,000	136.89	205.34	171.12	5	8	7	18%	11	10%	6	12%	7	
Honey Bucket Farms	Land Application w/ Lime Stabilization	Operating	Kern County, CA	160	25,000	75,000	68.45	205.34	136.89	3	8	5	9%	14	10%	16	10%	16	
Desert Ridge Farms	Land Application	Operating	Yuma County, AZ	300	25,000	75,000	68.45	205.34	136.89	3	8	5	9%	27	10%	30	10%	29	
EnerTech	Renewable Fuel	Operating	Rialto, CA	75	25,000	75,000	68.45	205.34	136.89	3	8	5	9%	7	10%	8	10%	7	
Mitsubishi Cement Corp	Injection for NO_x Control	Operating	San Bernardino County, CA	129	5,000	15,000	13.69	41.07	27.38	1	2	1	2%	2	2%	3	2%	3	
Puente Hills Landfill	Landfill Co-disposal	Operating	Los Angeles County, CA	27	50,000	200,000	136.89	547.57	342.23	5	22	14	18%	5	27%	7	25%	7	
				total	280,000	740,000	767	2,026	1,396	31	81	56		**119**		**118**		**118**	**Miles (Weighted Mean)**

Biosolid Hauling - VMT in each basin

Methodology

used Google Earth to map the distance traveled from JWPCP to the various landfills within each basin

output GIS shapefiles into kml file for use

Assumed Distances

scab north	86.5	miles
scab south	56.1	miles
sdab to ssab	123	miles
ssab to AZ	94.5	miles

Miles Per Basin per trip

Future Facility	Basin of Facility	Distance From JWPCP (miles)	Future SCAB	Future SJV	Future SDAB	Future SSAB	
Westlake Farms	SJV	200	86.5	113.5	--	--	
EnerTech	SCAB	75	75	--	--	--	
South Kern Industrial Center	SJV	131	86.5	44.5	--	--	
Inland Empire Regional Composting Facility	SCAB	59	59	--	--	--	
San Joaquin Composting Facility	SJV	170	86.5	83.5	--	--	
Desert Ridge Farms	AZ	300	56.1	--	123	94.5	273.6
Honey Bucket Farms	SJV	160	86.5	73.5	--	--	
Mitsubishi Cement Corp	SCAB	129	129	--	--	--	
		1208	665.1	315	123	94.5	
		> weighted distances in each basin	55.06%	26.08%	10.18%	7.82%	

Existing Facility	Basin of Facility	Distance From JWPCP (miles)	Existing SCAB	Existing SJV	Existing SDAB	Existing SSAB
San Joaquin Composting Facility	SJV	170	86.5	83.5	--	--
South Kern Industrial Center	SJV	131	86.5	44.5	--	--
Inland Empire Regional Composting Facility	SCAB	59	59	--	--	--
Honey Bucket Farms	SJV	160	86.5	73.5	--	--
Desert Ridge Farms	AZ	300	56.1	--	123	94.5
EnerTech	SCAB	75	75	--	--	--
Mitsubishi Cement Corp	SCAB	129	129	--	--	--
Puente Hills Landfill	SCAB	27	27	--	--	--
		1035	605.6	201.5	123	94.5
		> weighted distances in each basin	58.51%	19.47%	11.88%	9.13%

Emission Factors for Biosolid Hauling Trucks

from EMFAC BURDEN mode, for regional hauling and idling

	Criteria Pollutants						GHGs		
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	N20	CH4
Pounds per mile									
2008	0.0031	0.0118	0.0397	0.0000	0.0021	0.0018	4.0518	0.000011	0.000011
2020	0.0009	0.0042	0.0098	0.0000	0.0006	0.0005	4.0622	0.000011	0.000011
2030	0.0005	0.0029	0.0056	0.0000	0.0004	0.0003	4.0566	0.000011	0.000011
2040	0.0005	0.0027	0.0052	0.0000	0.0004	0.0003	4.0706	0.000011	0.000011
2050	0.0005	0.0027	0.0052	0.0000	0.0004	0.0003	4.0706	0.000011	0.000011
Pounds per idle trip									
2008	0.0102	0.0368	0.0783	0.0014	0.0016	0.0015	4.8811	0.000013	0.000014
2020	0.0063	0.0314	0.0890	0.0016	0.0004	0.0003	4.8822	0.000013	0.000014
2030	0.0057	0.0306	0.0905	0.0016	0.0001	0.0001	4.8464	0.000013	0.000013
2040	0.0056	0.0304	0.0908	0.0016	0.0001	0.0001	4.8791	0.000013	0.000014
2050	0.0056	0.0304	0.0908	0.0016	0.0001	0.0001	4.8791	0.000013	0.000014

from EMFAC, 5mph, for onsite travel

	Criteria Pollutants						GHGs		
	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	N20	CH4
Pounds per mile									
2008	0.0299	0.0655	0.0988	0.0001	0.0070	0.0064	8.3544	0.000011	0.000011
2020	0.0093	0.0213	0.0276	0.0001	0.0011	0.0009	8.4350	0.000011	0.000011
2030	0.0056	0.0138	0.0165	0.0001	0.0004	0.0003	8.4461	0.000011	0.000011
2040	0.0052	0.0129	0.0153	0.0001	0.0003	0.0002	8.4475	0.000011	0.000011
2050	0.0052	0.0129	0.0153	0.0001	0.0003	0.0002	8.4475	0.000011	0.000011

N2O and CH4 emission factors from General Reporting Protocol, Version 3.1. (Jan 2009)

	grams/mi	lbs/mile	GHG ratio to CO2 for idling calcs
CH4	0.0051	1.12436E-05	2.77495E-06
N2O	0.0048	1.05822E-05	2.61171E-06

(Table C.4)

grams per pound *453.59*

Road Dust (EPA AP-42, Section 13.2.1 Paved Roads, November 2006)

	PM10	PM2.5
pounds per mile	0.021722332	0.00325835

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS REGIONAL TRAVEL

EMFAC 2007 regional hauling emission factors - 2008

Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2008 -- All model years in the range 1965 to 2008 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	49391				
VMT/1000	9028	9028000			
Trips	249946				
Reactive Organic Gas Emissions					
Run Exh	14.12		28240	0.003128046	
Idle Exh	1.27		2540		0.010162195
Start Ex	0				

Total Ex	15.39				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	15.39				
Carbon Monoxide Emissions					
Run Exh	53.11		106220	0.011765618	
Idle Exh	4.6		9200		0.036807951
Start Ex	0				

Total Ex	57.71				
Oxides of Nitrogen Emissions					
Run Exh	179.14		358280	0.039685423	
Idle Exh	9.79		19580		0.078336921
Start Ex	0				

Total Ex	188.93				
Carbon Dioxide Emissions (000)					
Run Exh	18.29		36580000	4.051838724	
Idle Exh	0.61		1220000		4.881054308
Start Ex	0				

Total Ex	18.9				
PM10 Emissions					
Run Exh	8.73		17460	0.001933983	
Idle Exh	0.2		400		0.001600346
Start Ex	0				

Total Ex	8.93				
TireWear	0.36		720	7.97519E-05	
BrakeWr	0.28		560	6.20292E-05	

Total	9.57				
Lead	0				
SOx	0.18		360	3.98759E-05	0.001440311
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	1700.79				

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS REGIONAL TRAVEL

EMFAC 2007 regional hauling emission factors - 2020

Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	65570				
VMT/1000	13761	13761000			
Trips	331816				
Reactive Organic Gas Emissions					
Run Exh	6.23		12460	0.000905457	
Idle Exh	1.04		2080		0.006268534
Start Ex	0				

Total Ex	7.28				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.28				
Carbon Monoxide Emissions					
Run Exh	28.7		57400	0.004171208	
Idle Exh	5.21		10420		0.031402946
Start Ex	0				

Total Ex	33.92				
Oxides of Nitrogen Emissions					
Run Exh	67.65		135300	0.009832134	
Idle Exh	14.76		29520		0.088964969
Start Ex	0				

Total Ex	82.41				
Carbon Dioxide Emissions (000)					
Run Exh	27.95		55900000	4.062204782	
Idle Exh	0.81		1620000		4.882223883
Start Ex	0				

Total Ex	28.76				
PM10 Emissions					
Run Exh	3.3		6600	0.000479616	
Idle Exh	0.06		120		0.000361646
Start Ex	0				

Total Ex	3.36				
TireWear	0.55		1100	7.99361E-05	
BrakeWr	0.43		860	6.24955E-05	

Total	4.33				
Lead	0				
SOx	0.27		540	3.92413E-05	0.001627408
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2588.03				

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS REGIONAL TRAVEL

EMFAC 2007 regional hauling emission factors - 2030

Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	82364				
VMT/1000	17044	17044000			
Trips	416803				
Reactive Organic Gas Emissions					
Run Exh	4.62		9240	0.000542126	
Idle Exh	1.19		2380		0.005710132
Start Ex	0				

Total Ex	5.81				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	5.81				
Carbon Monoxide Emissions					
Run Exh	24.37		48740	0.002859657	
Idle Exh	6.37		12740		0.030565999
Start Ex	0				

Total Ex	30.75				
Oxides of Nitrogen Emissions					
Run Exh	47.87		95740	0.005617226	
Idle Exh	18.87		37740		0.090546373
Start Ex	0				

Total Ex	66.74				
Carbon Dioxide Emissions (000)					
Run Exh	34.57		69140000	4.056559493	
Idle Exh	1.01		2020000		4.846414253
Start Ex	0				

Total Ex	35.58				
PM10 Emissions					
Run Exh	2.3		4600	0.00026989	
Idle Exh	0.03		60		0.000143953
Start Ex	0				

Total Ex	2.32				
TireWear	0.68		1360	7.97935E-05	
BrakeWr	0.53		1060	6.2192E-05	

Total	3.53				
Lead	0				
SOx	0.34		680	3.98967E-05	0.001631466
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	3202.33				

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS REGIONAL TRAVEL

EMFAC 2007 regional hauling emission factors - 2040

Title : South Coast AQMD Avg Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/06/04 16:22:34
Scen Year: 2040 -- All model years in the range 1996 to 2040 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day
****

	HHDT-DSL		lbs/day	lbs/mile	lbs/trip
Vehicles	104492				
VMT/1000	21594	21594000			
Trips	528782				
Reactive Organic Gas Emissions					
Run Exh	5.54		11080	0.000513105	
Idle Exh	1.49		2980		0.005635593
Start Ex	0				

Total Ex	7.03				
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.03				
Carbon Monoxide Emissions					
Run Exh	28.92		57840	0.002678522	
Idle Exh	8.05		16100		0.03044733
Start Ex	0				

Total Ex	36.98				
Oxides of Nitrogen Emissions					
Run Exh	56.22		112440	0.005207002	
Idle Exh	24		48000		0.090774648
Start Ex	0				

Total Ex	80.22				
Carbon Dioxide Emissions (000)					
Run Exh	43.95		87900000	4.07057516	
Idle Exh	1.29		2580000		4.879137338
Start Ex	0				

Total Ex	45.23				
PM10 Emissions					
Run Exh	2.61		5220	0.000241734	
Idle Exh	0.02		40		7.56455E-05
Start Ex	0				

Total Ex	2.64				
TireWear	0.86		1720	7.96518E-05	
BrakeWr	0.67		1340	6.20543E-05	

Total	4.17				
Lead	0				
SOx	0.43		860	3.98259E-05	0.001626379
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	4070.99				

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS ONSITE TRAVEL

```
Title      :  South  Coast  AQMD  Subarea  Annual  5 CYrs  2008 to  2040 Default  Title
Version    :  Emfac2007 V2.3  Nov  1  2006
Run        Date  :  6/10/2010  10:30:42
Scen       Year:  2008 --  All  model  years  in  the  range  1965 to  2008 selected
Season     :  Annual
Area       :  South  Coast  AQMD
*****************************************************************************************
           Year:  2008 --  Model  Years  1965 to  2008 Inclusive  --  Annual
           Emfac2007 Emission  Factors:  V2.3  Nov  1  2006

           District  Average  District  Average  South  Coast  AQMD

           Table  1:00 Running  Exhaust  Emissions  (grams/mile)

           Pollutant  Name:  Reactive  Org  Gases  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  13.564  0  0  13.564


           Pollutant  Name:  Carbon  Monoxide  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  29.699  0  0  29.699


           Pollutant  Name:  Oxides  of  Nitrogen  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  44.8  0  0  44.8


           Pollutant  Name:  Carbon  Dioxide  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  3789.508  0  0  3789.508


           Pollutant  Name:  Sulfur  Dioxide  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  0.036  0  0  0.036


           Pollutant  Name:  PM10  Temperature 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  3.127  0  0  3.127


           Pollutant  Name:  PM10  -  Tire  Wear  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  0.035  0  0  0.035


           Pollutant  Name:  PM10  -  Brake  Wear  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  0.028  0  0  0.028


           Pollutant  Name:  Gasoline  -  mi/gal  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  3.088  0  0  3.088


           Pollutant  Name:  Diesel  -  mi/gal  Temperatu 60F  Relative  Humidity:  50%

           Speed
           MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

                5  0  0  0  2.621  0  0  2.621
```

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS ONSITE TRAVEL

EMFAC 2007 on-site hauling emission factor - 2020

Title : South Coast AQMD Subarea Annual 5 CYrs 2008 to 2040 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 6/10/2010 10:30:42
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average South Coast AQMD

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	4.219	0	0	4.219

Pollutant Name: Carbon Monoxide Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	9.641	0	0	9.641

Pollutant Name: Oxides of Nitrogen Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	12.504	0	0	12.504

Pollutant Name: Carbon Dioxide Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3826.031	0	0	3826.031

Pollutant Name: Sulfur Dioxide Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.037	0	0	0.037

Pollutant Name: PM10 Temperature 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.424	0	0	0.424

Pollutant Name: PM10 - Tire Wear Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.036	0	0	0.036

Pollutant Name: PM10 - Brake Wear Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	0.028	0	0	0.028

Pollutant Name: Gasoline - mi/gal Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	3.182	0	0	3.182

Pollutant Name: Diesel - mi/gal Temperatu 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0	0	0	2.621	0	0	2.621

EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS ONSITE TRAVEL

EMFAC 2007 on-site hauling emission factor - 2030

```
Title      :  South  Coast  AQMD  Subarea  Annual  5 CYrs  2008 to  2040 Default  Title
Version    :  Emfac2007 V2.3  Nov  1  2006
Run  Date  :  6/10/2010  10:30:42
Scen  Year:  2030 --  All  model  years  in  the  range  1986 to  2030 selected
Season     :  Annual
Area       :  South  Coast  AQMD
*****************************************************************************************
        Year:  2030 --  Model  Years  1986 to  2030 Inclusive  --  Annual
        Emfac2007 Emission  Factors:  V2.3  Nov  1  2006

        District  Average  District  Average  South  Coast  AQMD

        Table  1:00 Running  Exhaust  Emissions  (grams/mile)

        Pollutant  Name:  Reactive  Org  Gases  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  2.553  0  0  2.553


        Pollutant  Name:  Carbon  Monoxide  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  6.275  0  0  6.275


        Pollutant  Name:  Oxides  of  Nitrogen  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  7.488  0  0  7.488


        Pollutant  Name:  Carbon  Dioxide  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  3831.069  0  0  3831.069


        Pollutant  Name:  Sulfur  Dioxide  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  0.037  0  0  0.037


        Pollutant  Name:  PM10  Temperature 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  0.111  0  0  0.111


        Pollutant  Name:  PM10  -  Tire  Wear  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  0.036  0  0  0.036


        Pollutant  Name:  PM10  -  Brake  Wear  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  0.028  0  0  0.028


        Pollutant  Name:  Gasoline  -  mi/gal  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  3.254  0  0  3.254


        Pollutant  Name:  Diesel  -  mi/gal  Temperatu 60F  Relative  Humidity:  50%

        Speed
        MPH  LDA  LDT  MDT  HDT  UBUS  MCY  ALL

             5  0  0  0  2.621  0  0  2.621
```

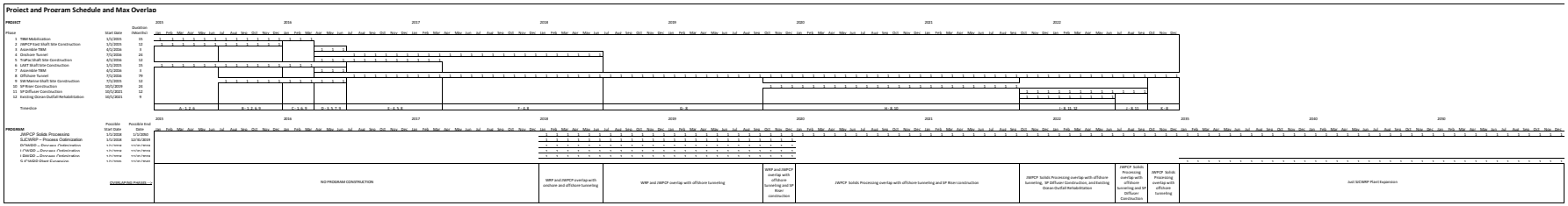
EMFAC 2007 EMISSION FACTORS - HEAVY DUTY BIOSOLIDS HAULING TRUCKS ONSITE TRAVEL

EMFAC 2007 on-site hauling emission factor - 2040

```
Title      :  South  Coast  AQMD  Subarea  Annual  5 CYrs  2008 to  2040 Default  Title
Version    :  Emfac2007 V2.3  Nov  1  2006
Run Date   :  6/10/2010  10:30:42
Scen Year: 2040 -- All model years in the range 1996 to 2040 selected
Season     :  Annual
Area       :  South  Coast  AQMD
**********************************************************************************************
Year: 2040 -- Model Years 1996 to 2040 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average South Coast AQMD

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Reactive Org Gases Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 2.371 0 0 2.371


Pollutant Name: Carbon Monoxide Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 5.859 0 0 5.859


Pollutant Name: Oxides of Nitrogen Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 6.931 0 0 6.931


Pollutant Name: Carbon Dioxide Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 3831.709 0 0 3831.709


Pollutant Name: Sulfur Dioxide Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 0.037 0 0 0.037


Pollutant Name: PM10 Temperature 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 0.09 0 0 0.09


Pollutant Name: PM10 - Tire Wear Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 0.036 0 0 0.036


Pollutant Name: PM10 - Brake Wear Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 0.028 0 0 0.028


Pollutant Name: Gasoline - mi/gal Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 3.269 0 0 3.269


Pollutant Name: Diesel - mi/gal Temperatu 60F Relative Humidity: 50%

Speed
MPH LDA LDT MDT HDT UBUS MCY ALL

5 0 0 0 2.621 0 0 2.621
```

Project Construction GHG Calculations

Alternative 1



UNMITIGATED

PROJECT EMISSION CALCULATIONS

Phase 1 — TBM Mobilization, Start Date 2015

Equipment	Type	HP	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs						Emission Factor								
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.6	3.8	4.3	0.0	0.3	0.3	568.3	0.1	0.0
Change House	offroad	-	16	1.00	0	24	0							308.9	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.9	0.0	0.0
Crawler Crane	offroad	500	500	0.64	0	6	0	0.5	1.8	4.0	0.0	0.2	0.1	549.6	0.0	0.0
Forklift	offroad	145	145	0.60	0	6	0	0.5	3.3	4.0	0.0	0.2	0.2	568.3	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.9	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.4	1.2	2.8	0.0	0.1	0.1	568.3	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.4	1.2	3.2	0.0	0.1	0.1	568.3	0.0	0.0
Loader	offroad	349	349	0.54	0	6	0	0.4	1.4	3.4	0.0	0.1	0.1	568.3	0.0	0.0
Motor Grader	offroad	259	259	0.61	0	6	0	0.4	1.3	3.9	0.0	0.1	0.1	568.3	0.0	0.0
Office Trailers	offroad	-	56	1.00	0	24	0							308.9	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.9	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.9	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.9	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.9	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.9	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.9	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.9	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.9	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.6	3.8	4.2	0.0	0.3	0.3	568.3	0.1	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.9	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.9	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.9	0.0	0.0
Water Truck	offroad	189	189	0.57	0	8	0	0.4	1.3	3.4	0.0	0.1	0.1	568.3	0.0	0.0
Worker Hoist	offroad	-	28	1.00	0	3	0							308.9	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Crew Boats	offroad	400	400	0.45	0	2	0	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Crane Barge	offroad	750	750	0.43	0	8	0	0.2	1.0	1.9	0.0	0.1	0.1	568.3	0.0	0.0
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.5	1.4	5.3	0.0	0.2	0.1	568.3	0.0	0.0
Dump Barge	offroad	250	250	0.51	0	8	0	0.4	1.3	4.0	0.0	0.1	0.1	568.3	0.0	0.0
Generator	offroad	500	500	0.74	0	8	0	0.4	1.3	3.5	0.0	0.1	0.1	568.3	0.0	0.0
Service Vessel	offroad	500	500	0.45	0	2	0	0.2	5.0	4.1	0.0	0.1	0.1	915.9	0.0	0.0
Locomotives	offroad	185	185	1.00	0	12	0	0.3	2.6	4.7	0.0	0.1	0.1	35.0	0.0	0.0
Hoist	offroad	250	250	0.51	0	4	0	0.4	1.3	4.0	0.0	0.1	0.1	568.3	0.0	0.0
Pump	offroad	500	500	0.74	0	8	0	0.3	1.2	3.3	0.0	0.1	0.1	568.3	0.0	0.0
		Daily Trips		Tons Soil												
On-Road Truck - Idle	onroad	-						9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				0								0.000166	0.0000249			
		Daily		Miles /	Acres Disturbed											
On-Road Truck	onroad	0		0				0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad	0						3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	0		0				0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad	0						0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Unmitigated Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Equipment	Number Active
Backhoe/L	0
Change	0
Crawler	0
Forklift	0
Gantry	0
Hydaulic	0
Hydaulic	0
Motor	0
Office	0
Shaft and	0
Shaft	0
Shop	0
Shop	0
Site	0
Slurry	0
Slurry	0
Slurry	0
Street	0
TBM &	0
Tower	0
Tunnel	0
Water	0
Worker Hoist	0
Tugboats	0
Tugboat -	0
Crew Boats	0
Crew	0
Crane	0
Pipe	0
Dump	0
Generato	0
Service	0
Locomoti	0
Hoist	0
Pump	0

Phase 2 — JWPCP East Shaft, Start Date 2015

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs						Emission Factor								
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003
Crawler Crane	offroad	500	500	0.64	2	6	3840	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	145	0.60	0	6	0	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	518	0.57	1	12	3543.12	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	210	0.57	1	8	957.6	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	349	0.54	2	6	2261.52	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	259	0.61	1	6	947.94	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003
Street Sweeper	offroad	90	90	0.68	0	12	0	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003
Water Truck	offroad	189	189	0.57	1	8	861.84	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	750	0.43	0	8	0	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	250	0.51	0	8	0	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	500	0.74	0	8	0	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	250	0.51	0	4	0	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	500	0.74	0	8	0	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000
		Daily Trips		Tons Soil												
On-Road Truck - Idle	onroad	130						9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250								0.000166	0.0000249			
		Daily		Miles /	Acres Disturbed											
On-Road Truck	onroad	130		7800				0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad	130						3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20		400				0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad	20						0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.8	14.9	5.1	0.0	0.7	0.6	4652.6	0.1	0.0	4654.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.5	9.4	3.3	0.0	0.4	0.4	4439.1	0.0	0.0	4440.1
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.2	2.6	1.0	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.4	6.9	2.5	0.0	0.3	0.3	2833.4	0.0	0.0	2834.1
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.2	2.8	1.2	0.0	0.2	0.1	1187.6	0.0	0.0	1188.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.1	2.4	1.0	0.0	0.1	0.1	1079.8	0.0	0.0	1080.1
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.54	0.08				
On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.4	40.1	17.0	0.2	2.4	1.8	15550.2	0.2	0.0	15554.2
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase

3 **Assemble TBM**

Start Date 2016

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs						**Emission Factor**								
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003
Crawler Crane	offroad	500	500	0.64	0	6	0	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	145	0.60	0	6	0	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	349	0.54	0	6	0	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	259	0.61	0	6	0	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003
Street Sweeper	offroad	90	90	0.68	0	12	0	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003
Water Truck	offroad	189	189	0.57	0	8	0	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	750	0.43	0	8	0	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	250	0.51	0	8	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	500	0.74	0	8	0	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	250	0.51	0	4	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	500	0.74	0	8	0	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000
		Daily Trips		**Tons Soil**												
On-Road Truck - Idle	onroad	-						9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0								0.000166	0.0000249			
			Daily		**Miles /**	**Acres Disturbed**										
On-Road Truck	onroad		0		0			0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0					3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad		0		0			0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0					0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										**Mitigated Daily Emission Rates (lbs/day)**									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase

4 **Onshore Tunnel**

Start Date 2016

Equipment	Type	HP	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs						**Emission Factor**								
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	1.00	1	24	384							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	1.00	1	12	4800							308.901	0.013	0.003
Crawler Crane	offroad	500	500	0.64	0	6	0	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	145	0.60	2	6	1044	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	1.00	1	3	480							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	349	0.54	2	6	2261.52	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	259	0.61	0	6	0	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	1.00	1	24	1344							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	1.00	1	24	3360							308.901	0.013	0.003
Shaft Pump	offroad	-	80	1.00	1	8	640							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	1.00	1	12	720							308.901	0.013	0.003
Shop (welding)	offroad	-	60	1.00	1	6	360							308.901	0.013	0.003
Site Lighting	offroad	-	8	1.00	1	24	192							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	1	12	59520							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	1	12	28800							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	1.00	1	19	60800							308.901	0.013	0.003
Street Sweeper	offroad	90	90	0.68	1	12	734.4	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	1.00	1	12	26880							308.901	0.013	0.003
Tower Crane	offroad		240	1.00	1	10	2400							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	1.00	1	24	71040							308.901	0.013	0.003
Water Truck	offroad	189	189	0.57	0	8	0	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	1.00	1	3	84							308.901	0.013	0.003
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	750	0.43	0	8	0	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	250	0.51	0	8	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	500	0.74	0	8	0	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	185	1.00	5	12	11100	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	250	0.51	0	4	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	500	0.74	0	8	0	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000
		Daily Trips		**Tons Soil**												
On-Road Truck - Idle	onroad	222						9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550								0.000166	0.0000249			
			Daily		**Miles /**	**Acres Disturbed**										
On-Road Truck	onroad		222		13320			0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222					3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad		240		4800			0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240					0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										**Mitigated Daily Emission Rates (lbs/day)**									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.0	0.0	0.0	0.0	0.0	0.0	261.5	0.0	0.0	262.5
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.0	0.0	0.0	0.0	0.0	0.0	3268.8	0.1	0.0	3280.9
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.2	7.6	1.2	0.0	0.4	0.3	1308.0	0.0	0.0	1308.4
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.0	0.0	0.0	0.0	0.0	0.0	326.9	0.0	0.0	328.1
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.3	6.7	2.3	0.0	0.3	0.3	2833.4	0.0	0.0	2834.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.0	0.0	0.0	0.0	0.0	0.0	915.3	0.0	0.0	918.7
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.0	0.0	0.0	0.0	0.0	0.0	2288.2	0.1	0.0	2296.6
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.0	0.0	0.0	0.0	0.0	0.0	435.8	0.0	0.0	437.5
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.0	0.0	0.0	0.0	0.0	0.0	490.3	0.0	0.0	492.1
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.0	0.0	0.0	0.0	0.0	0.0	245.2	0.0	0.0	246.1
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.0	0.0	0.0	0.0	0.0	0.0	130.8	0.0	0.0	131.2
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.0	0.0	0.0	0.0	0.0	0.0	40533.0	1.7	0.4	40683.3
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.0	0.0	0.0	0.0	0.0	0.0	19612.8	0.8	0.2	19685.5
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.0	0.0	0.0	0.0	0.0	0.0	41404.7	1.7	0.4	41558.3
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.1	6.1	1.0	0.0	0.3	0.2	920.1	0.0	0.0	920.3
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.0	0.0	0.0	0.0	0.0	0.0	18305.2	0.8	0.2	18373.1
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.0	0.0	0.0	0.0	0.0	0.0	1634.4	0.1	0.0	1640.5
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.0	0.0	0.0	0.0	0.0	0.0	48378.1	2.0	0.4	48557.5
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.0	0.0	0.0	0.0	0.0	0.0	57.2	0.0	0.0	57.4
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.6	63.6	7.3	0.1	0.4	0.4	855.4	0.0	0.0	863.2
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.92	0.14				
On Site Total	**10.7**	**85.7**	**148.2**	**0.2**	**5.9**	**5.0**	**184474.9**	**7.8**	**1.7**	**185151.2**	**4.7**	**85.7**	**16.7**	**0.2**	**2.2**	**1.3**	**184474.9**	**7.5**	**1.7**	**185145.1**
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	**32**	**183**	**371**	**1**	**18**	**15**	**243611**	**8**	**2**	**244480**	**16**	**147**	**125**	**1**	**8**	**5**	**243611**	**8**	**2**	**244474**

Phase

5 TraPac Shaft Site

Start Date 2016

		Equipment Specs						Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	500	0.64	2	6	3840	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	3.92	14.12	31.41	0.05	1.20	1.07	4652.56	0.35	0.00	4659.98	0.7	14.1	4.7	0.0	0.7	0.6	4652.6	0.1	0.0	4653.9
Forklift	offroad	145	145	0.60	0	6	0	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	1	12	3543.12	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	2.84	9.21	19.54	0.04	0.70	0.62	4439.05	0.26	0.00	4444.44	0.5	9.2	2.9	0.0	0.4	0.3	4439.1	0.0	0.0	4440.0
Hydaulic Excavator - Medium	offroad	210	210	0.57	1	8	957.6	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.80	2.56	5.99	0.01	0.20	0.18	1199.74	0.07	0.00	1201.26	0.1	2.6	0.9	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	offroad	349	349	0.54	2	6	2261.52	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.3	6.7	2.3	0.0	0.3	0.3	2833.4	0.0	0.0	2834.0
Motor Grader	offroad	259	259	0.61	1	6	947.94	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.87	2.71	7.27	0.01	0.25	0.22	1187.64	0.08	0.00	1189.28	0.2	2.7	1.1	0.0	0.1	0.1	1187.6	0.0	0.0	1187.9
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	189	0.57	1	8	861.84	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.77	2.37	5.67	0.01	0.19	0.17	1079.77	0.07	0.00	1081.22	0.1	2.4	0.9	0.0	0.1	0.1	1079.8	0.0	0.0	1080.0
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	offroad	750	750	0.43	0	8	0	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	250	0.51	0	8	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	500	0.74	0	8	0	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	250	0.51	0	4	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	500	0.74	0	8	0	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Tons Soil	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130		9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust			3250					0.000166	0.0000249								0.54	0.08									0.54	0.08				
												On Site Total	11.3	38.7	87.8	0.2	3.6	2.8	15550.2	1.0	0.0	15571.2	2.3	38.7	15.6	0.2	2.2	1.6	15550.2	0.2	0.0	15554.0

Equipment	Type	Daily	Miles /	Acres Disturbed	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	130	7800		0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	10.66	44.92	121.07	0.31	7.05	5.84	31697.93	0.09	0.08	31725.36	4.88	24.36	53.53	0.30	2.93	2.04	31697.93	0.09	0.08	31725.36
On-Road Truck	onroad	130			3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.91	4.22	11.31	0.00	0.08	0.08	629.25	0.00	0.00	629.25	0.73	3.95	11.81	0.00	0.00	0.00	629.25	0.00	0.00	629.25
On-Road Crew Vehicle	onroad	20	400		0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08
On-Road Crew Vehicle	onroad	20			0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15
													Total	23	88	217	0	11	9	48069	1	0	48130	8	67	78	0	5	4	48069	0	0	48113

Equipment	Backhoe/L	Change	Crawler	Forklift	Gantry	Hydaulic	Hydaulic	Motor	Office	Shaft and	Shaft	Shop	Shop	Site	Slurry	Slurry	Slurry	Street	TBM &	Tower	Tunnel	Water	Worker Hoist	Tugboats	Tugboat -	Crew Boats	Crew	Crane	Pipe	Dump	Generato	Service	Locomoti	Hoist	Pump
Number Active	0	0	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase

6 LAXT Shaft Site

Start Date 2015

		Equipment Specs						Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	500	0.64	2	6	3840	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.8	14.9	5.1	0.0	0.7	0.6	4652.6	0.1	0.0	4654.0
Forklift	offroad	145	145	0.60	0	6	0	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	1	12	3543.12	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.5	9.4	3.3	0.0	0.4	0.4	4439.1	0.0	0.0	4440.1
Hydaulic Excavator - Medium	offroad	210	210	0.57	1	8	957.6	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.2	2.6	1.0	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	offroad	349	349	0.54	2	6	2261.52	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.4	6.9	2.5	0.0	0.3	0.3	2833.4	0.0	0.0	2834.1
Motor Grader	offroad	259	259	0.61	1	6	947.94	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.2	2.8	1.2	0.0	0.2	0.1	1187.6	0.0	0.0	1188.0
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	189	0.57	1	8	861.84	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.1	2.4	1.0	0.0	0.1	0.1	1079.8	0.0	0.0	1080.1
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	offroad	750	750	0.43	0	8	0	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	250	0.51	0	8	0	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	500	0.74	0	8	0	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	250	0.51	0	4	0	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	500	0.74	0	8	0	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Tons Soil	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130		9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust			3250					0.000166	0.0000249								0.54	0.08									0.54	0.08				
												On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.4	40.1	17.0	0.2	2.4	1.8	15550.2	0.2	0.0	15554.2

Equipment	Type	Daily	Miles /	Acres Disturbed	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	130	7800		0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad	130			3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	400		0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad	20			0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
													Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase
7 Assemble TBM
Start Date
2016

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs						**Emission Factor**								
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003
Crawler Crane	offroad	500	500	0.64	0	6	0	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	145	0.60	0	6	0	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	349	0.54	0	6	0	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	259	0.61	0	6	0	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003
Street Sweeper	offroad	90	90	0.68	0	12	0	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003
Water Truck	offroad	189	189	0.57	0	8	0	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	750	0.43	0	8	0	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	250	0.51	0	8	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	500	0.74	0	8	0	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	250	0.51	0	4	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	500	0.74	0	8	0	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										**Mitigated Daily Emission Rates (lbs/day)**									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Tons Soil	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-		9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust			0					0.000166	0.0000249								0.00	0.00									0.00	0.00				
												On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Daily	Miles /	Acres Disturbed	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	0	0		0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad	0			3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	0	0		0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	0			0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
													Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase
8 Offshore Tunnel
Start Date
2016

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs						**Emission Factor**								
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	1.00	1	24	384							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	1.00	1	12	4800							308.901	0.013	0.003
Crawler Crane	offroad	500	500	0.64	0	6	0	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	145	0.60	2	6	1044	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	1.00	1	3	480							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	349	0.54	2	6	2261.52	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	259	0.61	0	6	0	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	1.00	1	24	1344							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	200	1.00	1	24	4800							308.901	0.013	0.003
Shaft Pump	offroad	-	80	1.00	1	8	640							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	1.00	1	12	720							308.901	0.013	0.003
Shop (welding)	offroad	-	60	1.00	1	6	360							308.901	0.013	0.003
Site Lighting	offroad	-	8	1.00	1	24	192							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	8.000	1.00	1	12	96000							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	3.760	1.00	1	12	45120							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	1.00	1	19	60800							308.901	0.013	0.003
Street Sweeper	offroad	90	90	0.68	1	12	734.4	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	1.00	1	12	26880							308.901	0.013	0.003
Tower Crane	offroad		240	1.00	1	10	2400							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	3.600	1.00	1	24	86400							308.901	0.013	0.003
Water Truck	offroad	189	189	0.57	0	8	0	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	1.00	1	3	84							308.901	0.013	0.003
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	750	0.43	0	8	0	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	250	0.51	0	8	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	500	0.74	0	8	0	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	185	1.00	5	12	11100	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	250	0.51	0	4	0	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	500	0.74	0	8	0	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										**Mitigated Daily Emission Rates (lbs/day)**									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.0	0.0	0.0	0.0	0.0	0.0	261.5	0.0	0.0	262.5
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.0	0.0	0.0	0.0	0.0	0.0	3268.8	0.1	0.0	3280.9
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.2	7.6	1.2	0.0	0.4	0.3	1308.0	0.0	0.0	1308.4
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.0	0.0	0.0	0.0	0.0	0.0	326.9	0.0	0.0	328.1
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.3	6.7	2.3	0.0	0.3	0.3	2833.4	0.0	0.0	2834.0
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.0	0.0	0.0	0.0	0.0	0.0	915.3	0.0	0.0	918.7
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.0	0.0	0.0	0.0	0.0	0.0	3268.8	0.1	0.0	3280.9
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.0	0.0	0.0	0.0	0.0	0.0	435.8	0.0	0.0	437.5
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.0	0.0	0.0	0.0	0.0	0.0	490.3	0.0	0.0	492.1
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.0	0.0	0.0	0.0	0.0	0.0	245.2	0.0	0.0	246.1
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.0	0.0	0.0	0.0	0.0	0.0	130.8	0.0	0.0	131.2
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29	0.0	0.0	0.0	0.0	0.0	0.0	65375.9	2.7	0.6	65618.3
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60	0.0	0.0	0.0	0.0	0.0	0.0	30726.7	1.3	0.3	30840.6
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.0	0.0	0.0	0.0	0.0	0.0	41404.7	1.7	0.4	41558.3
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.1	6.1	1.0	0.0	0.3	0.2	920.1	0.0	0.0	920.3
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.0	0.0	0.0	0.0	0.0	0.0	18305.2	0.8	0.2	18373.1
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.0	0.0	0.0	0.0	0.0	0.0	1634.4	0.1	0.0	1640.5
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46	0.0	0.0	0.0	0.0	0.0	0.0	58838.3	2.4	0.5	59056.5
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.0	0.0	0.0	0.0	0.0	0.0	57.2	0.0	0.0	57.4
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.6	63.6	7.3	0.1	0.4	0.4	855.4	0.0	0.0	863.2
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Tons Soil	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	282		9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82
Fugitive Dust			7050					0.000166	0.0000249								1.17	0.18									1.17	0.18				
												On Site Total	**10.8**	**86.2**	**149.5**	**0.2**	**6.2**	**5.0**	**231945.3**	**9.8**	**2.1**	**232797.4**	**4.8**	**86.2**	**18.0**	**0.2**	**2.5**	**1.4**	**231945.3**	**9.5**	**2.1**	**232791.4**

Equipment	Type	Daily	Miles /	Acres Disturbed	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	282	16920		0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	23.12	97.45	262.63	0.68	15.30	12.66	68760.13	0.19	0.18	68819.63	10.58	52.84	116.11	0.64	6.36	4.42	68760.13	0.19	0.18	68819.63
On-Road Truck	onroad	282			3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.97	9.15	24.53	0.00	0.18	0.17	1364.98	0.00	0.00	1364.98	1.58	8.57	25.62	0.00	0.00	0.00	1364.98	0.00	0.00	1364.98
On-Road Crew Vehicle	onroad	240	4800		0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	onroad	240			0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
													Total	**37.04**	**206**	**432**	**1**	**22**	**18**	**305929**	**10**	**3**	**306986**	**18**	**161**	**155**	**1**	**9**	**6**	**305929**	**10**	**3**	**306980**

Phase 9 SW Marine Shaft
Start Date 2015

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
		Equipment Specs						Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	500	0.64	2	6	3840	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.8	14.9	5.1	0.0	0.7	0.6	4652.6	0.1	0.0	4654.0
Forklift	offroad	145	145	0.60	0	6	0	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	1	12	3543.12	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.5	9.4	3.3	0.0	0.4	0.4	4439.1	0.0	0.0	4440.1
Hydaulic Excavator - Medium	offroad	210	210	0.57	1	8	957.6	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.2	2.6	1.0	0.0	0.1	0.1	1199.7	0.0	0.0	1200.0
Loader	offroad	349	349	0.54	2	6	2261.52	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.4	6.9	2.5	0.0	0.3	0.3	2833.4	0.0	0.0	2834.1
Motor Grader	offroad	259	259	0.61	1	6	947.94	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.2	2.8	1.2	0.0	0.2	0.1	1187.6	0.0	0.0	1188.0
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	189	0.57	1	8	861.84	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.1	2.4	1.0	0.0	0.1	0.1	1079.8	0.0	0.0	1080.1
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	offroad	57	57	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	offroad	400	400	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	offroad	25	25	0.43	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	offroad	750	750	0.43	0	8	0	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	250	0.51	0	8	0	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	500	0.74	0	8	0	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	500	0.45	0	2	0	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	250	0.51	0	4	0	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	500	0.74	0	8	0	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Daily Trips		Tons Soil																																
On-Road Truck - Idle	onroad	130						9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust				3250								0.000166	0.0000249								0.54	0.08									0.54	0.08				
																On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.4	40.1	17.0	0.2	2.4	1.8	15550.2	0.2	0.0	15554.2
			Daily		Miles /	Acres Disturbed																														
On-Road Truck	onroad		130		7800			0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130					3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad		20		400			0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20					0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
																Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Equipment	Backhoe/L	Change	Crawler	Forklift	Gantry	Hydaulic	Hydaulic	Motor	Office	Shaft and	Shaft	Shop	Shop	Site	Slurry	Slurry	Slurry	Street	TBM &	Tower	Tunnel	Water	Worker Hoist	Tugboats	Tugboat -	Crew Boats	Crew	Crane	Pipe	Dump	Generato	Service	Locomoti	Hoist	Pump
Number Active	0	0	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 10 SP Riser
Start Date 2019

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
		Equipment Specs						Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	500	0.64	0	6	0	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	offroad	145	145	0.60	0	6	0	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	offroad	349	349	0.54	0	6	0	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	offroad	259	259	0.61	0	6	0	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	189	0.57	0	8	0	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	3	2	2418	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77	1.2	26.7	21.8	0.0	0.6	0.5	4882.5	0.0	0.2	4951.8
Tugboat - Aux	offroad	57	57	0.43	3	2	147.06	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16	0.1	1.6	1.3	0.0	0.0	0.0	296.9	0.0	0.0	301.2
Crew Boats	offroad	400	400	0.45	3	2	1080	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71	0.5	11.9	9.7	0.0	0.3	0.2	2180.8	0.0	0.1	2211.7
Crew Boats - Aux	offroad	25	25	0.43	3	2	64.5	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09	0.0	0.7	0.6	0.0	0.0	0.0	130.2	0.0	0.0	132.1
Crane Barge	offroad	750	750	0.43	0	8	0	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	250	0.51	0	8	0	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	500	0.74	0	8	0	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	500	0.45	1	2	450	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.2	5.0	0.6	0.0	0.1	0.1	908.6	0.0	0.0	921.5
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	250	0.51	0	4	0	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	500	0.74	0	8	0	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Daily Trips		Tons Soil																																
On-Road Truck - Idle	onroad	16						8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400								0.000166	0.0000249								0.07	0.01									0.07	0.01				
																On Site Total	2.1	46.0	37.8	0.1	1.1	0.9	8418.5	0.0	0.4	8537.7	2.1	46.0	34.4	0.1	1.0	0.9	8418.5	0.0	0.4	8537.6
			Daily		Miles /	Acres Disturbed																														
On-Road Truck	onroad		16		960			0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	0.96	4.30	10.46	0.04	0.65	0.52	3899.45	0.01	0.01	3902.82	0.60	3.02	6.30	0.04	0.37	0.26	3899.45	0.01	0.01	3902.82
On-Road Truck	onroad		16					2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.10	0.51	1.42	0.00	0.01	0.01	77.47	0.00	0.00	77.47	0.09	0.49	1.45	0.00	0.00	0.00	77.47	0.00	0.00	77.47
On-Road Crew Vehicle	onroad		30		600			0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23
On-Road Crew Vehicle	onroad		30					0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69
																Total	3	52	49	0	2	1	12898	0	0	13037	3	51	42	0	1	1	12898	0	0	13037

Phase

11 SP Diffuser
Start Date
2021

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
		Equipment Specs						Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	500	0.64	0	6	0	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	offroad	145	145	0.60	0	6	0	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	offroad	349	349	0.54	0	6	0	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	offroad	259	259	0.61	0	6	0	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	189	0.57	0	8	0	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	2	2	1612	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.8	17.8	14.5	0.0	0.4	0.4	3255.0	0.0	0.1	3301.2
Tugboat - Aux	offroad	57	57	0.43	2	2	98.04	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.0	1.1	0.9	0.0	0.0	0.0	198.0	0.0	0.0	200.8
Crew Boats	offroad	400	400	0.45	1	2	360	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.2	4.0	3.2	0.0	0.1	0.1	726.9	0.0	0.0	737.2
Crew Boats - Aux	offroad	25	25	0.43	1	2	21.5	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.0	0.2	0.2	0.0	0.0	0.0	43.4	0.0	0.0	44.0
Crane Barge	offroad	750	750	0.43	1	8	2580	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000	0.86	5.70	3.38	0.03	0.10	0.09	3232.39	0.08	0.00	3234.03	0.2	5.7	0.5	0.0	0.1	0.1	3232.4	0.0	0.0	3232.7
Pipe Barge	offroad	2.000	2.000	0.59	1	8	9440	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000	7.35	24.46	76.05	0.12	1.82	1.62	11827.05	0.66	0.00	11840.97	1.3	24.5	11.4	0.1	1.0	0.9	11827.1	0.1	0.0	11829.6
Dump Barge	offroad	250	250	0.51	0	8	0	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	500	0.74	2	8	5920	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000	3.85	14.31	22.92	0.07	0.84	0.75	7416.97	0.35	0.00	7424.26	0.7	14.3	3.4	0.1	0.5	0.4	7417.0	0.1	0.0	7418.3
Service Vessel	offroad	500	500	0.45	1	2	450	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.2	5.0	0.6	0.0	0.1	0.1	908.6	0.0	0.0	921.5
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	250	0.51	1	4	510	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.33	1.27	2.20	0.01	0.07	0.07	638.96	0.03	0.00	639.58	0.1	1.3	0.3	0.0	0.0	0.0	639.0	0.0	0.0	639.1
Pump	offroad	500	500	0.74	1	8	2960	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000	1.30	6.65	10.84	0.04	0.36	0.32	3708.48	0.12	0.00	3710.94	0.2	6.7	1.6	0.0	0.2	0.2	3708.5	0.0	0.0	3708.9

Equipment	Type	Daily Trips	Tons Soil	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16		8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust			400					0.000166	0.0000249								0.07	0.01									0.07	0.01				
												On Site Total	**15.0**	**80.5**	**138.6**	**0.3**	**3.9**	**3.4**	**31975.2**	**1.3**	**0.2**	**32074.0**	**3.8**	**80.5**	**37.1**	**0.3**	**2.4**	**2.1**	**31975.2**	**0.3**	**0.2**	**32052.7**

Equipment	Type	Daily	Miles /	Acres Disturbed	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	16	960		0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005	0.80	3.75	8.59	0.04	0.55	0.42	3909.79	0.01	0.01	3913.16	0.60	3.00	6.17	0.04	0.38	0.27	3909.79	0.01	0.01	3913.16
On-Road Truck	onroad	16			2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000	0.10	0.50	1.43	0.00	0.01	0.01	78.10	0.00	0.00	78.10	0.09	0.49	1.45	0.00	0.00	0.00	78.10	0.00	0.00	78.10
On-Road Crew Vehicle	onroad	30	600		0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32
On-Road Crew Vehicle	onroad	30			0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67
													Total	**16**	**86**	**148**	**0**	**4**	**4**	**36467**	**1**	**0**	**36585**	**5**	**85**	**44**	**0**	**3**	**2**	**36467**	**0**	**0**	**36564**

Equipment	Backhoe/L	Change	Crawler	Forklift	Gantry	Hydaulic	Hydaulic	Motor	Office	Shaft and	Shaft	Shop	Shop	Site	Slurry	Slurry	Slurry	Street	TBM &	Tower	Tunnel	Water	Worker Hoist	Tugboats	Tugboat -	Crew Boats	Crew	Crane	Pipe	Dump	Generato	Service	Locomoti	Hoist	Pump
Number Active	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	0	2	1	0	1	1

Phase

12 Existing Ocean
Start Date
2021

Equipment	Type	HP	Power	LF	Number	Equipment	Daily Hp-	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
		Equipment Specs						Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	offroad	120	120	0.55	0	18	0	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	offroad	-	16	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	offroad	500	500	0.64	0	6	0	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	offroad	145	145	0.60	0	6	0	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	offroad		160	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	offroad	518	518	0.57	0	12	0	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	210	0.57	0	8	0	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	offroad	349	349	0.54	0	6	0	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	offroad	259	259	0.61	0	6	0	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	offroad	-	56	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	offroad	-	80	1.00	0	8	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	offroad	-	60	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	offroad	-	60	1.00	0	6	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	offroad	-	8	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2.400	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	offroad	-	3.200	1.00	0	19	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	offroad	90	90	0.68	0	12	0	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	offroad	-	2.240	1.00	0	12	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	offroad		240	1.00	0	10	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2.960	1.00	0	24	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	offroad	189	189	0.57	0	8	0	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	offroad	-	28	1.00	0	3	0							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	offroad	1.300	1.300	0.31	2	2	1612	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.8	17.8	14.5	0.0	0.4	0.4	3255.0	0.0	0.1	3301.2
Tugboat - Aux	offroad	57	57	0.43	2	2	98.04	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.0	1.1	0.9	0.0	0.0	0.0	198.0	0.0	0.0	200.8
Crew Boats	offroad	400	400	0.45	1	2	360	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.2	4.0	3.2	0.0	0.1	0.1	726.9	0.0	0.0	737.2
Crew Boats - Aux	offroad	25	25	0.43	1	2	21.5	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.0	0.2	0.2	0.0	0.0	0.0	43.4	0.0	0.0	44.0
Crane Barge	offroad	750	750	0.43	0	8	0	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	offroad	2.000	2.000	0.59	0	8	0	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	offroad	250	250	0.51	0	8	0	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	offroad	500	500	0.74	0	8	0	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	offroad	500	500	0.45	1	2	450	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.2	5.0	0.6	0.0	0.1	0.1	908.6	0.0	0.0	921.5
Locomotives	offroad	185	185	1.00	0	12	0	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	offroad	250	250	0.51	0	4	0	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	offroad	500	500	0.74	0	8	0	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Tons Soil	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-		8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust			0					0.000166	0.0000249								0.00	0.00									0.00	0.00				
												On Site Total	**1.3**	**28.0**	**22.9**	**0.0**	**0.6**	**0.6**	**5131.9**	**0.0**	**0.2**	**5204.8**	**1.3**	**28.0**	**19.4**	**0.0**	**0.6**	**0.5**	**5131.9**	**0.0**	**0.2**	**5204.7**

Equipment	Type	Daily	Miles /	Acres Disturbed	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	0	0		0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad	0			2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	400		0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21
On-Road Crew Vehicle	onroad	20			0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12
													Total	**1**	**29**	**23**	**0**	**1**	**1**	**5481**	**0**	**0**	**5564**	**1**	**29**	**20**	**0**	**1**	**1**	**5481**	**0**	**0**	**5564**

[a] Per CARB Regulations "A driver of a diesel-fueled motor vehicle with a gross vehicle weight rating (GVWR) greater than 10,000 pounds is prohibited from idling the vehicle's primary engine for more than 5 minutes at any location." Available http://www.arb.ca.gov/enf/diesel.htm#cmvidling.

GHG'S BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP East Shaft Site Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	24	59,073	2	1	59,284	59,073	2	1	59,283
5	TraPac Shaft Site Construction	4/1/2016	12	5,820	0	0	5,828	5,820	0	0	5,825
6	LAXT Shaft Site Construction	1/1/2015	15	7,272	0	0	7,281	7,272	0	0	7,278
7	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
8	Offshore Tunnel	7/1/2016	79	241,584	8	2	242,419	241,584	8	2	242,414
9	SW Marine Shaft Site Construction	7/1/2015	12	5,833	0	0	5,841	5,833	0	0	5,839
10	SP Riser Construction	10/1/2019	24	3,132	0	0	3,166	3,132	0	0	3,166
11	SP Diffuser Construction	10/1/2021	12	4,415	0	0	4,430	4,415	0	0	4,427
12	Existing Ocean Outfall Rehabilitation	10/1/2021	9	496	0	0	503	496	0	0	503
	Total						334,576				334,558
	Amortized Total						11,153				11,152

Conversion: Short Tons to Metric Tons

0.9071847

Harbor Craft Emission Factors

The NOX, ROG, and PM emission factors for both the unmitigated and mitigated scenarios are based on Tier 3 emission standards for marine vessels
Emission factors use a 95%/5% for NOX + HC, and a conversion factor of 1.053
CO emission factors do not change from Tier 2 to Tier 3. Thus, the CO emission factor is the Tier 2 emission standard
SO2, CO2, N2O, and CH4 use same unmitigated EF's as before

Calendar Year 2010

											Unmitigated and Mitigated Criteria Pollutant Emission Factors (g/hp-hr) [2]						GHG Emission Factors (g/hp-hr) [3]		
Equipment	Fuel	Average Model Year [1]	Number of Engines per Craft	Hp	kW	Equipment Age (yr)	Average Operating Hours (hr/yr) [1]	Average Useful Life (hr) [1]	Cumulative Hours (hr)	Load Factor (%)[1]	NOx	CO	HC	ROG [4]	PM	SO2	CO2	N2O	CH4
Work / Crew Boat (main engine)	diesel	1997	1	400	298	14	428	7,276	5,992	0.45	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Work / Crew Boat (auxiliary engine)	diesel	1992	1	25	19	19	250	5,750	4,750	0.43	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Tug Boat (main engine)	diesel	2003	2	1,300	970	8	668	14,028	5,344	0.31	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Tug Boat (auxiliary engine)	diesel	1997	2	57	43	14	700	16,100	9,800	0.43	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Push Tug/Tender (main engine)	diesel	1996	2	800	597	15	1,397	29,337	20,955	0.31	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005
Push Tug/Tender (auxiliary engine)	diesel	1998	2	138	103	13	1,253	26,313	16,289	0.43	4.09	5.00	0.22	0.23	0.11	0.006	916	0.042	0.005

Reference:

[1]: POLB 2008 Inventory, Chapter 3, Emission Factors for Harbor Craft

[2] Emission factors are adjusted for California diesel UL fuel (15 ppm sulfur).

[3] Cooper, David, and Tomas Gustafsson. Methodology for Calculating Emissions from Ships: 1. Update of Emission Factors. Swedish Environmental Protection Agency, Swedish Methodology for Environmental Data. Norrsköping, Sweden. 2004. http://www.smed.se. This is the same source as used by Starcrest C

(4): ROG/HC conversion factor for diesel engines: http://www.epa.gov/otaq/models/nonrdmdl/p03002.pdf

Equation 3: SOx Emission Factor

SOx (gms/hp-hr) = (S content in X/1,000,000) x (MW SO2/ MW S) x BSF = 0.00552

Where:

X = S content in parts per million (ppm) 15 ppm

BSFC = Brake Specific Fuel Consumption (184 g/bhp-hr per CARB 2007 Harbor Craft Methodology) 184 (g/hp-hr)

MW = Molecular Weight 32 S

OFFROAD OUTPUT AND EMISSION FACTORS

																						Emission Factors (g/hp-hr)								
CY	Season	Code	Equipment	Fuel	MaxHP	AveHP	Class	C/R	Pre	Hand	Port	Activity	ROG Exhaust	CO Exhaust	NOX Exhaust	CO2 Exhaust	SO2 Exhaust	PM Exhaust	N2O Exhaust	CH4 Exhaust	Load Factor	ROG	CO	NOX	SO2	PM10	PM25	CO2	CH4	N2O
2014	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	6.78E+01	4.00E-03	1.18E-02	3.44E-02	5.37E+00	6.05E-05	1.13E-03	0.00E+00	3.61E-04	0.57	0.423	1.246	3.642	0.006	0.120	0.107	568	0.038	0.000
2014	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	4.89E+01	4.05E-03	1.25E-02	3.22E-02	5.71E+00	5.60E-05	1.13E-03	0.00E+00	3.66E-04	0.57	0.403	1.239	3.206	0.006	0.113	0.100	568	0.036	0.000
2014	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.03E+01	2.13E-03	6.31E-03	1.96E-02	2.60E+00	2.93E-05	6.75E-04	0.00E+00	1.92E-04	0.61	0.465	1.377	4.270	0.006	0.147	0.131	568	0.042	0.000
2014	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.24E+01	7.91E-04	4.49E-03	6.08E-03	7.74E-01	8.71E-06	3.34E-04	0.00E+00	7.14E-05	0.60	0.581	3.299	4.466	0.006	0.245	0.218	568	0.052	0.000
2014	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.71E+01	2.39E-03	8.20E-03	2.10E-02	3.20E+00	3.14E-05	7.49E-04	0.00E+00	2.16E-04	0.54	0.425	1.455	3.732	0.006	0.133	0.118	568	0.038	0.000
2014	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.50E+02	1.12E-02	6.13E-02	7.46E-02	9.04E+00	1.06E-04	5.95E-03	0.00E+00	1.01E-03	0.55	0.704	3.853	4.694	0.007	0.374	0.333	568	0.064	0.000
2014	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.67E+01	3.22E-03	1.18E-02	2.75E-02	3.45E+00	3.39E-05	1.06E-03	0.00E+00	2.90E-04	0.64	0.512	1.873	4.383	0.005	0.169	0.150	550	0.046	0.000
2014	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.16E+01	1.41E-03	7.92E-03	9.63E-03	1.19E+00	1.39E-05	7.68E-04	0.00E+00	1.27E-04	0.68	0.676	3.798	4.616	0.007	0.368	0.328	568	0.061	0.000
2014	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.53E+01	1.02E-03	2.88E-03	8.52E-03	1.28E+00	1.44E-05	2.83E-04	0.00E+00	9.18E-05	0.57	0.453	1.283	3.796	0.006	0.126	0.112	568	0.041	0.000
2014	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	4.26E-03	1.30E-02	4.79E-02	4.78E+00	4.69E-05	1.42E-03	0.00E+00	3.85E-04	0.59	0.507	1.550	5.697	0.006	0.168	0.150	568	0.046	0.000
2014	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	1.27E-05	5.39E-05	1.20E-04	3.05E-02	3.00E-07	3.93E-06	0.00E+00	1.14E-06	0.43	0.235	1.003	2.233	0.006	0.073	0.065	568	0.021	0.000
2014	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	1.18E-04	3.58E-04	1.23E-03	1.57E-01	1.77E-06	3.98E-05	0.00E+00	1.07E-05	0.51	0.428	1.295	4.446	0.006	0.144	0.128	568	0.039	0.000
2014	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	6.16E-05	2.48E-04	7.39E-04	1.14E-01	1.12E-06	2.29E-05	0.00E+00	5.55E-06	0.74	0.307	1.238	3.685	0.006	0.114	0.102	568	0.028	0.000
2014	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	4.03E-04	1.29E-03	3.83E-03	5.54E-01	5.44E-06	1.32E-04	0.00E+00	3.64E-05	0.74	0.413	1.323	3.924	0.006	0.136	0.121	568	0.037	0.000
2014	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	9.70E-06	2.93E-05	1.01E-04	1.29E-02	1.45E-07	3.26E-06	0.00E+00	8.75E-07	0.51	0.428	1.295	4.446	0.006	0.144	0.128	568	0.039	0.000
2015	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	6.87E+01	3.84E-03	1.18E-02	3.09E-02	5.45E+00	6.13E-05	1.02E-03	0.00E+00	3.47E-04	0.57	0.401	1.228	3.224	0.006	0.107	0.095	568	0.036	0.000
2015	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	4.96E+01	3.91E-03	1.23E-02	2.89E-02	5.79E+00	5.68E-05	1.03E-03	0.00E+00	3.53E-04	0.57	0.384	1.206	2.839	0.006	0.101	0.090	568	0.035	0.000
2015	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.07E+01	2.04E-03	6.20E-03	1.79E-02	2.64E+00	2.97E-05	6.15E-04	0.00E+00	1.84E-04	0.61	0.439	1.334	3.859	0.006	0.132	0.118	568	0.040	0.000
2015	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.26E+01	7.43E-04	4.55E-03	5.54E-03	7.85E-01	8.84E-06	3.03E-04	0.00E+00	6.70E-05	0.60	0.538	3.296	4.008	0.006	0.219	0.195	568	0.049	0.000
2015	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.74E+01	2.30E-03	7.96E-03	1.93E-02	3.25E+00	3.19E-05	6.85E-04	0.00E+00	2.08E-04	0.54	0.403	1.392	3.367	0.006	0.120	0.107	568	0.036	0.000
2015	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.54E+02	1.03E-02	6.17E-02	6.89E-02	9.16E+00	1.07E-04	5.26E-03	0.00E+00	9.31E-04	0.55	0.640	3.827	4.274	0.007	0.326	0.290	568	0.058	0.000
2015	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.70E+01	3.10E-03	1.12E-02	2.57E-02	3.50E+00	3.43E-05	9.86E-04	0.00E+00	2.80E-04	0.64	0.487	1.762	4.036	0.005	0.155	0.138	550	0.044	0.000
2015	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.26E+01	1.28E-03	8.09E-03	8.93E-03	1.22E+00	1.43E-05	6.66E-04	0.00E+00	1.15E-04	0.68	0.594	3.765	4.156	0.007	0.310	0.276	568	0.054	0.000
2015	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.56E+01	9.74E-04	2.87E-03	7.69E-03	1.29E+00	1.46E-05	2.56E-04	0.00E+00	8.79E-05	0.57	0.428	1.262	3.375	0.006	0.112	0.100	568	0.039	0.000
2015	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	3.99E-03	1.19E-02	4.47E-02	4.78E+00	4.69E-05	1.29E-03	0.00E+00	3.60E-04	0.59	0.474	1.420	5.321	0.006	0.153	0.136	568	0.043	0.000
2015	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	1.20E-05	5.39E-05	1.03E-04	3.05E-02	3.00E-07	3.37E-06	0.00E+00	1.08E-06	0.43	0.223	1.003	1.915	0.006	0.063	0.056	568	0.020	0.000
2015	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	1.12E-04	3.49E-04	1.12E-03	1.57E-01	1.77E-06	3.62E-05	0.00E+00	1.01E-05	0.51	0.405	1.259	4.034	0.006	0.131	0.116	568	0.037	0.000
2015	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	5.74E-05	2.37E-04	6.67E-04	1.14E-01	1.12E-06	2.08E-05	0.00E+00	5.18E-06	0.74	0.286	1.180	3.327	0.006	0.104	0.093	568	0.026	0.000
2015	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	3.85E-04	1.23E-03	3.45E-03	5.54E-01	5.44E-06	1.20E-04	0.00E+00	3.47E-05	0.74	0.394	1.262	3.540	0.006	0.123	0.110	568	0.036	0.000
2015	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	9.17E-06	2.85E-05	9.14E-05	1.29E-02	1.45E-07	2.96E-06	0.00E+00	8.28E-07	0.51	0.405	1.259	4.034	0.006	0.131	0.116	568	0.037	0.000
2016	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	6.97E+01	3.68E-03	1.18E-02	2.76E-02	5.52E+00	6.22E-05	9.18E-04	0.00E+00	3.32E-04	0.57	0.378	1.213	2.837	0.006	0.094	0.084	568	0.034	0.000
2016	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	5.03E+01	3.76E-03	1.22E-02	2.58E-02	5.87E+00	5.76E-05	9.22E-04	0.00E+00	3.39E-04	0.57	0.364	1.179	2.501	0.006	0.089	0.079	568	0.033	0.000
2016	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.11E+01	1.95E-03	6.12E-03	1.64E-02	2.68E+00	3.01E-05	5.60E-04	0.00E+00	1.76E-04	0.61	0.414	1.299	3.478	0.006	0.119	0.106	568	0.037	0.000
2016	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.28E+01	6.95E-04	4.62E-03	5.01E-03	7.97E-01	8.96E-06	2.72E-04	0.00E+00	6.27E-05	0.60	0.496	3.293	3.572	0.006	0.194	0.173	568	0.045	0.000
2016	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.78E+01	2.22E-03	7.76E-03	1.76E-02	3.29E+00	3.23E-05	6.26E-04	0.00E+00	2.00E-04	0.54	0.383	1.339	3.031	0.006	0.108	0.096	568	0.035	0.000
2016	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.59E+02	9.50E-03	6.21E-02	6.36E-02	9.28E+00	1.09E-04	4.60E-03	0.00E+00	8.57E-04	0.55	0.582	3.804	3.893	0.007	0.282	0.251	568	0.052	0.000
2016	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.74E+01	2.98E-03	1.08E-02	2.39E-02	3.54E+00	3.48E-05	9.14E-04	0.00E+00	2.69E-04	0.64	0.463	1.668	3.710	0.005	0.142	0.126	550	0.042	0.000
2016	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.32E+01	1.15E-03	8.20E-03	8.22E-03	1.24E+00	1.46E-05	5.66E-04	0.00E+00	1.03E-04	0.68	0.524	3.743	3.752	0.007	0.259	0.230	568	0.047	0.000
2016	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.58E+01	9.31E-04	2.88E-03	6.89E-03	1.31E+00	1.48E-05	2.30E-04	0.00E+00	8.40E-05	0.57	0.403	1.245	2.984	0.006	0.100	0.089	568	0.036	0.000
2016	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	3.79E-03	1.13E-02	4.20E-02	4.78E+00	4.69E-05	1.18E-03	0.00E+00	3.42E-04	0.59	0.450	1.341	4.994	0.006	0.140	0.125	568	0.041	0.000
2016	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	1.13E-05	5.39E-05	8.73E-05	3.05E-02	3.00E-07	2.84E-06	0.00E+00	1.02E-06	0.43	0.211	1.003	1.625	0.006	0.053	0.047	568	0.019	0.000
2016	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	1.06E-04	3.40E-04	1.00E-03	1.57E-01	1.77E-06	3.26E-05	0.00E+00	9.56E-06	0.51	0.383	1.227	3.629	0.006	0.118	0.105	568	0.035	0.000
2016	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	5.35E-05	2.27E-04	5.98E-04	1.14E-01	1.12E-06	1.88E-05	0.00E+00	4.82E-06	0.74	0.267	1.130	2.984	0.006	0.094	0.084	568	0.024	0.000
2016	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	3.67E-04	1.18E-03	3.09E-03	5.54E-01	5.44E-06	1.09E-04	0.00E+00	3.31E-05	0.74	0.376	1.211	3.172	0.006	0.112	0.099	568	0.034	0.000
2016	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	8.67E-06	2.78E-05	8.22E-05	1.29E-02	1.45E-07	2.67E-06	0.00E+00	7.82E-07	0.51	0.383	1.227	3.629	0.006	0.118	0.105	568	0.035	0.000
2017	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	7.07E+01	3.51E-03	1.18E-02	2.44E-02	5.60E+00	6.30E-05	8.17E-04	0.00E+00	3.16E-04	0.57	0.356	1.200	2.477	0.006	0.083	0.074	568	0.032	0.000
2017	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	5.10E+01	3.60E-03	1.21E-02	2.30E-02	5.95E+00	5.84E-05	8.23E-04	0.00E+00	3.25E-04	0.57	0.344	1.157	2.193	0.006	0.079	0.070	568	0.031	0.000
2017	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.16E+01	1.87E-03	6.06E-03	1.49E-02	2.71E+00	3.05E-05	5.09E-04	0.00E+00	1.68E-04	0.61	0.391	1.270	3.127	0.006	0.107	0.095	568	0.035	0.000
2017	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.30E+01	6.44E-04	4.68E-03	4.47E-03	8.09E-01	9.10E-06	2.41E-04	0.00E+00	5.81E-05	0.60	0.453	3.289	3.142	0.006	0.169	0.151	568	0.041	0.000
2017	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.82E+01	2.14E-03	7.61E-03	1.60E-02	3.34E+00	3.28E-05	5.72E-04	0.00E+00	1.93E-04	0.54	0.364	1.296	2.722	0.006	0.097	0.087	568	0.033	0.000
2017	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.64E+02	8.75E-03	6.26E-02	5.87E-02	9.41E+00	1.10E-04	3.98E-03	0.00E+00	7.89E-04	0.55	0.528	3.783	3.547	0.007	0.241	0.214	568	0.048	0.000
2017	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.77E+01	2.87E-03	1.04E-02	2.22E-02	3.59E+00	3.52E-05	8.45E-04	0.00E+00	2.59E-04	0.64	0.439	1.591	3.405	0.005	0.129	0.115	550	0.040	0.000
2017	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.38E+01	1.06E-03	8.33E-03	7.64E-03	1.27E+00	1.49E-05	4.91E-04	0.00E+00	9.59E-05	0.68	0.476	3.732	3.422	0.007	0.220	0.196	568	0.043	0.000
2017	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.60E+01	8.87E-04	2.88E-03	6.13E-03	1.33E+00	1.50E-05	2.05E-04	0.00E+00	8.00E-05	0.57	0.379	1.230	2.617	0.006	0.088	0.078	568	0.034	0.000
2017	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	3.62E-03	1.08E-02	3.96E-02	4.78E+00	4.69E-05	1.08E-03	0.00E+00	3.27E-04	0.59	0.431	1.289	4.705	0.006	0.129	0.115	568	0.039	0.000
2017	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	1.06E-05	5.39E-05	7.29E-05	3.05E-02	3.00E-07	2.31E-06	0.00E+00	9.57E-07	0.43	0.197	1.003	1.357	0.006	0.043	0.038	568	0.018	0.000
2017	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	1.00E-04	3.32E-04	8.96E-04	1.57E-01	1.77E-06	2.93E-05	0.00E+00	9.03E-06	0.51	0.362	1.201	3.237	0.006	0.106	0.094	568	0.033	0.000
2017	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	5.01E-05	2.19E-04	5.36E-04	1.14E-01	1.12E-06	1.70E-05	0.00E+00	4.52E-06	0.74	0.250	1.092	2.676	0.006	0.085	0.076	568	0.023	0.000
2017	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	3.50E-04	1.14E-03	2.77E-03	5.54E-01	5.44E-06	9.85E-05	0.00E+00	3.16E-05	0.74	0.359	1.171	2.842	0.006	0.101	0.090	568	0.032	0.000
2017	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	8.20E-06	2.72E-05	7.33E-05	1.29E-02	1.45E-07	2.40E-06	0.00E+00	7.40E-07	0.51	0.362	1.201	3.237	0.006	0.106	0.094	568	0.033	0.000

2018	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	7.18E+01	3.34E-03	1.19E-02	2.15E-02	5.69E+00	6.40E-05	7.23E-04	0.00E+00	3.01E-04	0.57	0.334	1.189	2.146	0.006	0.072	0.064	568	0.030	0.000
2018	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	5.18E+01	3.45E-03	1.21E-02	2.04E-02	6.04E+00	5.93E-05	7.34E-04	0.00E+00	3.12E-04	0.57	0.325	1.139	1.916	0.006	0.069	0.061	568	0.029	0.000
2018	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.20E+01	1.79E-03	6.04E-03	1.36E-02	2.75E+00	3.10E-05	4.62E-04	0.00E+00	1.61E-04	0.61	0.369	1.247	2.804	0.006	0.095	0.085	568	0.033	0.000
2018	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.32E+01	5.99E-04	4.75E-03	3.98E-03	8.21E-01	9.24E-06	2.12E-04	0.00E+00	5.40E-05	0.60	0.414	3.288	2.759	0.006	0.146	0.130	568	0.037	0.000
2018	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.86E+01	2.06E-03	7.50E-03	1.45E-02	3.39E+00	3.32E-05	5.21E-04	0.00E+00	1.86E-04	0.54	0.346	1.259	2.438	0.006	0.087	0.078	568	0.031	0.000
2018	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.69E+02	8.06E-03	6.32E-02	5.43E-02	9.54E+00	1.12E-04	3.41E-03	0.00E+00	7.27E-04	0.55	0.480	3.765	3.233	0.007	0.203	0.181	568	0.043	0.000
2018	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.81E+01	2.75E-03	1.01E-02	2.06E-02	3.64E+00	3.57E-05	7.78E-04	0.00E+00	2.48E-04	0.64	0.416	1.522	3.117	0.005	0.118	0.105	550	0.038	0.000
2018	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.45E+01	1.00E-03	8.47E-03	7.12E-03	1.29E+00	1.52E-05	4.29E-04	0.00E+00	9.06E-05	0.68	0.442	3.727	3.133	0.007	0.189	0.168	568	0.040	0.000
2018	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.62E+01	8.44E-04	2.89E-03	5.41E-03	1.35E+00	1.52E-05	1.83E-04	0.00E+00	7.61E-05	0.57	0.355	1.218	2.277	0.006	0.077	0.068	568	0.032	0.000
2018	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	3.47E-03	1.05E-02	3.73E-02	4.78E+00	4.69E-05	9.95E-04	0.00E+00	3.13E-04	0.59	0.413	1.252	4.432	0.006	0.118	0.105	568	0.037	0.000
2018	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	9.88E-06	5.39E-05	5.97E-05	3.05E-02	3.00E-07	1.81E-06	0.00E+00	8.92E-07	0.43	0.184	1.003	1.111	0.006	0.034	0.030	568	0.017	0.000
2018	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	9.46E-05	3.26E-04	7.93E-04	1.57E-01	1.77E-06	2.62E-05	0.00E+00	8.54E-06	0.51	0.342	1.179	2.864	0.006	0.095	0.084	568	0.031	0.000
2018	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	4.72E-05	2.13E-04	4.80E-04	1.14E-01	1.12E-06	1.54E-05	0.00E+00	4.26E-06	0.74	0.236	1.064	2.395	0.006	0.077	0.068	568	0.021	0.000
2018	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	3.34E-04	1.11E-03	2.48E-03	5.54E-01	5.44E-06	8.90E-05	0.00E+00	3.01E-05	0.74	0.342	1.142	2.542	0.006	0.091	0.081	568	0.031	0.000
2018	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	7.75E-06	2.67E-05	6.49E-05	1.29E-02	1.45E-07	2.14E-06	0.00E+00	6.99E-07	0.51	0.342	1.179	2.864	0.006	0.095	0.084	568	0.031	0.000
2019	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	7.28E+01	3.18E-03	1.20E-02	1.88E-02	5.77E+00	6.50E-05	6.39E-04	0.00E+00	2.87E-04	0.57	0.313	1.180	1.855	0.006	0.063	0.056	568	0.028	0.000
2019	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	5.25E+01	3.31E-03	1.21E-02	1.81E-02	6.13E+00	6.02E-05	6.53E-04	0.00E+00	2.99E-04	0.57	0.307	1.125	1.673	0.006	0.061	0.054	568	0.028	0.000
2019	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.24E+01	1.71E-03	6.03E-03	1.23E-02	2.79E+00	3.14E-05	4.19E-04	0.00E+00	1.55E-04	0.61	0.349	1.230	2.508	0.006	0.085	0.076	568	0.032	0.000
2019	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.33E+01	5.62E-04	4.82E-03	3.56E-03	8.32E-01	9.37E-06	1.87E-04	0.00E+00	5.08E-05	0.60	0.384	3.288	2.431	0.006	0.128	0.114	568	0.035	0.000
2019	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.90E+01	1.99E-03	7.41E-03	1.31E-02	3.43E+00	3.37E-05	4.73E-04	0.00E+00	1.79E-04	0.54	0.329	1.228	2.176	0.006	0.078	0.070	568	0.030	0.000
2019	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.75E+02	7.45E-03	6.39E-02	5.03E-02	9.68E+00	1.14E-04	2.89E-03	0.00E+00	6.72E-04	0.55	0.437	3.748	2.951	0.007	0.170	0.151	568	0.039	0.000
2019	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.85E+01	2.64E-03	9.80E-03	1.91E-02	3.68E+00	3.62E-05	7.15E-04	0.00E+00	2.38E-04	0.64	0.394	1.462	2.848	0.005	0.107	0.095	550	0.036	0.000
2019	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.51E+01	9.55E-04	8.62E-03	6.65E-03	1.32E+00	1.54E-05	3.74E-04	0.00E+00	8.62E-05	0.68	0.413	3.724	2.871	0.007	0.161	0.144	568	0.037	0.000
2019	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.65E+01	8.06E-04	2.91E-03	4.77E-03	1.37E+00	1.54E-05	1.62E-04	0.00E+00	7.27E-05	0.57	0.334	1.207	1.976	0.006	0.067	0.060	568	0.030	0.000
2019	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	3.32E-03	1.03E-02	3.51E-02	4.78E+00	4.69E-05	9.09E-04	0.00E+00	3.00E-04	0.59	0.395	1.223	4.169	0.006	0.108	0.096	568	0.036	0.000
2019	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	9.16E-06	5.39E-05	4.77E-05	3.05E-02	3.00E-07	1.34E-06	0.00E+00	8.26E-07	0.43	0.170	1.003	0.888	0.006	0.025	0.022	568	0.015	0.000
2019	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	8.95E-05	3.21E-04	7.00E-04	1.57E-01	1.77E-06	2.34E-05	0.00E+00	8.08E-06	0.51	0.323	1.161	2.530	0.006	0.084	0.075	568	0.029	0.000
2019	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	4.46E-05	2.09E-04	4.28E-04	1.14E-01	1.12E-06	1.38E-05	0.00E+00	4.02E-06	0.74	0.222	1.044	2.134	0.006	0.069	0.061	568	0.020	0.000
2019	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	3.18E-04	1.09E-03	2.21E-03	5.54E-01	5.44E-06	7.99E-05	0.00E+00	2.87E-05	0.74	0.326	1.122	2.262	0.006	0.082	0.073	568	0.029	0.000
2019	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	7.33E-06	2.63E-05	5.73E-05	1.29E-02	1.45E-07	1.91E-06	0.00E+00	6.61E-07	0.51	0.323	1.161	2.530	0.006	0.084	0.075	568	0.029	0.000
2020	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	7.38E+01	3.04E-03	1.21E-02	1.65E-02	5.85E+00	6.58E-05	5.65E-04	0.00E+00	2.75E-04	0.57	0.296	1.172	1.606	0.006	0.055	0.049	568	0.027	0.000
2020	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	5.32E+01	3.18E-03	1.22E-02	1.60E-02	6.22E+00	6.10E-05	5.80E-04	0.00E+00	2.87E-04	0.57	0.290	1.115	1.461	0.006	0.053	0.047	568	0.026	0.000
2020	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.29E+01	1.64E-03	6.04E-03	1.11E-02	2.82E+00	3.18E-05	3.79E-04	0.00E+00	1.48E-04	0.61	0.331	1.215	2.235	0.006	0.076	0.068	568	0.030	0.000
2020	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.35E+01	5.32E-04	4.88E-03	3.18E-03	8.44E-01	9.50E-06	1.66E-04	0.00E+00	4.80E-05	0.60	0.358	3.288	2.141	0.006	0.112	0.099	568	0.032	0.000
2020	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.94E+01	1.91E-03	7.36E-03	1.19E-02	3.48E+00	3.41E-05	4.29E-04	0.00E+00	1.73E-04	0.54	0.313	1.202	1.936	0.006	0.070	0.062	568	0.028	0.000
2020	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.80E+02	6.95E-03	6.46E-02	4.68E-02	9.82E+00	1.15E-04	2.45E-03	0.00E+00	6.27E-04	0.55	0.402	3.736	2.706	0.007	0.142	0.126	568	0.036	0.000
2020	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.88E+01	2.54E-03	9.58E-03	1.76E-02	3.73E+00	3.66E-05	6.57E-04	0.00E+00	2.29E-04	0.64	0.374	1.410	2.598	0.005	0.097	0.086	550	0.034	0.000
2020	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.57E+01	9.07E-04	8.77E-03	6.18E-03	1.34E+00	1.57E-05	3.18E-04	0.00E+00	8.19E-05	0.68	0.385	3.719	2.621	0.007	0.135	0.120	568	0.035	0.000
2020	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.67E+01	7.72E-04	2.93E-03	4.20E-03	1.39E+00	1.56E-05	1.44E-04	0.00E+00	6.97E-05	0.57	0.316	1.198	1.718	0.006	0.059	0.052	568	0.028	0.000
2020	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.29E+01	3.17E-03	1.01E-02	3.30E-02	4.78E+00	4.69E-05	8.25E-04	0.00E+00	2.86E-04	0.59	0.376	1.199	3.916	0.006	0.098	0.087	568	0.034	0.000
2020	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	8.64E-06	5.39E-05	3.92E-05	3.05E-02	3.00E-07	1.14E-06	0.00E+00	7.79E-07	0.43	0.161	1.003	0.730	0.006	0.021	0.019	568	0.015	0.000
2020	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	8.48E-05	3.17E-04	6.17E-04	1.57E-01	1.77E-06	2.08E-05	0.00E+00	7.65E-06	0.51	0.306	1.145	2.229	0.006	0.075	0.067	568	0.028	0.000
2020	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	4.21E-05	2.07E-04	3.78E-04	1.14E-01	1.12E-06	1.24E-05	0.00E+00	3.80E-06	0.74	0.210	1.030	1.888	0.006	0.062	0.055	568	0.019	0.000
2020	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	3.03E-04	1.08E-03	1.95E-03	5.54E-01	5.44E-06	7.12E-05	0.00E+00	2.73E-05	0.74	0.310	1.108	1.999	0.006	0.073	0.065	568	0.028	0.000
2020	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	6.94E-06	2.60E-05	5.05E-05	1.29E-02	1.45E-07	1.70E-06	0.00E+00	6.27E-07	0.51	0.306	1.145	2.229	0.006	0.075	0.067	568	0.028	0.000
2021	Annual	2270002036	Hydraulic Excavator - Medium	D	250	222	Construction and Mining Equipment	U	N	NHH	NP	7.48E+01	2.92E-03	1.22E-02	1.45E-02	5.93E+00	6.67E-05	4.98E-04	0.00E+00	2.63E-04	0.57	0.280	1.166	1.392	0.006	0.048	0.043	568	0.025	0.000
2021	Annual	2270002036	Hydraulic Excavator - Large	D	500	327	Construction and Mining Equipment	U	N	NHH	NP	5.40E+01	3.06E-03	1.23E-02	1.41E-02	6.30E+00	6.18E-05	5.14E-04	0.00E+00	2.76E-04	0.57	0.276	1.109	1.274	0.006	0.046	0.041	568	0.025	0.000
2021	Annual	2270002048	Motor Grader	D	250	225	Construction and Mining Equipment	U	N	NHH	NP	3.33E+01	1.58E-03	6.06E-03	1.00E-02	2.86E+00	3.22E-05	3.43E-04	0.00E+00	1.42E-04	0.61	0.313	1.204	1.985	0.006	0.068	0.061	568	0.028	0.000
2021	Annual	2270002057	Forklift	D	175	166	Construction and Mining Equipment	U	P	NHH	NP	1.37E+01	5.05E-04	4.95E-03	2.83E-03	8.56E-01	9.63E-06	1.46E-04	0.00E+00	4.55E-05	0.60	0.335	3.288	1.880	0.006	0.097	0.086	568	0.030	0.000
2021	Annual	2270002060	Loader	D	500	350	Construction and Mining Equipment	U	N	NHH	NP	2.98E+01	1.85E-03	7.31E-03	1.07E-02	3.53E+00	3.46E-05	3.88E-04	0.00E+00	1.66E-04	0.54	0.297	1.179	1.720	0.006	0.062	0.056	568	0.027	0.000
2021	Annual	2270002066	Backhoe/Loader	D	120	75	Construction and Mining Equipment	U	P	NHH	NP	3.85E+02	6.54E-03	6.53E-02	4.37E-02	9.96E+00	1.17E-04	2.07E-03	0.00E+00	5.90E-04	0.55	0.373	3.727	2.495	0.007	0.118	0.105	568	0.034	0.000
2021	Annual	2270002069	Crawler Crane	D	500	334	Construction and Mining Equipment	U	N	NHH	NP	2.92E+01	2.44E-03	9.39E-03	1.63E-02	3.78E+00	3.71E-05	6.04E-04	0.00E+00	2.20E-04	0.64	0.355	1.365	2.366	0.005	0.088	0.078	550	0.032	0.000
2021	Annual	2270003030	Street Sweeper	D	120	88	Industrial Equipment	U	N	NHH	NP	3.74E+01	8.76E-04	9.13E-03	5.93E-03	1.40E+00	1.65E-05	2.71E-04	0.00E+00	7.90E-05	0.68	0.355	3.699	2.402	0.007	0.110	0.098	568	0.032	0.000
2021	Annual	2270002051	Water Truck	D	250	233	Construction and Mining Equipment	U	N	NHH	NP	1.69E+01	7.42E-04	2.95E-03	3.70E-03	1.41E+00	1.58E-05	1.28E-04	0.00E+00	6.70E-05	0.57	0.300	1.191	1.495	0.006	0.051	0.046	568	0.027	0.000
2021	Annual	2270003050	Pipe Barge	D	9999	1002	Industrial Equipment	U	N	NHH	NP	1.31E+01	3.02E-03	1.01E-02	3.13E-02	4.87E+00	4.78E-05	7.48E-04	0.00E+00	2.73E-04	0.59	0.353	1.175	3.655	0.006	0.087	0.078	568	0.032	0.000
2021	Annual	2270012010	Crane Barge	D	750	668	Dredging	U	N	NHH	P	1.70E-01	8.14E-06	5.39E-05	3.19E-05	3.05E-02	3.00E-07	9.84E-07	0.00E+00	7.35E-07	0.43	0.152	1.003	0.594	0.006	0.018	0.016	568	0.014	0.000
2021	Annual	2270012025	Hoist	D	250	213	Dredging	U	N	NHH	P	2.31E+00	8.04E-05	3.14E-04	5.40E-04	1.57E-01	1.77E-06	1.83E-05	0.00E+00	7.25E-06	0.51	0.290	1.133	1.952	0.006	0.066	0.059	568	0.026	0.000
2021	Annual	2270012030	Pump (Dredging)	D	500	386	Dredging	U	N	NHH	P	6.37E-01	3.98E-05	2.04E-04	3.33E-04	1.14E-01	1.12E-06	1.10E-05	0.00E+00	3.59E-06	0.74	0.199	1.019	1.660	0.006	0.055	0.049	568	0.018	0.000
2021	Annual	2270012035	Generator (Dredging)	D	500	401	Dredging	U	N	NHH	P	2.98E+00	2.87E-04	1.07E-03	1.71E-03	5.54E-01	5.44E-06	6.28E-05	0.00E+00	2.59E-05	0.74	0.295	1.096	1.756	0.006	0.064	0.057	568	0.027	0.000
2021	Annual	2270012040	Dump Barge	D	250	218	Dredging	U	N	NHH	P	1.85E-01	6.58E-06	2.57E-05	4.42E-05	1.29E-02	1.45E-07	1.50E-06	0.00E+00	5.94E-07	0.51	0.290	1.133	1.952	0.006	0.066	0.059	568	0.026	0.000

Electricity Usage

Emission Factors - Grams per Kilo Watt Hour (g/kw-hr)

CO_2	CH_4	N_2O
308.9009	0.012832	0.002826

Criteria Pollutant Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG Emission Factors from Table C2, California Climate Action Registry General Reporting Protocol Version 3.1. January 2009.

Emission Factors - Pounds per Mega Watt Hour (lbs/MWh)

ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
0.01	0.2	1.15	0.12	0.04	0.0356	681.01	0.02829	0.00623

Criteria Pollutant Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG Emission Factors from Table C2, California Climate Action Registry General Reporting Protocol Version 3.1. January 2009.

LOCOMOTIVE EMISSION FACTORS

EPA Tier 1-4 Nonroad Diesel Engine Emission Standards, g/bhp-hr

Engine Power	Tier	Year	CO	HC	NMHC + NOx	NOx	PM
130 ≤ kW < 225 (175 ≤ hp < 300)	Tier 1	1996	8.5	1	-	6.9	0.4
	Tier 2	2003	2.6	-	4.9	-	0.15
	Tier 3	2006	2.6	-	3	-	0.15
	Tier 4	2011-2014[d]	2.6	0.14	-	0.3	0.015

EPA Tier 1-4 Nonroad Diesel Engine Emission Standards, g/bhp-hr

Tier	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
1	1.05	8.50	6.90	0.01	0.39	0.39	114.28	0.01	0.00
2	0.26	2.60	4.66	0.01	0.15	0.15	34.96	0.00	0.00
3	0.16	2.60	2.85	0.01	0.15	0.15	34.96	0.00	0.00
4	0.15	2.60	0.30	0.01	0.01	0.01	34.96	0.00	0.00

NMHC/NOx Ratios	
NMHC/NMHC+NOx	0.05
NOx/NMHC+NOx	0.95
PM Ratios	
PM10/PM	0.98
PM2.5/PM	0.97
Hydrocarbon Ratios	
NMHC/HC	0.98
VOC/HC	1.05

Fuel Based Factors

Conversion Factor (gal/hp-hr)

0.05

SO2 Fuel Content (g/gal)	SO2 EF (g/hp-hr)
0.09	0.01

C Fuel Content (g/gal)	CO2 Fuel Content (g/gal)	CO2 EF (g/hp-hr)
0.18	2,079.86	114.28
0.05	636.19	34.96
0.05	636.19	34.96
0.05	636.19	34.96

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,075,410				
VMT/1000	205,698				
Trips	38,142,600				
Reactive Organic Gas Emissions					
Run Exh	7.93	15,860	7,193,977	0.03497	
Idle Exh	0	-	-		-
Start Ex	11.31	22,620	10,260,262		0.26900

Total Ex	19.24	38,480	17,454,239		
Diurnal	3.67	7,340	3,329,369	0.01619	
Hot Soak	6.44	12,880	5,842,271	0.02840	
Running	14.84	29,680	13,462,625	0.06545	
Resting	2.71	5,420	2,458,471	0.01195	

Total	46.91				
Carbon Monoxide Emissions					
Run Exh	338.41	676,820	307,000,476	1.49248	
Idle Exh	0	-	-		-
Start Ex	143.45	286,900	130,135,688		3.41182

Total Ex	481.86	963,720	437,136,164		
Oxides of Nitrogen Emissions					
Run Exh	28.69	57,380	26,027,138	0.12653	
Idle Exh	0	-	-		-
Start Ex	9.57	19,140	8,681,760		0.22761

Total Ex	38.26	76,520	34,708,898		
Carbon Dioxide Emissions (000)					
Run Exh	89.11	178,220	80,839,255	392.99971	
Idle Exh	0	-	-		-
Start Ex	3.01	6,020	2,730,627		71.58995

Total Ex	92.12	184,240	83,569,882		
PM10 Emissions					
Run Exh	2.81	5,620	2,549,190	0.01239	
Idle Exh	0	-	-		-
Start Ex	0.26	520	235,868		0.00618

Total Ex	3.07	6,140	2,785,058		
TireWear	1.81	3,620	1,642,005	0.00798	
BrakeWr	2.84	5,680	2,576,405	0.01253	

Total	7.73	15,460	7,012,540		
Lead	0				
SOx	0.89	1,780	807,395	0.00393	
Fuel Consumption (000 gallons)					
Gasoline	9515.69				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,157,280				
VMT/1000	207,520				
Trips	38,595,500				
Reactive Organic Gas Emissions					
Run Exh	7.27	14,540	6,595,235	0.03178	
Idle Exh	0	-	-		-
Start Ex	10.3	20,600	9,344,006		0.24210

Total Ex	17.57	35,140	15,939,240		
Diurnal	3.53	7,060	3,202,363	0.01543	
Hot Soak	6.4	12,800	5,805,984	0.02798	
Running	14.38	28,760	13,045,320	0.06286	
Resting	2.68	5,360	2,431,256	0.01172	

Total	44.56				
Carbon Monoxide Emissions					
Run Exh	316.52	633,040	287,142,196	1.38368	
Idle Exh	0	-	-		-
Start Ex	133.15	266,300	120,791,683		3.12968

Total Ex	449.68	899,360	407,942,951		
Oxides of Nitrogen Emissions					
Run Exh	26.45	52,900	23,995,043	0.11563	
Idle Exh	0	-	-		-
Start Ex	8.76	17,520	7,946,941		0.20590

Total Ex	35.21	70,420	31,941,984		
Carbon Dioxide Emissions (000)					
Run Exh	89.72	179,440	81,392,638	392.21587	
Idle Exh	0	-	-		-
Start Ex	3.04	6,080	2,757,842		71.45502

Total Ex	92.76	185,520	84,150,481		
PM10 Emissions					
Run Exh	2.86	5,720	2,594,549	0.01250	
Idle Exh	0	-	-		-
Start Ex	0.27	540	244,940		0.00635

Total Ex	3.13	6,260	2,839,489		
TireWear	1.83	3,660	1,660,149	0.00800	
BrakeWr	2.87	5,740	2,603,621	0.01255	

Total	7.83	15,660	7,103,259		
Lead	0				
SOx	0.9	1,800	816,467	0.00393	
Fuel Consumption (000 gallons)					
Gasoline	9575.19				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2016 -- All model years in the range 1972 to 2016 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,220,690				
VMT/1000	208,546				
Trips	38,927,800				
Reactive Organic Gas Emissions					
Run Exh	6.77	13,540	6,141,642	0.02945	
Idle Exh	0	-	-		-
Start Ex	9.38	18,760	8,509,395		0.21859

Total Ex	16.15	32,300	14,651,038		
Diurnal	3.39	6,780	3,075,357	0.01482	
Hot Soak	6.33	12,660	5,742,481	0.02767	
Running	13.94	27,880	12,646,159	0.06094	
Resting	2.65	5,300	2,404,040	0.01158	

Total	42.47				
Carbon Monoxide Emissions					
Run Exh	297.52	595,040	269,905,681	1.29423	
Idle Exh	0	-	-		-
Start Ex	123.39	246,780	111,937,557		2.87552

Total Ex	420.91	841,820	381,843,238		
Oxides of Nitrogen Emissions					
Run Exh	24.48	48,960	22,207,889	0.10649	
Idle Exh	0	-	-		-
Start Ex	7.99	15,980	7,248,408		0.18620

Total Ex	32.47	64,940	29,456,297		
Carbon Dioxide Emissions (000)					
Run Exh	90.45	180,900	82,054,883	393.46179	
Idle Exh	0	-	-		-
Start Ex	3.06	6,120	2,775,986		71.31115

Total Ex	93.51	187,020	84,830,869		
PM10 Emissions					
Run Exh	2.94	5,880	2,667,124	0.01279	
Idle Exh	0	-	-		-
Start Ex	0.28	560	254,012		0.00653

Total Ex	3.22	6,440	2,921,136		
TireWear	1.84	3,680	1,669,220	0.00800	
BrakeWr	2.88	5,760	2,612,693	0.01253	

Total	7.94	15,880	7,203,049		
Lead	0				
SOx	0.9	1,800	816,467	0.00392	
Fuel Consumption (000 gallons)					
Gasoline	9647.24				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,284,290				
VMT/1000	209,938				
Trips	39,265,500				
Reactive Organic Gas Emissions					
Run Exh	6.26	12,520	5,678,978	0.02705	
Idle Exh	0	-	-		-
Start Ex	8.55	17,100	7,756,432		0.19754

Total Ex	14.81	29,620	13,435,410		
Diurnal	3.27	6,540	2,966,495	0.01429	
Hot Soak	6.25	12,500	5,669,906	0.02732	
Running	13.52	27,040	12,265,141	0.05910	
Resting	2.6	5,200	2,358,681	0.01137	

Total	40.45				
Carbon Monoxide Emissions					
Run Exh	278.67	557,340	252,805,244	1.20419	
Idle Exh	0	-	-		-
Start Ex	114.19	228,380	103,591,455		2.63823

Total Ex	392.86	785,720	356,396,699		
Oxides of Nitrogen Emissions					
Run Exh	22.65	45,300	20,547,740	0.09788	
Idle Exh	0	-	-		-
Start Ex	7.26	14,520	6,586,163		0.16773

Total Ex	29.91	59,820	27,133,903		
Carbon Dioxide Emissions (000)					
Run Exh	90.91	181,820	82,472,188	392.84069	
Idle Exh	0	-	-		-
Start Ex	3.08	6,160	2,794,130		71.15992

Total Ex	93.99	187,980	85,266,318		
PM10 Emissions					
Run Exh	2.99	5,980	2,712,483	0.01292	
Idle Exh	0	-	-		-
Start Ex	0.28	560	254,012		0.00647

Total Ex	3.27	6,540	2,966,495		
TireWear	1.85	3,700	1,678,292	0.00799	
BrakeWr	2.9	5,800	2,630,837	0.01253	

Total	8.02	16,040	7,275,624		
Lead	0				
SOx	0.91	1,820	825,538	0.00393	
Fuel Consumption (000 gallons)					
Gasoline	9691.48				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,347,850				
VMT/1000	211,564				
Trips	39,607,000				
Reactive Organic Gas Emissions					
Run Exh	5.8	11,600	5,261,673	0.02487	
Idle Exh	0	-	-		-
Start Ex	7.8	15,600	7,076,043		0.17866

Total Ex	13.6	27,200	12,337,716		
Diurnal	3.14	6,280	2,848,561	0.01373	
Hot Soak	6.13	12,260	5,561,044	0.02680	
Running	13.13	26,260	11,911,339	0.05740	
Resting	2.55	5,100	2,313,322	0.01115	

Total	38.54				
Carbon Monoxide Emissions					
Run Exh	261.22	522,440	236,974,866	1.12011	
Idle Exh	0	-	-		-
Start Ex	105.54	211,080	95,744,305		2.41736

Total Ex	366.76	733,520	332,719,171		
Oxides of Nitrogen Emissions					
Run Exh	21	42,000	19,050,885	0.09005	
Idle Exh	0	-	-		-
Start Ex	6.59	13,180	5,978,349		0.15094

Total Ex	27.59	55,180	25,029,234		
Carbon Dioxide Emissions (000)					
Run Exh	91.44	182,880	82,952,996	392.09410	
Idle Exh	0	-	-		-
Start Ex	3.1	6,200	2,812,274		71.00446

Total Ex	94.54	189,080	85,765,270		
PM10 Emissions					
Run Exh	3.02	6,040	2,739,699	0.01295	
Idle Exh	0	-	-		-
Start Ex	0.29	580	263,084		0.00664

Total Ex	3.31	6,620	3,002,782		
TireWear	1.87	3,740	1,696,436	0.00802	
BrakeWr	2.93	5,860	2,658,052	0.01256	

Total	8.1	16,200	7,348,199		
Lead	0				
SOx	0.91	1,820	825,538	0.00390	
Fuel Consumption (000 gallons)					
Gasoline	9742.85				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2019 -- All model years in the range 1975 to 2019 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,411,000				
VMT/1000	213,354				
Trips	39,951,600				
Reactive Organic Gas Emissions					
Run Exh	5.39	10,780	4,889,727	0.02292	
Idle Exh	0	-	-		-
Start Ex	7.11	14,220	6,450,085		0.16145

Total Ex	12.5	25,000	11,339,813		
Diurnal	3.02	6,040	2,739,699	0.01320	
Hot Soak	6	12,000	5,443,110	0.02623	
Running	12.74	25,480	11,557,537	0.05569	
Resting	2.49	4,980	2,258,891	0.01089	

Total	36.76				
Carbon Monoxide Emissions					
Run Exh	245.27	490,540	222,505,265	1.04289	
Idle Exh	0	-	-		-
Start Ex	97.5	195,000	88,450,538		2.21394

Total Ex	342.77	685,540	310,955,802		
Oxides of Nitrogen Emissions					
Run Exh	19.52	39,040	17,708,251	0.08300	
Idle Exh	0	-	-		-
Start Ex	5.97	11,940	5,415,894		0.13556

Total Ex	25.49	50,980	23,124,146		
Carbon Dioxide Emissions (000)					
Run Exh	92.05	184,100	83,506,379	391.39824	
Idle Exh	0	-	-		-
Start Ex	3.12	6,240	2,830,417		70.84615

Total Ex	95.17	190,340	86,336,796		
PM10 Emissions					
Run Exh	3.06	6,120	2,775,986	0.01301	
Idle Exh	0	-	-		-
Start Ex	0.29	580	263,084		0.00659

Total Ex	3.35	6,700	3,039,070		
TireWear	1.88	3,760	1,705,508	0.00799	
BrakeWr	2.95	5,900	2,676,196	0.01254	

Total	8.18	16,360	7,420,773		
Lead	0				
SOx	0.92	1,840	834,610	0.00391	
Fuel Consumption (000 gallons)					
Gasoline	9803.49				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,473,030				
VMT/1000	215,241				
Trips	40,296,400				
Reactive Organic Gas Emissions					
Run Exh	4.99	9,980	4,526,853	0.02103	
Idle Exh	0	-	-		-
Start Ex	6.49	12,980	5,887,631		0.14611

Total Ex	11.48	22,960	10,414,484		
Diurnal	2.89	5,780	2,621,765	0.01263	
Hot Soak	5.84	11,680	5,297,960	0.02553	
Running	12.34	24,680	11,194,663	0.05394	
Resting	2.42	4,840	2,195,388	0.01058	

Total	34.97				
Carbon Monoxide Emissions					
Run Exh	230.3	460,600	208,924,706	0.97065	
Idle Exh	0	-	-		-
Start Ex	89.96	179,920	81,610,363		2.02525

Total Ex	320.26	640,520	290,535,068		
Oxides of Nitrogen Emissions					
Run Exh	18.15	36,300	16,465,408	0.07650	
Idle Exh	0	-	-		-
Start Ex	5.4	10,800	4,898,799		0.12157

Total Ex	23.55	47,100	21,364,207		
Carbon Dioxide Emissions (000)					
Run Exh	92.72	185,440	84,114,193	390.79076	
Idle Exh	0	-	-		-
Start Ex	3.14	6,280	2,848,561		70.69021

Total Ex	95.86	191,720	86,962,754		
PM10 Emissions					
Run Exh	3.09	6,180	2,803,202	0.01302	
Idle Exh	0	-	-		-
Start Ex	0.29	580	263,084		0.00653

Total Ex	3.38	6,760	3,066,285		
TireWear	1.9	3,800	1,723,652	0.00801	
BrakeWr	2.98	5,960	2,703,411	0.01256	

Total	8.26	16,520	7,493,348		
Lead	0				
SOx	0.93	1,860	843,682	0.00392	
Fuel Consumption (000 gallons)					
Gasoline	9869.77				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2021 -- All model years in the range 1977 to 2021 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	LDA-CAT				
Vehicles	6,506,540				
VMT/1000	215,640				
Trips	40,460,100				
Reactive Organic Gas Emissions					
Run Exh	4.68	9,360	4,245,626	0.01969	
Idle Exh	0	-	-		-
Start Ex	5.92	11,840	5,370,535		0.13274

Total Ex	10.6	21,200	9,616,161		
Diurnal	2.77	5,540	2,512,902	0.01211	
Hot Soak	5.67	11,340	5,143,739	0.02479	
Running	11.93	23,860	10,822,717	0.05215	
Resting	2.34	4,680	2,122,813	0.01023	

Total	33.32				
Carbon Monoxide Emissions					
Run Exh	217.96	435,920	197,730,043	0.91695	
Idle Exh	0	-	-		-
Start Ex	83.03	166,060	75,323,571		1.86168

Total Ex	300.99	601,980	273,053,613		
Oxides of Nitrogen Emissions					
Run Exh	16.94	33,880	15,367,714	0.07127	
Idle Exh	0	-	-		-
Start Ex	4.9	9,800	4,445,207		0.10987

Total Ex	21.84	43,680	19,812,920		
Carbon Dioxide Emissions (000)					
Run Exh	93.25	186,500	84,595,001	392.29735	
Idle Exh	0	-	-		-
Start Ex	3.15	6,300	2,857,633		70.62842

Total Ex	96.4	192,800	87,452,634		
PM10 Emissions					
Run Exh	3.15	6,300	2,857,633	0.01325	
Idle Exh	0	-	-		-
Start Ex	0.3	600	272,156		0.00673

Total Ex	3.44	6,880	3,120,716		
TireWear	1.9	3,800	1,723,652	0.00799	
BrakeWr	2.98	5,960	2,703,411	0.01254	

Total	8.33	16,660	7,556,851		
Lead	0				
SOx	0.93	1,860	843,682	0.00391	
Fuel Consumption (000 gallons)					
Gasoline	9921.23				
Diesel	0				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	58,324				
VMT/1000	11,439				
Trips	295,146				
Reactive Organic Gas Emissions					
Run Exh	9.95	19,900	9,026,491	0.78910	
Idle Exh	1.12	2,240	1,016,047		3.44252
Start Ex	0	-	-		-

Total Ex	11.07	22,140	10,042,538		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	11.07				
Carbon Monoxide Emissions					
Run Exh	40.32	80,640	36,577,699	3.19763	
Idle Exh	4.91	9,820	4,454,278		15.09178
Start Ex	0	-	-		-

Total Ex	45.23	90,460	41,031,978		
Oxides of Nitrogen Emissions					
Run Exh	116.86	233,720	106,013,639	9.26774	
Idle Exh	12.61	25,220	11,439,603		38.75913
Start Ex	0	-	-		-

Total Ex	129.47	258,940	117,453,242		
Carbon Dioxide Emissions (000)					
Run Exh	23.23	46,460	21,073,908	1,842.28582	
Idle Exh	0.72	1,440	653,173		2,213.05117
Start Ex	0	-	-		-

Total Ex	23.94	47,880	21,718,009		
PM10 Emissions					
Run Exh	5.7	11,400	5,170,955	0.45205	
Idle Exh	0.12	240	108,862		0.36884
Start Ex	0	-	-		-

Total Ex	5.82	11,640	5,279,817		
TireWear	0.45	900	408,233	0.03569	
BrakeWr	0.36	720	326,587	0.02855	

Total	6.63	13,260	6,014,637		
Lead	0				
SOx	0.23	460	208,653	0.01824	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2154.97				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	60,159				
VMT/1000	12,042				
Trips	304,434				
Reactive Organic Gas Emissions					
Run Exh	9.22	18,440	8,364,246	0.69459	
Idle Exh	1.1	2,200	997,904		3.27790
Start Ex	0	-	-		-

Total Ex	10.32	20,640	9,362,149		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	10.32				
Carbon Monoxide Emissions					
Run Exh	38.14	76,280	34,600,036	2.87328	
Idle Exh	5	10,000	4,535,925		14.89953
Start Ex	0	-	-		-

Total Ex	43.14	86,280	39,135,961		
Oxides of Nitrogen Emissions					
Run Exh	106.67	213,340	96,769,424	8.03599	
Idle Exh	13.14	26,280	11,920,411		39.15598
Start Ex	0	-	-		-

Total Ex	119.81	239,620	108,689,835		
Carbon Dioxide Emissions (000)					
Run Exh	24.45	48,900	22,180,673	1,841.94264	
Idle Exh	0.74	1,480	671,317		2,205.13116
Start Ex	0	-	-		-

Total Ex	25.19	50,380	22,851,990		
PM10 Emissions					
Run Exh	5.22	10,440	4,735,506	0.39325	
Idle Exh	0.11	220	99,790		0.32779
Start Ex	0	-	-		-

Total Ex	5.33	10,660	4,835,296		
TireWear	0.48	960	435,449	0.03616	
BrakeWr	0.37	740	335,658	0.02787	

Total	6.18	12,360	5,606,403		
Lead	0				
SOx	0.24	480	217,724	0.01808	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2266.95				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2016 -- All model years in the range 1972 to 2016 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	61,237				
VMT/1000	12,456				
Trips	309,889				
Reactive Organic Gas Emissions					
Run Exh	8.51	17,020	7,720,144	0.61979	
Idle Exh	1.08	2,160	979,760		3.16165
Start Ex	0	-	-		-

Total Ex	9.59	19,180	8,699,904		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	9.59				
Carbon Monoxide Emissions					
Run Exh	35.87	71,740	32,540,726	2.61245	
Idle Exh	5.03	10,060	4,563,141		14.72508
Start Ex	0	-	-		-

Total Ex	40.9	81,800	37,103,867		
Oxides of Nitrogen Emissions					
Run Exh	96.67	193,340	87,697,574	7.04059	
Idle Exh	13.48	26,960	12,228,854		39.46205
Start Ex	0	-	-		-

Total Ex	110.15	220,300	99,926,428		
Carbon Dioxide Emissions (000)					
Run Exh	25.31	50,620	22,960,852	1,843.35680	
Idle Exh	0.75	1,500	680,389		2,195.58858
Start Ex	0	-	-		-

Total Ex	26.06	52,120	23,641,241		
PM10 Emissions					
Run Exh	4.75	9,500	4,309,129	0.34595	
Idle Exh	0.1	200	90,719		0.29275
Start Ex	0	-	-		-

Total Ex	4.85	9,700	4,399,847		
TireWear	0.49	980	444,521	0.03569	
BrakeWr	0.39	780	353,802	0.02840	

Total	5.73	11,460	5,198,170		
Lead	0				
SOx	0.25	500	226,796	0.01821	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2345.42				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	62,310				
VMT/1000	12,833				
Trips	315,319				
Reactive Organic Gas Emissions					
Run Exh	7.84	15,680	7,112,330	0.55422	
Idle Exh	1.07	2,140	970,688		3.07843
Start Ex	0	-	-		-

Total Ex	8.9	17,800	8,073,947		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	8.9				
Carbon Monoxide Emissions					
Run Exh	33.77	67,540	30,635,637	2.38725	
Idle Exh	5.07	10,140	4,599,428		14.58659
Start Ex	0	-	-		-

Total Ex	38.84	77,680	35,235,065		
Oxides of Nitrogen Emissions					
Run Exh	87.86	175,720	79,705,274	6.21096	
Idle Exh	13.82	27,640	12,537,297		39.76068
Start Ex	0	-	-		-

Total Ex	101.68	203,360	92,242,571		
Carbon Dioxide Emissions (000)					
Run Exh	26.07	52,140	23,650,313	1,842.92940	
Idle Exh	0.77	1,540	698,532		2,215.31988
Start Ex	0	-	-		-

Total Ex	26.84	53,680	24,348,845		
PM10 Emissions					
Run Exh	4.31	8,620	3,909,967	0.30468	
Idle Exh	0.09	180	81,647		0.25893
Start Ex	0	-	-		-

Total Ex	4.4	8,800	3,991,614		
TireWear	0.51	1,020	462,664	0.03605	
BrakeWr	0.4	800	362,874	0.02828	

Total	5.31	10,620	4,817,152		
Lead	0				
SOx	0.26	520	235,868	0.01838	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2415.45				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	63,391				
VMT/1000	13,176				
Trips	320,790				
Reactive Organic Gas Emissions					
Run Exh	7.24	14,480	6,568,019	0.49848	
Idle Exh	1.05	2,100	952,544		2.96937
Start Ex	0	-	-		-

Total Ex	8.29	16,580	7,520,564		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	8.29				
Carbon Monoxide Emissions					
Run Exh	31.89	63,780	28,930,130	2.19567	
Idle Exh	5.11	10,220	4,635,715		14.45093
Start Ex	0	-	-		-

Total Ex	37	74,000	33,565,845		
Oxides of Nitrogen Emissions					
Run Exh	80.18	160,360	72,738,093	5.52050	
Idle Exh	14.14	28,280	12,827,596		39.98752
Start Ex	0	-	-		-

Total Ex	94.33	188,660	85,574,761		
Carbon Dioxide Emissions (000)					
Run Exh	26.77	53,540	24,285,342	1,843.14985	
Idle Exh	0.78	1,560	707,604		2,205.81782
Start Ex	0	-	-		-

Total Ex	27.55	55,100	24,992,947		
PM10 Emissions					
Run Exh	3.93	7,860	3,565,237	0.27059	
Idle Exh	0.08	160	72,575		0.22624
Start Ex	0	-	-		-

Total Ex	4	8,000	3,628,740		
TireWear	0.52	1,040	471,736	0.03580	
BrakeWr	0.41	820	371,946	0.02823	

Total	4.94	9,880	4,481,494		
Lead	0				
SOx	0.26	520	235,868	0.01790	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2479.14				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2019 -- All model years in the range 1975 to 2019 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	64,480				
VMT/1000	13,486				
Trips	326,300				
Reactive Organic Gas Emissions					
Run Exh	6.71	13,420	6,087,211	0.45137	
Idle Exh	1.05	2,100	952,544		2.91923
Start Ex	0	-	-		-

Total Ex	7.75	15,500	7,030,684		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.75				
Carbon Monoxide Emissions					
Run Exh	30.2	60,400	27,396,987	2.03151	
Idle Exh	5.16	10,320	4,681,075		14.34592
Start Ex	0	-	-		-

Total Ex	35.36	70,720	32,078,062		
Oxides of Nitrogen Emissions					
Run Exh	73.47	146,940	66,650,882	4.94223	
Idle Exh	14.46	28,920	13,117,895		40.20195
Start Ex	0	-	-		-

Total Ex	87.93	175,860	79,768,777		
Carbon Dioxide Emissions (000)					
Run Exh	27.39	54,780	24,847,797	1,842.48830	
Idle Exh	0.79	1,580	716,676		2,196.37190
Start Ex	0	-	-		-

Total Ex	28.19	56,380	25,573,545		
PM10 Emissions					
Run Exh	3.59	7,180	3,256,794	0.24149	
Idle Exh	0.07	140	63,503		0.19462
Start Ex	0	-	-		-

Total Ex	3.66	7,320	3,320,297		
TireWear	0.54	1,080	489,880	0.03633	
BrakeWr	0.42	840	381,018	0.02825	

Total	4.61	9,220	4,182,123		
Lead	0				
SOx	0.27	540	244,940	0.01816	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2536.81				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	65,570				
VMT/1000	13,761				
Trips	331,816				
Reactive Organic Gas Emissions					
Run Exh	6.23	12,460	5,651,763	0.41071	
Idle Exh	1.04	2,080	943,472		2.84336
Start Ex	0	-	-		-

Total Ex	7.28	14,560	6,604,307		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	7.28				
Carbon Monoxide Emissions					
Run Exh	28.7	57,400	26,036,210	1.89203	
Idle Exh	5.21	10,420	4,726,434		14.24414
Start Ex	0	-	-		-

Total Ex	33.92	67,840	30,771,715		
Oxides of Nitrogen Emissions					
Run Exh	67.65	135,300	61,371,065	4.45978	
Idle Exh	14.76	29,520	13,390,051		40.35384
Start Ex	0	-	-		-

Total Ex	82.41	164,820	74,761,116		
Carbon Dioxide Emissions (000)					
Run Exh	27.95	55,900	25,355,821	1,842.58562	
Idle Exh	0.81	1,620	734,820		2,214.54014
Start Ex	0	-	-		-

Total Ex	28.76	57,520	26,090,641		
PM10 Emissions					
Run Exh	3.3	6,600	2,993,711	0.21755	
Idle Exh	0.06	120	54,431		0.16404
Start Ex	0	-	-		-

Total Ex	3.36	6,720	3,048,142		
TireWear	0.55	1,100	498,952	0.03626	
BrakeWr	0.43	860	390,090	0.02835	

Total	4.33	8,660	3,928,111		
Lead	0				
SOx	0.27	540	244,940	0.01780	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2588.03				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:48:42
Scen Year: 2021 -- All model years in the range 1977 to 2021 selected
Season : Annual
Area : South Coast AQMD Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 59 Los Angeles (SC)
Emissions: Tons Per Day

**********		lbs/day	grams/day	grams/mile	grams/trip
	HHDT-DSL				
Vehicles	67,200				
VMT/1000	14,128				
Trips	340,066				
Reactive Organic Gas Emissions					
Run Exh	5.92	11,840	5,370,535	0.38013	
Idle Exh	1.05	2,100	952,544		2.80106
Start Ex	0	-	-		-

Total Ex	6.97	13,940	6,323,079		
Diurnal	0				
Hot Soak	0				
Running	0				
Resting	0				

Total	6.97				
Carbon Monoxide Emissions					
Run Exh	27.59	55,180	25,029,234	1.77160	
Idle Exh	5.31	10,620	4,817,152		14.16535
Start Ex	0	-	-		-

Total Ex	32.9	65,800	29,846,387		
Oxides of Nitrogen Emissions					
Run Exh	63.24	126,480	57,370,379	4.06076	
Idle Exh	15.18	30,360	13,771,068		40.49528
Start Ex	0	-	-		-

Total Ex	78.42	156,840	71,141,448		
Carbon Dioxide Emissions (000)					
Run Exh	28.77	57,540	26,099,712	1,847.37489	
Idle Exh	0.83	1,660	752,964		2,214.16887
Start Ex	0	-	-		-

Total Ex	29.59	59,180	26,843,604		
PM10 Emissions					
Run Exh	3.04	6,080	2,757,842	0.19520	
Idle Exh	0.06	120	54,431		0.16006
Start Ex	0	-	-		-

Total Ex	3.1	6,200	2,812,274		
TireWear	0.56	1,120	508,024	0.03596	
BrakeWr	0.44	880	399,161	0.02825	

Total	4.1	8,200	3,719,459		
Lead	0				
SOx	0.28	560	254,012	0.01798	
Fuel Consumption (000 gallons)					
Gasoline	0				
Diesel	2663.52				

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2014 -- Model Years 1970 to 2014 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	10.302

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	45.288

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	116.253

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.133

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	1.135

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2015 -- Model Years 1971 to 2015 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	9.875

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	44.682

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	117.427

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.137

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.995

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2016 -- All model years in the range 1972 to 2016 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2016 -- Model Years 1972 to 2016 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	9.518

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	44.171

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	118.404

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.136

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.873

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2017 -- Model Years 1973 to 2017 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	9.207

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	43.725

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	119.252

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.764

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2018 -- Model Years 1974 to 2018 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.947

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	43.349

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	119.963

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.669

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2019 -- All model years in the range 1975 to 2019 selected
Season : Annual
Area : South Coast AQMD
****
Year: 2019 -- Model Years 1975 to 2019 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.727

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	43.027

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	120.566

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.585

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.541

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	42.753

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	121.076

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.135

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.512

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Title : Los Angeles County Avg Annual All CYrs 2014 to 2021 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2010/02/04 15:37:57
Scen Year: 2021 -- All model years in the range 1977 to 2021 selected
Season : Annual
Area : South Coast AQMD
****

Year: 2021 -- Model Years 1977 to 2021 Inclusive --
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	8.384

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	42.52

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	121.509

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	6617.134

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.063

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0.447

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

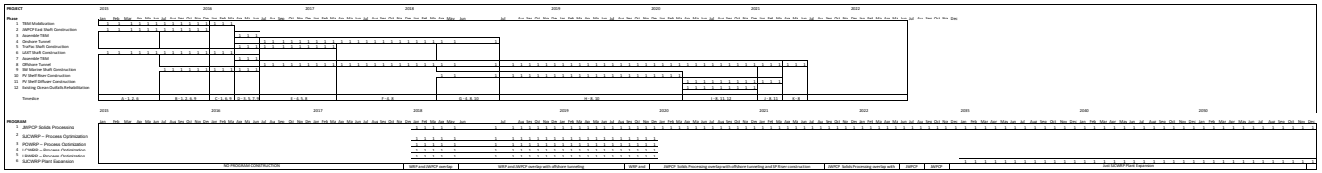
Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 50%

Speed MPH	HHD DSL
0	0

Project Construction GHG Calculations

Alternative 2

Project and Program Schedule and Max Overlap (Alternative 2)



PROJECT EMISSION CALCULATIONS

Phase 1 — TBM Mobiliz... (Start 2015)

Phase		Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
				Equipment Specs							Emission Factor									
1	TBM Mobiliz	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
	Start	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
	2015	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
		Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
		Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
		Hydraulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
		Hydraulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
		Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
		Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
		Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
		Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
		Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
		Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
		TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
		Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
		Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
		Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
		Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
		Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
		Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
		Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
		Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
		Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Unmitigated Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
														On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 2 — JWPCP East Sh... (Start 2015)

Phase		Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
				Equipment Specs							Emission Factor									
2	JWPCP East	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
	Start	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
	2015	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
		Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
		Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
		Hydraulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
		Hydraulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
		Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
		Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
		Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
		Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
		Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
		Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
		TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
		Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
		Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
		Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
		Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
		Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
		Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
		Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
		Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
		Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
		Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
		Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
		Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydraulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	2.4	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase 3 — Assemble TBM — Start 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Type	Daily Trips	Idle Time (min) a	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 4 — Onshore — Start 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Type	Daily Trips	Idle Time (min) a	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550	lbs/ton					0.000166	0.0000249			

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.01	0.02	2294.94
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	0.25	0.37	40653.18
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.12	0.18	19670.89
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	0.30	0.44	48521.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.31	1.69	5.04	0.00	0.00	0.00	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.92	0.14				
On Site Total	10.7	85.7	148.2	0.2	5.9	5.0	184474.9	7.8	1.7	185151.2	4.6	85.6	16.9	0.2	2.2	1.3	184474.9	1.2	1.7	185012.5
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	32	183	371	1	18	15	243611	8	2	244480	16	147	125	1	8	5	243611	2	2	244341

Phase 5 — TraPac Shaft — Start 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Equipment Specs									Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	3.92	14.12	31.41	0.05	1.20	1.07	4652.56	0.35	0.00	4659.98	0.72	14.12	4.71	0.05	0.66	0.58	4652.56	0.06	0.00	4653.91
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	2.84	9.21	19.54	0.04	0.70	0.62	4439.05	0.26	0.00	4444.44	0.52	9.21	2.93	0.04	0.38	0.34	4439.05	0.05	0.00	4440.04
Hydaulic Excavator - Medium	0.80	2.56	5.99	0.01	0.20	0.18	1199.74	0.07	0.00	1201.26	0.15	2.56	0.90	0.01	0.11	0.10	1199.74	0.01	0.00	1200.02
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.87	2.71	7.27	0.01	0.25	0.22	1187.64	0.08	0.00	1189.28	0.16	2.71	1.09	0.01	0.14	0.12	1187.64	0.01	0.00	1187.94
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.77	2.37	5.67	0.01	0.19	0.17	1079.77	0.07	0.00	1081.22	0.14	2.37	0.85	0.01	0.10	0.09	1079.77	0.01	0.00	1080.03
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.3	38.7	87.8	0.2	3.6	2.8	15550.2	1.0	0.0	15571.2	2.2	38.6	15.7	0.2	2.2	1.6	15550.2	0.2	0.0	15554.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	10.66	44.92	121.07	0.31	7.05	5.84	31697.93	0.09	0.08	31725.36	4.88	24.36	53.53	0.30	2.93	2.04	31697.93	0.09	0.08	31725.36
On-Road Truck	onroad		130			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.91	4.22	11.31	0.00	0.08	0.08	629.25	0.00	0.00	629.25	0.73	3.95	11.81	0.00	0.00	0.00	629.25	0.00	0.00	629.25
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08
On-Road Crew Vehicle	onroad		20			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15
															Total	23	88	217	0	11	9	48069	1	0	48130	8	67	78	0	5	4	48069	0	0	48113

Phase 6 — LAXT Shaft — Start 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Equipment Specs									Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	2.4	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase 7 — Assemble TBM — Start 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase 8 — Offshore — Start 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	200	200	1.00	1	24	4800	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	8.000	8.000	1.00	1	12	96000	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	3.760	3.760	1.00	1	12	45120	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	3.600	3.600	1.00	1	24	86400	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	0.40	0.60	65569.65
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	0.19	0.28	30817.74
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	0.36	0.54	59012.68
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	282	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				7050	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck - Idle	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82	0.40	2.15	6.40	0.00	0.01	0.01	342.82	0.00	0.00	342.82
Fugitive Dust					1.17	0.18									1.17	0.18				
On Site Total	**10.8**	**86.2**	**149.5**	**0.2**	**6.2**	**5.0**	**231945.3**	**9.8**	**2.1**	**232797.4**	**4.7**	**86.1**	**18.2**	**0.2**	**2.4**	**1.3**	**231945.3**	**1.5**	**2.1**	**232623.4**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	282	16920		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		282			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mit. ROG	Mit. CO	Mit. NO_X	Mit. SO_2	Mit. PM_{10}	Mit. $PM_{2.5}$	Mit. CO_2	Mit. CH_4	Mit. N_2O	Mit. CO_2e
On-Road Truck	23.12	97.45	262.63	0.68	15.30	12.66	68760.13	0.19	0.18	68819.63	10.58	52.84	116.11	0.64	6.36	4.42	68760.13	0.19	0.18	68819.63
On-Road Truck	1.97	9.15	24.53	0.00	0.18	0.17	1364.98	0.00	0.00	1364.98	1.58	8.57	25.62	0.00	0.00	0.00	1364.98	0.00	0.00	1364.98
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	**37**	**206**	**432**	**1**	**22**	**18**	**305929**	**10**	**3**	**306986**	**18**	**161**	**155**	**1**	**9**	**6**	**305929**	**2**	**3**	**306812**

Phase 9 SW Marine	Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
			Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Start	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
	Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydraulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
	Hydraulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
	Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
	Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
	Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
	Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249								0.54	0.08									0.54	0.08				
														On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.3	40.0	17.1	0.2	2.4	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase 10 PV Shelf	Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
			Equipment Specs								Emission Factor									Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Start	Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.480	3.765	3.233	0.007	0.203	0.181	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2018	Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.416	1.522	3.117	0.005	0.118	0.105	549.583	0.038	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.414	3.288	2.759	0.006	0.146	0.130	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydraulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.325	1.139	1.916	0.006	0.069	0.061	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hydraulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.334	1.189	2.146	0.006	0.072	0.064	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.346	1.259	2.438	0.006	0.087	0.078	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.369	1.247	2.804	0.006	0.095	0.085	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.442	3.727	3.133	0.007	0.189	0.168	568.300	0.040	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.355	1.218	2.277	0.006	0.077	0.068	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tugboats	offroad	1.300	-	1.300	0.31	3	2	2418	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77
	Tugboat - Aux	offroad	57	-	57	0.43	3	2	147.06	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16
	Crew Boats	offroad	400	-	400	0.45	3	2	1080	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71
	Crew Boats - Aux	offroad	25	-	25	0.43	3	2	64.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09
	Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.184	1.003	1.111	0.006	0.034	0.030	568.300	0.017	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.413	1.252	4.432	0.006	0.118	0.105	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.342	1.142	2.542	0.006	0.091	0.081	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
	Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.236	1.064	2.395	0.006	0.077	0.068	568.300	0.021	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.947	43.349	119.963	0.063	0.669	0.615	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.000166	0.0000249								0.07	0.01									0.07	0.01				
														On Site Total	2.1	46.0	37.8	0.1	1.1	0.9	8418.5	0.0	0.4	8537.7	2.1	46.0	37.8	0.1	1.1	0.9	8418.5	0.0	0.4	8537.7

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.498	2.196	5.520	0.018	0.335	0.270	1843.150	0.005	0.005	1.05	4.65	11.68	0.04	0.71	0.57	3900.85	0.01	0.01	3904.22	0.60	3.02	6.38	0.04	0.37	0.26	3900.85	0.01	0.01	3904.22
On-Road Truck	onroad		16			g/trip	2.969	14.451	39.988	0.000	0.226	0.208	2205.818	0.000	0.000	0.10	0.51	1.41	0.00	0.01	0.01	77.81	0.00	0.00	77.81	0.09	0.49	1.45	0.00	0.00	0.00	77.81	0.00	0.00	77.81
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.134	1.120	0.090	0.004	0.034	0.019	392.094	0.042	0.039	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71
On-Road Crew Vehicle	onroad		30			g/trip	0.179	2.417	0.151	0.000	0.007	0.006	71.004	0.000	0.000	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70
															Total	3	53	51	0	2	2	12901	0	0	13041	3	51	45	0	1	1	12901	0	0	13041

Phase 11 — **PV Shelf** — Start 2020

Equipment	Type	Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1.300	-	1.300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	1	8	2580	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.91	5.70	4.15	0.03	0.12	0.11	3232.39	0.08	0.00	3234.12	0.17	5.70	0.62	0.03	0.07	0.06	3232.39	0.02	0.00	3232.71
Pipe Barge	offroad	2.000	-	2.000	0.59	1	8	9440	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	7.83	24.96	81.49	0.12	2.04	1.82	11827.05	0.71	0.00	11841.89	1.43	24.96	12.22	0.12	1.12	0.99	11827.05	0.13	0.00	11829.77
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	2	8	5920	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	4.05	14.46	26.09	0.07	0.95	0.85	7416.97	0.37	0.00	7424.64	0.74	14.46	3.91	0.07	0.52	0.46	7416.97	0.07	0.00	7418.37
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	1	4	510	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.34	1.29	2.51	0.01	0.08	0.08	638.96	0.03	0.00	639.61	0.06	1.29	0.38	0.01	0.05	0.04	638.96	0.01	0.00	639.08
Pump	offroad	500	-	500	0.74	1	8	2960	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	1.37	6.72	12.32	0.04	0.40	0.36	3708.48	0.12	0.00	3711.08	0.25	6.72	1.85	0.04	0.22	0.20	3708.48	0.02	0.00	3708.96

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.03	0.13	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.000166	0.0000249								0.07	0.01									0.07	0.01				
														On Site Total	15.8	81.3	149.8	0.3	4.3	3.8	31975.2	1.3	0.2	32075.6	3.9	81.3	42.2	0.3	2.7	2.3	31975.2	0.3	0.2	32053.1

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.87	4.00	9.44	0.04	0.60	0.47	3899.65	0.01	0.01	3903.03	0.60	3.02	6.23	0.04	0.38	0.27	3899.65	0.01	0.01	3903.03
On-Road Truck			16			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.10	0.50	1.42	0.00	0.01	0.01	78.11	0.00	0.00	78.11	0.09	0.49	1.45	0.00	0.00	0.00	78.11	0.00	0.00	78.11
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88
On-Road Crew Vehicle	onroad		30			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68
															Total	17	87	160	0	5	4	36455	1	0	36575	5	86	50	0	3	3	36455	0	0	36552

Phase 12 — **Existing Ocean Outfalls** — Start 2020

Equipment	Type	Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydraulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1.300	-	1.300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
														On Site Total	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8	1.3	28.0	22.9	0.0	0.6	0.6	5131.9	0.0	0.2	5204.8

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25
On-Road Crew Vehicle	onroad		20			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
															Total	1	29	23	0	1	1	5480	0	0	5563	1	29	23	0	1	1	5480	0	0	5563

[a] Per CARB Regulations "A driver of a diesel-fueled motor vehicle with a gross vehicle weight rating (GVWR) greater than 10,000 pounds is prohibited from idling the vehicle's primary engine for more than 5 minutes at any location." Available http://www.arb.ca.gov/enf/diesel.htm#cmvidling.

GHG EMISSIONS BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP East Shaft Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	24	59,073	2	1	59,284	59,073	0	1	59,250
5	TraPac Shaft Construction	4/1/2016	12	5,820	0	0	5,828	5,820	0	0	5,825
6	LAXT Shaft Construction	1/1/2015	15	7,272	0	0	7,281	7,272	0	0	7,278
7	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
8	Offshore Tunnel	7/1/2016	61	185,717	6	2	186,358	185,717	1	2	186,253
9	SW Marine Shaft Construction	7/1/2015	12	5,833	0	0	5,841	5,833	0	0	5,839
10	PV Shelf Riser Construction	4/1/2018	24	3,133	0	0	3,167	3,133	0	0	3,167
11	PV Shelf Diffuser Construction	4/1/2020	12	4,414	0	0	4,428	4,414	0	0	4,426
12	Existing Ocean Outfalls Rehabilitation	4/1/2020	9	499	0	0	507	499	0	0	507
	Total						278,519				278,368
	Amortized Total						9,284				9,279

Conversion: Short Tons to Metric Tons

0.9071847

Project Construction GHG Calculations

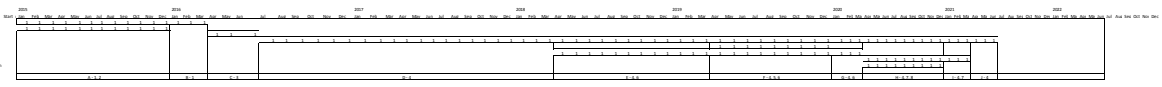
Alternative 3

Project and Program Schedule and Max Overlap (Alternative 3)

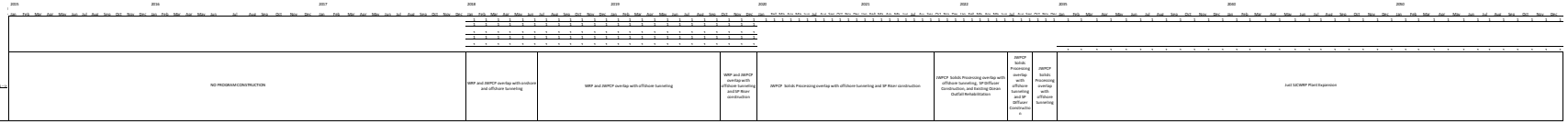
lookups columns

1	0.000
2	CO
3	NO3
4	SO2
5	PM10
6	PM2.5

PROJECT



PROGRAM



GHG EMISSION CALCULATIONS

Phase 1 — TBM Mobilization

Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Unmitigated Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000	0.000			

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase 2 — JWPCP West Shaft Construction

Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000	0.000			

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**11.9**	**40.1**	**97.2**	**0.2**	**3.4**	**3.1**	**15550.2**	**1.1**	**0.0**	**15572.4**	**2.3**	**40.0**	**17.1**	**0.2**	**1.9**	**1.7**	**15550.2**	**0.2**	**0.0**	**15554.2**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	**25**	**94**	**244**	**0**	**11**	**10**	**48047**	**1**	**0**	**48109**	**8**	**68**	**81**	**0**	**5**	**4**	**48047**	**0**	**0**	**48091**

Phase

3 Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.00017	0.000025			

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase

4 Onshore Tunnel

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.01	0.02	2294.94
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	0.25	0.37	40653.18
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.12	0.18	19670.89
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	0.30	0.44	48521.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550	lbs/ton					0.00017	0.000025			

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.31	1.69	5.04	0.00	0.00	0.00	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.46	0.07				
On Site Total	**10.7**	**85.7**	**148.2**	**0.2**	**5.9**	**5.0**	**184474.9**	**7.8**	**1.7**	**185151.2**	**4.6**	**85.6**	**16.9**	**0.2**	**1.7**	**1.2**	**184474.9**	**1.2**	**1.7**	**185012.5**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	**32**	**183**	**371**	**1**	**18**	**15**	**243611**	**8**	**2**	**244480**	**16**	**147**	**125**	**1**	**7**	**5**	**243611**	**2**	**2**	**244341**

Phase 5 — Angels Gate Shaft Construction — Start Date 2019

Equipment	Type	Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000	3.34	12.38	24.11	0.05	0.90	0.80	4652.56	0.30	0.00	4658.88	0.61	12.38	3.62	0.05	0.49	0.44	4652.56	0.06	0.00	4653.71
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000	2.40	8.79	13.07	0.04	0.47	0.42	4439.05	0.22	0.00	4443.59	0.44	8.79	1.96	0.04	0.26	0.23	4439.05	0.04	0.00	4439.88
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000	0.66	2.49	3.92	0.01	0.13	0.12	1199.74	0.06	0.00	1201.00	0.12	2.49	0.59	0.01	0.07	0.06	1199.74	0.01	0.00	1199.97
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000	1.64	6.12	10.85	0.03	0.39	0.35	2833.38	0.15	0.00	2836.49	0.30	6.12	1.63	0.03	0.21	0.19	2833.38	0.03	0.00	2833.95
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000	0.73	2.57	5.24	0.01	0.18	0.16	1187.64	0.07	0.00	1189.02	0.13	2.57	0.79	0.01	0.10	0.09	1187.64	0.01	0.00	1187.89
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000	0.63	2.29	3.76	0.01	0.13	0.11	1079.77	0.06	0.00	1080.97	0.12	2.29	0.56	0.01	0.07	0.06	1079.77	0.01	0.00	1079.99
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.21	1.03	2.88	0.00	0.01	0.01	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.00017	0.000025								0.54	0.08									0.27	0.04				
														On Site Total	**9.6**	**35.7**	**63.8**	**0.2**	**2.8**	**2.1**	**15550.2**	**0.8**	**0.0**	**15568.0**	**1.9**	**35.6**	**12.1**	**0.2**	**1.5**	**1.1**	**15550.2**	**0.2**	**0.0**	**15553.4**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	7.76	34.93	84.99	0.31	5.26	4.19	31683.00	0.09	0.08	31710.43	4.91	24.55	51.18	0.32	3.05	2.15	31683.00	0.09	0.08	31710.43
On-Road Truck	onroad		130			g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.84	4.11	11.52	0.00	0.06	0.05	629.47	0.00	0.00	629.47	0.73	3.96	11.80	0.00	0.00	0.00	629.47	0.00	0.00	629.47
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16
On-Road Crew Vehicle	onroad		20			g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
															Total	**18**	**75**	**158**	**0**	**8**	**6**	**48053**	**1**	**0**	**48109**	**7**	**64**	**72**	**0**	**5**	**3**	**48053**	**0**	**0**	**48095**

Phase 6 — PV Shelf Riser Construction — Start Date 2018

Equipment	Type	Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
		HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.480	3.765	3.233	0.007	0.203	0.181	568.300	0.043	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.416	1.522	3.117	0.005	0.118	0.105	549.583	0.038	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.414	3.288	2.759	0.006	0.146	0.130	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.325	1.139	1.916	0.006	0.069	0.061	568.300	0.029	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.334	1.189	2.146	0.006	0.072	0.064	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.346	1.259	2.438	0.006	0.087	0.078	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.369	1.247	2.804	0.006	0.095	0.085	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.442	3.727	3.133	0.007	0.189	0.168	568.300	0.040	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.355	1.218	2.277	0.006	0.077	0.068	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	3	2	2418	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77	1.21	26.65	21.78	0.03	0.59	0.54	4882.47	0.03	0.22	4951.77
Tugboat - Aux	offroad	57	-	57	0.43	3	2	147.06	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16	0.07	1.62	1.32	0.00	0.04	0.03	296.95	0.00	0.01	301.16
Crew Boats	offroad	400	-	400	0.45	3	2	1080	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71	0.54	11.90	9.73	0.01	0.26	0.24	2180.76	0.01	0.10	2211.71
Crew Boats - Aux	offroad	25	-	25	0.43	3	2	64.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09	0.03	0.71	0.58	0.00	0.02	0.01	130.24	0.00	0.01	132.09
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.184	1.003	1.111	0.006	0.034	0.030	568.300	0.017	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.413	1.252	4.432	0.006	0.118	0.105	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.342	1.142	2.542	0.006	0.091	0.081	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.342	1.179	2.864	0.006	0.095	0.084	568.300	0.031	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.236	1.064	2.395	0.006	0.077	0.068	568.300	0.021	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.947	43.349	119.963	0.063	0.669	0.615	6617.135	0.000	0.000	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.00017	0.000025								0.07	0.01									0.03	0.00				
														On Site Total	**2.1**	**46.0**	**37.8**	**0.1**	**1.1**	**0.9**	**8418.5**	**0.0**	**0.4**	**8537.7**	**2.1**	**46.0**	**37.8**	**0.1**	**1.0**	**0.9**	**8418.5**	**0.0**	**0.4**	**8537.7**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.498	2.196	5.520	0.018	0.335	0.270	1843.150	0.005	0.005	1.05	4.65	11.68	0.04	0.71	0.57	3900.85	0.01	0.01	3904.22	0.60	3.02	6.38	0.04	0.37	0.26	3900.85	0.01	0.01	3904.22
On-Road Truck	onroad		16			g/trip	2.969	14.451	39.988	0.000	0.226	0.208	2205.818	0.000	0.000	0.10	0.51	1.41	0.00	0.01	0.01	77.81	0.00	0.00	77.81	0.09	0.49	1.45	0.00	0.00	0.00	77.81	0.00	0.00	77.81
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.134	1.120	0.090	0.004	0.034	0.019	392.094	0.042	0.039	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71	0.18	1.48	0.12	0.01	0.04	0.03	518.64	0.05	0.05	535.71
On-Road Crew Vehicle	onroad		30			g/trip	0.179	2.417	0.151	0.000	0.007	0.006	71.004	0.000	0.000	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70	0.01	0.16	0.01	0.00	0.00	0.00	4.70	0.00	0.00	4.70
															Total	**3**	**53**	**51**	**0**	**2**	**2**	**12901**	**0**	**0**	**13041**	**3**	**51**	**45**	**0**	**1**	**1**	**12901**	**0**	**0**	**13041**

Phase

7 **PV Shelf Diffuser Construction**

Start Date 2020

		Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	1	8	2580	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.91	5.70	4.15	0.03	0.12	0.11	3232.39	0.08	0.00	3234.12	0.17	5.70	0.62	0.03	0.07	0.06	3232.39	0.02	0.00	3232.71
Pipe Barge	offroad	2,000	-	2,000	0.59	1	8	9440	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	7.83	24.96	81.49	0.12	2.04	1.82	11827.05	0.71	0.00	11841.89	1.43	24.96	12.22	0.12	1.12	0.99	11827.05	0.13	0.00	11829.77
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	2	8	5920	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	4.05	14.46	26.09	0.07	0.95	0.85	7416.97	0.37	0.00	7424.64	0.74	14.46	3.91	0.07	0.52	0.46	7416.97	0.07	0.00	7418.37
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	1	4	510	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.34	1.29	2.51	0.01	0.08	0.08	638.96	0.03	0.00	639.61	0.06	1.29	0.38	0.01	0.05	0.04	638.96	0.01	0.00	639.08
Pump	offroad	500	-	500	0.74	1	8	2960	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	1.37	6.72	12.32	0.04	0.40	0.36	3708.48	0.12	0.00	3711.08	0.25	6.72	1.85	0.04	0.22	0.20	3708.48	0.02	0.00	3708.96

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.03	0.13	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust				400	lbs/ton					0.00017	0.000025								0.07	0.01									0.03	0.00				
On Site Total															**15.8**	**81.3**	**149.8**	**0.3**	**4.3**	**3.8**	**31975.2**	**1.3**	**0.2**	**32075.6**	**3.9**	**81.3**	**42.2**	**0.3**	**2.6**	**2.3**	**31975.2**	**0.3**	**0.2**	**32053.1**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	16	960		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.87	4.00	9.44	0.04	0.60	0.47	3899.65	0.01	0.01	3903.03	0.60	3.02	6.23	0.04	0.38	0.27	3899.65	0.01	0.01	3903.03
On-Road Truck	onroad		16			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.10	0.50	1.42	0.00	0.01	0.01	78.11	0.00	0.00	78.11	0.09	0.49	1.45	0.00	0.00	0.00	78.11	0.00	0.00	78.11
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88	0.16	1.28	0.10	0.01	0.04	0.03	516.92	0.05	0.05	532.88
On-Road Crew Vehicle	onroad		30			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68	0.01	0.13	0.01	0.00	0.00	0.00	4.68	0.00	0.00	4.68
Total																**17**	**87**	**160**	**0**	**5**	**4**	**36455**	**1**	**0**	**36575**	**5**	**86**	**50**	**0**	**3**	**3**	**36455**	**0**	**0**	**36552**

Phase

8 **Existing Ocean Outfalls Rehabilitation**

Start Date 2020

		Equipment Specs							Emission Factor										Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.00017	0.000025								0.00	0.00									0.00	0.00				
On Site Total															**1.3**	**28.0**	**22.9**	**0.0**	**0.6**	**0.6**	**5131.9**	**0.0**	**0.2**	**5204.8**	**1.3**	**28.0**	**22.9**	**0.0**	**0.6**	**0.6**	**5131.9**	**0.0**	**0.2**	**5204.8**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25
On-Road Crew Vehicle	onroad		20			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
Total																**1**	**29**	**23**	**0**	**1**	**1**	**5480**	**0**	**0**	**5563**	**1**	**29**	**23**	**0**	**1**	**1**	**5480**	**0**	**0**	**5563**

[a] Per CARB Regulations "A driver of a diesel-fueled motor vehicle with a gross vehicle weight rating (GVWR) greater than 10,000 pounds is prohibited from idling the vehicle's primary engine for more than 5 minutes at any location." Available http://www.arb.ca.gov/enf/diesel.htm#cmvidling.

GHG'S BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase) CO_2	CH_4	N_2O	CO_2e	Mitigated Emissions (Metric Tons per Phase) CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP West Shaft Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	61	147,886	5	1	148,413	147,886	1	1	148,329
5	Angels Gate Shaft Construction	4/1/2019	9	4,380	0	0	4,385	4,380	0	0	4,383
6	PV Shelf Riser Construction	4/1/2018	24	3,133	0	0	3,167	3,133	0	0	3,167
7	PV Shelf Diffuser Construction	4/1/2020	12	4,414	0	0	4,428	4,414	0	0	4,426
8	Existing Ocean Outfalls Rehabilitation	4/1/2020	9	499	0	0	507	499	0	0	507
9	0	1/0/1900	0	-	-	-	-	-	-	-	-
10	0	1/0/1900	0	-	-	-	-	-	-	-	-
11	0	1/0/1900	0	-	-	-	-	-	-	-	-
12	0	1/0/1900	0	-	-	-	-	-	-	-	-
	Total						166,725				166,635
	Amortized Total						5,558				5,554

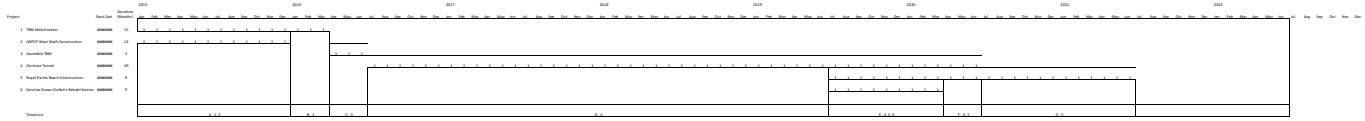
Conversion: Short Tons to Metric Tons

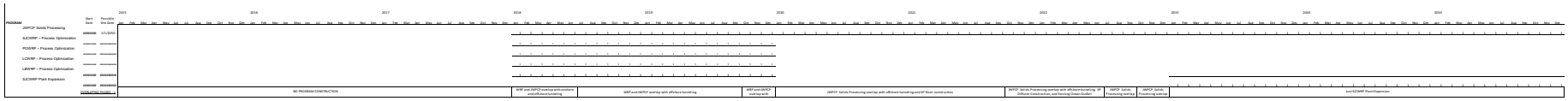
0.9071847

Project Construction GHG Calculations

Alternative 4

Project and Program Schedule and Max Overlap





PROJECT EMISSION CALCULATIONS

Phase 1 — TBM Mobilization (Start Date 2015)

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Unmitigated Daily Emission Rates (lbs/day) and Mitigated Daily Emission Rates (lbs/day) — Phase 1

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Unmitigated										Mitigated									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.0002	0.00002								0.00	0.00									0.00	0.00				
														On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase 2 — JWPCP West Shaft Site Construction (Start Date 2015)

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Daily Emission Rates (lbs/day) and Mitigated Daily Emission Rates (lbs/day) — Phase 2

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily										Mitigated									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.0002	0.00002								0.54	0.08									0.54	0.08				
														On Site Total	**11.9**	**40.1**	**97.2**	**0.2**	**4.0**	**3.1**	**15550.2**	**1.1**	**0.0**	**15572.4**	**2.3**	**40.0**	**17.1**	**0.2**	**2.4**	**1.7**	**15550.2**	**0.2**	**0.0**	**15554.2**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
															Total	**25**	**94**	**244**	**0**	**12**	**10**	**48047**	**1**	**0**	**48109**	**8**	**68**	**81**	**0**	**5**	**4**	**48047**	**0**	**0**	**48091**

Phase 3 — Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Mitigated ROG	Mitigated CO	Mitigated NO_X	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_X	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.0002	0.00002								0.00	0.00									0.00	0.00				
														On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_X	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase 4 — Tunneling

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Mitigated ROG	Mitigated CO	Mitigated NO_X	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.00	0.00	262.28
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.02	0.03	3278.48
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.00	0.00	327.85
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.01	0.01	917.98
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.01	0.02	2294.94
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.00	0.00	437.13
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.00	0.00	491.77
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.00	0.00	245.89
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.00	0.00	131.14
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	0.25	0.37	40653.18
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.12	0.18	19670.89
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	0.25	0.38	41527.44
Street Sweeper	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.11	0.17	18359.50
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.01	0.01	1639.24
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	0.30	0.44	48521.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.37
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_X	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.31	1.69	5.04	0.00	0.00	0.00	269.88	0.00	0.00	269.88
Fugitive Dust				5550	lbs/ton					0.0002	0.00002								0.92	0.14									0.92	0.14				
														On Site Total	10.7	85.7	148.2	0.2	5.9	5.0	184474.9	7.8	1.7	185151.2	4.6	85.6	16.9	0.2	2.2	1.3	184474.9	1.2	1.7	185012.5

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	EF ROG	EF CO	EF NO_X	EF SO_2	EF PM_{10}	EF $PM_{2.5}$	EF CO_2	EF CH_4	EF N_2O	Daily ROG	Daily CO	Daily NO_X	Daily SO_2	Daily PM_{10}	Daily $PM_{2.5}$	Daily CO_2	Daily CH_4	Daily N_2O	Daily CO_2e	Mitigated ROG	Mitigated CO	Mitigated NO_X	Mitigated SO_2	Mitigated PM_{10}	Mitigated $PM_{2.5}$	Mitigated CO_2	Mitigated CH_4	Mitigated N_2O	Mitigated CO_2e
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
															Total	32	183	371	1	18	15	243611	8	2	244480	16	147	125	1	8	5	243611	2	2	244341

Phase 5 — Royal Palms Shaft Site Construction (Start Date 2019)

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	3.34	12.38	24.11	0.05	0.90	0.80	4652.56	0.30	0.00	4658.88	0.61	12.38	3.62	0.05	0.49	0.44	4652.56	0.06	0.00	4653.71
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	2.40	8.79	13.07	0.04	0.47	0.42	4439.05	0.22	0.00	4443.59	0.44	8.79	1.96	0.04	0.26	0.23	4439.05	0.04	0.00	4439.88
Hydaulic Excavator - Medium	0.66	2.49	3.92	0.01	0.13	0.12	1199.74	0.06	0.00	1201.00	0.12	2.49	0.59	0.01	0.07	0.06	1199.74	0.01	0.00	1199.97
Loader	1.64	6.12	10.85	0.03	0.39	0.35	2833.38	0.15	0.00	2836.49	0.30	6.12	1.63	0.03	0.21	0.19	2833.38	0.03	0.00	2833.95
Motor Grader	0.73	2.57	5.24	0.01	0.18	0.16	1187.64	0.07	0.00	1189.02	0.13	2.57	0.79	0.01	0.10	0.09	1187.64	0.01	0.00	1187.89
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.63	2.29	3.76	0.01	0.13	0.11	1079.77	0.06	0.00	1080.97	0.12	2.29	0.56	0.01	0.07	0.06	1079.77	0.01	0.00	1079.99
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	130	5		g/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000	0.21	1.03	2.88	0.00	0.01	0.01	158.04	0.00	0.00	158.04	0.18	0.99	2.95	0.00	0.00	0.00	158.04	0.00	0.00	158.04
Fugitive Dust				3250	lbs/ton					0.0002	0.00002								0.54	0.08									0.54	0.08				
														On Site Total	**9.6**	**35.7**	**63.8**	**0.2**	**2.8**	**2.1**	**15550.2**	**0.8**	**0.0**	**15568.0**	**1.9**	**35.6**	**12.1**	**0.2**	**1.8**	**1.2**	**15550.2**	**0.2**	**0.0**	**15553.4**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	130	7800		g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005	7.76	34.93	84.99	0.31	5.26	4.19	31683.00	0.09	0.08	31710.43	4.91	24.55	51.18	0.32	3.05	2.15	31683.00	0.09	0.08	31710.43
On-Road Truck	onroad		130			g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000	0.84	4.11	11.52	0.00	0.06	0.05	629.47	0.00	0.00	629.47	0.73	3.96	11.80	0.00	0.00	0.00	629.47	0.00	0.00	629.47
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16	0.11	0.92	0.07	0.00	0.03	0.02	345.15	0.04	0.03	356.16
On-Road Crew Vehicle	onroad		20			g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.10	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
															Total	**18**	**75**	**158**	**0**	**8**	**6**	**48053**	**1**	**0**	**48109**	**7**	**64**	**72**	**0**	**5**	**3**	**48053**	**0**	**0**	**48095**

Phase 6 — Existing Ocean Outfalls Rehabilitation (Start Date 2020)

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.402	3.736	2.706	0.007	0.142	0.126	568.300	0.036	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.374	1.410	2.598	0.005	0.097	0.086	549.583	0.034	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.358	3.288	2.141	0.006	0.112	0.099	568.300	0.032	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.290	1.115	1.461	0.006	0.053	0.047	568.300	0.026	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.296	1.172	1.606	0.006	0.055	0.049	568.300	0.027	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.313	1.202	1.936	0.006	0.070	0.062	568.300	0.028	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.331	1.215	2.235	0.006	0.076	0.068	568.300	0.030	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.385	3.719	2.621	0.007	0.135	0.120	568.300	0.035	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.316	1.198	1.718	0.006	0.059	0.052	568.300	0.028	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.161	1.003	0.730	0.006	0.021	0.019	568.300	0.015	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.376	1.199	3.916	0.006	0.098	0.087	568.300	0.034	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.310	1.108	1.999	0.006	0.073	0.065	568.300	0.028	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.226	5.000	4.085	0.006	0.110	0.101	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.306	1.145	2.229	0.006	0.075	0.067	568.300	0.028	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.210	1.030	1.888	0.006	0.062	0.055	568.300	0.019	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										Mitigated Daily Emission Rates (lbs/day)									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18	0.80	17.77	14.52	0.02	0.39	0.36	3254.98	0.02	0.15	3301.18
Tugboat - Aux	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77	0.05	1.08	0.88	0.00	0.02	0.02	197.96	0.00	0.01	200.77
Crew Boats	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24	0.18	3.97	3.24	0.00	0.09	0.08	726.92	0.00	0.03	737.24
Crew Boats - Aux	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03	0.01	0.24	0.19	0.00	0.01	0.00	43.41	0.00	0.00	44.03
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55	0.22	4.96	4.05	0.01	0.11	0.10	908.65	0.01	0.04	921.55
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	8.541	42.753	121.076	0.063	0.512	0.471	6617.135	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.0002	0.00002								0.00	0.00									0.00	0.00				
														On Site Total	**1.3**	**28.0**	**22.9**	**0.0**	**0.6**	**0.6**	**5131.9**	**0.0**	**0.2**	**5204.8**	**1.3**	**28.0**	**22.9**	**0.0**	**0.6**	**0.6**	**5131.9**	**0.0**	**0.2**	**5204.8**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.411	1.892	4.460	0.018	0.282	0.221	1842.586	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	2.843	14.244	40.354	0.000	0.164	0.151	2214.540	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.124	0.971	0.076	0.004	0.034	0.019	390.791	0.039	0.036	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25	0.11	0.86	0.07	0.00	0.03	0.02	344.61	0.03	0.03	355.25
On-Road Crew Vehicle	onroad		20			g/trip	0.146	2.025	0.122	0.000	0.007	0.006	70.690	0.000	0.000	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12	0.01	0.09	0.01	0.00	0.00	0.00	3.12	0.00	0.00	3.12
															Total	**1**	**29**	**23**	**0**	**1**	**1**	**5480**	**0**	**0**	**5563**	**1**	**29**	**23**	**0**	**1**	**1**	**5480**	**0**	**0**	**5563**

[a] Per CARB Regulations "A driver of a diesel-fueled motor vehicle with a gross vehicle weight rating (GVWR) greater than 10,000 pounds is prohibited from idling the vehicle's primary engine for more than 5 minutes at any location." Available http://www.arb.ca.gov/enf/diesel.htm#cmvidling.

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	**CH_4**	**N_2O**	**CO_2e**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP West Shaft Site Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Tunneling	7/1/2016	49	118,309	4	1	118,731	118,309	1	1	118,663
5	Royal Palms Shaft Site Construction	4/1/2019	9	4,380	0	0	4,385	4,380	0	0	4,383
6	Existing Ocean Outfalls Rehabilitation	4/1/2020	9	499	0	0	507	499	0	0	507
7	0	1/0/1900	0	-	-	-	-	-	-	-	-
8	0	1/0/1900	0	-	-	-	-	-	-	-	-
9	0	1/0/1900	0	-	-	-	-	-	-	-	-
10	0	1/0/1900	0	-	-	-	-	-	-	-	-
11	0	1/0/1900	0	-	-	-	-	-	-	-	-
12	0	1/0/1900	0	-	-	-	-	-	-	-	-
	Total						129,447				129,377
	Amortized Total						4,315				4,313

Conversion: Short Tons to Metric Tons

0.9071847

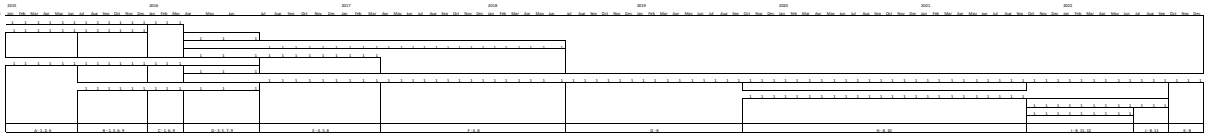
Project Construction GHG Calculations

Alternative 5

Project and Program Schedule and Max Overlap

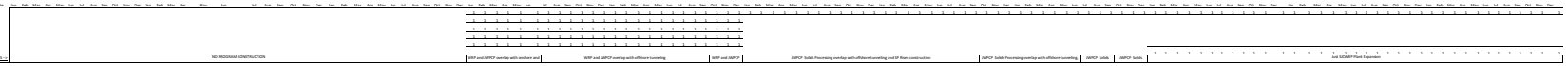
PROJECT

Phase	Start Date	Duration (Months)
1 TBM Mobilization	1/1/2015	15
2 JWPCP East Shaft Site Construction	1/1/2015	12
3 Assemble TBM	4/1/2016	3
4 Onshore Tunnel	7/1/2016	26
5 Traffic Shaft Site Construction	4/1/2016	12
6 LAXT Shaft Site Construction	1/1/2015	15
7 Assemble TBM	4/1/2016	3
8 Offshore Tunnel	7/1/2016	79
9 Old Marina Shaft Site Construction	7/1/2015	12
10 SP River Construction	10/1/2019	20
11 SP Diffuser Construction	10/1/2021	12
12 Existing Ocean Outfall Rehabilitation	10/1/2021	9



PROGRAM

	Baseline Start Date	Baseline End Date
JWPCP Solids Processing	1/1/2018	1/1/2030
SJCWRP – Process Optimization	1/1/2018	12/31/2020
PCWRP – Process Optimization	1/1/2018	12/31/2020
LCWRP – Process Optimization	1/1/2018	12/31/2020
LBWRP – Process Optimization	1/1/2018	12/31/2020
SJCWRP Plant Expansion	1/1/2018	12/31/2030
	OVERLAPPED PHASES →	NO PROGRAM CONSTRUCTION



PROJECT EMISSION CALCULATIONS

Phase 1 — TBM Mobilization
Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.6	3.8	4.3	0.0	0.3	0.3	568.3	0.1	0.0
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.9	0.0	0.0
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.9	0.0	0.0
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.5	1.8	4.0	0.0	0.2	0.1	549.6	0.0	0.0
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.5	3.3	4.0	0.0	0.2	0.2	568.3	0.0	0.0
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.9	0.0	0.0
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.4	1.2	2.8	0.0	0.1	0.1	568.3	0.0	0.0
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.4	1.2	3.2	0.0	0.1	0.1	568.3	0.0	0.0
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.4	1.4	3.4	0.0	0.1	0.1	568.3	0.0	0.0
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.4	1.3	3.9	0.0	0.1	0.1	568.3	0.0	0.0
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.9	0.0	0.0
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.9	0.0	0.0
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.9	0.0	0.0
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.9	0.0	0.0
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.9	0.0	0.0
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.9	0.0	0.0
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.9	0.0	0.0
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.9	0.0	0.0
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.9	0.0	0.0
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.6	3.8	4.2	0.0	0.3	0.3	568.3	0.1	0.0
TBM & Trailing gear	offroad	-	2.240	2.240	1.00	0	12	0	g/kW-hr							308.9	0.0	0.0
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.9	0.0	0.0
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.9	0.0	0.0
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.4	1.3	3.4	0.0	0.1	0.1	568.3	0.0	0.0
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.9	0.0	0.0
Tugboats	offroad	1.300	-	1.300	0.31	0	2	0	g/hp-hr	0.6	2.2	7.5	0.0	0.4	0.3	915.9	0.0	0.0
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.0	3.9	9.0	0.0	0.6	0.5	915.9	0.0	0.0
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.7	2.4	10.7	0.0	0.4	0.4	915.9	0.0	0.0
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.3	6.9	6.7	0.0	0.6	0.5	915.9	0.0	0.0
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.2	1.0	1.9	0.0	0.1	0.1	568.3	0.0	0.0
Pipe Barge	offroad	2.000	-	2.000	0.59	0	8	0	g/hp-hr	0.5	1.4	5.3	0.0	0.2	0.1	568.3	0.0	0.0
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.4	1.3	4.0	0.0	0.1	0.1	568.3	0.0	0.0
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.4	1.3	3.5	0.0	0.1	0.1	568.3	0.0	0.0
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.7	2.4	10.7	0.0	0.4	0.4	915.9	0.0	0.0
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.3	2.6	4.7	0.0	0.1	0.1	35.0	0.0	0.0
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.4	1.3	4.0	0.0	0.1	0.1	568.3	0.0	0.0
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.3	1.2	3.3	0.0	0.1	0.1	568.3	0.0	0.0

Equipment	Unmitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change House	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compressor (2000 cfm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gantry Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydaulic Excavator - Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office Trailers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft and Tunnel Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shaft Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (mechanical)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shop (welding)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (discharge)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Circuit Pumps (feed)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slurry Separation Plant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TBM & Trailing gear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunnel Ventilation Fans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tugboat - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crew Boats - Aux	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pipe Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Barge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Vessel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locomotives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hoist	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	Unmitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		0			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	Unmitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase 2 — JWPCP East Shaft Site Construction
Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.27	0.04				
On Site Total	**11.9**	**40.1**	**97.2**	**0.2**	**4.0**	**3.1**	**15550.2**	**1.1**	**0.0**	**15572.4**	**2.4**	**40.1**	**17.0**	**0.2**	**2.2**	**1.7**	**15550.2**	**0.2**	**0.0**	**15554.2**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

Equipment	Daily ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	**25**	**94**	**244**	**0**	**12**	**10**	**48047**	**1**	**0**	**48109**	**8**	**68**	**81**	**0**	**5**	**4**	**48047**	**0**	**0**	**48091**

Phase

3 Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs								**Emission Factor**								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										**Mitigated Daily Emission Rates (lbs/day)**									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Phase

4 Onshore Tunnel

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs								**Emission Factor**								
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	1	24	3360	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	1	12	59520	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	1	12	28800	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	1	24	71040	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
	Daily Emission Rates (lbs/day)										**Mitigated Daily Emission Rates (lbs/day)**									
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64	0.00	0.00	0.00	0.00	0.00	0.00	2288.16	0.10	0.02	2296.64
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34	0.00	0.00	0.00	0.00	0.00	0.00	40533.03	1.68	0.37	40683.34
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49	0.00	0.00	0.00	0.00	0.00	0.00	19612.76	0.81	0.18	19685.49
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25
Street Sweeper	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54	0.00	0.00	0.00	0.00	0.00	0.00	48378.14	2.01	0.44	48557.54
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min) [a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	222	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				5550	lbs/ton					0.000166	0.0000249			

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88	0.39	1.80	4.83	0.00	0.04	0.03	269.88	0.00	0.00	269.88
Fugitive Dust					0.92	0.14									0.46	0.07				
On Site Total	**10.7**	**85.7**	**148.2**	**0.2**	**5.9**	**5.0**	**184474.9**	**7.8**	**1.7**	**185151.2**	**4.7**	**85.7**	**16.7**	**0.2**	**1.8**	**1.3**	**184474.9**	**7.5**	**1.7**	**185145.1**

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	222	13320		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		222			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

Equipment	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	18.20	76.71	206.75	0.53	12.04	9.97	54130.32	0.15	0.14	54177.16	8.33	41.59	91.41	0.51	5.01	3.48	54130.32	0.15	0.14	54177.16
On-Road Truck	1.55	7.21	19.31	0.00	0.14	0.13	1074.56	0.00	0.00	1074.56	1.25	6.74	20.17	0.00	0.00	0.00	1074.56	0.00	0.00	1074.56
On-Road Crew Vehicle	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
Total	**32**	**183**	**371**	**1**	**18**	**15**	**243611**	**8**	**2**	**244480**	**16**	**147**	**125**	**1**	**7**	**5**	**243611**	**8**	**2**	**244474**

Phase 5 — **TraPac Shaft Site Construction**, Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr

Equipment	Emission Factor ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000
Change House							308.901	0.013	0.003
Compressor (2000 cfm)							308.901	0.013	0.003
Crawler Crane	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000
Forklift	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000
Gantry Crane							308.901	0.013	0.003
Hydaulic Excavator - Large	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000
Hydaulic Excavator - Medium	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000
Loader	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000
Motor Grader	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000
Office Trailers							308.901	0.013	0.003
Shaft and Tunnel Lighting							308.901	0.013	0.003
Shaft Pump							308.901	0.013	0.003
Shop (mechanical)							308.901	0.013	0.003
Shop (welding)							308.901	0.013	0.003
Site Lighting							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)							308.901	0.013	0.003
Slurry Circuit Pumps (feed)							308.901	0.013	0.003
Slurry Separation Plant							308.901	0.013	0.003
Street Sweeper	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000
TBM & Trailing gear							308.901	0.013	0.003
Tower Crane							308.901	0.013	0.003
Tunnel Ventilation Fans							308.901	0.013	0.003
Water Truck	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000
Worker Hoist							308.901	0.013	0.003
Tugboats	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000
Pipe Barge	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000
Dump Barge	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Generator	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000
Service Vessel	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000
Pump	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	3.92	14.12	31.41	0.05	1.20	1.07	4652.56	0.35	0.00	4659.98	0.72	14.12	4.71	0.05	0.66	0.58	4652.56	0.06	0.00	4653.91
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	2.84	9.21	19.54	0.04	0.70	0.62	4439.05	0.26	0.00	4444.44	0.52	9.21	2.93	0.04	0.38	0.34	4439.05	0.05	0.00	4440.04
Hydaulic Excavator - Medium	0.80	2.56	5.99	0.01	0.20	0.18	1199.74	0.07	0.00	1201.26	0.15	2.56	0.90	0.01	0.11	0.10	1199.74	0.01	0.00	1200.02
Loader	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	0.87	2.71	7.27	0.01	0.25	0.22	1187.64	0.08	0.00	1189.28	0.16	2.71	1.09	0.01	0.14	0.12	1187.64	0.01	0.00	1187.94
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.77	2.37	5.67	0.01	0.19	0.17	1079.77	0.07	0.00	1081.22	0.14	2.37	0.85	0.01	0.10	0.09	1079.77	0.01	0.00	1080.03
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

	Daily ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.23	1.05	2.83	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.27	0.04				
On Site Total	11.3	38.7	87.8	0.2	3.6	2.8	15550.2	1.0	0.0	15571.2	2.3	38.7	15.6	0.2	2.0	1.6	15550.2	0.2	0.0	15554.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041
On-Road Crew Vehicle	onroad		20			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000

	Daily ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	10.66	44.92	121.07	0.31	7.05	5.84	31697.93	0.09	0.08	31725.36	4.88	24.36	53.53	0.30	2.93	2.04	31697.93	0.09	0.08	31725.36
On-Road Truck	0.91	4.22	11.31	0.00	0.08	0.08	629.25	0.00	0.00	629.25	0.73	3.95	11.81	0.00	0.00	0.00	629.25	0.00	0.00	629.25
On-Road Crew Vehicle	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08	0.13	1.14	0.09	0.00	0.03	0.02	346.97	0.04	0.04	359.08
On-Road Crew Vehicle	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15	0.01	0.13	0.01	0.00	0.00	0.00	3.14	0.00	0.00	3.15
Total	23	88	217	0	11	9	48069	1	0	48130	8	67	78	0	5	4	48069	0	0	48113

Phase 6 — **LAXT Shaft Site Construction**, Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	g/hp-hr
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr
Water Truck	offroad	189	-	189	0.57	1	8	861.84	g/hp-hr
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr

Equipment	Emission Factor ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House							308.901	0.013	0.003
Compressor (2000 cfm)							308.901	0.013	0.003
Crawler Crane	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane							308.901	0.013	0.003
Hydaulic Excavator - Large	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers							308.901	0.013	0.003
Shaft and Tunnel Lighting							308.901	0.013	0.003
Shaft Pump							308.901	0.013	0.003
Shop (mechanical)							308.901	0.013	0.003
Shop (welding)							308.901	0.013	0.003
Site Lighting							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)							308.901	0.013	0.003
Slurry Circuit Pumps (feed)							308.901	0.013	0.003
Slurry Separation Plant							308.901	0.013	0.003
Street Sweeper	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear							308.901	0.013	0.003
Tower Crane							308.901	0.013	0.003
Tunnel Ventilation Fans							308.901	0.013	0.003
Water Truck	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist							308.901	0.013	0.003
Tugboats	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	0.286	1.180	3.327	0.006	0.104	0.093	568.300	0.026	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	4.13	14.92	34.17	0.05	1.31	1.17	4652.56	0.37	0.00	4660.38	0.75	14.92	5.13	0.05	0.72	0.64	4652.56	0.07	0.00	4653.99
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	3.00	9.42	22.18	0.04	0.79	0.70	4439.05	0.27	0.00	4444.74	0.55	9.42	3.33	0.04	0.43	0.38	4439.05	0.05	0.00	4440.09
Hydaulic Excavator - Medium	0.85	2.59	6.81	0.01	0.23	0.20	1199.74	0.08	0.00	1201.35	0.15	2.59	1.02	0.01	0.12	0.11	1199.74	0.01	0.00	1200.04
Loader	2.01	6.94	16.79	0.03	0.60	0.53	2833.38	0.18	0.00	2837.19	0.37	6.94	2.52	0.03	0.33	0.29	2833.38	0.03	0.00	2834.08
Motor Grader	0.92	2.79	8.06	0.01	0.28	0.25	1187.64	0.08	0.00	1189.38	0.17	2.79	1.21	0.01	0.15	0.13	1187.64	0.02	0.00	1187.96
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.81	2.40	6.41	0.01	0.21	0.19	1079.77	0.07	0.00	1081.31	0.15	2.40	0.96	0.01	0.12	0.10	1079.77	0.01	0.00	1080.05
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		g/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

	Daily ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08									0.27	0.04				
On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4	2.4	40.1	17.0	0.2	2.2	1.7	15550.2	0.2	0.0	15554.2

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		g/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

	Daily ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	25	94	244	0	12	10	48047	1	0	48109	8	68	81	0	5	4	48047	0	0	48091

Phase

7 Assemble TBM

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	Emission Factor ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	-	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust				0	lbs/ton					0.000166	0.0000249								0.00	0.00									0.00	0.00				
														On Site Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	0	0		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	onroad		0			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad	20	0	0		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	onroad		0			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phase

8 Offshore Tunnel

Start Date 2016

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	Emission Factor ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.582	3.804	3.893	0.007	0.282	0.251	568.300	0.052	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	offroad	-	16	16	1.00	1	24	384	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47	0.00	0.00	0.00	0.00	0.00	0.00	261.50	0.01	0.00	262.47
Compressor (2000 cfm)	offroad	-	400	400	1.00	1	12	4800	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.463	1.668	3.710	0.005	0.142	0.126	549.583	0.042	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	offroad	145	-	145	0.60	2	6	1044	g/hp-hr	0.496	3.293	3.572	0.006	0.194	0.173	568.300	0.045	0.000	1.14	7.58	8.22	0.01	0.45	0.40	1307.99	0.10	0.00	1310.15	0.21	7.58	1.23	0.01	0.36	0.32	1307.99	0.02	0.00	1308.39
Gantry Crane	offroad		160	160	1.00	1	3	480	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09	0.00	0.00	0.00	0.00	0.00	0.00	326.88	0.01	0.00	328.09
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.364	1.179	2.501	0.006	0.089	0.079	568.300	0.033	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.378	1.213	2.837	0.006	0.094	0.084	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.383	1.339	3.031	0.006	0.108	0.096	568.300	0.035	0.000	1.91	6.68	15.11	0.03	0.54	0.48	2833.38	0.17	0.00	2836.99	0.35	6.68	2.27	0.03	0.29	0.26	2833.38	0.03	0.00	2834.04
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.414	1.299	3.478	0.006	0.119	0.106	568.300	0.037	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	offroad	-	56	56	1.00	1	24	1344	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66	0.00	0.00	0.00	0.00	0.00	0.00	915.26	0.04	0.01	918.66
Shaft and Tunnel Lighting	offroad	-	200	200	1.00	1	24	4800	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91	0.00	0.00	0.00	0.00	0.00	0.00	3268.79	0.14	0.03	3280.91
Shaft Pump	offroad	-	80	80	1.00	1	8	640	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46	0.00	0.00	0.00	0.00	0.00	0.00	435.84	0.02	0.00	437.46
Shop (mechanical)	offroad	-	60	60	1.00	1	12	720	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14	0.00	0.00	0.00	0.00	0.00	0.00	490.32	0.02	0.00	492.14
Shop (welding)	offroad	-	60	60	1.00	1	6	360	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07	0.00	0.00	0.00	0.00	0.00	0.00	245.16	0.01	0.00	246.07
Site Lighting	offroad	-	8	8	1.00	1	24	192	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24	0.00	0.00	0.00	0.00	0.00	0.00	130.75	0.01	0.00	131.24
Slurry Circuit Pumps (discharge)	offroad	-	8,000	8,000	1.00	1	12	96000	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29	0.00	0.00	0.00	0.00	0.00	0.00	65375.86	2.72	0.60	65618.29
Slurry Circuit Pumps (feed)	offroad	-	3,760	3,760	1.00	1	12	45120	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60	0.00	0.00	0.00	0.00	0.00	0.00	30726.65	1.28	0.28	30840.60
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	1	19	60800	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25	0.00	0.00	0.00	0.00	0.00	0.00	41404.71	1.72	0.38	41558.25
Street Sweeper	offroad	90	-	90	0.68	1	12	734.4	g/hp-hr	0.524	3.743	3.752	0.007	0.259	0.230	568.300	0.047	0.000	0.85	6.06	6.08	0.01	0.42	0.37	920.10	0.08	0.00	921.71	0.12	6.06	0.99	0.01	0.25	0.22	920.10	0.01	0.00	920.34
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	1	12	26880	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12	0.00	0.00	0.00	0.00	0.00	0.00	18305.24	0.76	0.17	18373.12
Tower Crane	offroad		240	240	1.00	1	10	2400	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46	0.00	0.00	0.00	0.00	0.00	0.00	1634.40	0.07	0.01	1640.46
Tunnel Ventilation Fans	offroad	-	3,600	3,600	1.00	1	24	86400	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46	0.00	0.00	0.00	0.00	0.00	0.00	58838.27	2.44	0.54	59056.46
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.403	1.245	2.984	0.006	0.100	0.089	568.300	0.036	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	offroad	-	28	28	1.00	1	3	84	g/kW-hr							308.901	0.013	0.003	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42	0.00	0.00	0.00	0.00	0.00	0.00	57.20	0.00	0.00	57.42
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats	offroad	400	-	400	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.211	1.003	1.625	0.006	0.053	0.047	568.300	0.019	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.450	1.341	4.994	0.006	0.140	0.125	568.300	0.041	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.376	1.211	3.172	0.006	0.112	0.099	568.300	0.034	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	offroad	500	-	500	0.45	0	2	0	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Locomotives	offroad	185	-	185	1.00	5	12	11100	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001	6.42	63.62	113.91	0.13	3.58	3.55	855.39	0.05	0.02	863.21	3.61	63.62	7.34	0.13	0.36	0.35	855.39	0.05	0.02	863.21
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.383	1.227	3.629	0.006	0.118	0.105	568.300	0.035	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.267	1.130	2.984	0.006	0.094	0.084	568.299	0.024	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																			10.31																			

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	onroad	282	5		g/idle-hr	9.518	44.171	118.404	0.063	0.873	0.803	6617.136	0.000	0.000	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82	0.49	2.29	6.13	0.00	0.05	0.04	342.82	0.00	0.00	342.82
Fugitive Dust				7050	lbs/ton					0.000166	0.0000249								1.17	0.18									0.59	0.09				
														On Site Total	21.1	86.2	149.5	0.2	6.2	5.0	231945.3	9.8	2.1	232797.4	4.8	86.2	18.0	0.2	1.9	1.3	231945.3	9.5	2.1	232791.4

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	onroad	60	282	16920		g/mile	0.620	2.612	7.041	0.018	0.410	0.339	1843.357	0.005	0.005	23.12	97.45	262.63	0.68	15.30	12.66	68760.13	0.19	0.18	68819.63	10.58	52.84	116.11	0.64	6.36	4.42	68760.13	0.19	0.18	68819.63
On-Road Truck	onroad		282			g/trip	3.162	14.725	39.462	0.000	0.293	0.269	2195.589	0.000	0.000	1.97	9.15	24.53	0.00	0.18	0.17	1364.98	0.00	0.00	1364.98	1.58	8.57	25.62	0.00	0.00	0.00	1364.98	0.00	0.00	1364.98
On-Road Crew Vehicle	onroad	20	240	4800		g/mile	0.144	1.294	0.106	0.004	0.033	0.019	393.462	0.044	0.041	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95	1.53	13.70	1.13	0.04	0.35	0.20	4163.62	0.47	0.44	4308.95
On-Road Crew Vehicle	onroad		240			g/trip	0.219	2.876	0.186	0.000	0.007	0.006	71.311	0.000	0.000	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74	0.12	1.52	0.10	0.00	0.00	0.00	37.73	0.00	0.00	37.74
															Total	47.35	206	432	1	22	18	305929	10	3	306986	18	161	155	1	9	6	305929	10	3	306980

Phase 9 — SW Marine Shaft Site Construction

Start Date 2015

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120		120	0.55	0	18	0	e/hp-hr	0.640	3.827	4.274	0.007	0.326	0.290	568.300	0.058	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	e/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	2	6	3840	g/hp-hr	0.487	1.762	4.036	0.005	0.155	0.138	549.584	0.044	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.538	3.296	4.008	0.006	0.219	0.195	568.300	0.049	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	e/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	1	12	3543.12	g/hp-hr	0.384	1.206	2.839	0.006	0.101	0.090	568.300	0.035	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	1	8	957.6	e/hp-hr	0.401	1.228	3.224	0.006	0.107	0.095	568.300	0.036	0.000
Loader	offroad	349	-	349	0.54	2	6	2261.52	g/hp-hr	0.403	1.392	3.367	0.006	0.120	0.107	568.300	0.036	0.000
Motor Grader	offroad	259	-	259	0.61	1	6	947.94	g/hp-hr	0.439	1.334	3.859	0.006	0.132	0.118	568.300	0.040	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	e/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	e/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	e/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	e/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	e/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.594	3.765	4.156	0.007	0.310	0.276	568.300	0.054	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	e/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	1	8	861.84	e/hp-hr	0.428	1.262	3.375	0.006	0.112	0.100	568.300	0.039	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	0	2	0	e/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	0	2	0	e/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	0	2	0	e/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	0	2	0	e/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	e/hp-hr	0.223	1.003	1.915	0.006	0.063	0.056	568.300	0.020	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	e/hp-hr	0.474	1.420	5.321	0.006	0.153	0.136	568.300	0.043	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Generator	offroad	500	-	500	0.74	0	8	0	e/hp-hr	0.394	1.262	3.540	0.006	0.123	0.110	568.300	0.036	0.000
Service Vessel	offroad	500	-	500	0.45	0	2	0	e/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	e/hp-hr	0.405	1.259	4.034	0.006	0.131	0.116	568.300	0.037	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.286	1.180	3.227	0.006	0.104	0.093	568.300	0.026	0.000

	Type	Daily Trips	Idle Time (min) [1]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	130	5		e/idle-hr	9.875	44.682	117.427	0.063	0.995	0.915	6617.137	0.000	0.000
Fugitive Dust				3250	lbs/ton					0.000166	0.0000249			

	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	130	7800		e/mile	0.695	2.873	8.036	0.018	0.457	0.383	1841.943	0.005	0.005
On-Road Truck	onroad		130			g/trip	3.278	14.900	39.156	0.000	0.328	0.302	2205.131	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		e/mile	0.150	1.384	0.116	0.004	0.033	0.019	392.216	0.045	0.043
On-Road Crew Vehicle	onroad		20			g/trip	0.242	3.130	0.206	0.000	0.006	0.006	71.455	0.000	0.000

	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Daily Emission Rates (lbs/day)										
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.54	0.08				
On Site Total	11.9	40.1	97.2	0.2	4.0	3.1	15550.2	1.1	0.0	15572.4
On-Road Truck	11.94	49.41	138.19	0.31	7.86	6.58	31673.62	0.09	0.08	31701.05
On-Road Truck	0.94	4.27	11.22	0.00	0.09	0.09	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	25	94	244	0	12	10	48047	1	0	48109
Mitigated Daily Emission Rates (lbs/day)										
On-Road Truck - Idle	0.24	1.07	2.80	0.00	0.02	0.02	158.04	0.00	0.00	158.04
Fugitive Dust					0.27	0.04				
On Site Total	2.4	40.1	17.0	0.2	2.2	1.7	15550.2	0.2	0.0	15554.2
On-Road Truck	4.89	24.04	55.22	0.33	2.81	1.94	31673.62	0.09	0.08	31701.05
On-Road Truck	0.75	3.97	11.79	0.00	0.00	0.00	631.98	0.00	0.00	631.98
On-Road Crew Vehicle	0.13	1.22	0.10	0.00	0.03	0.02	345.87	0.04	0.04	358.35
On-Road Crew Vehicle	0.01	0.14	0.01	0.00	0.00	0.00	3.15	0.00	0.00	3.15
Total	8	68	81	0	5	4	48047	0	0	48091

Phase 10 — SP Riser Cosntruction

Start Date 2019

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
		Equipment Specs							Emission Factor									
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	e/hp-hr	0.437	3.748	2.951	0.007	0.170	0.151	568.300	0.039	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	e/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.394	1.462	2.848	0.005	0.107	0.095	549.583	0.036	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	e/hp-hr	0.384	3.288	2.431	0.006	0.128	0.114	568.300	0.035	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	e/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.307	1.125	1.673	0.006	0.061	0.054	568.300	0.028	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	e/hp-hr	0.313	1.180	1.855	0.006	0.063	0.056	568.300	0.028	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.329	1.228	2.176	0.006	0.078	0.070	568.300	0.030	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	e/hp-hr	0.349	1.230	2.508	0.006	0.085	0.076	568.300	0.032	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	e/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	e/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	e/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4,960	4,960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2,400	2,400	1.00	0	12	0	e/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	e/hp-hr	0.413	3.724	2.871	0.007	0.161	0.144	568.300	0.037	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	e/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2,960	2,960	1.00	0	24	0	e/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	e/hp-hr	0.334	1.207	1.976	0.006	0.067	0.060	568.300	0.030	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	e/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	3	2	2418	e/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	3	2	147.06	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	3	2	1080	e/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	3	2	64.5	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	e/hp-hr	0.170	1.003	0.888	0.006	0.025	0.022	568.300	0.015	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	e/hp-hr	0.395	1.223	4.169	0.006	0.108	0.096	568.300	0.036	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
Generator	offroad	500	-	500	0.74	0	8	0	e/hp-hr	0.326	1.122	2.262	0.006	0.082	0.073	568.300	0.029	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	e/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	e/hp-hr	0.323	1.161	2.530	0.006	0.084	0.075	568.300	0.029	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.222	1.044	2.134	0.006	0.069	0.061	568.300	0.020	0.000

	Type	Daily Trips	Idle Time (min) [1]	Tons Soil	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	16	5		e/idle-hr	8.727	43.027	120.566	0.063	0.585	0.538	6617.135	0.000	0.000
Fugitive Dust				400	lbs/ton					0.000166	0.0000249			

	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	16	960		g/mile	0.451	2.032	4.942	0.018	0.306	0.243	1842.488	0.005	0.005
On-Road Truck	onroad		16			g/trip	2.919	14.346	40.202	0.000	0.195	0.179	2196.372	0.000	0.000
On-Road Crew Vehicle	onroad	20	30	600		e/mile	0.129	1.043	0.083	0.004	0.034	0.019	391.398	0.040	0.038
On-Road Crew Vehicle	onroad		30			g/trip	0.161	2.214	0.136	0.000	0.007	0.006	70.846	0.000	0.000

	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Daily Emission Rates (lbs/day)										
On-Road Truck - Idle	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust					0.07	0.01				
On Site Total	6.0	21.9	80.4	0.1	3.8	3.4	8418.5	0.0	0.4	8537.7
On-Road Truck	0.96	4.30	10.46	0.04	0.65	0.52	3899.45	0.01	0.01	3902.82
On-Road Truck	0.10	0.51	1.42	0.00	0.01	0.01	77.47	0.00	0.00	77.47
On-Road Crew Vehicle	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23
On-Road Crew Vehicle	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69
Total	7	28	92	0	4	4	12898	0	0	13037
Mitigated Daily Emission Rates (lbs/day)										
On-Road Truck - Idle	0.03	0.13	0.35	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust					0.03	0.00				
On Site Total	1.7	21.9	18.7	0.1	2.1	1.9	8418.5	0.0	0.4	8537.0
On-Road Truck	0.60	3.02	6.30	0.04	0.37	0.26	3899.45	0.01	0.01	3902.82
On-Road Truck	0.09	0.49	1.45	0.00	0.00	0.00	77.47	0.00	0.00	77.47
On-Road Crew Vehicle	0.17	1.38	0.11	0.01	0.04	0.03	517.72	0.05	0.05	534.23
On-Road Crew Vehicle	0.01	0.15	0.01	0.00	0.00	0.00	4.69	0.00	0.00	4.69
Total	3	27	26	0	2	2	12898	0	0	13037

Phase 11 — SP Diffuser Construction

Start Date 2021

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3,200	3,200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	1	8	2580	g/hp-hr	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	1	8	9440	g/hp-hr	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Generator	offroad	500	-	500	0.74	2	8	5920	g/hp-hr	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	1	4	510	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Pump	offroad	500	-	500	0.74	1	8	2960	g/hp-hr	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	2.05	7.67	26.65	0.02	1.28	1.18	3254.98	0.02	0.15	3301.18	0.60	7.67	6.40	0.02	0.70	0.65	3254.98	0.01	0.15	3300.90
Tugboat - Aux	0.22	0.85	1.95	0.00	0.13	0.12	197.96	0.00	0.01	200.77	0.05	0.85	0.51	0.00	0.08	0.07	197.96	0.00	0.01	200.76
Crew Boats	0.54	1.89	8.53	0.00	0.35	0.33	726.92	0.00	0.03	737.24	0.16	1.89	2.05	0.00	0.19	0.18	726.92	0.00	0.03	737.17
Crew Boats - Aux	0.11	0.33	0.32	0.00	0.03	0.03	43.41	0.00	0.00	44.03	0.03	0.33	0.08	0.00	0.02	0.02	43.41	0.00	0.00	44.03
Crane Barge	0.86	5.70	3.38	0.03	0.10	0.09	3232.39	0.08	0.00	3234.03	0.16	5.70	0.51	0.03	0.06	0.05	3232.39	0.01	0.00	3232.69
Pipe Barge	7.35	24.46	76.05	0.12	1.82	1.62	11827.05	0.66	0.00	11840.97	1.34	24.46	11.41	0.12	1.00	0.89	11827.05	0.12	0.00	11829.60
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	3.85	14.31	22.92	0.07	0.84	0.75	7416.97	0.35	0.00	7424.26	0.70	14.31	3.44	0.07	0.46	0.41	7416.97	0.06	0.00	7418.30
Service Vessel	0.67	2.36	10.66	0.01	0.44	0.41	908.65	0.01	0.04	921.55	0.12	2.36	1.60	0.01	0.24	0.22	908.65	0.00	0.04	921.45
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.33	1.27	2.20	0.01	0.07	0.07	638.96	0.03	0.00	639.58	0.06	1.27	0.33	0.01	0.04	0.04	638.96	0.01	0.00	639.07
Pump	1.30	6.65	10.84	0.04	0.36	0.32	3708.48	0.12	0.00	3710.94	0.24	6.65	1.63	0.04	0.20	0.17	3708.48	0.02	0.00	3708.93

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	16	5		g/idle-hr	8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000
Fugitive Dust				400	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45	0.02	0.12	0.36	0.00	0.00	0.00	19.45	0.00	0.00	19.45
Fugitive Dust					0.07	0.01									0.03	0.00				
On Site Total	17.3	65.6	163.8	0.3	5.5	4.9	31975.2	1.3	0.2	32074.0	3.5	65.6	28.3	0.3	3.0	2.7	31975.2	0.2	0.2	32052.4

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	16	960		g/mile	0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005
On-Road Truck	onroad		16			g/trip	2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000
On-Road Crew Vehicle	onroad	20	30	600		g/mile	0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035
On-Road Crew Vehicle	onroad		30			g/trip	0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.80	3.75	8.59	0.04	0.55	0.42	3909.79	0.01	0.01	3913.16	0.60	3.00	6.17	0.04	0.38	0.27	3909.79	0.01	0.01	3913.16
On-Road Truck	0.10	0.50	1.43	0.00	0.01	0.01	78.10	0.00	0.00	78.10	0.09	0.49	1.45	0.00	0.00	0.00	78.10	0.00	0.00	78.10
On-Road Crew Vehicle	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32	0.16	1.21	0.09	0.01	0.04	0.03	518.91	0.05	0.05	534.32
On-Road Crew Vehicle	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67	0.01	0.12	0.01	0.00	0.00	0.00	4.67	0.00	0.00	4.67
Total	18	71	174	0	6	5	36467	1	0	36585	4	70	36	0	3	3	36467	0	0	36563

Phase 12 — Existing Ocean Outfall Rehabilitation

Start Date 2021

Equipment	Type	HP	kW	Power Rating	LF	Number Active	Equipment Hrs/Day	Daily Hp-hr	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Backhoe/Loader	offroad	120	-	120	0.55	0	18	0	g/hp-hr	0.373	3.727	2.495	0.007	0.118	0.105	568.300	0.034	0.000
Change House	offroad	-	16	16	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Compressor (2000 cfm)	offroad	-	400	400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Crawler Crane	offroad	500	-	500	0.64	0	6	0	g/hp-hr	0.355	1.365	2.366	0.005	0.088	0.078	549.583	0.032	0.000
Forklift	offroad	145	-	145	0.60	0	6	0	g/hp-hr	0.335	3.288	1.880	0.006	0.097	0.086	568.300	0.030	0.000
Gantry Crane	offroad		160	160	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Hydaulic Excavator - Large	offroad	518	-	518	0.57	0	12	0	g/hp-hr	0.276	1.109	1.274	0.006	0.046	0.041	568.300	0.025	0.000
Hydaulic Excavator - Medium	offroad	210	-	210	0.57	0	8	0	g/hp-hr	0.280	1.166	1.392	0.006	0.048	0.043	568.300	0.025	0.000
Loader	offroad	349	-	349	0.54	0	6	0	g/hp-hr	0.297	1.179	1.720	0.006	0.062	0.056	568.300	0.027	0.000
Motor Grader	offroad	259	-	259	0.61	0	6	0	g/hp-hr	0.313	1.204	1.985	0.006	0.068	0.061	568.300	0.028	0.000
Office Trailers	offroad	-	56	56	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft and Tunnel Lighting	offroad	-	140	140	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Shaft Pump	offroad	-	80	80	1.00	0	8	0	g/kW-hr							308.901	0.013	0.003
Shop (mechanical)	offroad	-	60	60	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Shop (welding)	offroad	-	60	60	1.00	0	6	0	g/kW-hr							308.901	0.013	0.003
Site Lighting	offroad	-	8	8	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (discharge)	offroad	-	4.960	4.960	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Circuit Pumps (feed)	offroad	-	2.400	2.400	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Slurry Separation Plant	offroad	-	3.200	3.200	1.00	0	19	0	g/kW-hr							308.901	0.013	0.003
Street Sweeper	offroad	90	-	90	0.68	0	12	0	g/hp-hr	0.355	3.699	2.402	0.007	0.110	0.098	568.300	0.032	0.000
TBM & Trailing gear	offroad	-	2,240	2,240	1.00	0	12	0	g/kW-hr							308.901	0.013	0.003
Tower Crane	offroad		240	240	1.00	0	10	0	g/kW-hr							308.901	0.013	0.003
Tunnel Ventilation Fans	offroad	-	2.960	2.960	1.00	0	24	0	g/kW-hr							308.901	0.013	0.003
Water Truck	offroad	189	-	189	0.57	0	8	0	g/hp-hr	0.300	1.191	1.495	0.006	0.051	0.046	568.300	0.027	0.000
Worker Hoist	offroad	-	28	28	1.00	0	3	0	g/kW-hr							308.901	0.013	0.003
Tugboats	offroad	1,300	-	1,300	0.31	2	2	1612	g/hp-hr	0.576	2.158	7.500	0.006	0.362	0.333	915.918	0.005	0.042
Tugboat - Aux	offroad	57	-	57	0.43	2	2	98.04	g/hp-hr	1.002	3.940	9.021	0.006	0.588	0.541	915.918	0.005	0.042
Crew Boats	offroad	400	-	400	0.45	1	2	360	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Crew Boats - Aux	offroad	25	-	25	0.43	1	2	21.5	g/hp-hr	2.276	6.894	6.735	0.006	0.579	0.533	915.918	0.005	0.042
Crane Barge	offroad	750	-	750	0.43	0	8	0	g/hp-hr	0.152	1.003	0.594	0.006	0.018	0.016	568.300	0.014	0.000
Pipe Barge	offroad	2,000	-	2,000	0.59	0	8	0	g/hp-hr	0.353	1.175	3.655	0.006	0.087	0.078	568.300	0.032	0.000
Dump Barge	offroad	250	-	250	0.51	0	8	0	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Generator	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.295	1.096	1.756	0.006	0.064	0.057	568.300	0.027	0.000
Service Vessel	offroad	500	-	500	0.45	1	2	450	g/hp-hr	0.676	2.376	10.742	0.006	0.447	0.411	915.918	0.005	0.042
Locomotives	offroad	185	-	185	1.00	0	12	0	g/hp-hr	0.262	2.600	4.655	0.005	0.146	0.145	34.956	0.002	0.001
Hoist	offroad	250	-	250	0.51	0	4	0	g/hp-hr	0.290	1.133	1.952	0.006	0.066	0.059	568.300	0.026	0.000
Pump	offroad	500	-	500	0.74	0	8	0	g/hp-hr	0.199	1.019	1.660	0.006	0.055	0.049	568.300	0.018	0.000

Equipment	Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated Daily Emission Rates (lbs/day) ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Backhoe/Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Change House	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor (2000 cfm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gantry Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydaulic Excavator - Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Grader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Office Trailers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft and Tunnel Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shaft Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (mechanical)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shop (welding)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (discharge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Circuit Pumps (feed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Separation Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Street Sweeper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBM & Trailing gear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tower Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tunnel Ventilation Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tugboats	2.05	7.67	26.65	0.02	1.28	1.18	3254.98	0.02	0.15	3301.18	0.60	7.67	6.40	0.02	0.70	0.65	3254.98	0.01	0.15	3300.90
Tugboat - Aux	0.22	0.85	1.95	0.00	0.13	0.12	197.96	0.00	0.01	200.77	0.05	0.85	0.51	0.00	0.08	0.07	197.96	0.00	0.01	200.76
Crew Boats	0.54	1.89	8.53	0.00	0.35	0.33	726.92	0.00	0.03	737.24	0.16	1.89	2.05	0.00	0.19	0.18	726.92	0.00	0.03	737.17
Crew Boats - Aux	0.11	0.33	0.32	0.00	0.03	0.03	43.41	0.00	0.00	44.03	0.03	0.33	0.08	0.00	0.02	0.02	43.41	0.00	0.00	44.03
Crane Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Barge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Vessel	0.67	2.36	10.66	0.01	0.44	0.41	908.65	0.01	0.04	921.55	0.12	2.36	1.60	0.01	0.24	0.22	908.65	0.00	0.04	921.45
Locomotives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hoist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Equipment	Type	Daily Trips	Idle Time (min)[a]	Tons Soil	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck - Idle	onroad	-	5		g/idle-hr	8.384	42.520	121.509	0.063	0.447	0.411	6617.134	0.000	0.000
Fugitive Dust				0	lbs/ton					0.000166	0.0000249			

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck - Idle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust					0.00	0.00									0.00	0.00				
On Site Total	3.6	13.1	48.1	0.0	2.2	2.1	5131.9	0.0	0.2	5204.8	1.0	13.1	10.6	0.0	1.2	1.1	5131.9	0.0	0.2	5204.3

Equipment	Type	Miles / Trip	Daily Trips	Miles / Day	Acres Disturbed	E.F. Units	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
On-Road Truck	onroad	60	0	0		g/mile	0.380	1.772	4.061	0.018	0.259	0.201	1847.375	0.005	0.005
On-Road Truck	onroad		0			g/trip	2.801	14.165	40.495	0.000	0.160	0.147	2214.169	0.000	0.000
On-Road Crew Vehicle	onroad	20	20	400		g/mile	0.119	0.917	0.071	0.004	0.034	0.020	392.297	0.038	0.035
On-Road Crew Vehicle	onroad		20			g/trip	0.133	1.862	0.110	0.000	0.007	0.006	70.628	0.000	0.000

Equipment	Daily ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	Mitigated ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
On-Road Crew Vehicle	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21	0.10	0.81	0.06	0.00	0.03	0.02	345.94	0.03	0.03	356.21
On-Road Crew Vehicle	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12	0.01	0.08	0.00	0.00	0.00	0.00	3.11	0.00	0.00	3.12
Total	4	14	48	0	2	2	5481	0	0	5564	1	14	11	0	1	1	5481	0	0	5564

[a] Per CARB Regulations "A driver of a diesel-fueled motor vehicle with a gross vehicle weight rating (GVWR) greater than 10,000 pounds is prohibited from idling the vehicle's primary engine for more than 5 minutes at any location." Available http://www.arb.ca.gov/enf/diesel.htm#cmvidling.

GHG'S BY PHASE

Phase		Start Date	Duration (Months)	Unmitigated Emissions (Metric Tons per Phase)				Mitigated Emissions (Metric Tons per Phase)			
				CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
1	TBM Mobilization	1/1/2015	15	-	-	-	-	-	-	-	-
2	JWPCP East Shaft Site Construction	1/1/2015	12	5,817	0	0	5,825	5,817	0	0	5,823
3	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
4	Onshore Tunnel	7/1/2016	24	59,073	2	1	59,284	59,073	2	1	59,283
5	TraPac Shaft Site Construction	4/1/2016	12	5,820	0	0	5,828	5,820	0	0	5,825
6	LAXT Shaft Site Construction	1/1/2015	15	7,272	0	0	7,281	7,272	0	0	7,278
7	Assemble TBM	4/1/2016	3	-	-	-	-	-	-	-	-
8	Offshore Tunnel	7/1/2016	79	241,584	8	2	242,419	241,584	8	2	242,414
9	SW Marine Shaft Site Construction	7/1/2015	12	5,833	0	0	5,841	5,833	0	0	5,839
10	SP Riser Cosntruction	10/1/2019	24	3,132	0	0	3,166	3,132	0	0	3,166
11	SP Diffuser Construction	10/1/2021	12	4,415	0	0	4,430	4,415	0	0	4,427
12	Existing Ocean Outfall Rehabilitation	10/1/2021	9	496	0	0	503	496	0	0	503
	Total						334,576				334,558
	Amortized Total						11,153				11,152

Conversion: Short Tons to Metric Tons

0.9071847

Appendix 13-A

MARINE ENVIRONMENT TECHNICAL MEMORANDUM REGARDING THE EXISTING REGIONAL AND PROJECT SETTINGS

Appendix 13-A
MARINE ENVIRONMENT TECHNICAL MEMORANDUM REGARDING THE EXISTING REGIONAL AND PROJECT SETTINGS

Introduction

This appendix describes the existing marine conditions the southern California region, specifically the Southern California Bight (SCB) and the San Pedro (SP) and Palos Verdes (PV) Shelves. It provides additional detail and support to the information that is summarized in Chapter 13 of the Environmental Impact Report (EIR)/Environmental Impact Statement (EIS).

Environmental Setting

The environmental settings for the region and the riser/diffuser areas are described at different levels of detail in this section. That is, the regional setting involves the largest area, and its physical and biological environments are discussed in more general terms. It is also important to note that the "Regional Setting" section sometimes summarizes historic and secondary reports that use different units of measure than more current standards. These sources frequently provide background data for the SCB that is not otherwise readily available. Use of this information, therefore, occasionally results in inconsistent units of measure. The PV and SP Shelves, as well as the existing ocean outfalls system areas, are described in greater detail not only because they are smaller but also because there is often more information available about these locations and the existing resources.

Any information not covered in the "Regional Setting" section that applies specifically to the SP and PV Shelves or the exiting ocean outfalls is provided in the relevant "Project Setting" sections that follow. Every effort was made to present the most accurate and recent information; whenever site-specific data were not available, the justification for the data used is clearly identified.

Regional Setting

Location and Geography

The project area includes both the PV and SP shelves, which are situated within the SCB. The SCB includes the area south of Point Conception, north of Cabo Colnett (Baja California, Mexico), seaward of the Southern California coastline and east of the Santa Rosa-Cortez ridge (Dailey et al. 1993). The mainland shelf of the SCB is narrow, ranging from less than 1.6 kilometers (km; 1 mile [mi]) to more than 15 km (9 mi) wide, with an average width of approximately 7 km (4 mi). Thirty-two submarine canyons (13 of which are relatively large and named) intersect the nearshore shelf, part of the unique basin-and-range submarine topography of the SCB, while eight offshore islands influence water circulation and oceanographic characteristics along the mainland coast.

The coastline between Point Conception and the Mexican border generally trends northwest to southeast. The continental margin has been slowly emerging over geological time, resulting in a predominantly cliffed coastline, broken by coastal plains in the Oxnard–Ventura, Los Angeles, and San Diego areas. Most drainage of the coastal region is via short streams, which normally flow only during rainstorms. However, only a small part of the storm runoff reaches the ocean directly; most is impounded by dams or diverted for other uses.

Oceanography

Currents

Water in the north Pacific Ocean is driven eastward by prevailing westerly winds until it meets the western coast of North America, where it divides and flows north and south. The southern component is the California Current, a diffuse southeast-flowing water mass. No true western boundary of this current exists, but more than 90 percent of the southeastward transport is within 725 km (450 mi) of the California coast. Just south of Point Conception, the California Current separates, with one branch turning back to the north and moving inshore through the Channel Islands. This branch forms the inner edge of the Southern California Countercurrent, which moves at an average speed between 5 and 10 centimeters per second (cm/s). The current fluctuates seasonally, stronger in summer and autumn, and weak or even absent in winter and spring. Its flow pattern is complicated by small eddies that appear between the Channel Islands.

Waves

The southern California coast is somewhat protected by the Channel Islands from swell originating in distant areas (Hickey 1993). However, waves in the SCB consist of swells that are both locally and distantly generated. On the mainland shelf, waves are primarily local in origin, most of which are of short period (Allan Hancock Foundation 1965). However, when winds blow from the west at more than approximately 63 kilometers per hour (km/hr) (35 knots per hour [kn/hr]), high waves can form over the shelf. In the San Pedro Channel, such waves have reached as high as 7.6 meters (m) (25 feet [ft]) (Allan Hancock Foundation 1965).

Tides

Tide waves along southern California, and in the eastern north Pacific Ocean in general, travel counterclockwise, with flood tide currents generally flowing up the coast and ebb tides flowing downcoast. Tides in the area are mixed semi-diurnal (daily), having two unequal highs and lows every 25 hours.

Upwelling

Upwelling occurs when wind-driven dense, cooler, and usually nutrient-rich water is driven towards the ocean surface, replacing warmer, usually nutrient-depleted surface water. Between February and October, northwesterly winds off the California coast create an offshore movement of surface water, which pushes deeper ocean waters upward near the coast. This upwelled water is colder, more saline, lower in oxygen, and higher in nutrient concentrations than the surface water. During these periods of upwelling, water column stratification is reduced, the physical properties of the surface waters are altered, and the added nutrients increase biological productivity.

The temporary reduction in water column density stratification, which occurs during upwelling, may allow buoyant discharges (normally trapped below a subsurface density stratification) to reach the sea surface. Upwelling also brings nutrient-rich water to the surface, and associated phytoplankton blooms result in increased dissolved oxygen (DO) concentrations in surface waters and reduced DO levels in

bottom waters. Normal depth stratification and water conditions return shortly following the end of upwelling events.

Water Quality

Water quality off the southern California shoreline is influenced by circulation (including currents), biological activity, and climate. Water temperature, salinity, hydrogen ion concentration (pH), and transparency are all important water quality parameters that are affected by large-scale oceanographic and meteorological conditions. Other parameters, such as DO and nutrient levels are primarily affected by local processes and conditions. These different parameters are discussed in detail below.

Temperature

According to the California State Water Resources Control Board, natural water temperature is "the temperature of the receiving water at locations, depths, and times which represent conditions unaffected by any elevated temperature waste discharge." In summer, in the SCB, natural surface water temperatures range from approximately 19 degrees Centigrade (°C) (66°Farenheit [F]) in July through September to approximately 14.5°C (58°F) in late winter (Dailey et al. 1993). Surface temperatures may vary daily by as much as 2°C (3.6°F) in summer and up to 1°C (1.8°F) in winter. Weak winds, clear skies, and warm air temperatures can contribute to rapid daytime surface warming, while overcast skies, moderate air temperatures, and vertical mixing of surface waters by winds and waves can reduce surface temperatures.

A thermocline is present when there is a sharp difference between surface and bottom water temperatures. In natural waters, a thermocline forms when a stable stratification develops, separating the surface layer from the subsurface layer, and is caused by a substantial amount of solar radiation penetrating the sea surface. Artificial thermoclines may be found in the vicinity of thermal discharges when elevated temperature fields result in heated water overlaying the cooler receiving water. Sharp, natural thermoclines have been noted in nearshore waters of the SCB during summer, at depths of between 9 and 15 m (30 to 50 ft); none are typically found during winter (Allan Hancock Foundation 1965).

Salinity

Salinity refers to the concentration of dissolved salts in water, and is influenced along the coast by freshwater runoff, direct rainfall, and evaporation, which vary by season. Offshore salinities throughout the SCB are fairly uniform, ranging between 33.0 and 34.0 parts per thousand (ppt) (Allan Hancock Foundation 1965).

Density

Pycnoclines are regions that exhibit rapid variability in salinity readings over very small changes in depth. They generally form in early spring, when cooler, more saline water is found near the bottom. Pycnoclines thicken and move up in the water column during the summer as surface temperatures increase, with higher salinities in the surface water. In fall, decreased solar isolation and increased surface mixing push the pycnocline back down in the water column, and nearshore pycnoclines generally disappear in winter. Seawater density varies inversely with temperature and directly with salinity; thus, because salinity is relatively uniform in southern California, density is mainly affected by water temperature and offshore density gradients are most pronounced during the spring and summer when pycnoclines are present.

Dissolved Oxygen

DO concentrations in seawater are influenced by physical, chemical, and biological factors. High concentrations may result when water temperatures are low (oxygen solubility in water increases as temperatures decrease), when there is active photosynthesis occurring, and/or there is mixing at the air–water interface (Sverdrup et al. 1942). Low concentrations may result when water temperatures are high, there is a high rate of organic decomposition, and/or there is mixing of surface water with oxygen-poor subsurface water. The levels of DO in the nearshore SCB typically fluctuate between approximately 5.5 and 6.0 milligrams per liter (mg/L) (Dailey et al. 1993); the threshold of biological concern is 5 mg/L. In the offshore SCB, concentrations typically range between approximately 5 and 13 mg/L (Allan Hancock Foundation 1965).

Hydrogen Ion Concentration

In the open ocean, pH remains fairly constant due to the buffering capacity of seawater (Sverdrup et al. 1942). In nearshore areas, pH varies in response to physical, chemical, and biological influences. For instance, in areas with a large organic influx, such as bays, estuaries, and river mouths, microbial decomposition results in the production of humic acids, which decrease pH. Reduced pH may also occur in areas of freshwater influx, because fresh water usually has a lower pH than salt water. In contrast, phytoplankton blooms (red tide), which are often associated with nearshore upwelling, may cause pH to increase. High photosynthetic rates increase the removal of carbon dioxide from water, thus reducing the carbonic acid concentration and raising the pH. For surface water off southern California, the pH value is approximately 8.0 (with a variation of approximately ± 0.5), decreasing slightly with depth (Allan Hancock Foundation 1965:92).

Transparency (Turbidity)

Conversi and McGowan (1994) found that in the SCB water clarity was characterized by an inshore-to-offshore gradient, with lower water clarity nearshore. Offshore of alluvial coastal plains, where fresh water flows are greater, the water transparency is usually less than 6 m (20 ft), while offshore of rocky areas transparency between 6 and 12 m (20 and 40 ft) is common. The depth to which light can penetrate water is important to photosynthesis, with transparent waters having the greatest depth of light penetration and thus a greater ability to photosynthesize. Using a Secchi disk from the surface, water transparency in the SCB ranges from 6 to 15 m (20 to 50 ft) (SCCWRP 1973). Increases in suspended solids resulting from stormwater runoff, sediment resuspension, wastewater effluent discharges, dredging activities, construction activities, and biological processes such as phytoplankton blooms can all cause a reduction in transparency. The first of these are most common near the shoreline, while biological processes are most common off shore. There is a band of low transparency water extending approximately 1.6 km (1 mi) off the coast within the SCB, with some variability cause by shore features. Because runoff from land areas is higher, transparency is usually lower in spring and higher in the fall when there is little runoff.

Nutrients

Phytoplankton produces organic matter by photosynthesis, and the process can be hindered if inorganic nutrients or light are lacking. Phosphates and nitrates are the major nutrients affecting phytoplankton photosynthesis. These nutrients vary in spatial and temporal concentrations daily, influenced by the following factors: cool, nutrient-rich bottom water upwelling; animal and bacteria biological processes that produce ammonium and urea; wastewater disposal; stormwater runoff; and aerial deposition. Nitrogen is probably the most important factor in limiting phytoplankton photosynthesis in the SCB, although phosphorus and silicates also are limiting nutrients (Hardy 1993).

During 1994–1995, the mass emission of major nutrients was estimated in the runoff flow for the SCB at between 300 and 3,200 metric tons (MT; 1 MT is equal to approximately 1.1 tons) for ammonia-nitrogen (ammonia-N), 2,300 to 34,500 MT for nitrate-N, and 500 to 12,000 MT for phosphate. These figures were later refined to mean annual values of 406 MT for ammonia-N, 1,940 MT for nitrate-N and 558 MT for phosphate (Sanitation Districts 2009). The Los Angeles and San Gabriel Rivers are estimated to discharge about one-third of all runoff in the SCB; therefore, their projected combined mass emissions is 135 MT for ammonia-N, 647 MT for nitrate-N, and 186 MT for phosphate.

Aerial emissions of nitrogen in the SCB have been estimated at levels up to 1,100 MT per year. These sources are considerably smaller than the input of nutrients from coastal upwelling, which is estimated to provide 431,000 MT of nitrate, 374 MT of nitrite, 76,100 MT of phosphate, and 333,000 MT of silicate to the nearshore environment in the vicinity of Palos Verdes annually.

Sediment Quality

Sediment is prevalent in the ocean, and there are many different types of sediment depending on the location. Sediment is important to habitat types and the lifecycles of marine biological resources. Therefore, characteristics and issues associated with sediment are discussed below.

Sediment Characteristics

Beach sediments continue offshore on mainland shelves, typically becoming finer with distance (Emery 1960). Regional monitoring from 2003 confirmed this trend in the SCB, showing increasing percentages of fine sediment with increasing depths. At midshelf depths (30 to 120 m [98 to 394 ft] there is a mean of 45 percent fine material (clay and silt sized particles) (Schiff et al. 2006). There are several factors affecting the introduction, suspension, transport, and deposition of sediments; however, the trend to finer sized sediment with increasing distance can be primarily attributed to increased wave action and water motion in nearshore waters, each of which keeps fine material from settling. Nonetheless, sediment characteristics can vary throughout the shelves, with different sizes and origins distributed across the bottom. Some of these differences are the result of bottom currents, wave exposure, proximity to sediment sources, and the local topography of the seafloor.

Mean annual sediment discharges into the marine environment by the San Gabriel and Los Angeles Rivers were estimated to be about 1,200,000 tons per year each (Dailey et al. 1993). In the lower San Gabriel River, sediments are predominantly sand (MBC 2008a). During years of normal or dry flow the percentage of fine material in the sediments begins to accumulate, while during wet years, runoff increases storm flow and removes the finer sediments from the river bottom, leaving sediments that are coarser.

Sediment Contaminants

Sediment pollutants come from both industrial and domestic uses. For example, oil and gasoline combustion releases many substances, including cadmium, copper, chromium, lead, mercury, and zinc. These and other metals also are found in paints, pigments, batteries, manufacturing processes, and protective coatings. Along harbors, pollutants result from the use and maintenance of boats, anti-fouling boat paints, protective metal plating, and alloys used in the structures of boats, piers, and docks. Aerial pollutants are the result of many sources, and, as they settle on the ground, rainfall washes them into rivers where they eventually travel to the ocean, which also receives aerial contaminants that settle directly on the sea surface. They are widespread and significant pollutants, and include such things as metals, chlorinated hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs) (SCCWRP 1973, 1986).

Studies in the Los Angeles coastal region found that stormwater metal loads were equal to 10 to 40 percent of the metals deposited by dry deposition in a watershed, and in impervious areas up to 100 percent of the aerial deposited metals were washed out (MBC and Flow Science 2008). In Santa Monica Bay, aerial deposition is a significant metal contributor, accounting for 99 percent of the lead, 50 percent of the chromium, and 43 percent of the zinc load in the bay. In southern California, the amount of aerial deposition varies along the coast, and is higher in urbanized areas (Sabin and Schiff 2007).

Elevated sediment metal levels may be toxic to some organisms. Ranges of toxicity were developed by the National Oceanic and Atmospheric Administration (NOAA 1990) and later updated (Long et al. 1995) using data from spiked sediment bioassays, sediment-water equilibrium partitioning, and the co-occurrence of adversely affected fauna and contaminant levels in the field. Chemical concentrations believed to be associated with adverse biological effects from the various independent studies were compared for each parameter and the lower 10 percentile was designated as the "Effects Range-Low" (ERL). The median of concentration levels was designated the "Effects Range-Median" (ERM). Concentrations equal to and above the ERL, but below the ERM, represent a possible effects range within which effects on biota could occasionally occur; concentrations above the ERM represent a probable effects range within which effects could frequently occur.

In 2003, 359 sediment samples were collected from 12 strata throughout the SCB as part of a regional monitoring study. These samples were analyzed for concentrations of 11 trace metals as well as organic chlorinated hydrocarbons, the pesticide dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCBs), and other contaminants (Schiff et al. 2006). The survey found that sediments in approximately 94 percent of the SCB were enriched for at least one contaminant, with 88 percent of the SCB enriched by at least one trace metal and 71 percent enriched by one or more organic constituent (Table 1). Total DDT was the most widespread contaminant, found in 71 percent of the sediments of the SCB, and was highest in sediments on and north of the PV shelf. Trace metals were highest in sediments from bays and harbors. The study found that on average more than 75 percent of the mass of contaminants of the SCB were in sediments at depths greater than 200 m (656 ft). Despite the overall contaminant enrichment, sediment from less than 1 percent of the area of the SCB (mostly embayments and near large municipal outfalls) was found to have contamination levels that indicated moderate to high risk of adverse biological effects (based on ERM quotient values). The areal extent of contamination reported in 2003 was nearly identical to those in surveys conducted in 1994 and 1998.

Table 1. Percentage of SCB Coastal Sediments with Concentrations of Metals, Organics, and Contaminants above Estimated Background Levels, above ERLS, and above ERMS

Parameter	Percent of Area Above Background Levels	Percent of Area Above ERL	Percent of Area Above ERM
Any metal	88.3	76.4	13.4
Any organic	71.4	60.3	9.2
Any contaminant	94.4	86.5	19.5

Marine Biological Resources

There are numerous biological resources located in the SCB. Biological communities such as plankton, invertebrates, fish, birds, and marine mammals (e.g., whales, seals, and sea otters) are all present in the SCB, and their community characteristics and requirements are described below. These communities are important indicators of the overall health and productivity of the SCB. In addition, some of these

biological communities are listed by either federal or state agencies as threatened or endangered. These species, their agency listing and status, and other information are also included in the discussion below. Finally, different habitats that support the biological communities are also discussed.

Biological Communities

Plankton

Plankton are any drifting organisms (animals, plants, archaea, or bacteria) that inhabit the pelagic zone of oceans, seas, or bodies of fresh water; they may drift passively with currents or be weakly motile. Phytoplankton are the autotrophic component of the plankton community, and include unicellular or colonial algal species. Zooplankton are the heterotrophic (sometimes detritivorous) type of plankton and include small animals (up to about 10 cm long) that may spend all or some portion of their life histories as planktonic organisms.

Phytoplankton. Surveys conducted for the State Water Quality Control Board (SWQCB) during the late 1950s at 800 stations from Point Conception to San Diego identified at least 70 phytoplankton taxa (Allan Hancock Foundation 1965). Of the individuals counted, 54 percent were diatoms and 41 percent were dinoflagellates, with miscellaneous forms accounting for the remainder. They appear only in the upper portion of the water column, the photic zone, where sunlight penetrates. They generally are most abundant at the bottom of the surface-mixed layer where there is a balance of light and nutrients, which promotes growth. Phytoplankton abundance decreases below the thermocline and as distance from shore increases. Chlorophyll-a, an indicator of phytoplankton productivity (measured indirectly as fluorescence), is regularly measured in situ in local marine monitoring programs.

Toxins at levels that can bioaccumulate and cause illness or death in higher-trophic–level animals and humans can result from planktonic algal blooms (Sanitation Districts 2009). Concern has increased worldwide over the past two decades in regards to Harmful Algal Blooms (HABs). Such blooms have become more frequent in the SCB and elsewhere during this period. Domoic acid, produced by several species of the phytoplankton *Pseudo-nitzchia*, is the most commonly occurring and most serious of the HAB-related toxins off Southern California. Such blooms are typically seasonal in the SCB, most often occurring during spring upwelling.

Zooplankton and Icthyoplankton. The SCB is a transition zone between subarctic, central, and equatorial species assemblages; and zooplankton assemblages and ecology are related to oceanic variability (Dawson and Pieper 1993). Nearshore, in the SCB, zooplankton is influenced by seasonal changes, with the greatest numbers appearing between April and June, and the fewest between December and February. Calanoid copepods are the dominant nearshore zooplankton fauna in the SCB, with *Acartia*, *Paracalanus*, *Labidocera*, and *Calanus* the most common genera.

Ichthyoplankton consists of the eggs and larvae of fishes. Most fish release eggs and sperm to the environment for external fertilization. Both eggs and newly hatched larvae are usually found seasonally throughout the water column (pelagic), subject to dispersion by ocean currents. Ichthyoplankton are generally well known in the SCB, due in large part to the California Cooperative Oceanic Fisheries Investigations program, which has been investigating oceanic and biological aspects of the California Current system since the late 1940s. More than 150 ichthyoplankton taxa have been identified from within a few kilometers of the coast in the SCB (Cross and Allen 1993). A summary of the dominant ichthyoplankton taxa in the SCB is presented in Table 2.

Table 2. Dominant Ichthyoplankton

Fish taxa	Abundance Percentage in the SCB	Abundance Percentage in the SCB <100 km off Coast
Northern anchovy (*Engraulis mordax*)	**80**	**83**
Rockfishes (*Sebastes* spp.)	**6**	**4**
California smoothtongue (*Leuroglossus stilbius*)	**4**	**4**
Mexican lampfish (*Triphoturus mexicanus*)	**2**	<1
Northern lampfish (*Stenobrachius leucopsarus*)	<1	**2**
White croaker (*Genyonemus lineatus*)	<1	**2**
Pacific hake (*Merluccius productus*)	**3**	**2**
Croakers (*Sciaenidae*)	**2**	<1
Sanddabs (*Citharichthys* spp.)	<1	**<1**
Popeye blacksmelt (*Bathylagus milleri*)	**<1**	**<1**
California halibut (*Paralichthys californicus*)	<1	**<1**
Combtooth blennies (*Hypsoblennius* spp.)	<1	**<1**
Shortbelly rockfish (*Sebastes jordani*)	**<1**	<1
Bocaccio (*Sebastes paucipinis*)	**<1**	<1
Speckled sanddab (*Citharichthys stigmaeus)*	**<1**	<1
Bold values indicate top ten species in each category		

Invertebrates

Invertebrates are those animals lacking vertebrae, or backbones. Table 3 summarizes different types of marine invertebrates that occur off southern California.

Table 3. Marine Invertebrates

Group	Habitat	Example
Infauna	Within seafloor sediments	Polychaete annelids
Epifauna	On the seafloor, both hard and soft bottoms	Sea stars
Pelagic invertebrates	In the water column	Squid, krill

Infauna. Benthic invertebrates live in sediments on the sea floor, and include many types of organisms; however, the most abundant groups in the SCB are the annelids, arthropods, and mollusks. They are an important food source for other invertebrates and fish. Communities of infaunal organisms can be characterized by their compositions (species present), abundance or density (number of individuals per unit area or volume, usually per m^2), species richness (number of species), and species diversity (number of different species relative to the total number of individuals).

Habitat type is an important determinant of community composition, particularly water depth and sediment characteristics, such as coarseness and heterogeneity. Because of this, natural variability is difficult to separate from potential anthropogenic effects.

Infauna are also a reliable indicator of an environment's level of stress; therefore, they are used worldwide for assessing marine sediment conditions (Smith et al. 1998). Typically, the more diverse the species the healthier, more the stable environment, and studies suggest that decreasing diversity is one of the first indications of a stressed community.

The southern California mainland shelf benthic infauna has been sampled and monitored continuously since 1952, and these studies have characterized the benthic communities over time (Jones 1969; Word and Mearns 1979; Bergen et al.1998; Ranasinghe et al. 2003). On the PV and SP Shelves, complex substrate resulted in nearly a dozen benthic community associations, including a number of specialized associations that occupy only a small fraction of the area. Studies performed throughout the SCB along the 60-m (197-ft) depth contour showed species' richness and diversity along the southern edge of the SP Shelf was the highest in the SCB, while further west along the PV Shelf, both species' richness and diversity were among the lowest found, though abundances were among the highest reported.

Epifauna. These invertebrates live on the seafloor, and are often larger than infaunal species, generally less common, and spaced further apart. Sea stars (*Pisaster* spp. and *Pateria miniata*), sea cucumbers (*Parastichopus* spp.), sand dollars (*Dendraster excentricus)*, sea urchins (*Strongylocentrotus* spp.), crabs, snails, and sea slugs are among the epifauna found on the SCB mainland shelves. Sand dollars may form dense beds in shallow, sandy areas and migrate inshore and offshore by season and varying in density and location year to year (Thompson et al. 1993a). Sea urchins may be found in rocky areas in very dense, single-species patches that limit the abundance of other species. These species exhibit vertical zonation on the shelves based on depth gradients.

The most abundant epifaunal invertebrate species on the soft bottom at project depths is the white urchin (*Lytechinus pictus*) (Allen et al. 2007; Thompson et al. 1993b). This species has occasionally been found in large-scale aggregations on the mainland shelf, with densities of hundreds of individuals per square meter. Other commonly encountered species include ridgeback prawn (*Sicyonia ingentis*), California sand star (*Astropecten californicus*), a brittle star (*Ophiura luetkenii*), red octopus (*Octopus rubescens*), trailtip sea pen (*Acanthoptilum* sp.), and gray sand star (*Luidia foliolata*).

In rocky or hard-bottomed areas a different suite of epibenthic invertebrates are found than on soft substrate. Relatively shallow areas at depths less than about 20 m (66 ft) may be dominated by giant kelp (*Macrocystis pyrifera*), which competes for attachment space with other algae as well as attached invertebrate species such as bryozoans, mussels (*Mytilus* spp.), sea anemones, rock scallops (*Crassadoma gigantea*), sponges, and sea fans (*Muricea* spp.) (Thompson et al. 1993a). These sessile (attached) species are generally dominant unless macroalgae are very abundant, and most feed by filtering plankton and detritus (particulate organic matter) from the water column. Motile invertebrates hide in crevices or are protectively colored.

Large invertebrate species include sea stars, octopus (*Octopus* spp.), California spiny lobster (*Panulirus interruptus*), and abalone (*Haliotis* spp.). Smaller species include rock crabs, polychaetes, bivalves, snails, amphipods, and isopods. Species tend to be replaced by related species with depth, so, for example, while green abalone (*H. fulgens*) is more common in shallow rocky areas, it will be replaced by pink (*H. corregata*), red (*H. refusens*), and white abalone (*H. sorensoni*) with increasing depth. Invertebrates dominate hard-substrate habitat below about 30 m (98 ft), including encrusting bryozoans, cup corals, and sea fans; however, some red algal turfs may still occur.

Pelagic Invertebrates. These organisms are large and/or strong enough to swim against currents, and include cephalopods such as California market squid (*Doryteuthis opalescens*) and Humboldt or jumbo squid (*Dosidicus gigas*). During warm water periods pelagic red crab (*Pleuroncodes planipes*) also may be abundant.

Fish

Demersal fish (soft- and hard-bottom species) habitat and pelagic (open water species) habitat can be found on the SCB's mainland shelf. This section discusses these habitats/species and examines the commercial and recreational fisheries in the area.

Soft-bottom Associated Demersal Fish. Soft-bottom substrate (sand, silt, and clay) habitat dominates the mainland shelf of the SCB. Dominant fish species, according to bottom trawl surveys (Allen et al. 2006) are scorpionfishes and rockfishes, perch, and flatfishes. In nearshore shelf areas of the southern SCB, juvenile and adult flatfish, including speckled sanddab (*Citharichthys stigmaeus*), spotted turbot (*Pleuronichthys ritteri*), and California halibut are the most commonly encountered species (Allen and Herbinson 1991). Larval and small queenfish (*Seripus politus*), white croaker (*Genyonemus lineatus*), and northern anchovy (*Engraulis mordax*) are less commonly encountered, but occasionally occur in coastal areas in high numbers, which is to be expected given the schooling nature of these species. The fish assemblage of the mainland shelf changes with both latitude and depth (Cross and Allen 1993). Fish species replacement is most rapid from the surf zone to a depth of about 25 m (82 ft), and between 100 and 150 m (328 and 492 ft). Flatfish make up a greater proportion of the fish assemblage with increased depth across the shelf and are more common in the southern bight.

Regional demersal fish studies conducted in the SCB in 1994, 1998, and 2003 found some differences in the demersal fish communities between surveys. In 1994, Pacific sanddab (*Citharichthys sordidus*), yellowchin sculpin (*Icelinus quadriseriatus*), and plainfin midshipman (*Porichthys notatus*) were the most abundant species at mid-shelf depths (26 to 100 m [85 to 328 ft]), each of which was found over more than 70 percent of the SCB shelf at those depths (Allen et al. 1998). In 1998, California lizardfish (*Synodus lucioceps*), Pacific sanddab, and longfin sanddab (*Citharichthys xanthostigma*) dominated the mid-shelf (31 to 120 m [102 to 394 ft]) demersal fish community, and of these only Pacific sanddab was found on more than 70 percent of the shelf at those depths (Allen et al. 2002). California lizardfish, a warm-water recruiter, was not among the most abundant species in 1994, suggesting that the high abundances were related to the ongoing El Niño during the 1998 sampling. In 2003, the mid-shelf fish assemblage was again dominated by Pacific sanddab, which was found to occur over 100 percent of the study area at these depths, and yellowchin sculpin and longspine combfish (*Zaniolepis latipinnis*), both of which were found to occur over 74 percent of the area at these depths (Allen et al. 2007). Despite some differences in dominant species between surveys, a core group of species comprised of Pacific sanddab, yellowchin sculpin, plainfin midshipman, and longspine combfish was found to be both abundant and frequently encountered at the mid-shelf depths during all surveys, suggesting that a stable and recurring demersal fish community exists at the those depths in the SCB.

Hard-bottom Associated Demersal Fish. In the SCB, hard substrate bottoms are the least abundant, but one of the most important, habitats for fishes (Cross and Allen 1993). About 30 percent of fish species in the SCB are associated with hard substrate. More than 125 fish species are found on shallow reefs and kelp beds, while another 30 species are found on the deep reefs of slopes and canyon edges. On shallow reefs, fish assemblage and abundance vary based on the presence or absence of kelp, with fewer species and numbers found in its absence. Common shallow reef fish species associated with rocks include pile perch (*Rhacochilus vacca*), black perch (*Embiotoca jacksoni*), garibaldi (*Hypsypops rubicundus*) and treefish (*Sebastes serriceps*), while barred sand bass (*Paralabrax nebulifer*), California scorpionfish (*Scorpaena guttata*), and blackeye goby (*Rhinogobiops nicholsii*) are attracted to the sand interface at the base of the reef. If kelp is present, kelp bass (*Paralabrax clathratus*), blacksmith (*Chromis punctipinnis*), giant kelpfish (*Heterostichus rostratus*), señorita (*Oxyjulis californica*), and California sheephead (*Semicossyphus pulcher*) are common (Cross and Allen 1993). At mid-shelf depths (30 to 100 m [98 to 328 ft]) large kelps are absent and rockfishes, including halfbanded rockfish (*Sebastes semicinctus*),

vermilion rockfish (*S. miniatus*), and bocaccio (*S. paucispinis*) are common (Allen et al. 1998). Other species commonly found on mid-shelf reefs include California scorpionfish, blackeye goby, and lingcod (*Ophiodon elongatus*).

Pelagic Fish. Pelagic fish communities tend to be similar throughout the SCB, characterized by small schooling fish species such as northern anchovy and Pacific sardine (*Sardinops sagax*), schooling predators such as Pacific bonito (*Sarda chiliensis*) and yellowtail (*Seriola lalandi*), and large solitary predators such as blue shark (*Prionace glauca*) and swordfish (*Xiphias gladius*) (Cross and Allen 1993; Allen et al. 2006). Distribution of northern anchovy, likely the most abundant pelagic species in nearshore waters in the SCB, is patchy, and abundances when taken may be high. Other species that may be commonly taken in the nearshore water column are queenfish, which aggregate near the bottom during the day, and white croaker, which aggregate in the water column during the day. Both species disperse to feed at night.

Commercial and Recreational Fisheries. There is a wide range of commercial and recreational species in the SCB. Commercial and recreational fisheries target both fish and invertebrates in the SCB. Fish species include both short-lived, fast-growing and productive species (northern anchovy, Pacific sardine, Pacific mackerel (*Scomber japonicus*), and jack mackerel) and slow-growing, long-lived demersal species (as tuna, yellowtail, and swordfish) (Cross and Allen 1993). The dominant catches are tunas, mackerel, bonito, and anchovy.

Some invertebrate species are taken as bycatch, or support very small commercial operations; those of importance to commercial fisheries are the California market squid, California spiny lobster, rock crabs (*Metacarcinus* and *Romaleon* spp.), red sea urchin, spot prawn (*Pandalus platyceros*), ridgeback prawn, and sea cucumber (Leet et al. 2001).

Fisheries management actions include restricting or defining seasons, limiting the number of licenses, instituting size limits and quotas, closing fisheries as necessary, and implementing gear restrictions. The use of bottom trawls and gill nets is restricted within 5.6 km (3 nautical miles [nmi]) of shore throughout the SCB, and gill nets have additional restrictions for minimum bottom depth at which they can be set (restrictions vary by region throughout southern California).

Recreational fisheries are those used by individuals for subsistence and/or pleasure. Shore fishers took three species in particular between 1995 and 2000: barred surfperch (*Amphistichus argenteus*), yellowfin croaker (*Umbrina roncador*), and opaleye (*Girella nigricans*) (Allen et al. 2006). During this period, pier fishers predominantly took Pacific mackerel, jacksmelt (*Atherninopsis californiensis*), and Pacific sardine. Private boat catches were predominantly Pacific mackerel, barred sand bass, and yellowtail. Party boat catches were predominantly barred sand bass, Pacific mackerel, and kelp bass. California spiny lobster also supports an important recreational fishery.

Birds

The SCB supports many species of marine-related birds, both shore- (those adapted to life on the coast or seashore) and seabirds (those adapted to life within the marine environment [ocean]).

Shorebirds. Shorebirds are most abundant in the SCB in winter, when 21 species can be found throughout Southern California (Baird 1993). Common overwintering species include black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), long-billed curlew (*Numenius americanus*), black-bellied plover (*Pluvialis squatarola*), sanderling (*Calidris alba*), and sandpipers (*Calidris* spp.). Other species such as willet (*Tringa semipalmatus*), killdeer (*Charadrius vociferus*), and

western snowy plover (*Charadrius alexandrinus nivosus*) may be found throughout the SCB year-round. Western snowy plover, a beach-nesting species, is a federally listed threatened species with designated critical habitat on four beaches in Santa Monica Bay and two sites in Bolsa Chica (U.S. Fish and Wildlife Service [USFWS] 2005)

Seabirds. There are 43 species of seabirds found in the SCB, the most numerous of which are shearwaters, phalaropes, and auklets, and coastally associated species such as terns and gulls (Baird 1993). Seabirds can be found in the SCB year-round with some species breeding, some overwintering, and others migrating through the area. Among the most common of the nearshore seabirds are seven tern and eight gull species. Several tern species nest in Southern California and are common in the summer. Most gulls (Subfamily Laridae), however, nest outside of the SCB and are more common in southern California in winter. Of the species that breed in the SCB, all but the terns and skimmers nest on the Channel Islands. California least tern (*Sternula antillarum browni*; state- and federally listed as endangered), another beach-nesting species, and California brown pelican (*Pelecanus occidentalis californicus*; state- and federally listed as endangered through 2009, now considered recovered), feed in nearshore waters in the SCB. Seabirds most frequently eat fish, squid, and crustaceans, although scavenging is common in gulls.

Some seabirds feed in the pelagic realm and rest on land, but loons (*Gavia* spp.), grebes (Family Podicipedidae), scoters (*Melanitta* spp.), California brown pelicans, gulls, and jaegers (*Stercorarius* spp.) rest on the sea surface throughout the SCB. Shearwaters (*Puffinus* spp.), northern fulmars (*Fulmarus glacialis*), storm-petrels (*Oceanodroma* spp.), murres (*Uria* spp.), puffins (*Fratercula* spp.), and auklets (Family Alcidae) are more oceanic and frequent the outer reaches of the mainland shelves. California brown pelicans and terns dive into the water from the air to catch fish; cormorants (Phalacrocorax spp.), murres, puffins, and auklets dive from the sea surface to pursue fish and zooplankton beneath the surface. Bonaparte's gulls (*Larus philadelphia*) congregate on the surface during the winter and feed on particulates and zooplankton. Red-necked phalaropes (*Phalaropus lobatus*) are common from spring to fall and feed at the sea surface using a characteristic spinning pattern that causes fish eggs and other planktonic species to accumulate immediately beneath them.

Marine Mammals

Many marine mammals inhabit or migrate through the SCB, including baleen whales, toothed whales (which include dolphins and porpoise), seals, sea lions, and sea otters. These mammals and their lifecycle characteristics are described below.

Mysticeti (Baleen Whales)

Gray whale. Gray whales (*Eschrichtius robustus*) in the SCB represent the Eastern Pacific population of the species (Dohl et al. 1981; SWFSC 2010a). The majority of the population migrates annually from the Arctic seas, where they feed (leaving the Bering Sea between late October and early January), to mating and calving grounds in coastal lagoons of Baja California and the Gulf of California, and then back to the Arctic seas (Bonnell and Dailey 1993). Most travel within a few kilometers of the shore off northern and central California (Bonnell and Dailey 1993; MBC 1989). Southbound whales begin arriving in the SCB in mid-December, and a small number calve in SCB waters (Dohl et al. 1981). Calving takes place from January through March, after which the northbound migration begins. Gray whales feed only occasionally during their migration, though observations of nearshore feeding in the SCB during migration have been reported.

Blue, fin, and sei whales. These balaenopterid whales are found in similar areas and numbers within the SCB, with the most sightings typically occurring between June and October.

Blue whales (*Balaenoptera musculus*) are found worldwide in circumpolar and temperate waters. In the North Pacific they are likely a single stock comprised of two distinct populations (Carretta et al. 2009). Their summer feeding grounds are believed to be in the Gulf of Alaska and off the eastern Aleutian Islands, and they begin migrating south in the fall, arriving in Baja California in October. Calving grounds are unknown, and they may calve far offshore or in more southern subtropical waters. Recently, they appear to be more common in the SCB, especially from June to September, but this may represent a change in distribution rather than an increase in population (Barlow 1994; Barlow and Forney 2007), and have been observed with some frequency feeding relatively close to shore off Orange and Los Angeles Counties.

Fin whales (*Balaenoptera physalus*) are considered the most widely distributed baleen whale in temperate and subarctic waters (Bonnell and Dailey 1993). In the North Pacific, there are two fin whale populations: the Asian stock and the eastern stock (Carretta et al. 2009). The eastern stock whales are assumed to winter offshore of Mexico and migrate northward to the Gulf of Alaska and adjacent waters, following the continental shelf through the SCB. During the summer they can be found within the Santa Rosa-San Nicolas Ridge and inshore waters to Anacapa and Santa Catalina Islands, with some year-round aggregations along the southern and central California coast (Bonnell and Dailey 1993; Carretta et al. 2009).

Sei whales (*Balaenoptera borealis*) occur worldwide, but are considered more boreal (northerly) in distribution than the other balaenopterids (Bonnell and Dailey 1993). They are an offshore species and do not appear to be associated with coastal features (Bonnell and Dailey 1993, Carretta et al. 2009). Sei whales are now considered rare in California waters.

North Pacific right whale. North Pacific right whales (*Eubalaena japonica*) are also rare in Southern California, represented in the SCB by only two sightings (Bonnell and Dailey 1993). In the eastern North Pacific, they range from the Bering Sea south to central Baja California. Right whales make seasonal north–south migrations, but with much less coherence and regularity as some other whale species, such as gray and humpback whales. Right whales are likely to be found at latitudes north of 50°N during summer months.

Humpback whale. Humpback whales (*Megaptera novaeangliae*) occur worldwide. In the North Pacific, they range in summer from Arctic waters south to Japan and central California (Bonnell and Dailey 1993). Wintering areas include waters off Mexico, Central America, Hawaii, southern Japan, and the Philippines (Carretta et al. 2009). Humpback whales are present in the SCB from March through June and from September through December. In these months, however, sightings are uncommon and widespread (Bonnell and Dailey 1993). Migrants transiting the SCB follow a more inshore corridor than blue, fin, or sei whales.

Minke whale. Minke whales (*Balaenoptera acutorostrata*) are abundant worldwide. In the eastern North Pacific they are broadly distributed between Baja California and the Chukchi Sea (Bonnell and Dailey 1993). Resident populations in California, Oregon, and Washington behave differently from the migratory population and are considered a separate stock (Carretta et al. 2009). Minke whales are present in the SCB year-round, though their abundance may vary. They are most abundant in spring and summer, and calving likely occurs in the SCB. The summer population of these whales is generally distributed in the western Santa Barbara Channel; the Santa Rosa-San Nicolas Ridge; the island shelves south of San Miguel, Santa Rosa, and Santa Cruz Islands; and the east side of San Nicolas Island (Bonnell and Dailey 1993). Though most sightings have been in the vicinity of the Channel Islands or seaward, they are

known to occur in the San Pedro Channel between Santa Catalina Island and Palos Verdes Point in late spring and early summer (Bonnell and Dailey 1993).

Bryde's whale. Bryde's whales (*Balaenoptera edenii*) are considered rare in Southern California, and one individual stranded at La Jolla in 1954 (Bonnell and Dailey 1993). This species is closely related to the sei whale and is found in more tropical waters than other Balaenoptera species.

Odontoceti (Toothed whales)

Sperm whale, dwarf sperm whale, and pygmy sperm whale. Though these species are considered rare over the continental shelf, the sperm whale (*Physeter macrocephalus*) is thought to be abundant in waters directly offshore the SCB (Bonnell and Dailey 1993). Sperm whales are found in temperate and tropical pelagic waters south of about 45°N latitude. This species is common year-round off central and northern California (Bonnell and Dailey 1993; Carretta et al. 2009). Pygmy sperm whale (*Kogia breviceps*) strandings have occurred in the eastern SCB, and dwarf sperm whales (*Kogia simus*) have been sighted near Santa Catalina Island, with at least five strandings in California since 1967 (Bonnell and Dailey 1993; Carretta et al. 2009).

Common dolphins. Short-beaked common dolphins (*Delphinus delphis*) are by far the most abundant cetacean species in the SCB (Bonnell and Dailey 1993; Carretta et al. 2009). Long-beaked common dolphins (*Delphinus capensis*) have only recently been recognized as a separate species, and much of the historic information does not distinguish between the two (Carretta et al. 2009). Both species are found in southern and central California, though this is probably the northern extent of the long-beaked species. Common dolphins occur in the SCB in groups that vary in size from a few individuals to over 8,000 animals (Dohl et al. 1981:119–143). Common dolphins occur in temperate and tropical oceans worldwide, though the eastern Pacific population is distributed primarily from Monterey Bay, California, south to Central America (Bonnell and Dailey 1993; Carretta et al. 2009). In the SCB, common dolphins can be seen throughout the year, with maximum density and northerly range during warmer water periods. Some portion of the common dolphin population gives birth in the SCB.

Bottlenose dolphin. Bottlenose dolphins (*Tursiops truncatus*) are distributed worldwide in tropical and temperate seas (Carretta et al. 2009). In the eastern North Pacific they range from the equator northward into waters off central California, with their northern extent probably dictated by sea surface temperature (Bonnell and Dailey 1993). The species is present in the SCB year-round, though large seasonal variation in abundance suggests some portion of the population is migrating through the area. In the SCB, there are two distinct populations of this species: the coastal and the offshore (Carretta et al. 2009). The coastal population generally inhabits waters within 1 km (0.6 mi) of the mainland shore, while the offshore population inhabits both nearshore and offshore waters extending out beyond the Channel Islands (Bonnell and Dailey 1993).

Northern right-whale dolphin. Northern right-whale dolphins (*Lissodephis borealis*) are found only in the North Pacific, distributed in the eastern North Pacific between British Columbia, Canada, and San Diego, and may range south into Mexico in cold water periods (Bonnell and Dailey 1993; Carretta et al. 2009). The species occurs in the SCB primarily in winter and spring, with smaller numbers during summer and early autumn (Bonnell and Dailey 1993).

Risso's dolphin. Risso's dolphins (*Grampus griseus*) are likely present in the SCB throughout the year, with 5,000 to 10,000 animals in California waters (Bonnell and Dailey 1993l Carretta et al. 2009). The onshore/offshore and north/south distribution of this species has been directly correlated with water temperature. In periods of warming water, increasing numbers were found in the SCB, and they were

more likely to be found near shore. During periods of cooling water, fewer individuals were spotted, and sightings were primarily offshore and to the south. Their greatest numbers occur during September through November (Bonnell and Dailey 1993).

Pacific white-sided dolphin. Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) occur from Baja California to Alaska, with a mean population of about 6,000 animals, and they are present off southern California throughout the year (Bonnell and Dailey 1993). Shifts in distribution of this species are correlated to water temperature, with schools moving to nearshore waters in late autumn and winter, then moving offshore and northerly in late spring and summer (Bonnell and Dailey 1993; Carretta et al. 2009). Schools increase in size as the offshore movement begins.

Dall's porpoise. Dall's porpoise (*Phocoenoides dalli*) occur only in the North Pacific, and they are rarely found in waters warmer than about 17°C (63°F) (Bonnell and Dailey 1993). They are present in greatest numbers in the SCB in autumn and winter, declining in spring and summer (Bonnell and Dailey 1993; Carretta et al. 2009). Sightings of this species have occurred in all portions of the SCB.

Harbor porpoise. Harbor porpoise (*Phocoena phocoena*) occur in the eastern North Pacific from about Point Conception northward to Alaska (Bonnell and Dailey 1993; Carretta et al. 2009). They are typically found in small groups within a few kilometers of shore. Harbor porpoise do not migrate extensively in the eastern Pacific, and four separate stocks are recognized along the California coast (Carretta et al. 2009). The Morro Bay stock is estimated to include about 1,200 individuals.

Pilot whale. Short-finned pilot whales (*Globicephala macrorhynchus*) occur in the eastern North Pacific, and more than one species may be present. In the SCB, a resident population of about 400 animals was estimated in 1981 with migrants increasing the number found in winter (Bonnell and Dailey 1993). Though once common, particularly around Santa Catalina Island, the San Pedro Channel, and the Palos Verdes Peninsula, short-finned pilot whales have been rare in the SCB following the 1982–1983 El Nino (Carretta et al. 2009).

Beaked whales. Though several species of beaked whales occur in the SCB, all are considered uncommon (Bonnell and Dailey 1993; Carretta et al. 2009). These include Cuvier's beaked whale (*Ziphius cavirostris*), Hector's beaked whale (*Mesoplodon hectori*), gingko-toothed beaked whale (*Mesoplodon gingkodens*), and Hubbs' beaked whale (*Mesoplodon carlhubbsi*). Two other beaked whales, Stejneger's beaked whale (*Mesoplodon stejnegeri*) and Blainville's beaked whale (*Mesoplodon densirostris*), could potentially occur in the SCB.

Killer whale and false killer whale. Killer whales (*Orcinus orca*) occur worldwide, including the eastern North Pacific (Carretta et al. 2009). They are divided into offshore and nearshore groups, with the latter including both resident and migrant types, all of which appear to have little interaction. There are a total of five killer whale stocks, with the Eastern North Pacific Transient and the Eastern North Pacific Offshore stocks reported in California. Most sightings in the SCB are likely members of Eastern North Pacific Transient stock, which is more common near shore throughout its range. Although few sightings have been reported in the SCB, killer whales have been sighted off Dana Point as recently as 2008 (Orange County Beach Blog 2008). There have been few sightings of false killer whales (*Pseudorca crassidens*) in the SCB, and this species is considered uncommon north of about 30°N (Bonnell and Dailey 1993).

Striped, spinner, spotted, and rough-toothed dolphin. Striped dolphins (*Stenella coeruleoalba*), spinner dolphins (*Stenella longirostris*), spotted dolphins (*Stenella attenuata*), and rough-toothed dolphins

(*Steno bredanensis*) are eastern tropical Pacific species that could be potential visitors to the SCB (Bonnell and Dailey 1993). Of these four species, striped dolphin has been sighted in the SCB.

Pinnipeds

Pinnipeds include eared seals (fur seals and sea lions) and earless seals (including the harbor seal). Common species in the SCB include the California sea lion (*Zalophus californianus californianus*) and Pacific harbor seal (*Phoca vitulina richardsi*). Northern elephant seal (*Mirounga angustirostris*), distributed primarily around their rookeries on the California Channel Islands and, rarely, Guadalupe fur seal (*Arctocephalus townsendi*), northern fur seal (*Callorhinus ursinus*), and Steller sea lion (*Eumetopias jubatus*) may be found in the SCB. Over the past several decades, California sea lion, Pacific harbor seal, and northern elephant seal populations have steadily increased in California waters and are now relatively stable.

California sea lion. California sea lions are composed of three stocks, defined by their breeding areas (Carretta et al. 2009). The U.S. stock begins at the U.S./Mexico border and extends northward to Canada. The Western Baja California stock ranges from the U.S./Mexico border south to the southern tip of the Baja California peninsula. The Gulf of California stock inhabits the Gulf of California and extends south and across to the mainland of southern Mexico. Though U.S. rookeries are far removed from the major rookeries of western Baja California, males from the western Baja California rookeries may be found in U.S. waters.

In southern California, there are rookeries on San Miguel, San Nicholas, Santa Barbara, and San Clemente Islands (Bonnell and Dailey 1993). Smaller numbers haul out seasonally at Santa Rosa, Anacapa, and Santa Catalina islands. Adult male California sea lions leave rookeries in August and September and migrate north during autumn and winter, returning in spring. Males from Baja California arrive at the Channel Islands in December and January, and males from Southern California travel as far north as British Columbia, Canada. The U.S. population was estimated to be at minimum 141,842 individuals in 2005 (Carretta et al. 2009).

Pacific harbor seal. Pacific harbor seals (*Phoca vitulina*) range from Baja California to the Pribilof Islands in Alaska (Carretta et al. 2009). Seals in the SCB all represent the California stock (*P. v. richardsi*), which numbers about 31,600 individuals (Carretta et al. 2009).

In California, 400–600 haul-out sites are distributed on the mainland and the offshore islands (Carretta et al. 2009). Pupping occurs in late spring in Southern California (Bonnell and Dailey 1993). Harbor seals display fidelity to haul-out grounds from year to year, but they are capable of long-distance movements. Short movements are likely associated with seasonal availability of prey and breeding. However, in some areas, harbor seals are present throughout the year.

Northern elephant seal. Northern elephant seals breed and give birth in California (California breeding stock) and in Baja California (Mexican breeding stock), primarily on offshore islands between December and March (Carretta et al. 2009).

In southern California, northern elephant seal colonies are established on Santa Barbara, San Nicholas, San Miguel, and Santa Rosa Islands (Bonnell and Dailey 1993). A few give birth on San Clemente Island. Males feed near the Aleutian Islands and in the Gulf of Alaska, while females feed further south (below 45°N). Adults return to land to molt between March and August, with males usually returning later than females. Although movement between rookeries occurs, most elephant seals return to their natal rookeries when they begin to breed. Weaned pups leave San Nicholas and San Miguel Islands in

late winter and spring. Most pups move northward, although a few remain near their birth sites or move south during their first year.

Fissiped (Southern Sea Otter)

Historically, southern sea otters (*Enhydra lutris nereis*) ranged from the Japanese Archipelago and the Aleutian Islands southward to Morro Hermoso, Baja California, and inhabited the nearshore waters of the SCB (Bonnell and Dailey 1993). This species was hunted throughout the North Pacific during the 18th and 19th century fur trade era to the point of near-extinction (Miller 1974). The otter subsequently began a slow and sporadic recovery in California waters. In 1987, the USFWS estimated the sea otter population to be approximately 1,650 animals, and in that same year began the translocation of over 100 sea otters to San Nicolas Island (Reeves et al. 1992; Bonnell and Dailey 1993). About 20 individuals were still present after one year, with many returning to central California (Reeves et al. 1992). Sea otters are unlikely to occur off Palos Verdes, although they are occasionally seen in the SCB. These may be individuals from either the San Nicolas colony or the central California population.

Sea Turtles

Sea turtles are air-breathing reptiles with streamlined bodies and large flippers. They inhabit tropical and subtropical ocean waters throughout the world. Of the seven species, six are found in U.S. waters, and all six are afforded protection under the Endangered Species Act (ESA) of 1973. Green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*), and olive ridley sea turtle (*Lepidochelys olivacea*) occur in nearshore waters off southern California (Eckert 1993). These four species have broad, international geographic ranges and are highly migratory. All four have been trapped on occasion in cooling water intake systems in southern California coastal generating stations (SCE and MBC 2010, unpublished data). Of these, the green turtle is the most commonly encountered nearshore in the SCB, and individuals are known to reside year round in the warm water effluent of the discharge channel of the South Bay Power Plant in San Diego Bay (Eckert 1993).

Threatened and Endangered Species

Many species occurring in the SCB are federally or state-listed as threatened or endangered (California and federal ESAs). In addition, the Marine Mammal Protection Act (MMPA) protects all marine mammals, and the Migratory Bird Treaty Act (MBTA) protects all migrating birds. These species are listed in Table 4.

Table 4. State and Federally Endangered and Threatened Fish and Wildlife Species That Occur or Could Potentially Occur in the Southern California Bight

Species	Status
INVERTEBRATES	
Black abalone	FE
White abalone	FE
FISH	
Southern steelhead Southern California ESU	FE, SSC
Tidewater goby	FE, SSC
REPTILES	
Green turtle	FT
Leatherback turtle	FE
Loggerhead turtle	FT
Olive ridley turtle	FT

Table 4 (Continued)

Species	Status
BIRDS	
California brown pelican	FE delisted (12/17/09): Recovered , SE delisted (6/3/09)
California least tern	FE, SE
Bald eagle	FT delisted (8/18/07), SE
Western snowy plover	FE, SSC
Marbled murrelet	FT, SE
Xantus' murrelet	ST
MAMMALS	
Guadalupe fur seal	FT, ST
Steller sea lion	FT
Southern sea otters	FT
Gray whale	FE delisted (6/15/94): Recovered
Blue whale	FE
Fin whale	FE
Humpback whale	FE
Northern right whale	FE
Sei whale	FE
Sperm whale	FE

FE = Federally Endangered
FT = Federally Threatened
SE = State (California) Endangered
SSC = State (California) Species of Concern
ST = State (California) Threatened
Source: CDFG 2010a.

Marine Habitat

Biological communities require different types of habitat. Some of these habitat characteristics are discussed previously in the biological communities section. However, specific habitats either designated by agencies or by unique characteristics are described below.

Essential Fish Habitat

Essential Fish Habitat (EFH) is managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act). The project is located in waters designated as EFH for two Fishery Management Plans (FMPs): the Coastal Pelagics FMP (6 species), and the Pacific Groundfish FMP (89 species). EFH for Coastal Pelagics is defined as all marine and estuarine waters from the shoreline of the coasts of California, Oregon, and Washington offshore to the limits of the Exclusive Economic Zone (EEZ, or 370 km [230 mi] from shore) and above the thermocline. For Pacific Groundfish, EFH includes all waters off Southern California between Mean Higher High Water and depths less than or equal to 3,500 m (11,483 ft). The Pacific Groundfish FMP also considers EFH to include areas of the upriver extent of saltwater intrusion. Lastly, specific Habitat Areas of Particular Concern for groundfishes have been identified as estuaries, canopy kelp, seagrass, rocky reefs, and other specific areas (such as seamounts).

Marine Protected Areas

A Marine Protected Area (MPA) is "any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part of all of the enclosed environment (McArdle 1997)." There are several along the southern California coastline, including state marine reserves, state marine parks, marine conservation areas, ecological reserves, state marine refuges, and state parks. There are also Areas of Special Biological Significance (ASBSs), which were established by State Water Resources Control Board Resolution No. 74-28 to provide protection to species or communities from water quality degradation. Relevant areas in the project vicinity are summarized in the following section.

Seabird and Shorebird Nesting Areas and Rookeries

There are several areas of importance to seabirds and shorebirds in the SCB. Because of the sensitivity of these birds to disturbance while nesting, access to nesting and rookery sites is often restricted and the areas are protected from disturbance by people and predators. Flat Rock Point, located just upcoast of Palos Verdes Point, and Abalone Cove Ecological Reserve (an MPA), just downcoast of Palos Verdes Point, are important overwintering areas for a variety of shorebirds.

Marine Vegetation

In nearshore areas between the shore and the edge of the photic zone, hard-bottom habitats provide substrate for the attachment of marine algae and plants. Close to shore, in shallow rocky areas, green algae (Chlorophyta), which are more common in the intertidal zone, are mostly small to moderate in size and are distinguished by their distinctive green coloration (Dawson 1966). In subtidal zones, red algae (Rhodophyta) create a low turf or understory of coralline, foliose, and filamentous shapes. Brown algae (Phaeophyta) in these areas are larger and create an overstory. Near the shore, feather-boa kelp (*Egregia menziesii*) dominates, while giant kelp dominates deeper areas of reefs down to about 20 m (66 ft). Habitat for more diverse organisms is created by Palm kelp (*Pterygophora californica*) and other large, upright kelps. In the low intertidal zone, but also at greater depths (to 15 m [50 ft]), surfgrass (*Phyllospadix* spp.), a flowering plant, occasionally forms dense beds in rocky areas. On hard bottoms to depths of 30 m (100 ft), bull kelp (*Nereocystis luetkeana* and other upright brown and low-growing red algal turfs can be found in some areas.

Public Health

People are subject to natural and anthropogenic hazards found in the marine environment that can affect public health and lead to illness. These issues are discussed in the following sections in the context of public health.

Microbiology

Microorganisms, which help with the decomposition process, are found in natural vegetation and animal remains, as well as anthropogenic byproducts such as sewage and industrial waste. Some such microorganisms are a health risk to humans and marine animals. Concentrations of microorganisms are, however, generally very low in anthropogenic sources; therefore, indicator organisms such as coliform bacteria and enterococcus are generally monitored as indicators of fecal pollution. (Geesey 1993.)

Because beaches are the most likely marine sites of contamination exposure to people, bacteria levels have been monitored and reported at these sites since 1990. Projects were initially focused on Los Angeles County, but are now common throughout coastal California. These projects monitor and grade swimming sites based on human health exposure guidelines. Recent results of beach bacteria levels have shown a continuing trend of annual improvement, with 2008 levels representing the best to date (Heal the

Bay 2008). Although there are a few remaining problem areas, 87 percent of southern California beaches were rated as very good to excellent for water quality during dry weather (2007–2008 reporting period). However, in Los Angeles County only 71 percent were rated as very good to excellent for water quality in dry weather. In contrast, during wet weather, 52 percent of southern California beaches were rated fair to poor for water quality. Also, water quality at open ocean beaches during dry weather was found to be significantly better than at beaches within enclosed bays or harbors, or at those close to running storm drains.

Fish Tissue Bioaccumulation

Beginning in the 1970s, there has been regional concern about the impacts of contaminants in the SCB, especially regarding the chlorinated hydrocarbons DDT and PCBs. Although the last several decades have seen a significant reduction in contaminant sources, there remains an issue with substances that are bound to sediments and that impact organisms through direct uptake from those sediments or through feeding on contaminated organisms. Areas with the highest levels of contamination in the SCB are located in harbors and bays, and offshore of the Palos Verdes Peninsula (Mearns et al. 1991; Anderson et al. 1993). It is important to note that bight-wide surveys of bioaccumulation in tissues are limited, and tissue monitoring programs tend to be localized, particularly near municipal wastewater discharges, to assess point-source impacts and local trends (Allen et al. 1998).

Mearns et al. (1991) analyzed sediments and invertebrate and fish tissue throughout the SCB for a variety of contaminants, including PAHs, 17 metals, PCBs, and historically important pesticides such as DDT. They concluded that there was no evidence that levels of chemical pollution were increasing. The only contaminants found to biomagnify in the food web were mercury, PCBs, and the pesticides DDT and chlordane. With the exception of tin in San Diego Harbor, metal levels in fish tissues were within expected ranges, and levels tended to be higher in the tissues of fish remote from major contaminant sources (such as outfalls or harbors). High levels of organic contaminants may depress uptake of some metals in fish muscle, which suggests that continued reductions in PCBs and DDT levels may lead to increased uptake of some metals in fish tissues. With the exception of the Palos Verdes Peninsula, highest tissue contamination levels in the SCB were found in harbors.

As part of the 1994 Southern California Bight Pilot Project, fish tissue investigations on flatfishes were conducted throughout the mainland shelf of the SCB to identify any regional contamination trends. Tissue contamination on the mainland shelf was widespread, with nearly 100 percent of the Pacific sanddab and longfin sanddab from throughout the SCB testing positive for DDT and PCBs (Allen et al. 1998). Although DDT levels were similarly high in Dover sole (*Microstomus pacificus*), only 16 percent of the population was contaminated with PCBs. Twelve other pesticides were undetected in flatfish liver tissue samples. The principal investigators found that, although DDT and PCB contamination was widespread in the SCB, substantial reductions in their concentrations from reference areas had occurred in the last 10 to 20 years, with reductions of up to two orders of magnitude in some fish tissue.

During a 1998 regional monitoring survey, 99 percent of the individuals of five related flatfish species collected at 225 trawl stations were found to have detectable concentrations of DDT (Allen et al. 2002). Highest DDT values were reported in fish from the PV Shelf, as well as from areas around several large municipal discharges. Comparisons of DDT levels to an established level of risk for higher predators (marine mammals and sea birds) found that DDT levels in 66 percent of the fish analyzed, from over 70 percent of the area of the southern California shelf, exceed that risk level. In the same study, 44 percent of the fish were found to have detectable levels of PCBs, with highest levels reported in the shelf region of Los Angeles (including the PV Shelf) and in bays and harbors. Overall, 7 percent of the

fish were found with PCB levels that exceeded the mammal predator risk guideline and 5 percent exceeded the bird risk guideline levels.

In 2003, the regional monitoring program evaluated tissue bioaccumulation in pelagic species. The study found that DDT was prevalent in pelagic forage fish in the SCB, estimating that 99 percent of northern anchovy, 86 percent of Pacific sardine, and 33 percent of Pacific mackerel had tissue concentrations that exceeded values protective of sea birds and marine mammals (Allen et al. 2007). Tissue concentrations of DDT were generally highest in the central portion of the SCB. None of the composite samples of market squid were found to exceed DDT predator guidance levels, and virtually none of the pelagic species exceeded screening values for PCBs.

Project Setting – San Pedro Shelf

In general, characteristics of the SP Shelf are similar to those described in the "Regional Setting." This section focuses on the characteristics unique to the SP Shelf, augmenting the information from the regional setting with site-specific data. Unless noted otherwise, the information contained in the "Regional Setting" is relevant to each of the following sections.

Location and Geography

The SP Shelf riser and diffuser assembly site would be approximately 12 km (7.5 mi) from the Los Angeles–Long Beach Breakwater, at a depth of approximately 60 m (200 ft). At about 22 km (13.5 mi) wide, the SP Shelf is one of the widest in the SCB (Jones 1969). Along the mainland shore, the shelf reaches from the Palos Verdes Peninsula on the northwest to the Newport Sea Canyon to the southeast, and extends generally south offshore of the Los Angeles–Long Beach Harbor Complex (or port complex) over an area commonly referred to as San Pedro Bay. The outer edge of the SP Shelf is defined by a shelf break at a depth of about 140 m (460 ft), beyond which a narrow slope region drops steeply to the depths of the San Pedro Basin (SCCWRP 1973).

The SP Shelf diffuser area would be on the southwest edge of the SP Shelf, on a relatively flat plain of the outer shelf. The riser would be approximately 3.2 km (2 mi) southeast of the southern edge of the San Pedro Sea Valley, approximately 1.6 km (1 mi) northwest of the shelf break.

Oceanography

Currents

Large-scale, depth-averaged current patterns for the SP and PV Shelves were modeled and calibrated against field measurements to confirm consistency (Parsons 2011). In summer, the strongest currents are found in the vicinity of the shelf break and slope, where currents of up to 6 cm/s (0.13 miles per hour [mph]) to the northwest are predicted to occur. On the western edge of the shelf, the currents turn north and follow the edge of the shelf, cross over the base of the San Pedro Sea Valley, and then predominantly turn to the west to follow the slope on the PV Shelf at similar speeds to those found on the SP Shelf slope. In shallower regions of the sea valley, the slope currents are slow and move onto the PV and SP Shelves, forming a split current that flows principally to the east, with one stream that moves parallel to the harbor breakwaters and another that crosses the SP Shelf at mid-shelf depths. These cross-shelf currents join in the southeastern region of the shelf, resulting in a nearshore downcoast current. In the mid-shelf areas between the more predominant flows, currents are somewhat variable.

In winter, currents are predicted to flow north onto the SP Shelf, then diverge to the west and northwest at outer shelf depths on the southeastern region of the shelf, where the currents split to the north and south (Parsons 2011). The more southerly current flows to the western edge of the shelf, then, as in summer, turns north to follow the edge of the shelf, crosses the base of the San Pedro Sea Valley, and turns west to follow the slope of the PV Shelf at speeds of up to 6 cm/s (0.13 mph). The northwest split of the cross-shelf current is generally slower than the more offshore flow. This current predominantly moves toward and along the PV Shelf in the same direction as the offshore flow, although in the region of the port's complex breakwaters part of the flow moves east and then turns southeast to form a nearshore downcoast current. At the head of the San Pedro Sea Valley, a slow, counter-current gyre forms between the two stronger cross-shelf flows and turns south mid-shelf to rejoin the southernmost westerly current.

In the vicinity of the SP Shelf riser and diffuser assembly site, average currents throughout the water column in summer were modeled to flow northwest in the direction of the predominant slope flow, although speeds on the flatter area of the shelf in the project area is expected to be slower, at speeds up to 4 cm/s (0.09 mph; Figure 1). In winter, average speeds throughout the water column in the project area were modeled to flow west with the predominant cross-slope flow at speeds of up to 4 cm/s (0.09 mph), possibly faster (Figure 2). As part of the Palos Verdes Flow Study conducted by the County Sanitation Districts of Los Angeles County, currents were measured at Station AG in the SP Shelf riser and diffuser area between 2006 and 2008. Current speeds above 15 cm/s (0.33 mph) were common in depths above about 38 m (125 ft), but currents were variable in both speed and direction with depth throughout the water column (Sanitation Districts 2008a). Because Station AG is deeper than the proposed riser site, data from a depth of 59 m (194 ft) is presented to represent bottom currents in the project area. Currents at project depth in the area averaged almost 13 cm/s (0.28 mph) over the 3-year study period, with the highest speed being recorded in 2007 of 47 cm/s (1.0 mph).

Waves and Tides

Waves and tides in the SCB, including on the SP Shelf, are discussed in "Regional Setting – Oceanography."

Upwelling

Near the Palos Verdes Peninsula, upwelling events typically occur in winter and spring when northwesterly winds blow surface waters offshore, allowing colder and more saline bottom water to migrate to the surface (SCCWRP 1973; Sanitation Districts 2008b). Upwelling is often localized, so effects may persist in some areas, but not in others (Sanitation Districts 2008b). In addition to seasonal upwelling events, a cold-water phase has been observed on occasion on the SP Shelf, even when wind conditions that normally produce upwelling were not present (SCCWRP 1973; Hardy 1993). This phenomenon, which results from the surfacing of bottom water caused by local eddies, has been observed in all months of the year.

Water Quality

Water quality parameters are determined at Station 2706, which is in the vicinity of the SP Shelf riser and diffuser area, on a quarterly basis as part of the Joint Water Pollution Control Plant (JWPCP) receiving water monitoring program. Because Station 2706 is at a lower depth than the proposed riser site, 60-m (200-ft) depth data has been used to represent bottom conditions in the project area.

Temperature

In 2006, temperatures at 60 m (200 ft) on the SP Shelf ranged from 9.9°C (49.8°F) in May to 12.4°C (54.3°F) in August and averaged 11.2°C (52.2°F) over the four quarters (Sanitation Districts 2008b). In

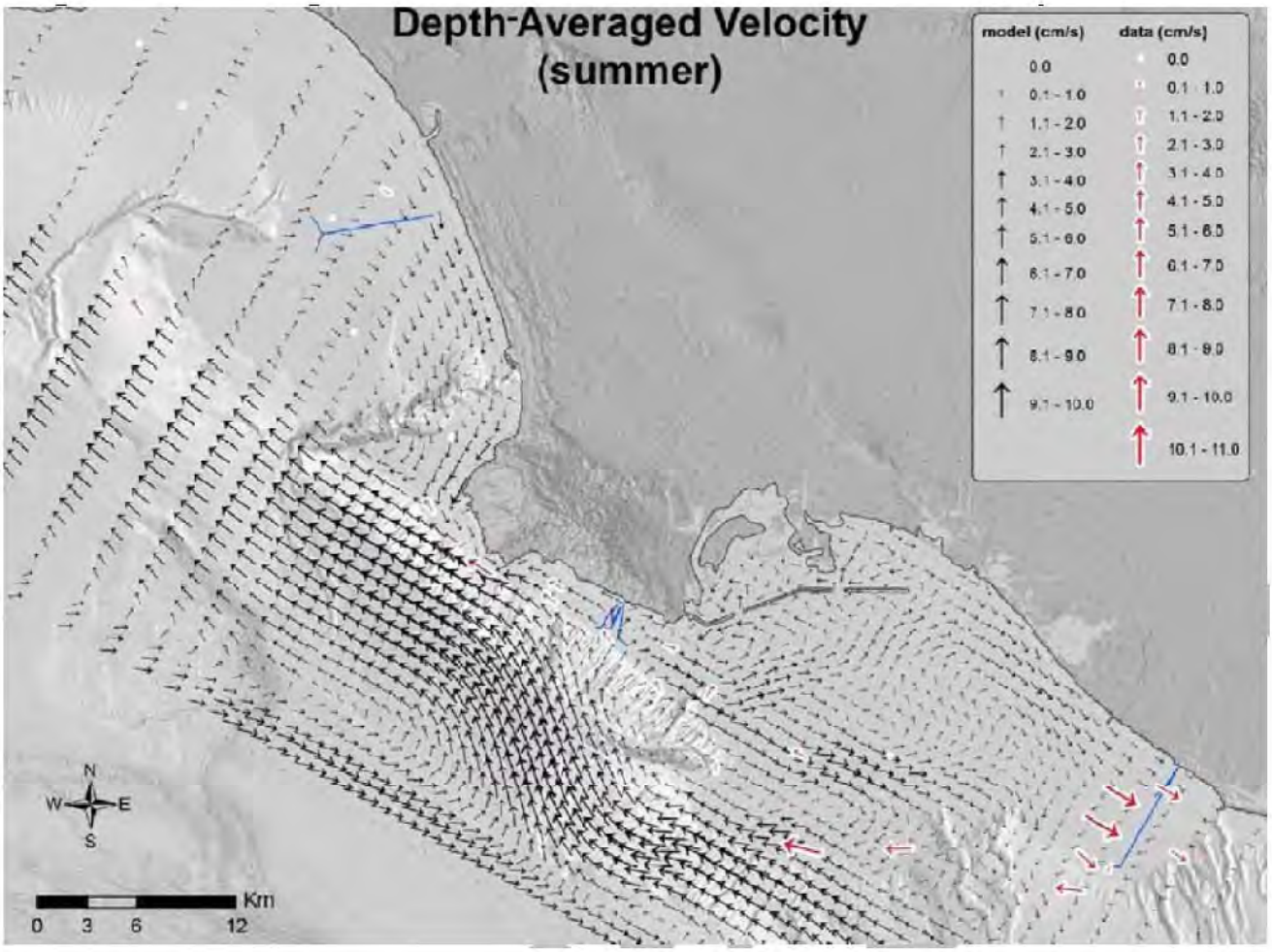


FIGURE 1

Average Currents on the San Pedro and Palos Verdes Shelves (Summer)

CLEARWATER Program

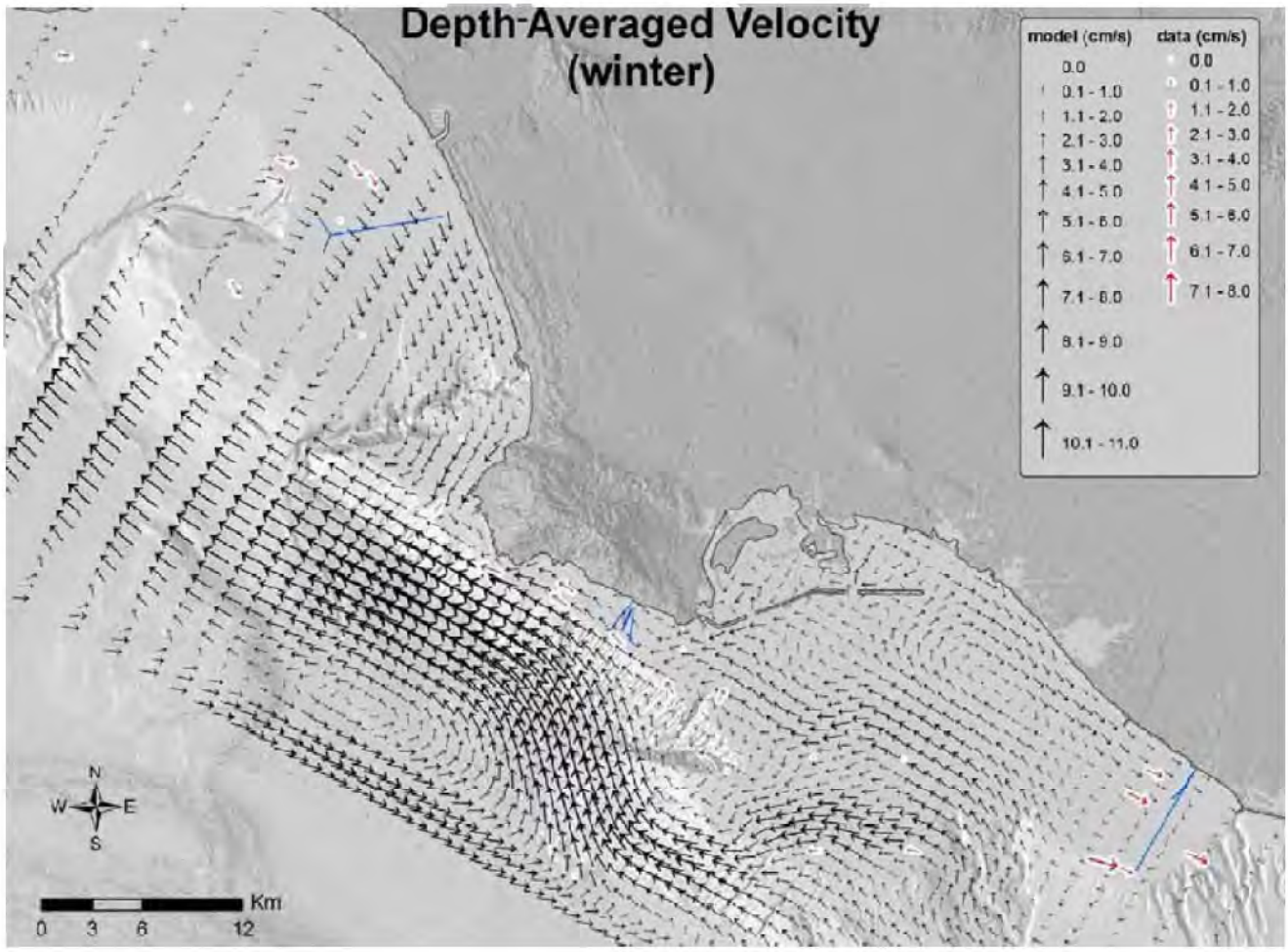


FIGURE 2

Average Currents on the San Pedro and Palos Verdes Shelves (Winter)

CLEARWATER Program

2007, temperatures averaged 11.3°C (52.3°F), ranging from 10.2°C (50.4°F) in May to 12.6°C (54.7°F) in February.

Salinity

In 2006, salinity at 60 m (200 ft) on the SP Shelf ranged from 33.42 practical salinity units (psu, which is roughly equivalent to ppt) in August to 33.83 psu in February and averaged 33.63 psu over the four quarters (Sanitation Districts 2008b). In 2007, salinity averaged 33.65 psu, ranging from 33.49 psu in November to 33.86 psu in May.

Density

In 2006, seawater density (σt) at 60 m (200 ft) on the SP Shelf ranged from 25.30 σt in August to 26.04 σt in May, averaging 25.67 σt over the four quarters (Sanitation Districts 2008b). In 2007, density averaged 25.67 σt, ranging from 25.35 σt in November to 26.02 σt in May.

Dissolved Oxygen

In 2006, DO at 60 m (200 ft) on the SP Shelf ranged from 3.8 mg/L in May to 6.8 mg/L in August, averaging 5.0 mg/L over the four quarters (Sanitation Districts 2008b). In 2007, DO averaged 4.6 mg/L, ranging from 3.4 mg/L in May to 5.4 mg/L in February.

Hydrogen Ion Concentration

In 2006, pH at 60 m (200 ft) on the SP Shelf ranged from 7.8 units in May to 7.9 units in February, with an average pH of 7.8 over the four quarters (Sanitation Districts 2008b). In 2007, pH averaged 7.8 units, ranging from a pH of 7.6 in August to a pH of 8.0 in February.

Transparency (Turbidity)

In 2006, transmissivity, a measure of water transparency (based on the percent of light detected after passing through a known length of water), at 60 m (200 ft) on the SP Shelf ranged from 88.3 percent in November to 89.8 percent in February, with an average transmissivity of 89.0 percent over the four quarters (Sanitation Districts 2008b). In 2007, transmissivity averaged 88.6 percent, ranging from 87.7 percent in November to 90.0 percent in May.

Nutrients

Because operational volumes and effluent quality discharged through the proposed SP Shelf discharge would be similar to existing conditions, discussion of the current emission of nutrients in the JWPCP effluent is presented in “Project Setting – Existing Ocean Outfalls.”

Sediment Quality

Sediment Characteristics

On the SP Shelf, hard substrate is exposed at several locations, particularly offshore of the Palos Verdes Peninsula, in the Horseshoe Kelp region offshore of the port complex, and on the outer shelf south of the San Pedro Sea Valley, but comprises only 1.5 percent of the shelf area (Dartnell et al. 2006). Sand with bedforms (ripples and dunes) and shell hash comprises another 8.5 percent of the shelf sediments, and is most common in the Horseshoe Kelp region and nearshore on the eastern shelf. Bioturbated sand (sand displaced and mixed by the burrowing and boring of benthic organisms) is found on another 17 percent of the shelf, particularly surrounding Horseshoe Kelp and on the eastern side of the shelf inshore of the San Gabriel Canyon. Bioturbated muddy sand is found on 73 percent of the shelf area, and thus comprises the majority of the sediment on the shelf, including the area proposed for the SP Shelf riser and diffuser.

Additional multibeam sonar surveys and cores near the project area indicate that sediments are primarily composed of sand or alternating sand and subsurface fine clay sediment layers (Fugro 2011). In regional monitoring conducted in 2003, sediments at three stations on the SP Shelf at depths between 25 and 50 m (82 and 164 ft) contained less than 30 percent fine material, compared to a mean of 45 percent fines for mid-shelf stations throughout the SCB (Schiff et al. 2006).

Sediment Contaminants

The SP Shelf diffuser area would not be within the boundaries of the Environmental Protection Agency (EPA) designated DDT/PCB contaminated sediment study area (DDT/PCB study area). Still, DDT and PCBs are typically reported in sediments from the SP Shelf, with higher levels found closer to the Palos Verdes Peninsula (Eganhouse and Venkatesan 1993; Schiff et al. 2006). Regional sampling in 2003 revealed DDT in sediments on the middle shelf at three mid-shelf depth stations that are outside the area of direct impact of municipal discharges (Schiff et al. 2006). At the two stations closest to Palos Verdes, DDT levels were below the ERM for total DDT but exceeded the ERL. PCBs were also detected in the sediments at these stations, but the levels were below the ERL.

In addition to the organic chlorinated hydrocarbons, samples were analyzed for concentrations of trace metals as well as other contaminants during the 2003 regional survey. At one or more of the three mid-shelf depth stations on the SP Shelf, 11 trace metals were reported as enriched (Schiff et al. 2006). Levels were below the ERL for each reported metal with the exception of mercury, which had a value between the ERL and ERM levels at one of the three stations. Other contaminants were not found at levels considered enriched.

Marine Biological Resources

Biological Communities

Plankton

Phytoplankton. Chlorophyll-a is measured quarterly as part of the JWPCP receiving water monitoring program at Station 2706, in the vicinity of SP Shelf riser and diffuser area (Sanitation Districts 2008b – follow-up WQ data). Because Station 2706 is deeper than the proposed riser site, data from a depth of 60 m (200 ft) was used to represent bottom conditions in the project area. In 2006, chlorophyll-a at 60 m (200 ft) ranged from 0.3 micrograms per liter (µg/L) in May to 2.8 µg/L in August, with an average concentration of 1.1 µg/L over the four quarters. In 2007, chlorophyll-a averaged 0.6 µg/L, ranging from 0.2 µg/L in May to 1.0 µg/L in November. Phytoplankton trends in the vicinity of the existing discharge are discussed in "Project Setting – Existing Ocean Outfalls."

Zooplankton and Ichthyoplankton. See "Regional Setting – Marine Biological Resources."

Invertebrates

Infauna. The infaunal invertebrate assemblage of the SP Shelf was evaluated in 2003 as part of the SCB regional monitoring study (Ranasinghe et al. 2007). Four 0.1 m^2 (1 ft^2) grab samples screened to 1 millimeter (mm) were collected in areas on the SP Shelf considered to be unimpacted between depths of 25 and 85 m (82 and 279 ft). The number of individuals taken in the four grabs ranged from 196 to 486, averaging 341 individuals with 1,363 individuals overall (SCCWRP 2010a). The number of taxa ranged from 68 to 94 per station, with an average of 87 for the SP Shelf stations. A total of 15 species – 10 annelids, 3 amphipods, 1 tanaid, and 1 ostracod – contributed 1 percent or more to the total abundance at the four stations, accounting for 52 percent of the individuals reported. All but three of the most abundant taxa were taken at two or more of the stations.

The infauna assemblage found on the SP Shelf during the 2003 regional survey was similar to that found throughout the SCB, with abundances dominated primarily by polychaete annelids and arthropods. The common taxa found on the SP Shelf in the regional study are abundant in the SCB and typical of soft bottoms at mid-shelf depths.

Epifauna. The epibenthic invertebrate assemblage of the SP Shelf was evaluated in 2003 as part of the SCB regional monitoring study (Allen et al. 2007). In bottom trawls at four stations in areas considered to be unimpacted on the SP Shelf between depths of 25 and 85 m (82 and 279 ft), the number of individuals caught ranged from 13 to 1,496, averaging 839 individuals per trawl, with 3,358 individuals overall (SCCWRP 2010b). The number of species per station ranged from 6 to 16 and averaged 11 species per trawl, with 36 invertebrate species taken overall in the survey. California sand star was the only species found at all four stations. White urchin, absent at the shallowest (28 m [92 ft]) station, was the most abundant species on the shelf overall, accounting for 64 percent of the total epifauna abundance at all four stations. Other common species included the trailtip sea pen (*Acanthoptilum* sp.) and the yellow sea twig (*Thesea* sp. B).

Biomass was variable among the four stations, ranging from 0.97 to 7.3 kilograms (kg) (2 to 16 pounds [lbs]) and averaging 4.3 kg (9.5 lbs) (SCCWRP 2010c). Biomass was dominated by white urchin, which contributed nearly 35 percent to the total for the four stations. California sea cucumber contributed another 29 percent to the combined biomass, followed by the ascidian *Polyclinum planum* at about 8 percent. The trawl-caught invertebrate assemblage found on the SP Shelf during the regional survey was similar to those found throughout the SCB, dominated by common species typical of soft bottoms at mid-shelf depths.

Pelagic Invertebrates. See “Regional Setting – Marine Biological Resources.”

Fish

Soft-bottom Associated Demersal Fish. The demersal fish populations of the SP Shelf were evaluated in 2003 as part of the SCB regional monitoring study (Allen et al. 2007). In demersal trawls at four stations in areas considered to be unimpacted on the SP Shelf between depths of 25 and 85 m (82 and 279 ft), the number of individuals caught ranged from 192 to 937, averaging 858 individuals per trawl (SCCWRP 2010d). Number of species per station ranged from 9 to 16 and averaged 14 species per trawl, with 27 fish species taken overall in the survey. Three species – roughback sculpin (*Chitonotus pugetensis*), California scorpionfish, and English sole (*Parophrys vetulus*) – were taken at all four stations, though abundances for these species were moderate or low overall. Six additional species, speckled sanddab, Pacific sanddab, yellowchin sculpin, California tonguefish (*Symphurus atricaudus*), hornyhead turbot (*Pleuronichthys verticalis*), and bigmouth sole (*Hippoglossina stomata*), were taken at three of the four stations during the survey. Of these, speckled sanddab, Pacific sanddab, and yellowchin sculpin were among the most abundant species taken with 344, 331, and 173 individuals caught. The most abundant species, halfbanded rockfish with 702 individuals and longfin sanddab with 496 individuals, were both highly dominant at one station, though both also occurred in low numbers at a second station on the shelf.

Fish biomass was variable among the four stations, ranging from 2.3 to 22.6 kg (5 to 50 lbs) and averaging 10.2 kg (22.5 lbs) (SCCWRP 2010e). Biomass was dominated by Pacific sanddab, which contributed 42 percent to the total for the four stations. Halfbanded rockfish contributed another 8 percent to the combined biomass, followed by California skate (*Raja inornata*) and bigmouth sole at about 5 percent each.

Hard-bottom Associated Demersal Fish. The SP Shelf diffuser area is relatively flat with little rocky structure in the immediate vicinity. On the SP Shelf, reefs and rocky substrate occur along the shelf edge, as well as inshore of the project at shallower depths in the Horseshoe Kelp area. Recreational species taken on the SP Shelf reefs include rockfish, lingcod, ocean whitefish (*Caulolatilus princeps*), and California scorpionfish. In a photo survey of seafloor habitats on the SP Shelf, blackeye goby was the most frequently observed fish species on rocky areas at mid-shelf depths (Cadien et al. 2006). The nearest known reef to the proposed diffuser area is approximately 5 km (3 mi) southeast of the riser at a shallower depth (Sloan pers. comm. 2007).

Pelagic Fish. See "Regional Setting – Marine Biological Resources."

Commercial and Recreational Fisheries. Commercial fishery catches, or landings, are tracked by the California Department of Fish and Game (CDFG) and summarized by catch blocks, which are 10-by-10-nmi areas delineated to track catches. Catch blocks are numbered and represent a known geographic area whose boundaries are based on ten degrees of latitude and longitude. Catch block data allow for review of both localized information and long-term trends. The SP Shelf riser and diffuser area is in Catch Block 740.

In 2006, six methods of commercial take were reported for fish in Catch Block 740: collection by various traps and nets, hook and line, longlines, harpoon and spear, set and drift gill nets, and purse seines and trawls (CDFG 2007). In the project area, use of gill nets and trawls are prohibited within 5.6 km (3 nmi) of shore, with the additional condition that gill nets cannot be set at depths of less than 70 fathoms (128 m or 420 ft). Other methods have a variety of other use restrictions.

In 2006, total commercial fish catch for Block 740 was nearly 198,000 kg (437,000 lbs) for 40 fish species with a total value of over $375,000 (CDFG 2007). Four species together contributed more than 81 percent of the value of the catch in 2006. California halibut accounted for 43 percent of the catch value but only 7 percent of the biomass reported for the year. Pacific bonito contributed the most to the commercial fish biomass, accounting for 51 percent of the total, and was second highest in value at nearly 18 percent of the total. Swordfish ranked third, accounting for 14 percent of the value but only 2 percent of the biomass. White croaker contributed another 7 percent of the yearly value, and 6 percent of the biomass. Pacific sardine had the second highest biomass at 21 percent of the total, though value was only slightly more than 1 percent. Other important species included sheephead, unidentified sole, white seabass (*Atractocion nobilis*), and California scorpionfish.

In 2006, total commercial invertebrate catch for Block 740 was nearly 438,000 kg (965,000 lbs), including 11 invertebrate species with a total value of nearly $273,000 (CDFG 2007). California market squid accounted for 96 percent of the biomass and 85 percent of the value, with squid taken by both purse seine and trawl. Red sea urchin (*Strongylocentrotus franciscanus*), all hand collected by divers, accounted for another 8 percent of the value and 3 percent of the biomass for the year. California spiny lobster contributed another 3 percent to the value of the commercial invertebrate catch for the block, but accounted for less than 1 percent of the weight. Crab, including rock, spider, and crab claws, accounted for another 3 percent of the value and about 1 percent of the 2006 biomass. Other invertebrate species reported in the commercial catch included ridgeback prawn, mantis shrimp, sea cucumber, octopus, and whelk.

Recreational fishing information was acquired from sport fishing landing reports by port, and the long-term data was summarized by NOAA's Southwest Fisheries Science Center (SWFSC). To analyze recreational fisheries in the project area, sport fishing landing reports for Long Beach, San Pedro, Seal

Beach, and Wilmington were queried for a 4-year period from 2000 through 2003, the latest data available on the recreational sport fishing website (SWFSC 2007). Nearly 3,625,000 fish were reported taken by recreational fishermen at these four ports, averaging over 900,000 fish per year. Of the 80 total species taken, 16 contributed more than 96 percent of the total abundance, including pelagic species such as albacore (*Thunnus alalunga*), Pacific barracuda (*Sphyraena argentea*), Pacific bonito, jumbo squid, chub mackerel, and yellowtail; hard-bottom associated species such as rockfishes, barred sand bass, kelp bass, California sheephead, surfperches, California scorpionfish, and ocean whitefish; and sanddabs, most commonly caught in soft-bottomed habitats. During the 4-year period, 87,365 invertebrates were reported in the recreational catch at the four ports, all but 28 of which were squid. Although some of the squid were unidentified in the reports all were likely jumbo squid, which accounted for more than 99 percent of all squid reported taken in 2002.

Of the recreationally taken fish species, 19 are likely to be caught at depths from 30 to 90 m (98 to 295 ft). The species list included eight rockfish species, two surfperches, two croakers, California halibut, kelp greenling (*Hexagrammos decagrammus*), lingcod, ocean whitefish, sanddab, and California scorpionfish. Over the 4-year period, nearly 1.2 million fish of these 19 species were reported at local sport fishing landings, for an average of almost 300,000 fish per year (SWFSC 2007). Sanddabs were overwhelmingly the most common, accounting for 63 percent of the recreational catch, due in large part to recent special regulations reducing season length and take of some rockfish species. Other important recreational species included blue rockfish (*Sebastes mystinus*) with 13 percent, ocean whitefish with 11.5 percent, and California scorpionfish with about 10 percent of the catch.

Reefs and rocky outcroppings fished by recreational anglers and sport fishing boats occur along the shelf edge; however, most recreational reefs, including the area of the SP Shelf commonly known as Horseshoe Kelp, are located inshore of the project at shallower depths (Sloan pers. comm. 2007). Recreational species taken on the SP Shelf reefs include rockfishes, lingcod, ocean whitefish, and California scorpionfish. The SP Shelf diffuser area is relatively flat with little rocky structure in the immediate vicinity. The nearest known recreationally fished reef is approximately 5 km (3 mi) southeast of the riser area at a shallower depth (Sloan pers. comm. 2007).

Birds

Because the project would be located at least 12 km (7.5 mi) from mainland nesting areas, terns (including the California least tern) and skimmers are unlikely to feed in the project area. Other seabirds, including California brown pelican, gulls, shearwaters, grebes, and cormorants are likely to feed and rest throughout the SP Shelf area. See “Regional Setting – Marine Biological Resources.”

Marine Mammals

Marine mammals are highly mobile and may be found throughout the SCB. See “Regional Setting – Marine Biological Resources.”

Sea Turtles

Offshore observations of sea turtles are infrequent and turtles may be found throughout the SCB. Sea turtles could occur in the project area. See “Regional Setting – Marine Biological Resources.”

Threatened and Endangered Species

Threatened and endangered species are highly mobile and may be found throughout the SCB, including on the SP Shelf. See “Regional Setting – Marine Biological Resources.”

Marine Habitat

Essential Fish Habitat

A project-specific EFH Analysis is presented in Appendix 13-B.

Marine Protected Areas

Two State Marine Parks, Abalone Cove State Marine Park and Point Fermin State Marine Park, occur on the Palos Verdes Peninsula in the project vicinity (CDFG 2010b). In addition, Bolsa Chica State Marine Park in Orange County is approximately 20 km (12 mi) east and downcoast of the project area. There are 11 additional State Marine Reserves, parks, and conservation areas and 3 ASBSs in Orange County, at least 32 km (20 mi) from the project area (McArdle 1997; CDFG 2010d). Also, there are two State Marine Conservation Areas, one Special Closure Area, one State Marine Reserve, and four ASBSs about 24 km (15 mi) southwest of the project area on Santa Catalina Island.

In November 2009, the Marine Life Protection Act (MLPA) Blue Ribbon Task Force approved the MLPA South Coast Integrated Preferred Alternative MPA Proposal for recommendation to the California Fish and Game Commission. Then, in December 2010, the California Fish and Game Commission approved the South Coast Marine Protected Areas Project Final EIR. Under this recommendation, two MPAs would be established offshore of the Palos Verdes Peninsula – the Point Vicente State Marine Conservation Area (SMCA) and the Abalone Cove State Marine Conservation Area (SMCA) – both to the northwest of the project area (CDFG 2010c, 2010d, 2010e). The proposed Point Vicente SMCA would be a 39 km^2 (15.1 mi^2) reserve offshore of the bend at Point Vicente along 6 km (3.7 mi) of coast, with a depth range of 0 to 805 m (0 to 2,640 ft). The Abalone Cove SMCA would be a 12 km^2 (4.75 mi^2) offshore habitat along 1.9 km (1.2 mi) of coastline at the existing Abalone Cove State Marine Park. Depths for the SMCA would range from 0 to 665 m (0 to 2,181 ft). The Point Fermin State Marine Park would not be preserved as a state-protected area under the current proposal. Two SMCAs are proposed for Bolsa Chica. These recommended MPAs are subject to final approval by the California Fish and Game Commission.

Three SMCAs and one SMR are proposed for Orange County to the southeast of the project area (CDFG 2010c, 2010d). Six SMCAs and three SMRs are proposed for Santa Catalina Island southwest of the project area. These proposed protected areas are outside of the project area.

Areas of Special Biological Significance. Four ASBS are designated on Santa Catalina Island southwest of the project area, and there are three in Orange County to the southeast. All are outside of the project area.

Reserves and Ecological Reserves. The two State Marine Parks on the Palos Verdes Peninsula are both nearshore in the vicinity of the project. Abalone Cove State Marine Park, upcoast of the project area, extends 91 m (300 ft) offshore to a depth of about 9 m (30 ft). Take of all living marine resources is prohibited in the park with the exception of recreational take of finfish by hook and line or by spear (McArdle 1997; CDFG 2010b). Point Fermin State Marine Park is adjacent to Cabrillo Beach and the Cabrillo Marine Museum, which utilizes the area for educational purposes. The park extends 183 m (600 ft) offshore to a depth of about 18 m (60 ft). Limited recreational and commercial fishing is allowed in the park for California lobster and specified finfish species. All other take is prohibited. Bolsa Chica State Marine Park is an estuarine marine park where take of all marine plants is prohibited. Invertebrates and finfish by hook and line may be taken in designated areas.

The eleven additional SMRs, parks, and conservation areas in Orange County to the southeast and the two SMCAs, one Special Closure Area, and one SMR on Santa Catalina Island to the southwest are outside of the project area.

Marine Life Refuges. No locally designated marine life refuges are located in the project area. Seal Beach National Wildlife Refuge is a remnant saltwater marsh in the Anaheim Bay estuary, southeast of the project area.

Seabird and Shorebird Nesting Areas and Rookeries. There are several areas of importance to seabirds and shorebirds along the coasts of Los Angeles and Orange Counties. In Los Angeles County, state and federally endangered California least tern nest at an artificially created and managed nesting site at Pier 400 in the Port of Los Angeles. In 2001, approximately 200 pairs of California least terns nested on the site, which is also used for nesting by Caspian tern (*Hydroprogne caspia*), elegant tern (*Thalasseus elegans*), royal tern (*Thalasseus maximus*), and black skimmer (*Rynchops niger*) (NAS 2010). California least terns also nest at a site established at the mouth of the Santa Ana River in Orange County, at Bolsa Chica State Marine Park (along with other tern species) and in the Seal Beach National Wildlife Refuge, which also supports a few nesting pairs of the state and federally endangered light-footed clapper rail (*Rallus longirostris levipes*). In the Port of Long Beach, a black-crowned night heron (*Nycticorax nycticorax*) rookery exists at Gull Park on the Navy Mole in Long Beach Harbor (MBC 2008b). Though not threatened or endangered, black-crowned night heron is considered a rare resource. The rookery was translocated to Gull Park from the former Long Beach Naval Station in 1998.

Other important non-nesting bird use in the project area includes Flat Rock Point, located just upcoast of Palos Verdes Point, and Abalone Cove State Marine Park, just downcoast of Palos Verdes Point. These sites are important overwintering areas for a variety of shorebirds, including willets, marbled godwit (*Limosa fedoa*), turnstones, plovers, and yellowlegs. Seal Beach National Wildlife Refuge in Orange County serves as a significant stopover and wintering area along the Pacific Flyway for shorebirds. Several bird species overwinter at the refuge including loons, grebes, dabbling ducks, diving ducks, and sea ducks.

Marine Vegetation

Marine vegetation is not expected to occur in the SP Shelf riser and diffuser area because of the soft sediments of the sea floor and the depth of the site.

Public Health

Microbiology

Compliance monitoring requirements for human health risk water contact and shellfish harvesting standards as well as recent findings in the vicinity of the JWPCP outfall are presented in “Project Setting – Existing Ocean Outfalls.”

Fish Tissue Bioaccumulation

During the 1998 regional monitoring survey, individuals of five related flatfish species were collected at two trawl stations on the SP Shelf at mid-shelf depths to analyze whole body concentrations of chlorinated hydrocarbon contaminants (Allen et al. 2002). Fish from both stations were found to have detectable concentrations of DDT, with 26.40 µg/kg reported for fish from a 30-m (98-ft) station and 252.94 µg/kg reported at a station from 43 m (141 ft). PCBs were also reported in the fish samples, at concentrations of 4.36 µg/kg at 30 m (98 ft) and 29.96 µg/kg at 43 m (141 ft). Chlordane was not detected in fish tissue from either site.

Project Setting – Palos Verdes Shelf

Although, in general, characteristics of the PV Shelf are similar to those discussed under "Regional Setting" and "Project Setting – San Pedro Shelf," one of the major differences is that the PV Shelf riser and diffuser area is within the boundaries of the EPA-designated DDT/PCB study area. This section focuses on the characteristics unique to the PV Shelf, augmenting the information provided in the previous discussions with site-specific data.

Location and Geography

The PV Shelf riser and diffuser assembly site would be approximately 3 km (2 mi) from Point Fermin, at a depth of approximately 53 m (175 ft). The PV Shelf varies from about 1 km (0.6 mi) to 6 km (3.7 mi) in width (EPA 2010), extending offshore of the Palos Verdes Peninsula, south of Point Fermin to the San Pedro Sea Valley, then following the peninsula to Palos Verdes Point on the northwest, a distance of about 15 km (9.3 mi). The outer edge of the PV Shelf is defined by the shelf break at depths of about 70 to 100 m (230 to 330 ft).

The PV Shelf diffuser area is on a relatively flat area of the southeast edge of the PV Shelf. The riser location is approximately 2.25 km (1.4 mi) northwest of the northern edge of the San Pedro Sea Valley, and approximately 800 m (0.5 mi) northeast of the shelf break.

Oceanography

Currents

Large-scale depth-averaged current patterns for the SP and PV Shelves were modeled and calibrated against field measurements to confirm consistency and are described in "Project Setting – San Pedro Shelf."

Based on the models, in the PV Shelf riser and diffuser assembly site vicinity, average currents in summer throughout the water column flow northeast across the San Pedro Sea Valley, then flow easterly and southeasterly in the project area at speeds of about 3 cm/s (Figure 1). In winter, average speeds throughout the water column in the project area are potentially variable, with both upslope and cross-shelf westerly currents and southeast countercurrent flow indicated at speeds of about 2 cm/s (Figure 2). As part of the Palos Verdes Flow Study conducted, currents were measured at Station A6 in the vicinity of the PV Shelf riser and diffuser area between 2000 and 2008. Current speeds above 15 cm/s were common in depths above about 14 m (46 ft), but currents were variable in both speed and direction with depth throughout the water column (Sanitation Districts 2008a). Because Station A6 is deeper than the proposed riser site, data from a depth of 53 m (175 ft) is presented to represent bottom currents in the project area. Currents at project depth in the area averaged almost 10 cm/s over the 9-year study period, with the highest speed being recorded in 2001 at 69 cm/s.

Waves, Tides, and Upwelling

Waves in the SCB, including on the PV Shelf, are discussed in "Regional Setting – Oceanography."

Water Quality

As part of the JWPCP receiving water monitoring program, water quality parameters are measured quarterly throughout the water column at Station 2803, in the vicinity of PV Shelf riser and diffuser area

(Sanitation Districts 2008b). Because Station 2803 is deeper than the proposed riser site, data from a depth of 53 m (175 ft) is presented to represent bottom conditions in the project area.

Temperature

In 2006, temperatures at 53 m (175 ft) on the PV Shelf ranged from 10.5°C (50.9°F) in February to 13.6°C (56.5°F) in August and averaged 11.6°C (52.9°F) over the four quarters (Sanitation Districts 2008b). In 2007, temperatures averaged 11.4°C (52.5°F), ranging from 10.0°C (50.0°F) in May to 13.0°C (55.4°F) in February.

Salinity

In 2006, salinity at 53 m (175 ft) on the PV Shelf ranged from 33.28 psu in November to 33.86 psu in February and averaged 33.55 psu over the four quarters (Sanitation Districts 2008b). In 2007, salinity averaged 33.65 psu, ranging from 33.46 psu in November to 33.97 psu in May.

Density

In 2006, density at 53 m (175 ft) on the PV Shelf ranged from 24.95 σt in November to 25.99 σt in February and averaged 25.53 σt over the four quarters (Sanitation Districts 2008b). In 2007, density averaged 25.64 σt, ranging from 25.24 σt in February to 26.15 σt in May.

Dissolved Oxygen

In 2006, DO at 53 m (175 ft) on the PV Shelf ranged from 3.9 mg/L in February to 6.8 mg/L in November, averaging 5.4 mg/L over the four quarters (Sanitation Districts 2008b). In 2007, DO averaged 4.6 mg/L, ranging from 2.8 mg/L in May to 5.6 mg/L in November.

Hydrogen Ion Concentration

In 2006, pH at 53 m (175 ft) on the PV Shelf ranged from 7.8 units in August to slightly over 7.9 units in November, with an average pH of 7.9 over the four quarters (Sanitation Districts 2008b). In 2007, pH averaged 7.8 units, ranging from a pH of 7.6 in August to a pH of 8.0 in February.

Transparency (Turbidity)

In 2006, transmissivity at 53 m (175 ft) on the PV Shelf ranged from 86.8 percent in November to 90.2 percent in May, with an average transmissivity of 88.2 percent over the four quarters (Sanitation Districts 2008b). In 2007, transmissivity averaged 88.6 percent, ranging from 87.4 percent in February to 89.2 percent in November.

Nutrients

Because operational volumes and effluent quality discharged through the proposed PV Shelf discharge would be similar to existing conditions, discussion of the current emission of nutrients in the JWPCP effluent is presented in “Project Setting – Existing Ocean Outfalls.”

Sediment Quality

Sediment Characteristics

General conditions in the vicinity of the Palos Verdes Peninsula are described in “Project Setting – San Pedro Shelf.” Multibeam sonar surveys and cores near the project area indicate that sediments are primarily composed of sand and clay (Fugro 2011). Sediments in the vicinity of the proposed PV Shelf riser and diffuser assembly site were sampled in 2006 and 2007 at Station 10C as part of the JWPCP receiving water monitoring program. Mean sediment grain size was similar during both years, with sediments in the very fine sand size category (Sanitation Districts 2008b). As discussed in “Regional

Setting – Sediment Quality," sediments on the PV Shelf tend to become finer with depth, and this was observed in sediments in the riser area where coarse silt and medium silt were reported at deeper stations. Since 1984, mean grain size of the sediments in the riser and diffuser area have varied slightly but have remained relatively fine, with fine sands reported in 1994, 2006, and 2007, and coarse to medium silt found in 1984 and 2002.

Sediment Contaminants

As noted previously, the PV Shelf riser and diffuser area is within the DDT/PCB study area. An estimated 1,800 MT of DDT was discharged onto the PV Shelf between 1953 and 1971. Today, much of the original DDT that was discharged has dispersed throughout the greater PV Shelf, but a reservoir of approximately 100 MT remains buried in the seafloor, centered on the existing ocean outfalls.

Elevated DDT and PCB levels were detected in 2003 at two stations offshore of Point Fermin, just upcoast of the riser and diffuser area and at similar depths (Schiff et al. 2006). At both stations, DDT exceeded the ERM, and PCBs exceeded the ERL (but PCBs were below the ERM). Samples were also analyzed for trace metals and other contaminants. All metals were found to be below the ERL. At one station, levels of PAHs in sediments in the riser area were elevated; both stations reported elevated levels of total nitrogen and total organic carbon (TOC), which are indicators of organic enrichment.

As part of the JWPCP receiving water monitoring program, sediments at Station 10C in the vicinity of the PV Shelf riser and diffuser area have been analyzed for sediment contamination on a periodic basis. At that station total DDT levels have declined from historic levels. In 1973, DDT concentrations of more than 50 mg/dry kg were reported, well above the ERM; by 1985 concentrations of less than 10 mg/dry kg were reported (Sanitation Districts 2008b). In 2002, the last year the station reported total DDT, levels were below 1 mg/dry kg, and although these levels still have the potential to impact the biota, DDT was notably lower than reported 20 years previously. PCBs were reported at Station 10C in 1985 at a relatively low value compared to other areas of the shelf, but within a range of concentrations where effects on the biota could occur. In 1974, cadmium, copper, lead, and mercury were all enriched at Station 10C, with values reported within the range that exceeds ERL or ERM levels for all metals. By 1985, the concentrations of at least three of the four metals were reduced from 1974 levels, and, by 2002, copper, lead, and mercury were at levels below their respective ERLs. Cadmium, although reported in a range that could exceed its ERL, was (at a minimum) 50 percent of the reported 1974 concentration. Similar trends in reductions over time at Station 10C were also noted for the five additional trace metals analyzed, although in 2002 arsenic was reported within a range that could exceed the ERL.

Contaminants that indicate organic enrichment, including organic nitrogen, hydrogen sulfide, and TOC are analyzed at Station 10C regularly during receiving water monitoring. In 2006 and 2007, nitrogen and hydrogen sulfide values were similar to background levels, while TOC was slightly elevated. Both nitrogen and hydrogen sulfide have been near background levels at Station 10C since 1984, although levels elsewhere on the shelf have been variably elevated. A new analytical method was utilized for TOC samples in 2006 and 2007 that does not allow for long-term comparisons.

Marine Biological Resources

Biological Communities

Plankton

Phytoplankton. Chlorophyll-a is measured quarterly as part of the JWPCP receiving water monitoring program at Station 2803, in the vicinity of PV Shelf riser and diffuser area (Sanitation Districts 2008b).

Because Station 2803 is deeper than the proposed riser site, data from a depth of 53 m (175 ft) is presented to represent bottom conditions in the project area. In 2006, chlorophyll-a at 53 m (175 ft) ranged from 0.6 µg/L in May to 2.1 µg/L in November, with an average concentration of 1.2 µg/L over the four quarters. In 2007, chlorophyll-a averaged 0.7 µg/L, ranging from 0.3 µg/L in May to 1.0 µg/L in August.

Discussion of phytoplankton trends in the vicinity of the existing discharge is presented in "Project Setting – Existing Ocean Outfalls." Because operational volumes and effluent quality discharged through the proposed PV Shelf discharge would be similar to existing conditions, and discharge depths and predicted trapping depths are comparable with the existing JWPCP discharge site, it is unlikely that relocating the JWPCP discharge would cause any change in the phytoplankton response between sites (Sanitation Districts 2009).

Zooplankton and Ichthyoplankton. See "Regional Setting – Marine Biological Resources."

Invertebrates

Infauna. In both 2006 and 2007, as part of the JWPCP receiving water monitoring program, sediments were collected for infaunal analysis using 0.1 m^2 (1 ft^2) grabs at 44 stations on the PV Shelf. Station 10C, on the 61-m (200-ft) isobath is in the vicinity of the PV Shelf riser and diffuser area. In 2006, 404 individuals were collected at Station 10C, less than the average of 477 individuals for all 61-m (200-ft) stations on the PV Shelf for the year (Sanitation Districts 2008b). In 2007, 834 individuals were collected at Station 10C, notably more than the average of 545 reported at all stations on the shelf at the same depth for the year. In both 2006 and 2007, 114 and 163 taxa, respectively, were reported at Station 10C, in both years exceeding the mean number of taxa reported at all stations on the shelf at the same depth. Dominance, diversity, and richness values at Station 10C also exceeded the shelf-wide average for the depth. Benthic response, an indication of environmental disturbance based on the resident infaunal assemblage, indicated that the community at Station 10C in the vicinity of the PV Shelf riser and diffuser area was in reference condition, or healthy, during both years.

In 2006 and 2007, the infaunal assemblage found on the PV Shelf was similar to those found throughout the SCB, with polychaete annelids, arthropods, and mollusks of taxa typical of soft bottoms in Southern California dominating (Sanitation Districts 2008b). The benthic infauna communities on the PV Shelf have recovered from the highly impacted conditions of the 1970s as a result of improvements in effluent quality at the JWPCP. Although benthic conditions at slope and inshore depths indicate that legacy contaminants may still be adversely affecting community composition slightly, on the 61-m (200-ft) isobath, including in the project area, reference conditions predominate.

Epifauna. In 2006 and 2007, as part of the JWPCP receiving water monitoring program, quarterly trawls were conducted on the PV Shelf, including two locations on the 61-m (200-ft) isobath up- and downcoast of the existing discharges at Stations T4-61 and T5-61, respectively. These stations are at only slightly greater depths than the proposed riser and diffuser and are relatively close by, the nearest trawl location being about 2 km (1.3 mi) northwest of the project area.

In 2006, 1,677 individuals from 21 invertebrate species, weighing 18.97 kg (42 lbs), were taken in quarterly trawls at Station T4-61, upcoast of the outfalls (Sanitation Districts 2008b). Of those, two species – ridgeback prawn and the brittle star *Ophiura luetkenii* – dominated the catch. Ridgeback prawn also contributed most to biomass, followed by California sea slug (*Pleurobranchaea californica*) and sheep crab (*Loxorhynchus grandis*). At Station T5-61, downcoast of the outfalls, 746 individuals from 30 species, weighing 10.37 kg (23 lbs), were taken during the surveys. Four species dominated the

abundance: the brittle star *Ophiura luetkenii*, ridgeback prawn, California sea slug, and California sand star. California pleurobranchus dominated the biomass, followed by California sea cucumber, ridgeback prawn, gray sand star, and gigantic anemone (*Metridium farcimen*). In 2007, 4,268 individuals from 21 invertebrate species, weighing 9.46 kg (21 lbs), were taken in quarterly trawls at Station T4-61 (Sanitation Districts 2008b). As in 2006, only the brittle star *Ophiura luetkenii* and ridgeback prawn contributed more than 5 percent to the total abundance, with the brittle star notably more abundant. These two species also contributed most to biomass, followed by sheep crab and red octopus.

In both 2006 and 2007, the trawl-caught invertebrate assemblages were similar to those found throughout the SCB, dominated by common species typical of soft bottoms at mid-shelf depths, as well as some species likely attracted to the hard structure of the outfalls. On the PV Shelf, depth has been found to be the primary influence on community composition (Sanitation Districts 2008b), suggesting that the epifauna assemblages at the proposed riser location would be similar to those at the nearby monitoring stations.

Pelagic Invertebrates. Pelagic invertebrate species are highly mobile and may be found throughout the region. See "Regional Setting – Marine Biological Resources."

Fish

Soft-bottom Associated Demersal Fish. In 2006 and 2007, as part of the JWPCP receiving water monitoring program, quarterly trawls were conducted on the PV Shelf, including two locations on the 61-m (200-ft) isobath upcoast and downcoast of the discharges at Stations T4-61 and T5-61, respectively. These stations are at only slightly greater depths than the proposed riser and diffuser and are relatively close by, the nearest trawl location being about 2 km (1.3 mi) northwest of the project area.

In 2006, 1,922 individual fish from 26 species, weighing 134 9 kg (297 lbs), were taken in quarterly trawls at Station T4-61, upcoast of the existing outfalls (Sanitation Districts 2008b). Nine species dominated the abundance: Pacific sanddab, California scorpionfish, longspine combfish, yellowchin sculpin, speckled sanddab, Dover sole, California tonguefish, hornyhead turbot, and plainfin midshipman. Biomass at Station T4-61 was dominated by California scorpionfish, hornyhead turbot, and California skate. At Station T5-61, downcoast of the outfalls and nearer the PV Shelf diffuser area, 2,168 individuals from 22 species, weighing 49.7 kg (110 lbs), were taken during the four surveys. Five species, all among the most abundant at Station T4-61, dominated abundance: Pacific sanddab, yellowchin sculpin, longspine combfish, Dover sole, and California tonguefish. Pacific sanddab contributed the most to overall biomass, followed by hornyhead turbot, and California scorpionfish.

In 2007, 2,664 individual fish from 26 species, weighing 73.7 kg (162 lbs), were taken in quarterly trawls at Station T4-61 (Sanitation Districts 2008b). Nine species contributed 5 percent or more to the total abundance: Pacific sanddab, yellowchin sculpin, stripetail rockfish (Sebastes saxicola), English sole, longspine combfish, California tonguefish, plainfin midshipman, Dover sole, and hornyhead turbot. Biomass at Station T4-61 was dominated by English sole, hornyhead turbot, and California scorpionfish. At Station T5-61, 2,099 individuals from 23 species, weighing 41.45 kg (91 lbs), were taken during these surveys. Six species dominated the abundance: halfbanded rockfish, Pacific sanddab, yellowchin sculpin, plainfin midshipman, longspine combfish, and California tonguefish. Halfbanded rockfish also contributed the most to biomass, followed by Pacific sanddab and hornyhead turbot.

In both 2006 and 2007, the trawl-caught fish assemblages were similar to those found throughout the SCB, dominated by commonly occurring flatfishes and other species typical of soft bottoms at mid-shelf depths, as well as some species likely attracted to the hard substrate of the outfalls. On the PV Shelf,

depth has been found to be the primary influence on community composition (Sanitation Districts 2008b), suggesting that the fish assemblages at the proposed riser and diffuser location would be similar to those at the nearby monitoring stations.

Hard-bottom Associated Demersal Fish. Although the PV Shelf riser area is a relatively flat soft bottom habitat, rocky structure is found approximately 1.5 km (0.9 mi) to the southeast at a shallower depth (Sloan pers. comm. 2007). Similar to the fish assemblage found at Stations T4-61 and T5-61, some species attracted to structures are likely to be found in the area. Hard-bottom associated fish species reported in JWPCP monitoring included California scorpionfish (second highest in abundance at Station T4-61 in 2006) and blackeye goby, calico rockfish (*Sebastes dallii*), and shiner perch (*Cymatogaster aggregata*), which were taken on occasion in low numbers (Sanitation Districts 2008b).

Pelagic Fish. Pelagic fish species are highly mobile and may be found throughout the region. See "Regional Setting – Marine Biological Resources."

Commercial and Recreational Fisheries. The PV Shelf riser and diffuser area is in Catch Block 719. In 2006, eight methods of commercial take were reported for fish take in the block, including collection by diver, fish trap, hook and line, set and drift gill nets, purse and drum seines, and by brail (CDFG 2007).

Total commercial fish catch for Block 719 in 2006 was nearly 7,744,000 kg (17,073,000 lbs) for 43 fish species, with a total value of over $1,072,000 (CDFG 2007). Pacific sardine accounted for more than 90 percent of the value and nearly 97 percent of the biomass for the year. Five additional species contributed another 1 percent or more to the total value for the block. California halibut accounted for nearly 3 percent of the value but considerably less than 1 percent of the biomass. Northern anchovy, California barracuda (*Sphyraena argentea*), and white seabass each accounted for slightly more than 1 percent of the reported fish value. Northern anchovy ranked second in biomass for the year with more than 2 percent of the total.

In 2006, total commercial invertebrate catch for Catch Block 719 was more than 3,355,000 kg (7,397,000 lbs) for at least 26 invertebrate species, with a total value of nearly $2,381,000 (CDFG 2007). California market squid accounted for 97 percent of the biomass and more than 74 percent of the value. California spiny lobster accounted for another 18 percent of the value, but less than 1 percent of the weight. Red sea urchin accounted for slightly more than 2 percent of the value and 1 percent of the biomass. Sea hare, rock crab, and spot prawn each accounted for about 1 percent of the value but less than 1 percent of the biomass. Other invertebrate species that contributed at least 0.1 percent to the commercial value included spider crab, whelk, sea cucumber, and limpet.

Reefs and rocky outcroppings fished by recreational anglers and sport fishing boats occur along the shelf edge and there are shallower inshore reefs on the western edge of Horseshoe Kelp. Although the SP Shelf riser area is a relatively flat soft-bottom habitat, rocky structure is found in the area, with the closest known recreationally fished reef approximately 1.5 km (0.9 mi) to the southeast at a shallower depth (Sloan pers. comm. 2007). See "Project Setting – San Pedro Shelf," for more information regarding recreational fishing on both shelves.

Birds

Because the PV Shelf site is only 3 km (2 mi) from shore it is possible that skimmers and terns, including the California least tern, may feed in the project area. Other seabirds, including California brown pelican,

gulls, shearwaters, grebes, and cormorants are likely to feed and rest throughout the PV Shelf area. See "Regional Setting – Marine Biological Resources."

Marine Mammals, Sea Turtles, and Threatened and Endangered Species

Marine mammals, sea turtles, and threatened and endangered species are highly mobile and may be found throughout the SCB. See "Regional Setting – Marine Biological Resources."

Marine Habitat

Essential Fish Habitat and Marine Protected Areas

A project-specific EFH Analysis is presented in Appendix 13-B. Marine Protected Areas in the vicinity of PV Shelf project area are discussed in "Project Setting – San Pedro Shelf."

Marine Vegetation

Marine vegetation is not expected to occur in the PV Shelf riser and diffuser area because of the soft sediments of the sea floor and the depth of the site.

Public Health

Microbiology

Compliance monitoring requirements for human health risk water contact and shellfish harvesting standards and recent findings in the vicinity of the JWPCP outfall are presented in "Project Setting – Existing Ocean Outfalls."

Fish Tissue Bioaccumulation

During the 1998 regional monitoring survey, individuals of five related flatfish species were collected at two trawl stations near the riser/diffuser area at mid-shelf depths to analyze whole body concentrations of chlorinated hydrocarbon contaminants (Allen et al. 2002). Fish from both stations were found to have detectable concentrations of DDT, with concentrations of 845.24 µg/kg reported for fish from a 75-m (246-ft) station and 7,606.38 µg/kg for fish from a 48-m (157-ft) station. PCBs were also reported in the fish samples, at concentrations of 101.20 µg/kg at 75 m (246 ft) and 390.88 µg/kg at 48 m (157 ft). Chlordane was not detected in fish tissue from either site. The proposed PV Shelf riser and diffuser site is within an area closed by CDFG to the commercial fishing of white croaker due to public health concerns regarding consumption of high concentrations of contaminants bioaccumulated in fish tissue (Sanitation Districts 2008b). The riser site is also adjacent to White's Point, an area with a fish consumption advisory, recommending that locally caught white croaker not be consumed and that California scorpionfish, rockfish, or kelp bass from the area not be eaten more frequently than once every two weeks.

Project Setting – Existing Ocean Outfalls

In general, characteristics of the existing ocean outfalls are similar to those discussed under "Regional Setting" and "Project Setting – San Pedro Shelf." As with the PV Shelf, the existing ocean outfalls are within the boundaries of the DDT/PCB study area. This section focuses on the characteristics unique to the existing ocean outfalls, augmenting the information provided in the previous discussions with site-specific data.

Location and Geography

The existing ocean outfalls extend from the existing manifold structure at Royal Palms Beach and terminate at a depth of 61 m (200 ft) on the PV Shelf. There are four outfalls, all of which originate at a manifold structure at White Point on the Palos Verdes Peninsula. All are seafloor pipe structures ballasted and armored with rock. Two are in active use, one 120 inches (3.1 m) in diameter and one 90 inches (2.3 m) in diameter; a third (72-inch [1.8-m]) is used during heavy rains. The fourth (60-inch [1.5–m]) is kept on standby for emergency use. The two active outfalls discharge treated effluent through diffusers that are located about 2.4 km (1.5 mi) offshore.

Oceanography

Currents

Large-scale, depth-averaged current patterns for the SP and PV Shelves were modeled and calibrated against field measurements to confirm consistency (Figures 1 and 2) and are described in "Project Setting – San Pedro Shelf." Current speeds of 9 to 15 cm/s are common in the existing ocean outfalls area, and net, long-term speeds average about 4 cm/s (Sanitation Districts 2008b).

Waves and Tides

Waves in the SCB, including in the existing ocean outfalls area, are discussed in "Regional Setting – Oceanography."

Upwelling

Upwelling in the vicinity of the Palos Verdes Peninsula is described in "Project Setting – San Pedro Shelf." Reports from recent monitoring of oceanographic conditions revealed upwelling events in the project area in February and May of 2006, and in May of 2007 (Sanitation Districts 2008b).

Water Quality

As part of the JWPCP receiving water monitoring program, water quality parameters are determined quarterly throughout the water column at three stations – 2903, 2902, and 2901 – adjacent to the outfall on the 60-m (200-ft), 30-m (98-ft), and 10-m (33-ft) isobaths, respectively (Sanitation Districts 2008b).

Temperature

In 2006, bottom temperatures at the 60-m (200-ft) station ranged from 10.1°C (50.2°F) in May to 12.9°C (55.2°F) in November, averaging 11.3°C (52.3°F) over the four quarters. At the 30-m (98-ft) station, bottom temperatures ranged from 10.8°C (51.4°F) in May to 15.1°C (59.2°F) in November, averaging 12.7°C (54.9°F). At the 10-m (33-ft) station, bottom temperatures ranged from 13.5°C (56.3°F) in February to 17.3°C (63.1°F) August, averaging 15.5°C (59.9°F). In 2007, temperatures at the 60-m (200-ft) station averaged 11.2°C (52.2°F), ranging from 9.8°C (49.6°F) in May to 12.2°C (54.0°F) in February. At 30 m (98 ft), bottom temperatures averaged 12.2°C (54.0°F), ranging from 10.1°C (50.2°F) in May to 13.4°C (56.1°F) in February. At 10 m (33 ft), bottom temperatures ranged from 11.2°C (52.2°F) in May to 17.9°C (64.2°F) in August, averaging 14.1°C (57.4°F).

Salinity

In 2006, bottom salinity at the 60-m (200-ft) station ranged from 33.24 psu in November to 33.77 psu in May, averaging 33.54 over the four quarters. At the 30-m (98-ft) station, bottom salinity ranged from 33.26 psu in August to 33.55 psu in May, averaging 33.39 psu. At the 10-m (33-ft) station, bottom salinity averaged 33.48 psu, ranging from 33.33 psu in November to 33.61 psu in May. In 2007, salinity

at the 60-m (200-ft) station averaged 33.67 psu, ranging from 33.48 in November to 34.01 in May. At 30 m (98 ft), bottom salinity averaged 33.52 psu, ranging from 33.28 psu in November to 33.83 psu in May. At 10 m (33 ft), bottom salinity ranged from 33.32 psu in November to 33.72 psu in May, averaging 33.53 psu.

Density

In the project area, the ambient density stratification is found at 20 to 50 m (66 to 164 ft) through much of the year (Sanitation Districts 2009). In 2006, bottom density at the 60-m (200-ft) station ranged from 25.06 σt in November to 25.98 σt in May, averaging 25.57 over the four quarters. At the 30-m (98-ft) station, bottom density ranged from 24.63 σt in November to 25.69 σt in May, averaging 25.19 σt. At the 10-m (33-ft) station, bottom density averaged 24.9 σt, ranging from 24.20 σt in August to 25.17 σt in February. In 2007, density at the 60-m (200-ft) station averaged 25.71 σt, ranging from 25.44 σt in February to 26.21 σt in May. At 30 m (98 ft), bottom density averaged 25.39 σt, ranging from 25.11 σt in February to 26.02 σt in May. At 10 m (33 ft), bottom density ranged from 24.24 σt in August to 25.74 σt in May, averaging 25.01 σt.

Dissolved Oxygen

In 2006, bottom DO concentrations at the 60-m (200-ft) station ranged from 3.7 mg/L in February to 6.4 mg/L in November, averaging 5.0 over the four quarters. At the 30-m (98-ft) station, bottom DO ranged from 4.5 mg/L in May to 7.5 mg/L in November, averaging 6.4 mg/L. At the 10-m (33-ft) station, bottom DO averaged 8.5 mg/L, ranging from 7.7 mg/L in November to 9.3 mg/L in February. In 2007, DO at the 60-m (200-ft) station averaged 4.4 mg/L, ranging from 2.6 mg/L in May to 5.4 mg/L in November. At 30 m (98 ft), bottom DO averaged 5.7 mg/L, ranging from 3.7 mg/L in May to 7.1 mg/L in August. At 10 m (33 ft), bottom DO ranged from 5.0 mg/L in May to 7.9 mg/L in August, averaging 6.7 mg/L.

Hydrogen Ion Concentration

In 2006, bottom pH concentrations at the 60-m (200-ft) station ranged narrowly between 7.8 and 7.9 units, with an average of 7.8 over the four quarters. At the 30-m (98-ft) station, bottom pH ranged from 7.9 units in May and August to 8.1 units in February, with an average of 8.0 units. At the 10-m (33-ft) station, bottom pH averaged 8.2 units, ranging from 8.0 units in November to slightly more than 8.3 units in May. In 2007, pH at the 60-m (200-ft) station averaged 7.8 mg/L, ranging from 7.6 units in May to 8.0 units in February. At 30 m (98 ft), bottom pH averaged 7.9 units with a range from 7.7 units in May to 8.1 units in February. At 10 m (33 ft), bottom pH ranged from 7.8 units in May to 8.2 units in February, averaging 8.0 units.

Transparency (Turbidity)

In 2006, bottom transmissivity at the 60-m (200-ft) station ranged from 81.7 percent in August to 87.2 percent in May, averaging 85.0 percent over the four quarters. At the 30-m (98-ft) station, transmissivity ranged from 76.7 percent in November to 84.6 percent in May, averaging 80.9 percent. At the 10-m (33-ft) station, transmissivity averaged 71.6 percent, ranging from 57.7 percent in November to 79.7 percent in May. In 2007, transmissivity at the 60-m (200-ft) station averaged 84.4 percent, ranging from 77.8 percent in February to 87.1 percent in August. At 30 m (98 ft), bottom transmissivity averaged 81.3 percent, ranging from 75.1 percent units in February to 84.0 percent in November. At 10 m (33 ft), bottom transmissivity ranged from 48.1 percent in February to 81.3 percent in May, averaging 71.0 percent.

Nutrients

Since the 1970s, routine monitoring has been conducted in the JWPCP discharge for ammonia-N, organic nitrogen, nitrate, nitrite, and phosphate (Sanitation Districts 2008b, 2009). Since the 1980s, improvements in effluent quality have reduced the mass emissions of ammonia, organic nitrogen, total nitrogen, and total phosphate by 27, 85, 41, and 94 percent, respectively (Sanitation Districts 2009). Because there is no significant variation in discharge volume throughout the year, concentrations of effluent nutrients stay relatively consistent. However, in one area near the outfalls, ammonia-N registers more than 1,000 percent over ambient levels, although nitrate, nitrite, and phosphate are only minimally increased in the outfall area because there are low levels in the effluent and ambient levels are high.

Discharge rates in 2008 (average concentrations) were as follows: total nitrogen – 39.4 mg/L, ammonia-N – 36.7 mg/L, organic nitrogen – 2.5 mg/L, nitrate-N – 0.05 mg/L, nitrite-N – 0.14 mg/L, total phosphate – 0.73 mg/L, and silicon (based on a single study conducted in early 2009) – 22.0 mg/L. Annual mass emissions were calculated based on this data and regional inputs (see "Regional Setting – Water Quality, Nutrients") adjusted for the project area (Table 5). Although for most nutrients, JWPCP discharge is higher than the local runoff and aerial deposition estimated input, upwelling events far surpass JWPCP numbers.

Table 5. Annual Mass Nutrient Emissions (Estimated) Near Existing Ocean Outfalls (MT)

Nutrient	JWPCP	Local Runoff	Aerial Deposition	Upwelling
Ammonia nitrogen	15,365	135	NA	NA
Organic nitrogen	1,047	NA	NA	NA
Nitrate nitrogen	21	647	NA	431,000
Nitrite nitrogen	59	NA	NA	374
Total nitrogen	**16,495**	**782**	**70**	**431,374**
Total phosphate	306	186	NA	76,100
Silicate	9,210	NA	NA	333,000

NA= Not Analyzed
Source: Sanitation Districts 2009

Sediment Quality

Sediments in the vicinity of the existing outfalls were sampled at and inshore of the outfalls at Stations 8C and 8D, respectively, as part of the JWPCP receiving water monitoring program in 2006 and 2007.

Sediment Characteristics

Mean sediment grain size at outfall depths was in the medium silt category during both surveys; at the inshore station, sediments were coarser, being in the fine sand category (Sanitation Districts 2008b). Fine and very fine silt-sized sediments were reported at deeper stations offshore of the outfalls. Since 1984, mean grain size of the sediments in the outfalls' vicinity has become coarser. In 1984, sediments in the fine silt ranges were found at discharge depths and greater both upcoast, and to a lesser extent downcoast, of the outfalls, while coarse and medium sized silt was reported inshore and at stations farther upcoast and downcoast at all depths. By 1994, fine silts were reported only at offshore depths and upcoast of the outfalls at discharge depths. Inshore, and particularly downcoast, fine sand-size sediments were reported. Since 1994, the distribution of fine sand and coarser silts has been slightly variable downcoast of the outfalls, but generally similar over several surveys, while areas of fine silt sediments have decreased

offshore and upcoast of the outfalls, most likely as a result of improved treatment processes that have reduced the discharge of suspended particles from the outfalls.

Sediment Contaminants

An estimated 1,800 MT of DDT were discharged onto the PV Shelf between 1953 and 1971. Today, much of the original DDT that was discharged has dispersed throughout the greater PV Shelf, but a reservoir of approximately 100 MT remains buried in the seafloor within the boundaries of the DDT/PCB study area, which is centered on the existing outfalls.

In addition to the two PV Shelf stations (described in "Project Setting – Palos Verdes Shelf"), the 2003 regional sampling survey found elevated levels of DDT and PCBs in sediments at a station on the PV Shelf upcoast, and thus upcurrent, of the existing diffuser area at similar depths (Schiff et al. 2006). Total DDT levels exceeded the ERM at that station, and PCBs exceeded the ERL but were below the ERM for total PCBs. In addition to the organic chlorinated hydrocarbons, samples were analyzed for concentrations of trace metals and other contaminants: 13 trace metals were reported as enriched, with 7 at levels above their ERLs. Sediments in the riser area were also found to be elevated for PAHs, total nitrogen, and TOC.

At Station 8C near the outfalls, total DDT was found at concentrations of 53.0 mg/dry kg in 2006 and 30.2 mg/dry kg in 2007 (Sanitation Districts 2008b). Inshore at Station 8D, levels were reported at 0.26 mg/dry kg in 2006 and 0.36 mg/dry kg, approximately 100 times lower than the values at the discharge. Despite these differences, levels at both stations in both 2006 and 2007 exceeded the ERM for total DDT. Total PCBs were 1.59 mg/dry kg in 2006 and 2.85 mg/dry kg in 2007 at the outfall depths. Both reported values exceed the ERM for total PCB; however, levels were below detection limits at the inshore station. Total chlordanes, another organochlorine, were also found at levels that exceeded the ERM at Station 8C during both years, but were not detected in sediments at the shallower Station 8D.

Sediments were also analyzed for concentrations of nine trace metals. In 2006, levels reported near the outfalls for three of those metals – arsenic, cadmium, and silver – exceeded their ERLs, while mercury levels exceeded the ERM. In 2007, concentrations of all nine trace metals were higher than reported in 2006 and all exceeded their respective ERLs, with mercury again exceeding the ERM. At the shallower, inshore Station 8D, only cadmium exceeded its ERL in 2006 and arsenic and cadmium in 2007. At both stations, hydrogen sulfide was below reportable limits in both 2006 and 2007, while organic nitrogen was slightly elevated near the discharges in both years and levels inshore of the discharge were among the lowest reported on the shelf. In both 2006 and 2007, TOC levels at the outfall station were among the highest reported on the shelf, though in 2006 TOC in sediments from the inshore station was among the lowest reported on the shelf for the year. In 2007, values at the inshore station exceeded those reported at the outfall station. Although contaminant levels in the vicinity of the outfalls may exceed values reported on other areas of the shelf and may still be found at levels at which effects on biota could occur, contaminant concentrations both near and inshore of the existing ocean outfalls have trended down since the 1970s.

Marine Biological Resources

Biological Communities

Plankton

Phytoplankton. In the vicinity of the existing outfalls, water column monitoring of the receiving waters for DO and chlorophyll-a levels, indicators of phytoplankton productivity, occurs quarterly at 48 stations

offshore of the discharges, including three stations adjacent to the outfall pipelines – 2903, 2902, and 2901 – on the 60-m (200-ft), 30-m (98-ft) and 10-m (33-ft) isobaths, respectively (Sanitation Districts 2008b, 2009). Ammonia, a potential nutrient for phytoplankton, is evaluated quarterly at 24 stations.

In 2006, near-bottom chlorophyll-a concentrations at Station 2903 on the 60-m (200-ft) isobath ranged from 0.3 µg/L in May to 1.4 µg/L in August, averaging 1.0 µg/L over the four quarters (Sanitation Districts 2008b). At Station 2902, bottom concentrations at 30 m (98 ft) averaged 5.2 µg/L, ranging from 0.8 µg/L in May to 15.2 µg/L in February. At Station 2901, bottom concentrations at 10 m (33 ft) ranged from 1.9 µg/L in August to 16.9 µg/L in February, averaging 5.9 µ/L overall. In 2007, concentrations at 60 m (200 ft) near the outfalls ranged from 0.3 µg/L in May to 1.3 µg/L in August, averaging 0.7 µg/L. Near bottom at the 30-m (98-ft) station, concentrations averaged 2.4 µg/L over the four quarters, ranging from 1.4 µg/L in May to 5.0 µg/L in August. At 10 m (33 ft), bottom values ranged from 1.4 µg/L in November to 7.1 µg/L in August, averaging 4.2 µg/L.

Analysis of four years of data confirmed that the majority of phytoplankton was typically found in the upper water column, while the effluent plume was trapped below a density stratification layer at deeper depths and therefore unavailable (Sanitation Districts 2009). Although local upwelling may occasionally push the trapping layer up to depths that make the nutrients in the discharge available to phytoplankton, between November 2002 and November 2008, no increase in phytoplankton levels was associated with the effluent plume. In addition, no association between the JWPCP discharge and harmful algal blooms was indicated. In the SCB, HABs have been associated with spring upwelling events with no obvious link to anthropogenic inputs, including ocean discharges. If nutrients from the JWPCP and other SCB discharges were associated with HABs, the events would likely have been present in the SCB for decades instead of being a relatively recent phenomenon.

Zooplankton and Ichthyoplankton. See “Regional Setting – Marine Biological Resources.”

Invertebrates

Infauna. In both 2006 and 2007, sediments for infaunal analysis were collected using 0.1 m^2 (1 ft^2) grabs at 44 stations on the PV Shelf as part of the JWPCP receiving water monitoring program, including at Stations 8C and 8D in the vicinity of the existing outfalls on the 61-m (200-ft) and 30-m (98-ft) isobaths, respectively. Community dominants on the 61-m (200-ft) isobath on the PV Shelf are discussed in “Project Setting –Palos Verdes Shelf.”

At Station 8C, 1,251 individuals from 134 species were collected in 2006 and 1,349 individuals from 153 species were collected in 2007 (Sanitation Districts 2008b). During both years, abundance was about two and a half times the average number reported at Station 10C on the PV Shelf at the same depth, while species richness exceeded the shelf-wide average at 61-m (200-ft) isobath by about one-third. As a result, dominance, diversity, and richness values at the station were somewhat lower than the shelf-wide average for the depth during both years. The Benthic Response Index (BRI), a measure of the condition of marine and estuarine benthic communities based on an abundance-weighted average pollution tolerance of species occurring in a sample was also slightly higher than the average for the depth, but still indicated that the community at Station 8C near the outfalls was in reference condition, or healthy, during both years.

In both 2006 and 2007, the annelids *Spiophanes berkeleyorum*, *Spiophanes duplex*, *Paraprionospio pinnata*, *Prionospio (Prionospio) jubata*, *Mediomastus* spp., and *Lumbrinerus cruzensis* were among the most common taxa collected on the PV Shelf on the 30-m (98-ft) isobath (Sanitation Districts 2008b). In

2006, the annelid *Neosabellaria cementarium* was also abundant on the shelf at 61 m (200 ft), while the phoronid *Phoronis* sp. and the annelid *Monticellina cryptica* were common in 2007. Of these species, *Paraprionospio pinnata*, *Spiophanes berkeleyorum*, and *Mediomastus* spp. were among the most frequently encountered species at stations on the shelf during both years.

In 2006, 804 individuals were collected at Station 8D, slightly more than the average of 715 individuals for all 30-m (98-ft) stations on the PV Shelf for the year (Sanitation Districts 2008b). In 2007, 1,215 individuals were collected at Station 8D, notably more than the average of 752 at the same depth for the year. In 2006, 157 taxa were reported for Station 8D, slightly exceeding the average of 145 taxa for the depth. In 2007, 206 taxa were found at the station, again notably more than the average of 146 taxa for the shelf at that depth. Dominance, diversity, and richness values at Station 8D were similar to the shelf-wide averages for the depth in 2006, but exceeded average values in 2007. BRI values in both 2006 and 2007 indicated that the benthic community at Station 8C deviated slightly from reference conditions, as was noted at most stations on the 30-m (98-ft) isobath on the PV Shelf during both years.

In 2006 and 2007, the infauna assemblage found on the PV Shelf was similar to those found throughout the SCB, with abundances dominated primarily by polychaete annelids, arthropods, and mollusks of taxa typical of soft bottoms in Southern California (Sanitation Districts 2008b). As a result of improvements in effluent quality, burial of legacy toxicants and reductions in the organic enrichment of legacy sediments, the benthic infauna communities on the PV Shelf have recovered notably from the highly impacted conditions of the 1970s (Sanitation Districts 2008b). Although benthic conditions at slope depths and on the 30-m (98-ft) isobath indicate that legacy contaminants may still be impacting community composition slightly, on the 61-m (200-ft) isobath, including in the project area, reference conditions predominate.

Epifauna. In 2006 and 2007, quarterly trawls were conducted in the existing ocean outfalls area as part of the JWPCP receiving water monitoring program, including Stations T4-23 and T5-3 on the 23-m (75-ft) and Stations T4-61 and T5-61 on the 61-m (200-ft) isobaths upcoast and downcoast of the existing discharges. Epibenthic invertebrates at Stations T4-61 and T5-61 are discussed in "Project Setting – Palos Verdes Shelf."

In 2006, 3,028 individuals from 29 invertebrate species, weighing 4.15 kg (9 lbs), were taken in quarterly trawls at Station T4-23, upcoast of the outfalls (Sanitation Districts 2008b). White urchin dominated the catch with 93 percent of the total abundance. Biomass at Station T4-23 was also led by white urchin, which contributed 55 percent to the total weight, followed by Kellet's whelk (*Kelletia kelletii*) with another 17 percent of the total. Red octopus and California sand star contributed another 10 and 7 percent to the total, respectively. At Station T5-23, 958 individuals from 32 species, weighing 5.48 kg (12 lbs), were taken during the four surveys. White urchin was again the most common species, accounting for 74 percent of the total catch, followed by California sand star and New Zealand papperbubble at 5 percent each. The greatest biomass was contributed by shortspined sea star (*Pisaster brevispinus*) with 53 percent of the total, followed by white urchin at 18 percent. California sand star and blueleg mantis shrimp *(Hemisquilla californiensis*) each contributed another 5 percent to the biomass.

In 2007, 525 individuals from 35 invertebrate species, weighing 25.02 kg (55 lbs), were taken in quarterly trawls at Station T4-23 (Sanitation Districts 2008b). The catch was again highly dominated by white urchin, which accounted for 77 percent, followed by California sand star with about 5 percent of the abundance. Biomass was dominated by sheep crab, with 89 percent of the total, and shortspined sea star contributed another 5 percent. At Station T5-23, 633 individuals from 24 species, weighing 5.9 kg (13 lbs), were taken during the four surveys. Again, only two species contributed more than 5 percent to

abundance, with white urchin accounting for 75 percent of the catch and California sand star another 12 percent. Shortspined sea star contributed most to the biomass with 75 percent of the total, followed by white urchin and California sand star at 7 percent each and Kellet's whelk at 5 percent.

In both 2006 and 2007, the trawl-caught invertebrate assemblages were similar to those found throughout the SCB, dominated by species typical of soft bottoms at shallow shelf depths.

Pelagic Invertebrates. Pelagic invertebrate species are highly mobile and may be found throughout the region. See "Regional Setting – Marine Biological Resources."

Fish

Soft-Bottom Associated Demersal Fish. In 2006 and 2007, quarterly trawls were conducted in the existing ocean outfalls area as part of the JWPCP receiving water monitoring program, including Stations T4-23 and T5-3 on the 23-m (75-ft) and Stations T4-61 and T5-61 on the 61-m (200-ft) isobaths upcoast and downcoast of the existing discharges. Fish assemblages at Stations T4-61 and T5-61 are discussed in "Project Setting – Palos Verdes Shelf."

In 2006, 910 individual fish from 20 species, weighing 17.5 kg (38 lbs), were taken in quarterly trawls at Station T4-23, upcoast of the outfalls (Sanitation Districts 2008b). Of those, three species contributed 5 percent or more to the total abundance. Speckled sanddab dominated the catch at 74 percent of the total with 673 individuals. Hornyhead turbot and yellowchin sculpin each contributed about 5 percent to the total abundance. Biomass at Station T4-23 was also led by speckled sanddab, which contributed 31 percent to the total weight, 5.5 kg (12 lbs). Hornyhead turbot accounted for another 31 percent of the biomass and California halibut for 10 percent. Fantail sole (*Xystreurys liolepis*) and Pacific sanddab contributed another 7 percent and 6 percent to the total, respectively. At Station T5-23 downcoast of the outfalls, number of individuals, biomass, and number of species reported were similar to those at Station T4-23, with 16 fish species taken in common at the two trawl locations in 2006. At Station T5-23, 856 individuals from 20 species, weighing 17.95 kg (39 lbs), were taken during the four surveys. Speckled sanddab, hornyhead turbot, and yellowchin sculpin were again most abundant species, highly dominated by speckled sanddab at 72 percent of the total (621 individuals). Hornyhead turbot and yellowchin sculpin contributed 7 and 5 percent to the total, respectively. Both speckled sanddab and hornyhead turbot accounted for 27 percent of the biomass at 4.9 kg (11 lbs) each. California halibut, California scorpionfish, and English sole each contributed another 5 percent to the biomass.

In 2007, 1,239 individual fish from 24 species, weighing 21.6 kg (48 lbs), were taken in quarterly trawls at Station T4-23 (Sanitation Districts 2008b). Two species contributed 5 percent to the total abundance. The catch was again highly dominated by speckled sanddab – 73 percent of the catch with 907 individuals. Yellowchin sculpin, with 87 individuals, contributed another 7 percent to the total. Biomass at Station T4-23 was dominated by speckled sanddab with 27 percent of the total, followed by hornyhead turbot (20 percent), California halibut (18 percent), and California lizardfish (7 percent). At Station T5-23, 910 individuals from 18 species, weighing 18 kg (40 lbs), were taken during the four surveys. Again, only two species contributed more than 5 percent to abundance, with speckled sanddab accounting for 79 percent, with 716 individuals. Hornyhead turbot contributed another 6 percent to the total. Both of the species accounted for about 28 percent of the weight of the catch, with California skate, specklefin midshipman (*Porichthys myriaster*), and English sole contributing another 5 percent to the total biomass.

In both 2006 and 2007, the trawl-caught fish assemblages were similar to those found throughout the SCB, dominated by commonly occurring flatfish and other species typical of soft bottoms at shallow shelf depths as well as some species likely attracted to hard structure in the area.

Hard-bottom Associated Demersal Fish. Hard-bottom associated fish of the Southern California mainland shelf are discussed in "Regional Setting." Fish assemblages near the outfalls on the 61-m (200-ft) isobaths are discussed in "Project Setting – Palos Verdes Shelf." Similar to that assemblage, some individuals caught in the 23-m (75-ft) trawls were from species likely attracted to nearby structures, including the outfall pipeline and nearshore reefs. Hard-bottom-associated fish species reported in JWPCP monitoring on the 23-m (75-ft) isobath included California scorpionfish, blackeye goby, shiner perch, and ocean whitefish, all of which were taken on occasion in low abundances during the trawl surveys (Sanitation Districts 2008b).

Pelagic Fish. Pelagic fish species are highly mobile and may be found throughout the region. See "Regional Setting – Marine Biological Resources."

Commercial and Recreational Fisheries. The existing ocean outfalls area is in Catch Block 719, which is described in "Project Setting – Palos Verdes Shelf."

Recreational fishing information was acquired from sport fishing landing reports for Long Beach, San Pedro, Seal Beach, and Wilmington for a 4-year period from 2000 through 2003, the latest data available on the recreational sport fishing website (SWFSC 2010b). Recreational fish and invertebrate fisheries for these ports for the 4-year time period are described in "Project Setting – San Pedro Shelf."

Reefs and rocky outcroppings fished by recreational anglers and sport fishing boats in the project area occur along the shelf edge, along the rock-armored discharge pipe, and at shallower depths inshore of the existing discharges. Fish targeted on deeper hard-bottom structure include rockfish, lingcod, ocean whitefish, and California scorpionfish, while in shallower areas, including nearshore kelp beds, sea basses, croakers, perch, and rockfishes are targeted.

Birds, Marine Mammals, and Sea Turtles

See "Regional Setting – Marine Biological Resources."

Threatened and Endangered Species

Most threatened and endangered species are highly mobile and may be found throughout the SCB, including in the vicinity of the existing ocean outfalls. Those with the potential to occur in the vicinity of the existing ocean outfalls are discussed in "Regional Setting – Marine Biological Resources."

Black abalone, which is not a highly mobile species, have been known to occur to depths of about 9 m (30 ft), inshore of the existing diffusers. The CDFG has identified areas off Palos Verdes near the JWPCP outfalls as key locations for the recovery of black abalone (CDFG 2005:6-27). Black abalone is further discussed in "Regional Setting – Marine Biological Resources."

Marine Habitat

Essential Fish Habitat and Marine Protected Areas

A project specific EFH Analysis is presented in Appendix 13-B. MPAs in the vicinity of the existing ocean outfalls are discussed in "Project Setting – San Pedro Shelf."

Marine Vegetation

Giant kelp beds occur near the existing ocean outfalls, though the sizes of the beds have changed through time. A survey conducted along the Palos Verdes Peninsula in 1911 noted two large kelp beds between Point Vicente and Cabrillo Beach, which together had a combined surface canopy area of over 3 km^2 (740 acres [ac]), with a nearly continuous bed noted between Inspiration Point and Point Fermin (MBC 2009b). Though kelp surveys were not conducted regularly through most of the 1900s, the kelp beds in the vicinity of White's Point appeared to be robust in 1928 and again in 1945. By 1947, kelp in the vicinity of White's Point had declined in surface area, and segregated into upcoast and downcoast beds. In 1953, the downcoast bed had disappeared, and, by 1955, only 0.08 km^2 (20 ac) of surface kelp was observed between Point Vicente and Cabrillo Beach. This declining trend, which continued through the 1950s and into the 1970s, was attributed to nutrient enrichment, which supported high numbers of sea urchins that graze on kelp, and turbidity as a result of effluent discharge from the White's Point outfall (SWQCB 1964). In 1975 kelp began to recover along the peninsula and near the outfall, likely as a result of improved effluent quality, and trends in kelp coverage have since appeared to be influenced more by regional oceanographic conditions than by the discharge (MBC 2009b). In 1980, 1984, 2002, and 2003, kelp canopy cover between Inspiration Point and Point Fermin exceeded 1 km^2 (247 ac), with no less than 0.2 km^2 (49 ac) reported in the vicinity of White's Point in annual monitoring since 2002. In 2008, more than 0.6 km^2 (150 ac) of kelp was reported in the White's Point area.

Public Health

Microbiology

Microbiology in the SCB is discussed in "Regional Setting." As part of the monitoring requirements for the JWPCP discharge, eight shoreline sites on the Palos Verdes Peninsula are sampled on a weekly basis, and the testing results are provided to public health officials (Sanitation Districts 2008b). In addition, surface and near-bottom samples are collected at six inshore sites five times a month to assess compliance with human health risk water contact and shellfish harvesting standards. Another three samples are collected monthly near the surface at offshore stations close to the existing ocean outfalls, with the results also used to assess compliance with water contact requirements. In sampling conducted in 2006 and 2007 at shoreline stations, concentrations of total coliform ranged from <1 to 1,000 colony forming units (CFU)/mL, fecal coliform from <1 to 700 CFU/mL, and enterococcus from <1 to 2,088 CFU/mL. At the inshore stations, concentrations in surface and bottom samples ranged from <1 to 600 CFU/mL for total coliform, from <1 to 410 CFU/mL for fecal coliform, and from <1 to 98 CFU/mL for enterococcus. At the offshore stations closest to the discharges, concentrations of total coliform, fecal coliform, and enterococcus were lower than reported closer to shore, ranging from <1 to 200 CFU/mL, <1 to 2 CFU/mL, and <1 to 1 CFU/ mL, respectively. During the monitoring period, the JWPCP was found to be in compliance with water contact and shellfish harvesting microbiological standards. Lower values near the discharge and higher shoreline and, to a lesser extent inshore values, suggested a shoreline source of bacteria related to local human and wildlife use and storm water runoff.

Fish Tissue Bioaccumulation

Tissue bioaccumulation on the Southern California mainland shelf is discussed in "Regional Setting." In the vicinity of the discharges, fish tissue is examined for the bioaccumulation of contaminants on a regular basis to assess risks to humans and wildlife from the consumption of locally caught fish (Sanitation Districts 2008b). In 2006, concentrations of total DDT in muscle tissue from five recreationally fished species ranged from 90 µg/kg in kelp bass to 1,740 µg/kg in white croaker. Similarly, total PCBs in fish muscle tissue ranged from 30 µg/kg in kelp bass to 220 µ/kg in white croaker in the vicinity of the outfalls. Levels of arsenic and mercury are also evaluated in local fish, with arsenic ranging from 0.69 mg/kg in white croaker to 2.37 mg/kg in California scorpionfish in 2006. Mercury

levels ranged from 0.04 mg/kg in black perch (*Embiotoca jacksoni*) muscle tissue to 0.11 mg/kg in kelp bass from the existing ocean outfall area.

Bioaccumulated contaminants in fish have been studied in the area since the 1970s, and despite reductions in levels by the 1990s, growing concerns about human consumption resulted in the commercial closure of white croaker fishing offshore of Palos Verdes (Sanitation Districts 2008b). The existing ocean outfalls are also within the White's Point Fish Consumption Advisory area, which recommends that locally caught white croaker not be consumed and that sculpin, rockfish, or kelp bass from the area not be eaten more frequently than once every two weeks. Despite continued declines in the concentrations of DDT and PCBs in the tissue of fish from the PV Shelf, levels found in locally caught fish still pose a health threat to people who frequently consume fish from the area.

References

Allan Hancock Foundation. 1965. An oceanographic and biological survey of the southern California mainland shelf. State Water Qual. Cont. Bd., Publ. No. 27. 232 pp.

Allen, L. G., D. J. Pondella II, and M. H. Horn, Eds. 2006. The Ecology of Marine Fishes: California and Adjacent Waters. University of California Press, Berkeley and Los Angeles, CA. 660 pp.

Allen, M. J., S. L. Moore, K. C. Schiff, S. B. Weisberg, D. Diener, J. K. Stull, A. Groce, J. Mubarak, C. L. Tang, and R. Gartman. 1998. Southern California Bight 1994 Pilot Project: V. Demersal fishes and megabenthic invertebrates. Southern California Coastal Water Research Project, Westminster, CA.

Allen, M. J., A. K. Groce, D. Diener, J. Brown, S. A. Steinert, G. Deets, J. A. Noblet, S. L. Moore, D, Diehl, E. T. Jarvis, V. Raco-Rands, C. Thomas, Y. Ralph, R. Gartman, D. Cadien, S. B. Weisberg, and T. Mikel. 2002. Southern California Bight 1998 Regional Monitoring Program: V. Demersal Fishes and Megabenthic Invertebrates. Southern California Coastal Water Research Project, Westminster, CA. Dec. 2002. 272 pp. plus appendices

Allen, M. J., T. Mikel, D. Cadien, J. E. Kalman, E. T. Jarvis, K. C. Schiff, D. W. Diehl, S. L. Moore, S. Walther, G. Deets, C. Cash, S. Watts, D. J. Pondella II, V. Raco-Rands, C. Thomas, R. Gartman, L. Sabin, W. Power, A. K. Groce, and J. L. Armstrong. 2007. Southern California Bight 2003 Regional Monitoring Program: IV. Demersal Fishes and Megabenthic Invertebrates. Southern California Coastal Water Research Project. Costa Mesa, CA.

Allen, M. J. and K. T. Herbinson. 1991. Beam-trawl survey of bay and nearshore fishes of the soft-bottom habitat of southern California in 1989. Allen and Herbinson: Beam-Trawl Fish Survey, 1989. CalCOFI Rep., Vol. 32, 16 pp.

Anderson, J. W., D. J. Reish, R. B. Spies, M. E. Brady, and E. W. Segelhorst. 1993. Human impacts. Chapter 12 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Ecology of the Southern California Bight: A synthesis and interpretation. Univ. Calif. Press, Los Angeles, CA. 926 pp.

Baird, P. H. 1993. Birds. Chapter 10 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Ecology of the Southern California Bight: A synthesis and interpretation. Univ. of Calif. Press, Berkeley, Calif. 926 pp.

Barlow, J. 1994. Recent information on the status of large whales in California waters. NOAA Technical Memorandum NMFS. NOM-TM-NMFS-SWFSC-203. 32 pp.

Barlow, J. and K. A. Forney. 2007. Abundance and population density of cetaceans in the California Current ecosystem. Fish. Bull. 105:509–526.

Bergen, M., S. B. Weisberg, D. Cadien, A. Dalkey, D. Montagne, R. W. Smith, J. K. Stull, and R. G. Velarde. 1998. Southern California Bight 1994 Pilot Project: IV. Benthic Infauna. Southern California Coastal Water Research Project, Westminster, CA. 260 pp.

Bonnell, M. L. and M. D. Dailey. 1993. Marine mammals. Chapter 11 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Ecology of the Southern California Bight: A synthesis and interpretation. Univ. Calif. Press, Los Angeles, CA. 926 pp.

Cadien, D. B., D. E. Montagne, S. M. Walther, B. D. Edwards, P. Dartnett, and E. L. Phillips. 2006. Identifying biological assemblages of soft and hard bottom habitats on the San Pedro Sea Shelf, California, using remote sampling techniques [Poster]. Abstract OS15F - 12 IN: American Geophysical Union. Eos Transactions AGU, 87(36) in 2006 Oceans Sciences Meeting Supplement, Program and Abstracts. Honolulu, Hawaii: U.S.A. American Geophysical Union.

Carretta, J. V, K. A. Forney, M. S. Lowry, J. Barlow, J. Baker, D. Johnston, B. Hanson, M. M. Muto, D. Lynch, and L. Carswell. 2009. U.S. Pacific marine mammal stock assessments: 2008. NOAA-TM-NMFS-SWFSC-434. 343 pp.

CDFG (California Department of Fish and Game). 2005. Abalone Recovery and Management Plan Adopted by the California Fish and Game Commission 9 December 2005. Final. 363 pp.

———. 2007. 2006 catch block data.

———. 2010a. State and federally listed endangered and threatened animals of California. 13 pp.

———. 2010b. Existing Marine Protected Areas in California: Regulations. Available: http://www.dfg.ca.gov/mlpa/mpa_regs.asp. Accessed: March 8, 2010.

———. 2010c. California Marine Life Protection Act Initiative South Coast Project Staff Summary. Last updated: November 25, 2009. Available: http://www.dfg.ca.gov/mlpa/pdfs/scsr_summary_ipa.pdf. Accessed February 25, 2010.

———. 2010d. Overview Map: South Coast Integrated Preferred Alternative (IPA) MPA Proposal. Available: http://www.dfg.ca.gov/mlpa/pdfs/scsr_map_ipa.pdf. Accessed: February 25, 2010.

———. 2010e. South Coast Marine Protected Areas Project Final Environmental Impact Report. Sacramento, CA. Prepared by URS. December 2010.

Conversi, A. and J. A. McGowan. 1994. Natural versus human-caused variability of water clarity in the Southern California Bight. Limnol. Oceanogr. 39(3):632–648.

Cross, J. N. and L. G. Allen. 1993. Fishes. In M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Ecology of the Southern California Bight: A synthesis and interpretation. Univ. of Calif. Press, Berkeley, Calif. 926 pp.

Dailey, M. D., J. W. Anderson, D. J. Reish, and D. S. Gorsline. 1993. The Southern California Bight: Background and setting. Chapter 1 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Ecology of the Southern California Bight: A synthesis and interpretation. Univ. of Calif. Press, Berkeley, Calif. 926 pp.

Dartnell, P., B. D. Edwards, E. L. Phillips, D. E. Montagne, D. B. Cadien, G. Robertson. 2006. An empirical approach to mapping the distribution of seafloor geologic and biologic characteristics offshore San Pedro, Southern California (Poster). Abstract OS15F - 11 IN: American Geophysical

Union. Eos Transactions AGU, 87(36) in 2006 Oceans Sciences Meeting Supplement, Program and Abstracts. Honolulu, Hawaii: U.S.A. American Geophysical Union.

Dawson, E. Y. 1966. Seashore plants of southern California. Calif. Nat. Hist. Guides No. 19., Univ. Calif. Press, Los Angeles, CA. 101 pp.

Dawson, J. K. and R. E. Pieper. 1993. Zooplankton. Chapter 6 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Ecology of the Southern California Bight. Los Angeles: Univ. Calif. Press. 926 pp.

Dohl, T. P., K. S. Norris, R. C. Guess, J. D. Bryant, and M. W. Honig. 1981. Summary of marine mammal and seabird surveys of the Southern California Bight area, 1975-1978, final report. Vol. III - Investigators' reports. U. S. Dep. Int. Bur. Land Mgmt. Pacific OCS Office. PB81-248189. Contract AA550-CT7-36. Center for Coast. Mar. Stud., Univ. Calif., Santa Cruz, CA.

DPW (Department of Public Works). 2010. San Gabriel River Watershed. Available: http://dpw.lacounty.gov/wmd/watershed/sg/ 5/4/2010. Accessed: May 4, 2010.

Eckert, K. L. 1993. The biology and population status of marine turtles in the north Pacific Ocean. Prepared for Honolulu Laboratory, SWFSC, National Marine Fisheries Service, NOAA, 2570 Dole Street, Honolulu, HI. NOAA Technical Memorandum. NOAA-TM-NMFS-SWFSCX-186. 156 pp.

Eganhouse, R. P. and M. I. Venkatesan. 1993. Chemical oceanography and geochemistry. Chapter 3 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.), Ecology of the Southern California Bight. Los Angeles: Univ. Calif. Press. 926 pp.

Emery, K. O. 1960. The sea off southern California. A modern habitat of petroleum. John Wiley & Sons, Inc., New York and London. 366 pp.

EPA (U.S. Environmental Protection Agency). 2010. PV Shelf. Available: http://yosemite.epa.gov/R9/SFUND/R9SFDOCW.NSF/db29676ab46e80818825742600743734/e61d525580dd68288257007005e9422!OpenDocument. Accessed: March 5, 2010.

Fugro. 2011. Preliminary Site Characterization Report JWPCP Tunnel and Ocean Outfall Project Los Angeles, California. Prepared for Sanitation Districts of Los Angeles County, November 2011. Fugro Job No. 04.B3387004.

Geesey, G. G. 1993. Microbiology. Chapter 4 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.), Ecology of the Southern California Bight. Los Angeles: Univ. Calif. Press. 926 pp.

Hardy, J. T. 1993. Phytoplankton. Chapter 5 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.), Ecology of the Southern California Bight. Los Angeles: Univ. Calif. Press. 926 pp.

Heal the Bay. 2008. Heal the Bay’s 18th Annual Beach Report Card. May 21, 2008. 91 pp.

Hickey, B. M. 1993. Physical oceanography. Chapter 2 in M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.), Ecology of the Southern California Bight: A synthesis and interpretation. Univ. Calif. Press, Los Angeles, CA. 926 pp.

Jones, G. 1969. The Benthic Macrofauna of the Mainland Shelf of Southern California. Allan Hancock Mon. in Mar. Biol. No. 4, 219 pp.

Leet, W. S., C. M. DeWees, R. Klingbeil, and E. J. Larson. 2001. California's living marine resources: a status report. 592 pp.

Long, E. R, D. D. MacDonald, S. L. Smith, and F. D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ. Management 19(1):81–97.

MBC Applied Environmental Sciences. 1989. Gray whale monitoring study, final report. Prepared for Minerals Management Service, Pacific OCS Region. August 1989. MMS 88-0075. 99 pp. plus appendices.

———. 2008a. National Pollutant Discharge Elimination System, 2008 receiving water monitoring report, Haynes and AES Alamitos L.L.C. Generating Station, Los Angeles County, California. Prepared for AES Alamitos L.L.C., and Los Angeles Department of Water and Power. 89 pp. plus appendices.

———. 2008b. Black-crowned night heron study. Year 10, 2008 nesting season, Gull Park, Navy Mole, Long Beach, California. Final Report. Prepared for the Port of Long Beach, Long Beach, CA. 6 pp. plus appendix.

———. 2009b. Status of the Kelp Beds 2008. Prepared for the Central Region Kelp Survey Consortium. 40 pp. plus appendices.

MBC Applied Environmental Sciences and Flow Science, Inc. 2008. Village at Playa Vista – Technical Report on Cumulative Wastewater Impacts. Prepared for Christopher A. Joseph and Associates, Los Angeles, CA. 58 pp.

McArdle, D. A., Ed. 1997. California Marine Protected Areas. California Sea Grant College System, University of California, La Jolla, CA 92093-0232. Publication No. T.

Mearns, A. J., M. Matta, G. Shigenaka, D. MacDonald, M. Buchman, H. Harris, J. Golas, and G. Lauenstein. 1991. Contaminant trends in the Southern California Bight: Inventory and assessment. NOAA Tech. Mem. NOS ORCA 62.

Miller, D. J. 1974. The sea otter, *Enhydra lutris*. Its life history, taxonomic status and some ecological relationships. Cal. Fish and Game.

NAS (National Audubon Society). 2010. Pier 400 Site profile. Available: http://iba.audubon.org/iba/viewSiteProfile.do?siteId=255&navSite=state. Accessed: March 8, 2010.

NOAA (National Oceanic and Atmospheric Administration). 1990. The potential for biological effects of sediment-sorbed contaminants tested in the national status and trends program. NOAA, Seattle, WA. NOAA Tech. Memo. NOS OMA 52. 175 pp. plus appendices.

Orange County Beach Blog. 2008. Available: http://beach.freedomblogging.com/2008/06/12/rare-sighting-of-killer-whales-close-to-coast/. Accessed: March 19, 2010.

Parsons. 2011. Professional Design Services for the Preliminary Engineering of the Joint Water Pollution Control Plant Tunnel and Ocean Outfall Feasibility Study Report. Prepared for Sanitation Districts of Los Angeles County, November 30, 2011. Parsons Project No. 260252.

Ranasinghe, J. A., A. M. Barnett, K. Schiff, D. E Montagne, C. Brantley, C. Beegan, D. B. Cadien, C. Cash, G. B. Deets, D. R. Diener, T. K. Mikel, R. W. Smith, R. G. Velarde, S. D. Watts, and S. B. Weisberg. 2007. Southern California Bight 2003 Regional Monitoring Program: III. Benthic macrofauna. Southern California Coastal Water Research Project. Costa Mesa, CA.

Ranasinghe, J. A., D. E. Montagne, R. W. Smith, T. K. Mikel, S. B. Weisberg, D. Cadien, R. Velarde, and A. Dalkey. 2003. Southern California Bight 1998 Regional Monitoring Program: VII. Benthic Macrofauna. Southern California Coastal Water Research Project. Westminster, CA. 91 pp. plus appendices.

Reeves, R. R., B. S. Stewart, and S. Leatherwood. 1992. The Sierra Club handbook of seals and sirenians. Sierra Club Books, San Francisco, CA. 359 pp.

Sabin L. D., and K. C. Schiff. 2007. Metal dry deposition rates along a coastal transect in southern California. Pages 61–71 in S. B. Weisberg and K. Miller (eds.), Southern California Coastal Water Research Project 2007 Annual Report. Southern California Coastal Water Research Project. Costa Mesa, CA.

Sanitation Districts (Sanitation Districts of Los Angeles County). 2008a. Palos Verdes Flow Study. September 2008 Final Data Processing Summary. 21 pp. plus appendices.

———. 2008b. 2006–2007 Joint Water Pollution Control Plant Biennial Receiving Water Monitoring Report. 151 pp. including appendices and unpublished data files.

———. 2009. Review of Data and Literature to Address Joint Water Pollution Control Plant (JWPCP) Discharge Impacts on Receiving Water Nutrient Levels, Phytoplankton Concentrations, and Harmful Algal Blooms (HABs). 30 pp.

SCCWRP (Southern California Coastal Water Research Project). 1973. The ecology of the Southern California Bight: Implications for water quality management. SCCWRP, El Segundo, CA.

———. 1986. Contaminant levels in the sea-surface microlayer. Pages 6-8 in So. Calif. Coastal Water Res. Proj. – 1986. SCCWRP, Long Beach, CA.

———. 2010a. Bight ‘03 Infauna Abundances. Data download March 7, 2010.

———. 2010b. Bight ‘03 Trawl Fish Abundances. Data download March 7, 2010.

———. 2010c. Bight 03 Trawl Invert Biomass. Data download March 15, 2010.

———. 2010d. Bight 03 Trawl Fish Abundances. Data download March 7, 2010.

———. 2010e. Bight 03 Trawl Fish Biomass. Data download March 15, 2010.

Southern California Edison and MBC Applied Environmental Sciences. 2010. Marine mammal and sea turtle entrapment 1981–2009. Unpublished data

Schiff, K., K. Maruya, and K. Christensen. 2006. Southern California Bight 2003 Regional Monitoring Program: II. Sediment Chemistry. Southern California Coastal Water Research Project. Westminster, CA.

Sloan, James. 2007. Boat Operator, MBC. Personal communications March 19, 2007, through March 26, 2007. Several conversations – fishing reefs on the SP Shelf.

Smith, R. W., M. Bergen, S. B. Weisberg, D. Cadien, A. Dalkey, D. Montagne, J. K. Stull, and R. G. Velarde. 1998. Benthic response index for assessing infaunal communities on the mainland shelf of southern California. Southern California Coastal Water Research Project, Annual Report 1997–1998.

SWQCB (State Water Quality Control Board). 1964. An investigation of the effects of discharged wastes on kelp. The Resources Agency of California. Publ. No. 26. 124 pp.

SWFSC (Southwest Fisheries Science Center). 2007. Recreational Sport Fisheries Data.

———. 2010a. Gray whale. Available: http://swfsc.noaa.gov/textblock.aspx?ParentMenuId=230&id=1431. Accessed: March 1, 2010.

———. 2010b. Southwest fisheries science center Service. Recreational Invertebrate Sport Fisheries Data.

Sverdrup, H. U., M. W. Johnson, and R. H. Fleming. 1942. The oceans; their physics, chemistry, and general biology. Prentice-Hill, Inc. Englewood Cliffs, NY. 1060 pp. plus appendices.

Swift, C. C., T. R. Haglund, M. Ruiz, and R. N. Fisher. 1993. The status and distribution of the freshwater fishes of southern California. Bull. Southern California Acad. Sci. 92(3):101-167.

Thompson, B., J. Dixon, S. Schroeter, and D. J. Reish. 1993a. Benthic Invertebrates. Chapter 8 in M. D. Dailey, D.J. Reish, and J.W. Anderson (eds.): Ecology of the Southern California Bight. Los Angeles: Univ. Calif. Press. 926 pp.

Thompson, B., D. Tsukada, and D. O'Donohue. 1993b. 1990 reference site survey. Final report. Southern California coastal water research project. Technical Report 269, July.

USFWS (US Fish and Wildlife Services). 2005. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover. Final Rule. 50 CFR Part 17 Federal Register Vol. 70, No. 188 / Thursday, September 29, 2005

Word, J. and A. Mearns. 1979. 60-meter control survey off southern California. Southern California Coastal Water Research Project, Annual Report 1978, 41-56 pp.

Appendix 13-B

REVIEW OF DATA AND LITERATURE TO ADDRESS JOINT WATER POLLUTION CONTROL PLANT (JWPCP) DISCHARGE IMPACTS ON RECEIVING WATER NUTRIENT LEVELS, PHYTOPLANKTON CONCENTRATIONS, AND HARMFUL ALGAL BLOOMS (HABS)

Review of Data and Literature to Address Joint Water Pollution Control Plant (JWPCP) Discharge Impacts on Receiving Water Nutrient Levels, Phytoplankton Concentrations, and Harmful Algal Blooms (HABs)

November 2009

SANITATION DISTRICTS OF LOS ANGELES COUNTY

Cover
Anemones surround one of the discharge ports on the JWPCP 120” outfall.
The image is a captured video frame from the annual ROV inspection
of the outfalls in March, 2009.

November 23, 2009

Review of Data and Literature to Address Joint Water Pollution Control Plant (JWPCP) Discharge Impacts on Receiving Water Nutrient Levels, Phytoplankton Concentrations, and Harmful Algal Blooms (HABs)

EXECUTIVE SUMMARY

Research on the levels of domoic acid (DA), the primary toxin of concern in southern California coastal ocean waters is reviewed. DA can be produced by selected species of phytoplankton *Pseudo-nitzchia sp.* (PN), and has been documented to have a strong seasonal signal, coincident with spring upwelling. The published distribution patterns in the area suggest that the sources of DA are from shallow very nearshore waters, including water within the LA/LB harbor, and from blooms which start hundreds of kilometers up the coast and move southward during the spring months. All algae require light and nutrients to grow, and the wastewater discharges from Publicly Owned Treatment Works (POTWs) are a potential source of those nutrients. Various data assessments were conducted to determine whether effluent from JWPCP contribute to increased nutrients, phytoplankton and HABs.

The historical levels of nutrients discharged by the JWPCP are reviewed. The JWPCP nutrient loadings are compared with estimates for three other significant sources; storm runoff, aerial deposition and upwelling. The contribution of nutrients to the coastal ocean by upwelling is determined to be far greater than from the JWPCP discharge. The estimated contributions from storm runoff and aerial deposition are less than the JWPCP discharge.

A data set of receiving water nutrients collected during four years of quarterly offshore water column sampling is used to estimate the changes to ambient nutrient levels due to the JWPCP discharge. In a relatively small, localized area near the outfalls, ammonia nitrogen is increased by at least 1000% over ambient levels. Levels of other nutrients such as nitrite, nitrate and phosphate appear to be at most only minimally increased by the JWPCP discharge because effluent concentrations of these nutrients are fairly low and ambient receiving water levels of these nutrients are high. A major regional coastal ocean database, the California Cooperative Oceanic Fisheries Investigations (CalCOFI), is reviewed to further confirm ambient, background levels of nutrients in the receiving water.

Eutrophication, or an excess of nutrients, can cause overgrowth of algae and subsequent reductions in oxygen levels as the algae decompose. The County Sanitation Districts of Los Angeles County (Sanitation Districts) and other POTW agencies sample the upper 100m of the coastal ocean for dissolved oxygen (DO). Typical levels of DO in the upper 100m of the coastal ocean range from 2 to 12 mg/l, with the lowest values seen at the deepest points during upwelling. In surface waters DO is consistently close to 100% saturation. As part of National Pollutant Discharge Elimination System (NPDES) compliance assessment the Sanitation Districts assesses DO around the discharge site to ascertain that the discharge does not reduce DO by greater than 10% from background

levels. A review of 23 Sanitation Districts offshore water quality surveys over the last six years, after accounting for the secondary effect of entrainment by the rising effluent, found no reductions in DO greater than 10%. The biological oxygen demand (BOD) of secondary treated JWPCP effluent averages 6 mg/l, and at this level only a 1-2% change in ambient ocean oxygen levels should be possible due to direct demand after initial dilution. Due to high effluent ammonia levels, nitrogenous oxygen demand is potentially 10-20 times more significant than BOD, however because effluent ammonia appears to be well preserved in the receiving waters near the outfalls, any NOD effect should be balanced by increasing far-field dilution.

An analysis of chlorophyll distributions from six years of JWPCP water column surveys finds no apparent elevation of phytoplankton associated with the discharge. Chlorophyll concentrations in samples collected by the Central Bight Cooperative Water Quality Survey (CBCWQS), CalCOFI and University of Southern California (USC) are assessed to confirm regional scale background levels of chlorophyll are comparable to the levels around the JWPCP discharge.

Modeling of the JWPCP effluent discharge using direct observations of the receiving water density stratification and ambient ocean currents, determines that the effluent plume is trapped below the surface nearly continuously, with much of the plume trapped below the euphotic zone (the depth in the water column exposed to sufficient sunlight for photosynthesis to occur). Below this depth primary productivity that might utilize the JWPCP nutrients will not occur.

The analyses and results summarized above are discussed to address questions regarding the JWPCP discharge effects on the receiving waters, and in particular, whether there is any evidence linking the discharge to HABs. In summary, it is determined that JWPCP nutrient inputs have only a minimal and localized effect, that there is no detectable increase in productivity near the discharge site, that often the JWPCP effluent will be trapped below the euphotic zone, and therefore not available to grow phytoplankton, and that there is no established link between POTW effluent discharges and HABs. In fact temporal and spatial patterns of HABs in the southern California Bight (SCB) strongly suggest that they are produced as a result of naturally intensified upwelling during the spring season. In addition, the measurements of water quality around the JWPCP discharge span a 30 kilometer coastal region, and are integrated with similar scale surveys to the north and south, where comparable effluent discharges from the City of Los Angeles and Orange County are sited. It seems unlikely, given these adjacent discharges, that a relocation of the JWPCP outfalls, particularly if they were kept at the same depth, would alter the local patterns of nutrient or phytoplankton distributions.

INTRODUCTION

Over the last two decades there has been a growing concern, worldwide, regarding HABs. There are numerous species of algae that produce toxins that can bioaccumulate up the foodchain and cause illness and death of higher foodchain animals and humans. In southern California coastal waters, PN, and the toxin it produces, DA, is the most

commonly occurring and most serious. There is some evidence that PN HABs have become more frequent and intense in the last two decades in southern California. All algae require light and nutrients to grow, and the POTW discharges are a potential source of those nutrients. This paper reviews what is known about the nutrient loading from the JWPCP discharge, and compares the JWPCP nutrient input with estimated contributions of nutrients from stormwater runoff, aerial deposition, and upwelling. Ambient levels of nutrients and chlorophyll in waters near the JWPCP discharge are described and possible associations between the discharge and enhanced levels of phytoplankton growth and HABs are explored.

I. Harmful Algal Blooms in Southern California

The California Department of Public Health (CDPH) operates a marine biotoxin monitoring program (BMP). Information about the program can be found at http://ww2.cdph.ca.gov/healthinfo/environhealth/water/Pages/Shellfish.aspx. The BMP program gathers data from multiple program participants that collect and process samples from coastal waters throughout the State. The Sanitation Districts are one of the many volunteer participants in this program: in coordination with our inshore microbiological sampling under the JWPCP NPDES permit, Ocean Monitoring and Research Group staff collect a weekly plankton sample which is sent for screening of phytoplankton species, including *Pseudo-nitzchia* (**Figure 1**) and if necessary, for testing for DA.

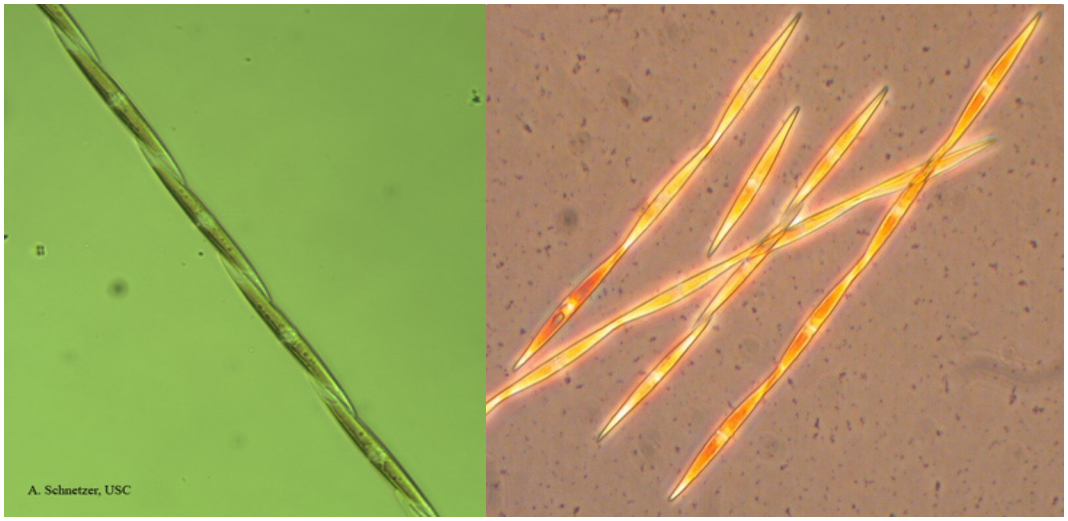


Figure 1[1]**.** -Images of *Pseudo-nitzschia* phytoplankton, which produce the DA toxin.

The original concern of public health officials was protecting the public from paralytic shellfish poisoning (PSP), which has been documented back to the 1920s, and is responsible for 542 illnesses and 39 deaths since that time (CDPH 2008). In 1991 the BMP first identified DA as a less potent neurotoxin, which was still a significant concern

[1] Fig. 1 Left image from Dr. Astrid Schnetzer, USC, Right image from: http://wdfw.wa.gov/science/articles/razor_clams/images/2_pseudo.jpg

because the PN blooms tended to be more frequent and last longer. In Prince Edward Island, eastern Canada, in 1987 three people died and over 100 became ill after consuming mussels contaminated with DA. Although human illness is relatively rare, the DA toxin can result in a condition called amnesic shellfish poisoning (ASP) and has had dramatic effects on marine mammal and seabird populations along the California coast. In 1991 large numbers of seabirds in Monterey Bay died after consuming anchovies that had in turn been feeding on a bloom of PN. Although no human health impacts occurred, it was this event which caused the State to initiate the phytoplankton monitoring program.

The 2007 annual report of the BMP notes that although most commonly observed in central and northern California, PSP, and the algae that produces the PSP toxin, *Alexandrium spp*. (**Figure 2**), has in 2006 and 2007 been found more frequently in waters on the coast of southern California, and PSP toxin has been measured above the alert level. While the majority of this discussion focuses on PN and DA, it should be noted that PSP is also a concern.

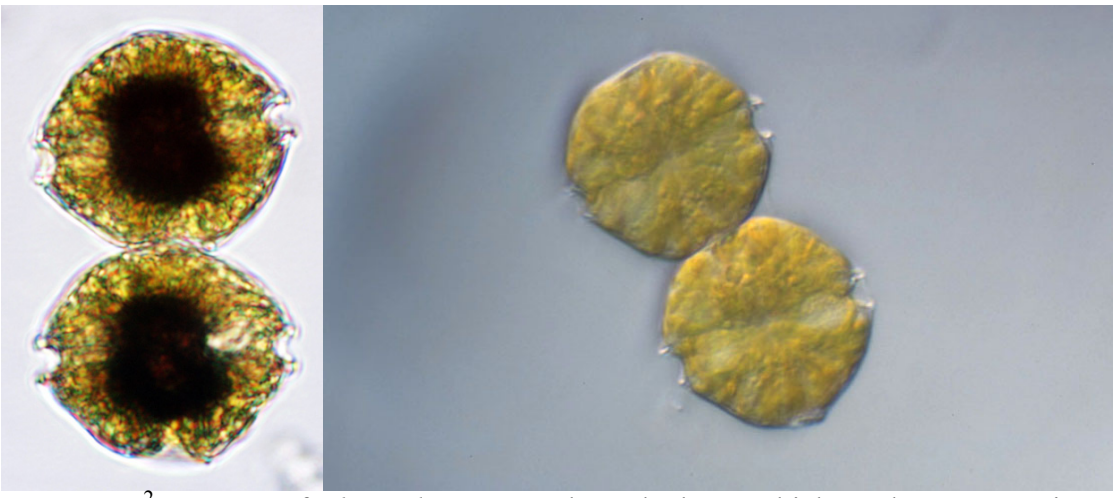


Figure 2[2]**.** -Images of *Alexandrium spp*. Phytoplankton, which produce PSP toxin.

During 2007, the BMP documented that 1741 samples were collected for phytoplankton identification (**Figure 3** shows the locations in southern California from where phytoplankton samples were collected), and 351 shellfish samples were analyzed for domoic acid (**Figure 4** shows the locations in southern California from where shellfish samples were collected).

[2] Fig. 2 Left image from http://www.hkredtide.org/images/images_photo_large/Photo_15_Alexandrium_tamarense.jpg, Right image from http://www.nies.go.jp/biology/mcc/images/PCD5008/0335L.jpg

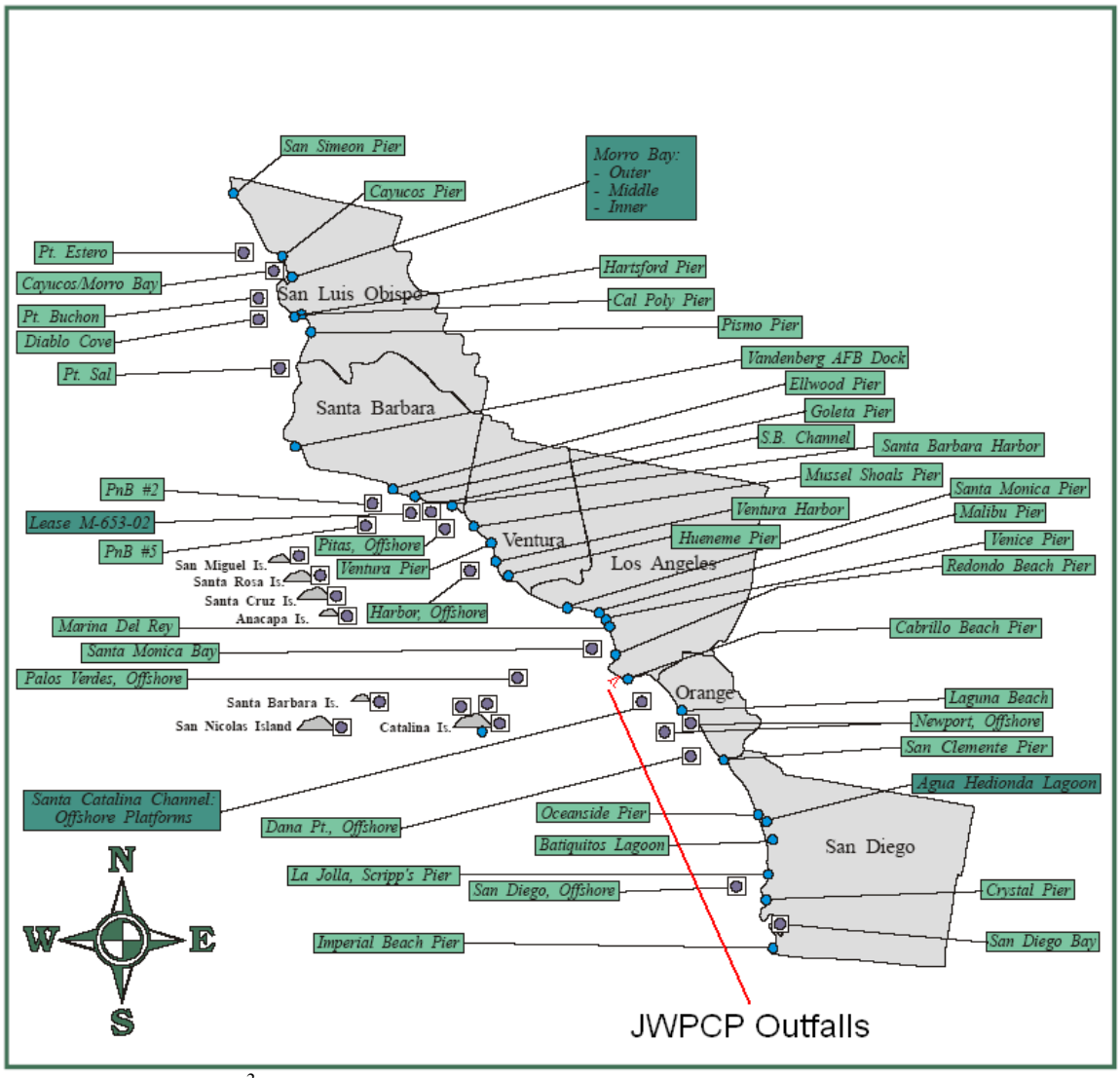


Figure 3[3]**.** –Southern California BMP phytoplankton sampling sites.

In 2007 detectable DA was only found in shellfish samples from Los Angeles County in the months of April and May. By comparison DA was found in samples from somewhere along the coast in all months except February and December 2007.

[3] From California Department of Public Health Marine Biotoxin Monitoring Program website http://ww2.cdph.ca.gov/healthinfo/environhealth/water/Pages/Shellfish.aspx (modified to show JWPCP outfalls)

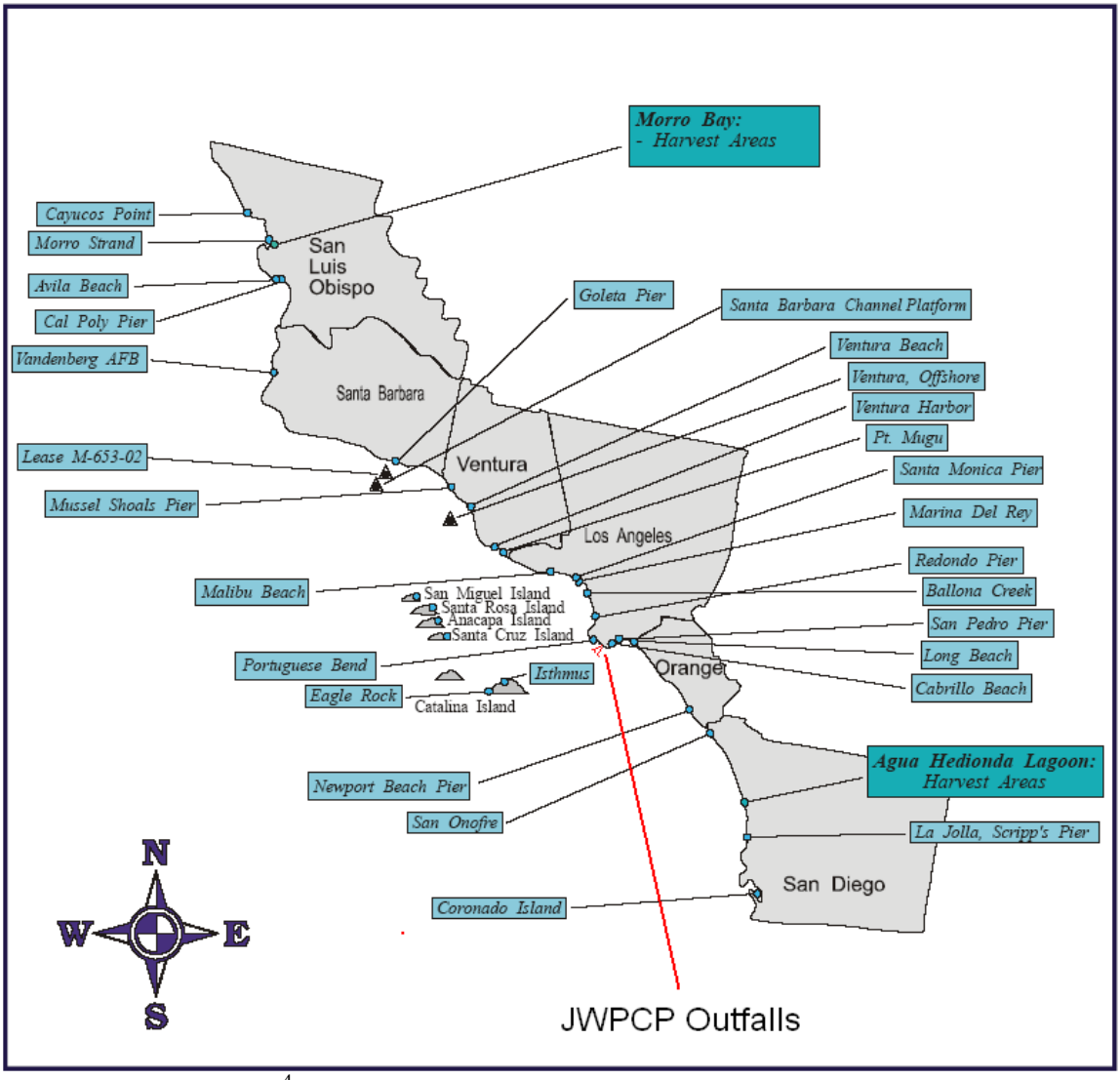


Figure 4[4]**.** –Southern California BMP shellfish sampling sites.

The 2007 CDPH BMP Report described the recent spatial and temporal patterns of PN and DA as below;

> "*The magnitude of domoic acid toxicity in 2007 was greater compared to 2006 but the geographic distribution was similar. The majority of positive samples came from southern California counties, with sites in Santa Barbara and Ventura counties experiencing the highest concentrations of domoic acid. As observed in recent years, there appeared to be a temporal progression of the spring bloom down the coast from San Luis Obispo to Los Angeles counties. By March there were elevated numbers of this diatom along most of the southern California coast. Domoic acid levels began increasing in March and continued*

[4] From California Department of Public Health Marine Biotoxin Monitoring Program website http://ww2.cdph.ca.gov/healthinfo/environhealth/water/Pages/Shellfish.aspx (modified to show JWPCP outfalls)

through April (Figure 5), primarily along the southern California coast between San Luis Obispo and Los Angeles counties. The highest percent compositions of this diatom were observed in April in San Luis Obispo (84%, April 5), Santa Barbara (91%, April 18 and 26), and Ventura (90%, April 23) counties."

Beyond the comprehensive BMP program run by the CDPH, PN, and the DA toxin it produces are now extensively monitored and studied in numerous locations around the world. Locally, in southern California, the Laboratory of Dr. David Caron at USC has conducted Monitoring and Event Response for Harmful Algal Blooms **(**MERHAB**)** and Ecology and Oceanography of Harmful Algal Bloom (ECOHAB) studies that include extensive sampling of the coastal waters near Los Angeles. Although many of these studies are driven to identify the causes of HABs, no obvious anthopogenic explanation has been determined to date in southern California, including nutrient discharges from ocean outfalls. These studies have identified high levels of DA occurring near Los Angeles during the spring upwelling period, and spatial sampling has determined that the highest levels are found in the LA Harbor, as seen in **Figure 5** – which is taken from a recent publication.

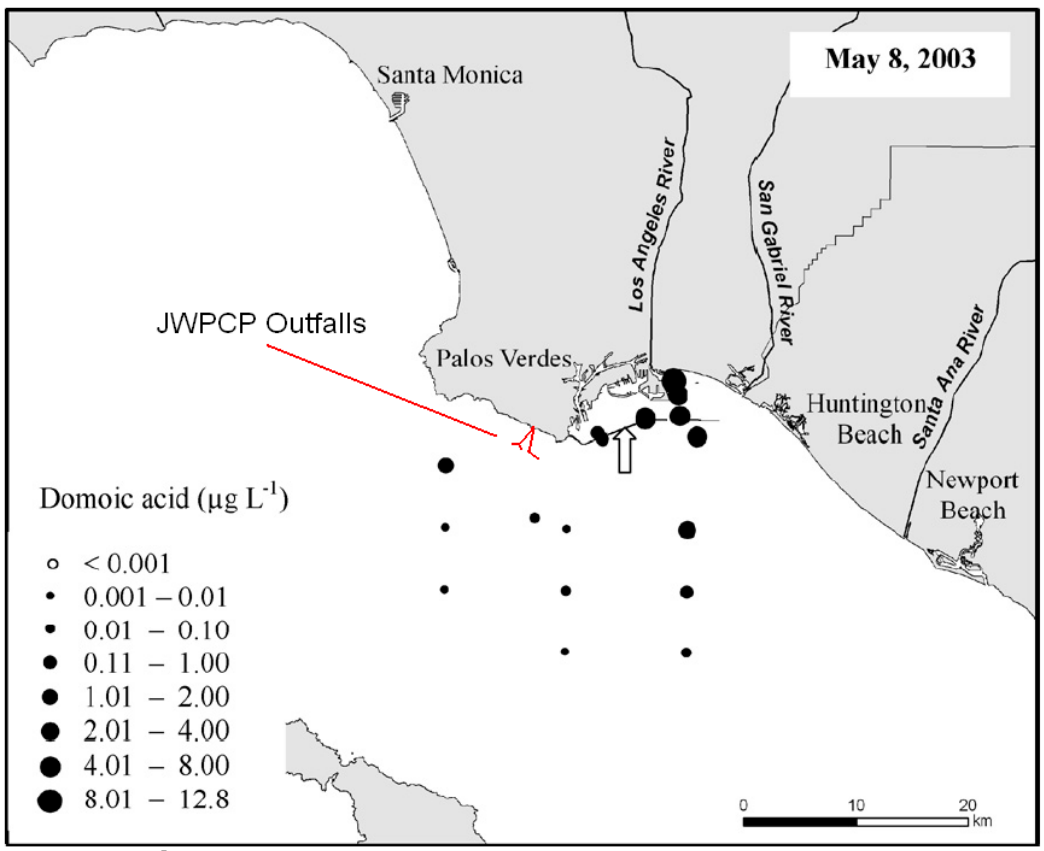


Figure 5[5]**.** –Measured levels of DA in surface waters. Reproduced from Schnetzer et al 2007.

[5] From Schnetzer, A. et al., Blooms of Pseudo-nitzschia and domoic acid in the San Pedro Channel and Los Angeles harbor areas of the Southern California Bight, 2003–2004, Harmful Algae (2007). (modified to show JWPCP outfalls)

II. Nutrient Sources - Data Review/Analysis

JWPCP Nutrients

The JWPCP, located in the City of Carson, serves a population of 3.5 million southern Californians. The plant has a design capacity of 400 million gallons per day (mgd). In 2008 the average daily flow at the plant was 296 mgd. Over the entire year, 4.19 x 10^{11} liters of effluent were discharged. The JWPCP effluent has been routinely sampled for ammonia nitrogen, organic nitrogen, nitrate, nitrite and phosphate for over 30 years. As the data in **Figure 6** show, the mass emission rates (MERs) of ammonia and other measured nutrients in the JWPCP effluent have generally declined over time. Between 1980 and 2008 the MERs for ammonia, organic nitrogen, total nitrogen, and total phosphate were reduced by 27%, 85%, 41% and 94%, respectively. Nitrate and nitrite effluent levels have always been very low, and together they comprise less than 1% of the total nitrogen MER. The silicon measurement for JWPCP effluent is based on a single research sample in early 2009, but this result is comparable with over 100 effluent analyses for silicon at inland water reclamation plants over the last two decades. However, bioavailable silica in the coastal receiving waters may exist in a form (silicate) different from the form of the silicon measured in the effluent.

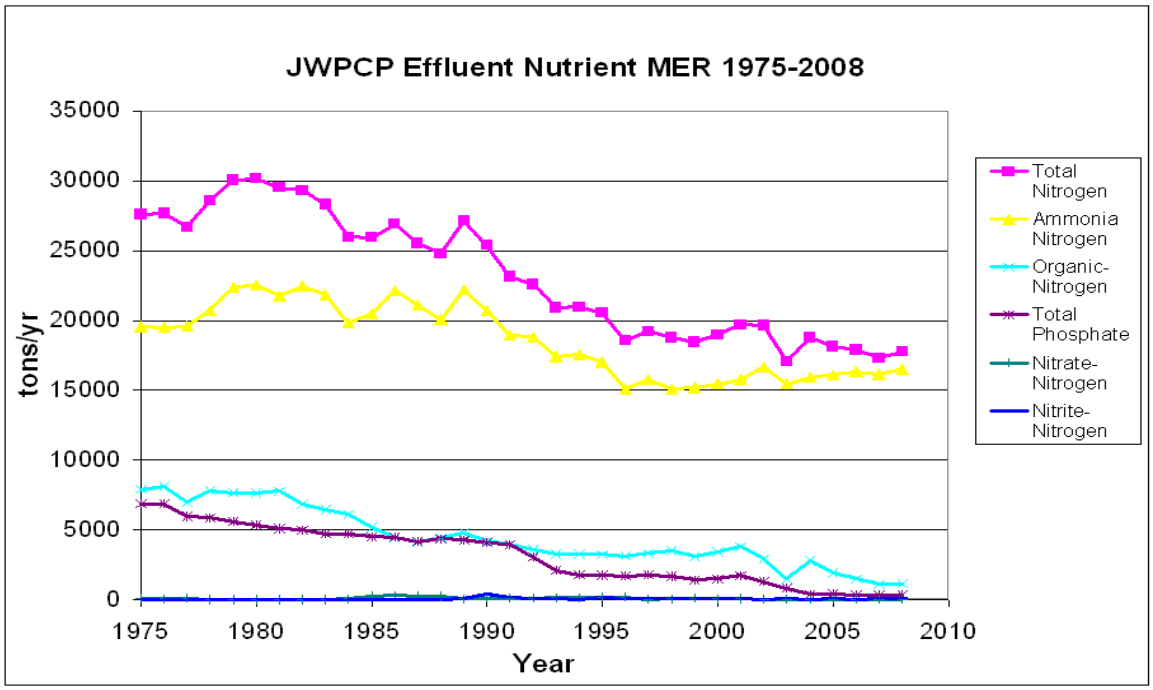


Figure 6. JWPCP historical nutrient mass emission rates.

JWPCP effluent ammonia values generally stay quite constant. The daily average effluent flow rate does not vary significantly through the year, and, as the concentration data in **Table 1** show, in 2008 monthly ammonia concentrations in the final effluent

ranged from 32.2 to 40.7 mg/l with an annual mean value of 36.7 mg/l. The annual mass emission rate, in metric tons (MT), for each nutrient is also included in Table 1.

Table 1. –JWPCP Nutrient concentrations and MERs in 2008.

Nutrient	Minimum (mg/l)	Average (mg/l)	Maximum (mg/l)	MER (MT)
Total Nitrogen	38.7	39.4	42.5	16495
Ammonia Nitrogen	32.2	36.7	40.7	15365
Organic Nitrogen	1.5	2.5	3.7	1047
Nitrate Nitrogen	ND	0.05	0.19	21
Nitrite Nitrogen	0.11	0.14	0.17	59
Total Phosphate	0.63	0.73	0.87	306
Silicon	NA	22.0	NA	9210

NA = not analyzed

Estimated Runoff Input

A study of the 1994-95 water year (Schiff 1997) attempted to quantify the mass emissions of major nutrients to the coastal waters of southern California from river discharges. Data were obtained from stormwater management agency annual discharge monitoring reports. The total watershed area of the rivers and creeks monitored was approximately 26,000 km^2. The total runoff flow for the 1994-95 water year was $2.9x10^{12}$ liters, while the rainfall for the region in this water year was approximately twice as high as the average. Limitations to this study include that actual sampling was less than 5% of the watershed area, and less than 2% of the total flow volume. Further complications were introduced because different agencies had different sampling procedures, and numerous assumptions were required in order to produce final estimates of the mass emission discharges to the ocean. The uncertainty in this study was such that estimated nutrient mass emission rates range over an order of magnitude. Subsequently, a GIS based stormwater runoff model was used (Drew 2003) to estimate pollutant mass emissions using information on land use, rainfall, runoff volume, and local water quality information. This latter study produced results that are somewhat lower than the earlier numbers, but the differences may be in part because the 1994-95 year had much higher than average rainfall. Over 600 water quality measurements were used to determine the geometric mean as well as 10th and 90th percentile estimates mass emission rates for the modeling study. Estimates from both studies are reported in **Table 2**. In 1994-95 the flow from the Los Angeles River was $882 * 10^9$ liters, and from the San Gabriel River was $155 * 10^9$ liters, and these two rivers, whose outlets are in relatively close proximity to the JWPCP outfalls, discharged about 1/3 of all runoff in the SCB. Thus, although this section of coastline may represent less than a third of the total, it appears to receive more runoff. As a conservative estimate of the nutrient loading from runoff to the area near the JWPCP discharge the modeled nutrient MERs are multiplied by 1/3, reflecting the proportion of runoff from the two closest river outlets. The ammonia-N and nitrate measured for this study, were combined to give a median total nitrogen estimate of 782 MT.

Table 2. –Estimated nutrient MER to the SCB.

	(Schiff 1997)		(Drew 2003)		
Nutrient	**Median 1994-1995 (MT)**	**Estimated Range 1994-95 (MT)**	**All SCB Geo. Mean (MT)**	**All SCB 10th – 90th %ile (MT)**	**Multiply by 1/3 for SG and LA Rivers contribution near JWPCP (MT)**
Ammonia-N	900	300–3200	406	4.79-1,160	135
Nitrate-N	8800	2300–34500	1940	199-7,350	647
Phosphate	2900	500 – 12000	558	261-975	186

Estimated Aerial Input

In a presentation in November 2007, Southern California Coastal Water Research Project (SCCWRP) researcher Dr. Lisa Sabin synthesized available modeling work to estimate total aerial loading of nitrogen directly to the coastal ocean (for the purpose of this study the coastal ocean was defined as 500 kilometers of coastline from shore out three kilometers). Due to a lack of existing empirical data, the synthesis used two model results. The Community Multiscale Air Quality (CMAQ) model, which includes both wet and dry deposition, predicts an annual load to the SCB of 300 – 600 MT nitrogen, while the University of California at Los Angeles (UCLA) model, for dry deposition only, predicts an annual load of 1,100 MT nitrogen. Using the higher of the two results, and then adjusting for the nutrient loading to the 30 km section of coastal waters surrounding the JWPCP discharge, the estimated aerial deposition is 30/500 * 1,100 = 70 MT nitrogen. Dr. Sabin cautions that these are preliminary estimates. Dr. Sabin is participating in a regional offshore water quality study, initiated in 2008 (Bight '08), which will quantify the contribution of nitrogen and phosphorus via atmospheric deposition to the coastal waters offshore of southern California. Atmospheric loading estimates will be combined with load estimates from other nutrient sources (including treated wastewater discharge, urban runoff, and natural sources such as upwelling) to establish a nutrient budget for the SCB, and then to assess causes of HAB formation based on the improved understanding of nutrient contributions.

Estimated Upwelling Input

The upper layer of the coastal ocean near the JWPCP discharge site is a highly productive region, supporting a complex ecosystem of kelp forests immediately along the coast. Further offshore phytoplankton are present year round, and support a food chain that at the top includes large numbers of seabirds and marine mammals. The nutrients to support this productivity come from upwelling, coastal runoff, aerial deposition, sediment release, recycling within the euphotic zone, and from POTW discharges.

It is expected that upwelling (**Figure 7**) is the most significant source of nutrients into the southern California coastal ecosystem. The National Oceanic and Atmospheric

Administration (NOAA) Environmental Research Division (ERD), has studied upwelling and describes the phenomena at their website as follows;

> "*The frictional stress of equatorward wind on the ocean's surface, in concert with the effect of the earth's rotation, causes water in the surface layer to move away from the western coast of continental land masses. This offshore moving water is replaced by water which upwells, or flows toward the surface from depths of 50 to 100 meters and more. Upwelled water is cooler and saltier than the original surface water, and typically has much greater concentrations of nutrients such as nitrates, phosphates and silicates that are key to sustaining biological production. It is for this reason that marine ecosystems in the ocean's eastern boundary currents are highly productive, and capable of maintaining large standing crops of plankton, massive fish stocks such as sardines and anchovies, and major populations of marine mammals and sea birds. The major eastern boundary currents include the Canary off the Iberian peninsula and northwestern Africa, the Benguela off southwestern Africa, the Peru off western South America, and the California Current System off western North America. Moreover variations in upwelling over seasonal to interannual periods, due to large-scale shifts in wind patterns and atmospheric systems, are linked to variability in fish populations and other biological components in coastal ocean ecosystems*."

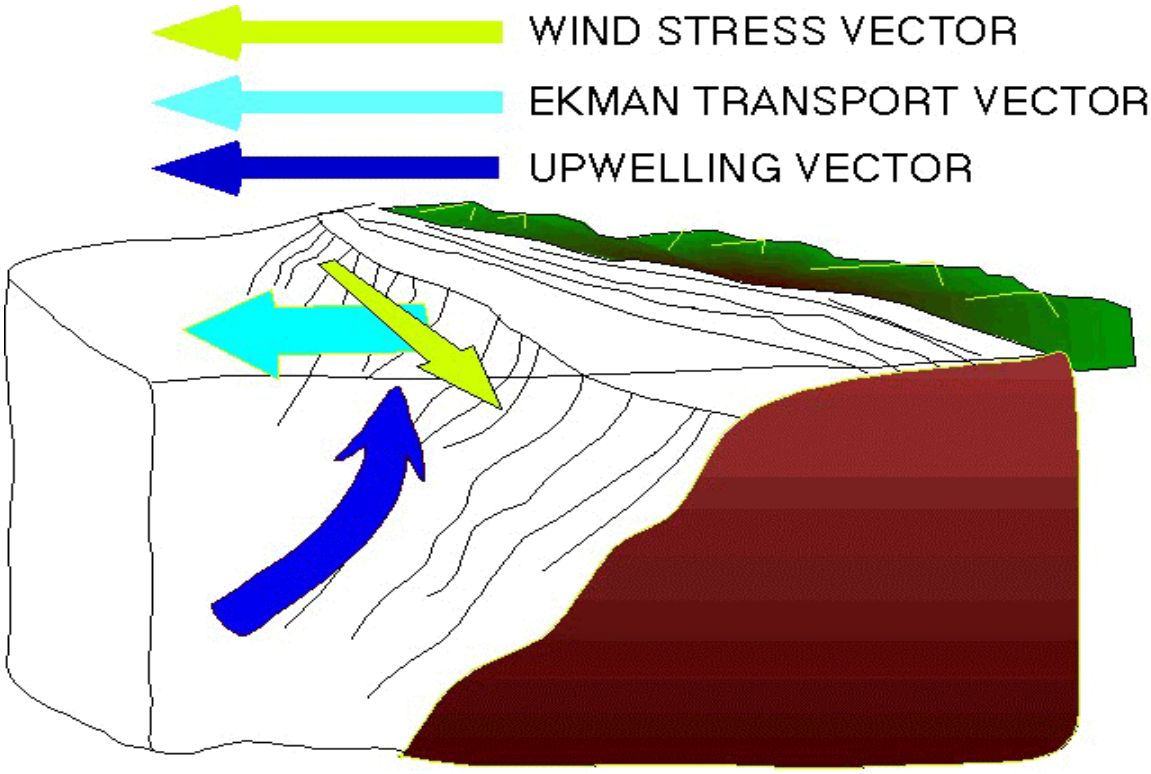


Figure 7[6]**.** –Schematic explaining the upwelling process.

[6] Schematic of upwelling is from NOAA ERD website at http://www.pfeg.noaa.gov/products/PFEL/modeled/indices/upwelling/NA/what_is_upwell.html

The ERD publishes an Upwelling Index that is calculated for each subsection of the west coast of North America.

The average upwelling indices for each month of the year for the coast of California at 33 degrees north latitude were downloaded from the ERD website. **Figure 8** shows a plot of the average annual cycle in the index using the monthly average values for 1967-2009. The NOAA site where these indices are published is http://www.pfeg.noaa.gov/products/PFEL/modeled/indices/upwelling/. As figure 8 shows, the monthly average index value varies from near zero in December and January to over 300 in June. The average value of all monthly index values from January 1967 to May 2009 at the latitude on the coast where the JWPCP discharge is located is 141 $m^3/s/100m$ coastline. The upwelling index specifies the number of cubic meters of water that are expected to move upward to the surface each second along each 100m section of coastline.

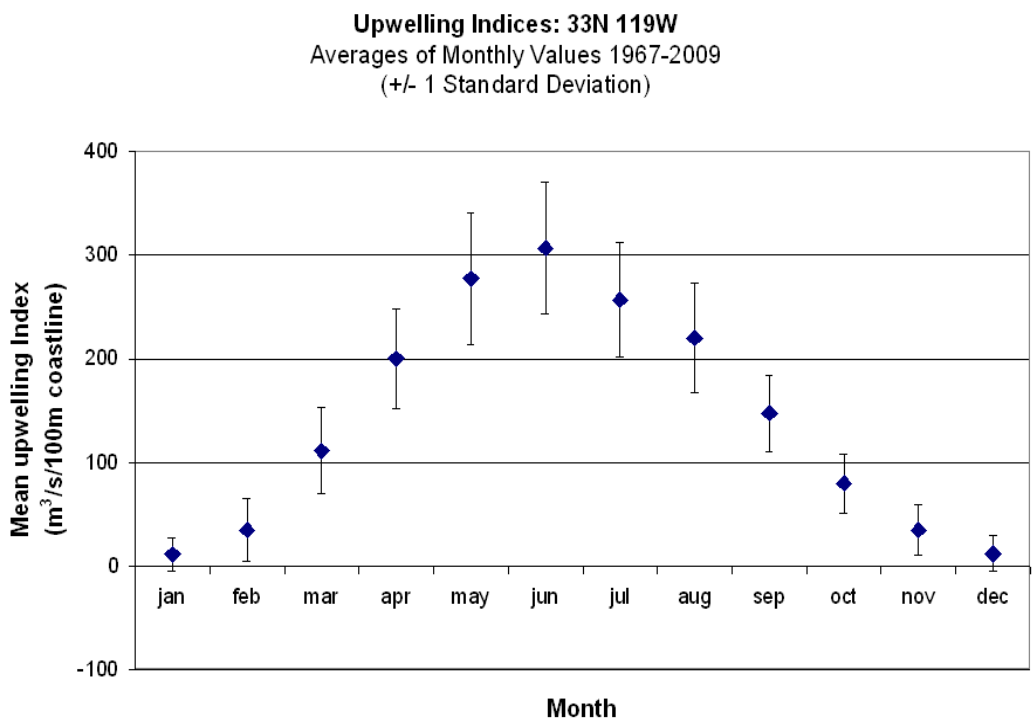


Figure 8. –Upwelling Index by month for the southern California coastal region.

For this analysis the annual average upwelling index value of 141 $m^3/s/100m$ and was applied to a 30-kilometer stretch of coastline (comparable to the receiving water survey area around the JWPCP discharge site, which is approximately 30 kilometers in size measured parallel to the coast). The annual upwelling volume can be quantified to be 141 x 30 x 365 x 86400 sec/day x 1000 liter/m^3 = 1.33 x 10^{15} liter/year. By comparison, in 2008 the JWPCP discharged approximately 4.19 x 10^{11} liters of effluent. Therefore, by this calculation, upwelling introduces approximately 3,000 times more water into the JWPCP receiving water area than the effluent discharge.

To characterize the levels of nutrients in the upwelled water, a large database of coastal ocean nutrient data collected during California Cooperative Oceanic Fisheries Investigations (CalCOFI) research cruises was utilized. The CalCOFI cruises sample at the grid of stations shown in **Figure 9**. For this investigation, nutrient results for the depth range 90 to 110 meters at CalCOFI station 45 on line 90, sampled between 2005 and 2007, were averaged to estimate levels of nutrients in upwelled water (**Table 3**). This location was chosen as the nearest regularly sampled CalCOFI site that was offshore, and deeper than the depth of the discharge, to reduce the possibility that any of the measured nutrients could be from POTW discharges. Table 3 also compares average nutrient levels at the same depths over the entire CalCOFI sampling area with site 45 on line 90, averaging for the full time period 1951 to 2007. This 2005 to 2007 data was selected because it coincides with the time period when additional higher density nutrient and ammonia data is available from surveys immediately around the JWPCP discharge site.

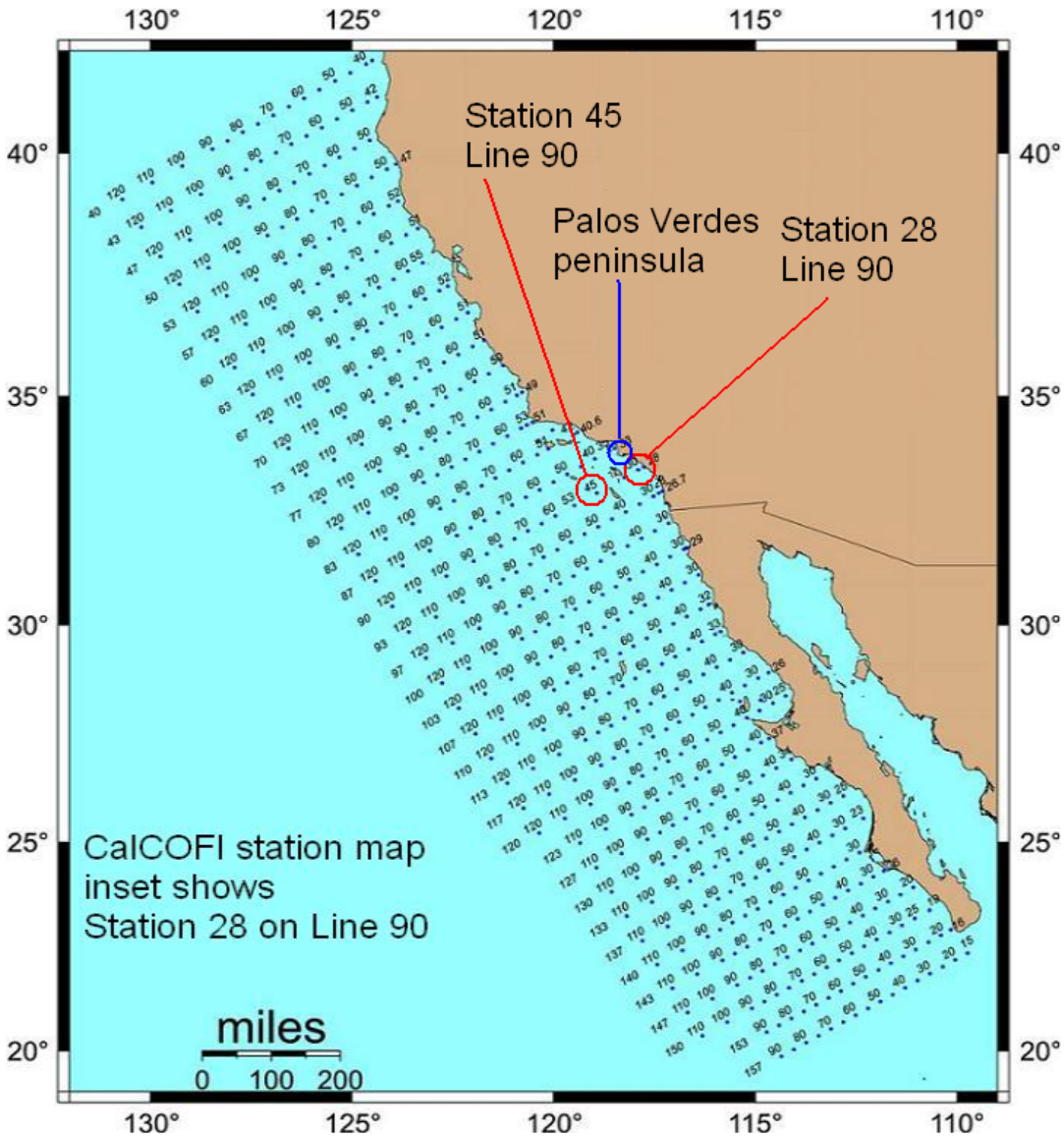


Figure 9. –Map showing CalCOFI sampling sites.

With the exception of nitrite, which is only present at very low levels, the recent (2005 – 2007) period nutrient levels at station 45 are slightly higher than the 1951 – 2007 average levels. When compared with the overall average levels, for the entire CalCOFI grid, the nutrient levels at station 45 are 50-70% higher, suggesting that the source water for upwelling in the central part of the southern California bight generally has higher nutrient levels.

Although this analysis used just the most recent three years of nutrient data from station 45, the regional and longer period averages show reasonably close agreement with this subset of data, and any one of the three would produce a level of predicted nutrient mass loading that is within a factor of two of the others.

Table 3. –CalCOFI nutrient concentrations 90-110 meter depths.

Nutrient	CalCOFI – Line 90 Station 45 1951-2007 Average Levels (µM/L)	CalCOFI – Line 90 Station 45 2005-2007 Average Levels (µM/L)	CalCOFI – All Lines, All Stations 2005-2007 Average Levels (µM/L)	CalCOFI – Line 90 Station 45 2005-2007 Annual Upwelled Mass (MT)
Nitrate	20.1	23.1	13.9	431,000
Nitrite	0.02	0.02	0.052	374
Phosphate	1.66	1.84	1.21	76,100
Silicate	21.84	24.2	13.9	333,000

Table 4 summarizes the estimated nutrient inputs from the JWPCP effluent, runoff, aerial deposition and upwelling. The total nitrogen from the JWPCP effluent appears to be roughly twenty times greater than the amount estimated for the Los Angeles and San Gabriel Rivers, but is only about 4% of the nitrogen from upwelling. The nitrogen in the JWPCP effluent is mostly in the form of ammonia, while the upwelled water is mostly nitrate. It is likely that the deep source water for upwelling does not have significant levels of ammonia, because below the euphotic zone any ammonia is oxidized to nitrite and nitrate by bacteria (Eppley 1986). Further, historical offshore surveys conducted by the Sanitation Districts under the monitoring and reporting program (MRP) requirements in previous permits included discrete sampling for ammonia at 100m at offshore sites. These deep samples consistently had no detectable ammonia. The JWPCP discharged effluent contains about twice as much phosphate as the Los Angeles and San Gabriel River runoff, but less than 1% of the amount estimated from upwelling.

The comparison of runoff with JWPCP contributions in Table 4, are consistent with the comparisons for the entire SCB (Drew 2003) that found runoff contributing approximately 1% of ammonia, 92% of nitrate, and 32% of phosphate, relative to the combined SCB-wide POTW contribution of these nutrients.

Table 4. –Nutrient MERs.

Parameter	JWPCP (MT)	Runoff (MT)	Aerial Dep. (MT)	Upwelling (MT)
Total Nitrogen	16,495	782	70	431,374
Ammonia Nitrogen	15,365	135	NA	NA
Organic Nitrogen	1,047	NA	NA	NA
Nitrate Nitrogen	21	647	NA	431,000
Nitrite Nitrogen	59	NA	NA	374
Total Phosphate	306	186	NA	76,100
Silicate	9210*	NA	NA	333,000

NA = Not Analyzed, * measured in JWPCP effluent as silicon

Silicate is not measured in the JWPCP effluent, but based on a research sample of silicon at JWPCP in 2009, and on silicon levels measured in effluent at inland plants, it appears that less than 5% of the elemental silicon in JWPCP receiving waters could come from the JWPCP effluent. In the ocean, silicon is usually measured as silicate. Silicon is important because it is required by diatoms to build their cell walls, which are made of hydrated silicon dioxide.

Measured Nutrient Levels in the waters near the JWPCP discharge

The monitoring and reporting program (MRP) in the NPDES permit for the JWPCP requires quarterly offshore sampling. The Sanitation Districts sample a total of 48 offshore stations (**Figure 10**). At each station, vertical profiles are made through the water column from the surface to the bottom, or to 100 m at offshore stations, using a conductivity, temperature and depth (CTD) instrument.

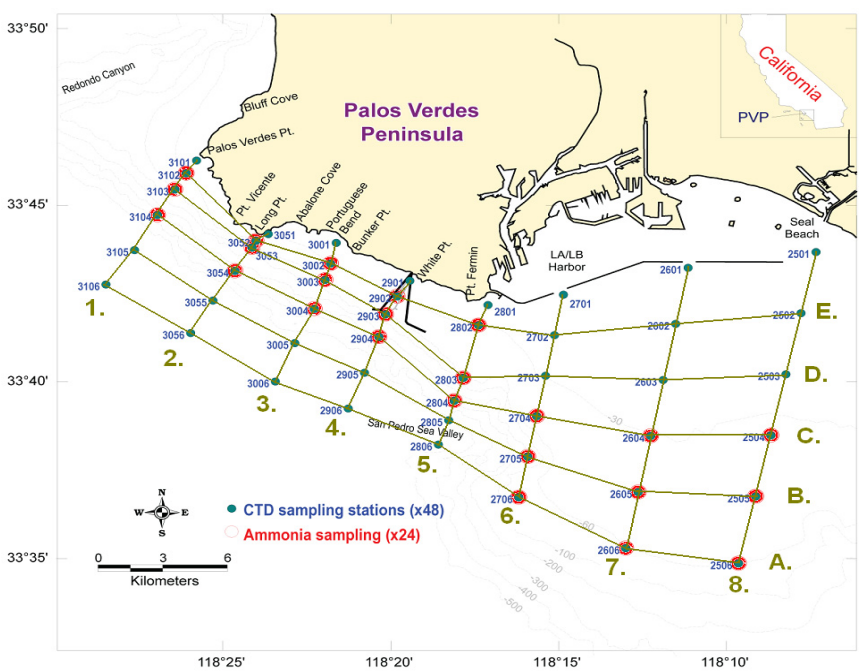


Figure 10. –Map of offshore CTD and discrete water sampling sites.

The CTD includes probes for *in situ* measurement of pressure, temperature, conductivity, dissolved oxygen, and pH. In addition, a beam transmissometer is attached to the CTD to measure light transmission. Two additional optical sensors measure chlorophyll-a fluorescence and levels of colored dissolved organic material (CDOM) in the water at depth intervals of approximately one meter. During each quarterly survey approximately 90 discrete water samples are collected using a winch and Van Dorn bottle at the surface (0.5 m), 15, 30, and 45 m depths at 24 CTD sites (shown on Figure 10 as ammonia sampling sites).

After applying the permitted 166:1 minimum initial dilution to the 2008 average final effluent ammonia concentration in JWPCP effluent (36.7 mg/l), the expected ammonia concentration in the receiving water after initial dilution is 0.22 mg/l. The JWPCP Laboratory has a minimum reportable level of 0.02 mg/l of ammonia for seawater samples. Thus we expect to be able to detect the dilute plume in the receiving water at dilutions of up to 0.02/36.7 = ~1800:1. As shown in **Figure 11**, the ammonia data from discrete sampling can be used to map the distribution and concentration of the dilute effluent plume in the receiving water. Using this information, we can identify sites that are influenced by the discharge plume (impacted) and compare them with locations without an effluent signature (reference). As Figure 11 shows, using ammonia the effluent plume can typically only be identified within a small sub-area of the survey volume. The relatively small volume of effluent does not spread evenly in receiving water. A more or less coherent plume feature is observed which consistently has lowest dilutions at sites nearest the discharge, and then quickly dilutes as it moves with the currents. In most surveys only a small percentage of the discrete ammonia samples have detectable ammonia.

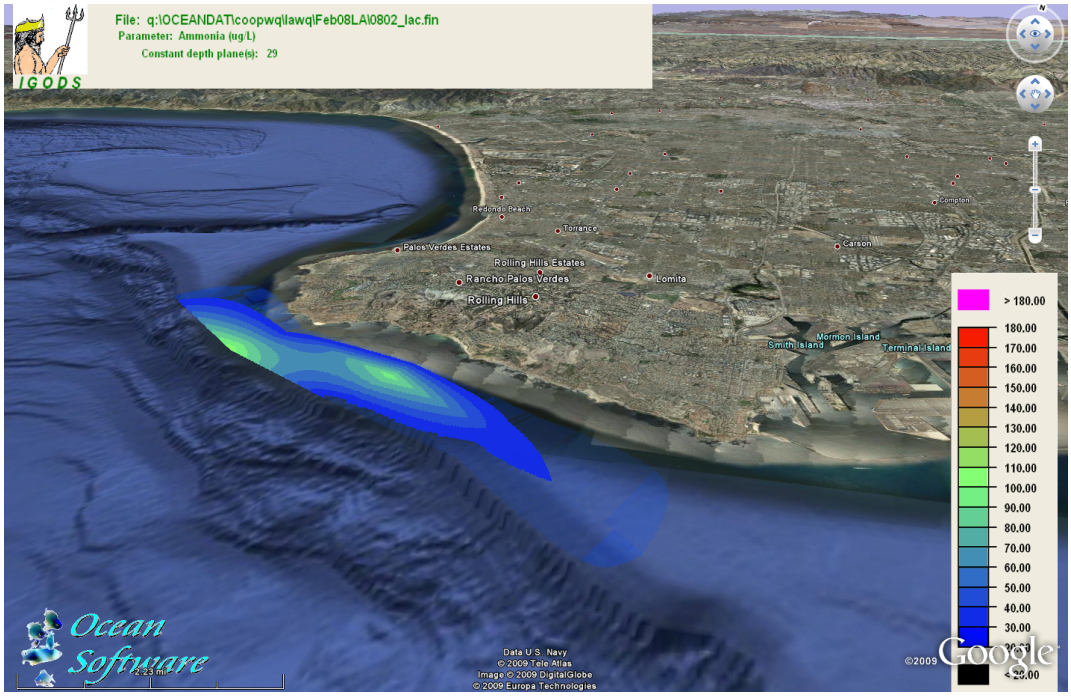


Figure 11. –Example ammonia distribution 29m depth plane view of February 2008 survey.

Since 2005 the Sanitation Districts have collaborated with USC researchers, inviting them to participate on offshore surveys. The same discrete water samples we collected during the surveys were split and analyzed at USC for an extended suite of constituents including nutrients. This effort has produced a data set of over 400 receiving water nutrient measurements at 24 sites and multiple depths (the discrete sampling sites are highlighted in red on the map in Figure 10). Since the Sanitation Districts measured ammonia on the same samples, ammonia data were available for each nutrient sample. The ammonia results were used to separate USC nutrient analyses into groups where ammonia was detected, indicating that the sample included a fraction of the dilute effluent (Impacted) and where ammonia was below detection (Reference). The results are shown in **Table 5** below. Also included in Table 5 are selected nutrient data from CalCOFI cruises. These include average nutrient levels for station 28 on line 90, calculated using either all (1951-2007) or recent (2005-2007) CalCOFI data. Station 28 is located approximately 30 kilometers south of the JWPCP discharge site (Figure 9). The average CalCOFI nutrient levels in Table 5 were calculated using subsets of the data for depth ranges centered around the same depths where the Sanitation Districts and USC collected samples (the complete CalCOFI nutrient data sets are available online at http://www.calcofi.org/newhome/index.htm).

Table 5. –USC and CalCOFI nutrient concentrations.

Nutrient	USC Sample Depth (m)	USC Ref. Avg. (µM/L)	USC Imp. Avg. (µM/L)	Diff. Ref. Vs Imp. (%)	Cal-COFI 090-028 Depth ranges (m)	CalCOFI 090-028 2005-2007 Avg. (µM/L)	CalCOFI 090-028 1951-2007 Avg. (µM/L)
Si	1	2.99	4.03	35%	0-5	5.23	3.36
	15	4.97	5.41	9%	10-20	5.07	4.04
	30	9.04	8.48	-6%	25-35	10.28	7.23
	45	12.70	10.57	-17%	40-50	14.78	11.39
	All	6.61	7.05	7%		8.84	
PO_4	1	0.49	0.58	18%	0-5	0.31	0.31
	15	0.63	0.70	12%	10-20	0.50	0.42
	30	1.03	0.97	-6%	25-35	1.04	0.75
	45	1.32	1.12	-15%	40-50	1.36	1.10
	All	0.79	0.83	5%		0.80	
NO_3	1	1.39	2.01	45%	0-5	0.77	0.41
	15	2.50	3.64	46%	10-20	2.03	1.32
	30	7.87	6.93	-12%	25-35	8.84	5.19
	45	12.66	10.01	-21%	40-50	14.44	10.41
	All	5.10	5.47	7%		6.5	
NO_2	1	0.23	0.29	27%	0-5	0.04	0.02
	15	0.19	0.37	93%	10-20	0.07	0.06
	30	0.36	0.52	43%	25-35	0.26	0.19
	45	0.29	0.44	50%	40-50	0.31	0.25
	All	0.26	0.42	62%		0.17	

The CalCOFI nutrient data from station 28 are quite comparable to the USC nutrient results from sampling done between 2005-2008 at sites around the JWPCP discharge site on the Palos Verdes shelf. In most cases the CalCOFI average levels were actually a little higher than either the Impacted or Reference sets of nutrients near the discharge site. This suggests that there is no significant localized elevation of nutrients due to the effluent discharge.

The Impacted and Reference populations of USC receiving water nutrient data are very similar, suggesting that with the exception of ammonia, there is limited contribution from the discharged effluent to increase nutrient levels in the vicinity of the discharge. As shown in Table 5, levels of silicate, phosphate, nitrate and nitrite were found to be 7%, 5%, 7% and 62%, respectively, elevated in the Impacted population, when nutrient results from all depths were averaged. These two populations are graphically compared in **Figure 12,** which plots average levels from the discrete sampling depths at surface, 15m, 30m and 45m at the Reference (no detected ammonia) and Impacted (detected ammonia) groups. Figure 12 graphically illustrates that there are only minimal differences in levels of nutrients (other than ammonia) between areas where the effluent plume was detected (based on ammonia) and where it wasn't. The graph includes error bars of plus and minus one standard deviation for each nutrient group, which indicate there is significant variability in measured levels. This variability is significantly higher than the percent differences between the reference and impacted average levels that are included in Table 5.

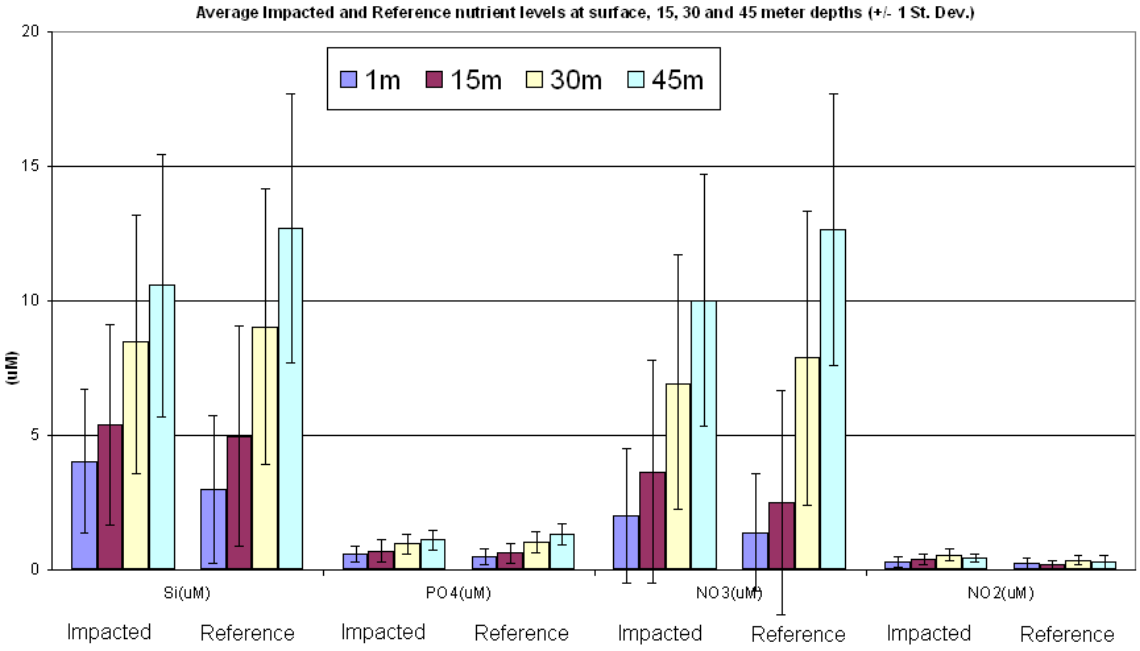


Figure 12. –Reference and Impacted categorized USC nutrient data distributions by depth.

Despite the variability, silica, phosphate and nitrate all show a pattern of increasing levels with depth, which reflects the natural condition that deeper in the water column, and

particularly below the euphotic zone, nutrient levels increase as settling biological material decays and nutrients are liberated. The entrainment that occurs when the buoyant effluent is discharged to the receiving water may raise the Impacted water relative to the Reference, and thus even the relatively small differences in observed concentrations may be due to entrainment more than to direct contribution of nutrient from the effluent. An entrainment induced vertical shift of only 2m would explain the small differences in nitrate and phosphate. Despite being present at 62% higher levels in effluent impacted water, nitrite overall is detected at such a low level that it is insignificant when compared to the nitrogen contributed from ammonia in the effluent. It is possible that the explanation for the elevated nitrite is that a very small fraction of the effluent ammonia is being oxidized at the Impacted sites.

To estimate the relative contributions of total nitrogen to the study area around the discharge, using the discrete nutrient sampling data, the sum of nitrogen species at Impacted sites was compared with the sum at Reference sites. The uM/L average levels of nitrate and nitrite were converted to ug/L units of nitrate N and nitrite N, and the ammonia nitrogen at the Reference sites, which was all <20 ug/L, was assumed to be zero.

The results in **Table 6** show that on average the portion of the study area (defined by the coverage of the 24 discrete sampling sites at depths between the surface and 45 meters), which contained detectable effluent plume, contained 88% more total nitrogen than the reference. Over 90% of the additional nitrogen was present in the form of ammonia.

Table 6. –Reference and Impacted total nitrogen levels.

Species	**Reference (ug/L N)**	**Impacted (ug/L N)**	**Difference (%)**
Ammonia N	ND (zero)	58.6	>300%
Nitrate N	71.4	76.6	8%
Nitrite N	3.6	5.9	64%
Total N	75.0	141.0	88%

To confirm the above estimates of effluent nutrient contributions to local ambient levels, an alternative approach, utilizing the same discrete USC nutrient measurements, estimates loading to the local receiving waters. The offshore area sampled during quarterly surveys is approximately 30 kilometers in length, parallel with the coastline. The average width of the survey area between inshore and offshore discrete sampling boundaries is 3 kilometers. Discrete samples are taken at depths of up to 45 meters, but only at depths to 30 meters at shallower sites. Multiplying these three boundaries, 30,000 x 3,000 x 30, the receiving water survey area sampled for ammonia and nutrients is calculated to be 2.7 x 10^9 cubic meters. By comparison, five days of effluent discharge represents only 0.2% of this volume, equivalent to an average dilution of 500:1. Furthermore, it is likely that ambient currents would move water out of the sampling area in less than 5 days (the average current recorded at the 30 meter depth at a current meter mooring site in 65 meters water depth directly adjacent to the JWPCP outfalls on the Palos Verdes shelf, was just under four cm/s towards the west. At this speed water would

travel 15 kilometers to the western edge of the sampled area in five days). The mass of nutrients discharged over a five-day period is compared with the ambient background mass estimated to be present in this volume of water using CalCOFI measurements from station 28 on line 90.

This alternate approach produces results that are similar to the measured differences when Impacted and Reference measured nutrients are compared. Specifically, total nitrogen may be increased by approximately 90%, with the vast majority of that increase due to ammonia, and phosphate may be increased by 6%.

Table 7. –Five-day mass balance between discharged and ambient nutrient levels.

Species	**5-day Effluent Loading (kg)**	**Ambient Load (CalCOFI Sta. 28, Line 90 2005-07) (kg)**	**Addition to Ambient Load (%)**
Total N	225959	252126	90%
Ammonia N	210475	NA	
Organic N	14338	NA	
Nitrate N	287	245700	<1%
Nitrite N	803	6426	12%
Phosphate P	4187	66960	6%
Silica	126170	246217	51%

NA = not analyzed

Long Term Trends in Receiving Water Nutrient Levels

The CalCOFI surveys were begun approximately 60 years ago. In **Figure 13**, nutrient data from the 40-50 meter depths of one of the closest CalCOFI stations to the JWPCP discharge, station 28 on line 90, are plotted for the entire period, to look for trends in the levels of nutrients. The plots show the wide range of variability in nutrient levels, and confirm that nutrient levels are rarely below detection. Although the R^2 values on the individual plots are not significant, the consistent slopes of trend lines for all the nutrient species plotted in Figure 13 suggest gradual increases in nutrient levels over time. Supporting this pattern of increasing nutrient levels, in Table 5, the average levels of nutrients at this site for the recent period 2005 to 2007 are higher than the long-term average values for 1951 to 2007. During the CalCOFI cruises that collected the nutrient data, chlorophyll was also measured, and the time series of chlorophyll data for all depths from the surface to 50 meters suggests a gradual increase in chlorophyll levels has also occurred. These apparent increases have occurred even during a period of dropping nutrient MERs in the JWPCP effluent.

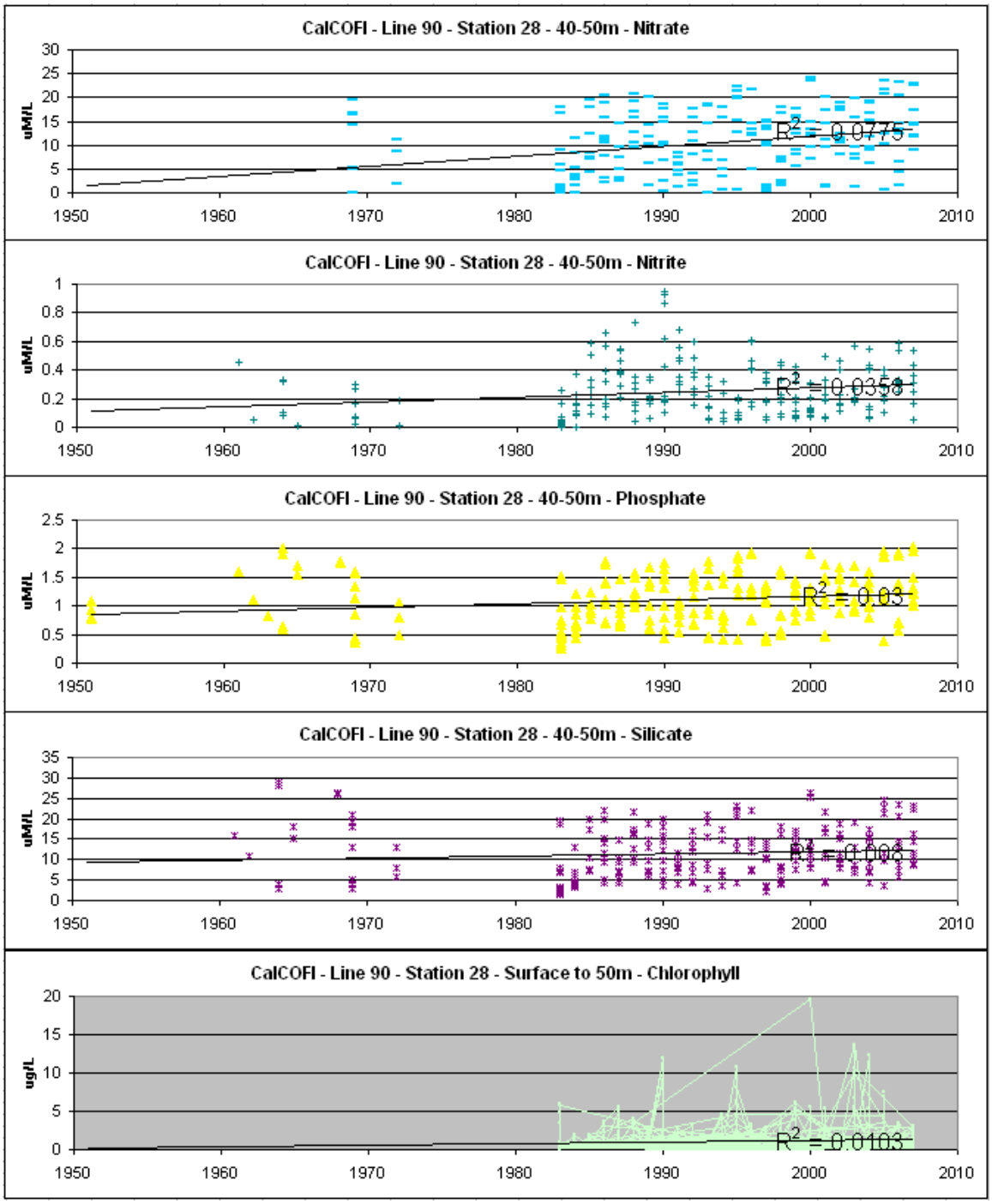


Figure 13. –CalCOFI nutrient and chlorophyll trends.

III. Chlorophyll/Phytoplankton Data Review

To look for an enhancement of phytoplankton in the receiving waters around the JWPCP discharge, 23 offshore water quality surveys completed by the Sanitation Districts between November 2002 and November 2008 were evaluated. As was done for the USC receiving water nutrient data, the 24 sites sampled for ammonia during each survey were

separated into Impacted and Reference groups, where Impacted sites had detected ammonia at at least one sampling depth, while Reference sites had no detected ammonia at any sampling depth. At each site in each group the sum of chlorophyll-a for all depths was determined to approximate the "mass" of phytoplankton present. Finally the sums for the two groups were subjected to a t-test to determine whether a statistically significant increase in the mass of phytoplankton was present at the impacted sites.

Figure 14 compares the average sum of chlorophyll for the Impacted and Reference groups for each of the 23 surveys. Only the November 2006 survey (marked with an asterisk) was found to have statistically higher levels of phytoplankton at the Impacted sites than at the Reference sites. However, during this particular survey chlorophyll levels were relatively low over the entire survey, and the apparent difference does not appear significant when compared against the variability seen in the other surveys. In thirteen of the 23 surveys the Reference population had higher chlorophyll than the Impacted sites, and when all 23 surveys are combined, the average Reference sum of chlorophyll is about 3% higher than the Impacted.

This analysis of chlorophyll levels in the survey area confirms that within approximately 20 kilometers of the JWPCP discharge there is no consistent enhancement of phytoplankton growth in locations impacted by the dilute effluent plume.

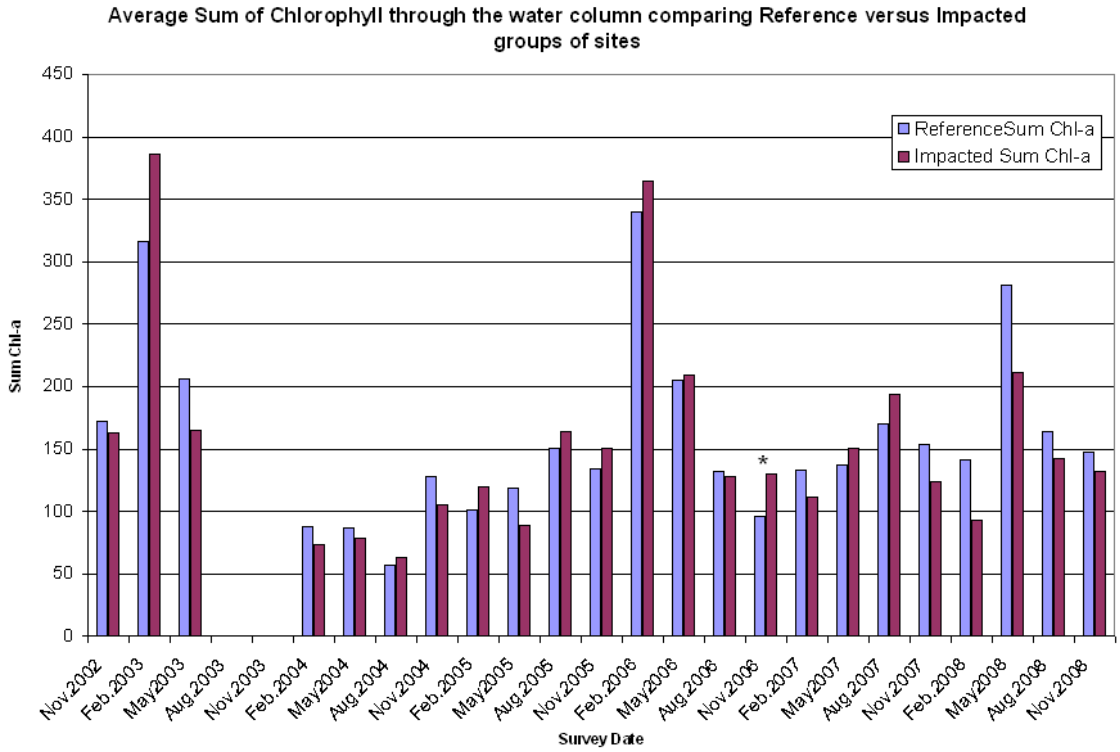


Figure 14. –Comparison of Impacted and Reference chlorophyll levels for 23 offshore surveys.

Because the effluent is discharged into density stratified receiving waters at a depth of about 60 meters, it is routinely trapped 20-50 meters below the surface. The LACSD

used the Visual Plumes model developed by the Environmental Protection Agency (EPA) to simulate the dilution and rise height of the effluent plume using detailed information about the JWPCP outfalls, and a 15-month continuous record of hourly currents and vertical temperature stratification, combined with a typical diurnal effluent flow cycle. **Figure 15** shows the hourly record of the depth to the top of the plume (red), plume centerline (blue) and bottom of the plume (green). On average, the top of the plume was located 23 meters below the surface, the centerline was located 34 meters below the surface, and the bottom of the plume was located 50 meters below the surface.

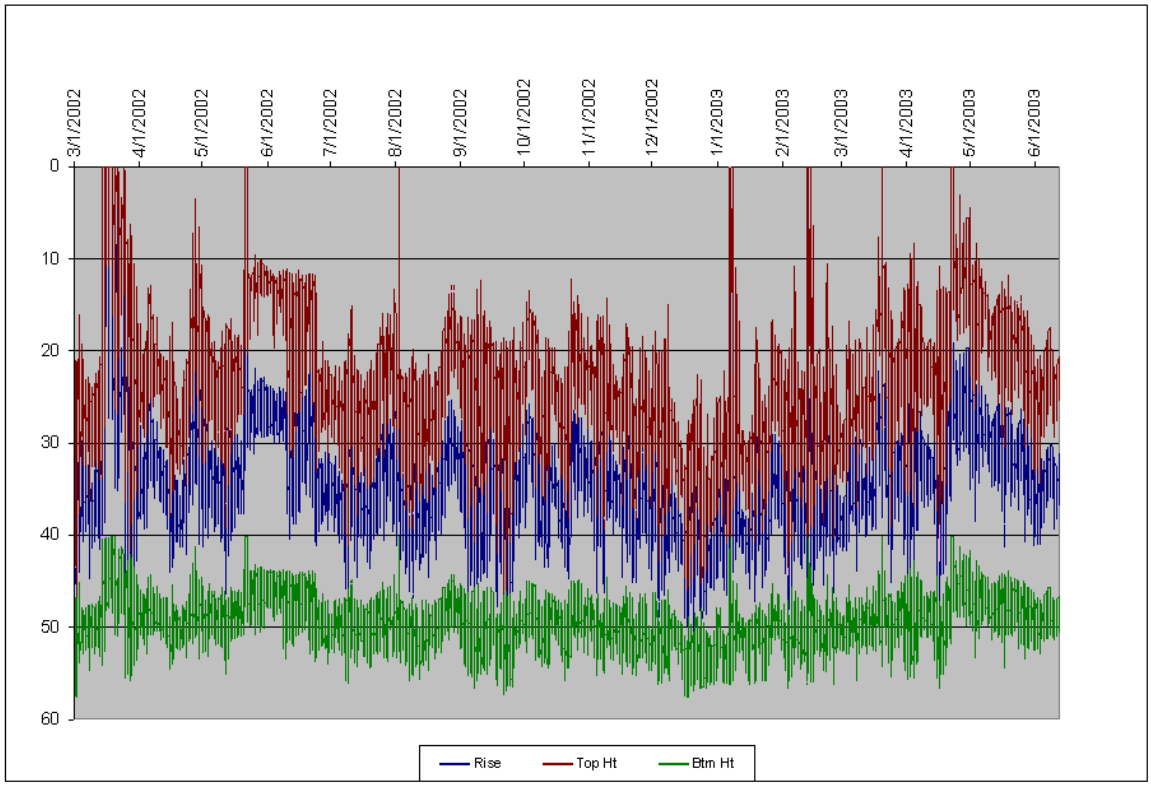


Figure 15. –Modeled position of JWPCP effluent plume in receiving water.

The offshore water quality data sets collected by the Sanitation Districts include continuous vertical sampling of colored dissolved organic material (CDOM), an effective tracer of the dilute effluent plume, and chlorophyll-a fluorescence, a very good tracer for phytoplankton, both using optical instruments. Profiles of CDOM at sites near the outfall can be compared with average profiles of chlorophyll distribution to get some idea of where the effluent plume overlaps with phytoplankton in the water column. **Figure 16** uses selected data from the two-day CBCWQS survey in February 2009 to illustrate this. The overlaid vertical profiles are from a group of sites near the JWPCP discharge that were determined to be effluent impacted based on ammonia. Figure 16 includes profiles of chlorophyll-a, CDOM and ammonia. The elevated chlorophyll-a is largely restricted to the upper 15 meters of the water column. By comparison, the distributions of elevated CDOM and ammonia show that the effluent plume was mostly located deeper than 15 meters, although some ammonia was present at 15-meter depth sampling sites. During the February survey photosynthetically available light (PAR) sensors were used by

CBCWQS partners at grids of sampling sites to both north and south of the survey area sampled by the Sanitation Districts. Using their PAR data, and simultaneously collected deck measurements, the percentage of surface light energy reaching to depth was calculated. The average profile of percentage of light penetration is also plotted on Figure 16. Based on this profile, the measured, average euphotic depth, where 1% or less of surface light is available, and where consequently phytoplankton are generally not able to grow, was located at 30m. This figure illustrates how due to trapping of the effluent plume a significant fraction of the effluent nutrients may be unavailable to phytoplankton growing in the upper part of the water column.

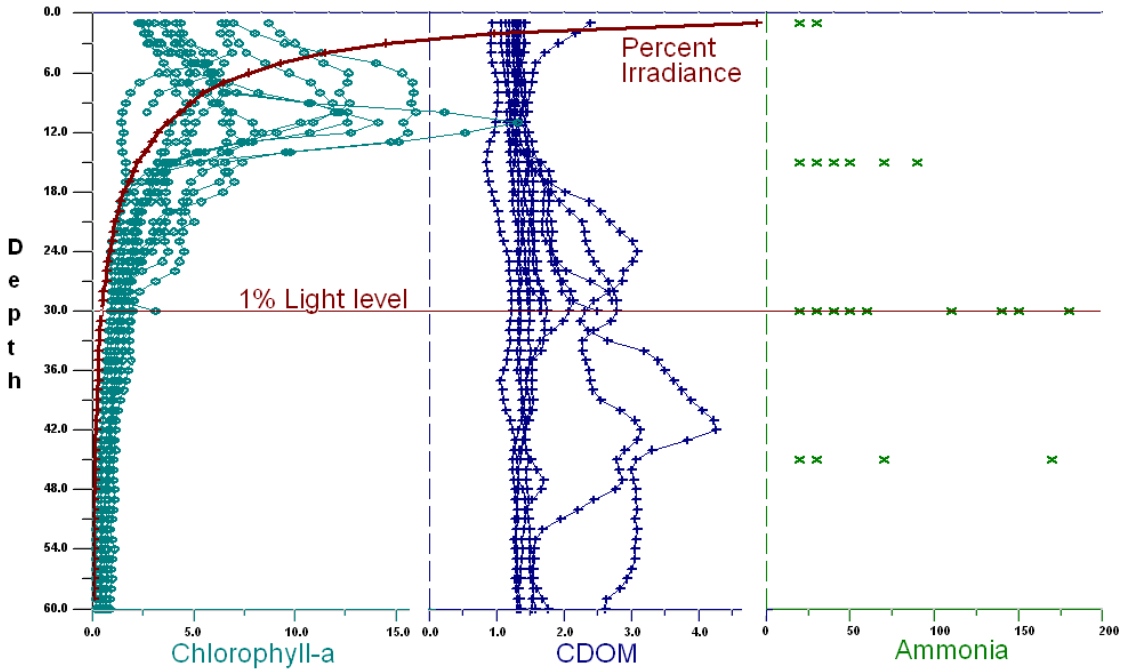


Figure 16. –Profiles of chlorophyll-a, CDOM and ammonia.

The time series data showing the vertical position of the effluent field (Figure 15) illustrate that the effluent field only infrequently reaches the surface. The modeled time series does show the top of the plume reaching the surface for short periods, primarily during the winter and spring, and these events probably correlate with pulses of upwelling that reduce the vertical density stratification. Without corresponding time series data for the euphotic depth, it is not possible to estimate what fraction of the effluent field, and hence the nutrients it contains, are trapped below the depth where they could be used to grow phytoplankton. Furthermore, some phytoplankton species are known to migrate nightly to deeper depths where nutrients are more available, and then return to shallower layers during daylight to obtain greater light energy.

The question can also be asked whether there is a build up of nutrients over time from the continuous discharge from the JWPCP and other southern California POTW dischargers. As described earlier, long term net currents at the plume trapping depths average just under 4 cm/sec towards the west. At these speeds, the average net displacement of the

effluent plume will be 100 kilometers after 30 days. Dispersive forces will continuously mix and dilute the effluent plume during this time.

IV. Oxygen Reduction and Dead Zones

In recent years, scientists have recognized that coastal waters in some areas on occasion have such low levels of dissolved oxygen that they are no longer capable of supporting benthic communities of organisms. The media have described these areas as "dead zones". The CTD monitoring program of the Sanitation Districts, as well as all the other major ocean discharging POTWs in southern California, includes use of an *in-situ* oxygen sensor, able to give continuous accurate reading of the level of dissolved oxygen in the water. As a result, since the early 1980s the Sanitation Districts has amassed a large data set (over 200 discrete offshore surveys) of dissolved oxygen measurements in the sampling area around the JWPCP discharge, between the surface and the seafloor, or to 100m depths at sites further offshore. Throughout this period levels of dissolved oxygen have never been observed to be critically low (<2 mg/l) at any time. The Sanitation Districts subject data from every survey to an assessment of compliance with the California Ocean Plan standard that DO should not be reduced more than 10% as a result of the demand from the discharged effluent, and has never determined an exceedence of this standard. The surveys have documented that dissolved oxygen in our sampling area is highly variable. Levels range from over 12 mg/l near the surface to near 2 mg/l at 100m during periods of upwelling. The primary source of variability is vertical stratification, with surface oxygen levels typically at close to 100% saturation. Levels of oxygen generally are reduced with increasing depth because density stratification prevents turnover of the water, preventing exchange of oxygen between the air and surface seawater. Because oxygen levels decrease with depth, during upwelling, when deeper waters are moving up onto the shelf, we observe the lowest oxygen levels. **Figure 17** shows the results of CTD profiling for DO at 48 surveys sites during two recent periods of upwelling, in February 2006 and May 2007, during which low levels of DO were seen at the deepest depths.

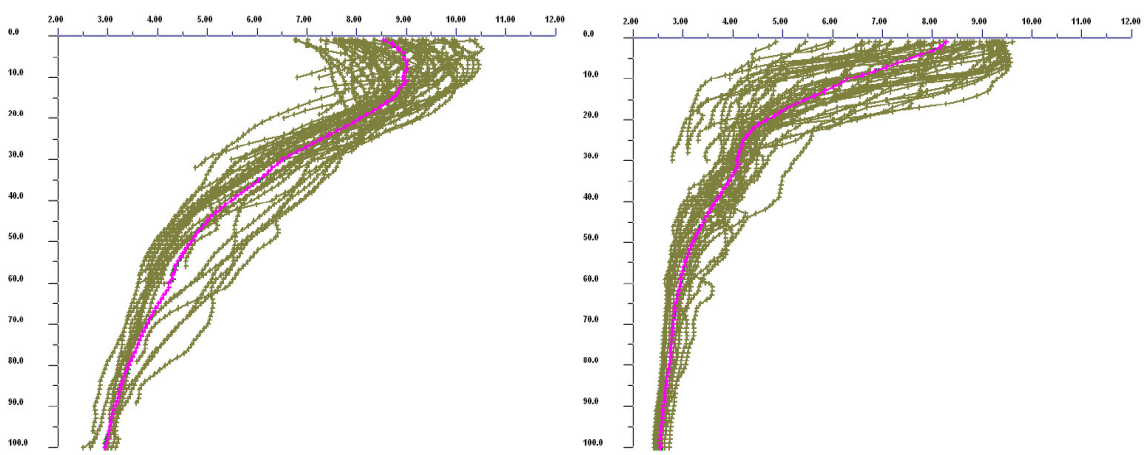


Figure 17. –Overlay of all DO profiles for two upwelling periods Feb. 2006 (l) and May 2007 (r).

In addition to "natural" intrusions of low DO containing water such as by upwelling, DO levels can also drop to critical levels as a result of eutrophication. An excess of nutrients that enhances productivity, can ultimately cause a DO reduction as the excess plant material decomposes. As mentioned earlier, a review of 23 surveys found no indication that the JWPCP discharge increases phytoplankton levels within 30 kilometers around the discharge site. Further, the ambient levels of nutrients suggest that the euphotic zone of the southern California coastal ocean is not usually nutrient limited. Finally, a further examination of the 23-survey data set found that oxygen levels and oxygen saturation generally increased with increasing phytoplankton.

DISCUSSION / SYNTHESIS

How significant are the POTW nutrient inputs relative to other sources?

A comparison of effluent nutrient mass emission rates (MERs) for phosphate, ammonia, nitrate and nitrite with estimated nutrient loadings for stormwater runoff, aerial deposition and upwelling, found that with the exception of ammonia, the nutrient contribution from upwelling is far greater than the JWPCP contribution. When total nitrogen is compared, upwelling appears to contribute 50-100 times more total nitrogen (in the form of nitrate and nitrite nitrogen) than is contributed by the effluent (as ammonia nitrogen). On the other hand, stormwater runoff and aerial deposition appear to be less significant nutrient sources that the JWPCP discharge. An analysis of nutrient sampling data from the survey area around the JWPCP discharge did not find significantly more nitrite, nitrate, phosphate, or silica, when ammonia was used to differentiate the data set into average ambient and effluent impacted populations. The exception is ammonia, which is increased by 1000% or more relative to background levels at selected locations and depths nearest the JWPCP discharge where the effluent field is present at lowest dilutions. However, at most reference sites outside the effluent field, ammonia is not detected, while all other nutrients were almost always detected at reference locations, suggesting that these nutrients do not limit productivity. These are preliminary estimates, and it is expected that the Bight '08 regional offshore study will further refine nutrient sources and contributions, and will quantify shore runoff and atmospheric sources, in addition to upwelling processes, however results will probably not be available until sometime in 2010.

Is there enhancement of productivity near the discharge?

An analysis of 23 offshore water column surveys done by the Sanitation Districts between November 2002 and November 2008 found no enhancement of phytoplankton levels associated with the dilute effluent plume. The combined sums of chlorophyll-a for all 23 surveys actually determined a 3% higher level at the reference.

Are the discharged nutrients able to be used by phytoplankton?

The JWPCP outfalls discharge effluent through multiport diffusers in approximately 60 meters of water. Through much of the year, ambient density stratification in the receiving waters acts to trap the effluent field 20-50 meters below the ocean surface. As a result, nutrients from the JWPCP discharge are largely trapped below the pycnocline,

and therefore may not be available in the euphotic zone where they would be available to phytoplankton. The Sanitation District's offshore water column sampling program measures chlorophyll continuously at vertical profiling sites. Typically the majority of phytoplankton is located in the upper 30m of the water column. At the same time much of the dilute effluent plume may be trapped by the ambient density stratification at deeper depths. In addition to the limited overlap between the observed phytoplankton and the effluent plume, there is a relatively shallow euphotic depth (depth with less than 1% of surface light) at inshore coastal sites with elevated turbidity. Typical euphotic depths may range from <20 to 40 meters. During periods of upwelling, and at times that the pycnocline is weak or shallow, the JWPCP nutrients may reach closer to the surface, and be more accessible to phytoplankton. Direct sampling of the penetration of PAR at the offshore grid of sampling sites, simultaneous with measurement of chlorophyll fluorescence, and other water column properties, may be needed to more accurately assess this question of "usability" of the nutrients.

Is there any possible association of HAB to discharge? If this is still an open question, explain some of theories as to how this could work.

No linkage of HABs with the effluent discharge has been made. As described in this report, even though the effluent discharge adds extra nitrogen to the receiving water, and also moderately elevates the level of phosphate, there is no discernable increase in phytoplankton levels. It is not possible to say whether over a larger area, the combined nutrient inputs of the four major southern California POTWs could be slightly elevating the overall levels of phytoplankton, at time and spatial scales greater than the receiving water surveys capture. However, it should be kept in mind that when the spatial scale is expanded, so also is the amount of coast over which upwelling processes will be taking place. There are also complications because upwelling is a sporadic and seasonal phenomena, whereas effluent discharges are continuous and constant throughout the year. The continuous nature of the nutrient inputs from the POTWs could have a localized effect, particularly during times of year when upwelling is most limited, to maintain phytoplankton populations that might otherwise diminish due to lack of nutrients.

Any expected consequences of discharge relocation? Even if discharge was somehow enhancing HAB growth, is there any reason to suspect such a change would increase HABs?

A review of 23 surveys found no local enhancement of phytoplankton associated with the effluent plume from the JWPCP discharge. The boundaries of the Sanitation Districts offshore survey directly meet the boundaries of the comparably scaled surveys of OCSD to the southeast and Hyperion to the northwest. At typical measured current speeds, the effluent plume from the JWPCP may often reach one or the other of these areas in between 24 to 72 hours. Ultimately the nutrient loads from all three discharges are likely to become commingled at high dilutions (low concentrations of nutrients), and depending on the currents, could occupy coastal waters from Santa Monica Bay to Orange County. Therefore as long as discharge depths and predicted trapping depths are comparable with the existing JWPCP discharge site, it is unlikely that relocating the JWPCP discharge would cause any change in the phytoplankton response.

What do temporal and spatial patterns of domoic acid occurrence tell us about a discharge related effect?

The JWPCP discharge has maintained a fairly constant year round flow with relatively constant nutrient loadings continuously discharged from the same outfalls for over 40 years. The California Department of Public Health has reported that PN and DA appeared as a significant concern, causing impacts to marine life, only at the beginning of the 1990s. If POTW nutrients were causing HABs then we might have expected PN and DA to have been present in southern California coastal waters for many decades.

The Biotoxin Monitoring Program (BMP) reports that in southern California domoic acid (DA) is most commonly observed coincident with the spring/upwelling period. If nutrients from the discharge were an important source that was causing growth of DA producing phytoplankton, then we might expect to see year round elevated DA.

The BMP reports describe the typical progression of the seasonal bloom of PN down the coast, beginning off San Luis Obispo and then moving southward past Ventura and into the SCB. Relatively lower human populations and much smaller POTW discharges in San Luis Obispo and Ventura, make it less likely that POTW nutrients are the cause of these blooms. However it is significant that these coastal regions experience greater levels of upwelling than are observed within the SCB. The pattern of progression down along the coast several hundred kilometers also seems to rule out the JWPCP or other large southern California POTWs as the "source" of the blooms. In fact the extent over which PN blooms are typically seen appears to rule out any localized nutrient source as a cause.

Local ECOHAB and MERHAB studies have found high levels of DA in the LA Harbor, and the explanation for why this area may favor PN or at least the production of DA, is not clear. The Harbor complex receives runoff from major urban stormwater collection systems through Wilmington Drain and Dominquez Channel, as well as large amounts of runoff from the Los Angeles River. The breakwater surrounding the Harbor isolates the water within the from the fairly energetic coastal shelf current regime.

Are there remaining uncertainties (e.g. micronutrient contributions from JWPCP discharge)?

It has been recognized that PN may grow to high concentrations without the production of DA. This observation has led to the suggestion that environmental stressors may trigger production of DA. The mechanism of such stressors is not yet well understood, but clearly would provide a starting point for future management and control. Unusual ratios of nutrients have been suggested as possibly encouraging either the preferential growth of harmful algal species, or the production of toxins by those species in response to a nutrient ratio "stress". With the exception of ammonia, and possibly urea, it does not seem that the JWPCP effluent is significantly altering ambient nutrient levels.

Some of the nitrogen in the JWPCP effluent may exist in the form of urea, and it has been suggested that this form of nitrogen may cause increased DA production by *Psuedo-nitzschia australis* (Heisler et al. 2008). Currently urea is not sampled in JWPCP

effluent, or in the local receiving waters. The planned regional study, Bight '08, will include extensive sampling for urea that will characterize this nutrient form.

The JWPCP effluent contains both copper and iron at levels above those in the ambient ocean (in 2008 JWPCP effluent copper concentrations averaged 0.0037 mg/l and iron averaged 1.22 mg/l). These metals are both required micronutrients needed for growth of phytoplankton. However, due to very effective source control, removal of a significant fraction of the solids by secondary treatment, and high initial dilutions, the JWPCP effluent levels of these two constituents are actually only slightly higher than ambient ocean levels, for example the California Ocean Plan provides a background seawater concentration for copper of 0.002 mg/l. In the open ocean, far offshore, it has been suggested that iron "fertilization" could stimulate phytoplankton growth. However, iron is generally present at higher levels in coastal waters and is not expected to be a limiting nutrient.

Understanding the causes of HABs is a major research effort involving many academic and government entities. Questions about nutrient budgets, as well as HAB formation are ongoing, and are the focus of the regional scale coastal ocean study known as Bight '08 in which the Sanitation Districts are an active participant.

LITERATURE CITED

California Department of Public Health Marine Biotoxin Monitoring Program, 2008. "Shellfish biotoxin monitoring program annual report, 2007", 47 pp.

California Department of Public Health Marine Biotoxin Monitoring Program website http://ww2.cdph.ca.gov/healthinfo/environhealth/water/Pages/Shellfish.aspx

Drew A, Schiff K. 2003, Modeling stormwater mass emissions to the Southern California Bight. pp. 58-71 in: S.B. Weisberg, D Elmore (eds.), Southern California Coastal Water Research Project Annual Report 2001-02. Southern California Coastal Water Research Project. Westminster, CA

Eppley RW, Renger EH, Harrison WG, Cullen JJ. 1979. Ammonium Distribution in Southern California Coastal Waters and its Role in the Growth of Phytoplankton. *Limnology and Oceanography.* 24(3):495-509.

Heisler J, et al. 2008. Eutrophication and harmful algal blooms: A scientific consensus. Harmful Algae Volume 8, Issue 1, December 2008, Pages 3-13

Lopez CB, Dortch Q, Jewett EB, Garrison D. 2008. Scientific Assessment of Marine Harmful Algal Blooms. Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health of the Joint Subcommittee on Ocean Science and Technology. Washington, D.C.

Lu R, Schiff KC, Stolzenbach KD. 2004, Nitrogen deposition on coastal watersheds in the Los Angeles regionpp. 73-81 in: S.B. Weisberg and D. Elmore (eds.),

Southern California Coastal Water Research Project 2003-04 Biennial Report. Southern California Coastal Water Research Project. Westminster, CA.

Schiff, K. 1997, Review of existing stormwater monitoring programs for estimating bight-wide mass emissions from urban runoff. pp. 44-55 in: S.B. Weisberg, C. Francisco and D. Hallock (eds.), Southern California Coastal Water Research Project 1996 Annual Report. Southern California Coastal Water Research Project. Westminster, CA

Schnetzer A, et al., Blooms of Pseudo-nitzschia and domoic acid in the San Pedro Channel and Los Angeles harbor areas of the Southern California Bight, 2003–2004, Harmful Algae (2007), doi:10.1016/j.hal.2006.11.004

Appendix 13-C

ESSENTIAL FISH HABITAT ASSESSMENT FOR THE SANITATION DISTRICTS OF LOS ANGELES COUNTY CLEARWATER PROGRAM DRAFT EIR/EIS

ESSENTIAL FISH HABITAT ASSESSMENT FOR THE SANITATION DISTRICTS OF LOS ANGELES COUNTY CLEARWATER PROGRAM DRAFT EIR/EIS

EFH ANALYSIS

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ATTACHMENT EFH-1

1.0 INTRODUCTION

The Clearwater Program is necessary to ensure adequate Joint Outfall System (JOS) wastewater system capacity and reliability through the year 2050. Essential Fish Habitat (EFH) is managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, or MSA), which is designed to protect waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). This EFH Assessment was prepared pursuant to the MSA to analyze potential impacts to federally managed fishes and invertebrates from construction and operation of the Clearwater Program.

2.0 PROJECT OVERVIEW

The Sanitation Districts of Los Angeles County (Sanitation Districts) serve the regional wastewater and solid waste management needs of approximately 5.7 million people in Los Angeles County (County). The Sanitation Districts' service area covers approximately 800 square miles and encompasses 78 cities and unincorporated territory within the County. The 24 separate districts that comprise the Sanitation Districts work cooperatively under a Joint Administration Agreement with one administrative staff headquartered near the city of Whittier. The individual districts operate and maintain their own portions of the collection system. Seventeen of the Districts in the metropolitan Los Angeles area are served by a regional, interconnected system of facilities known as the JOS. The JOS service area includes 73 cities and unincorporated territory, and small areas within the City of Los Angeles, Orange County, and San Bernardino County. The JOS serves a population of 5.1 million people.

As a result of the Clearwater Program planning effort, system-wide improvements were identified in the Clearwater Program and evaluated at either a program or project level. Five program elements within the JOS will be analyzed at the program level. The program elements include:

- Improvements to the existing conveyance system;
- Effluent management options at the water reclamation plants (WRPs);
- Solids processing at the Joint Water Pollution Control Plant (JWPCP);
- Biosolids management at the JWPCP; and
- JWPCP Effluent Management.

These program elements, with the exception of the JWPCP Effluent Management, would primarily occur in a terrestrial or freshwater environment and therefore would not have the ability to impact EFH (Refer to Chapter 11 of the environmental impact report/environmental impact statement [EIR/EIS] for a discussion of potential impacts of the program to the San Gabriel Tidal Prism). The JWPCP Effluent Management program element includes the construction and operation of a new riser and diffuser either on the San Pedro (SP) Shelf or the Palos Verdes (PV) Shelf, and/or the rehabilitation of the existing ocean outfalls. The construction and operation of a new riser and diffuser includes tunneling from the JWPCP

to either the SP Shelf or PV Shelf. Rehabilitation of the existing ocean outfalls includes construction at the existing White Point's ocean outfalls and also includes an onshore tunnel extending from the JWPCP to Royal Palms. Four alternatives were identified in the MFP, and each project alternative is summarized in the following sections and depicted in Figure EFH-1.

Alternative 1 (Project)

Alternative 1 (Project) would consist of an onshore and offshore tunnel extending from the JWPCP along Wilmington Boulevard through the Port of Los Angeles to the SP Shelf site. It also includes rehabilitation of the existing ocean outfalls as described in Alternative 4 (excluding the onshore tunnel). Under this alternative, the new riser and diffuser would operate continuously and the rehabilitated existing ocean outfalls would only be operated under emergency conditions (i.e., emergency circumstances where the new riser and diffuser could not operate). The SP Shelf site and existing ocean outfalls are located within existing EFH.

Alternative 2 (Project)

Alternative 2 (Project) would consist of an onshore and offshore tunnel extending from the JWPCP along Wilmington Boulevard through the Port of Los Angeles to the PV Shelf site. It also includes rehabilitation of the existing ocean outfalls as described in Alternative 4 (excluding the onshore tunnel). Under this alternative, the new riser and diffuser would operate continuously and the rehabilitated existing ocean outfalls would only be operated under emergency conditions if the new riser and diffuser could not operate. The PV Shelf site and existing ocean outfalls are located within existing EFH.

Alternative 3 (Project)

Alternative 3 (Project) would consist of an onshore and offshore tunnel extending from the JWPCP along Figueroa/Gaffey and to the PV Shelf site. It also includes the rehabilitation of the existing ocean outfalls as described in Alternative 4 (excluding the onshore tunnel). Under this alternative, the new riser and diffuser would operate continuously and the rehabilitated existing ocean outfalls would only be operated under emergency conditions if the new riser and diffuser could not operate. The PV Shelf site and existing ocean outfalls are located within existing EFH.

Alternative 4 (Project)

Alternative 4 (Project) would consist of an onshore tunnel extending from the JWPCP along Figueroa/Western to the existing ocean outfalls at Royal Palms Beach and the rehabilitation of the existing ocean outfalls. The existing ocean outfalls are located within existing EFH.

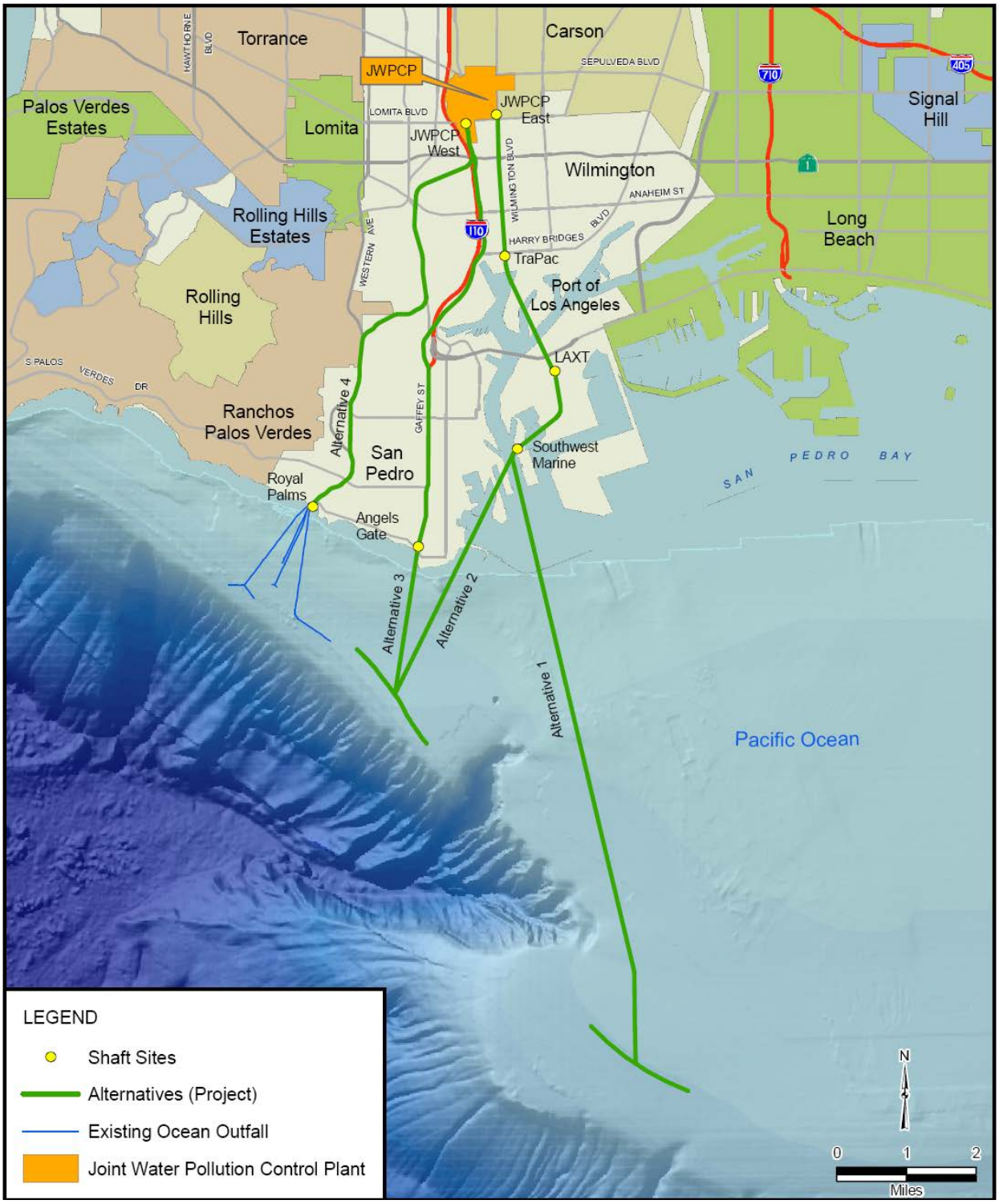

Figure EFH-1: Four Alternatives (Project)

3.0 PROJECT DESCRIPTION

The following section includes a discussion of activities associated with construction and operation of the project elements that could result in potential impacts to EFH. The project elements that could potentially affect the marine environment and EFH include:

- Construction of offshore riser.
- Construction of offshore diffuser.
- Rehabilitation of the existing ocean outfalls.
- Operating new riser and diffuser continuously.
- Operation of rehabilitated existing ocean outfall under emergency conditions only.

Construction of the offshore tunnel would result in generating excavated offshore material (i.e., fill), which could be disposed of at either Ocean Dredged Material Disposal Site (ODMDS) LA-2 or ODMDS LA-3 or an upland disposal site. The effects from fill disposal at the ODMDS LA-2 and ODMDS LA-3 were evaluated previously. If the material is not suitable for ocean disposal, it will be appropriately used onshore, and there would be no subsequent effects to EFH. Therefore, offshore tunneling would not directly affect EFH since it would occur beneath the seafloor and the effects of disposal have already been analyzed.

Shaft sites would be required along each alignment to facilitate onshore tunnel construction, such as JWPCP East, JWPCP West, LAXT, and so forth, as depicted in Figure EFH-1. All shaft sites would be constructed on land, and there would be no effects to EFH from their construction or use.

3.1 CONSTRUCTION AND OPERATION OF OFFSHORE RISER AND DIFFUSER

There are two proposed riser and diffuser locations: the SP Shelf and PV Shelf. The SP Shelf site would be located approximately 7.5 miles (mi) from the Los Angeles-Long Beach Harbor Complex (port complex) breakwaters. The riser assembly would be located at a depth of approximately 61 m (200 ft) of water and would extend approximately 34 m (110 ft) below the seafloor to meet the tunnel.

The PV Shelf site would be located approximately 3.2 km (2 mi) from Point Fermin. The riser assembly would be located at a depth of approximately 53 m (175 ft) of water and would extend approximately 44 m (145 ft) below the seafloor to meet the tunnel. The PV Shelf site is within the boundaries of the EPA-designated **d**ichloro**d**iphenyl**t**richloroethane (DDT) contaminated sediment study area.

Construction and operation of the riser and diffuser are described in Chapter 3 and Chapter 13 of the EIR/EIS. This section summarizes some of the details associated with construction relevant to impacts to EFH. At the downstream terminus of the offshore tunnel alignment for Alternatives 1, 2, and 3 (Project), a riser would be constructed to physically connect the offshore tunnel to seafloor diffuser lines. Hydro-jetting or pile-driving would be used to install the riser casing. The riser would be constructed of steel with a concrete lining. The riser inner casing diameter would be approximately 4 m (13 ft) and the outer casing diameter would be approximately 4.9 m (16 ft). The riser would be driven into the seafloor to the

offshore tunnel. Sediments would then be removed by mechanical means. The top of the riser head structure would be positioned approximately 6.1 m (20 ft) above the surrounding seafloor. Ballast rock would be placed within a 23-m (75-ft) radius around the riser head to protect the structure.

For Alternatives 1, 2, and 3 (Project), the seafloor diffusers would be constructed from either steel pipe, reinforced concrete pipe (RCP), or high-density polyethelene (HDPE) pipe. Each type of piping would include diffuser ports that would be spaced to facilitate initial dilution and distribution of the treated effluent. They would be protected by ballast rock to withstand impact forces from falling anchors and to minimize the risk of snagging by anchor wires and chains.

If the diffusers were constructed of steel or RCP, the diffusers would consist of two legs oriented out of the riser head, 120 or 180 degrees apart, and each leg would be approximately 1,219 m (4,000 ft) long. The inner diameter of the steel or RCP diffusers would incrementally decrease in sizes ranging from approximately 132 inches to 48 inches (11 feet to 4 feet). Installation of the steel or RCP diffusers would require seafloor grading and dredging for site preparation purposes. The dredged materials would be sidecast, if feasible, on the SP Shelf. On the PV Shelf, sidecasting would not occur and the sediment would be removed. The diffuser installation may also require construction of a roadbed base of ballast rock that would be approximately 7.6 to 16.5 m (25 to 54 ft) wide and 0 to 1.5 m (0 to 5 ft) deep on the SP Shelf. The diffusers would be placed on the roadbed with additional ballast rock up to the center of the pipe for stability. The riser and diffusers would cover a seafloor area of approximately 5 to 10 acres, depending on the required roadbed depth.

If the diffusers were constructed of HDPE, no trenching or dredging would be required. The HDPE would be placed directly on the seafloor, which may require some minor grading. There would also be a limited amount of ballast rock required to protect the piping and riser. The HDPE design would consist of a manifold with eight diffuser legs configured in a sequentially staggered array from shortest to longest. The pipe outer diameter would range in sizes from approximately 63 inches to 42 inches (5.25 feet to 3.5 feet). The riser, manifold, and diffusers would cover a seafloor area of approximately 8 acres. Approximately 1,500 pre-installed concrete anchor blocks would be attached to HDPE piping to provide ballast during the sinking and installation process as well as to provide stability against ocean currents and wave-induced hydrodynamic loading.

Once constructed, the new diffuser located either on the SP Shelf or the PV Shelf would operate continuously. It is anticipated the system would discharge up to 400 million gallons per day (mgd) during average dry-weather conditions, with up to 927 mgd during peak wet-weather conditions. This discharge is the same as the discharge currently released from the existing ocean outfalls. Effluent would consist of wastewater treated to secondary levels, the same as the level of treatment currently provided.

3.2 REHABILITATION AND OPERATION OF THE EXISTING OCEAN OUTFALLS

Each project alternative and Alternative 4 (Project) would include rehabilitation of the existing ocean outfalls. The existing ocean outfalls extend from the manifold structure at Royal Palms Beach. The rehabilitation includes joint repairs and re-ballasting. The re-ballasting work would occur on the existing

72-, 90- and 120-inch outfalls in water depths ranging from approximately 6 to 15 m (20 to 50 ft). A small derrick barge would be used to place the ballast rock around the outfalls and support the joint repair work. Joint repairs would involve temporarily removing some of the existing ballast rock from around the outfall to fully expose the joint being repaired. A coupling, which is a giant clamp that wraps around the joint, would be installed and the annular space filled with concrete. The existing ballast rock would be replaced around the pipe.

Under Alternative 4 (Project) the rehabilitated existing ocean outfalls would operate exactly as they currently do. Under Alternatives 1, 2, or 3 (Project) the existing ocean outfalls would only be used under emergency conditions (e.g., shut down of the new riser and diffusers).

4.0 DESCRIPTION OF THE STUDY AREA

The study area includes both the PV and SP shelves, located within the Southern California Bight (SCB), since the project elements would be constructed on either the PV Shelf or the SP Shelf. Detailed descriptions of the different areas are presented in Chapter 13 and Appendix 13-A of the EIS/EIR. Construction of the risers and diffusers could potentially affect fish/invertebrate communities that comprise EFH. Habitat types in the project area are presented in Figure EFH-2.

The SP Shelf site would be located approximately 12 km (7.5 mi) from the port complex breakwaters. The riser assembly and diffuser assembly would be located at a depth of approximately 60 m (200 ft) of water. At about 22 km (13.5 mi) wide, the SP Shelf is one of the widest in the SCB (Jones 1969:14–20). Along the mainland shore, the shelf extends from the Palos Verdes Peninsula on the northwest to the Newport Sea Canyon to the southeast, and extends generally south offshore of the port complex over an area commonly referred to as San Pedro Bay. The outer edge of the SP Shelf is defined by a shelf break found at a depth of about 140 m (460 ft), beyond which a narrow slope region drops steeply to the depths of the San Pedro Basin (SCCWRP 1973:22–24). The SP shelf site diffuser area is a relatively flat area on the southwest edge of the SP Shelf (Figure EFH-2). The riser location is approximately 3,200 m (2 mi) southeast of the southern edge of the San Pedro Sea Valley, and approximately 1,600 m (1 mi) northwest of the shelf break.

The PV Shelf site is a relatively flat area on the southeast edge of the PV Shelf (Figure EFH-2). The riser location is approximately 2,250 m (1.4 mi) northwest of the northern edge of the San Pedro Sea Valley, and approximately 800 m (0.5 mi) northeast of the shelf break. The PV Shelf varies from about 1 km (0.6 mi) to 6 km (3.7 mi) in width (EPA 2010). The PV Shelf extends offshore of the Palos Verdes Peninsula, south of Pt. Fermin to the San Pedro Sea Valley, then follows the peninsula to Palos Verdes Point on the northwest, a distance of about 15 km (9.3 mi). The outer edge of the PV Shelf is defined by a shelf break at depths of about 70 to 100 m (230 to 330 ft).

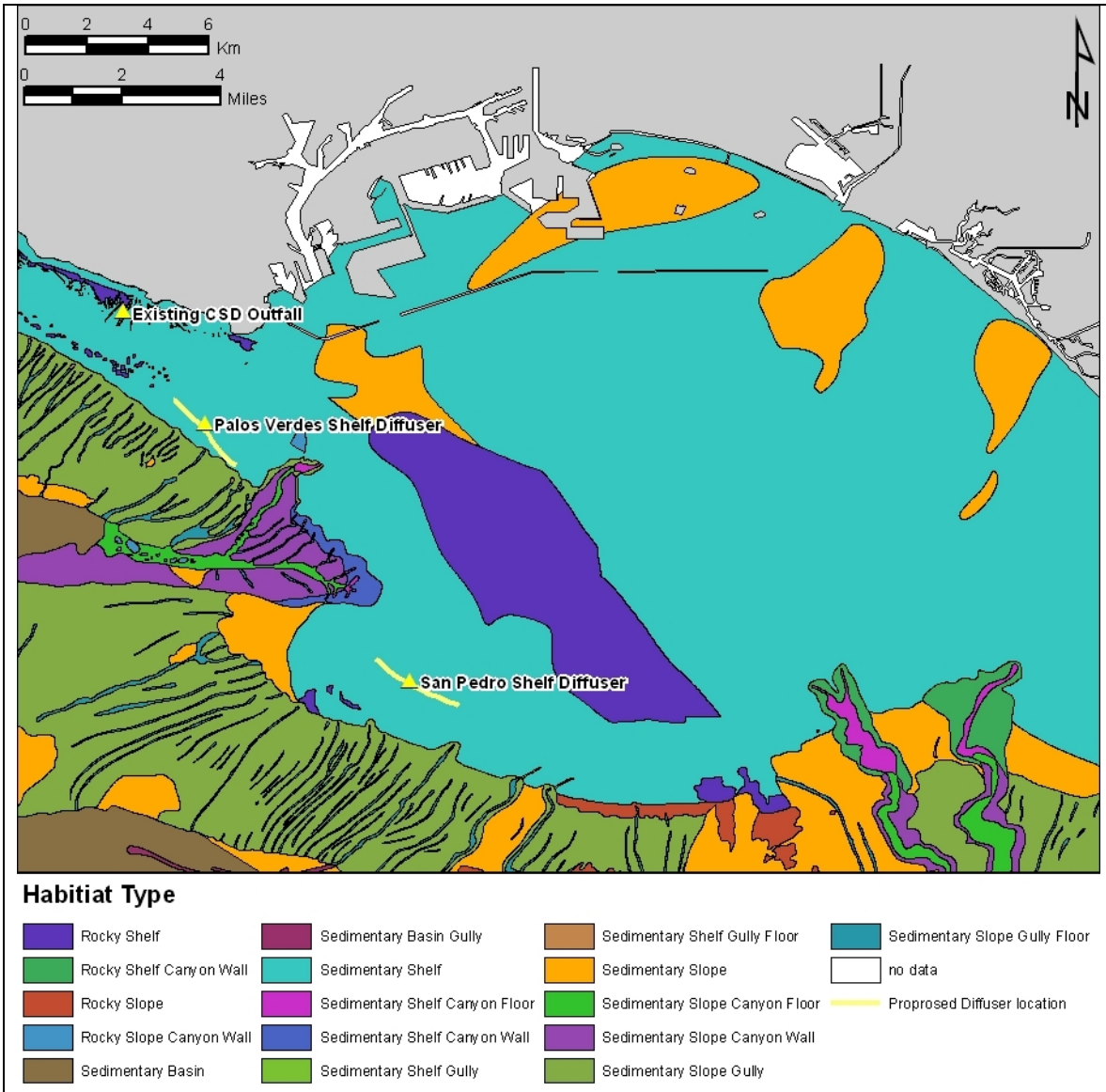

Figure EFH-2. Habitat types on the San Pedro and Palos Verdes Shelves.

5.0 FISH AND INVERTEBRATE COMMUNITIES

5.1 FISH DIVERSITY

Ichthyoplankton

Most fish release eggs and sperm to the environment for external fertilization. Both eggs and newly hatched larvae are usually found throughout the water column (pelagic), subject to dispersion by ocean currents. Ichthyoplankton are generally well known in the SCB, due in large part to the California Cooperative Oceanic Fisheries Investigations (CalCOFI) program, which has been investigating oceanic and biological aspects of the California Current system since the late 1940s. More than 150 ichthyoplankton taxa have been identified from within a few kilometers of the coast in the SCB (Cross and Allen 1993:476–483). A summary of the dominant ichthyoplankton taxa in the SCB is presented in Table EFH-1.

Ichthyoplankton mortality is extremely high and the number of individuals declines precipitously between the egg and juvenile stages. However, mortality stabilizes during late larval and early juvenile stages (Cross and Allen 1993). Ichthyoplankton abundances are spatially and temporally variable in the SCB, and distribution of some common species, such as northern anchovy (*Engraulis mordax*) and jack mackerel (*Trachurus symmetricus*), are usually very patchy. Ichthyoplankton abundance in the SCB has two peaks (Cross and Allen 1993). In the winter-spring peak, 69% of the nearshore ichthyoplankton assemblage is comprised of the larvae of fish with a northern range limit of Oregon to Canada. During the summer-fall abundance peak, 91% of larvae are fish species with a northern range limit from Pt. Conception to Monterey.

Geographical distribution of larval fish is related to habitat preference of the adult fish (Cross and Allen 1993). Larval stages of jack mackerel, Pacific hake (*Merluccius productus*) and epipelagic species (those found in the upper water column, or photic zone) are most abundant 10–100 km (6.2–62 mi) from the coast. California halibut (*Paralichthys californicus*) and turbot (*Pleuronichthys* spp.), sea bass (*Paralabrax* spp.), and combtooth blenny (*Hypsoblennius* spp.) larvae are most abundant within 10 km (6.2 mi) of the coast. White croaker (*Genyonomus lineatus*) larvae are abundant within 4 km (2.5 mi) of the shore, while the larvae of nearshore associates such as queenfish (*Seriphus politus*), gobies (Gobiidae), and silversides (Atherinopsidae) are most common within 2 km (1.2 mi) of the coast. Nearshore species tend to develop faster and recruit at a smaller size than epipelagic species, minimizing offshore transport. Northern anchovy, rockfish, and sanddab larvae show no apparent geographical distribution patterns in the SCB.

Table EFH-1. Dominant Ichthyoplankton of the SCB.

Fish taxa	Percent abundance in SCB	Percent abundance in SCB <100 km (62 mi) of coast
Northern anchovy	**80**	**83**
Rockfishes (*Sebastes* spp.)	**6**	**4**
California smoothtongue	**4**	**4**
Mexican lampfish	**2**	<1
Northern lampfish	<1	**2**
White croaker	<1	**2**
Pacific hake	**3**	**2**
Croakers (Sciaenidae)	**2**	<1
Sanddabs (*Citharichthys* spp.)	<1	**<1**
Popeye blacksmelt	**<1**	**<1**
California halibut	<1	**<1**
Combtooth blennies (*Hypsoblennius* spp.)	<1	**<1**
Shortbelly rockfish	**<1**	<1
Bocaccio	**<1**	<1
Speckled sanddab	**<1**	<1

Bold = top ten species in each category

Data presented in Cross and Allen (1993), originally from Loeb et al. (1983a, b) and Gruber et al. (1982).

SCB Juvenile and Adult Fishes

Fish habitats on the mainland shelf of the SCB include demersal (fish species generally associated with the bottom) soft-bottom associated, demersal hard-bottom associated, and pelagic (open-water) fish species.

Demersal fish. In the SCB, soft-bottom substrate is the dominant habitat on the mainland shelf. Bottom trawl surveys at shelf depths in the SCB have historically been dominated by scorpionfishes and rockfishes, perch, and flatfish (Allen 2006:171–172.). In nearshore shelf areas of the southern SCB, juvenile and adult flatfish, including speckled sanddab (*Citharichthys stigmaeus*), spotted turbot (*Pleuronichthys ritteri*), and California halibut are the most commonly encountered species (Allen and Herbinson 1991:1–16). Larval and small queenfish, white croaker, and northern anchovy are less

commonly encountered, but occasionally occur in coastal areas in large abundances as expected with the schooling nature of these species. Schooling species such as these are dominant just outside of the surf zone throughout the SCB. The fish assemblage of the mainland shelf changes with both latitude, and more notably, with depth (Cross and Allen 1993:496–503). Fish species replacement is most rapid from the surf zone to about 25 m (82 ft) depth, and between 100 and 150 m (328 and 492 ft). Flatfish contribute a greater proportion to the fish assemblage with increased depth across the shelf, and are more common in the southern bight.

Regional demersal fish studies conducted in the southern SCB in 1994, 1998, and 2003 found some differences in the demersal fish community between surveys. In 1994, Pacific sanddab *(Citharichthys sordidus*), yellowchin sculpin (*Icelinus quadriseriatus*) and plainfin midshipman (*Porichthys notatus*) were the most abundant species at mid-shelf depths (26 to 100 m [85 to 328 ft]), each of which was found over more than 70% on the SCB shelf at that depth (Allen et al. 1998). In 1998, California lizardfish (*Synodus lucioceps*), Pacific sanddab, and longfin sanddab (*Citharichthys xanthostigma*) dominated the mid-shelf (31 to 120 m [102 to 394 ft]) demersal fish community, and of these only Pacific sanddab was found on more than 70% of the shelf at those depths (Allen et al. 2002). California lizardfish, a warm-water recruiter, was not among the most abundant species in 1994, suggesting that the high abundances were related to the ongoing El Niño during the 1998 sampling. In 2003, the mid-shelf (31 to 120 m [102 to 394 ft]) fish assemblage was again dominated by Pacific sanddab, which was found to occur over 100% of the study area at these depths, yellowchin sculpin, and longspine combfish (*Zaniolepis latipinnis*), both of which were found to occur over 74% of the area at these depths (Allen et al. 2007). Despite some differences in dominant species between surveys, a core group of species comprised of Pacific sanddab, yellowchin sculpin, plainfin midshipman, and longspine combfish were found to be both abundant and frequently encountered at the mid-shelf depths during all surveys, suggesting that a stable and recurring demersal fish community exists at the those depths in the SCB.

Hard-bottom associated fish. In the SCB, hard substrate bottoms are the least abundant, but one of the most important habitats for fish (Cross and Allen 1993:506–518). In the SCB, about 30% of fish species, and 40% of fish families are associated with hard substrate. More than 125 fish species of more than 40 families are found on shallow reefs and kelp beds, while another 30 species of at least 10 families are found on the deep reefs of slopes and canyon edges. On shallow reefs, fish assemblage and abundance will vary based on the presence or absence of kelp, with fewer species and numbers found when kelp is absent. In the SCB common shallow reef fish species associated with rocks include pile perch (*Rhacochilus vacca*), black perch (*Embitoca jacksoni*), garibaldi (*Hypsypops rubicundus*), and tree fish (*Sebastes serriseps*), while barred sand bass (*Paralabrax nebulifer*), California scorpionfish (*Scorpaena guttata*) and blackeye goby (*Rhinogobiops nicholsii*) are attracted to the sand interface at the base of the reef. If kelp is present, kelp bass (*Paralabrax clathratus*), blacksmith (*Chromis punctipinnis*), giant kelpfish (*Heterostichus rostratus*), señorita (*Oxyjulis californica*), and California sheephead (*Semicossyphus pulcher*) are common (Cross and Allen 1993:506–518; Allen et al. 1998:232–241). At mid-shelf depths (30 to 100 m [98 to 328 ft]) large kelps are absent and rockfishes, including halfbanded rockfish (*Sebastes semicintus*), vermilion rockfish (*S. miniatus*), and bacaccio (*S. paucispinis*) are

common in hard-bottom habitats (Allen et al. 1998:253–261). Other species found commonly on mid-shelf reefs include California scorpionfish, blackeye goby, and lingcod (*Ophiodon elongatus*).

Pelagic Fish. Pelagic fish communities tend to be similar throughout the SCB, characterized by small schooling fish species such as northern anchovy and Pacific sardine (*Sardinops sagax*), schooling predators such as Pacific bonito (*Sarda chiliensis*) and yellowtail (*Seriola lalandi*), and large solitary predators such as blue shark (*Prionace glauca*) and swordfish (*Xiphias gladius*) (Cross and Allen 1993: 465–470; Allen et al. 2006:329–333). Distribution of northern anchovy, likely the most abundant pelagic species in nearshore waters in the SCB, is patchy, and abundances when taken may be high. Other species that may be commonly taken in the nearshore water column are queenfish, which aggregate near the bottom during the day, and white croaker, which aggregate in the water column during the day. Both species disperse to feed at night.

Commercial and Sport Fisheries. The SCB supports a wide range of commercial and recreational fisheries for both fishes and invertebrates. Commercial target species include: short-lived, fast-growing and productive species such as northern anchovy, Pacific sardine, Pacific mackerel (*Scomber japonicus*), and jack mackerel; slow-growing, long-lived demersal species such as flatfishes and rockfishes; and large, fast-growing migratory species such as tuna, yellowtail, and swordfish. (Cross and Allen 1993:463–465). Tunas, mackerel, bonito, and anchovy dominate the commercial fish landings. Declines in fish stocks have resulted in season restrictions, limited numbers of licenses issued, size limits and quotas, fishery closures, and gear restrictions. As a result, the use of bottom trawls and gill nets is restricted within 5.6 km (3 nautical miles [nm]) of shore throughout the SCB, and gill nets have additional restrictions for minimum bottom depth at which they can be set (which varies by region throughout southern California).

Several invertebrate species that occur in the SCB support active commercially-important fisheries. These species include: California market squid (*Doryteuthis opalescens*), California spiny lobster (*Panulirus interruptus*), rock crabs (*Metacarcinus* and *Romaleon* spp), red sea urchin (*Strongylocentrotus franciscanus*), spot prawn (*Pandalus platyceros*), ridgeback prawn (*Sicyonia ingentis*), and sea cucumber (*Parastichopus* spp.*)* (Leet et al. 2001). California spiny lobster also supports an important recreational fishery. Several other invertebrate species are taken as bycatch in other fisheries or support only a small commercial fishery.

Recreational fisheries include fishing by individuals, ranging from subsistence to pleasure fishing. Although recreational fisheries overwhelmingly use hook and line, four modes of fishing are noted in the SCB: shore fishing, pier and manmade structure fishing, private and rental vessels, and commercial passenger fishing vessels (party boats). Fish species taken vary by mode. Between 1995 and 2000, the three most numerous fish species taken by shore fishers in southern California were barred surfperch (*Amphistichus argenteus*), yellowfin croaker (*Umbrina roncador*), and opaleye (*Girella nigricans*) (Allen et al. 2006:580–586). Pier fishing during the same period was dominated by Pacific mackerel, jacksmelt (*Atherninopsis californiensis*), and Pacific sardine. Species caught by private and party vessels were similar overall, with the private boat catch dominated by Pacific mackerel, barred sand bass, and yellowtail, while the party boat catch was dominated by barred sand bass, Pacific mackerel, and kelp bass.

JWPCP Long-Term Fish Summary. The Sanitation Districts have sampled fish communities in the receiving waters of their outfalls since 1972. The monitoring program currently consists of quarterly surveys, with trawls along four transects extending from Bluff Cove (northwest Palos Verdes Peninsula) to just west of Point Fermin. At each transect, trawls are performed on four isobaths: 23 m (75 ft), 61 m (200 ft), 137 m (450 ft), and 305 m (1,000 ft). Data from the 305-m (1,000-ft) trawls were not analyzed prior to 1997 (Sanitation Districts 2001). The fish community off Palos Verdes between 23 and 137 m (75 and 450 ft) is dominated by flatfishes (Pleuronectiformes) and scorpionfishes (Scorpaenidae) (Stull and Tang 1996:218). The proportion of rockfish decreased from 1973 to 1993, while the relative abundance of flatfishes in trawl samples increased. Seven species accounted for 6% or more each of the total abundance during the 21-year period: Dover sole (*Microstomus pacificus*; 17%), stripetail rockfish (*Sebastes saxicola*; 9%), slender sole (*Eopsetta exilis*; 8%), Pacific sanddab (*Citharichthys sordidus*; 8%), plainfin midshipman (*Porichthys notatus*; 8%), yellowchin sculpin (*Icelinus quadriseriatus*; 7%), and speckled sanddab (*Citharichthys stigmaeus*; 6%). Water depth was the primary determinant of spatial distribution of Palos Verdes from 1973 to 1993 (Stull and Tang 1996:238).

Dover sole was most abundant on the upper slope (137 m [450 ft]) near the outfalls in the 1970s, but abundance declined thereafter. This species is usually buried in sediments when inactive (Stull and Tang 1996:219). Stripetail rockfish was abundant at all three depths (23, 61, and 137 m [75, 200, and 450 ft]) in the early 1970s; however, it persisted primarily at the deepest depth. Slender sole was recorded only at the deepest stations (137 m [450 ft]), and abundance increased after 1986. Like Dover sole, slender sole is usually buried when inactive. Pacific sanddab was usually collected at 61 and 137 m (200 and 450 ft), and abundance was usually reduced during warm-water El Niño conditions. Sanddabs are also usually buried when inactive. Plainfin midshipman preferred upper slope and outer shelf habitats (61 and 137 m [200 and 450 ft]), and abundance increased following the 1983 El Niño. This species also buries when not active.

SP Shelf Juvenile and Adult Fishes

Soft-bottom Associated Demersal fish. The demersal fish populations of the SP Shelf were evaluated in 2003 as part of the SCB regional monitoring study (Allen et al. 2007). In demersal trawls at four stations in areas considered to be unimpacted on the SP Shelf between the depths of 25 and 85 m (82 and 279 ft) the number of individuals caught ranged from 192 to 937, averaging 858 individuals per trawl (SCCWRP 2010d). Number of species per station ranged from 9 to 16 and averaged 14 species per trawl, with 27 fish species taken overall in the survey. Three species, roughback sculpin (*Chitonotus pugetensis*), California scorpionfish, and English sole (*Parophrys vetulus*) were taken at all four stations, though abundances for these species were moderate or low overall. Six additional species, speckled sanddab, Pacific sanddab, yellowchin sculpin, California tonguefish (*Symphurus atricaudus*), hornyhead turbot (*Pleuronichthys verticalis*), and bigmouth sole (*Hippoglossina stomata*), were taken at three of the four stations during the survey. Of these, speckled sanddab, Pacific sanddab, and yellowchin sculpin were among the most abundant species taken with 344, 331, and 173 individuals caught. The most abundant species, halfbanded rockfish with 702 individuals and longfin sanddab with 496 individuals, were both highly dominant at one station, though both also occurred in low numbers at a second station on the shelf.

Fish biomass was variable among the four stations, ranging from 2.3 to 22.6 kg (5 to 50 lbs) and averaging 10.2 kg (22.5 lbs) (SCCWRP 2010e). Biomass was dominated by Pacific sanddab, which contributed 42% to the total biomass for the four stations. Halfbanded rockfish contributed another 8% to the combined biomass, followed by California skate (Raja inornata) and bigmouth sole at 5% of the total each.

Hard-bottom Associated Demersal Fish. The SP Shelf diffuser area is a relatively flat area with little rocky structure in the immediate vicinity. On the SP Shelf, reefs and rocky substrate occur along the shelf edge, as well as inshore of the project at shallower depths in the Horseshoe Kelp area. Recreational species taken on the SP Shelf reefs include rockfish, lingcod, ocean whitefish (*Caulolatilus princeps*), and California scorpionfish. In a photo survey of seafloor habitats on the SP Shelf, blackeye goby was the most frequently observed fish species at rocky areas at mid-shelf depths (Cadien et al. 2006). The nearest known reef to the proposed diffuser area is approximately 5 km (3 mi) southeast of the riser at a shallower depth (Sloan pers. comm. 2007).

PV Shelf Juvenile and Adult Fishes

Soft-bottom Associated Demersal fish. In 2006 and 2007, quarterly trawls were conducted on the PV Shelf as part of the JWPCP receiving water monitoring program, including two locations on the 61-m (200-ft) isobath upcoast and downcoast of the discharges at Stations T4-61 and T5-61, respectively. These stations are located only slightly deeper than the proposed riser and diffuser location and are relatively near; the closer of the trawl locations is about 2 km (1.3 mi) northwest of the proposed project area.

In 2006, 1,922 individual fish of 26 species and weighing 134.9 kg (297 lbs) were taken in quarterly trawls at Station T4-61, upcoast of the outfalls (Sanitation Districts 2008b). Of those, eight species contributed 5% or more to the total abundance. Pacific sanddab, with 25% of the total (486 individuals), was the most abundantly taken species followed by California scorpionfish (14%), longspine combfish (12%), and yellowchin sculpin (10%). Speckled sanddab, Dover sole, California tonguefish, hornyhead turbot, and plainfin midshipman were also among the most abundant species. Biomass at T4-61 was dominated by California scorpionfish with nearly 66% of the total weight (88.4 kg [195 lbs]). Hornyhead turbot and California skate (*Raja inornata*) contributed another 7% and 6% to the total, respectively. At Station T5-61 downcoast of the outfalls, 2,168 individuals of 22 species weighing 49.7 kg (110 lbs) were taken during the four surveys. Five species contributed 5% or more to the total abundance, all among the most abundant at Station T4-61. Pacific sanddab was again most abundant accounting for 48% of the catch with 1,040 individuals, followed by yellowchin sculpin with 11% of the catch. Other common species included longspine conbfish, Dover sole, and California tonguefish. Pacific sanddab also dominated the biomass, contributing 27%, while hornyhead turbot accounted for another 15% of the total. California scorpionfish, English sole, longspine combfish, California tonguefish, and Dover sole also contributed 5% or more to the total biomass.

In 2007, 2,664 individual fish of 26 species and weighing 73.7 kg (162 lbs) were taken in quarterly trawls at Station T4-61 (Sanitation Districts 2008b). Nine species contributed 5% or more to the total abundance. Three species, Pacific sanddab, with 18% of the total (482 individuals), yellowchin sculpin

(16%), and stripetail rockfish (*Sebastes saxicola*; 14%) were the most abundant. Other common species included English sole, longspine combfish, California tonguefish, plainfin midshipman, Dover sole, and hornyhead turbot. Biomass at T4-61 was dominated by English sole with 25% of the total weight (18.4 kg [41 lbs]). Hornyhead turbot and California scorpionfish contributed 16% to the total each and California tonguefish and Pacific sanddab were each responsible for more than 5% of the combined weight at the station. At Station T5-61, 2,099 individuals of 23 species weighing 41.45 kg (91 lbs) were taken during the four surveys. Six species contributed 5% or more to the total abundance. Halfbanded rockfish was the most abundant species accounting for 27% of the catch with 576 individuals, followed by Pacific sanddab with 24% of the catch. Other species common species included yellowchin sculpin, plainfin midshipman, longspine combfish, and California tonguefish. Halfbanded rockfish also dominated the biomass contributing 24%, while Pacific sanddab accounted for another 17% of the total. Hornyhead turbot, California scorpionfish, English sole, California tonguefish, and plainfin midshipman also contributed 5% or more to the total biomass.

In both 2006 and 2007, the trawl-caught fish assemblages were similar to those found throughout the SCB, dominated by commonly occurring flatfishes and other species typical of soft bottoms at mid-shelf depths, as well as some species likely attracted to the hard substrate of the outfalls. On the PV Shelf, depth has been found to be the primary influence on community composition (Sanitation Districts 2008b), suggesting that the fish assemblages at the proposed riser location will be similar to those at the nearby monitoring stations.

Hard-bottom Associated Fish. While the PV Shelf riser area is a relatively flat soft bottom habitat, rocky structure is found approximately 1.5 km (0.9 mi) southeast of the riser area at a shallower depth (Sloan pers. comm. 2007). Similar to the fish assemblage found at Stations T4-61 and T5-61, some species attracted to structures are likely to be found in the area. Hard-bottom associated fish species reported in JWPCP monitoring included California scorpionfish, second highest in abundance at T4-61 in 2006, and blackeye goby, calico rockfish (*Sebastes dallii*), and shiner perch (*Cymatogaster aggregata*), which were taken on occasion in low numbers (Sanitation Districts 2008b).

Invertebrate Diversity

Epibenthic invertebrates (or epifauna) are those that live on soft-bottom habitat and are generally collected in bottom trawl samples. These organisms are larger than infaunal species, are generally less common and, therefore, are spaced further apart. On the SCB mainland shelf epifaunal invertebrates include sea stars, sea cucumbers, sand dollars, sea urchins, crabs, snails, and sea slugs. In shallow, sandy areas, sand dollars (*Dendraster excentricus*) may form dense beds that migrate inshore and offshore by season and may vary in density and location year to year (Thompson et al. 1993a), while in rocky areas sea urchins (*Strongylocentrotus* spp) may be found in very dense, single-species patches that limit the abundance of other species. These species are well adapted to the habitat where they are found, so species found on soft-bottom habitat burrow in or move over, or sometimes through, shifting sand and mud surfaces, while hard-bottom species are often attached to substrate, or have the ability to move over and often to cling to rocky surfaces. These species exhibit vertical zonation on the shelves based on depth

gradients, so while similar taxa groups are found across the mainland shelf, the actual species found vary by depth.

In a series of trawl surveys conducted in 1977, 1985, and 1990 on the SCB shelf along the 60-m (197-ft) isobath, white urchin (*Lytechinus pictus*) was found to be the most abundant epifaunal invertebrate species on the soft bottom at that depth (Thompson et al. 1993b). This species was occasionally in large-scale aggregations on the mainland shelf. Other commonly encountered species included ridgeback prawn and California sand star (*Astropecten californicus*). In regional monitoring conducted in 2003, six invertebrate species where found to occur on more than 50% of the soft-bottom area of middle shelf depths (31 to 120 m [102 to 394 ft]) in southern California (Allen et al. 2007). These species were, in descending order of area found, white sea urchin, California sand star, brittle star (O*phiura luetkenii)*, red octopus (*Octopus rubescens*), trailtip sea pen (*Acanthoptilum* sp), and gray sand star (*Luidia foliolata*).

In rocky or hard-bottom areas a different suite of epibenthic invertebrates are found. In relatively shallow areas less than about 20 m (66 ft) depth the habitat may be dominated by the presence of giant kelp (*Macrocystis pyrifera*) which competes for attachment space with other algas as well as attached invertebrate species such as bryozoans, mussels (*Mytilus* spp), sea anemones, rock scallops (*Crassadoma gigantea*), sponges, sea fans *(Muricea* spp), feather duster worms (a polychaete, Family Serpulidae), wormsnails (Vermetidae), and sea squirts (Ascidiacea) (Thompson et al. 1993a). These sessile species are generally dominant unless macroalgae are very abundant. Most of these sessile invertebrates feed by filtering plankton and detritus from the water column. Motile invertebrates hide in crevices or are protectively colored. Large invertebrate species include sea stars (*Pisaster* spp and *Pateria miniata*), octopus (*Octopus* spp), California spiny lobster, and abalone (*Haliotis* spp). Smaller species include rock crabs, polychaetes, bivalves, snails, amphipods, and isopods. As mentioned above, species tend to be replaced by related species with depth, so, for example while green abalone (*H. fulgens*) is more common in shallow rocky areas, it will be replaced by pink (*H. corregata*), red (*H. refusens*) and white abalone (*H. sorensoni*) with increasing depth. Below depths of about 30 m (98 ft), invertebrates will dominate the hard-substrate habitat including encrusting bryozoans, cup corals, and sea fans, though some red algal turfs may still occur. Because reefs are diverse and have an abundance of unique organisms, they are important sites for recreational diving and fishing

Pelagic Invertebrates. Larger, mobile pelagic invertebrates are those large or strong enough to swim against prevailing currents. In the SCB these species include cephlapods including California market squid (*Doryteuthis opalescens*) and occasionally Humboldt or jumbo squid (*Dosidicus gigas*). Pelagic red crab (*Pleuroncodes planipes*) and jumbo shrimp (*Tribe Caridea*) may also be abundant locally in southern California during warmer water periods.

Invertebrate Fisheries. Several species that occur in the SCB support active commercially important fisheries. These species include California market squid, California spiny lobster, rock crabs (*Metacarcinus* and *Romaleon* spp.), red sea urchin, spot prawn (*Pandalus platyceros*), ridgeback prawn, and sea cucumber (*Parastichopus* spp.*)* (Leet et al. 2001). California spiny lobster also supports an important recreational fishery. Several other invertebrate species are taken as bycatch in other fisheries or support only a small commercial fishery.

Market squid range from southeastern Alaska to Bahia Asunción, Baja California (Leet et al. 2001). In southern California, fisherman target schools in shallow water spawning areas in depths ranging from 15 to 45 m (49 to 148 ft). Most boats use powerful lights to attract squid to the water surface, where they capture them using roundhaul nets or brails, and though they are fishing in central and southern California, 90% of the take occurs south of Pt. Conception. In 1999, the total landings in California were 90 million kg (200 million lbs) (Leet et al. 2001). Large-scale fluctuations are characteristic of this fishery, and may be due, in part, to the short life span of the squid along with fishing pressure from the previous year. Climatological changes also play a large part in squid landings.

5.2 PROTECTED SPECIES

Some fish and invertebrate species (e.g., abalone) in southern California are protected under California Department of Fish and Game (CDFG) regulations, although few marine species are listed as either threatened or endangered. Special-status fish species that could occur on the PV Shelf and vicinity include garibaldi (*Hypsypops rubicundus*) and California grunion (*Leuresthes tenuis*).

Garibaldi, designated as the California state marine fish, is a bright orange shallow-water species that is relatively common around natural and artificial rock reefs in southern California. Because of its territorial behavior, it is an easy target for fishers and could be significantly depleted if not protected. Garibaldi spawn from March through October, and the female deposits demersal adhesive eggs in a nest that may contain up to 190,000 eggs deposited by several females (Fitch and Lavenberg 1975: 99–100). Garibaldi larvae were collected in the Long Beach Outer Harbor and in Fish Harbor in 2008 (Science Applications International Corporation (SAIC) 2009).

California grunion is a species with special status not because the population is threatened or endangered, but because their spring-summer spawning activities on southern California beaches put them at risk of overharvesting, and CDFG actively manages the fishery to ensure sustainability. Spawning occurs only three or four nights following each full or new moon, and then only for 1 to 3 hours immediately after the high tide, from late February to early September (Walker, B.W. 1949:127–130). The female swims onto the beach, digs tail-first into the wet sand, and deposits her eggs, which are then fertilized by the male. Normally, the eggs are triggered to hatch at the high tide of the subsequent new or full moon by the waves that reach high enough on shore to wash out the sand and carry the eggs to the ocean, approximately 10 days after fertilization (Walker 1952). California grunion are known to spawn on Cabrillo Beach.

Off southern California, species managed under the Magnuson-Stevens Fishery Conservation and Management Act are listed in the Coastal Pelagics Fishery Management Plan (FMP) and the Pacific Groundfish FMP. A discussion of these species is provided in Section 6.

6.0 EFH AND MANAGED SPECIES

EFH is managed under the MSA. This act protects waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). Substrates include sediment, hard bottom, structures underlying waters, and associated biological communities (NMFS 2002. The final rule for essential fish habitat. Federal Register 67(12):2343-2383. http://www.nero.noaa.gov/hcd/efhfinalrule.pdf)

NMFS (2002) defines specific EFH terms as follows (50 Code of Federal Regulations [C.F.R.] §§ 600.05–600.930):

- "Waters" include all aquatic areas and their associated biological, chemical, and physical properties that are used by fish and may include aquatic areas historically used by fish where appropriate.
- "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities.
- "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "Spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle."

Fish and invertebrate communities of the study area are presented in Section 4.0 of this report.

6.1 FISHERY MANAGEMENT PLANS

Under the MSA, the federal government has jurisdiction to manage fisheries in the U. S. Exclusive Economic Zone (EEZ), which extends from the outer boundary of state waters (3 nm [5.6 km] from shore) to a distance of 200 nm (370 km) from shore. Fishery Management Plans (FMPs) are extensive documents that are constantly revised and updated. The goals of the FMPs include, but are not limited to, the promotion of an efficient and profitable fishery, achievement of optimal yield, provision of adequate forage for dependent species, prevention of overfishing, and development of long-term research plans (PFMC 1998, 2008a). There are two FMPs that include waters adjacent to the proposed project site: the Coastal Pelagics FMP (6 species), and the Pacific Groundfish FMP (89 species).

6.1.1 Coastal Pelagics

Until 2008, the Coastal Pelagics FMP covered one invertebrate (market squid) and four fish species (northern anchovy, jack mackerel, Pacific [chub] mackerel, and Pacific sardine). Amendment 12 to the FMP was introduced in 2006 "to ensure the preservation of a key trophic relationship between fished and unfished elements in the California Current ecosystem by protecting krill resources off the U. S. West Coast" (PFMC 2008b). NMFS published the ruling in the Federal Register in July 2009 (FR 74[132]33372-3). Krill (euphausiids) are small, shrimp-like crustaceans that are eaten by many species of fish, whales, and seabirds. Although there is no fishery for krill off the U.S. West Coast, krill are fished in Antarctica, Japan, and off the west coast of Canada. They are used in aquaculture and livestock feed and for fish bait and pet foods. EFH for Coastal Pelagics is defined as all marine and estuarine waters from the

shoreline of the coasts of California, Oregon, and Washington offshore to the limits of the EEZ and above the thermocline. The thermocline is the portion of the water column where water temperature changes rapidly, usually warmer surface waters transitioning to cooler subsurface waters. The habitat for the Coastal Pelagics is primarily above the thermocline.

6.1.2 Pacific Groundfish

There are 89 fish species covered under the Pacific Groundfish FMP, including ratfish (*Hydrolagus colliei*), finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*); three species of sharks, three skates; six species of roundfish; 62 species of scorpionfishes and thornyheads; and 12 species of flatfishes (PFMC 2008a). For Pacific Groundfish, EFH includes all waters off southern California between Mean Higher High Water (MHHW) and depths less than or equal to 3,500 m (2.2 mi). The FMP also considers EFH to include areas of the upriver extent of saltwater intrusion. Lastly, specific Habitat Areas of Particular Concern (HAPCs) have been identified as estuaries, canopy kelp, seagrass, rocky reefs, and other specific areas (such as seamounts). Habitat associations for each species covered under the Pacific Groundfish FMP are presented in Attachment EFH-1.

6.2 RELEVANT SPECIES

Although there are nearly 100 fish/invertebrate species covered under the Coastal Pelagics and Pacific Groundfish FMPs, not all occur near the proposed project site.

6.2.1 Coastal Pelagics

All coastal pelagics are likely to occur in the vicinity of the proposed project. All coastal pelagics are associated with the water column (as opposed to the seafloor like many of the groundfish); however, female squid also lay egg masses on sandy bottoms during spawning at depths of about 5-55 m (16-180 ft), with most occurring between 20-35 m (66-115 ft) (PFMC 1998). Table EFH-2 lists the species included in the Coastal Pelagics FMP, whether their range is included off Los Angeles County, their depth range, whether they have been reported in ongoing monitoring programs off the joint outfall system (from Stull and Tang 1996, or Sanitation Districts 2001, 2008), and whether they were reported in commercial catch block data off Palos Verdes (CDFG 2007). While krill have not been reported as part of the catch under Sanitation Districts trawling programs, they routinely occur (D. Cadien, pers. comm. 2011). Since they are not demersal invertebrates they are not intended to be sampled under the program, and are considered an incidental and unreportable catch.

Table EFH-2. Occurrence of Coastal Pelagic Fish/Invertebrate Species Near the Proposed Project Sites Based on Past Surveys and Reports.

Common Name	Range Included?	Depth Range	Collected via trawl by Sanitation Districts?			Reported in 2006 Catch Blocks?	
			1973-93	2000	2006-7	719	740
northern anchovy	X	0 – 310 m (0 – 1,017 ft)	X	X		X	
jack mackerel	X	0 – 46 m (0 – 151 ft)	X			X	
Pacific mackerel	X	0 – 302 m (0 – 991 ft)	X			X	X
Pacific sardine	X	Epipelagic				X	X
market squid	X	0 – 800 m (0 – 2,625 ft)	-		X	X	X

6.2.2 Pacific Groundfish

Almost all of the Pacific groundfish have ranges that include the waters off Palos Verdes.

Sharks. All three species of sharks listed in the Pacific Groundfish FMP have been collected off Palos Verdes (Table EFH-3). Only spiny dogfish have been collected in trawls; leopard and soupfin sharks have been reported in commercial fishery landing reports.

Skates. All skates have been collected off Palos Verdes: California, big, and longnose skate. Commercial fishery landings do not identify skates by species.

Ratfish, Rattail, and Codling. Spotted ratfish has been collected off Palos Verdes. However, Pacific rattail and finescale codling have not, likely due to their deeper depth range (>366 m [1,200 ft] for finescale codling and >701 m [2,300 ft] for Pacific rattail).

Roundfish. Five of the six roundfish species have been collected off Palos Verdes, including kelp greenling, lingcod, Pacific whiting (hake), cabezon and sablefish. Pacific cod has not been collected by trawl or listed in commercial landings off Palos Verdes.

Flatfishes. Nine of the twelve flatfishes listed in the Pacific Groundfish FMP have ranges that include the waters off Palos Verdes. Of these nine, seven species have been collected by trawl: curlfin sole, Dover sole, English sole, Pacific sanddab, petrale sole, rex sole, and rock sole. Commercial landings off Palos verdes include ‘unspecified sole’ and ‘sand sole.’ However, the southern range limit for sand sole is Redondo Beach, California (PFMC 2008a: 29). Dover sole was the most abundant species collected by trawl from 1973-1993 off Palos Verdes (Stull and Tang 1996:217).

Scorpionfishes. Of the 62 rockfishes and thornyheads that are listed in the Pacific Groundfish FMP, only 4 species do not have ranges that include the waters off Palos Verdes. The 58 remaining species occupy a variety of habitats and depth ranges, and at least 31 of these species have been collected during the Sanitation Districts’ trawl surveys since 1973. Two additional species—black rockfish and longspine thornyhead—have been reported in commercial landings. Stripetail rockfish was the second most

abundant species in trawl surveys from 1973-1993, comprising 9% of the total catch (Stull and Tang 1996, p. 216).

Table EFH-3. Occurrence of Pacific Groundfish Species Near the Proposed Project Sites Based on Past Surveys and Reports.

			Collected via trawl by Sanitation Districts?			Reported in 2006 Catch Blocks?	
Common Name	**Range?**	**Depth Range**	**1973-93**	**2000**	**2006-7**	**719**	**740**
leopard shark	Y	0 - 91 m (0 – 299 ft)				X	X
soupfin shark	Y	Shallow to 411 m (1,348 ft)				X	X
spiny dogfish	Y	Shallow to 366 m (1,201 ft)			X		
big skate	Y	3 - 800 m (9.8 – 2,625 ft)	X			*	*
California skate	Y	18 - 671 m (59 – 2,201 ft)	X	X	X	*	*
longnose skate	Y	55 - 622 m (180 – 2,041 ft)			X	*	*
ratfish	Y	Shallow to 366 m (1,201 ft)	X	X	X		
finescale codling	Y	366 - 3,048 m (1,201 – 10,000 ft)					
Pacific rattail	Y	701 - 1,829 m (2,300 – 6,001 ft)					
cabezon	Y	Intertidal to 76 m (249 ft)				X	X
kelp greenling	Y	Intertidal to 46 m (151 ft)	X				X
lingcod	Y	0 - 427 m (0 – 1,401 ft)	X	X			X
Pacific cod	Y	12 - 366 m (39 – 1,201 ft)					
Pacific whiting (hake)	Y	0 - 914 m (0 – 2,999 ft)	X	X	X		
sablefish	Y	0 - 1,524 m (0 – 5,000 ft)	X	X			X
rougheye rockfish	Y	25 - 2,830 m (82 – 9,285 ft)					
Pacific ocean perch	Y	37 - 825 m (121 – 2,707 ft)					
kelp rockfish	Y	18 - 58 m (59 – 190 ft)					
brown rockfish	Y	Shallow to 135 m (443 ft)	X		X		
aurora rockfish	Y	81 - 768 m (266 – 2,520 ft)		X			
redbanded rockfish	Y	49 - 625 m (161 – 2,051 ft)	X		X		
shortraker rockfish	Y	0 – 875 m (0 – 2,871 ft)					
silvergray rockfish	Y	0 - 436 m (0 – 1,430 ft)					
gopher rockfish	Y	0 - 80 m (0 – 262 ft)	X				
copper rockfish	Y	0 - 183 m (0 – 600 ft)	X				
greenspotted rockfish	Y	30 - 363 m (98 – 1,191 ft)	X	X	X		
black and yellow rockfish	Y	0 - 37 m (0 – 121 ft)					
dusky rockfish							
starry rockfish	Y	60 - 150 m (197 – 492 ft)	X				
darkblotched rockfish	Y	25 - 904 m (82 – 2,966 ft)	X				

Table EFH-3 (continued)

Common Name	Range?	Depth Range	Collected via trawl by Sanitation Districts?			Reported in 2006 Catch Blocks?	
			1973-93	2000	2006-7	719	740
calico rockfish	Y	0 - 256 m (0 – 840 ft)	X	X	X		
splitnose rockfish	Y	91 - 795 m (299 – 2,608 ft)	X	X	X		
greenstriped rockfish	Y	12 - 495 m (39 – 1,624 ft)	X	X	X		
swordspine rockfish	Y	50 - 433 m (164 – 1,421 ft)					
widow rockfish	Y	24 - 549 m (79 – 1,801 ft)					
pink rockfish	Y	45 - 366 m (148 – 1,201 ft)	X	X	X		
yellowtail rockfish	Y	0 - 549 m (0 – 1,801 ft)					
bronzespotted rockfish	Y	75 - 413 m (246 – 1,355 ft)					
chilipepper	Y	0 - 325 m (0 – 1,066)	X	X	X		X
rosethorn rockfish	Y	25 - 549 m (82 – 1,801 ft)					
squarespot rockfish	Y	18 - 224 m (59 – 735 ft)	X		X		
shortbelly rockfish	Y	91 - 491 m (299 – 1,611 ft)	X		X		
freckled rockfish	Y	36 - 290 m (118 – 951 ft)					
cowcod	Y	40 - 491 m (131 – 1,611 ft)	X	X	X		
Mexican rockfish	Y	76 - 238 m (249 – 781 ft)	X				
quillback rockfish		0 – 275 m (0 – 902 ft)					
black rockfish	Y	0 - 366 m (0 – 1,201 ft)					X
blackgill rockfish	Y	87 - 768 m (285 – 2,520 ft)		X			X
vermilion rockfish	Y	6 - 436 m (20 – 1,430 ft)	X	X			
blue rockfish	Y	0 - 549 m (0 – 1,801 ft)	X				
China rockfish							
tiger rockfish	?	18 - 298 m (59 – 978 ft)					
speckled rockfish	Y	30 - 366 m (98 – 1,201 ft)					
bocaccio	Y	12 - 478 m (39 – 1,568 ft)	X				X
chameleon rockfish	Y	174 - 274 m (571 – 899 ft)					
canary rockfish	Y	0 - 838 m (0 – 2,749 ft)					
redstripe rockfish	Y	12 - 425 m (39 – 1,394 ft)					
grass rockfish	Y	0 - 46 m (0 – 151 ft)	X			X	
yellowmouth rockfish							
rosy rockfish	Y	7 - 262 m (23 – 860 ft)	X				
greenblotched rockfish	Y	55 - 491 m (180 – 1,611 ft)	X	X	X		
yelloweye rockfish	Y	15 - 549 m (49 – 1,801 ft)					

Table EFH-3 (continued)

Common Name	Range?	Depth Range	Collected via trawl by Sanitation Districts? 1973-93	2000	2006-7	Reported in 2006 Catch Blocks? 719	740
flag rockfish	Y	30 - 418 m (98 – 1,371 ft)	X		X		
dwarf-red rockfish							
bank rockfish	Y	31 - 454 m (102 – 1,490 ft)					
stripetail rockfish	Y	25 - 547 m (82 – 1,795 ft)	X	X	X		
halfbanded rockfish	Y	15 - 402 m (49 – 1,319 ft)	X	X	X		
olive rockfish	Y	0 - 172 m (0 – 564 ft)	X				
treefish	Y	0 - 97 m (0 – 318 ft)					
pinkrose rockfish	Y	99 - 360 m (325 – 1,181 ft)					
honeycomb rockfish	Y	30 - 270 m (98 – 886 ft)	X		X		
harlequin rockfish							
pygmy rockfish	Y	29 - 383 m (95 – 1,257 ft)					
sharpchin rockfish	Y	25 - 495 m (82 – 1,624 ft)					
California scorpionfish	Y	Shallow to 183 m (600 ft)	X	X	X	X	X
shortspine thornyhead	Y	20 - 1,524 m (66 – 16,404 ft)		X	X		X
longspine thornyhead	Y	201 - 1,756 m (659 – 5,761 ft)					X
arrowtooth flounder	Y	18 - 732 m (59 – 2,402 ft)					
butter sole		Shallow to 146 m (479 ft)					
curlfin sole	Y	30 - 137 m (98 – 449)	X	X	X		
Dover sole	Y	27 - 914 m (89 – 2,999 ft)	X	X	X	*	*
English sole	Y	18 - 305 m (59 – 1,001 ft)	X	X	X	*	*
flathead sole							
Pacific sanddab	Y	9 - 549 m (30 – 1,801 ft)	X	X	X		X
petrale sole	Y	18 - 457 m (59 – 1,499 ft)	X		X		
rex sole	Y	18 - 640 m (59 – 2,100 ft)	X	X	X		X
rock sole	Y	15 - 146 m (49 – 479 ft)	X		X		X
sand sole							X
starry flounder							

** 'Sole' and 'Skates' in categories in Catch Block data (not identified to species).*

7.0 ASSESSMENT OF POTENTIAL IMPACTS

The following section includes a discussion of potential impacts resulting from both the construction and operation of the proposed project. The construction activities described in Section 3 could result in the following physical effects that could affect managed fishes/invertebrates:

- Suspension of sediments and increased turbidity;
- Suspension and redistribution of contaminated sediments;
- Noise/vibration from offshore construction activities;
- Disturbance and/or loss of habitat and organisms; and
- Introduction of contaminants due to spills.

Additionally, operation of the proposed project could affect EFH by:

- Changes in water quality due to operation of the outfall system; and
- Changes in habitat due to operation of the outfall system.

7.1 ASSESSMENT ASSUMPTIONS

The assessment for construction activities assumes the following requirements as summarized in Table EFH-4 would be followed for the proposed project or alternatives:

Table EFH-4. Assumptions and Requirements for Marine Construction Activities

Project Element	Construction Activity Subject to Regulation	Applicable Environmental Regulation	Responsible Agency	Purpose
Riser/Diffuser – SP Shelf PV Shelf	Dredging and placement of riser/diffuser structures within waters of the U.S. (i.e., discharge of fill in waters of the U.S.)	Section 401 of the CWA	LARWQCB[a]	CWA Section 401 Water Quality Certification ensures that discharge of dredge or fill materials in waters of the U.S. is in compliance with state water quality standards.
Riser/Diffuser – SP Shelf PV Shelf	Dredging and placement of riser/diffuser structures within waters of the U.S. (i.e., discharge of fill in waters of the U.S.)	Section 404 of the CWA	Corps	Section 404 of the CWA regulates discharge of dredge or fill materials in order to minimize impacts to the physical, chemical, and biological environment through avoidance, minimization, and compensation measures that are incorporated as permit conditions.

Table EFH-4 (continued)

Project Element	Construction Activity Subject to Regulation	Applicable Environmental Regulation	Responsible Agency	Purpose
Riser/Diffuser – SP Shelf PV Shelf	Transport of materials in navigable waters of the U.S.	Section 404 of the CWA	California Office of Spill Prevention and Response, SLC, CDFG, USCG	A spill prevention and control plan would be required for marine vessels carrying petroleum and nontank vessels over 300 gross tons. The plan would detail and implement spill prevention and control measures.
Riser/Diffuser – SP Shelf PV Shelf	Work and placement of structures in navigable waters of the U.S.	Section 10 of the RHA	Corps	Section 10 of the RHA protects navigation channels and lanes through regulation of work and structures in navigable waters of the U.S.
Riser/Diffuser – SP Shelf PV Shelf	Transport and disposal of dredge material	Section 103 of the MPRSA	Corps	Section 103 of the MPRSA regulates the transport and ocean disposal of dredge material in order to protect human health and the health of the marine environment.
Riser/Diffuser – SP Shelf PV Shelf	Pile driving of inner and outer riser casings	MMPA	NMFS	The MMPA protects marine mammals through regulation of activities that could result in the take or harassment of marine mammals.
Rehabilitation of the Existing Ocean Outfalls	Placement of ballast over the existing ocean outfalls (i.e., discharge of fill in waters of the U.S.)	Section 401 of the CWA	LARWQCB[a]	CWA Section 401 Water Quality Certification ensures that discharge of dredge or fill materials in waters of the U.S. is in compliance with state water quality standards.
Rehabilitation of the Existing Ocean Outfalls	Placement of ballast over the existing ocean outfalls (i.e., discharge of fill in waters of the U.S.)	Section 404 of the CWA	Corps	Section 404 of the CWA regulates discharge of dredge or fill materials in order to minimize impacts to the physical, chemical, and biological environment through avoidance, minimization, and compensation measures that are incorporated as permit conditions.

[a] RWQCB-Los Angeles Region (Region 4) has jurisdiction in the project area

These assumptions are incorporated in the analysis.

Suitable dredge and tunnel spoils as a result of construction activities would be disposed of at LA-2 or LA-3, or sidecast, if practicable, for graded seafloor sediments. If the material is not suitable for ocean disposal, it will be appropriately disposed of onshore. LA-2 and LA-3 are permanent offshore ocean sites approved by the EPA for the disposal of dredge materials from projects located within Los Angeles and

Orange Counties. Both LA-2 and LA-3 are located off the coast of Southern California as shown in Figure 3-26 of the EIR/EIS. The Southern California Dredge Material Management Team (SC-DMMT)[1] would determine the suitability of the sediment based on sediment testing and characterization requirements outlined in the Ocean Testing Manual, a joint guidance prepared by the EPA and the Corps. This decision and approval for ocean disposal is made as part of the Clean Water Act (CWA) Section 404 permitting process. Management of sediments found to be unsuitable for disposal at the LA-2 or LA-3 disposal sites or for sidecasting or seafloor grading would be consistent with practices outlined in the contaminated sediment task force long-term management strategy to appropriately handle and dispose of contaminated sediments.

7.2 DISTURBANCE DURING CONSTRUCTION

Impacts to species, communities, and habitats expected to occur as a result of project implementation were identified by examining the project description in view of the existing biological setting.

7.2.1 Sediment Suspension and Redistribution

Temporary disturbances in the water during riser and diffuser construction may affect EFH by suspending bottom sediment. The riser structure will be driven into the seafloor, and the encased sediments will be mechanically removed. Installation would require seafloor grading and dredging for site preparation. The dredged materials would be sidecast, if feasible. Sidecasting involves excavating seafloor sediments from the construction site with a clamshell dredge, raising and moving the clamshell away from the excavation site and releasing the sediments above the seafloor. All of these activities will result in the suspension of sediments into the water column. Placement of armor rock would also result in sediment suspension. Fish in the water column and on or near the bottom of the construction area would be temporarily disturbed by the underwater construction activities as a result of turbidity. Most fish would leave the immediate area of disturbance, although some may stay to feed on invertebrates released from the sediments.

Dredging and other underwater construction would affect water quality in the project area. The types of water quality impacts that could occur include short-term increases in suspended sediments and turbidity levels, decreases in DO concentrations, increases in nutrient concentrations, and increases in dissolved and particulate contaminant concentrations in areas where contaminated sediments would be disturbed by dredging and construction activities. These changes to water quality would be temporary and expected to be confined to the immediate vicinity (e.g., within 300 feet) of in-water construction and dredging activities and in the mixing zone defined by the water quality certification issued by the Regional Water Quality Control Board (RWQCB) and included by reference in dredge permit issued by the U.S. Army Corps of Engineers (Corps). Riser installation activities at the outfall tunnel terminus would suspend bottom sediments into the water column, causing localized and temporary turbidity. Each of these

[1] The SC-DMMT is an inter-agency body comprised of state and federal agencies that have direct permitting authority over dredging projects, and other stakeholder agencies. SC-DMMT member agencies include the EPA, the Corps (Los Angeles District), the California Coastal Commission, and California State Water Quality Control Boards, among others. The primary purpose of the SC-DMMT is to expedite reviews and approvals of dredging projects through monthly inter-agency meetings.

construction operations would occur over periods up to approximately 6 months. Resuspended sediments would settle fairly rapidly (within hours to days) and turbidity levels would decrease once activities were completed. Contaminants already present in those sediments could be resuspended in the water column (see discussion below) and would settle to the bottom with the sediments.

The certification and permits issued by the RWQCB and the Corps would include water quality standards that must be met at various distances from the dredging activities, the mixing zone, or other in-water activities. Total suspended solids (TSS) concentrations would drop to levels approaching background concentrations in the vicinity of the dredging activity and, therefore, resuspended sediments would settle in the vicinity of the dredging activities. Because of this, the water quality standards at the specified distances in the certification/permits resulting from in-water activities are not expected to be violated, and significant impacts to water quality would not result.

The dredging permit issued by the Corps would require the dredger to minimize the amount of water in the disposal vessel that flows back to the dredging site and prohibit the flow back of dredged water from containing any solid dredged material. Dredging would resuspend some bottom sediments and create localized turbidity plumes. For continuous dredging operations, elevated turbidity conditions would occur in the immediate vicinity of the dredge for periods of days to several weeks. Following completion or interruption of dredging, the time it takes for suspended materials to settle out, combined with the current velocity, would determine the size and persistence of the turbidity plume. Settling rates are largely determined by the grain size of the suspended material but are also affected by the chemistry of the particle and the receiving water (Corps and LAHD 1992:4B-41). Dredging sediments for the riser shaft and diffuser lines would generate a relatively small turbidity plume (i.e., within the mixing zone defined in the waste discharge requirement [WDR]).

Slight changes in pH may occur in the immediate vicinity of dredging operations due to reducing conditions in sediments resuspended into the water column. Seawater, however, is a buffer solution (Sverdrup et al. 1942) that acts to repress any change in pH. Therefore, any measurable change in pH would likely be highly localized and temporary, and would not result in persistent changes to ambient pH levels of more than 0.2 units. Thus, the water quality objective for pH would likely not be exceeded outside the mixing zone.

Contaminants, including metals and organics, could be released into the water column during the dredging and underwater construction operations. However, like pH and turbidity, any increase in contaminant levels in the water is expected to be localized in the mixing zone and of short duration. The magnitude of contaminant releases would be related to the bulk contaminant concentrations of the disturbed sediments, as well as the organic content and grain size that affect the binding capacity of sediments for contaminants. Because the sediment characteristics vary across the Project area, the magnitude of contaminant releases, and water quality effects, would also vary.

Sediments containing contaminants that are suspended by the dredging and construction activities would settle back to the bottom in a period of hours to days. Transport of suspended particles by tidal currents would result in some redistribution of sediment contaminants. The amount of contaminants redistributed

in this manner would be small, and the distribution localized in the nearshore waters adjacent to the work area. Monitoring efforts associated with previous dredging projects in the nearby Los Angeles-Long Beach Harbor Complex have shown that resuspension followed by settling of sediments is low (generally 2 percent or less). Consequently, concentrations of contaminants in sediments of the nearshore waters adjacent to the dredged area are not expected to be measurably increased by dredging activities and other in-water activities.

Nutrients could be released into the water column during the dredging and in-water construction operations. Release of nutrients may promote nuisance growths of phytoplankton if operations occur during warm water conditions. Phytoplankton blooms have occurred during previous dredging projects in the nearby harbor complex, including the Deep Draft Navigation Improvement Project (Corps and LAHD 1992). However, there is no evidence that the plankton blooms observed were not a natural occurrence or that they were exacerbated by dredging activities. The Basin Plan (RWQCB 1994) limits on biostimulatory substances are defined as "…concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses." Given the limited spatial and temporal extent of project activities with the potential for releasing nutrients from bottom sediments, effects on beneficial uses of the nearshore waters are not anticipated to occur in response to the proposed Project.

Dredging and in-water construction operations are not expected to affect the temperature or salinity of waters in the West Basin because these activities would not involve any wastewater discharges or processes that would affect the baseline conditions. Placement of dredged materials at an approved upland disposal site would be in accordance with existing permit conditions and would not affect water quality because it is an upland site.

Dredging for the proposed Project would require a permit from the Corps and a Section 401 (of the CWA) Water Quality Certification from the RWQCB. The Water Quality Certification would specify receiving water monitoring requirements. Monitoring requirements typically include measurements of water quality parameters such as DO, light transmittance (turbidity), pH, and suspended solids at varying distances from the dredging operations.

During riser and diffuser construction, analyses of contaminant concentrations (i.e., metals, DDT, polychlorinated biphenyls [PCBs], polynuclear aromatic hydrocarbons [PAHs]) in waters near the dredging operations will be required if the contaminant levels in the dredged sediments are known to be elevated and represent a potential risk to beneficial uses. Monitoring data are used by the dredger to demonstrate that water quality limits specified in the permit are not exceeded. The dredging permit would identify corrective or adaptive actions, which would be implemented if the monitoring data indicate that water quality conditions outside the mixing zone could be below the permit-specified limits.

7.2.2 Noise/Vibration from Construction Activities

Other effects of the construction include the unnatural occurrence of light and noise. Both would be short-term during construction activities. It is unlikely that these effects would lead to reduced survival of fishes and/or invertebrates, and if so, only a small percentage of individuals would be affected. Activities from

construction barges and ships would cause a short-term disturbance to fish in the immediate vicinity of the work sites. These impacts would also be of short duration, and result in very little effect on individuals of managed species.

Sound pressure waves in the water from pile driving can affect fish, particularly those with a swim bladder, with the level of effect influenced by factors such as species, size of fish (smaller fish are affected more), physical condition of fish, peak sound pressure and frequency, shape of the sound wave, depth of water at the piles, location of fish in the water column, amount of air in the water, size and number of waves on the water surface, bottom substrate composition and texture, tidal currents, and presence of predators (NMFS 2004). Types of effects on fish can include mortality from swim bladder rupture or internal hemorrhaging, changes in behavior, and hearing loss (permanent or temporary) (Vagle 2003). The most common behavioral changes include temporary dispersal of fish schools.

Sound pressure waves caused by the steel pile driving (during riser construction) could affect fish near the project site with mortality of some individuals. Species in both the Coastal Pelagics and Pacific Groundfish FMPs could be affected by pile driving. The number of fish affected would depend on the distribution and abundance of these species near the construction site at the time of construction. However, there have been no documented cases of fish mortality as a result of pile driving in nearby Los Angeles-Long Beach Harbor (MBC et al. 2008:11). Fish would likely avoid the work area while construction activities were occurring. Thus, few individuals would be present in or near the work area, and those present would likely move out of the work area.

Fish in the water column and on or near the bottom of the construction area would be temporarily disturbed by the underwater construction activities such as noise, displacement, and vibration. Most fish would leave the immediate area of disturbance, although some may stay to feed on invertebrates released from the sediments. The injury threshold for fishes from peak sound level (206 dB) would be exceeded at a distance of 12 m (39 ft) for fishes during stabilization of the jack-up barge (Figure EFH-3). This is expected to last five days. During riser installation, the peak injury threshold for fishes would be exceeded at distances of 40 to 56 m (131 to 184 ft). Injury to fish from accumulated sound energy could occur within 95 m (312 ft) of the pile driving for the jack-up barge, within 536 m (1,758 ft) for impact driving of the inner casing, and 758 m (2,487 ft) for driving the outer casing. However, there would be no substantial disruption of SP Shelf fish communities because the affected area represents only a small proportion of the total available habitat on the SP Shelf, and the effects would be temporary.

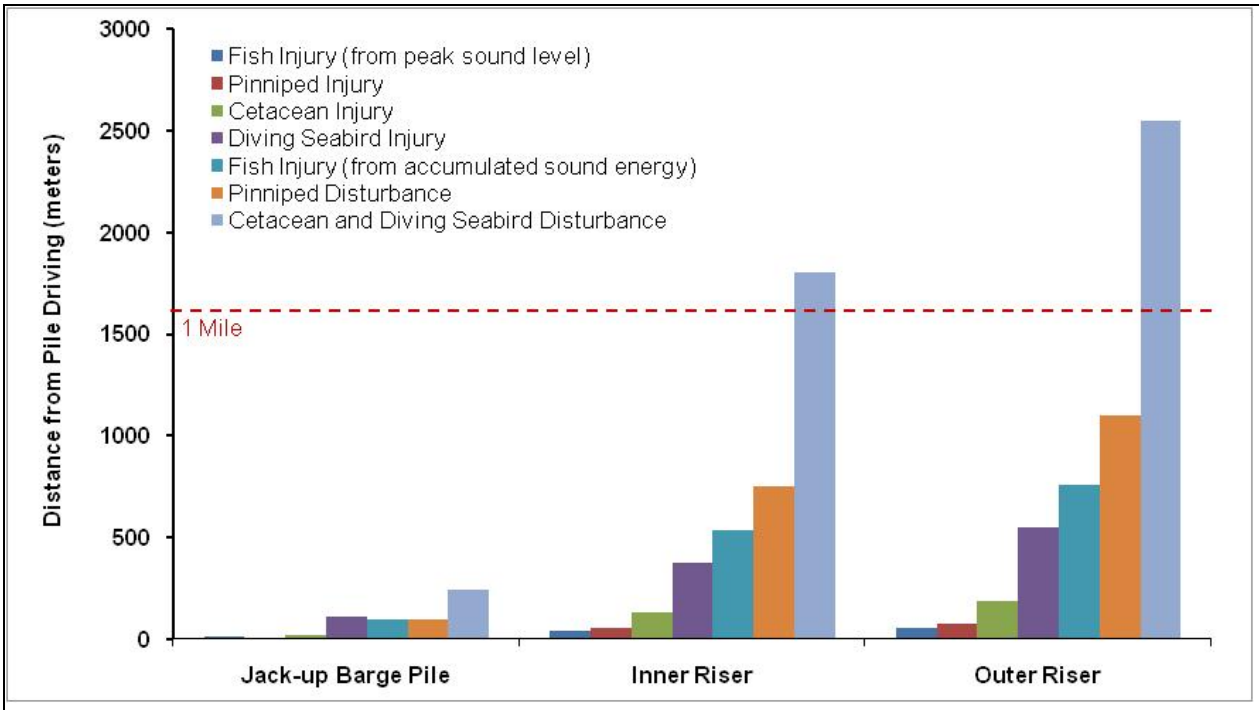

Figure EFH-3. Estimated noise thresholds for fishes, diving seabirds, and marine mammals during pile driving operations.

7.2.3 Disturbance and Loss of Habitat and Individuals

The habitat found in the area of the proposed project includes open water habitat, soft bottom, hard bottom, and canyon habitats. Marine invertebrates, including benthic infaunal organisms and macroinvertebrates that live in the soft bottom habitat, epifaunal invertebrates that live on the soft- and hard-bottom habitats, and pelagic invertebrates, could be affected by the construction activities. Specifically, a small amount of the benthic infauna (e.g., polychaete worms, crustaceans, and molluscs), as well as the epifaunal invertebrates would be lost during dredging, grading, riser installation, and rock placement. Suspension of sediments during in-water construction could also have sub-lethal to lethal effects on the invertebrates immediately adjacent to the work. This impact, however, would be temporary and have minimal impacts given the relative abundance, rapid colonization rates, and movement of at least some individuals of these species. Some soft bottom habitat lost would be replaced by hard substrate habitat (risers, diffusers, and ballast rock). In a review of studies examining effects to aquatic organisms due to dredging and suspended sediments, Anchor (2002:27) found that in most cases marine organisms are unlikely to suffer from adverse impacts from dredging activities.

Soft-bottom habitat on the SP Shelf will be replaced with natural and man-made, hard substrate due to placement of the riser, diffusers, and ballast rock. Due to the small amount of soft-bottom habitat lost (10 acres or less), and the availability of similar habitat throughout the SP Shelf, this loss is not considered substantial. This soft-bottom habitat will be replaced with hard substrate (i.e., riser, diffusers, and ballast rock).

Dredging/grading and sidecasting will result in the disturbance of some organisms, as well; however, areas with sidecast sediments would be recolonized after disturbance. Anchor lines and/or mooring lines could drag on the seafloor, temporarily disturbing bottom habitat. In soft sediments on the SP Shelf, anchors or anchor/mooring lines could create large divots or furrows, disrupting benthic and epibenthic communities. Hard substrate, including reefs, is much less common on the SP Shelf. Anchors and lines could alter low- or high-relief reefs, and disrupt the associated communities. Prior to construction, the contractor will review sonar data, and take measures to avoid disturbing any hard substrate (such as a rocky reef). This will include identifying reefs, and avoiding deployment of anchors on reefs, and deployment of anchor lines near reefs.

There will be an increase in hard-substrate habitat available after construction. Wastewater outfalls in southern California essentially serve as artificial reefs, attracting surrounding fauna and resulting in higher abundance than soft-bottom communities (Allen and Moore 1976). Placement of bottom structures will result in less habitat for soft-bottom species, such as Dover sole and Pacific sanddab, and more habitat for structure-oriented species, or those that prefer sand/structure interface. Soft-bottom infauna and epifauna will be replaced by hard-substrate epifauna and attached invertebrates, such as gorgonians.

7.2.4 Introduction of Contaminants from Spills

Accidental spills of fuel, lubricants, or hydraulic fluid from the equipment used during project construction are unlikely to occur during construction of the proposed Project to the degree that local biological communities are substantially disrupted. Any such spills would be small and cleaned up immediately, resulting in loss of only a few common marine organisms and causing no adverse effects on biological communities as a whole. A larger spill that could have locally substantial effects on biological resources is not expected to occur, even under reasonable worst-case conditions. Accidental spills of pollutants during construction on land (such as during construction of shaft sites) would be small because large quantities of such substances would not be used during construction. These spills would be contained and cleaned up with no runoff to ocean waters.

A moderate to large fuel or oil spill, while unlikely, could have an impact on the managed fish species present off Palos Verdes. Spilled material that remained in the upper water column or sea surface would affect the coastal pelagics more than the Pacific groundfish, while material in the lower water column and on the seafloor would affect the groundfish more than the pelagic. Indirect effects, such as loss of some zoo- or phytoplankton (not fish eggs or larvae) under the spilled oil, would not substantially reduce the amount of food available to fish/invertebrate species of fish due to the small area affected and relatively rapid regeneration of plankton.

7.3 DISTURBANCE DURING OPERATION

Once constructed, the new outfall system would operate continuously for decades. This could affect habitat and species managed under the Pacific Groundfish and Coastal Pelagic FMPs. The effects from operation of the current outfall system have been studied for decades, providing insight into potential effects from a new system.

7.3.1 Effects from Operation of the Outfall System

The operation of the proposed outfall system would affect the physical and biological environment in the vicinity of the diffusers. Effects from the operation of the current outfall system have been studied for decades, and effects from the new system would be similar to those measured in recent studies.

The discharge of treated wastewater results in a plume that is diluted upon release into the receiving waters. Effects from this discharge are most pronounced in the zone of initial dilution (ZID), which is adjacent to the area of discharge. Improvements to treatment processes and effluent quality have resulted in improvement to surrounding water and sediment quality. However, it is difficult to discern biological effects of current discharge from those arising from the legacy of historic discharge.

Water Quality

The effluent plume can currently be distinguished in the vicinity of the joint outfall system by analysis of colored dissolved organic material (CDOM) and ammonia (Sanitation Districts 2008). The plume is diluted with distance from the outfalls to the point that it can no longer be distinguished. However, it was still detected at a distance of up to 20 km (12 mi) from the outfalls. Based on past monitoring, the discharged wastewater can result in reduced pH and dissolved oxygen in the receiving waters, but the difference between those values within the ZID and reference stations is much lower than naturally occurring variability. The wastewater also has reduced salinity and increased ammonia. Despite these effects, discharge of treated wastewater has still been compliant with provisions in the California Ocean Plan and the facility's National Pollutant Discharge Elimination System (NPDES) permit. Coliform levels on the beach inshore of the outfalls are usually much higher than those offshore, suggesting a shoreline source. Even if a new outfall system resulted in effects within the ZID, Ocean Plan exceedances would not be expected.

Sediment Quality and Infauna

Suspended solids discharged with the wastewater effluent settle to the bottom and mingle with marine sediments. Despite 38 years of declining emissions of suspended solids and other contaminants, there is still a reservoir of organically enriched and contaminated sediments on the PV shelf and slope (Sanitation Districts 2008). Highest sediment concentrations are found on the 50- to 70-m (164- to 230-ft) isobaths buried to a depth of 20-50 cm (8-20 inches). There are higher levels of many of the monitoring constituents (e.g., metals, pesticides, PCBs) at stations nearest the outfalls than at stations further away. Much of the sediment contamination is likely from historic discharges, however. As with sediment quality, the benthic community conditions have improved over time, though there are still sites near the

outfall system where the infaunal community is impacted (likely by legacy contamination). Most of the study area has returned to a reference condition. A new outfall system would result in some organic enrichment of sediments within the zone of initial dilution (ZID), which would likely result in some detectable differences in the infauna community nearest the discharge.

Fishes and Invertebrates

Recent studies did not detect any pattern in spatial distribution of epibenthic fishes or invertebrates with respect to the current outfall system, and depth is the dominant factor determining distributions (Sanitation Districts 2008). Physical effects to fishes from wastewater discharge (such as fin rot, tumors, lesions, etc.) were once evident in southern California, especially near wastewater outfalls. Currently, incidence of these conditions near the outfall system are consistent with bight-wide frequencies. Numbers of anomalous fish conditions were highest nearest the discharge in 2006-7, but these could be due to legacy contamination. Whereas outfall gradients were obvious in studies conducted in the 1970s, but in the mid-1980s the fish communities on the PV Shelf were considered indicative of reference conditions.

The pesticide DDT and PCBs are found in fish tissues on the PV Shelf, and historic discharges through the outfall system are the primary cause (Sanitation Districts 2008). There is a gradient of decreasing tissue concentrations away from the outfall system. However, tissue concentrations are decreasing with time. There is a remaining human health risk related to consumption of certain fish species on the PV Shelf.

Operation of a new outfall system is not expected to appreciably impact fishes or epibenthic invertebrates. There will likely be some minor community shifts nearest the ZID, but no widespread effects from contaminant discharge. Similarly, fish and invertebrate health should not be impacted, even though some contaminants could accumulate in their tissues.

7.4 ASSESSMENT SUMMARY

Impacts during construction will be localized and temporary. The construction contractor will take measures to avoid impacts to low- or high-relief reefs. While there will be some permanent habitat modification (from soft-bottom to hard-substrate), the affected area is relatively small compared to the available habitat on the shelf. Impacts during operation will be limited to water quality effects. Ongoing studies of the current wastewater outfall have indicated that fish communities in the vicinity of the outfall are representative of reference conditions. Overall, impacts to EFH as a result of the proposed project are considered insignificant.

8.0 LITERATURE CITED

Allen, M.J. 2006. Continental shelf and upper slope. Pp. 167-202 *In* The Ecology of Marine Fishes: California and Adjacent Waters. University of California Press, Berkeley and Los Angeles, CA. 660 p.

Allen, M.J. and K.T. Herbinson. 1991. Beam-trawl survey of bay and nearshore fishes of the soft-bottom habitat of southern California in 1989. CalCOFI Rep., Vol. 32, 1-16 p.

Allen, M. J., S. L. Moore, K. C. Schiff, S. B. Weisberg, D. Diener, J. K. Stull, A. Groce, J. Mubarak, C. L. Tang, and R. Gartman. 1998. Southern California Bight 1994 Pilot Project: V. Demersal fishes and megabenthic invertebrates. Southern California Coastal Water Research Project, Westminster, CA.

Allen, M.J., A.K. Groce, D. Diener, J. Brown, S.A. Steinert, G. Deets, J.A. Noblet, S.L. Moore, D, Diehl, E.T. Jarvis, V. Raco-Rands, C. Thomas, Y. Ralph, R. Gartman, D. Cadien, S.B. Weisberg, and T. Mikel. 2002. Southern California Bight 1998 Regional Monitoring Program: V. Demersal Fishes and Megabenthic Invertebrates. Southern California Coastal Water Research Project, Westminster, CA. Dec 2002. 272 p. plus appendices.

Allen, M. J., T. Mikel, D. Cadien, J. E. Kalman, E. T. Jarvis, K. C. Schiff, D. W. Diehl, S. L. Moore, S. Walther, G. Deets, C. Cash, S. Watts, D. J. Pondella II, V. Raco-Rands, C. Thomas, R. Gartman, L. Sabin, W. Power, A. K. Groce, and J. L. Armstrong. 2007. Southern California Bight 2003 Regional Monitoring Program: IV. Demersal Fishes and Megabenthic Invertebrates. Southern California Coastal Water Research Project. Costa Mesa, CA.

Anchor Environmental, L.L.C. 2002. Literature review of effects of resuspended sediments due to dredging operations. Feb. 21, 2002. 58 p.

California Dept. of Fish and Game (CDFG). 2007. 2006 Catch Block Data. Received from CDFG Marine Fisheries Statistical Unit, Los Alamitos, CA. Feb. 2007.

Sanitation Districts. 2001. Palos Verdes Ocean Monitoring, 2000. July 16, 2001.

Sanitation Districts. 2008. Joint Water Pollution Control Plant Biennial Receiving Water Monitoring Report 2006-7. Aug. 1, 2008.

Cross, J. N. and L. G. Allen. 1993. Fishes. Pp. 459-540 *In* Ecology of the Southern California Bight: A synthesis and interpretation. M. D. Dailey, D. J. Reish, and J. W. Anderson (eds.). Univ. Calif. Press, Los Angeles, CA. 926 p.

Dawson, J.K. and R.E. Pieper. 1993. Zooplankton. Chapter 6 *in*: Ecology of the Southern California Bight Dailey, M.D., D.J. Reish, and J.W. Anderson (eds.). Los Angeles: Univ. Calif. Press. 926 p.

EPA. 2010. Palos Verdes Shelf. Available at:<http://yosemite.epa.gov/R9/SFUND/R9SFDOCW.NSF/db29676ab46e80818825742600743734/e61d525580dd68288257007005e9422!OpenDocument> Accessed 5 March 2010.

Fitch, J. E. and R. J. Lavenberg. 1975. Tidepool and nearshore fishes of California. Univ. Calif. Press, Berkeley, CA. 156 p.

Gruber, D., E. Ahalstrom, and M.M. Mullin. 1982. Distribution of ichthyoplankton in the Southern California Bight. Calif. Coop. Oceanic Fish. Invest. Rep. 23: 172-179.

Jones, G. 1969. The Benthic Macrofauna of the Mainland Shelf of Southern California. Allan Hancock Mon. in Mar. Biol. No. 4, 219 pp.

Leet, W.S., C.M. DeWees, R. Klingbeil, and E.J. Larson. 2001. California's living marine resources: a status report. 592 p.

Loeb, V.J., P.E. Smith, and H.G. Moser. 1983a. Geographical and seasonal patterns of larval fish species structure in the California Current area, 1975. Calif. Coop. Oceanic Fish. Invest. Rep. 24: 132-151.

Loeb, V.J., P.E. Smith, and H.G. Moser. 1983b. Ichthyoplankton and zooplankton abundance patterns in the California Current area, 1975. Calif. Coop. Oceanic Fish. Invest. Rep. 24: 109-131.

MBC Applied Environmental Sciences. 2004. Unpublished data. Fish and invertebrate surveys from lower San Gabriel River.).

MBC Applied Environmental Sciences, Tenera Environmental, Inc., and URS Corporation. 2007. Final Report: Harbor Generating Station Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study. Prepared for the City of Los Angeles Dept. of Water and Power. Dec. 26, 2007.

MBC Applied Environmental Sciences, ICF Jones & Stokes, and Essentia Management Services. 2008. Essential Fish Habitat Assessment: San Pedro Waterfront Project. Prepared for the Port of Los Angeles, San Pedro, CA. May 2008. 15 p.

National Marine Fisheries Service (NMFS). 2002. The final rule for essential fish habitat. Federal Register 67(12):2343-2383. http://www.nero.noaa.gov/hcd/efhfinalrule.pdf

National Marine Fisheries Service (NMFS). 2004. Final Report on the National Oceanic and Atmospheric Administration "Shipping Noise and Marine Mammals: A forum for science, management, and technology". Presented 18-19 May 2004. Arlington, Virginia. 40 pp.

Pacific Fishery Management Council. 1998. Coastal Pelagic Species Fishery Management Plan. Amendment 8 to the Northern Anchovy Fishery Management Plan. Dec. 1998. 40 p. plus appendices.

Pacific Fishery Management Council. 2008a. Pacific Coast Groundfish Fishery Management Plan: For the California, Oregon, and Washington Groundfish Fishery as Amended through Amendment 19 (including Amendment 15). July 2008. 155 p. plus appendices.

Pacific Fishery Management Council. 2008b. Amendment 12 to the Coastal Pelagic Species Fishery Management Plan. Management of krill as an essential component of the California Current Ecosystem. Environmental Assessment, Regulatory Impact Review, & Regulatory Flexibility Analysis. Submitted by the PFMS in conjunction with NMFS Southwest Region. Feb. 2008.

Regional Water Quality Control Board, Los Angeles Region (RWQCB). 1994. Water Quality Control Plan: Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties.

Southern California Coastal Water Research Project (SCCWRP). 1973. The ecology of the Southern California Bight: Implications for water quality management. Three-year report of the Southern California Coastal Water Research Project, El Segundo, CA. 531 p.

Science Applications International Corporation (SAIC), 2009. Draft 2008 Biological Surveys of Los Angeles and Long Beach Harbors. In Association with Seaventures, Keane Biological Consulting, Tenera Environmental, ECORP Consulting Inc., and Tierra Data Inc. Dec. 2009.

Sloan pers. comm. 2007 James Sloan, Boat Operator, MBC 3/19/2007 through 3/26/2007, several conversations – fishing reefs on the SP Shelf

Stull, J.K. and C. Tang. 1996. Demersal fish trawls off Palos Verdes, southern California, 1973-1993. CalCOFI Rep. 37:211-240.

Sverdrup, H.U., M.W. Johnson, and R.H. Fleming. 1942. The oceans; their physics, chemistry, and general biology. Prentice-Hill, Inc. Englewood Cliffs, NY. 1060 p. plus appendices.

Swift, C. C., J. L. Nelson, C. Maslow, and T. Stein. 1989. Biology and distribution of the tidewater goby, Eucyclogobius newberryi (Pisces: Gobiidae) in California. Contrib. in Science 404:1–19.

Thompson, B., J. Dixon, S. Schroeter and D.J. Reish. 1993a. Benthic Invertebrates. Chapter 8 *in*: Ecology of the Southern California Bight Dailey, M.D., D.J. Reish, and J.W. Anderson (eds.). Los Angeles: Univ. Calif. Press. 926 p.

Thompson, B., D. Tsukada, and D. O'Donohue. 1993b. 1990 Reference Site Survey. Final Report. Southern California Coastal Water Research Project. Tech. Rpt. No. 269, July 1993. 105 p.

U.S. Army Corps of Engineers (Corps) and Los Angeles Harbor Department (LAHD). 1992. Final EIS/EIR for Deep Draft Navigation Improvements, Los Angeles and Long Beach Harbors, San Pedro Bay, CA. Sept. 1992.

U.S. Environmental Protection Agency (EPA). 2010. http://yosemite.epa.gov/R9/SFUND/R9SFDOCW.NSF/db29676ab46e80818825742600743734/e61d525580dd68288257007005e9422!OpenDocument. Accessed 5 March 2010.

Vagle, S. 2003. On the impact of underwater pile-driving noise on marine life. Report prepared for the Canadian Coast Guard, Department of Fisheries and Oceans, Canada (unpublished). 41 p.

Walker, B.W. 1949. The periodicity of spawning by the grunion, *Leuresthes tenuis*, an atherine fish. Ph.D. Thesis, Scripps Inst. Oceanogr., La Jolla, CA. 166 p.

Walker, B.W. 1952. A guide to the grunion. Calif. Fish & Game 38(3):411-420.

Attachment EFH-1

Table 1. Pacific Groundfish Associated with Rooted Macrophytes, Algae, or Seagrass in Estuarine, Intertidal, and Continental Shelf Zones (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark	X	X			Kelp Rockfish	X	X	X	
Soupfin Shark					Longspine Thornyhead				
Spiny Dogfish					Mexican Rockfish				
Big Skate					Olive Rockfish	X	X		
California Skate					Pacific Ocean Perch				
Longnose Skate					Pink Rockfish				
Spotted ratfish					Quillback Rockfish	X	X		
Pacific Flatnose					Redbanded Rockfish				
Pacific Grenadier					Redstripe Rockfish				
Lingcod	X				Rosethorn Rockfish				
Cabezon	X	X		X	Rosy Rockfish				
Kelp Greenling	X	X		X	Rougheye Rockfish				
Pacific Cod					Sharpchin Rockfish				
Pacific Hake					Shortbelly Rockfish		X		
Sablefish					Shortraker Rockfish				
Aurora Rockfish					Shortspine Thornyhead				
Bank Rockfish					Silverygray Rockfish		X		
Black Rockfish	X	X			Speckled Rockfish		X		
Black-and-Yellow Rockfish	X	X			Splitnose Rockfish		X		
Blackgill Rockfish					Squarespot Rockfish				
Blue Rockfish	X	X			Starry Rockfish				
Bocaccio	X	X	X		Stripetail Rockfish		X		
Bronzespotted Rockfish					Tiger Rockfish				
Brown Rockfish	X	X			Treefish				
Calico Rockfish					Vermilion Rockfish	X	X	X	
California Scorpionfish	X	X			Widow Rockfish		X		
Canary Rockfish		X			Yelloweye Rockfish				
Chilipepper		X	X		Yellowmouth Rockfish				
China Rockfish	X				Yellowtail Rockfish	X	X		
Copper Rockfish	X	X	X		Arrowtooth Flounder				
Cowcod					Butter Sole				
Darkblotched Rockfish					Curlfin Sole				
Dusky Rockfish					Dover Sole				
Flag Rockfish					English Sole	X	X		
Gopher Rockfish	X	X			Flathead Sole				
Grass Rockfish	X	X			Pacific Sanddab	X			
Greenblotched Rockfish					Petrale Sole				
Greenspotted Rockfish					Rex Sole				
Greenstriped Rockfish					Rock Sole				
Harlequin Rockfish					Sand Sole				
Honeycomb Rockfish					Starry Flounder				

Table 2. Pacific Groundfish Associated with Hard and Mixed Hard/Soft Bottoms on the Continental Shelf (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark	**X**				Kelp Rockfish	X	X		
Soupfin Shark					Longspine Thornyhead				
Spiny Dogfish					Mexican Rockfish	X			
Big Skate					Olive Rockfish	X	X		
California Skate					Pacific Ocean Perch	X	X		
Longnose Skate					Pink Rockfish	X			
Spotted ratfish	X	X		X	Quillback Rockfish	X	X		
Pacific Flatnose					Redbanded Rockfish	**X**			
Pacific Grenadier					Redstripe Rockfish	X	X		
Lingcod	X			X	Rosethorn Rockfish	X	X		
Cabezon	X	X		X	Rosy Rockfish	X	X		
Kelp Greenling	X	X		X	Rougheye Rockfish	X			
Pacific Cod		X		X	Sharpchin Rockfish	X	**X**		
Pacific Hake					Shortbelly Rockfish	X	X		
Sablefish					Shortraker Rockfish	X			
Aurora Rockfish	X				Shortspine Thornyhead	**X**	**X**		
Bank Rockfish	X	X			Silverygray Rockfish	X	X		
Black Rockfish	X	X			Speckled Rockfish	X	X		
Black-and-Yellow Rockfish	X	X			Splitnose Rockfish	X	X		
Blackgill Rockfish	X				Squarespot Rockfish	X	X		
Blue Rockfish	X	X			Starry Rockfish	X	X		
Bocaccio	X	X			Stripetail Rockfish	**X**	X		
Bronzespotted Rockfish	X				Tiger Rockfish	X	X		
Brown Rockfish	X	X			Treefish	X	X		
Calico Rockfish	X	X			Vermilion Rockfish	X	**X**		
California Scorpionfish	X	X			Widow Rockfish	X	X		
Canary Rockfish	X	X			Yelloweye Rockfish	X	X		
Chilipepper	X	X			Yellowmouth Rockfish	X			
China Rockfish	X	X			Yellowtail Rockfish	X	X		
Copper Rockfish	X	X			Arrowtooth Flounder	**X**	**X**		
Cowcod	X	X			Butter Sole				
Darkblotched Rockfish	**X**	X			Curlfin Sole				
Dusky Rockfish	X	X			Dover Sole				
Flag Rockfish	X	X			English Sole				
Gopher Rockfish	X	X			Flathead Sole				
Grass Rockfish	X	X			Pacific Sanddab	**X**	**X**		
Greenblotched Rockfish	X	X			Petrale Sole				
Greenspotted Rockfish	X	X			Rex Sole				
Greenstriped Rockfish	X	**X**			Rock Sole	**X**	**X**		
Harlequin Rockfish	X				Sand Sole				
Honeycomb Rockfish	X	X			Starry Flounder				

X = Associated with mixed hard/soft
X = Associated with hard and mixed hard/soft
X = Weak association with hard bottom.

Table 3. Pacific Groundfish Associated with Soft and Mixed Hard/Soft Bottoms on the Continental Shelf (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark	**X**				Kelp Rockfish				
Soupfin Shark	X	X			Longspine Thornyhead				
Spiny Dogfish	X	X			Mexican Rockfish				
Big Skate	X	X		X	Olive Rockfish				
California Skate	X	X		X	Pacific Ocean Perch	X			
Longnose Skate	X	X			Pink Rockfish	**X**	X		
Spotted ratfish	X	X		X	Quillback Rockfish	**X**	X		
Pacific Flatnose					Redbanded Rockfish	X	X		
Pacific Grenadier					Redstripe Rockfish	**X**	**X**		
Lingcod		X			Rosethorn Rockfish	**X**	X		
Cabezon					Rosy Rockfish	**X**	**X**		
Kelp Greenling					Rougheye Rockfish	X	X		
Pacific Cod	X	X		X	Sharpchin Rockfish	**X**	X		
Pacific Hake					Shortbelly Rockfish	X	**X**		
Sablefish		X			Shortraker Rockfish	X			
Aurora Rockfish	X	X			Shortspine Thornyhead	X	X		
Bank Rockfish	**X**	X			Silverygray Rockfish				
Black Rockfish		**X**			Speckled Rockfish				
Black-and-Yellow Rockfish		**X**			Splitnose Rockfish	X	X		
Blackgill Rockfish		X			Squarespot Rockfish				
Blue Rockfish					Starry Rockfish				
Bocaccio	X	X			Stripetail Rockfish	X	X		
Bronzespotted Rockfish					Tiger Rockfish				
Brown Rockfish					Treefish				
Calico Rockfish	**X**	X			Vermilion Rockfish		X		
California Scorpionfish	X				Widow Rockfish	**X**	X		
Canary Rockfish	**X**	**X**			Yelloweye Rockfish	**X**			
Chilipepper	X	X			Yellowmouth Rockfish				
China Rockfish					Yellowtail Rockfish	X			
Copper Rockfish	**X**	**X**			Arrowtooth Flounder	X	X		
Cowcod		X			Butter Sole	X	X		
Darkblotched Rockfish	X	X			Curlfin Sole	X	X		
Dusky Rockfish					Dover Sole	x	X	X	
Flag Rockfish					English Sole	X	X		
Gopher Rockfish		**X**			Flathead Sole	X	X		
Grass Rockfish		**X**			Pacific Sanddab	X	X		
Greenblotched Rockfish	**X**	**X**			Petrale Sole	X	X		
Greenspotted Rockfish	X	X			Rex Sole	X	X		
Greenstriped Rockfish	X	X			Rock Sole	X	X		X
Harlequin Rockfish					Sand Sole	X	X		
Honeycomb Rockfish		X			Starry Flounder	X	X		

X = Associated with mixed hard/soft
X = Associated with soft and mixed hard/soft
X = Weak association with soft bottom.

Table 4. Pacific Groundfish Associated with Canyon Habitats on the Continental Shelf (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark					Kelp Rockfish				
Soupfin Shark	X				Longspine Thornyhead				
Spiny Dogfish					Mexican Rockfish				
Big Skate					Olive Rockfish	X			
California Skate					Pacific Ocean Perch	X			
Longnose Skate					Pink Rockfish	X			
Spotted ratfish					Quillback Rockfish				
Pacific Flatnose					Redbanded Rockfish				
Pacific Grenadier					Redstripe Rockfish				
Lingcod					Rosethorn Rockfish	X			
Cabezon					Rosy Rockfish				
Kelp Greenling					Rougheye Rockfish				
Pacific Cod					Sharpchin Rockfish				
Pacific Hake		X			Shortbelly Rockfish	X			
Sablefish	X				Shortraker Rockfish				
Aurora Rockfish					Shortspine Thornyhead				
Bank Rockfish	X	X			Silverygray Rockfish				
Black Rockfish					Speckled Rockfish	X			
Black-and-Yellow Rockfish					Splitnose Rockfish	X			
Blackgill Rockfish	X				Squarespot Rockfish				
Blue Rockfish					Starry Rockfish				
Bocaccio	**X**	**X**			Stripetail Rockfish				
Bronzespotted Rockfish					Tiger Rockfish				
Brown Rockfish		X			Treefish				
Calico Rockfish	X				Vermilion Rockfish	X			
California Scorpionfish					Widow Rockfish	**X**	X		
Canary Rockfish					Yelloweye Rockfish	X			
Chilipepper		X			Yellowmouth Rockfish				
China Rockfish					Yellowtail Rockfish				
Copper Rockfish					Arrowtooth Flounder				
Cowcod	**X**				Butter Sole				
Darkblotched Rockfish	**X**				Curlfin Sole				
Dusky Rockfish					Dover Sole				
Flag Rockfish	X				English Sole				
Gopher Rockfish					Flathead Sole				
Grass Rockfish					Pacific Sanddab				
Greenblotched Rockfish	X				Petrale Sole				
Greenspotted Rockfish	**X**				Rex Sole				
Greenstriped Rockfish					Rock Sole				
Harlequin Rockfish					Sand Sole				
Honeycomb Rockfish		X			Starry Flounder				

X = Associated with mixed hard/soft bottom habitat.

Table 5. Pacific Groundfish Associated with Hard and Mixed Hard/Soft Bottoms on the Continental Slope/Rise (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark					Kelp Rockfish				
Soupfin Shark					Longspine Thornyhead	**X**			
Spiny Dogfish					Mexican Rockfish	**X**			
Big Skate					Olive Rockfish				
California Skate					Pacific Ocean Perch	X	X		
Longnose Skate					Pink Rockfish	X			
Spotted ratfish					Quillback Rockfish				
Pacific Flatnose					Redbanded Rockfish	**X**			
Pacific Grenadier					Redstripe Rockfish	X	X		
Lingcod					Rosethorn Rockfish	**X**			
Cabezon					Rosy Rockfish				
Kelp Greenling					Rougheye Rockfish	X			
Pacific Cod					Sharpchin Rockfish	**X**	**X**		
Pacific Hake					Shortbelly Rockfish				
Sablefish					Shortraker Rockfish	**X**			
Aurora Rockfish	X				Shortspine Thornyhead	**X**	**X**		
Bank Rockfish	X				Silverygray Rockfish	X	X		
Black Rockfish					Speckled Rockfish	x			
Black-and-Yellow Rockfish					Splitnose Rockfish	**X**	**X**		
Blackgill Rockfish	x				Squarespot Rockfish				
Blue Rockfish	x				Starry Rockfish	x			
Bocaccio	X				Stripetail Rockfish	**X**			
Bronzespotted Rockfish	X	X			Tiger Rockfish	X	X		
Brown Rockfish					Treefish				
Calico Rockfish	x				Vermilion Rockfish	X			
California Scorpionfish					Widow Rockfish	X			
Canary Rockfish					Yelloweye Rockfish	X			
Chilipepper	X				Yellowmouth Rockfish	X			
China Rockfish					Yellowtail Rockfish	X			
Copper Rockfish					Arrowtooth Flounder	**X**	**X**		
Cowcod	X				Butter Sole				
Darkblotched Rockfish	**X**				Curlfin Sole				
Dusky Rockfish	X				Dover Sole				
Flag Rockfish					English Sole				
Gopher Rockfish					Flathead Sole				
Grass Rockfish					Pacific Sanddab	**X**			
Greenblotched Rockfish	X				Petrale Sole				
Greenspotted Rockfish					Rex Sole				
Greenstriped Rockfish	X				Rock Sole	**X**	**X**		
Harlequin Rockfish	x				Sand Sole				
Honeycomb Rockfish					Starry Flounder				

X = Associated with mixed hard/soft
X = Associated with hard and mixed hard/soft
X = Weak association with hard bottom.

Table 6. Pacific Groundfish Associated with Soft and Mixed Hard/Soft Bottoms on the Continental Slope/Rise (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark					Kelp Rockfish				
Soupfin Shark	X				Longspine Thornyhead	X	X		
Spiny Dogfish	X	X			Mexican Rockfish	**X**			
Big Skate	X				Olive Rockfish				
California Skate	x				Pacific Ocean Perch	X	X		
Longnose Skate	X				Pink Rockfish	**X**	X		
Spotted ratfish					Quillback Rockfish				
Pacific Flatnose					Redbanded Rockfish	X	X		
Pacific Grenadier	X	X			Redstripe Rockfish	**X**	**X**		
Lingcod					Rosethorn Rockfish	**X**	X		
Cabezon					Rosy Rockfish				
Kelp Greenling					Rougheye Rockfish	X	X		
Pacific Cod	X				Sharpchin Rockfish	**x**	X		
Pacific Hake					Shortbelly Rockfish	X			
Sablefish	X	X	X		Shortraker Rockfish	X			
Aurora Rockfish	X	X			Shortspine Thornyhead	X	X		
Bank Rockfish	**X**				Silverygray Rockfish				
Black Rockfish					Speckled Rockfish				
Black-and-Yellow Rockfish					Splitnose Rockfish	X	X		
Blackgill Rockfish		X			Squarespot Rockfish				
Blue Rockfish					Starry Rockfish				
Bocaccio					Stripetail Rockfish	X			
Bronzespotted Rockfish					Tiger Rockfish				
Brown Rockfish					Treefish				
Calico Rockfish					Vermilion Rockfish				
California Scorpionfish					Widow Rockfish	**X**			
Canary Rockfish					Yelloweye Rockfish				
Chilipepper	X				Yellowmouth Rockfish				
China Rockfish					Yellowtail Rockfish	**X**			
Copper Rockfish					Arrowtooth Flounder	**X**	**X**		
Cowcod					Butter Sole	x			
Darkblotched Rockfish	X				Curlfin Sole	x	x		
Dusky Rockfish					Dover Sole	X	X	X	
Flag Rockfish					English Sole	x			
Gopher Rockfish					Flathead Sole	X			
Grass Rockfish					Pacific Sanddab	X			
Greenblotched Rockfish	**X**				Petrale Sole	X	x		
Greenspotted Rockfish					Rex Sole	X	X		
Greenstriped Rockfish	X				Rock Sole	X	X		X
Harlequin Rockfish					Sand Sole	x			
Honeycomb Rockfish					Starry Flounder				

X = Associated with mixed hard/soft
X = Associated with soft and mixed hard/soft
X = Weak association with soft bottom.

Table 7. Pacific Groundfish Associated with the Intertidal Zone (PFMC 2005).

Common Name	Adults	Juv.	Larvae	Eggs	Common Name	Adults	Juv.	Larvae	Eggs
Leopard Shark	X	X			Kelp Rockfish				
Soupfin Shark	X	X			Longspine Thornyhead				
Spiny Dogfish	X	X			Mexican Rockfish				
Big Skate	X				Olive Rockfish	X	X	X	
California Skate	X			X	Pacific Ocean Perch				
Longnose Skate					Pink Rockfish				
Spotted ratfish					Quillback Rockfish	X	X		
Pacific Flatnose					Redbanded Rockfish				
Pacific Grenadier					Redstripe Rockfish				
Lingcod	X	X	X	X	Rosethorn Rockfish				
Cabezon	X	X	X	X	Rosy Rockfish				
Kelp Greenling	X	X	X		Rougheye Rockfish				
Pacific Cod					Sharpchin Rockfish				
Pacific Hake		X			Shortbelly Rockfish		X		
Sablefish					Shortraker Rockfish				
Aurora Rockfish					Shortspine Thornyhead				
Bank Rockfish					Silverygray Rockfish				
Black Rockfish					Speckled Rockfish				
Black-and-Yellow Rockfish		X			Splitnose Rockfish				
Blackgill Rockfish	X	X			Squarespot Rockfish				
Blue Rockfish					Starry Rockfish				
Bocaccio					Stripetail Rockfish				
Bronzespotted Rockfish					Tiger Rockfish				
Brown Rockfish	X				Treefish				
Calico Rockfish		X			Vermilion Rockfish		X		
California Scorpionfish	X	X			Widow Rockfish				
Canary Rockfish		X			Yelloweye Rockfish				
Chilipepper		X			Yellowmouth Rockfish				
China Rockfish					Yellowtail Rockfish				
Copper Rockfish		X			Arrowtooth Flounder				
Cowcod					Butter Sole				
Darkblotched Rockfish					Curlfin Sole				
Dusky Rockfish					Dover Sole				
Flag Rockfish					English Sole	X	X		
Gopher Rockfish	x	x			Flathead Sole				
Grass Rockfish	X	X	X	X	Pacific Sanddab				
Greenblotched Rockfish					Petrale Sole				
Greenspotted Rockfish					Rex Sole				
Greenstriped Rockfish					Rock Sole	X	X		
Harlequin Rockfish					Sand Sole				
Honeycomb Rockfish					Starry Flounder				

X = Weak association with intertidal habitat.

Appendix 13-D

JOINT WATER POLLUTION CONTROL PLANT 2008 EFFLUENT WATER QUALITY

Appendix 13-D
JOINT WATER POLLUTION CONTROL PLANT 2008 EFFLUENT WATER QUALITY

Introduction

This appendix presents a summary of physical, chemical, and biological characteristics of the effluent from the Joint Water Pollution Control Plant (JWPCP).

Effluent Water Quality Data

The NPDES permit for the JWPCP contains approximately 27,000 numeric and qualitative limits that must be met each year based on results of final effluent and receiving water sampling and analysis. During 2008, JWPCP complied with all of these limits. A summary of some of the effluent characteristics monitored at the JWPCP for 2008 is presented in Table 1. The water quality constituents are ordered in the table according to: (1) physical parameters, (2) chemical parameters and (3) emerging parameters of interest such as toxicity and disinfection by-products. The NPDES permit does not contain numerical discharge limits for constituents when the monitored concentrations are sufficiently below the thresholds necessary to protect the marine environment, therefore these are represented as *not applicable* (N/A) in Table 1. The JWPCP NPDES permits (2006 and 2011) are included as Appendix 13-E and Appendix 13-F of the Environmental Impact Report/Environmental Impact Summary for the Clearwater Program.

Table 1. JWPCP Effluent Water Quality for 2008

			2008 Effluent Monitoring Data		
Constituent	**Units**	**Permit Limit**	**Mean**	**Max**	**Min**
pH		6.0 (minimum); 9.0 (maximum)[a]	7.19	7.22	7.12
Turbidity	NTU	75 (monthly average)[a]	5	7	4
Temperature	°F	100 (maximum)[a]	82.5	87.8	76.8
Suspended Solids	mg/L	30 (monthly average)[a]	15	17	11
Settleable Solids	mL/L	1.3 (daily maximum)[a]	< 0.1	< 0.1	< 0.1
Oil and Grease	mg/L	N/A	ND	ND	ND
Total Dissolved Solids	mg/L	N/A	1,403	1,570	1,270
Biochemical Oxygen Demand	mg/L	30 (monthly average)[a]	6	8	4
Ammonia Nitrogen	mg/L	N/A	36.7	40.7	32.2
Fluoride	mg/L	N/A	1.34	1.48	1.17
Boron	mg/L	N/A	0.937	1.06	0.863
Chloride	mg/L	N/A	478	506	449
Sulfate	mg/L	N/A	265	306	195
Total Hardness	mg/L	N/A	294	326	271

Table 1 (Continued)

			2008 Effluent Monitoring Data		
Constituent	**Units**	**Permit Limit**	**Mean**	**Max**	**Min**
Antimony	µg/L	N/A	6.38	9.83	4.01
Arsenic	µg/L	N/A	2.06	2.35	1.57
Cadmium	µg/L	N/A	ND	DNQ 0.24	ND
Total Chromium	µg/L	N/A	1.71	4.71	0.70
Hexavalent Chromium	µg/L	N/A	ND	DNQ 2.0	ND
Copper	µg/L	N/A	3.69	6.37	2.57
Lead	µg/L	N/A	0.127	0.38	DNQ 0.150
Mercury	µg/L	N/A	ND	DNQ 0.03	ND
Nickel	µg/L	N/A	9.04	11.30	6.02
Selenium	µg/L	N/A	5.39	7.53	4.00
Silver	µg/L	N/A	ND	DNQ 0.10	ND
Thallium	µg/L	N/A	ND	ND	ND
Zinc	µg/L	N/A	16.17	26	9.0
Acute toxicity	TUa	5.3[b]	1.5	1.6	1.4
Chronic toxicity	TUc	167[b]	42	42	42
Total Detectable DDT	µg/L	0.028 (monthly average)[a]	ND	ND	ND
Heptachlor	µg/L	0.0084 (monthly average)[a]	ND	ND	ND
Heptachlor epoxide	µg/L	0.0033 (monthly average)[a]	ND	ND	ND
Aldrin	µg/L	0.0037 (monthly average)[a]	ND	ND	ND
Dieldrin	µg/L	0.0067 (monthly average)[a]	ND	ND	ND
Toxaphene	µg/L	0.0032 (monthly average)[a]	ND	ND	ND
Chlorodane	µg/L	0.0038 (monthly average)[a]	ND	ND	ND
Benzidine	µg/L	0.012 (monthly average)[a]	ND	ND	ND
Hexachlorobenzene	µg/L	0.035 (monthly average)[a]	ND	ND	ND
Gross alpha radioactivity	PCI/L	15 (daily maximum)[a]	1.495	4.69	ND
Gross beta radioactivity	PCI/L	50 (daily maximum)[a]	10.59	42.7	ND
Bromoform	µg/L	N/A	ND	DNQ 0.3	ND
N-Nitrosodimethylamine	µg/L	N/A	ND	DNQ 0.6	ND

[a] NPDES discharge limit

[b] Results reported are from the 12/09/08 sampling event.

TUa = Acute Toxicity Unit s100/LC50 where the Lethal Concentration, 50 Percent (LC50) is expressed as the estimate of the percent effluent concentration that causes death in 50% of the test population in the time period prescribed by the NPDES permit.

TUc = Chronic Toxicity Units 100/NOEC where the No Observed Effect Concentration (NOEC) is expressed as the maximum percent effluent that causes no observable effect on test organisms as determined by the result of a critical life stage toxicity test.

NPDES = National Pollutant Discharge Elimination System

°F = degrees Fahrenheit
ND = non-detect
DDT = dichlorodiphenyltrichloroethane
PCI/L = picocuries per liter
DNQ = detected but not quantified
mg/L = milligrams per liter
mL/L = milliliters per liter
µg/L = micrograms per liter
N/A = not applicable
NTU = nephelometric turbidity unit

Source: Sanitation Districts 2009: Table 4-2, Table 4-4

References

Sanitation Districts. 2009. Joint Water Pollution Control Plant Annual Monitoring Report 2008. NPDES No. CA0053813 RWQCB Order No. R4-2006-0042 Monitoring and Reporting Program No. 1758 DM5#1231924. Whittier, CA. Prepared for the Los Angeles County Sanitation Districts, Treatment Plant Monitoring Group, Technical Services Department.

Appendix 13-E

JOINT WATER POLLUTION CONTROL PLANT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT (2006)

California Regional Water Quality Control Board

Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 • Fax (213) 576-6640
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ORDER NO. R4-2006-0042
NPDES NO. CA0053813

WASTE DISCHARGE REQUIREMENTS FOR THE
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
(Joint Water Pollution Control Plant)
DISCHARGE TO THE PACIFIC OCEAN

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 1. Discharger Information

Discharger	**County Sanitation Districts of Los Angeles County**
Name of Facility	**Joint Water Pollution Control Plant, Carson**
Facility Address	**24501 South Figueroa Street**
	Carson, CA 90745
	Los Angeles County

The discharge by the County Sanitation Districts of Los Angeles County from the discharge points identified below is subject to waste discharge requirements as set forth in this Order:

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
Serial No. 001	**Secondary treated wastewater**	**33 º, 41', 21" N**	**118 º, 19', 00" W**	**Pacific Ocean**
Serial No. 002	**Secondary treated wastewater**	**33 º, 42', 03" N**	**118 º, 20', 17" W**	**Pacific Ocean**
Serial No. 003	**Secondary treated wastewater**	**33 º, 42', 05" N**	**118 º, 20', 20" W**	**Pacific Ocean**
Serial No. 004	**Secondary treated wastewater**	**33 º, 41', 20" N**	**118 º, 19', 40" W**	**Pacific Ocean**

Table 3. Administrative Information

This Order was adopted by the Regional Water Board on:	**April 6, 2006**
This Order shall become effective on:	**May, 25 2006**
This Order shall expire on	**May, 24 2011**
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Board have classified this discharge as a major discharge.	
The Discharger shall file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, not later than 180 days in advance of the Order expiration date as application for issuance of new waste discharge requirements.	

IT IS HEREBY ORDERED, that Order No. 97-090 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted therein, and the provisions of the federal Clean Water Act (CWA), and regulations and guidelines adopted therein, the Discharger shall comply with the requirements in this Order.

I, Jonathan Bishop, Executive Officer, do hereby certify the following is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on April 6, 2006.

Original signed by

_____

Jonathan S. Bishop, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
REGION 4, LOS ANGELES REGION

ORDER NO. R4-2006-XXX
NPDES NO. CA0053813

WASTE DISCHARGE REQUIREMENTS FOR THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY (Joint Water Pollution Control Plant) DISCHARGE TO THE PACIFIC OCEAN

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Appendix 2 – Reasonable Potential Analysis and Effluent Limitations Table (Discharge Serial No. 003)
Appendix 3 – Reasonable Potential Analysis and Effluent Limitations Table (Discharge Serial No. 004)

I. FACILITY INFORMATION

The following Discharger is authorized to discharge in` accordance with the conditions set forth in this Order:

Table 4. Facility Information

Discharger	**County Sanitation Districts of Los Angeles County**
Name of Facility	**Joint Water Pollution Control Plant, Carson**
Facility Address	**24501 South Figueroa Street**
	Carson, CA 90745
	Los Angeles County
Facility Contact, Title, and Phone	**Ann Heil, Supervising Engineer, (562) 699-7411 x 2803**
Mailing Address	**1955 Workman Mill Road, Whittier, CA 90601**
Type of Facility	**Publicly Owned Treatment Works**
Facility Design Flow	**400 million gallons per day**

II. FINDINGS

The California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Water Board), finds:

A. Background. The County Sanitation Districts of Los Angeles County (hereinafter Discharger or Districts) is currently discharging under Order No. 97-090 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0053813, which was adopted on June 16, 1997. The Discharger submitted a Report of Waste Discharge, dated November 9, 2001**,** and applied for a NPDES permit renewal to discharge up to 400 million gallons per day (mgd) of secondary treated wastewater from the Joint Water Pollution Control Plant**,** hereinafter Facility or JWPCP. The application was deemed complete on May 6, 2002**.**

Compliance with Consent Decree. On June 8, 1994, the Districts entered into a Consent Decree [No. 92 0061 RG (JRx)] with USEPA Region 9 and the Regional Water Board. The Consent Decree primarily requires the Districts to construct additional secondary treatment facilities and achieve compliance with full secondary treatment at JWPCP by December 31, 2002. On January 7, 2003, the Districts informed the Regional Water Board that JWPCP had achieved full secondary treatment on November 8, 2002.

B. Facility Description. The Discharger owns and operates JWPCP. The secondary treated effluent, after traveling approximately 6 miles through tunnels, is discharged from Discharge Serial Nos. 001 and 002 to the Pacific Ocean, a water of the United States, at Whites Point within the Palos Verdes Peninsula Sub-Watershed that is part of the Santa Monica Bay Watershed.

The treatment system at JWPCP consists of screening, grit removal, primary sedimentation, pure oxygen activated sludge reactors, secondary clarification, and chlorination. Effluent from the primary sedimentation tanks is biologically treated in pure oxygen activated sludge reactors. The secondary effluent is then clarified, chlorinated and pumped into the outfall manifold. JWPCP has a dry weather average design treatment capacity of 400 million gallons per day (mgd) and a peak design capacity of 540 mgd. For the period from January 2003 (JWPCP in full secondary treatment mode) to August 2005, effluent discharge flow from JWPCP has averaged 322 mgd with a maximum daily flow of 492 mgd on February 21, 2005. JWPCP receives discharges from more than 1200 significant industrial users.

Solid fractions recovered from wastewater treatment processes include grit, primary screenings, primary sludge and skimmings, thickened waste activated sludge, digested sludge screenings and digester cleaning solids. The fine solids (grit, primary screenings, digested sludge screenings, digester cleaning solids) which are primarily inorganic materials are hauled away to a landfill. The remaining solid fractions (primary sludge and skimmings, thickened waste activated sludge) are anaerobically digested onsite. The digested solids are screened, and dewatered using scroll centrifuges. The dewatered cake contains approximately 25% solids (Class B biosolids). JWPCP generates approximately 11,000 wet tons of Class B biosolids per week. More than half of the biosolids are managed by composting operations in Riverside and Kern County. One quarter of the biosolids are sent to southwestern Arizon for air drying and direct land application. The remaining biosolids are lime stabilized for Class A land application in Kern County, incinerated in a cement kiln in San Bernardino County, and co-disposed with municipal solid waste in Los Angeles County.

Digester gas (containing approximately 65% methane), produced from anaerobic digestion of sludge, is used onsite to fuel a combined cycle power plant (gas turbines followed by boilers and a steam turbine) which generates 22 MW of electricity for plant equipment and steam for digester heating. The power plant allows JWPCP to be essentially self-sufficient with respect to its energy requirements and even produces surplus electricity for export to Southern California Edison Co. sufficient to power approximately 1,500 homes.

Attachment B provides a location map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

Discharge Points. JWPCP has fifteen discharge/bypass points (Discharge Serial Nos. 001 through 015). Four outfalls (Discharge Serial Nos. 001 through 004) are located at Whites Point, off the Palos Verdes Peninsula. Discharge Serial Nos. 001 and 002 are routinely used for discharge of treated wastewater. Discharge Serial No. 003 is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. Discharge Serial No. 004 serves as a standby outfall to provide additional hydraulic relief during the very heaviest flows. These four outfalls are described as follows:

Table 5. Detailed Descriptions of NPDES Discharge Points

Discharge Point	Description
Serial No. 001	**Whites Point 120-inch ocean outfall** This outfall routinely discharges approximately 65% of the effluent from the JWPCP. It discharges south of the shoreline off Whites Point, San Pedro. The outfall is 7440 ft long to the beginning of a single L-shaped diffuser leg which is 4440 ft long. Depth at the beginning of the diffuser is 167 ft and at the end of the diffuser is 190 ft.
Serial No. 002	**Whites Point 90-inch ocean outfall** This outfall routinely discharges approximately 35% of the effluent from the JWPCP. It discharges southwest of the shoreline off Whites Point, San Pedro. The outfall is 7982 ft long to the beginning of a y-shaped diffuser with two legs. Each leg is 1208 ft long. Depth at the beginning of the diffusers is 196 ft and at the end of the diffusers is 210 ft.
Serial No. 003	**Whites Point 72-inch ocean outfall** This outfall is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. When used, it discharges off the Whites Point shoreline between Discharge Points 001 and 002 and about 160 ft below the ocean surface. The outfall is about 6500 ft long and connect to one of three legs of a y-shaped diffuser upstream of the y-intersection. Each leg is approximately 200 ft long.
Serial No. 004	**Whites Point 60-inch ocean outfall** This outfall is used as a standby to provide additional hydraulic relief during the heaviest flow. When used, it discharges off the Whites Point shoreline between

	Discharge Serial Nos. 002 and 003 and about 110 ft below the ocean surface. The outfall is about 5000 ft long and connect to a single, very short diffuser.

Two discharge points (Serial Nos. 006 and 013) have been eliminated following facility modifications. The remaining nine discharge points, with seven of them being bypass points (Discharge Serial Nos. 007-012, and 014) located prior to the headworks, provide for overflow, emergency bypass, and/or hydraulic relief of the JWPCP. This permit does not authorize any discharge from these nine discharge points (Discharge Serial Nos. 005, 007-012, 014, and 015).

Joint Outfall System. JWPCP is part of a Joint Outfall System with six upstream water reclamation plants - La Cañada, Whittier Narrows, San Jose Creek, Pomona, Los Coyotes and Long Beach. It treats municipal and industrial wastewater. The flow from the six upstream plants can be bypassed, to a limited extent, to JWPCP. The sludge generated from the upstream plants are returned to the joint outfall trunk sewers and conveyed to JWPCP for further treatment. There are approximately five million people in the Joint Outfall System service area.

C. Legal Authorities. This Order is issued pursuant to section 402 of the Federal Clean Water Act (CWA) and implementing regulations adopted by USEPA and Chapter 5.5, Division 7 of the California Water Code (CWC). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4 of the CWC for discharges that are not subject to regulation under CWA section 402.

D. Background and Rationale for Requirements. The Regional Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available environmental information. Attachments F, which contain background information and rationale for Order requirements, is hereby incorporated into this Order and constitute part of the Findings for this Order. Attachments A through J and Appendices are also incorporated into this Order.

E. California Environmental Quality Act (CEQA). This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with Section 13389 of the CWC.

F. Technology-based Effluent Limitations. The Code of Federal Regulations (CFR) at 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards. This Order includes technology-based effluent limitations based on Secondary Treatment Standards at 40 CFR 133. A detailed discussion of the technology-based effluent limitations development is included in the Fact Sheet (Attachment F).

G. Water Quality-based Effluent Limitations. Section 122.44(d) of 40 CFR requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Where numeric water quality objectives have not been established, 40 CFR 122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a), proposed State criteria or a State policy interpreting narrative criteria supplemented with other relevant information, or an indicator parameter.

H. Water Quality Control Plans. The Regional Water Board adopted a revised *Water Quality Control Plan, Los Angeles Region*: *Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (hereinafter Basin Plan) on June 13, 1994, that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assigns the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Beneficial uses applicable to the Pacific Ocean (Point Vicente Beach, Royal Palms Beach, and Whites Point Beach) in the Palos Verdes Peninsula are as follows:

Table 6. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
Serial Nos. 001, 002, 003, and 004	Point Vicente Beach, Royal Palms Beach, and Whites Point Beach	Existing: Navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), and shellfish harvesting (SHELL). Potential: Spawning, reproduction, and/or early development of fish (SPWN).
	Nearshore Zone (The zone bounded by the shoreline and a line 1000 feet from the shoreline or the 30-foot depth contours, whichever is further from the shoreline)	Existing: Industrial service supply (IND), navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), preservation of biological habitats (BIOL), preservation of rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development of fish (SPWN).and shellfish harvesting (SHELL).
	Offshore Zone	Existing: Industrial service supply (IND), navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), preservation of rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development of fish (SPWN).and shellfish harvesting (SHELL).

The Basin Plan relies primarily on the requirements of the *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) for protection of the beneficial uses of the State ocean waters. The Basin Plan, however, may contain additional water quality objectives applicable to the Discharger.

On July 25, 2003, USEPA approved the State's 2002 list of impaired waterbodies prepared pursuant to CWA 303(d). The 303(d)list identifies waterbodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations by point sources (water quality-limited waterbodies).

Requirements of this Order specifically implement the applicable Water Quality Control Plans.

I. Santa Monica Bay Beaches Bacteria Total Maximum Daily Loads (TMDLs). The Regional Water Board has adopted two TMDLs to reduce bacteria at Santa Monica Bay beaches during dry and wet weather. The Regional Water Board adopted the Dry Weather and Wet Weather TMDLs on January 24, 2002 and December 12, 2002, respectively (Resolution Nos. 2002-004 and 2002-022). These TMDLs were approved by the State Water Board, State Office of Administrative Law and USEPA Region 9 and became effective on July 15, 2003. In these TMDLs, waste load allocations (WLAs) are expressed as the number of sample days at a shoreline monitoring site that may exceed the single sample targets for total coliform, fecal coliform and enterococcus identified under "Numeric Target" in the TMDLs. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection at beaches. The final shoreline compliance point for the WLAs in the TMDLs is the wave wash where there is a freshwater outlet (i.e., publicly owned storm drain or natural creek) to the beach, or at ankle depth at beaches without a freshwater outlet. The Districts, as the owner of JWPCP, are identified as a responsible jurisdiction in these TMDLs. In these TMDLs, JWPCP is assigned a WLA of zero days of exceedance of the single sample bacterial objectives during all three identified periods – summer dry weather, winter dry weather and wet weather. JWPCP's WLA of zero exceedance days requires that no discharge from its outfalls may cause or contribute to any exceedances of the single sample bacteria objectives at the shoreline compliance points identified in the TMDL and, subsequently, in the approved Coordinated Shoreline Monitoring Plan (dated April 7, 2004) submitted by responsible agencies and jurisdictions under the TMDLs.

J. Thermal Plan. The State Water Board adopted a Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for coastal waters.

K. CWA 303(d) Listed Pollutants. Santa Monica Bay (Offshore and Nearshore) is on the 303(d) list for the following pollutants/stressors, from point and non-point sources: chlordane (sediment), DDT (tissue & sediment, centered on Palos Verdes Shelf), PAHs (sediment), PCBs (tissue & sediment), debris, sediment toxicity, and fish consumption advisory. The 303(d) list also includes the Pacific Ocean shoreline (Point Vicente Beach, Royal Palms Beach, and Whites Point Beach) within the Palos Verdes Hydrologic Subarea as impaired for beach closures. Both DDT (Fish consumption advisory for DDT) and PCBs (Fish consumption advisory for PCBs) are also listed as impairments for Royal Palms Beach, and Whites Point Beach. TMDLs for DDT, PCBs and PAHs have not been scheduled. A TMDL for chlordane is scheduled for 2006.

The receiving waters in the Palos Verdes Peninsula watershed are impacted primarily because of elevated concentrations of contaminants such as PCBs and DDT. Between approximately 1950 and 1971, Montrose Chemical Corporation of California, Inc., a DDT manufacturing plant in Los Angeles County, discharged wastewater containing significant concentrations of DDT to the Joint Outfall System and was conveyed to JWPCP. The DDT was ultimately discharged to the ocean through the Whites Point outfalls. PCB's were also discharged from the Whites Point ocean outfall. Historically, PCBs entered the Joint Outfall System as the result of discharges from several sources in the greater Los Angeles area.

The highest concentrations of DDT and PCB are in a layer of low density sewage-derived sediments around the main sewer outfalls at Whites Point on the Palos Verdes Shelf. USEPA has considered the DDT/PCB contaminated area as a superfund site. It has been investigating the feasibility of various technologies for remediating the contaminated sediments. In August 2000, the USEPA initiated a pilot capping project in which they placed clean sediment over approximately 135 acres (1%) of the contaminated ocean floor. Currently, the results of the capping project are being evaluated by USEPA and their contractors to determine whether capping is an appropriate remediation approach.

L. California Ocean Plan. The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005 and it became effective on February 14, 2006. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. The Ocean Plan identifies beneficial uses of ocean waters of the State to be protected as summarized below:

Table 7. Ocean Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
Serial Nos. 001, 002, 003, and 004	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Area of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting.

In order to protect the beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan.

M. Alaska Rule. On March 30, 2000, USEPA revised its regulation that specifies when new and revised State and Tribal water quality standards (WQS) become effective for CWA purposes (40 CFR 131.21, 65 FR 24641, April 27, 2000). Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

N. Stringency of Requirements for Individual Pollutants. This Order contains restrictions on individual pollutants that are no more stringent than required by the federal CWA. Individual pollutant restrictions consist of technology-based restrictions and water quality-based effluent limitations. The technology-based effluent limitations consist of restrictions on biochemical oxygen demand (BOD), total suspended solids (TSS), and hydrogen ion concentration (pH). Restrictions on BOD, TSS and pH are specified in federal regulations as discussed in Finding F, and the permit's technology-based pollutant restrictions are no more stringent than required by the CWA. Water quality-based effluent limitations have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. All beneficial uses and water quality objectives contained in the Basin Plan and the Ocean Plan were approved under state law and submitted to and approved by USEPA prior to May 30, 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the technology-based requirements of the CWA and the applicable water quality standards for purposes of the CWA.

O. Antidegradation Policy. Section 131.12 of 40 CFR requires that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. As discussed in detail in the Fact Sheet

(Attachment F) the permitted discharge is consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution 68-16.

P. Anti-Backsliding Requirements. Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. Some effluent limitations in this Order are less stringent than those in the previous Order. As discussed in detail in the Fact Sheet (Attachment F) this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

Q. Monitoring and Reporting. Section 122.48 of 40 CFR requires that all NPDES permits specify requirements for recording and reporting monitoring results. Sections 13267 and 13383 of the CWC authorize the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. This Monitoring and Reporting Program is provided in Attachment E.

R. Standard and Special Provisions. Standard Provisions, which in accordance with 40 CFR Sections 122.41and 122.42, apply to all NPDES discharges and must be included in every NPDES permit, are provided in Attachment D. The Regional Water Board has also included in this Order special provisions applicable to the Discharger. A rationale for the special provisions contained in this Order is provided in the attached Fact Sheet (Attachment F).

S. Performance Goals. Chapter III, Section F.2, of the 2001 Ocean Plan allows the Regional Water Board to establish more restrictive water quality objectives and effluent limitations than those set forth in the Ocean Plan as necessary for the protection of the beneficial uses of ocean waters.

Pursuant to this provision and to implement the recommendation of the Water Quality Advisory Task Force (*Working Together for an Affordable Clean Water Environment, A final report presented to the California Water Quality Control Board, Los Angeles Region by Water Quality Advisory Task Force, September 30, 1993)* that was adopted by the Regional Water Board on November 1, 1993, performance goals that are more stringent than those based on Ocean Plan objectives are prescribed in this Order. This approach is consistent with the antidegradation policy in that it requires the Discharger to maintain its treatment level and effluent quality, recognizing normal variations in treatment efficiency and sampling and analytical techniques. However, this approach does not address substantial changes in treatment plant operations that could significantly affect the quality of the treated effluent.

The performance goals are based upon the actual performance of JWPCP and are specified only as an indication of the treatment efficiency of the facility. Performance goals are intended to minimize pollutant loading (primarily for toxics) and while maintaining the incentive for future voluntary improvement of water quality whenever feasible, without the imposition of more stringent limits based on improved performance. They are not considered as limitations or standards for the regulation of the discharge from the treatment facility. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted. The methodology for calculating performance goals is described in the Fact Sheet (Attachment F).

T. Mass Emission Benchmarks. To address relative changes in toxic pollutant loadings from the JWPCP discharge to the marine environment during the five-year permit term, and to collect information that can be used to determine compliance with State and federal antidegradation requirements when a subsequent permit is re-issued to the JWPCP, 12-month average mass emission benchmarks have been established for effluent discharged through Discharge Serial Nos. 001 and 002 (see MRP – Attachment E). These mass

emission benchmarks are not enforceable water quality based effluent limitations. They may be re-evaluated and revised during the five-year permit term. The methodology for calculating mass emission benchmarks is described in the Fact Sheet (Attachment F).

U. Notification of Interested Parties. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet (Attachment F) of this Order.

V. Consideration of Public Comment. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet (Attachment F) of this Order.

III. DISCHARGE PROHIBITIONS

A. Wastes discharged from Discharge Serial Nos. 001 through 004 shall be limited to secondary treated wastewater.

B. Discharges not specifically authorized under this Order are prohibited.

C. The bypass or overflow of untreated wastewater or wastes to surface waters or surface water drainage courses is prohibited, except as allowed in Standard Provision I.G. of Attachment D.

D. The discharge of municipal and industrial waste sludge directly to the ocean, or into a waste stream that discharges to the ocean, is prohibited.

E. The discharge of sludge digester supernatant and centrate directly to the ocean, or into a waste stream that discharges to the ocean without further treatment is prohibited.

F. The discharge of any radiological, chemical, or biological warfare agent or high-level radioactive waste into the ocean is prohibited.

IV. DISCHARGE SPECIFICATIONS AND EFFLUENT LIMITATIONS

A. Discharge Specifications

The discharge of effluent through all discharge points shall comply with the following:

1. Waste management systems that discharge to the ocean must be designed and operated in a manner that will maintain the indigenous marine life and a healthy and diverse marine community.

2. Waste discharged to the ocean must be essentially free of:

   a. Material that is floatable or will become floatable upon discharge.

   b. Settleable material or substances that may form sediments which will degrade benthic communities or other aquatic life.

c. Substances that will accumulate to toxic levels in marine waters, sediments or biota.

d. Substances that significantly decrease the natural light to benthic communities and other marine life.

e. Materials that result in aesthetically undesirable discoloration of the ocean surface.

3. Waste effluents from the Facility shall be discharged in a manner that provides sufficient initial dilution to minimize the concentrations of substances not removed in treatment.

4. The locations of waste discharge from the Facility shall assure that:

   a. Pathogenic organism and viruses are not present in areas where shellfish are harvested for human consumption or in areas used for swimming or other body contact sports.

   b. Natural water quality conditions are not altered in areas designated as being areas of special biological significance or areas that existing marine laboratories use as a source of seawater.

5. Maximum protection is provided to the marine environment.

6. The monthly average effluent dry weather discharge flow rate from the Facility shall not exceed 400 mgd.

B. Effluent Limitations and Performance Goals
(for footnotes, see pages 21 to 24)

1. The effluent limitations for Discharge Serial Nos. 001, 002, 003 and 004 are given below. The discharge of secondary treated effluent shall maintain compliance with the effluent limitations at Discharge Serial Nos. 001, 002, 003 and 004, with compliance measured at Monitoring Location M-001 and Manifold stations as described in the attached Monitoring and Reporting Program (Attachment E). The discharge of an effluent with constituents in excess of effluent limitations is prohibited.

2. The performance goals for Discharge Serial Nos. 001 and 002 are also given below. The listed performance goals are not enforceable effluent limitations or standards. However, the Discharger shall maintain, if not improve, its treatment efficiency. Any exceedance of the performance goals shall trigger an investigation into the cause of the exceedance. If the exceedance persists in <u>three</u> successive monitoring periods, the Discharger shall submit a written report to the Regional Water Board on the nature of the exceedance, the results of the investigation as to the cause of the exceedance, and the corrective actions taken or proposed corrective measures with timetable for implementation, if necessary.

a. Effluent Limitations for Major Wastewater Constituents for the discharge of effluent at **Discharge Serial Nos. 001, 002, 003 and 004**

(1) **Major Wastewater Constituents**

Discharge Serial Nos. 001, 002, 003 and 004

Parameter	Units	Effluent Limitations [1]				
		Average Monthly	Average Weekly	Maximum Daily [2]	Instantaneous Minimum [3]	Instantaneous Maximum [3]
Biochemical Oxygen Demand 5-day @ 20°C [4]	mg/L	30	45	--	--	--
	lbs/day	96,300	144,500	--	--	--
Total Suspended Solids [4]	mg/L	30	45	--	--	--
	lbs/day	96,300	144,500	--	--	--
PH [4, 6]	standard units	--	--	--	6.0	9.0
Oil and Grease	mg/L	15 [5]	22.5 [5]	45 [5]	--	75 [6]
	lbs/day	48,200	72,200	144,500	--	--
Settleable Solids	ml/L	0.5 [5]	0.75 [5]	1.5 [5]	--	3.0 [6]
Turbidity [6]	NTU	75	100	--	--	225

b. Effluent Limitations and Performance Goals for Toxic Materials for the discharge of effluent at **Discharge Serial Nos. 001 and 002.** (Initial dilution ratio = 166:1)

(1) **Marine Aquatic Life Toxicants**

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations [1, 7]			Performance Goals [8]
		Average Monthly	Maximum Daily [2]	Instantaneous Maximum [3]	Average Monthly
Arsenic [9]	µg/L	[10]	[10]	[10]	2.0 [11]
Cadmium [9]	µg/L	[10]	[10]	[10]	1 [12]
Chromium (hexavalent) [9, 15]	µg/L	[10]	[10]	[10]	330 [14]
Copper [9, 16]	µg/L	[10]	[10]	[10]	12 [12]
Lead [9, 16]	µg/L	[10]	[10]	[10]	11 [12]
Mercury [9]	µg/L	[10]	[10]	[10]	2.5 [13]
Nickel [9]	µg/L	[10]	[10]	[10]	37 [12]

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations [1, 7]			Performance Goals [8]
		Average Monthly	Maximum Daily [2]	Instantaneous Maximum [3]	Average Monthly
Selenium [9]	µg/L	[10]	[10]	[10]	11 [11]
Silver [9, 16]	µg/L	[10]	[10]	[10]	12 [12]
Zinc [9, 16]	µg/L	[10]	[10]	[10]	32 [12]
Cyanide	µg/L	[10]	[10]	[10]	8 [12]
Chlorine Residual [18]	µg/L	330	1,300	10,000	300 [12]
	lbs/day	1,060	4,170	--	--
Ammonia as N	mg/L	[10]	[10]	[10]	36 [12]
Phenolic compounds [19] (non-chlorinated)	µg/L	[10]	[10]	[10]	250 [13]
Phenolic compounds [20] (chlorinated)	µg/L	[10]	[10]	[10]	167 [14]
Endosulfan [21]	µg/L	[10]	[10]	[10]	0.5 [13]
HCH [22]	µg/L	[10]	[10]	[10]	0.01 [12]
Endrin	µg/L	[10]	[10]	[10]	0.05 [13]
Acute toxicity [23]	TUa	---	5.3	---	---
Chronic toxicity [24]	TUc	---	167	---	---
Radioactivity [25]					
Gross alpha	PCi/L	N/A	15	N/A	N/A
Gross beta	PCi/L	N/A	50	N/A	N/A
Combined Radium-226 & Radium-228	PCi/L	N/A	5.0	N/A	N/A
Tritium	PCi/L	N/A	20,000	N/A	N/A
Strontium-90	PCi/L	N/A	8.0	N/A	N/A
Uranium	PCi/L	N/A	20	N/A	N/A

(2) Human Health Toxicants – Non Carcinogens

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations [1, 7]	Performance Goals [8]
		Average Monthly	Average Monthly
Acrolein	µg/L	[10]	100 [13]
Antimony [9]	µg/L	[10]	2.6 [12]
Bis(2-chloroethoxy) methane	µg/L	[10]	250 [13]
Bis(2-chloroisopropyl) ether	µg/L	[10]	100 [13]
Chlorobenzene	µg/L	[10]	5 [13]
Chromium (III) [9]	µg/L	[10]	22 [12]
Di-n-butyl-phthalate	µg/L	[10]	500 [13]
Dichlorobenzenes [26]	µg/L	[10]	100 [13]
Diethyl phthalate	µg/L	[10]	100 [13]
Dimethyl phthalate	µg/L	[10]	100 [13]
2-Methyl-4,6-dinitrophenol	µg/L	[10]	250 [13]
2,4-Dinitrophenol	µg/L	[10]	250 [13]
Ethyl benzene	µg/L	[10]	5 [13]
Fluoranthene	µg/L	[10]	50 [13]
Hexachlorocyclopentadiene	µg/L	[10]	250 [13]
Nitrobenzene	µg/L	[10]	50 [13]
Thallium [9]	µg/L	[10]	100 [13]
Toluene	µg/L	[10]	0.5 [12]
Tributyltin	µg/L	[10]	0.026 [12]
1,1,1-Trichloroethane	µg/L	[10]	5 [13]

(3) Human Health Toxicants – Carcinogens

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations [1, 7]	Performance Goals [8]
		Average Monthly	Average Monthly
Acrylonitrile	µg/L	[10]	17 [14]
Aldrin	µg/L	0.0037	[17]
	lbs/day	0.012	---
Benzene	µg/L	[10]	2.5 [13]
Benzidine	µg/L	0.012	[17]
	lbs/day	0.039	---
Beryllium [9]	µg/L	[10]	5 [13]
Bis(2-chloroethyl) ether	µg/L	[10]	7.5 [14]
Bis(2-ethylhexyl) phthalate	µg/L	[10]	20 [12]
Carbon tetrachloride	µg/L	[10]	2.5 [13]
Chlordane [27]	µg/L	0.0038	[17]
	lbs/day	0.012	---
Chlorodibromomethane	µg/L	[10]	2 [12]
Chloroform	µg/L	[10]	34 [12]
DDT [28]	µg/L	0.028	[17]
	lbs/day	0.090	---
1,4-Dichlorobenzene	µg/L	[10]	25 [13]
3,3'-Dichlorobenzidine	µg/L	[10]	0.7 [13]
1,2-Dichloroethane	µg/L	[10]	2.5 [13]
1,1-Dichloroethylene	µg/L	[10]	2.5 [13]
Bromodichloromethane	µg/L	[10]	6 [12]
Dichloromethane	µg/L	[10]	12 [11]
1,3-Dichloropropene	µg/L	[10]	2.5 [13]
Dieldrin	µg/L	0.0067	[17]
	lbs/day	0.022	---

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations [1, 7]	Performance Goals [8]
		Average Monthly	Average Monthly
2,4-Dinitrotoluene	µg/L	[10]	125 [13]
1,2-Diphenylhydrazine	µg/L	[10]	25 [13]
Halomethanes [29]	µg/L	[10]	2.6 [12]
Heptachlor	µg/L	0.0084	[17]
	lbs/day	0.027	---
Heptachlor epoxide	µg/L	0.0033	[17]
	lbs/day	0.011	---
Hexachlorobenzene	µg/L	0.035	[17]
	lbs/day	0.11	---
Hexachlorobutadiene	µg/L	[10]	25 [13]
Hexachloroethane	µg/L	[10]	25 [13]
Isophorone	µg/L	[10]	25 [13]
N-Nitrosodimethylamine	µg/L	[10]	125 [13]
N-Nitrosodi-N-propylamine	µg/L	[10]	63 [14]
N-Nitrosodiphenylamine	µg/L	[10]	25 [13]
PAHs [30]	µg/L	[10]	0.06 [12]
PCBs [31]	µg/L	0.0032	[17]
	lbs/day	0.010	---
TCDD equivalents [32]	**pg/L**	0.65	[17]
	lbs/day	2.1×10^{-6}	---
1,1,2,2-Tetrachloroethane	µg/L	[10]	2.5 [13]
Tetrachloroethylene	µg/L	[10]	7 [12]
Toxaphene	µg/L	0.035	[17]
	lbs/day	0.11	---
Trichloroethylene	µg/L	[10]	2.5 [13]
1,1,2-Trichloroethane	µg/L	[10]	2.5 [13]
2,4,6-Trichlorophenol	µg/L	[10]	48 [14]

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations [1, 7]	Performance Goals [8]
		Average Monthly	Average Monthly
Vinyl chloride	µg/L	[10]	2.5 [13]

c. Effluent Limitations for Toxic Materials for the discharge of effluent at **Discharge Serial No. 003.** (Initial dilution ratio = 150:1)

(1) **Marine Aquatic Life Toxicants**

Discharge Serial No. 003

Parameter	Units	Effluent Limitations [1, 7]		
		Average Monthly	Maximum Daily [2]	Instantaneous Maximum [3]
Chlorine Residual [18]	µg/L	300	1200	9100
Chronic toxicity [24]	TUc	---	151	---
Radioactivity [25]				
Gross alpha	PCi/L	N/A	15	N/A
Gross beta	PCi/L	N/A	50	N/A
Combined Radium-226 & Radium-228	PCi/L	N/A	5.0	N/A
Tritium	PCi/L	N/A	20,000	N/A
Strontium-90	PCi/L	N/A	8.0	N/A
Uranium	PCi/L	N/A	20	N/A

(2) **Human Health Toxicants – Carcinogens**

Discharge Serial No. 003

Parameter	Units	Effluent Limitations [1, 7]
		Average Monthly
Aldrin	µg/L	0.0033
Benzidine	µg/L	0.010
Chlordane [27]	µg/L	0.0034
DDT [28]	µg/L	0.026
Dieldrin	µg/L	0.0060

Discharge Serial No. 003

Parameter	Units	Effluent Limitations [1, 7]
		Average Monthly
Heptachlor	µg/L	0.0076
Heptachlor epoxide	µg/L	0.0030
Hexachlorobenzene	µg/L	0.032
PCBs [31]	µg/L	0.0029
TCDD equivalents [32]	**pg/L**	0.59
Toxaphene	µg/L	0.032

d. Effluent Limitations for Toxic Materials for the discharge of effluent at **Discharge Serial No. 004.** (Initial dilution ratio = 115:1)

(1) **Marine Aquatic Life Toxicants**

Discharge Serial No. 004

Parameter	Units	Effluent Limitations [1, 7]		
		Average Monthly	Maximum Daily [2]	Instantaneous Maximum [3]
Chlorine Residual [18]	µg/L	230	930	7,000
Chronic toxicity [24]	TUc	---	116	---
Radioactivity [25]				
Gross alpha	PCi/L	N/A	15	N/A
Gross beta	PCi/L	N/A	50	N/A
Combined Radium-226 & Radium-228	PCi/L	N/A	5.0	N/A
Tritium	PCi/L	N/A	20,000	N/A
Strontium-90	PCi/L	N/A	8.0	N/A
Uranium	PCi/L	N/A	20	N/A

(2) Human Health Toxicants – Carcinogens

Discharge Serial No. 004

Parameter	Units	Effluent Limitations [1, 7]
		Average Monthly
Aldrin	µg/L	0.0026
Benzidine	µg/L	0.008
Chlordane [27]	µg/L	0.0027
DDT [28]	µg/L	0.020
Dieldrin	µg/L	0.0046
Heptachlor	µg/L	0.0058
Heptachlor epoxide	µg/L	0.0023
Hexachlorobenzene	µg/L	0.024
PCBs [31]	µg/L	0.0022
TCDD equivalents [32]	pg/L	0.45
Toxaphene	µg/L	0.024
2,4,6-Trichlorophenol	µg/L	34

Footnotes for Effluent Limitations and Performance Goals

[1] The daily mass emission calculations are based on the average design flow rate of 385 million gallons per day (mgd) specified in the 1997 Joint Water Pollution Control Plant (JWPCP) permit according to the Ocean Plan equation: lbs/day = 0.00834 x Ce (effluent concentration, ug/L) x Q (flow rate, mgd).

During storm events when flow exceeds the dry weather design capacity, the mass emission rate limits shall not apply. Only the concentration limits shall apply.

[2] The maximum daily effluent concentration limit shall apply to flow-weighted 24-hour composite samples. It may apply to grab samples if the collection of composite samples for those constituents is not appropriate because of the instability of the constituents.

[3] The instantaneous maximum (minimum) shall apply to grab sample results.

[4] Effluent limits are based on secondary treatment standards, 40 CFR 133.102.

[5] Effluent limit is the same as that in Order No. 97-090 and is more stringent than the limit specified in the 2001

Ocean Plan. (Antibackliding Policy)

[6] Limits are based on Table A effluent limitations in the 2001 Ocean Plan.

[7] Effluent limitations for these constituents are based on Ocean Plan objectives using initial dilution ratios of 166, 150, and 115 parts of seawater to 1 part effluent for Discharge Serial Nos. 001 and 002, Discharge Serial No. 003, and Discharge Serial No. 004, respectively. However, for the calculation of the acute toxicity limitation, only 10% of the initial dilution ratio is used. Effluent limitations for radioactivity are not dependent on the initial dilution ratio with respect to each discharge point.

[8] The performance goals are based upon the actual performance data (November 2002 to August 2005) of JWPCP and are specified only as an indication of the treatment efficiency of the plant. They are not considered as limitations or standards for the treatment plant. JWPCP shall make best efforts to maintain, if not improve, the effluent quality at the level of these performance goals. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted.

[9] Concentration expressed as total recoverable.

[10] These constituents did not show reasonable potential to exceed Ocean Plan objectives, therefore, no numerical water quality based effluent limitations are prescribed.

[11] Numerical effluent quality performance goals are derived statistically using data reported by the Discharger from November 2002 to August 2005 when JWPCP was operating in full secondary treatment mode. Please refer to Fact Sheet (Attachment F) for calculation procedures.

[12] For the pollutant, the maximum detected effluent concentration (MDEC) from November 2002 to August 2005 is prescribed as the performance goal. . Please refer to Fact Sheet (Attachment F) for procedures.

[13] The monitoring data for these constituents were not detected. Performance goals are set at five times (for carcinogens and marine aquatic life toxicants) or ten times (for noncarcinogens) the minimum reporting limits in the 2004 annual report.

[14] These constituents were determined to have no reasonable potential to exceed the respective water quality objective. However, the calculated performance goal is greater than the respective calculated Ocean Plan effluent limit. Therefore, effluent limit is prescribed as the performance goal.

[15] The Discharger has the option to meet the hexavalent chromium performance goal with a total chromium analysis. However, if the total chromium level exceeds the hexavalent chromium performance goal, it will be considered an exceedance unless an analysis has been made for hexavalent chromium in a replicate/split sample and the result has been shown to be in compliance with the hexavalent chromium performance goal.

[16] These constituents are pollutants of concern identified by the Santa Monica Bay Restoration Plan that are causing or could cause deterioration of designated beneficial uses in Santa Monica Bay. Mass emission performance caps were set in Order No. 97-090. In this Order, 12-monthe average mass emission benchmarks have been established in the MRP (Attachment E) for these pollutants of concern to serve same purpose.

[17] These constituents were determined to have reasonable potential to exceed the respective water quality objective. Therefore, effluent limits are prescribed for these constituents. Since the calculated performance goal is higher than the respective effluent limit, no performance goal is prescribed.

[18] These total chlorine residual limits shall only apply to continuous discharge exceeding two hours.

For intermittent discharges not exceeding two hours, water quality objectives for total chlorine residual shall be determined through the use of the following equation:

$$\log y = -0.43(\log x) + 1.8$$

where: y = the water quality objective (in µg/L) to apply when chlorine is being discharged;
x = the duration of uninterrupted chlorine discharge in minutes.

For intermittent discharges not exceeding two hours, the applicable total chlorine residual limit (daily maximum) shall then be calculated using the above calculated water quality objective according to procedures outlined in Section III.C.3.a of the 2001 Ocean Plan. The minimum dilution ratios shall be 166:1 for Discharge Serial Nos. 001 and 002, 150:1 for Discharge Serial No. 003, and 115:1 for Discharge Serial No. 004.

[19] Nonchlorinated phenolic compounds shall mean the sum of Phenol, 2,4-Dimethylphenol, 2-Nitrophenol, and 4-Nitrophenol, 2,4-Dinitrophenol and 4,6-Dinitro-2-Methylphenol.

[20] Chlorinated phenolic compounds mean the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

[21] Endosulfan shall mean the sum of endosulfan-alpha and -beta and endosulfan sulfate.

[22] HCH shall mean the sum of alpha, beta, gamma (lindane), and delta isomers of hexachlorocyclohexane.

[23] Expressed as Acute Toxicity Units (TUa)

TUa = 100/LC50

where: Lethal Concentration, 50 Percent (LC50) is expressed as the estimate of the percent effluent concentration that causes death in 50% of the test population, in the time period prescribed by the toxicity test, as required by this permit.

[24] Expressed as Chronic Toxicity Units (TUc)

TUc = 100/NOEC

where: NOEC (No Observed Effect Concentration) is expressed as the maximum percent effluent that causes no observable effect on test organisms as determined by the result of a critical life stage toxicity test, as required by this permit.

[25] Effluent limits for radioactivity are based on Maximum Contaminant Levels (MCLs) specified in Title 22, Chapter 15, Article 5, Section 64443, California Code of Regulations.

[26] Dichlorobenzenes shall mean the sum of 1,2- and 1,3-dichlorobenzene.

[27] Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma and oxychlordane.

[28] DDT shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

[29] Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

[30] PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1, 2-benzanthracene, 3, 4-benzofluoranthene, benzo[k]-fluoranthene, 1, 12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1, 2, 3-cd]pyrene, phenanthrene and pyrene.

[31] PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-l232, Aroclor-1242, Aroclor-l248, Aroclor-1254 and Aroclor-1260.

[32] TCDD equivalents shall mean the sum of the concentration of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below:

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
l,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

3. **Percent Removal:** The average monthly percent removal of BOD 5-day 20°C and total suspended solids shall not be less than 85 percent.

4. The Discharger shall ensure that bacterial concentrations in the effluent discharge do not result in an exceedance of the JWPCP waste load allocation of zero (0) days exceedance of single sample numeric limits or geometric mean limits [based on Basin Plan bacteria objectives for marine waters designated REC-1, see V.(Receiving Water Limitations).A.1.a. below] at shoreline compliance points, as specified in Regional Water Board Resolution Nos. 2002-004 and 2002-022.

5. The temperature of wastes discharged shall not exceed 100°F, which takes into account the very large dilution credit based upon BPJ.

V. RECEIVING WATER LIMITATIONS

Unless specifically excepted by this Order, the discharge, shall not cause violation of the following water quality objectives. Compliance with these objectives shall be determined by samples collected at stations representative of the area within the waste field where initial dilution is completed.

A. Bacterial Characteristics

1. Water Contact Standards

   a. State/Regional Water Board Water Contact Standards

      In marine water designated for water contact recreation (REC-1), the waste discharged shall not cause the following bacterial standards to be exceeded in the receiving water outside the initial dilution zone.

      Geometric Mean Limits
      (1) Total coliform density shall not exceed 1,000/100 ml.
      (2) Fecal coliform density shall not exceed 200/100 ml.
      (3) Enterococcus density shall not exceed 35/100 ml.

Single Sample Maximum (SSM)

(4) Total coliform density shall not exceed 10,000/100 ml.
(5) Fecal coliform density shall not exceed 400/100 ml.
(6) Enterococcus density shall not exceed 104/100 ml.
(7) Total coliform density shall not exceed 1,000/100 ml, when the fecal coliform/total coliform ratio exceeds 0.1.

In addition, total coliform density shall not exceed 1,000/100 ml for more than 20 percent of the samples at any sampling station in any 30-day period.

b. Department of Health Services (DHS) Standards

DHS has established minimum protective bacteriological standards for coast water adjacent to public beaches and for public water contact sports areas in ocean waters. These standards are found in the California Code of Regulations, title 17, section 7958, and they are identical to the objectives contained in subsection a. above. When a public beach or public water contact sports area fails to meet these standards, DHS or the local public health officer may post with warning signs or otherwise restrict use of the public beach or public water contact sports area until the standards are met. The DHS regulations impose more frequent monitoring and more stringent posting and closure requirements on certain high-use public beaches that are located adjacent to a storm drain that flows in the summer.

For beaches not covered under AB 411 regulations, DHS imposes the same standards as contained in Title 17 and requires weekly sampling but allows the county health officer more discretion in making posting and closure decisions.

2. Shellfish Harvesting Standards

At all areas where shellfish may be harvested for human consumption, as determined by the Regional Water Board, the waste discharged shall not cause the following bacterial standards to be exceeded:

The median total coliform density for any 6-month period shall not exceed 70 per 100 ml, and not more than 10 percent of the samples during any 6-month period shall exceed 230 per 100 ml.

3. Implementation Provisions for Bacterial Characteristics

a. At a minimum, weekly samples shall be collected from each site. The geometric mean values should be calculated using the five most recent sample results. If sampling occurs more frequently than weekly, all samples taken during the previous 30-day period shall be used to calculated the geometric mean.

b. If a single sample exceeds any of the single sample maximum (SSM) standards, repeat sampling at that location shall be conducted to determine the extent and persistence of the exceedance. Repeat sampling shall be conducted within 24 hours of receiving analytical results and continued until the sample result is less than the SSM standard or until the Regional Water Board requires the Discharger or appropriate agency to conduct a sanitary survey to determine the source of the high bacterial densities. A sanitary survey shall also be required if three out of four weekly samples exceed any SSM standard, or if 75 percent of the samples from more frequent testing during any 30-day period exceed any SSM standard.

When repeat sampling is required because of an exceedance of any one single sample density, values from all samples collected during that 30-day period will be used to calculate the geometric mean.

c. It is state policy that the geometric mean bacterial objectives are strongly preferred for use in water body assessment decisions, for example, in developing the Clean Water Act section 303(d) list of impaired waters, because the geometric mean objectives are a more reliable measure of long-term water body conditions. In making assessment decisions on bacterial quality, single sample maximum data must be considered together with any available geometric mean data. The use of only single sample maximum bacterial data is generally inappropriate unless there is a limited data set, the water is subject to short-term spikes in bacterial concentrations, or other circumstances justify the use of only single sample maximum data.

B. Physical Characteristics

The waste discharged shall not:

1. Cause floating particulates and oil and grease to be visible;

2. Cause aesthetically undesirable discoloration of the ocean surface;

3. Significantly reduce the transmittance of natural light at any point outside the initial dilution zone; and,

4. Change the rate of deposition of inert solids and the characteristics of inert solids in ocean sediments such that benthic communities are degraded.

C. Chemical Characteristics

The waste discharged shall not:

1. Cause the dissolved oxygen concentration at any time to be depressed more than 10 percent from that which occurs naturally;

2. Change the pH of the receiving waters at any time more than 0.2 units from that which occurs naturally;

3. Cause the dissolved sulfide concentration of waters in and near sediments to be significantly increased above that present under natural conditions;

4. Contain individual pesticides or combinations of pesticides in concentrations that adversely affect beneficial uses;

5. Cause the concentration of substances set forth in Chapter II, Table B of the Ocean Plan, in marine sediments to increase to levels that would degrade indigenous biota;

6. Cause the concentration of organic materials in marine sediments to be increased to levels that would degrade marine life; and,

7. Contain nutrients at levels that will cause objectionable aquatic growths or degrade indigenous biota.

D. Biological Characteristics

The waste discharged shall not:

1. Degrade marine communities, including vertebrate, invertebrate, and plant species;

2. Alter the natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption; and,

3. Cause the concentration of organic materials in fish, shellfish or other marine resources used for human consumption to bioaccumulate to levels that are harmful to human health.

E. Radioactivity

Discharge of radioactive waste shall not degrade marine life.

VI. PROVISIONS

A. Standard Provisions

1. **Federal Standard Provisions.** The Discharger shall comply with all Standard Provisions included in Attachment D of this Order.

2. **Regional Water Board Standard Provisions.** The Discharger shall comply with the following provisions:

   a. Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance as defined by Section 13050 of the California Water Code.

   b. Odors, vectors, and other nuisances of sewage or sludge origin beyond the limits of the treatment plant site or the sewage collection system due to improper operation of facilities, as determined by the Regional Water Board , are prohibited.

   c. All facilities used for collection, transport, treatment, or disposal of "wastes" shall be adequately protected against damage resulting from overflow, washout, or inundation from a storm or flood having a recurrence interval of once in 100 years.

   d. Collection, treatment, and disposal systems shall be operated in a manner that precludes public contact with wastewater.

   e. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer of the Regional Water Board.

   f. The provisions of this order are severable. If any provision of this order is found invalid, the remainder of this Order shall not be affected.

g. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the CWA.

h. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities or penalties to which the discharger is or may be subject to under Section 311 of the CWA.

i. The Discharger must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to storm drain systems or other water courses under their jurisdiction; including applicable requirements in municipal storm water management program developed to comply with NPDES permits issued by the Regional Water Board to local agencies.

j. Discharge of wastes to any point other than specifically described in this Order is prohibited, and constitutes a violation thereof.

k. The Discharger shall comply with all applicable effluent limitations, national standards of performance, toxic effluent standards, and all federal regulations established pursuant to Sections 301, 302, 303(d), 304, 306, 307, 316, 403, and 405 of the Federal CWA and amendments thereto.

l. These requirements do not exempt the operator of the waste disposal facility from compliance with any other laws, regulations, or ordinances which may be applicable; they do not legalize this waste disposal facility, and they leave unaffected any further restraints on the disposal of wastes at this site which may be contained in other statutes or required by other agencies.

m. Oil or oily material, chemicals, refuse, or other pollutionable materials shall not be stored or deposited in areas where they may be picked up by rainfall and carried off of the property and/or discharged to surface waters. Any such spill of such materials shall be contained and removed immediately.

n. A copy of these waste discharge specifications shall be maintained at the discharge facility so as to be available at all times to operating personnel.

o. If there is any storage of hazardous or toxic materials or hydrocarbons at this facility and if the facility is not manned at all times, a 24-hour emergency response telephone number shall be prominently posted where it can easily be read from the outside.

p. The Discharger shall file with the Regional Water Board a report of waste discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge.

q. In the event of any change in name, ownership, or control of these waste disposal facilities, the discharger shall notify the Regional Water Board of such change and shall notify the succeeding owner or operator of the existence of this Order by letter, copy of which shall be forwarded to the Regional Water Board.

r. The CWC provides that any person who violates a waste discharge requirement or a provision of the CWC is subject to civil penalties of up to $5,000 per day, $10,000 per day, or $25,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil penalties

of up to $10 per gallon per day or $25 per gallon per day of violation; or some combination thereof, depending on the violation, or upon the combination of violations.

Violation of any of the provisions of the NPDES program or of any of the provisions of this Order may subject the violator to any of the penalties described herein, or any combination thereof, at the discretion of the prosecuting authority; except that only one kind of penalty may be applied for each kind of violation.

s. Under CWC 13387, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this order, including monitoring reports or reports of compliance or noncompliance, or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained in this order and is subject to a fine of not more than $25,000 or imprisonment of not more than two years, or both. For a second conviction, such a person shall be punished by a fine of not more than $25,000 per day of violation, or by imprisonment of not more than four years, or by both.

t. The discharge of any waste resulting from the combustion of toxic or hazardous wastes to any waste stream that ultimately discharges to waters of the United States is prohibited, unless specifically authorized elsewhere in this permit.

u. The Discharger shall notify the Executive Officer in writing no later than 6 months prior to planned discharge of any chemical, other than the products previously reported to the Executive Officer, which may be toxic to aquatic life. Such notification shall include:

(1) Name and general composition of the chemical,

(2) Frequency of use,

(3) Quantities to be used,

(4) Proposed discharge concentrations, and

(5) USEPA registration number, if applicable.

B. Monitoring and Reporting Program Requirements

The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order.

C. Special Provisions

1. Reopener Provisions

a. This Order may be modified, revoked and reissued, or terminated for cause, including, but not limited to:

(1) Violation of any term or condition contained in this Order;

(2) Obtaining this Order by misrepresentation, or by failure to disclose fully all relevant facts;

(3) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the Discharger for an Order modification, revocation, and issuance or termination, or a notification of planned changes or anticipated noncompliances does not stay any condition of this Order.

b. If applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under section 307(a) of the CWA for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in this Order, the Regional Water Board may institute proceedings under these regulations to modify or revoke and reissue the Order to conform to the toxic effluent standard or prohibition.

c. This Order may be reopened and modified, to incorporate new limits based on future reasonable potential analyses to be conducted based on on-going monitoring data collected by the Discharger and evaluated by the Regional Water Board .

d. This Order may be reopened and modified, to incorporate new mass emission limitations based on the current JWPCP's design capacity of 400 mgd provided that the Discharger requests and conducts an Antidegradation Analysis to demonstrate that no adverse impacts would result from the increased flow rate.

e. This Order may be reopened and modified upon the State Water Board releasing final compliance determination language.

f. This Order may be reopened and modified, in accordance with the provisions set forth in 40 CFR 122 and 124, to incorporate requirements for the implementation of the watershed management approach.

g. This Order may be modified, in accordance with the provisions set forth in 40 CFR 122 and 124, to include new Minimum Levels (ML).

h. This Order may be reopened and modified, to revise effluent limitations as a result of future Basin Plan Amendments or the adoption of a TMDL for Santa Monica Bay Watershed Management Areas.

i. The Regional Water Board may modify, or revoke and reissue this Order if present or future investigations demonstrate that the discharge(s) governed by this Order will cause, have the potential to cause, or will contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters.

j. This Order may be modified, revoked, and reissued or terminated in accordance with the provisions of 40 CFR 122.44, 122.62 to 122.64, 125.62, and 125.64. Causes for taking such actions include, but are not limited to, failure to comply with any condition of this Order, endangerment to human health or the environment resulting from the permitted activity, or acquisition of newly obtained information which would have justified the application of different conditions if known at the time of Order adoption and issuance.

k. The waste discharged shall not cause a violation of any applicable water quality standard for receiving waters. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the CWA, or amendments, thereto, the Regional Water Board will revise and modify this Order in accordance with such standards.

2. **Special Studies, Technical Reports and Additional Monitoring Requirements**

a. **Treatment Plant Capacity**

The Discharger shall submit a written report to the Executive Officer of the Regional Water Board within 90 days after the "30-day (monthly) average" daily dry-weather flow equals or exceeds 75 percent of the design capacity of waste treatment and/or disposal facilities. The Discharger's senior administrative officer shall sign a letter, which transmits that report and certifies that the discharger's policy-making body is adequately informed of the report's contents. The report shall include the following:

(1) The average daily flow for the month, the date on which the peak flow occurred, the rate of that peak flow, and the total flow for the day;

(2) The best estimate of when the monthly average daily dry-weather flow rate will equal or exceed the design capacity of the facilities; and

(3) A schedule for studies, design, and other steps needed to provide additional capacity for waste treatment and/or disposal facilities before the waste flow rate equals the capacity of present units.

This requirement is applicable to those facilities which have not reached 75 percent of capacity as of the effective date of this Order. For those facilities that have reached 75 percent of capacity by that date but for which no such report has been previously submitted, such report shall be filed within 90 days of the issuance of this Order.

b. **Toxicity Reduction Requirements**.

The Discharger shall prepare and submit a copy of the Discharger's initial investigation Toxicity Reduction Evaluation (TRE) workplan to the Executive Officer of the Regional Water Board for approval within 90 days of the effective date of this permit. If the Executive Officer does not disapprove the workplan within 60 days, the workplan shall become effective. The Discharger shall use USEPA manual EPA/833B-99/002 (municipal) as guidance, or most current version. At a minimum, the initial investigation TRE workplan must contain the provisions in **Attachment G**. This workplan shall describe the steps the Discharger intends to follow if toxicity is detected, and should include, at a minimum:

(1) A description of the investigation and evaluation techniques that will be used to identify potential causes and sources of toxicity, effluent variability, and treatment system efficiency.

(2) A description of the facility's methods of maximizing in-house treatment efficiency and good housekeeping practices, and a list of all chemicals used in the operation of the facility; and,

(3) If a toxicity identification evaluation (TIE) is necessary, an indication of the person who would conduct the TIEs (i.e., an in-house expert or an outside contractor).

If the effluent toxicity test result exceeds the limitation, then the Discharger shall immediately implement accelerated toxicity testing that consists of six additional tests, approximately every two weeks, over a 12-week period. Effluent sampling for the first test of the six additional tests shall commence within 3 days of receipt of the test results exceeding the toxicity limitation.

If the results of any two of the six tests (any two tests in a 12-week period) exceed the limitation, the Discharger shall initiate a Toxicity Reduction Evaluation (TRE).

If results of the implementation of the facility's initial investigation TRE workplan (as described above) indicate the need to continue the TRE/TIE, the Discharger shall expeditiously develop a more detailed TRE workplan for submittal to the Executive Officer within 15 days of completion of the initial investigation TRE.

Detailed toxicity testing and reporting requirements are contained in Section V of the MRP (Attachment E).

3. **Best Management Practices and Pollution Prevention**

a. **Storm Water Pollution Prevention Plan (SWPPP)**

Within 90 days of the effective date of this Order the Discharger shall submit an updated SWPPP that describes site-specific management practices for minimizing contamination of storm water runoff and for preventing contaminated storm water runoff from being discharged directly to waters of the State to the Regional Water Board. The SWPPP shall be developed in accordance with the requirements in *Storm Water Pollution Prevention Plan Requirements* (**Attachment H**). If all storm water is captured and treated on-site and no storm water is discharged or allowed to run off-site from the Facility, the Discharge shall provide certification with descriptions of on-site storm water management to the Regional Water Board.

b. **Spill Contingency Plan (SCP)**

The Discharger shall maintain a SCP for JWPCP and its sanitary sewage collection system in an up-to-date condition and shall amend the SCP whenever there is a change (e.g. in the design, construction, operation, or maintenance of the sewage system or sewage facilities) which materially affects the potential for spills. The Discharger shall review and amend the SCP as appropriate after each spill from JWPCP or in the service area of the Facility. Upon request of the Regional Water Board, the Discharge shall submit the SCP and any amendments to the Regional Water Board. The Discharger shall ensure that the up-to-date SPC is readily available to the sewage system personnel at all times and that the sewage system personnel are familiar with it.

Within ninety days of the adoption of this Order, the Discharger is required to submit an interim Spill Contingency Plan, which describes current activities and protocols, to address cleanup of spills, overflows, and bypasses of untreated or partially treated wastewater caused by a failure in the publicly owned portion of a sanitary sewer system, that reach water bodies, including dry channels and beach sands. This Plan shall be developed in consultation with Regional Water Board staff, the City of Los Angeles, the County Health Department and the Environmental Community.

Within six months of the adoption of this Order, the Discharger is required to convene a multi-agency workgroup to review the interim Spill Contingency Plan and make their recommendations

to the group for the most applicable containment, cleanup and monitoring of sewer spills or overflows that reach water bodies, including dry channels and beach sands. The multi-agency workgroup shall be developed with a statewide participants (to the extent practicable) with a goal of achieving a plan that could be implemented on a statewide basis. However, if a statewide consensus can not be achieved, the plan at a minimum must address the Discharger's site specific Plan. The interim Plan shall include at a minimum sections on spill, cleanup, and containment measures, public notification, and receiving water monitoring.

Within two years of the adoption of this Order, the Discharger should submit a final Spill Contingency Plan which provides the most applicable containment, cleanup and monitoring of sewer spills or overflows that reach water bodies, including dry channels and beach sands, to the Executive Officer of the Regional Board.

c. **Pollutant Minimization Program (PMP)**

Reporting protocols in the Monitoring and Reporting Program, Attachment E, Section VIII.B.4 describe sample results that are to be reported as Detected but Not Quantified (DNQ) or Not Detected (ND). Definitions for a reported Minimum Level (ML) and Method Detection Limit (MDL) are provided in Attachment A. These reporting protocols and definitions are used in determining the need to conduct a Pollution Minimization Program (PMP) as follows:

The Discharger shall be required to develop and conduct a PMP as further described below when there is evidence (e.g., sample results reported as DNQ when the effluent limitation is less than the MDL, sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) that a pollutant is present in the effluent above an effluent limitation and either:

(1) The concentration of the pollutant is reported as DNQ and the effluent limitation is less than the reported ML; or

(2) The concentration of the pollutant is reported as ND and the effluent limitation is less than the MDL.

The goal of the PMP shall be to reduce all potential sources of a pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Regional Water Board may consider cost-effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to CWC Section 13263.3(d), shall be considered to fulfill the PMP requirements.

The PMP shall include, but not be limited to, the following actions and submittals acceptable to the Regional Water Board:

(1) An annual review and semi-annual monitoring of potential sources of the reportable pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling;

(2) Quarterly monitoring for the reportable pollutant(s) in the influent to the wastewater treatment system;

(3) Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable pollutant(s) in the effluent at or below the effluent limitation;

(4) Implementation of appropriate cost-effective control measures for the reportable pollutant(s), consistent with the control strategy; and

(5) An annual status report that shall be sent to the Regional Water Board including:

(a) All PMP monitoring results for the previous year;

(b) A list of potential sources of the reportable pollutant(s);

(c) A summary of all actions undertaken pursuant to the control strategy; and

(d) A description of actions to be taken in the following year.

4. **Construction, Operation and Maintenance Specification**

a. Wastewater treatment facilities subject to this Order shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Chapter 3, Subchapter 14, Title 23 of the California Code of Regulations (Section 13625 of the California Water Code).

b. The Discharger shall maintain in good working order a sufficient alternate power source for operating the wastewater treatment and disposal facilities. All equipment shall be located to minimize failure due to moisture, liquid spray, flooding, and other physical phenomena. The alternate power source shall be designed to permit inspection and maintenance and shall provide for periodic testing. If such alternate power source is not in existence, the discharger shall halt, reduce, or otherwise control all discharges upon the reduction, loss, or failure of the primary source of power.

5. **Special Provisions for Municipal Facilities**

a. **Biosolids Requirements**

(1) The Discharger shall comply with the requirements of 40 CFR 503, in general, and in particular the requirements in **Attachment I** of this Order, [Biosolids/sludge Management]. These requirements are enforceable by USEPA.

(2) The Discharger shall ensure compliance with the requirements in SWRCB Order No. 2004-10-DWQ, "General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural and Land Reclamation Activities" for those sites receiving the Discharger's biosolids which a Regional Water Quality Control Board has placed under this general order, and with the requirements in individual Waste Discharge Requirements (WDRs) issued by a Regional Water Board for sites receiving the Discharger's biosolids.

(3) The Discharger shall comply, if applicable, with WDRs issued by other Regional Water Boards to which jurisdiction the biosolids are transported and applied, and with the State of Arizona's biosolids rule for biosolids transported to Arizona for treatment and/or use.

(4) The Discharger shall furnish this Regional Water Board with a copy of any report submitted to USEPA, State Board or other Regional Water Board, with respect to municipal sludge or biosolids.

b. **Pretreament Requirements**

(1) This Order includes the Discharger's approved Pretreatment Program as an enforceable condition. The Discharger is required to implement and enforce the pretreatment program in its entire service area.

(2) The Discharger shall evaluate whether its pretreatment local limits are adequate to meet the requirements of this Order. JWPCP is part of a Joint Outfall System, including six upstream water reclamation plants. In the reevaluation of local limits, the Discharger shall consider the effluent limitations contained in this Order, and other relevant factors due to the interconnectedness of the system and protection of the upstream plants. The Discharger shall submit by November 15, 2006 to the Regional Water Board the results of the evaluation indicating whether changes to the Discharger's local limits are needed. Any revised local limits shall be submitted to the Regional Water Board for approval under 40 CFR 403.18 by November 15, 2007. In addition, the Discharger shall consider collection system overflow protection from such constituents as oil and grease, etc. Lack of adequate local limits shall not be a defense against liability for violations of effluent limitations and overflow prevention requirements contained in this Order.

(3) Any substantial modifications to the approved Pretreatment Program, as defined in 40 CFR 403.18(b), shall be submitted in writing to the Regional Water Board and shall not become effective until Regional Water Board approval is obtained.

(4) The Discharger shall enforce the requirements promulgated under Sections 307(b), 307(c), 307(d), and 402(b) of the CWA with timely, appropriate, and effective enforcement actions. The Discharger shall require all nondomestic users subject to the federal categorical standards to comply with those standards and shall take enforcement actions against those users who do not comply with the standards. Such enforcement actions shall be consistent with an enforcement response plan, developed pursuant to 40 CFR 403.8(f)(5). The Discharger shall ensure that all nondomestic users subject to the federal categorical standards achieve compliance no later than the date specified in those requirements or, in the case of a new nondomestic user, upon commencement of the discharge.

(5) The Discharger shall perform the pretreatment functions as required in Federal Regulations 40 CFR 403 including, but not limited to:

(a) Implement the necessary legal authorities as provided in 40 CFR 403.8(f)(1);
(b) Enforce the pretreatment requirements under 40 CFR 403.5 and 403.6;
(c) Implement the programmatic functions as provided in 40 CFR 403.8(f)(2); and
(d) Provide the requisite funding and personnel to implement the Pretreatment Program as provided in 40 CFR 403.8(f)(3).

(6) The Discharger shall submit semiannual and annual reports to the Regional Water Board, describing the Discharger's pretreatment activities over the period. The annual and semiannual reports shall contain, but not be limited to, the information required in the attached *Pretreatment Reporting Requirements* (**Attachment J**), or an approved revised version thereof. A full scan of the priority pollutants for the influent and effluent should be conducted at least annually in August. If the Discharger is not in compliance with any conditions or requirements of this Order, the Discharger shall include the reasons for noncompliance and shall state how and when the Discharger will comply with such conditions and requirements.

(7) The Discharger shall be responsible and liable for the performance of all control authority pretreatment requirements contained in 40 CFR 403, including subsequent regulatory revisions thereof. Where Part 403 or subsequent revision places mandatory actions upon the Discharger as Control Authority but does not specify a timetable for completion of the actions, the Discharger shall complete the required actions within six months from the effective date of this Order or the effective date of Part 403 revisions, whichever comes later. For violations of pretreatment requirements, the Discharger shall be subject to enforcement actions, penalties, fines, and other remedies by the Regional Water Board, USEPA, or other appropriate parties, as provided in the CWA. The Regional Water Board or USEPA may initiate enforcement action against a nondomestic user for noncompliance with applicable standards and requirements, as provided in the CWA and/or the California Water Code.

c. **Spill Reporting Requirements**

(1) The Discharger shall develop and maintain a record of all spills, overflows or bypasses of raw or partially treated sewage from its collection system or treatment plant. This record shall be made available to the Regional Water Board and USEPA upon request. On the first day of February, May, August and November (one month after the end of the fiscal quarter) of each year, the Discharger shall submit to the Regional Water Board and USEPA a report listing all spills, overflows or bypasses occurring during the previous quarter. The reports shall provide:

- the date and time of each spill, overflow or bypass;
- the location of each spill, overflow or bypass;
- the estimated volume of each spill, overflow or bypass including gross volume, amount recovered and amount not recovered;
- the cause of each spill, overflow or bypass;
- whether each spill, overflow or bypass entered a receiving water and, if so, the name of the water body and whether it entered via storm drains or other man-made conveyances;
- mitigation measures implemented; and
- corrective measures implemented or proposed to be implemented to prevent/minimize future occurrences.
- beneficial uses impacted

(2) For certain spills, overflows and bypasses of untreated or partially treated wastewater caused by a failure in the publicly owned portion of a sanitary sewer system, the Discharger shall make reports and conduct monitoring as required below:

(a) For any spills or overflows of any volume discharged where they are, or will probably be, discharged to waters of the State, the Discharger shall immediately <u>notify</u> the local health agency in accordance with California Health and Safety Code section 5411.5, and if feasible the appropriate Regional Water Board staff within 2 hours of the spill reaching receiving water.

(b) For spills, overflows or bypasses of any volume that flowed to receiving waters or entered a shallow ground water aquifer or has public exposure, the Discharger shall report such spills to the Regional Water Board, by telephone or electronically as soon as possible but not later

than 24 hours of knowledge of the incident. The following information shall be included in the report: location; date and time of spill; volume and nature of the spill; cause(s) of the spill; mitigation measures implemented; and corrective measures implemented or proposed to be implemented to prevent/minimize future occurrences.

(c) For any spills or overflows of 1000 gallons or more discharged where they are, or probably will be discharged to waters of the State, the Discharger shall immediately notify the State Office of Emergency Services pursuant to Water Code section 13271.

(d) For spills, overflows or bypasses of any volume that reach receiving waters, the Discharger shall obtain and analyze sufficient grab samples for total and fecal coliforms or E. coli, and enterococcus, and relevant pollutants of concern, upstream and downstream, or upcoast and/or downcoast, of the point of entry of the spill (if feasible, accessible and safe) in order to define the geographical extent of impact of the spill. The first set of samples shall be collected as soon as possible if feasible, accessible and safe. This monitoring shall be at least on a daily basis from time the spill is known until the results of two consecutive sets of bacteriological monitoring indicate the return to the background level or cessation of monitoring is authorized by the County Department of Health Services.

(e) For spills, overflows or bypasses of any volume that reach receiving waters or have the potential to enter a shallow ground water aquifer, and all spills, overflows and bypasses of 1,000 gallons or more, the Discharger shall analyze a grab sample of the spill or overflow for total and fecal coliforms or E. coli, and enterococcus, and relevant pollutants of concern depending on the area and nature of spills or overflows if feasible, accessible and safe.

(f) The Regional Water Board notification shall be followed by a written preliminary report five working days after verbal notification of the incident. Within 30 days after submitting preliminary report, the Discharger shall submit the final written report to this Regional Water Board. The written report shall document the information required in subparagraphs (b) and (d) above, monitoring results and any other information required in Provision V.E.1 of the Standard Provisions (Attachment D). An extension for submittal of the final written report can be granted by the Executive Officer for just cause. Submission of information required pursuant to California Water Code Section 13193 or pursuant to a Statewide General Waste Discharge Requirements for Wastewater Collection System Agencies shall satisfy this requirement.

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in Section IV of this Order will be determined as specified below:

A. General.

Compliance with effluent limitations for reportable pollutants shall be determined using sample reporting protocols defined in the MRP. Dischargers shall be deemed out of compliance with effluent limitations if the concentration of the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level (ML).

B. Multiple Sample Data Reduction

When determining compliance with a measure of central tendency (arithmetic mean, geometric mean, median, etc.) of multiple sample analyses and the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

C. Average Monthly Effluent Limitation (AMEL).

If the average of daily discharges over a calendar month exceeds the AMEL for a given parameter, an alleged violation will be flagged and the discharger may be considered out of compliance for each day of that month for that parameter (e.g., resulting in 31 days of non-compliance in a 31-day month). However, an alleged violation of the AMEL will be considered one violation for the purpose of assessing mandatory minimum penalties. The average of daily discharges over the calendar month that exceeds the AMEL for a parameter will be considered out of compliance for that month only. If only a single sample is taken during the calendar month and the analytical result for that sample exceeds the AMEL, the discharger will be considered out of compliance for that calendar month. For any one calendar month during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar month with respect to effluent violation determination, and not reporting violations.

If the analytical result of a single sample, monitored monthly, quarterly, semiannually, or annually, does not exceed the AMEL for a given parameter, the Discharger will have demonstrated compliance with the AMEL for each day of that month for that parameter.

If the analytical result of any single sample, monitored monthly, quarterly, semiannually, or annually, exceeds the AMEL for any parameter, the Discharger shall collect up to four additional weekly samples. All analytical results shall be reported in the monitoring report for that month, or the subsequent month. The concentration of pollutant (an arithmetic mean or a median) estimated from the "Multiple Sample Data Reduction" Section above, will be used for compliance determination.

In the event of noncompliance with an AMEL, the sampling frequency for that parameter shall be increased to weekly and shall continue at this level until compliance with the AMEL has been demonstrated.

D. Average Weekly Effluent Limitation (AWEL).

If the average of daily discharges over a calendar week exceeds the AWEL for a given parameter, an alleged violation will be flagged and the discharger may be considered out of compliance for each day of that week for that parameter, resulting in 7 days of non-compliance.). However, an alleged violation of the AWEL will be considered one violation for the purpose of assessing mandatory minimum penalties.

The average of daily discharges over the calendar week that exceeds the AWEL for a parameter will be considered out of compliance for that week only. If only a single sample is taken during the calendar week and the analytical result for that sample exceeds the AWEL, the discharger will be considered out of compliance for that calendar week. For any one calendar week during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar week with respect to effluent violation determination, and not reporting violations.

A calendar week will begin on Sunday and end on Saturday. Partial weeks consisting of four or more days at the end of any month will include the remaining days of the week, which occur in the following month in order to calculate a consecutive seven-day average. This value will be reported as a weekly average or seven-day average on the SMR for the month containing the partial week of four or more days. Partial calendar weeks consisting of less than four days at the end of any month will be carried forward to the succeeding month and reported as a weekly average or a seven-day average for the calendar week that ends with the first Saturday of that month.

E. Maximum Daily Effluent Limitation (MDEL).

If a daily discharge exceeds the MDEL for a given parameter, an alleged violation will be flagged and the discharger will be considered out of compliance for that parameter for that 1 day only within the reporting period. For any 1 day during which no sample is taken, no compliance determination can be made for that day with respect to effluent violation determination, and not reporting violations.

F. Instantaneous Minimum Effluent Limitation.

If the analytical result of a single grab sample is lower than the instantaneous minimum effluent limitation for a parameter, a violation will be flagged and the discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both are lower than the instantaneous minimum effluent limitation would result in two instances of non-compliance with the instantaneous minimum effluent limitation).

G. Instantaneous Maximum Effluent Limitation.

If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for a parameter, a violation will be flagged and the discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both exceed the instantaneous maximum effluent limitation would result in two instances of non-compliance with the instantaneous maximum effluent limitation).

H. Six-month Median Effluent Limitation.

If the median of daily discharges over any 180-day period exceeds the six-month median effluent limitation for a given parameter, an alleged violation will be flagged and the discharger will be considered out of compliance for each day of that 180-day period for that parameter. The next assessment of compliance will occur after the next sample is taken. If only a single sample is taken during a given 180-day period and the analytical result for that sample exceeds the six-month median, the discharger will be considered out of compliance for the 180-day period. For any 180-period during which no sample is taken, no compliance determination can be made for the six-month median limitation.

I. Percent Removal.

The average monthly percent removal is the removal efficiency expressed in percentage across a treatment plant for a given pollutant parameter, as determined from the 30-day average values of pollutant concentrations (C in mg/L) of influent and effluent samples collected at about the same time using the following equation:

Percent Removal (%) = $[1-(C_{Effluent}/C_{Influent})] \times 100\ \%$

When preferred, the Discharger may substitute mass loadings and mass emissions for the concentrations.

J. Mass and Concentration Limitations

Compliance with mass and concentration effluent limitations for the same parameter shall be determined separately with their respective limitations. When the concentration of a constituent in an effluent sample is determined to be ND or DNQ, the corresponding mass emission rate determined from that sample concentration shall also be reported as ND or DNQ.

K. Compliance with single constituent effluent limitations

Dischargers are out of compliance with the effluent limitation if the concentration of the pollutant (see Section B "Multiple Sample Data Reduction" above)in the monitoring sample is greater than the effluent limitation and greater than or equal to the RML.

L. Compliance with effluent limitations expressed as a sum of several constituents

Dischargers are out of compliance with an effluent limitation which applies to the sum of a group of chemicals (e.g., PCB's) if the sum of the individual pollutant concentrations is greater than the effluent limitation. Individual pollutants of the group will be considered to have a concentration of zero if the constituent is reported as ND or DNQ.

M. Mass Emission Rate.

The mass emission rate shall be obtained from the following calculation for any calendar day:

$$\text{Mass emission rate (lb/day)} = \frac{8.337}{N}\sum_{i=1}^{N} Q_i C_i$$

$$\text{Mass emission rate (kg/day)} = \frac{3.785}{N}\sum_{i=1}^{N} Q_i C_i$$

in which 'N' is the number of samples analyzed in any calendar day. 'Qi' and 'Ci' are the flow rate (MGD) and the constituent concentration (mg/L), respectively, which are associated with each of the 'N' grab samples, which may be taken in any calendar day. If a composite sample is taken, 'Ci' is the concentration measured in the composite sample and 'Qi' is the average flow rate occurring during the period over which samples are composited.

The daily concentration of all constituents shall be determined from the flow-weighted average of the same constituents in the combined waste streams as follows:

$$\text{Daily concentration} = \frac{1}{Q_t}\sum_{i=1}^{N} Q_i C_i$$

in which 'N' is the number of component waste streams. 'Qi' and 'Ci' are the flow rate (MGD) and the constituent concentration (mg/L), respectively, which are associated with each of the 'N' waste streams. 'Qt' is the total flow rate of the combined waste streams.

N. Bacterial Standards and Analysis.

1. The geometric mean used for determining compliance with bacterial standards is calculated with the following equation:

   $$\text{Geometric Mean} = (C_1 \times C_2 \times \ldots \times C_n)^{1/n}$$

   where n is the number of days samples were collected during the period and C is the concentration of bacteria (MPN/100 mL or CFU/100 mL) found on each day of sampling.

2. For bacterial analyses, sample dilutions should be performed so the expected range of values is bracketed (for example, with multiple tube fermentation method or membrane filtration method, 2 to 16,000 per 100 ml for total and fecal coliform, at a minimum, and 1 to 1000 per 100 ml for enterococcus). The detection methods used for each analysis shall be reported with the results of the analyses.

3. Detection methods used for coliforms (total and fecal) shall be those presented in Table 1A of 40 CFR 136 (revised May 14, 1999), unless alternate methods have been approved by USEPA pursuant to 40 CFR 136, or improved methods have been determined by the Executive Officer and/or USEPA.

4. Detection methods used for enterococcus shall be those presented in the USEPA publication EPA 600/4-85/076, *Test Methods for Escherichia coli and Enterococci in Water By Membrane Filter Procedure* or any improved method determined by the Executive Officer and/or USEPA to be appropriate.

O. Single Operational Upset

A single operational upset (SOU) that leads to simultaneous violations of more than one pollutant parameter shall be treated as a single violation and limits the Discharger's liability in accordance with the following conditions:

1. A single operational upset is broadly defined as a single unusual event that temporarily disrupts the usually satisfactory operation of a system in such a way that it results in violation of multiple pollutant parameters.

2. A Discharger may assert SOU to limit liability only for those violations which the Discharger submitted notice of the upset as required in Provision V.E.2(b) of Attachment D – Standard Provisions.

3. For purpose outside of CWC Section 13385 (h) and (i), determination of compliance and civil liability (including any more specific definition of SOU, the requirements for Dischargers to assert the SOU limitation of liability, and the manner of counting violations) shall be in accordance with

USEPA Memorandum "Issuance of Guidance Interpreting Single Operational Upset" (September 27, 1989).

4. For purpose of CWC Section 13385 (h) and (i), determination of compliance and civil liability (including any more specific definition of SOU, the requirements for Dischargers to assert the SOU limitation of liability, and the manner of counting violations) shall be in accordance with CWC Section 13385 (f)(2).

ATTACHMENT A – DEFINITIONS

Acute Toxicity:

a Acute Toxicity (TUa)

Expressed in Toxic Units Acute (TUa)

$$TUa = \frac{100}{96\text{-hr LC } 50\%}$$

b Lethal Concentration 50% (LC 50)

LC 50 (percent waste giving 50% survival of test organisms) shall be determined by static or continuous flow bioassay techniques using standard marine test species as specified in Appendix III of the 2001 Ocean Plan. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC 50 may be determined after the test samples are adjusted to remove the influence of those substances.

When it is not possible to measure the 96-hour LC 50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \frac{\log (100 - S)}{1.7}$$

where:

S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

Areas of Special Biological Significance (ASBS): are those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of Special Biological Significance are also classified as a subset of STATE WATER QUALITY PROTECTION AREAS.

Annual Average is the arithmetic mean of daily concentrations, or of daily "mass emission rates", over the specified 365-day period.

$$\text{Average} = \frac{1}{N}\sum_{i=1}^{N} X_i$$

in which 'N' is the number of days samples were analyzed during the period and 'Xi' is either the constituent concentration (mg/L) or "mass emission rate" (kg/day or lb/day) for each day sampled.

Anti-Backsliding. Provisions in the Clean Water Act and USEPA regulations [CWA 303(d)(4); CWA 402(c); CFR 122.44(1)] that require a reissued permit to be as stringent as the previous permit with some exceptions.

Antidegradation. Policies which ensure protection of water quality for a particular water body where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as outstanding natural resource waters. Antidegradation plans are adopted by the State to minimize adverse effects on water.

Applicable Standards and Limitations mean all State, interstate, and federal standards and limitations to which a discharge, a sewage sludge use or disposal practice, or a related activity is subject under the CWA, including

effluent limitations, water quality standards, standards of performance, toxic effluent standards or prohibitions, best management practices, pretreatment standards, and standards for sewage sludge use or disposal under sections 301, 302, 303, 304, 306, 307, 316, 403 and 405 of CWA.

Average Monthly Effluent Limitation (AMEL): The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL): The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practice (BMP) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs may include, but are not limited to, treatment requirements, operating procedures, or practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ). The method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis using all reasonably available and relevant data.

Bioaccumulative pollutants are those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Bioassay. A test used to evaluate the relative potency of a chemical or a mixture of chemicals by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism.

Biochemical Oxygen Demand (BOD). A measurement of the amount of oxygen utilized by the decomposition of organic material, over a specified time period (usually 5 days) in a wastewater sample; it is used as a measurement of the readily decomposable organic content of a wastewater.

Biosolids. Sewage sludge that is used or disposed through land application, surface disposal, incineration, or disposal in a municipal solid waste landfill.

Bypass means the intentional diversion of waste streams from any portion of a treatment (or pretreatment) facility whose operation is necessary to maintain compliance with the terms and conditions of this order and permit.

Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma and oxychlordane.

Chronic Toxicity: This parameter shall be used to measure the acceptability of waters for supporting a healthy marine biota until improved methods are developed to evaluate biological response.

a Chronic Toxicity (TUc)

Expressed as Toxic Units Chronic (TUc)

$$TUc = \frac{100}{NOEL}$$

b No Observed Effect Level (NOEL)

The NOEL is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test listed in Appendix III of the 2001 Ocean Plan.

Clean Water Act (CWA). The Clean Water Act is an act passed by the U.S. Congress to control water pollution. It was formerly referred to as the Federal Water Pollution Control Act of 1972 or Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), 33 US.C. 1251 et. seq., as amended by: Public Law 96-483; Public Law 97-117; Public Laws 95-217, 97-117, 97-440, and 100-04.

Code of Federal Regulation (CFR). A codification of the final rules published daily in the *Federal Register.* Title 40 of the CFR contains the environmental regulations.

Composite Sample means, for flow rate measurements, the arithmetic mean of no fewer than eight individual measurements taken at equal intervals for 24 hours or for the duration of discharge, whichever is shorter.

Composite sample means, for other than flow rate measurement,

a. A combination of at least eight individual portions obtained at equal time intervals for 24 hours, or the duration of the discharge, whichever is shorter. The volume of each individual portion shall be directly proportional to the discharge flow rate at the time of sampling.

OR

b. A combination of at least eight individual portions of equal volume obtained over a 24-hour period. The time interval will vary such that the volume of wastewater discharged between sampling remains constant.

The compositing period shall equal the specified sampling period, or 24 hours, if no period is specified.

Conventional Pollutants. Pollutants typical of municipal sewage, and for which municipal secondary treatment plants are typically designed; defined at 40 CFR 401.16 as BOD, TSS, fecal coliform bacteria, oil and grease, and pH.

Daily Discharge: Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

DDT shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

Degrade (Degredation). Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected.

Dichlorobenzenes shall mean the sum of 1,2- and 1,3-dichlorobenzene.

Downstream Ocean Waters shall mean waters downstream with respect to ocean currents.

Dredged Material: Any material excavated or dredged from the navigable waters of the United States, including material otherwise referred to as "spoil".

Enclosed Bays are indentations along the coast which enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. This definition includes but is not limited to: Humboldt Bay, Bodega Harbor, Tomales Bay, Drakes Estero, San Francisco Bay, Morro Bay, Los Angeles Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay.

Endosulfan shall mean the sum of endosulfan-alpha and -beta and endosulfan sulfate.

Estuaries and Coastal Lagoons are waters at the mouths of streams that serve as mixing zones for fresh and ocean waters during a major portion of the year. Mouths of streams that are temporarily separated from the ocean by sandbars shall be considered as estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters. The waters described by this definition include but are not limited to the Sacramento-San Joaquin Delta as defined by Section 12220 of the California Water Code, Suisun Bay, Carquinez Strait downstream to Carquinez Bridge, and appropriate areas of the Smith, Klamath, Mad, Eel, Noyo, and Russian Rivers.

Grab Sample is defined as any individual sample collected in a short period of time not exceeding 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not be during hydraulic peaks. It is used primarily in determining compliance with the maximum daily effluent limitations and the instantaneous maximum effluent limitations.

Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

Hazardous Substance means any substance designated under 40 CFR 116 pursuant to Section 311 of the Clean Water Act and/or a hazardous waste, as defined in 40 CFR 261.3.

HCH shall mean the sum of alpha, beta, gamma (lindane), and delta isomers of hexachlorocyclohexane.

Indirect Discharger means the introduction of pollutants into a municipal sewage treatment system from any nondomestic source (i.e., any industrial or commercial facility) regulated under section 307(b), (c), or (d) of the CWA.

Initial Dilution is the process which results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge.

For a submerged buoyant discharge, characteristic of most municipal wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

For shallow water submerged discharges, surface discharges, and nonbuoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of

the discharge ceases to produce significant mixing of the waste, or the diluting plum reaches a fixed distance from the discharge to be specified by the Regional Water Board, whichever results in the lower estimate for initial dilution.

Instantaneous Maximum Effluent Limitation: the highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation: the lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Interference Discharge which, alone or in conjunction with discharges from other sources, inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use, or disposal and is a cause of a violation of the POTW's NPDES permit or prevents lawful sludge use or disposal.

Kelp Beds, for purposes of the bacteriological standards of this order, are significant aggregations of marine algae of the genus Macrocystis and Nereocystis. Kelp beds include the total foliage canopy of Macrocystis and Nereocystis plants throughout the water column. Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp beds for purposes of bacteriological standards.

Land Application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Local Limits. Conditional discharge limits imposed by municipalities upon industrial or commercial facilities that discharge to the municipal sewage treatment system.

Mariculture is the culture of plants and animals in marine waters independent of any pollution source.

Material: (a) In common usage: (1) the substance or substances of which a thing is made or composed (2) substantial; (b) For purposes of the California Ocean Plan relating to waste disposal, dredging and the disposal of dredged material and fill, MATERIAL means matter of any kind or description which is subject to regulation as waste, or any material dredged from the navigable waters of the United States. See also, DREDGED MATERIAL.

Maximum Daily Effluent Limitation (MDEL) is the highest allowable discharge of a pollutant during a calendar day. Where MDELs are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where MDELs are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day. For pollutant measurements, unless otherwise specified, the results to be compared to the MDEL are based on composite samples. However, it may apply to grab samples if the collection of composite samples for those constituents is not appropriate because of instability of the constituents.

Method Detection Limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte, as defined in 40 CFR 136 Appendix B.

Minimum Level (ML) is the concentrations at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes and processing steps have been followed. The reported Minimum Level (RML) is derived from the ML chosen by the Discharger for reporting and compliance determination from the

MLs listed in Appendix II of the 2001 Ocean Plan with the application of additional factors, if any, resulting from deviation from the method-specific analytical procedures and/or the sample preparation protocol.

Monthly Average is the arithmetic mean of daily concentrations, or of daily "mass emission rates", over the specified monthly period:

$$\text{Average} = \frac{1}{N}\sum_{i=1}^{N} X_i$$

in which 'N' is the number of days samples were analyzed during the period and 'X_i' is either the constituent concentration (mg/L) or mass emission rate (kg/day or lb/day) for each sampled day.

Natural Light is used in this order to mean the transmittance and total irradiance of sunlight. Reduction of natural light may be determined by the Regional Water Board by measurement of light transmissivity or total irradiance, or both, according to the monitoring needs of the Regional Water Board.

Nonchlorinated Phenolic Compounds shall mean the sum of Phenol, 2,4-Dimethylphenol, 2-Nitrophenol, and 4-Nitrophenol, 2,4-Dinitrophenol and 4,6-Dinitro-2-Methylphenol.

Nonconventional Pollutants. All pollutants that are not included in the list of conventional or toxic pollutants in 40 CFR 401. Includes pollutants such as chemical oxygen demand (COD), total organic carbon (TOC), nitrogen, and phosphorus.

Ocean Waters are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the California Ocean Plan will occur in ocean waters.

Overflow means the intentional or unintentional diversion of flow from the collection and transport systems, including pumping facilities.

PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1, 2-benzanthracene, 3, 4-benzofluoranthene, benzo[k]-fluoranthene, 1, 12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1, 2, 3-cd]pyrene, phenanthrene and pyrene.

Pass Through is defined as the discharge through the POTW to navigable waters which, alone or in conjunction with discharges from other sources, is a cause of a violation of POTW's NPDES permit.

PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-l232, Aroclor-1242, Aroclor-l248, Aroclor-1254 and Aroclor-1260.

Chlorinated Phenolic Compounds shall mean the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

Pretreatment. The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a publicly owned treatment works [40 CFR 403.3(q)].

Priority Pollutants are those constituents referred to in 40 CFR 401.15; a list of these pollutants is provided as Appendix A to 40 CFR 423.

Publicly Owned Treatment Works (POTW). A treatment works, as defined by Section 212 of the CWA, that is owned by the State or municipality. This definition includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW treatment plant [40 CFR 403.3].

Sanitary Sewer. A pipe or conduit (sewer) intended to carry wastewater or water-borne wastes from homes, businesses, and industries to the POTW.

Sanitary Sewer Overflows (SSO). Untreated or partially treated sewage overflows from a sanitary sewer collection system.

Secondary Treatment Standards. Technology-based requirements for direct discharging municipal sewage treatment facilities. Standards are based on a combination of physical and biological processes typical for the treatment of pollutants in municipal sewage. Standards are expressed as a minimum level of effluent quality in terms of: BOD_5, total suspended solids (TSS), and pH (except as provided for special considerations and treatment equivalent to secondary treatment).

Severe Property Damage means substantial physical damage, to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a "bypass" or "overflow." It does not mean economic loss caused by delays in production.

Shellfish are organisms identified by the California Department of Health Services as shellfish for public health purposes (i.e., mussels, clams, and oysters).

Significant Difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level.

Six-month Median Effluent Limitation: the highest allowable moving median of all daily discharges for any 180-day period. For intermittent discharges, the daily value shall be considered to equal zero for days on which no discharge occurred.

Sludge means the solids, semi-liquid suspensions of solids, residues, screenings, grit, scum, and precipitates separated from, or created in, wastewater by the unit processes of a treatment system. It also includes, but is not limited to, all supernatant, filtrate, centrate, decantate, and thickener overflow/underflow in the solids handling parts of the wastewater treatment system.

State Water Quality Protection Areas (SWQPAs) are nonterrestrial marine or estuarine areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS) that were previously designated by the State Water Board in Resolution No.s 74-28, 74-32, and 75-61 are now classified as a subset of State Water Quality Protection Areas and require special protections afforded by the California Ocean Plan.

Statistical analyses that are useful in determining temporal and spatial trends in the marine environment include, but are not limited to, the following:

a Mean and standard deviation ($x \pm s.d.$)

b Regression analyses (univariate and multivariate)
[e.g., correlation coefficients (r)]

c Parametric statistics
[e.g., Student's t-test, analysis of variance (ANOVA), Student-Newman-Keuls test (SNK), t-test for paired comparisons]

d Nonparametric statistics
[e.g., Mann-Whitney U-test, Kruskal-Wallis one-way ANOVA, Friedman two-way ANOVA, chi-square test (or G-test)]

e Multivariate techniques
[e.g., discriminant analysis, classification analyses (cladistic/parsimony analysis of endemicity, or phenetic clustering), non-metric multidimensional scaling (NMDS), principal component analysis (PCA), principal coordinate analysis (PCOA), and/or multivariate ANOVA (MANOVA)]

f Biological indices
[e.g., species richness (S), Margalef (d), Shannon-Wiener (H'), Brillouin (H), Simpson (SI), Gleason, Infaunal Trophic Index (ITI), evenness, Benthic Response Index (BRI), phylogenetic diversity, and taxonomic distinctiveness]

TCDD Equivalents shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below:

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
1,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

Technology-Based Effluent Limit. A permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration.

Total Maximum Daily Load (TMDL). The amount of pollutant, or property of a pollutant, from point, nonpoint, and natural background sources, that may be discharged to a water quality-limited receiving water. Any pollutant loading above the TMDL results in violation of applicable water quality standards.

Toxic Pollutant. Pollutants or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly - from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of USEPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring. Toxic pollutants also include those pollutants listed by the Administrator under CWA Section 307(a)(l) or any pollutant listed under Section 405 (d) which relates to sludge management

Toxicity Reduction Evaluation (TRE) is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of

toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A TOXICITY IDENTIFICATION EVALUATION (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with the permit because of factors beyond the reasonable control of the permittee. It does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, careless or improper operation, or those problems the discharger should have foreseen.

Waste. As used in the California Ocean Plan, waste includes a discharger's total discharge, of whatever origin, i.e., gross, not net, discharge.

Weekly Average is the arithmetic mean of daily concentrations, or of daily mass emission rates, over the specified weekly period:

$$\text{Average} = \frac{1}{N}\sum_{i=1}^{N} X_i$$

in which "N" is the number of days samples were analyzed during the period and "X_i" is either the constituent concentration (mg/L) or mass emission rate (kg/day or lb/day) for each sampled day.

Wasteload Allocation (WLA). The proportion of a receiving water's total maximum daily load that is allocated to one of its existing or future point sources of pollution.

Water Quality-Based Effluent Limit (WQBEL). A value determined by selecting the most stringent of the effluent limits calculated using all applicable water quality criteria (e.g., aquatic life, human health, and wildlife) for a specific point source to a specific receiving water for a given pollutant.

Water Quality Criteria. Comprised of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by USEPA or States for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal.

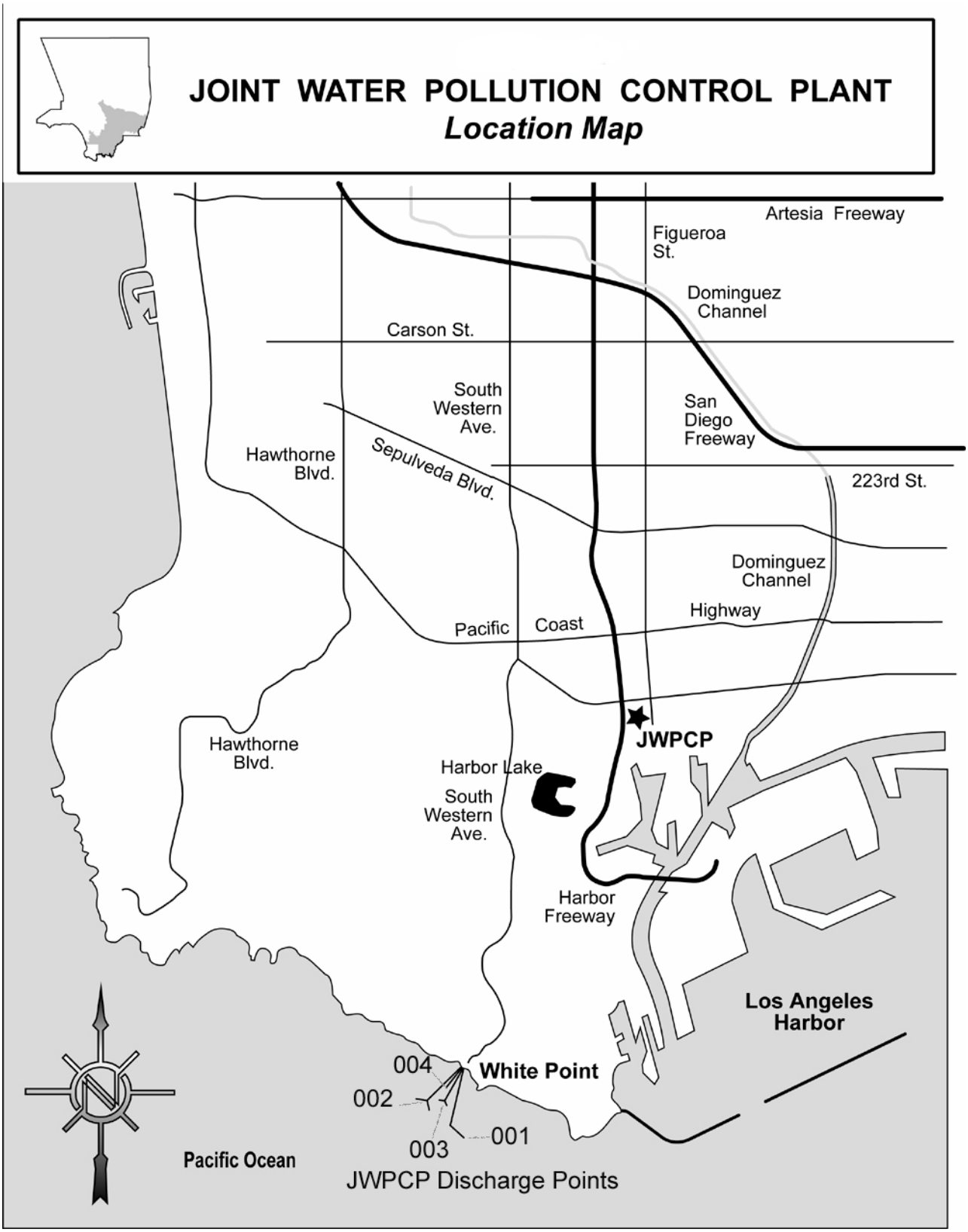
Water Quality Standard. A law or regulation that consists of the beneficial use or uses of a waterbody, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular waterbody, and an antidegradation statement.

Water Reclamation: The treatment of wastewater to render it suitable for reuse, the transportation of treated wastewater to the place of use, and the actual use of treated wastewater for a direct beneficial use or controlled use that would not otherwise occur.

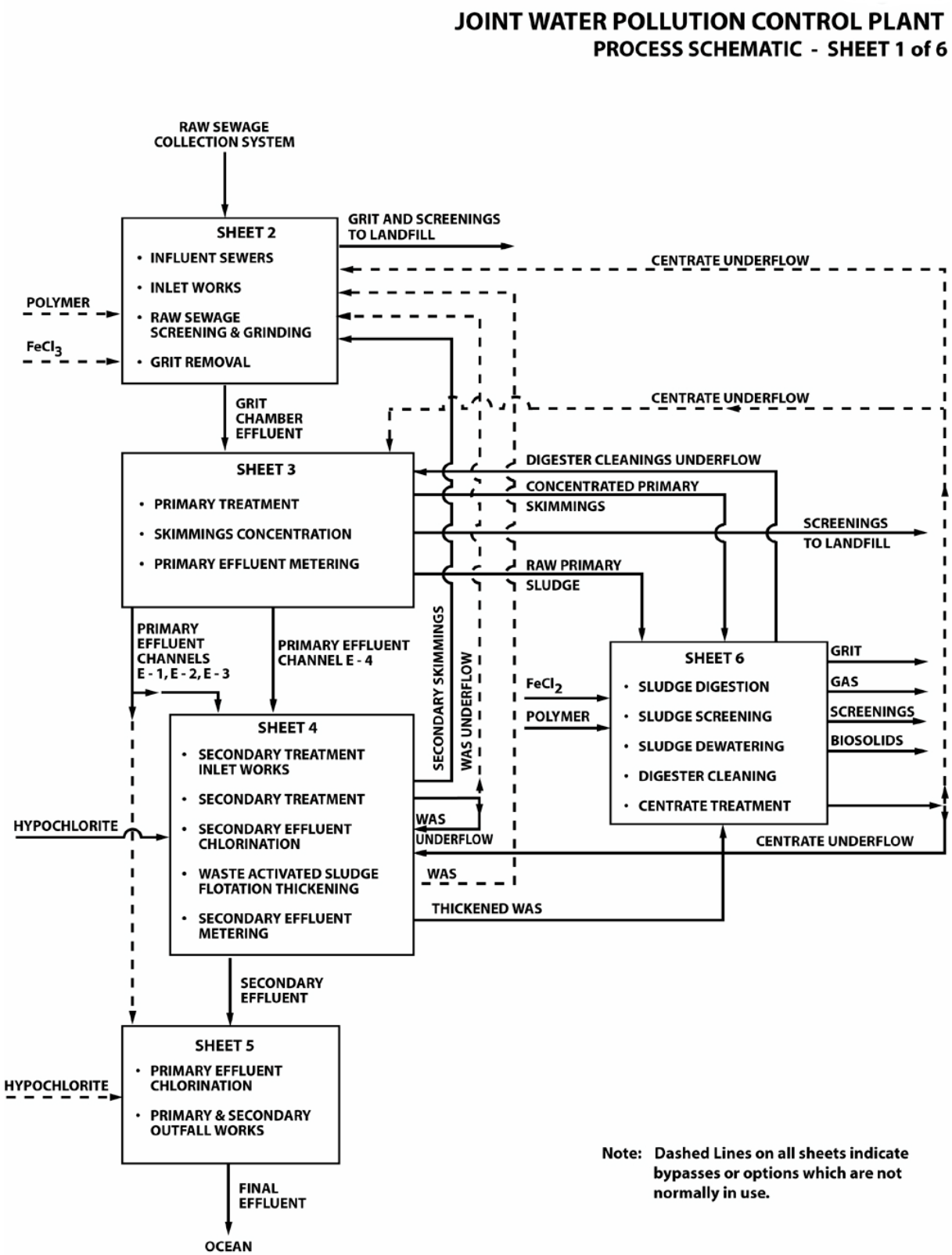
Whole Effluent Toxicity (WET). The total toxic effect of an effluent measured directly with a toxicity test.

Zone of Initial Dilution (ZID) means, for purposes of designating monitoring stations, the region within a horizontal distance equal to a specified water depth (usually depth of outfall or average depth of diffuser) from any point of the diffuser or end of the outfall and the water column above and below that region, including the underlying seabed.

ATTACHMENT B – LOCATION MAP



ATTACHMENT C – FLOW SCHEMATIC



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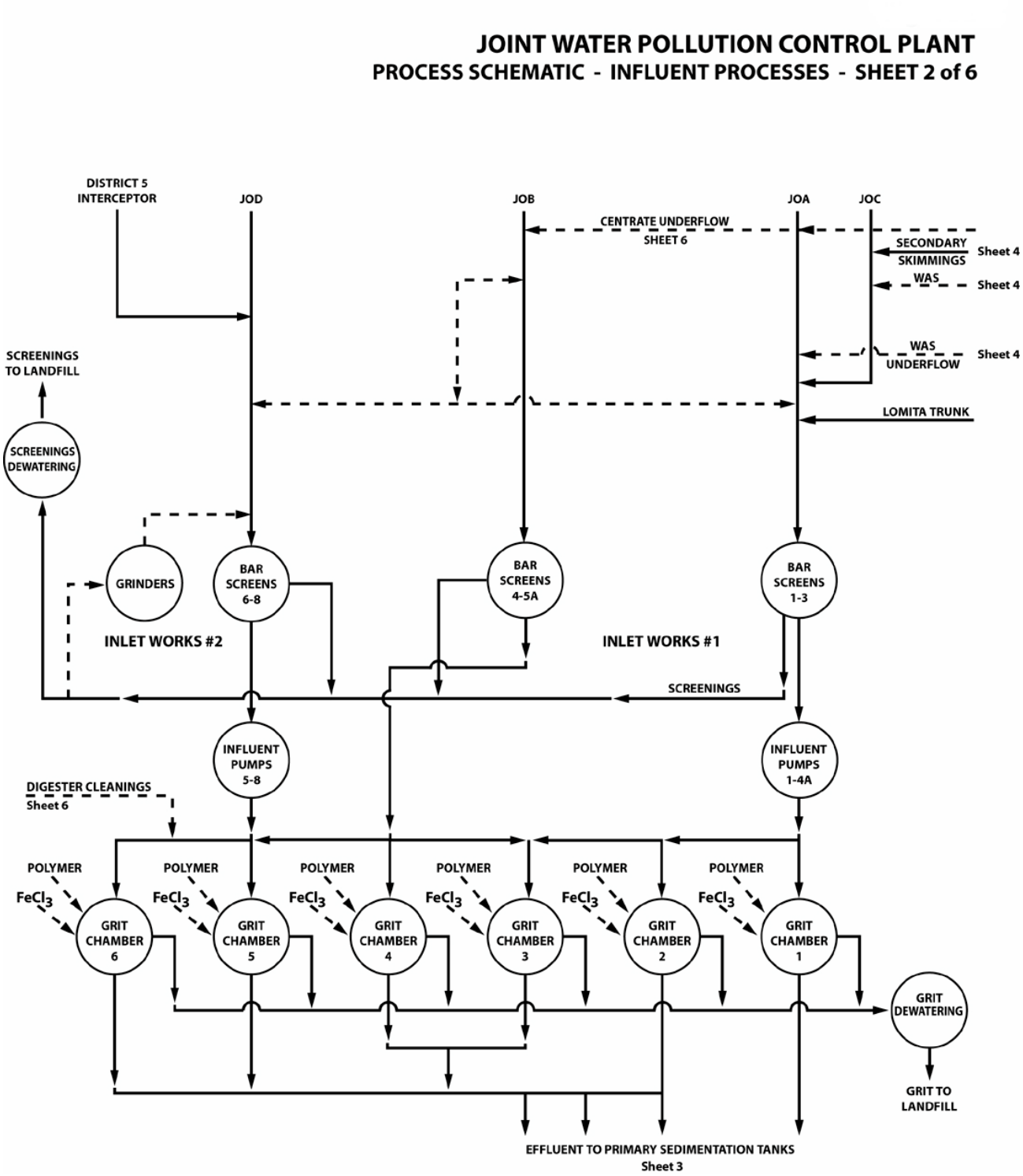

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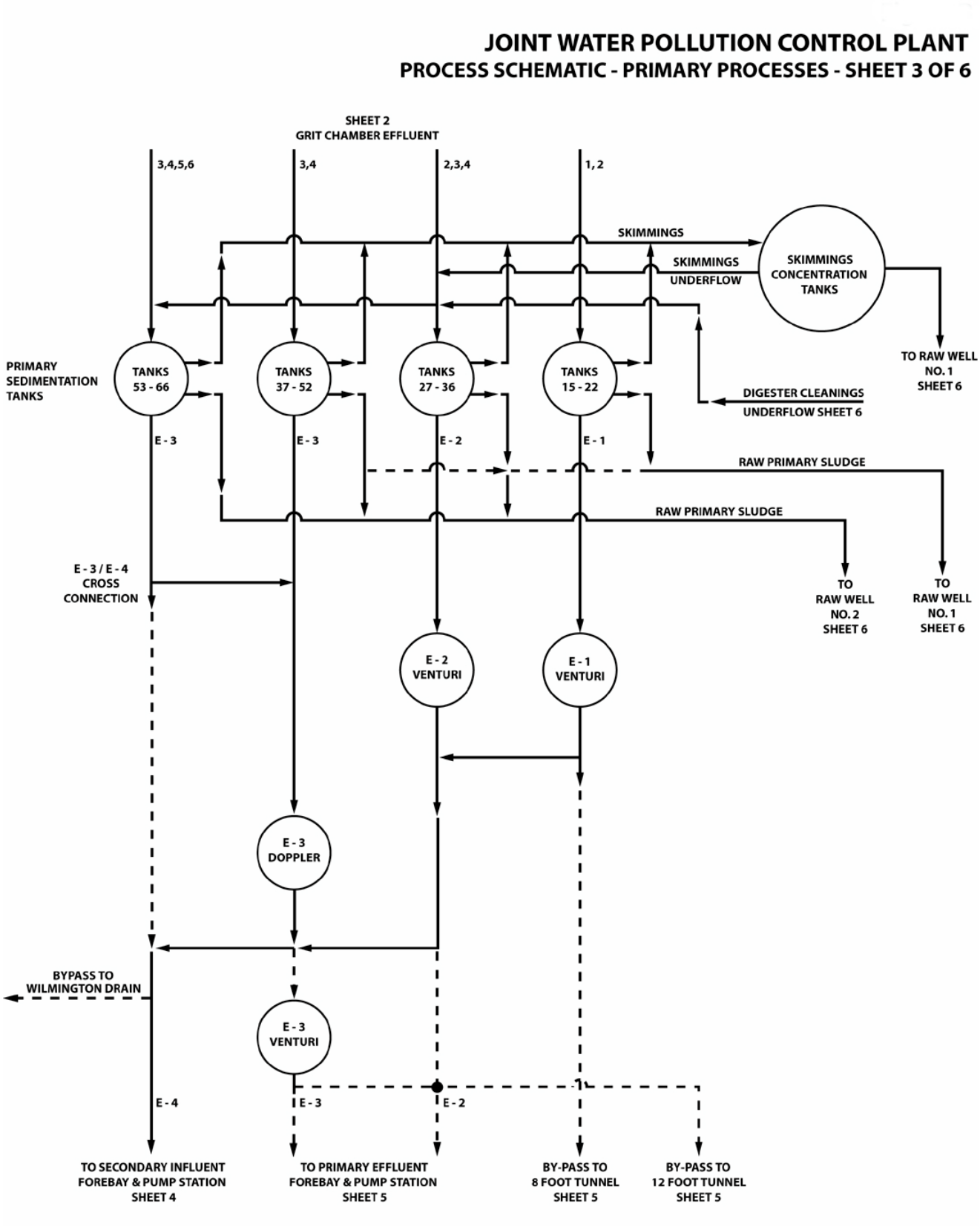

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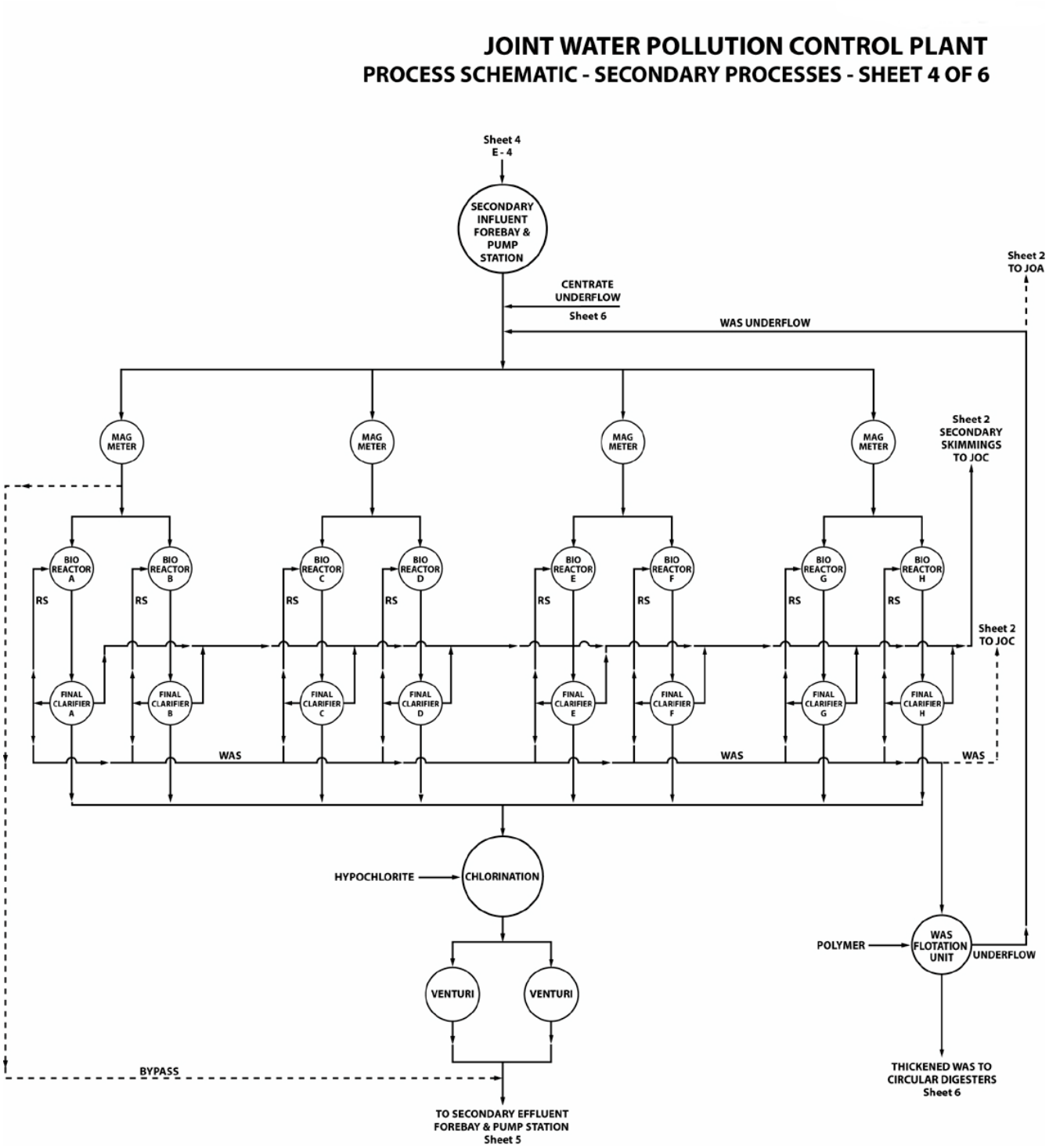
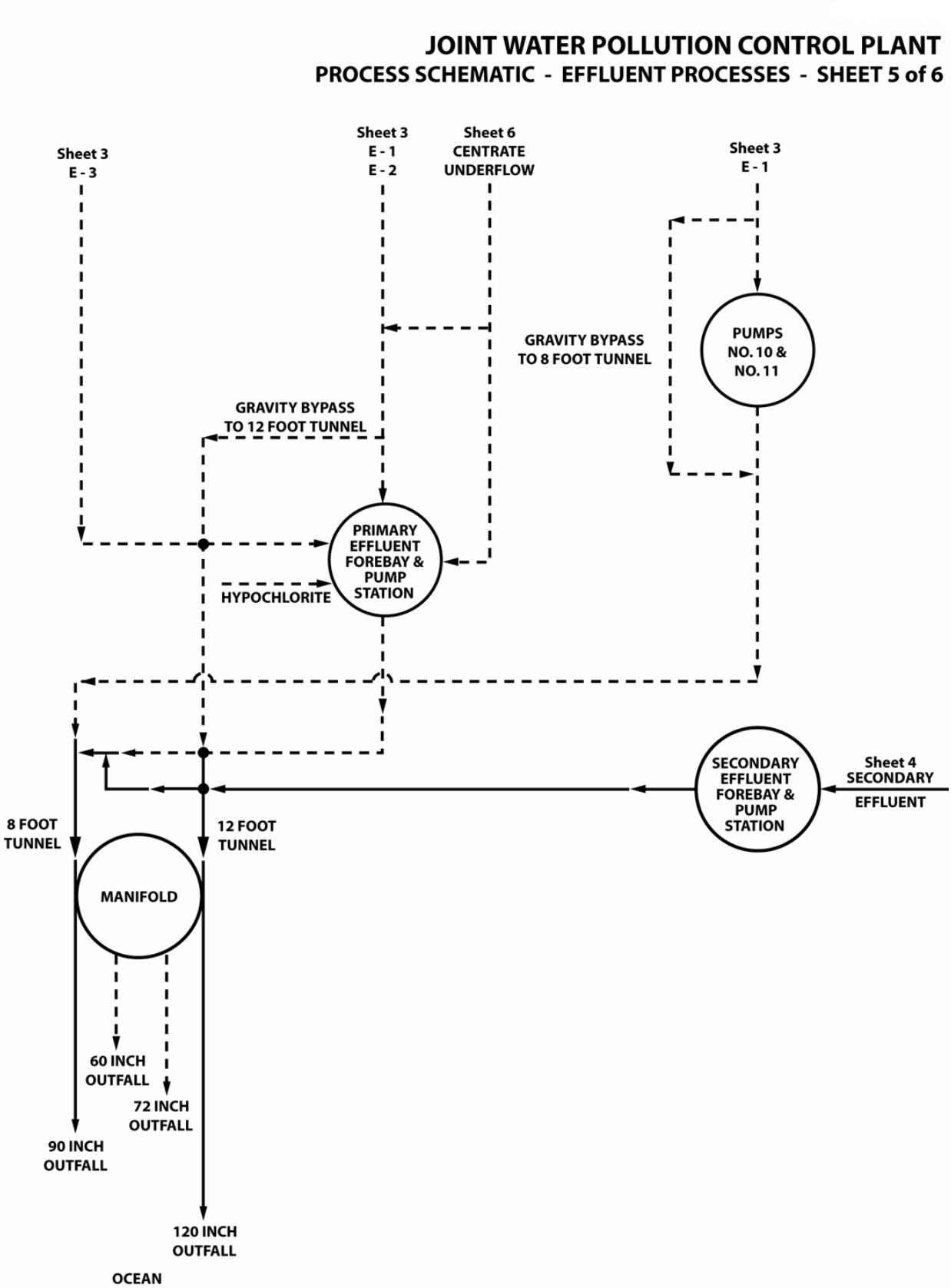
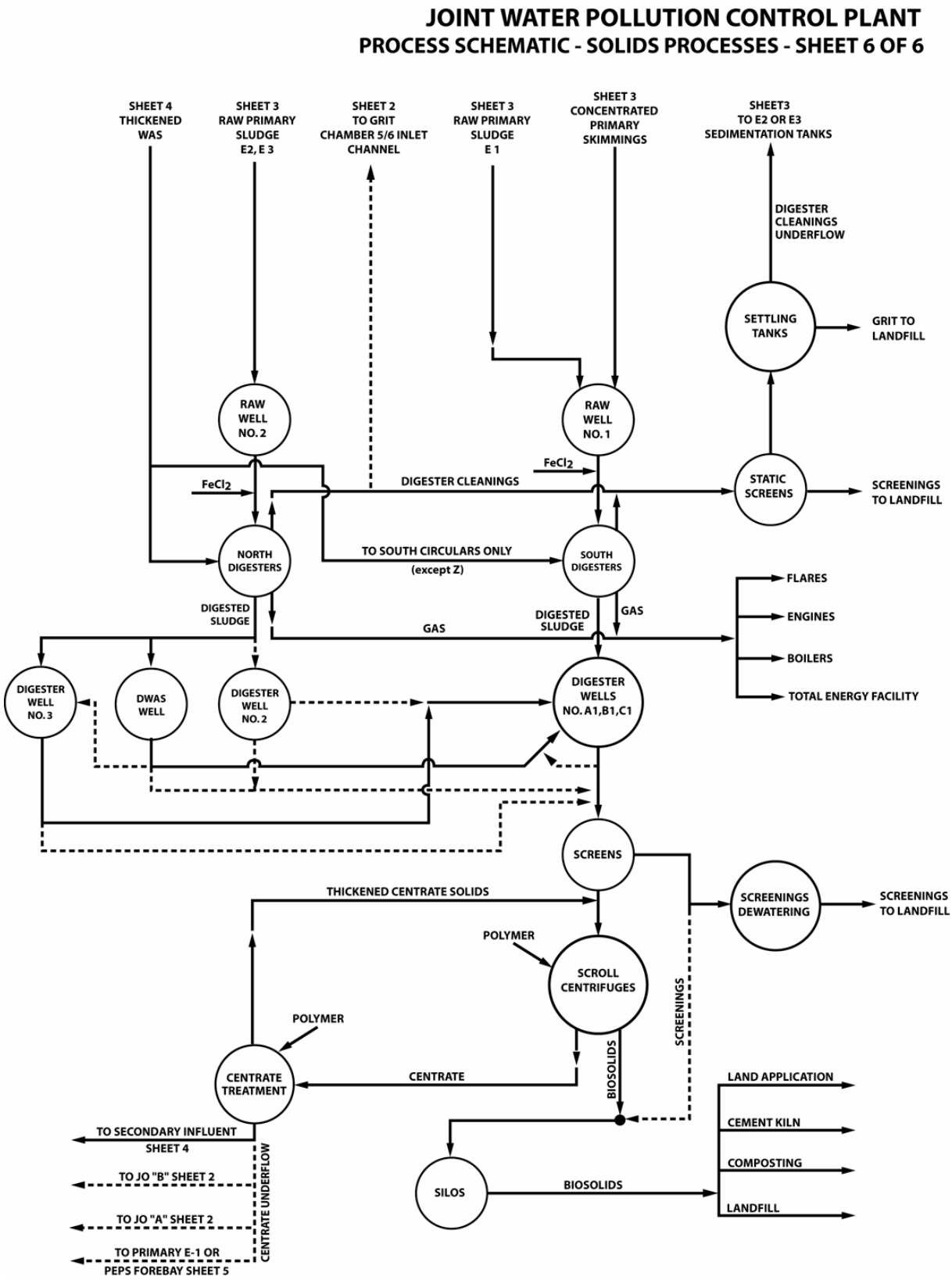


ATTACHMENT C – FLOW SCHEMATIC (Contd.)



ATTACHMENT C – FLOW SCHEMATIC (Contd.)



ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (CWC) and is grounds for enforcement action, for permit termination, revocation and reissuance, or denial of a permit renewal application [*40 CFR 122.41(a)*].

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not been modified to incorporate the requirement [*40 CFR 122.41(a)(1)*].

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order [*40 CFR 122.41(c)*].

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment [*40 CFR 122.41(d)*].

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order [*40 CFR 122.41(e)*].

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges [*40 CFR 122.41(g)*].

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations [*40 CFR 122.5(c)*].

F. Inspection and Entry

The Discharger shall allow the Regional Water Quality Control Board (RWQCB), State Water Resources Control Board (SWRCB), United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the

presentation of credentials and other documents, as may be required by law, to [*40 CFR 122.41(i)*] [*CWC 13383(c)*]:

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order [*40 CFR 122.41(i)(1)*];

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order [*40 CFR 122.41(i)(2)*];

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order [*40 CFR 122.41(i)(3)*];

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the CWC, any substances or parameters at any location [*40 CFR 122.41(i)(4)*].

G. Bypass

1. Definitions

   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility [*40 CFR 122.41(m)(1)(i)*].

   b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production [*40 CFR 122.41(m)(1)(ii)*].

2. Bypass not exceeding limitations – The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3 and I.G.5 below [*40 CFR 122.41(m)(2)*].

3. Prohibition of bypass – Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless [*40 CFR 122.41(m)(4)(i)*]:

   a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage [*40 CFR 122.41(m)(4)(A)*];

   b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance [*40 CFR 122.41(m)(4)(B)*]; and

   c. The Discharger submitted notice to the Regional Water Board as required under Standard Provision – Permit Compliance I.G.5 below [*40 CFR 122.41(m)(4)(C)*].

4. The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above [*40 CFR 122.41(m)(4)(ii)*].

5. Notice

   a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass [*40 CFR 122.41(m)(3)(i)*].

   b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below [*40 CFR 122.41(m)(3)(ii)*].

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation [*40 CFR 122.41(n)(1)*].

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph H.2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review [*40 CFR 122.41(n)(2)*].

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that [*40 CFR 122.41(n)(3)*]:

   a. An upset occurred and that the Discharger can identify the cause(s) of the upset [*40 CFR 122.41(n)(3)(i)*];

   b. The permitted facility was, at the time, being properly operated [*40 CFR 122.41(n)(3)(i)*];

   c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b [*40 CFR 122.41(n)(3)(iii)*]; and

   d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above [*40 CFR 122.41(n)(3)(iv)*].

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof [*40 CFR 122.41(n)(4)*].

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition [*40 CFR 122.41(f)*].

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit [*40 CFR 122.41(b)*].

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the CWC [*40 CFR 122.41(l)(3)*] [*40 CFR 122.61*].

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity [*40 CFR 122.41(j)(1)*].

B. Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503 unless other test procedures have been specified in this Order [*40 CFR 122.41(j)(4)*] [*40 CFR 122.44(i)(1)(iv)*].

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time [*40 CFR 122.41(j)(2)*].

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements [*40 CFR 122.41(j)(3)(i)*];

2. The individual(s) who performed the sampling or measurements [*40 CFR 122.41(j)(3)(ii)*];

3. The date(s) analyses were performed [*40 CFR 122.41(j)(3)(iii)*];

4. The individual(s) who performed the analyses [*40 CFR 122.41(j)(3)(iv)*];

5. The analytical techniques or methods used [*40 CFR 122.41(j)(3)(v)*]; and

6. The results of such analyses [*40 CFR 122.41(j)(3)(vi)*].

C. Claims of confidentiality for the following information will be denied [*40 CFR 122.7(b)*]:

1. The name and address of any permit applicant or Discharger [*40 CFR 122.7(b)(1)*]; and

2. Permit applications and attachments, permits and effluent data [*40 CFR 122.7(b)(2)*].

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, SWRCB, or USEPA within a reasonable time, any information which the Regional Water Board, SWRCB, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, SWRCB, or USEPA copies of records required to be kept by this Order [40 CFR 122.41(h)] [CWC 13267].

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, SWRCB, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below [*40 CFR 122.41(k)*].

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA) [*40 CFR 122.22(a)(3)*].

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above [*40 CFR 122.22(b)(1)*];

   b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (a duly authorized representative may thus be either a named individual or any individual occupying a named position) [*40 CFR 122.22(b)(2)*]; and

c. The written authorization is submitted to the Regional Water Board, State Water Board, or USEPA [*40 CFR 122.22(b)(3)*].

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board, State Water Board or USEPA prior to or together with any reports, information, or applications, to be signed by an authorized representative [*40 CFR 122.22(c)*].

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations" [*40 CFR 122.22(d)*].

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in this Order [*40 CFR 122.41(l)(4)*].

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices [*40 CFR 122.41(l)(4)(i)*].

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR 136 or, in the case of sludge use or disposal, approved under 40 CFR 136 unless otherwise specified in 40 CFR 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board [*40 CFR 122.41(l)(4)(ii)*].

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order [*40 CFR 122.41(l)(4)(iii)*].

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date [*40 CFR 122.41(l)(5)*].

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description

of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance [*40 CFR 122.41(l)(6)(i)*].

2. The following shall be included as information that must be reported within 24 hours under this paragraph [*40 CFR 122.41(l)(6)(ii)*]:

   a. Any unanticipated bypass that exceeds any effluent limitation in this Order [*40 CFR 122.41(l)(6)(ii)(A)*].

   b. Any upset that exceeds any effluent limitation in this Order [*40 CFR 122.41(l)(6)(ii)(B)*].

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours [*40 CFR 122.41(l)(6)(iii)*].

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when [*40 CFR 122.41(l)(1)*]:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b) [*40 CFR §122.41(l)(1)(i)*]; or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in this Order nor to notification requirements under 40 CFR Part 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1) [*40 CFR 122.41(l)(1)(ii)*].

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan [*40 CFR 122.41(l)(1)(iii)*].

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements [*40 CFR 122.41(l)(2)].*

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E [*40 CFR 122.41(l)(7)*].

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information [*40 CFR 122.41(l)(8)*].

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following [*40 CFR 122.42(b)*]:

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to Sections 301 or 306 of the CWA if it were directly discharging those pollutants [*40 CFR 122.42(b)(1)*]; and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order [*40 CFR 122.42(b)(2)*].

Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW [*40 CFR 122.42(b)(3)*].

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations (CFR) at 40 CFR 122.48 requires that all NPDES permits specify monitoring and reporting requirements. CWC sections 13267 and 13383 also authorize the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, which implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. NPDES compliance monitoring focuses on the effects of a specific point source discharge. Generally, it is not designed to assess impacts from other sources of pollution (e.g., nonpoint source runoff, aerial fallout) or to evaluate the current status of important ecological resources in the waterbody. The scale of existing compliance monitoring programs does not match the spatial and, to some extent, temporal boundaries of the important physical and biological processes in the ocean. In addition, the spatial coverage provided by compliance monitoring programs is less than ten percent of the nearshore ocean environment. Better technical information is needed about status and trends in ocean waters to guide management and regulatory decisions, to verify the effectiveness of existing programs, and to shape policy on marine environmental protection.

B. The Regional Water Board and USEPA, working with other groups, have developed a comprehensive basis for effluent and receiving water monitoring appropriate to large publicly owned treatment works (POTWs) discharging to waters of the Southern California Bight. This effort has culminated in the publication by the Southern California Coastal Water Research Project (SCCWRP) of the Model Monitoring Program guidance document (Schiff, K.C., J.S. Brown and S.B. Weisberg. 2001. *Model Monitoring Program for Large Ocean Dischargers in Southern California*. SCCWRP Tech. Rep #357. Southern California Coastal Water Research Project, Westminster, CA. 101 pp.). This guidance provides the principles, framework and recommended design for effluent and receiving water monitoring elements that have guided development of the monitoring program described below.

C. In July 2000, the Santa Monica Bay Restoration Project (SMBRP) published "An Assessment of the Compliance Monitoring System in Santa Monica Bay" to set forth recommendations and priorities for compliance monitoring in Santa Monica Bay. This report reasoned that a reduced level of receiving water monitoring is justified for large POTWs discharging to Santa Monica Bay due to improvements in effluent quality and associated decreases in receiving water impacts. Like the Model Monitoring Program developed by SCCWRP, SMBRP recommendations are focused on providing answers to management questions and allowing a reduction in POTW receiving water monitoring where discharge effects are well understood. The monitoring plan set forth here has been guided by SMBRP recommendations.

D. The conceptual framework for the Model Monitoring Program has three components that comprise a range of spatial and temporal scales: (1) core monitoring; (2) regional monitoring; and (3) special studies.

1. Core monitoring is local in nature and focused on monitoring trends in quality and effects of the point source discharge. This includes effluent monitoring as well as some aspects of receiving water monitoring. In the monitoring program described below these core components are typically referred to as local monitoring.

2. Regional monitoring is focused on questions that are best answered by a region-wide approach that incorporates coordinated survey design and sampling techniques. The major objective of regional monitoring is to collect information required to assess how safe it is to swim in the ocean, how safe it is to eat seafood from the ocean, and whether the marine ecosystem is being protected. Key components of regional monitoring include elements to address pollutant mass emission estimations, public health concerns, monitoring of trends in natural resources, assessment of regional impacts from all

contaminant sources, and protection of beneficial uses. The final design of regional monitoring programs is developed by means of steering committees and technical committees comprised of participating agencies and organizations, and is not specified in this permit. Instead, for each regional component, the degree and nature of participation of the Discharger is specified. For this permit, these levels of effort are based upon past participation of the Los Angeles County Sanitation Districts (Discharger or Districts) in regional monitoring programs.

The Discharger shall participate in regional monitoring activities coordinated by the SCCWRP or any other appropriate agency approved by the Regional Water Board. The procedures and time lines for the Regional Water Board approval shall be the same as detailed for special studies, below.

3. Special studies are focused on refined questions regarding specific effects or development of monitoring techniques and are anticipated to be of short duration and/or small scale, although multiyear studies also may be needed. Questions regarding effluent or receiving water quality, discharge impacts, ocean processes in the area of the discharge, or development of techniques for monitoring the same, arising out of the results of core or regional monitoring, may be pursued through special studies. These studies are by nature ad hoc and cannot be typically anticipated in advance of the five-year permit cycle.

   The Discharger and the Regional Water Board shall consult annually to determine the need for special studies. Each year, the Discharger shall submit proposals for any proposed special studies (For example, endocrine disruptors and their effect on fish populations) to the Regional Water Board by December 15, for the following year's monitoring effort (July through June). The following year, detailed scopes of work for proposals, including reporting schedules, shall be presented by the Discharger at a Spring Regional Water Board meeting, to obtain the Regional Water Board approval and to inform the public. Upon approval by the Regional Water Board, the Discharger shall implement its special study or studies.

E. The conceptual framework for the SMBRP Comprehensive Monitoring Program was designed to be implemented in part through modifications to existing receiving water monitoring programs for major NPDES dischargers into coastal ocean waters. Some elements of this monitoring program already have been implemented, for example through establishment of periodic bight-wide regional monitoring surveys (Southern California Bight Pilot Project'94, Bight'98 and Bight'03) and annual kelp bed monitoring. However, other elements of the program have yet to be developed, including:

- rocky intertidal monitoring
- resident fish monitoring
- pelagic ecosystem monitoring
- wetlands monitoring
- hard bottom benthos monitoring
- bird and mammal monitoring
- commercial shellfish monitoring
- stormwater mass emission loading and plume tracking monitoring.

The Santa Monica Bay Restoration Commission's Technical Advisory Committee has agreed to develop a detailed workplan outlining the monitoring surveys required to complete implementation of the Comprehensive Monitoring Program framework developed in 1993. This workplan should include formulation of management goals and objectives, identification of suitable monitoring indicators, detailed sampling designs, and cost estimates for each monitoring component. Upon completion of this workplan, USEPA, the Regional Water Board, affected NPDES permit holders, and other interested agencies and stakeholders will develop implementation plans to collaboratively fund these programs and determine each party's level of participation. It is anticipated that funding for these programs from the Districts will be supplied through a combination of modifications to the Joint Water Pollution Control Plant's (JWPCP)

Monitoring and Reporting Program, including redirection of existing effort and new monitoring efforts relevant to the JWPCP's discharge, and integration with monitoring efforts conducted by other agencies and interested stakeholders. Redirection of existing monitoring requirements and/or the imposition of additional monitoring efforts are subject to a hearing before the Regional Water Board.

F. In an attempt to bridge the foregoing gap in information, this monitoring program for JWPCP is comprised of requirements to demonstrate compliance with the conditions of the NPDES permit, ensure compliance with State water quality standards, and mandate participation in regional monitoring and/or area-wide studies.

G. Discharger participation in regional monitoring programs is required as a condition of this permit. The Discharger shall complete collection and analysis of samples in accordance with the schedule established by the Steering Committee directing the Bight-wide regional monitoring surveys. The level of participation shall be similar to that provided by the Discharger in previous regional surveys conducted in 1994, 1998 and 2003. The regional programs which must be conducted under this permit include:

1. Future Southern California Bight regional surveys, including benthic infauna, sediment chemistry, fish communities and fish predator risk.

2. Santa Monica Bay Restoration Project's Seafood Safety Survey – The Local Seafood Safety Survey stipulated in this permit is a contribution to the Santa Monica Bay Restoration Project's Seafood Safety Survey.

3. Central Region Kelp Monitoring Program – coordinated by the Regional Water Board.

4. Central Bight Water Quality Cooperative Program – coordinated monitoring conducted by Orange County Sanitation District, County Sanitation Districts of Los Angeles County, City of Los Angeles and City of Oxnard through appropriate agencies for water quality monitoring.

H. Regular regional monitoring for the Southern California Bight has been established, occurring at four- to five-year intervals, and coordinated through SCCWRP with discharger agencies and numerous other entities. The third regional monitoring program (Bight'03) occurred during summer 2003 and winter 2003-4. The next (fourth) regional monitoring program (Bight'08) is expected to take place during 2008. While participation in regional programs is required under this permit, revisions to the JWPCP's monitoring program at the direction of the Regional Water Board may be necessary to accomplish the goals of regional monitoring or to allow the performance of special studies to investigate regional or site-specific water issues of concern. These revisions may include a reduction or increase in the number of parameters to be monitored, the frequency of monitoring, or the number and size of samples to be collected. Such changes may be authorized by the Executive Officer upon written notification to the Discharger.

I. The Regional Water Board has helped to establish the Central Region Kelp Survey Consortium to conduct regional kelp bed monitoring. This program is designed to require ocean dischargers in the Regional Water Board's jurisdiction to undertake a collaborative program (which may include participation by Orange County ocean dischargers) to monitor kelp beds in the Southern California Bight, patterned after the successful program implemented by the San Diego Regional Water Board since 1985. Data collected in this regional survey will be used to assess status and trends in kelp bed health and spatial extent. The regional nature of the survey will allow the status of beds local to specific dischargers to be compared to regional trends. Additionally, this survey provides data to the Santa Monica Bay Restoration Project's Kelp Beds program. The regional kelp monitoring survey was initiated during 2003.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table 1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
Influent Monitoring Station		
--	M-INF	Sampling stations shall be established at each point of inflow to the sewage treatment plant and shall be located upstream of any in-plant return flows and where representative samples of the influent can be obtained.
Effluent Monitoring Station		
Discharge Serial Nos. 001, 002, 003, and 004	M-001	The effluent sampling station shall be located downstream of any in-plant return flows but before entering discharge tunnel where representative samples of the effluent can be obtained.
Discharge Serial Nos. 001, 002, 003, and 004	M-002A M-002B	These effluent sampling stations shall be located at the outfall manifold at Whites Point. Samples taken at monitoring location M-002A shall be considered representative of discharges from Discharge Serial Nos. 001 and 003. Samples taken at monitoring location M-002B shall be considered representative of discharges from Discharge Serial Nos. 002 and 004.
Receiving Water Monitoring Stations		
- Shoreline Monitoring Stations -		
	R-M-SB	Bluff Cove, 33° 47.52', 118° 23.76'
	R-M-SM	Malaga Cove, 33° 48.22', 118° 24.44'
	R-M-S1	Long Point, 33° 44.22', 118° 23.62'
	R-M-S2	Abalone Cove, 33° 44.44', 118° 22.18'
	R-M-S3	Portuguese Bend, 33° 44.02', 118° 21.40'
	R-M-S5	White Point, 33° 43.12', 118° 19.35'
	R-M-S6	Wilder Addition Park, 33° 42.59', 118° 17.95'
	R-M-S7	Cabrillo Beach, 33° 42.50', 118° 16.86'
- Inshore Monitoring Stations -		
	R-M-IL2	Long Point, 33° 44.20', 118° 24.15'
	R-M-IL3	Portuguese Point, 33° 44.25', 118° 22.67'
	R-M-IL4	Bunker Point, 33° 43.46', 118° 21.09'
	R-M-IL5	Royal Palms, 33° 42.91', 118° 19.85'
	R-M-IL6	West of Point Fermin, 33° 42.44', 118° 18.53'
	R-M-IL7	Cabrillo Beach, 33° 42.20', 118° 17.04'
- Nearshore/Offshore Monitoring Stations -		
	R-M-6C	6C, 33° 42.47’, 118° 21.24’
	R-M-8C	8C, 33° 41.91’, 118° 20.14’
	R-M-9C	9C, 33° 41.32’, 118° 19.10’
	R-WQ-2501	10 meter depth, 33° 43.67', 118° 07.21'
	R-WQ-2502	20 meter depth, 33° 41.94', 118° 07.67'
	R-WQ-2503	26 meter depth, 33° 40.21', 118° 08.12'

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
	R-WQ-2504	33 meter depth, 33° 38.48', 118° 08.57'
	R-WQ-2505	44 meter depth, 33° 36.75', 118° 09.02'
	R-WQ-2506	60 meter depth, 33° 34.86', 118° 09.54'
	R-WQ-2601	19 meter depth, 33° 43.23', 118° 11.06'
	R-WQ-2602	23 meter depth, 33° 41.64', 118° 11.43'
	R-WQ-2603	23 meter depth, 33° 40.05', 118° 11.80'
	R-WQ-2604	32 meter depth, 33° 38.46', 118° 12.18'
	R-WQ-2605	47 meter depth, 33° 36.88', 118° 12.55'
	R-WQ-2606	62 meter depth, 33° 35.29', 118° 12.93'
	R-WQ-2701	26 meter depth, 33° 42.46', 118° 14.80'
	R-WQ-2702	26 meter depth, 33° 41.32', 118° 15.07'
	R-WQ-2703	28 meter depth, 33° 40.17', 118° 15.34'
	R-WQ-2704	50 meter depth, 33° 39.03', 118° 15.60'
	R-WQ-2705	100 meter depth, 33° 37.88', 118° 15.87'
	R-WQ-2706	80 meter depth, 33° 36.73', 118° 16.14'
	R-WQ-2801	10 meter depth, 33° 42.17', 118° 17.06'
	R-WQ-2802	30 meter depth, 33° 41.60', 118° 17.34'
	R-WQ-2803	60 meter depth, 33° 40.11', 118° 17.81'
	R-WQ-2804	100 meter depth, 33° 39.46', 118° 18.08'
	R-WQ-2805	100 meter depth, 33° 38.91', 118° 18.24'
	R-WQ-2806	100 meter depth, 33° 38.22', 118° 18.55'
	R-WQ-2901	10 meter depth, 33° 42.86', 118° 19.41'
	R-WQ-2902	30 meter depth, 33° 42.42', 118° 19.79'
	R-WQ-2903	60 meter depth, 33° 41.91', 118° 20.14'
	R-WQ-2904	100 meter depth, 33° 41.27', 118° 20.34'
	R-WQ-2905	100 meter depth, 33° 40.26', 118° 20.77'
	R-WQ-2906	100 meter depth, 33° 39.25', 118° 21.26'
	R-WQ-3001	10 meter depth, 33° 43.93', 118° 21.62'
	R-WQ-3002	30 meter depth, 33° 43.34', 118° 21.79'
	R-WQ-3003	60 meter depth, 33° 42.88', 118° 21.96'
	R-WQ-3004	100 meter depth, 33° 42.06', 118° 22.28'
	R-WQ-3005	100 meter depth, 33° 41.10', 118° 22.86'
	R-WQ-3006	100 meter depth, 33° 40.01', 118° 23.44'
	R-WQ-3051	13 meter depth, 33° 44.18', 118° 23.66'
	R-WQ-3052	30 meter depth, 33° 43.99', 118° 24.03'
	R-WQ-3053	60 meter depth, 33° 43.80', 118° 24.15'
	R-WQ-3054	100 meter depth, 33° 43.14', 118° 24.66'
	R-WQ-3055	100 meter depth, 33° 42.30', 118° 25.32'
	R-WQ-3056	100 meter depth, 33° 41.38', 118° 25.99'
	R-WQ-3101	10 meter depth, 33° 46.26', 118° 25.81'
	R-WQ-3102	30 meter depth, 33° 45.90', 118° 26.12'
	R-WQ-3103	60 meter depth, 33° 45.44', 118° 26.46'
	R-WQ-3104	100 meter depth, 33° 44.72', 118° 26.99'
	R-WQ-3105	100 meter depth, 33° 43.73', 118° 27.67'
	R-WQ-3106	100 meter depth, 33° 42.75', 118° 28.53'

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
- Nearshore Light Energy Monitoring Stations -		
	R-WQ-L1	Palos Verdes Point, 33° 46.12', 118° 25.82'
	R-WQ-L2	Long Point, 33° 44.09', 118° 24.22'
	R-WQ-L3	Portuguese Point, 33° 44.06', 118° 22.72'
	R-WQ-L4	Bunker Point, 33° 43.40', 118° 21.12'
	R-WQ-L5	Royal Palms, 33° 42.85', 118° 19.93'
	R-WQ-L6	West of Point Fermin, 33° 42.36', 118° 18.53'
	R-WQ-L7	Cabrillo Beach, 33° 41.83', 118° 17.10'
- Bottom Monitoring Stations -		
	R-B-0A	305 meter depth, 33° 49.10', 118° 27.25'
	R-B-0B	152 meter depth, 33° 48.70', 118° 26.50'
	R-B-0C	61 meter depth, 33° 48.43', 118° 25.83'
	R-B-0D	30 meter depth, 33° 48.17', 118° 25.36'
	R-B-1A	305 meter depth, 33° 44.72', 118° 26.99'
	R-B-1B	152 meter depth, 33° 44.97', 118° 26.81'
	R-B-1C	61 meter depth, 33° 45.44', 118° 26.46'
	R-B-1D	30 meter depth, 33° 45.90', 118° 26.12'
	R-B-2A	305 meter depth, 33° 43.62', 118° 25.72'
	R-B-2B	152 meter depth, 33° 43.95', 118° 25.55'
	R-B-2C	61 meter depth, 33° 44.26', 118° 25.39'
	R-B-2D	30 meter depth, 33° 44.47', 118° 25.28'
	R-B-3A	305 meter depth, 33° 43.14', 118° 24.66'
	R-B-3B	152 meter depth, 33° 43.43', 118° 24.44'
	R-B-3C	61 meter depth, 33° 43.80', 118° 24.15'
	R-B-3D	30 meter depth, 33° 43.99', 118° 24.03'
	R-B-4A	305 meter depth, 33° 42.70', 118° 23.38'
	R-B-4B	152 meter depth, 33° 43.00', 118° 23.24'
	R-B-4C	61 meter depth, 33° 43.40', 118° 23.08'
	R-B-4D	30 meter depth, 33° 43.91', 118° 22.83'
	R-B-5A	305 meter depth, 33° 42.06', 118° 22.28'
	R-B-5B	152 meter depth, 33° 42.54', 118° 22.08'
	R-B-5C	61 meter depth, 33° 42.88', 118° 21.96'
	R-B-5D	30 meter depth, 33° 43.34', 118° 21.79'
	R-B-6A	305 meter depth, 33° 41.99', 118° 21.56'
	R-B-6B	152 meter depth, 33° 42.18', 118° 21.35'
	R-B-6C	61 meter depth, 33° 42.47', 118° 21.24'
	R-B-6D	30 meter depth, 33° 42.98', 118° 20.91'
	R-B-7A	305 meter depth, 33° 41.86', 118° 21.19'
	R-B-7B	152 meter depth, 33° 42.05', 118° 21.09'
	R-B-7C	61 meter depth, 33° 42.31', 118° 20.92'
	R-B-7D	30 meter depth, 33° 42.76', 118° 20.61'
	R-B-8A	305 meter depth, 33° 41.27', 118° 20.34'
	R-B-8B	152 meter depth, 33° 41.53', 118° 20.24'
	R-B-8C	61 meter depth, 33° 41.91', 118° 20.14'
	R-B-8D	30 meter depth, 33° 42.42', 118° 19.79'

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
	R-B-9A	305 meter depth, 33° 40.58', 118° 19.46'
	R-B-9B	152 meter depth, 33° 40.89', 118° 19.31'
	R-B-9C	61 meter depth, 33° 41.32', 118° 19.10'
	R-B-9D	30 meter depth, 33° 41.97', 118° 18.78'
	R-B-10A	305 meter depth, 33° 39.46', 118° 18.08'
	R-B-10B	152 meter depth 33° 39.73', 118° 17.90'
	R-B-10C	61 meter depth, 33° 40.11', 118° 17.81'
	R-B-10D	30 meter depth, 33° 41.60', 118° 17.34'
	R-BA-Z1	Outfall zone: inshore of the 150 meter depth contour and between a line bearing 150° magnetic of White Point and a line bearing 180° magnetic off Bunker Point.
	R-BA-Z2	Intermediate zone: inshore of the 150 meter depth contour and between a line bearing 160° magnetic off Long Point and a line bearing 245° magnetic off Point Vicente.
	R-BA-Z3	Distant zone: inshore of the 150 meter depth contour and between a line bearing 225° magnetic off the southern face of Palos Verdes Point and a line bearing 235° magnetic off the south end of the Redondo Beach Pier.
	R-T-T0/23	23 meter depth, 33° 48.19', 118° 25.04' (trawl mid-point)
	R-T-T0/61	61 meter depth, 33° 48.57', 118° 25.84' (trawl mid-point)
	R-T-T0/137	137 meter depth, 33° 48.83', 118° 26.36' (trawl mid-point)
	R-T-T0/305	305 meter depth, 33° 49.23', 118° 27.09' (trawl mid-point)
	R-T-T1/23	26 meter depth, 33° 44.65', 118° 25.09' (trawl mid-point)
	R-T-T1/61	61 meter depth, 33° 44.16', 118° 25.23' (trawl mid-point)
	R-T-T1/137	137 meter depth, 33° 44.84', 118° 25.34' (trawl mid-point)
	R-T-T1/305	305 meter depth, 33° 43.55', 118° 25.64' (trawl mid-point)
	R-T-T4/23	27 meter depth, 33° 42.79', 118° 20.48' (trawl mid-point)
	R-T-T4/61	61 meter depth, 33° 42.33', 118° 20.92' (trawl mid-point)
	R-T-T4/137	137 meter depth, 33° 44.06', 118° 21.05' (trawl mid-point)
	R-T-T4/305	305 meter depth, 33° 42.00', 118° 21.49' (trawl mid-point)
	R-T-T5/23	23 meter depth, 33° 42.29', 118° 18.98' (trawl mid-point)
	R-T-T5/61	61 meter depth, 33° 41.45', 118° 19.31' (trawl mid-point)
	R-T-T5/137	137 meter depth, 33° 41.11', 118° 19.61' (trawl mid-point)
	R-T-T5/305	305 meter depth, 33° 40.85’, 118° 19.85’ (trawl mid-point)

CORE MONITORING

III. INFLUENT MONITORING REQUIREMENTS

(for footnotes, see pages E-17 and E-18)

Influent monitoring is required to:

- Determine compliance with NPDES permit conditions.
- Assess treatment plant performance.
- Assess effectiveness of the Pretreatment Program

A. Monitoring Location (M-INF)

1. The Discharger shall establish a sampling station at each point of inflow to the sewage treatment plant. The sampling stations shall be located upstream of any in-plant return flows and where representative samples of the influent can be obtained. The Discharger shall monitor influent to the facility at influent monitoring station(s) M-INF as follows:

Table 2. Influent Monitoring

Influent Monitoring Program			
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**
Flow	mgd	recorder/totalizer	continuous
BOD_5 20°C	mg/L	24-hr composite	daily
Suspended solids	mg/L	24-hr composite	daily
pH	pH units	grab	daily
COD	mg/L	24-hr composite	daily
Oil and grease	mg/L	grab [3]	monthly
Ammonia nitrogen	mg/L	24-hr composite	monthly
Cyanide	µg/L	grab	monthly
Nitrate nitrogen	mg/L	24-hr composite	quarterly
Nitrite nitrogen	mg/L	24-hr composite	quarterly
Organic nitrogen	mg/L	24-hr composite	quarterly
Radioactivity [4] (Including gross alpha, gross beta, combined radium-226 and radium-228, tritium, strontium-90 and uranium)	pCi/L	24-hr composite	monthly
Total phosphorus (as P)	mg/L	24-hr composite	quarterly
Tributyltin	ng/L	24-hr composite	quarterly
Aldrin	µg/L	24-hr composite	quarterly
Chlordane & related compounds [5]	µg/L	24-hr composite	quarterly
DDT [6]	µg/L	24-hr composite	quarterly
Dieldrin	µg/L	24-hr composite	quarterly

Influent Monitoring Program			
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**
Endosulfan [7]	µg/L	24-hr composite	quarterly
Endrin	µg/L	24-hr composite	quarterly
HCH [8]	µg/L	24-hr composite	quarterly
Heptachlor	µg/L	24-hr composite	quarterly
Heptachlor epoxide	µg/L	24-hr composite	quarterly
PCBs [9]	µg/L	24-hr composite	quarterly
Toxaphene	µg/L	24-hr composite	quarterly
2,4-Dinitrophenol	µg/L	24-hr composite	quarterly
2,4,6-Trichlorophenol	µg/L	24-hr composite	quarterly
4,6-Dinitro-2-methyl-phenol	µg/L	24-hr composite	quarterly
Phenolic compounds (chlorinated) [11]	µg/L	24-hr composite	quarterly
Phenolic compounds (non-chlorinated) [12]	µg/L	24-hr composite	quarterly
Bis(2-chloro-ethoxy) methane	µg/L	24-hr composite	quarterly
Bis(2-chloro-isopropyl) ether	µg/L	24-hr composite	quarterly
Di-n-butylphthalate	µg/L	24-hr composite	quarterly
Dichlorobenzenes [13]	µg/L	24-hr composite	quarterly
Diethylphthalate	µg/L	24-hr composite	quarterly
Dimethylphthalate	µg/L	24-hr composite	quarterly
Fluoranthene	µg/L	24-hr composite	quarterly
Hexachlorocyclopentadiene	µg/L	24-hr composite	quarterly
Isophorone	µg/L	24-hr composite	quarterly
Nitrobenzene	µg/L	24-hr composite	quarterly
Benzidine	µg/L	24-hr composite	quarterly
Bis(2-chloroethyl) ether	µg/L	24-hr composite	quarterly
Bis(2-ethylhexyl) phthalate	µg/L	24-hr composite	quarterly
1,4-Dichlorobenzene	µg/L	24-hr composite	quarterly
3,3-Dichlorobenzidine	µg/L	24-hr composite	quarterly
2,4-Dinitrotoluene	µg/L	24-hr composite	quarterly
1,2-Diphenylhydrazine	µg/L	24-hr composite	quarterly
Hexachlorobenzene	µg/L	24-hr composite	quarterly
Hexachlorobutadiene	µg/L	24-hr composite	quarterly
Hexachloroethane	µg/L	24-hr composite	quarterly

Influent Monitoring Program			
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**
N-Nitrosodimethylamine	µg/L	24-hr composite	quarterly
N-Nitrosodi-n-propylamine	µg/L	24-hr composite	quarterly
N-Nitrosodiphenylamine	µg/L	24-hr composite	quarterly
PAHs [14]	µg/L	24-hr composite	quarterly
TCDD equivalents]15]	pg/L	24-hr composite	quarterly
Acrolein	µg/L	grab	quarterly
Acrylonitrile	µg/L	grab	quarterly
Benzene	µg/L	grab	quarterly
Carbon tetrachloride	µg/L	grab	quarterly
Chlorobenzene	µg/L	grab	quarterly
Chlorodibromomethane	µg/l	grab	quarterly
Chloroform	µg/L	grab	quarterly
Dichlorobromomethane	µg/l	grab	quarterly
Dichloromethane	µg/L	grab	quarterly
1,1-Dichloroethylene	µg/L	grab	quarterly
1,2-Dichloroethane	µg/L	grab	quarterly
1,3-Dichloropropene	µg/L	grab	quarterly
Ethylbenzene	µg/L	grab	quarterly
Halomethanes [16]	µg/L	grab	quarterly
Methyl-tert-butyl-ether	µg/l	grab	quarterly
Toluene	µg/L	grab	quarterly
1,1,2,2-Tetrachloroethane	µg/L	grab	quarterly
1,1,1-Trichloroethane	µg/L	grab	quarterly
1,1,2-Trichloroethane	µg/L	grab	quarterly
Tetrachloroethylene	µg/L	grab	quarterly
Trichloroethylene	µg/L	grab	quarterly
Vinyl chloride	µg/L	grab	quarterly
Antimony	µg/L	24-hr composite	quarterly
Arsenic	µg/l	24-hr composite	monthly
Beryllium	µg/L	24-hr composite	quarterly
Cadmium	µg/L	24-hr composite	monthly
Chromium (III)	µg/L	24-hr composite	quarterly

Influent Monitoring Program			
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency**
Copper	µg/L	24-hr composite	monthly
Hexavalent chromium [17]	µg/L	24-hr composite	monthly
Lead	µg/L	24-hr composite	monthly
Mercury	µg/L	24-hr composite	monthly
Nickel	µg/L	24-hr composite	monthly
Selenium	µg/L	24-hr composite	monthly
Silver	µg/L	24-hr composite	monthly
Thallium	µg/L	24-hr composite	quarterly
Zinc	µg/L	24-hr composite	monthly

IV. EFFLUENT MONITORING REQUIREMENTS

(for footnotes, see pages E-17 and E-18)

Effluent monitoring is required to:

- Determine compliance with NPDES permit conditions and water quality standards.
- Assess plant performance, identify operational problems and improve plant performance.
- Provide information on wastewater characteristics and flows for use in interpreting water quality and biological data.

A. Monitoring Location (M-001, and Manifold Stations: M-002A and M-002B)

1. The Discharger shall establish sampling locations representative of each point of discharge. The sampling stations shall be located downstream of any in-plant return flows where representative samples of the effluent can be obtained. The Discharger shall monitor secondary effluent at effluent monitoring location M-001 for all parameters except chlorine residual and bacteria. The chlorine residual and bacteria samples shall be collected at effluent manifold monitoring M-002A and M-002B. Effluent limitations for chlorine residual and bacteria applicable to discharges through Discharge Serial Nos. 001 and 003 shall apply at manifold monitoring location M-002A. Effluent limitations for chlorine residual and bacteria applicable to discharges through Discharge Serial Nos. 002 and 004 shall apply at manifold monitoring location M-002B. The effluent monitoring program is described as follows:

Table 3. Effluent Monitoring

Effluent Monitoring Program			
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency [2]**
Flow	mgd	recorder/totalizer	continuous
BOD_5 20°C	mg/L	24-hr composite	daily
Suspended solids	mg/L	24-hr composite	daily
pH	pH units	grab	daily

Effluent Monitoring Program			
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency [2]**
Oil and grease	mg/L	grab [3]	daily
Temperature	°C	grab	daily
Settleable solids	ml/L	grab	daily
Total chlorine residual (at manifold station)	mg/L	grab	daily
Turbidity	NTU	24-hr composite	daily
Total coliform (at manifold station)	CFU/100 ml or MPN/100 ml	grab	daily
Enterococcus (at manifold station)	CFU/100 ml or MPN/100 ml	grab	daily
Fecal coliform (at manifold station)	CFU/100 ml or MPN/100 ml	grab	5 times/month
COD	mg/L	24-hr composite	daily
TOC	mg/L	24-hr composite	monthly
Ammonia nitrogen	mg/L	24-hr composite	monthly
Toxicity, acute	TUa	24-hr composite	monthly
Toxicity, chronic	TUc	24-hr composite	monthly
Cyanide	µg/L	grab	monthly
Nitrate nitrogen	µg/L	24-hr composite	quarterly
Nitrite nitrogen	µg/L	24-hr composite	quarterly
Organic nitrogen	mg/L	24-hr composite	quarterly
Radioactivity [4] (Including gross alpha, gross beta, combined radium-226 and radium-228, tritium, strontium-90 and uranium)	pCi/L	24-hr composite	monthly
Total phosphorus (as P)	mg/L	24-hr composite	quarterly
Tributyltin	ng/L	24-hr composite	quarterly
Aldrin	µg/L	24-hr composite	quarterly
Chlordane & related compounds [5]	µg/L	24-hr composite	quarterly
DDT [6]	µg/L	24-hr composite	quarterly
Dieldrin	µg/L	24-hr composite	quarterly
Endosulfan [7]	µg/L	24-hr composite	quarterly
Endrin	µg/L	24-hr composite	quarterly
HCH [8]	µg/L	24-hr composite	quarterly
Heptachlor	µg/L	24-hr composite	quarterly
Heptachlor epoxide	µg/L	24-hr composite	quarterly

Effluent Monitoring Program			
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency [2]**
PCBs [9]	µg/L	24-hr composite	quarterly
PCBs congeners [10]	µg/L	24-hr composite	annually
Toxaphene	µg/L	24-hr composite	quarterly
2,4-Dinitrophenol	µg/L	24-hr composite	quarterly
2,4,6-Trichlorophenol	µg/L	24-hr composite	quarterly
4,6-Dinitro-2-methyl-phenol	µg/L	24-hr composite	quarterly
Phenolic compounds (chlorinated) [11]	µg/L	24-hr composite	quarterly
Phenolic compounds (non-chlorinated) [12]	µg/L	24-hr composite	quarterly
Bis(2-chloro-ethoxy) methane	µg/L	24-hr composite	quarterly
Bis(2-chloro-isopropyl) ether	µg/L	24-hr composite	quarterly
Di-n-butylphthalate	µg/L	24-hr composite	quarterly
Dichlorobenzenes [13]	µg/L	24-hr composite	quarterly
Diethylphthalate	µg/L	24-hr composite	quarterly
Dimethylphthalate	µg/L	24-hr composite	quarterly
Fluoranthene	µg/L	24-hr composite	quarterly
Hexachlorocyclopentadiene	µg/L	24-hr composite	quarterly
Isophorone	µg/L	24-hr composite	quarterly
Nitrobenzene	µg/L	24-hr composite	quarterly
Benzidine	µg/L	24-hr composite	quarterly
Bis(2-chloroethyl) ether	µg/L	24-hr composite	quarterly
Bis(2-ethylhexyl) phthalate	µg/L	24-hr composite	quarterly
1,4-Dichlorobenzene	µg/L	24-hr composite	quarterly
3,3-Dichlorobenzidine	µg/L	24-hr composite	quarterly
2,4-Dinitrotoluene	µg/L	24-hr composite	quarterly
1,2-Diphenylhydrazine	µg/L	24-hr composite	quarterly
Hexachlorobenzene	µg/L	24-hr composite	quarterly
Hexachlorobutadiene	µg/L	24-hr composite	quarterly
Hexachloroethane	µg/L	24-hr composite	quarterly
N-Nitrosodimethylamine	µg/L	24-hr composite	quarterly
N-Nitrosodi-n-propylamine	µg/L	24-hr composite	quarterly
N-Nitrosodiphenylamine	µg/L	24-hr composite	quarterly
PAHs [14]	µg/L	24-hr composite	quarterly

Effluent Monitoring Program			
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency [2]**
TCDD equivalents [15]	pg/L	24-hr composite	quarterly
Acrolein	µg/L	grab	quarterly
Acrylonitrile	µg/L	grab	quarterly
Benzene	µg/L	grab	quarterly
Carbon tetrachloride	µg/L	grab	quarterly
Chlorobenzene	µg/L	grab	quarterly
Chlorodibromomethane	µg/l	grab	quarterly
Chloroform	µg/L	grab	quarterly
Dichlorobromomethane	µg/l	grab	quarterly
Dichloromethane	µg/L	grab	quarterly
1,1-Dichloroethylene	µg/L	grab	quarterly
1,2-Dichloroethane	µg/L	grab	quarterly
1,3-Dichloropropene	µg/L	grab	quarterly
Ethylbenzene	µg/L	grab	quarterly
Halomethanes [16]	µg/L	grab	quarterly
Methyl-tert-butyl-ether	µg/l	grab	quarterly
Toluene	µg/L	grab	quarterly
1,1,2,2-Tetrachloroethane	µg/L	grab	quarterly
1,1,1-Trichloroethane	µg/L	grab	quarterly
1,1,2-Trichloroethane	µg/L	grab	quarterly
Tetrachloroethylene	µg/L	grab	quarterly
Trichloroethylene	µg/L	grab	quarterly
Vinyl chloride	µg/L	grab	quarterly
Antimony	µg/L	24-hr composite	quarterly
Arsenic	µg/l	24-hr composite	monthly
Beryllium	µg/L	24-hr composite	quarterly
Cadmium	µg/L	24-hr composite	monthly
Chromium (III)	µg/L	24-hr composite	quarterly
Copper	µg/L	24-hr composite	monthly
Hexavalent chromium [17]	µg/L	24-hr composite	monthly
Lead	µg/L	24-hr composite	monthly
Mercury	µg/L	24-hr composite	monthly

Effluent Monitoring Program			
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency [2]**
Nickel	µg/L	24-hr composite	monthly
Selenium	µg/L	24-hr composite	monthly
Silver	µg/L	24-hr composite	monthly
Thallium	µg/L	24-hr composite	quarterly
Zinc	µg/L	24-hr composite	monthly

Footnotes for Influent and effluent Monitoring Program

[1] For 24-hour composite samples, if the duration of the discharge is less than 24 hours but greater than 8 hours, at least eight flow-weighted samples shall be obtained during the discharge period and composited. For discharge durations of less than eight hours, individual "grab samples" may be substituted. A grab sample is an individual sample collected in less than 15 minutes.

[2] For Discharge Serial Nos. 003 and 004, the minimum frequency of analysis shall be once per discharge day, but no more than one analysis need be done during the period indicated. The permit does not require acute toxicity testing of this effluent discharge. During routine maintenance activities if it is reported to the Regional Water Board in advance , sampling and analyses are not required.

[3] Grease and oil monitoring in the influent and effluent shall consist of a single grab sample at peak flow over a 24-hour period.

[4] Analyze these radiochemicals by the following USEPA methods: method 900.0 for gross alpha and gross beta, method 903.0 or 903.1 for radium-226, method 904.0 for radium-228, method 906.0 for tritium, method 905.0 for strontium-90, and method 908.0 for uranium.
Analysis for combined Radium-226 & 228 shall be conducted only if gross alpha results for the same sample exceed 15 pCi/L or beta greater than 50 pCi/L. If Radium-226 & 228 exceeds the stipulated criteria, analyze for Tritium, Strontium-90 and uranium.

[5] *Chlordane* shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-cis, nonachlor-trans and oxychlordane. Discharger may temporarily suspend the monitoring requirements for alpha and gamma chlordene if standards for these compounds are not available. However, Discharger is required to resume detection and quantification practices as soon as standards for these two compounds become available.

[6] *DDT* shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

[7] *Endosulfan* shall meanSum of endosulfan-alpha and –beta and endosulfan sulfate.

[8] *HCH* shall mean the sum of alpha, beta, gamma (lindane) and delta isomers of hexachlorocyclohexane.

[9] *PCBs (polychlorinated biphenyls)* shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

[10] To facilitate interpretation of sediment/fish tissue data and TMDL development, PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206 shall be individually quantified.

[11] *Chlorinated phenolic compounds* shall mean the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

[12] *Nonchlorinated phenolic compounds* shall mean the sum of Phenol, 2,4-Dimethylphenol, 2-Nitrophenol, and 4-Nitrophenol, 2,4-Dinitrophenol and 4,6-Dinitro-2-Methylphenol.

[13] *Dichlorobenzenes* shall mean the sum of 1,2- and 1,3-dichlorobenzene.

[14] *PAHs* shall mean the sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene.

[15] *TCDD equivalents* shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below:

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
1,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

[16] *Halomethanes* shall mean the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).

[17] Discharger may, at its option, meet the hexavalent chromium limitation by analyzing for total chromium rather than hexavalent chromium.

B. Mass Emission Benchmarks

The following Mass Emission Benchmarks, in metric tons per year (MT/yr), have been established for the discharge (methodology described in the Fact Sheet). The Discharger shall monitor and report the mass emission rate for all constituents that have mass emission benchmarks. For each constituent, the 12-month average mass emission rate and the concentration and flow used to calculate that mass emission rate shall be reported in the annual pretreatment report and the annual receiving water monitoring report.

Table 4. 12-Month Average Effluent Mass Emission Benchmarks

Ocean Plan Constituent	12-month Average Mass Emission Benchmarks (MT/yr)
Marine Aquatic Life Toxicants	
Arsenic	0.95
Cadmium	0.47
Chromium (hexavalent)	46.70
Copper	5.78
Lead	3.74
Mercury	0.23
Nickel	22.58
Selenium	5.00
Silver	2.33
Zinc	11.67
Cyanide	4.05
Chlorine Residual	N/a
Ammonia as N	17070
Phenolic compounds (non-chlorinated)	23.35
Phenolic compounds (chlorinated)	23.35
Endosulfan	0.047
HCH	0.0047
Endrin	0.0047
Acute toxicity	N/a
Chronic toxicity	N/a
Radioactivity	N/a
Human Health Toxicants – Non Carcinogens	
Acrolein	4.67
Antimony	1.61
Bis(2-chloroethoxy) methane	11.67
Bis(2-chloroisopropyl) ether	4.67
Chlorobenzene	0.23
Chromium (III)	5.60
Di-n-butyl-phthalate	23.35
Dichlorobenzenes	4.67
Diethyl phthalate	4.67

Ocean Plan Constituent	12-month Average Mass Emission Benchmarks (MT/yr)
Dimethyl phthalate	4.67
2-Methyl-4,6-dinitrophenol	11.67
2,4-Dinitrophenol	11.67
Ethyl benzene	0.23
Fluoranthene	2.33
Hexachlorocyclopentadiene	11.67
Nitrobenzene	2.33
Thallium	4.67
Toluene	0.23
Tributyltin	0.028
1,1,1-Trichloroethane	0.23
Human Health Toxicants – Carcinogens	
Acrylonitrile	2.33
Aldrin	N/a
Benzene	0.23
Benzidine	N/a
Beryllium	0.47
Bis(2-chloroethyl) ether	2.33
Bis(2-ethylhexyl) phthalate	15.25
Carbon tetrachloride	0.23
Chlordane	N/a
Chlorodibromomethane	1.15
Chloroform	20.78
DDT	N/a
1,4-Dichlorobenzene	2.33
3,3'-Dichlorobenzidine	0.065
1,2-Dichloroethane	0.23
1,1-Dichloroethylene	0.23
Bromodichloromethane	.84
Dichloromethane	5.38
1,3-Dichloropropene	0.23
Dieldrin	N/a
2,4-Dinitrotoluene	11.67
1,2-Diphenylhydrazine	2.33

Ocean Plan Constituent	12-month Average Mass Emission Benchmarks (MT/yr)
Halomethanes	1.50
Heptachlor	N/a
Heptachlor epoxide	N/a
Hexachlorobenzene	N/a
Hexachlorobutadiene	2.33
Hexachloroethane	2.33
Isophorone	2.33
N-Nitrosodimethylamine	11.67
N-Nitrosodi-N-propylamine	11.67
N-Nitrosodiphenylamine	2.33
PAHs	23.35
PCBs	N/a
TCDD equivalents	N/a
1,1,2,2-Tetrachloroethane	0.23
Tetrachloroethylene	4.41
Toxaphene	N/a
Trichloroethylene	0.23
1,1,2-Trichloroethane	0.23
2,4,6-Trichlorophenol	23.35
Vinyl chloride	0.23

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. Acute Toxicity Testing

1. **Methods and test species**. Test Species and Methods for Discharge Serial Nos. 001 and 002. The Discharger shall conduct 96-hour static renewal acute toxicity tests on flow-weighted 24-hour composite effluent samples. When conducting toxicity tests in accordance with a specified chronic test methods manual, if daily observations of mortality make it possible to also calculate acute toxicity for the desired exposure period and the dilution series for the toxicity test includes the acute IWC, such method may be used to estimate the 96-hour LC50.

   The presence of acute toxicity shall be estimated as specified in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA 821-R-02-012, 2002), with preference for west coast vertebrate and invertebrate species.

2. **Frequency**

   a. Screening - The Discharger shall conduct the first acute toxicity test screening for three consecutive months in 2006. Re-screening is required every 24 months. The Discharger shall re-screen with a marine vertebrate species and a marine invertebrate species and continue to monitor with the most sensitive species. If the first suite of re-screening tests demonstrate that the same species is the most sensitive, then the re-screening does not need to include more than one suite of tests. If a different species is the most sensitive or if there is ambiguity, then the Discharger shall proceed with suites of screening tests for a minimum of three, but not to exceed five, suites.

   b. Regular toxicity tests - After the screening period, monitoring shall be conducted monthly using the most sensitive marine species.

3. **Toxicity Units.** The acute toxicity of the effluent shall be expressed and reported in Acute Toxic Units, TUa, where,

$$TU_a = \frac{100}{LC50}$$

The Lethal Concentration, 50 Percent (LC50) is expressed as the estimate of the percent effluent concentration that causes death in 50% of the test population, in the time period prescribed by the toxicity test.

B. Chronic Toxicity Testing

1. **Methods and test species**. The Discharger shall conduct critical life stage chronic toxicity tests on 24-hour composite effluent samples in accordance with USEPA's *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*, 1995, (EPA/600/R-95/136). Pursuant to the 2005 California Ocean Plan, upon the approval of the Executive Officer of the Regional Water Board, the Discharger may use a second tier organism (e.g., silverside) if first tier organisms (e.g., topsmelt) are not available. However, the Discharger is required to immediately resume the chronic toxicity test using the original testing organism as soon as this organism becomes available. When a chronic toxicity test method that incorporates a 96-hour acute toxicity endpoint is used to monitor toxicity at the chronic IWC in effluent discharged from Discharge Serial No. 003 or 004, the 96-hour acute toxicity statistical endpoint shall also be reported as LC50 and TUa, along with other chronic toxicity test results required by this permit.

2. **Frequency**

   a. Screening - The Discharger shall conduct the first chronic toxicity test screening for three consecutive months in 2006. Re-screening is required every 24 months. The Discharger shall re-screen with a marine vertebrate species, a marine invertebrate species, and a marine alga species and continue to monitor with the most sensitive species. If the first suite of re-screening tests demonstrate that the same species is the most sensitive, then the re-screening does not need to include more than one suite of tests. If a different species is the most sensitive or if there is ambiguity, then the Discharger shall proceed with suites of screening tests for a minimum of three, but not to exceed five, suites.

   b. Regular toxicity tests - After the screening period, monitoring shall be conducted monthly using the most sensitive species.

3. **Toxicity Units.** The chronic toxicity of the effluent shall be expressed and reported in Chronic Toxic Units, TUc, where,

$$TU_c = \frac{100}{NOEC}$$

The No Observable Effect Concentration (NOEC) is expressed as the maximum percent effluent concentration that causes no observable effect on test organisms, as determined by the results of a critical life stage toxicity test.

C. Quality Assurance

1. Concurrent testing with a reference toxicant shall be conducted. Reference toxicant tests shall be conducted using the same test conditions as the effluent toxicity tests (e.g., same test duration, etc).

2. If either the reference toxicant test or effluent test does not meet all test acceptability criteria (TAC) as specified in the test methods manual (EPA-821-R-02-012 and/or EPA/600/R-95/136), then the Discharger must re-sample and re-test within 14 days.

3. Control and dilution water should be receiving water or laboratory water, as appropriate, as described in the manual. If the dilution water used is different from the culture water, a second control using culture water shall be used.

4. A series of at least five dilutions and a control shall be tested. The dilution series shall include the instream waste concentration (IWC), and two dilutions above and two below the IWC. The acute IWC for Discharge Serial Nos. 001 and 002 is 19% effluent. The chronic IWC for Discharge Serial Nos. 001 and 002 is 0.60% effluent; the chronic IWC for Discharge Serial No. 003 is 0.66% effluent; the chronic IWC for Discharge Serial No. 004 is 0.86% effluent

5. Because this permit requires sublethal hypothesis testing endpoints from the 1995 West Coast marine and estuarine WET test methods manual and the 2002 East Coast marine and estuarine WET test methods manual, with-in test variability must be reviewed and variability criteria [e.g., Minimum Significance Difference (MSD) bound, Percent ., Minimum Significance Difference (PMSD) bounds] must be applied, as specified in the test methods manuals. The calculated MSD (or PMSDs) for both reference toxicant test and effluent toxicity test results must meet the MDS bound (or PMSD bounds) variability criteria specified in the test methods manuals.

D. Accelerated Monitoring

If the effluent toxicity test result exceeds the limitation, then the Discharger shall immediately implement accelerated toxicity testing that consists of six additional tests, approximately every two weeks, over a 12-week period. Effluent sampling for the first test of the six additional tests shall commence within 5 working days of receipt of the test results exceeding the toxicity limitation.

1. If all the results of the six additional tests are in compliance with the toxicity limitation, the Discharger may resume regular monthly testing.

2. If the result of any of the six additional tests exceeds the limitation, then the Discharger shall continue to monitor once every two weeks until six consecutive biweekly tests are in compliance. At that time, the Discharger may resume regular monthly testing.

3. If the results of any two of the six tests (any two tests in a 12-week period) exceed the limitation, the Discharger shall initiate a Toxicity Identification Evaluation (TIE) and implement the initial investigation Toxicity Reduction Evaluation (TRE) Workplan.

4. If implementation of the initial investigation TRE workplan (see item E below) indicates the source of toxicity (e.g., a temporary plant upset, etc.), then the Discharger shall return to the regular testing frequency.

E. Preparation of an Initial Investigation TRE Workplan

The Discharger shall prepare and submit a copy of the Discharger's initial investigation Toxicity Reduction Evaluation (TRE) workplan to the Executive Officer of the Regional Water Board for approval within 90 days of the effective date of this permit. If the Executive Officer does not disapprove the workplan within 60 days, the workplan shall become effective. The Discharger shall use USEPA manual EPA/833B-99/002 (municipal) as guidance, or most current version. At a minimum, the TRE Workplan must contain the provisions in Attachment G. This workplan shall describe the steps the Discharger intends to follow if toxicity is detected, and should include, at a minimum:

1. A description of the investigation and evaluation techniques that will be used to identify potential causes and sources of toxicity, effluent variability, and treatment system efficiency.

2. A description of the facility's methods of maximizing in-house treatment efficiency and good housekeeping practices, and a list of all chemicals used in the operation of the facility; and,

3. If a toxicity identification evaluation (TIE) is necessary, an indication of the person who would conduct the TIEs (i.e., an in-house expert or an outside contractor). See MRP Section V.F.3 for guidance manuals.

F. Steps in Toxicity Reduction Evaluation (TRE) and Toxicity Identification Evaluation (TIE)

1. If results of the implementation of the facility's initial investigation TRE workplan indicate the need to continue the TRE/TIE, the Discharger shall expeditiously develop a more detailed TRE workplan for submittal to the Executive Officer within 15 days of completion of the initial investigation TRE. The detailed workplan shall include, but not be limited to:

   a. Further actions to investigate and identify the cause of toxicity;

   b. Actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and

   c. A schedule for these actions.

2. The following section summarizes the stepwise approach used in conducting the TRE:

   a. Step 1 includes basic data collection.

   b. Step 2 evaluates optimization of the treatment system operation, facility housekeeping, and selection and use of in-plant process chemicals.

c. If Steps 1 and 2 are unsuccessful, Step 3 implements a Toxicity Identification Evaluation (TIE) and employment of all reasonable efforts using currently available TIE methodologies. The objective of the TIE shall be to identify the substance or combination of substances causing the observed toxicity.

d. Assuming successful identification or characterization of the toxicant(s), Step 4 evaluates final effluent treatment options.

e. Step 5 evaluates in-plant treatment options.

f. Step 6 consists of confirmation once a toxicity control method has been implemented.

Many recommended TRE elements parallel source control, pollution prevention, and storm water control program best management practices (BMPs). To prevent duplication of efforts, evidence of compliance with those requirements may be sufficient to comply with TRE requirements. By requiring the first steps of a TRE to be accelerated testing and review of the facility's TRE workplan, a TRE may be ended in its early stages. All reasonable steps shall be taken to reduce toxicity to the required level. The TRE may be ended at any stage if monitoring indicates there are no longer toxicity violations.

3. The Discharger may initiate a TIE as part of the TRE process to identify the cause(s) of toxicity. The Discharger shall use the USEPA acute manual, chronic manual, EPA/600/R-96-054 (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III), as guidance.

4. If a TRE/TIE is initiated prior to completion of the accelerated testing required in Section V.D. of this program, then the accelerated testing schedule may be terminated, or used as necessary in performing the TRE/TIE, as determined by the Executive Officer .

5. The Regional Water Board recognizes that toxicity may be episodic and identification of causes of and reduction of sources of toxicity may not be successful in all cases. Consideration of enforcement action by the Board will be based, in part, on the Discharger's actions and efforts to identify and control or reduce sources of consistent toxicity.

G. Ammonia Removal

1. Except with prior approval from the Executive Officer of the Regional Water Board, ammonia shall not be removed from bioassay samples. The Discharger must demonstrate the effluent toxicity is caused by ammonia *because of increasing test pH* when conducting the toxicity test. It is important to distinguish the potential toxic effects of ammonia from other pH sensitive chemicals, such as certain heavy metals, sulfide, and cyanide. The following may be steps to demonstrate that the toxicity is caused by ammonia and not other toxicants before the Executive Officer would allow for control of pH in the test.

   a. There is consistent toxicity in the effluent and the maximum pH in the toxicity test is in the range to cause toxicity due to increased pH.

   b. Chronic ammonia concentrations in the effluent are greater than 4 mg/L total ammonia.

   c. Conduct graduated pH tests as specified in the toxicity identification evaluation methods. For example, mortality should be higher at pH 8 and lower at pH 6.

   d. Treat the effluent with a zeolite column to remove ammonia. Mortality in the zeolite treated effluent should be lower than the non-zeolite treated effluent. Then add ammonia back to the zeolite-treated samples to confirm toxicity due to ammonia.

2. When it has been demonstrated that toxicity is due to ammonia because of increasing test pH, pH may be controlled using appropriate procedures which do not significantly alter the nature of the effluent, after submitting a written request to the Regional Water Board , and receiving written permission expressing approval from the Executive Officer of the Regional Water Board .

H. Reporting

The Discharger shall submit a full report of the toxicity test results, including any accelerated testing conducted during the month, as required by this permit. Test results shall be reported in Acute Toxicity Units (TUa) or Chronic Toxicity Units (TUc), as required, with the self-monitoring report (SMR) for the month in which the test is conducted.

If an initial investigation indicates the source of toxicity and accelerated testing is unnecessary, pursuant to Section V.D.4, then those results also shall be submitted with the SMR for the period in which the Investigation occurred.

1. The full report shall be received by the Regional Water Board by the 15th day of the second month following sampling.

2. The full report shall consist of (1) the results; (2) the dates of sample collection and initiation of each toxicity test; (3) the toxicity limit.

3. Test results for toxicity tests also shall be reported according to the appropriate manual chapter on Report Preparation and shall be attached to the SMR. Routine reporting shall include, at a minimum, as applicable, for each test, as appropriate:

   a. sample date(s)

   b. test initiation date

   c. test species

   d. end point values for each dilution (e.g. number of young, growth rate, percent survival)

   e. LC_{50} value(s) in percent effluent

   f. TUa value(s) $\left(TU_a = \frac{100}{LC50}\right)$

   g. NOEC value(s) in percent effluent

   h. TUc values $\left(TU_c = \frac{100}{NOEC}\right)$

   i. Mean percent mortality (+standard deviation) after 96 hours in 100% effluent (if applicable)

   j. IC/EC_{25} values(s) in percent effluent

Inhibition Concentration (IC_P) is a point estimate of the toxicant concentration that causes a given percent reduction (p) in a non-quantal biological endpoint (e.g., reproduction, growth) calculated from a continuous model (e.g., EPA Interpolation Model).

Effective Concentration (EC_P) is a point estimate of the toxicant concentration that causes a given percent reduction (p) in a quantal biological measurement (e.g., development, survival) calculated from a continuous model (e.g., Probit).

k. NOEC and LOEC (Lowest Observable Effect Concentration) values for reference toxicant test(s)

l. Available water quality measurements for each test (e.g., pH, D.O., temperature, conductivity, hardness, salinity, ammonia).

4. The Discharger shall provide a compliance summary that includes a summary table of toxicity data from at least eleven of the most recent samples.

5. The Discharger shall notify this Regional Water Board immediately of any toxicity exceedance and in writing 14 days after the receipt of the results of an effluent limit. The notification will describe actions the Discharger has taken or will take to investigate and correct the cause(s) of toxicity. It may also include a status report on any actions required by the permit, with a schedule for actions not yet completed. If no actions have been taken, the reasons shall be given.

VI. RECEIVING WATER MONITORING REQUIREMENTS

(for footnotes, see page E-43)

A. Shoreline/Inshore/Offshore Microbiological Monitoring

The shoreline monitoring addresses the question: Are densities of bacteria in water contact zones below those that ensure public safety? The data collected provide public health officials with information necessary for the management of beach postings and closures. Monitoring at these shoreline stations is conducted for the purposes of public health assessment and to ensure protection for public recreational use of coastal ocean waters throughout Santa Monica Bay, and are not intended for use as compliance sites for JWPCP.

The inshore and offshore monitoring addresses the question: Are Ocean Plan compliance standards for bacteriological contamination being met? The data collected at inshore stations provide the means to determine whether bacteriological standards for water contact and shellfish harvesting are being met in the area of greatest potential water contact and shellfish harvesting most proximal to the point of discharge. The data collected at the offshore sites provide the means to determine whether bacteriological standards for water contact are being met in the area of around the discharge point. Data from both inshore and offshore compliance sampling sites are augmented by the frequent (typical daily) manifold bacterial monitoring collected for plant operational purposes and which provides effluent bacterial densities actually discharged through the outfall system.

1. Shoreline Monitoring

The Discharger shall monitor the following eight shoreline stations (figure 1):

Table 5. Shoreline Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Shoreline Station	R-M-SB	Bluff Cove, 33° 47.52', 118° 23.76'
Shoreline Station	R-M-SM	Malaga Cove, 33° 48.22', 118° 24.44'
Shoreline Station	R-M-S1	Long Point, 33° 44.22', 118° 23.62'
Shoreline Station	R-M-S2	Abalone Cove, 33° 44.44', 118° 22.18'
Shoreline Station	R-M-S3	Portuguese Bend, 33° 44.02', 118° 21.40'
Shoreline Station	R-M-S5	White Point, 33° 43.12', 118° 19.35'
Shoreline Station	R-M-S6	Wilder Addition Park, 33° 42.59', 118° 17.95'
Shoreline Station	R-M-S7	Cabrillo Beach, 33° 42.50', 118° 16.86'

as follows:

Table 6. Shoreline Microbiological Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency *
Total coliform [1]	CFU/100 ml (or MPN/100 ml)	Grab in wave wash zone	weekly
Fecal coliform [1,]	CFU/100 ml (or MPN/100 ml)	Grab in wave wash zone	weekly
Enterococcus [1]	CFU/100 ml (or MPN/100 ml)	Grab in wave wash zone	weekly
Visual observation [2]	--	--	weekly

Visual observations shall be recorded at the same time that bacteriological samples are collected. Monitoring at these eight stations is conducted for the purposes of public health assessment and to ensure protection for public recreational use of coastal ocean waters throughout Santa Monica Bay, and are not intended for use as compliance sites for JWPCP.

In the event of stormy weather that makes sampling hazardous or impractical, these samples can be omitted.

2. **Inshore Monitoring**

The Discharger shall monitor the following <u>six inshore stations</u> located along the 30-foot (9.1-meter) depth contour (figure 2):

Table 7. Inshore Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Inshore Station	R-M-IL2	Long Point, 33° 44.20', 118° 24.15'
Inshore Station	R-M-IL3	Portuguese Point, 33° 44.25', 118° 22.67'
Inshore Station	R-M-IL4	Bunker Point, 33° 43.46', 118° 21.09'
Inshore Station	R-M-IL5	Royal Palms, 33° 42.91', 118° 19.85'

Station Type	Monitoring Location Name	Monitoring Location Description
Inshore Station	R-M-IL6	West of Point Fermin, 33° 42.44', 118° 18.53'
Inshore Station	R-M-IL7	Cabrillo Beach, 33° 42.20', 118° 17.04'

as follows:

Table 8. Inshore Microbiological Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total coliform [1]	CFU/100 ml (or MPN/100 ml)	Grabs at 0.5 meters below the surface (designated as surface sample) and within 2 meters of the seabed (designated as bottom sample)	5 times per month
Fecal coliform [1, 3]	CFU/100 ml (or MPN/100 ml)	Grabs at 0.5 meters below the surface (designated as surface sample) and within 2 meters of the seabed (designated as bottom sample)	5 times per month
Enterococcus [1]	CFU/100 ml (or MPN/100 ml)	Grabs at 0.5 meters below the surface (designated as surface sample) and within 2 meters of the seabed (designated as bottom sample)	5 times per month
Visual observation [2]	--	--	5 times per month

Visual observations shall be recorded at the same time that bacteriological samples are collected.

In the event of stormy weather that makes sampling hazardous or impractical, these samples can be omitted, provided that such omissions do not occur in consecutive weeks or in more than four weeks in a calendar year. Sampling may be conducted along a deeper depth contour during periods of adverse weather.

If a kelp bed is present at any of the six inshore stations, sampling shall be conducted at the outer edge of the kelp bed rather than at the 30-foot depth contour. The actual depth of all sampling stations shall be reported in the monthly monitoring reports.

3. **Offshore Monitoring**

The Discharger shall monitor the following three offshore stations located along the 200-foot (60-meter) depth contour (figure 2):

Table 9. Offshore Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Offshore Station	R-M-6C	6C, 33° 42.47', 118° 21.24'
Offshore Station	R-M-8C	8C, 33° 41.91', 118° 20.14'
Offshore Station	R-M-9C	9C, 33° 41.32', 118° 19.10'

as follows:

Table 10. Offshore Microbiological Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total coliform [1]	CFU/100 ml (or MPN/100 ml)	Grab at 0.5 meters below the surface	monthly
Fecal coliform [1, 3]	CFU/100 ml (or MPN/100 ml)	Grab at 0.5 meters below the surface	monthly
Enterococcus [1]	CFU/100 ml (or MPN/100 ml)	Grab at 0.5 meters below the surface	monthly
Visual observation [2]	--	--	monthly

Visual observations shall be recorded at the same time that bacteriological samples are collected.

B. Nearshore/Offshore Water Quality Monitoring

This monitoring addresses the question: Are Ocean Plan limits for dissolved oxygen and pH being met? Data collected provide the information necessary to demonstrate compliance with the standards. In addition, the data collected by the Discharger are a contribution to the Central Region Cooperative Water Quality Survey. This regionally coordinated survey provides integrated water quality surveys on a quarterly basis. These surveys cover 200 kilometers of coast in Ventura, Los Angeles and Orange Counties from the nearshore zone to approximately 10 kilometers offshore. This cooperative program contributes to a regional understanding of seasonal patterns in nearshore water column structure. The regional view provides context for determining the significance and causes of locally observed patterns in the area of wastewater outfalls. The collection of chlorophyll-a profiles during the quarterly survey is a contribution to the Santa Monica Bay Restoration Commission's Pelagic Ecosystem Monitoring program. The light energy survey addresses the compliance question: Is the transmission of natural light within ranges that ensure the protection of benthic algal communities. The data from this survey will be used to determine if discharged wastewater reduces natural light levels sufficient to suppress macroalgal growth.

1. Nearshore/Offshore Monitoring

a. The Discharger shall monitor the following 48 nearshore/offshore stations on the Palos Verdes and San Pedro Shelf (figure 3):

Table 11. Nearshore/Offshore Water Quality Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	R-WQ-2501	10 meter depth, 33° 43.67', 118° 07.21'
Nearshore/Offshore Station	R-WQ-2502	20 meter depth, 33° 41.94', 118° 07.67'
Nearshore/Offshore Station	R-WQ-2503	26 meter depth, 33° 40.21', 118° 08.12'
Nearshore/Offshore Station	R-WQ-2504	33 meter depth, 33° 38.48', 118° 08.57'
Nearshore/Offshore Station	R-WQ-2505	44 meter depth, 33° 36.75', 118° 09.02'
Nearshore/Offshore Station	R-WQ-2506	60 meter depth, 33° 34.86', 118° 09.54'
Nearshore/Offshore Station	R-WQ-2601	19 meter depth, 33° 43.23', 118° 11.06'
Nearshore/Offshore Station	R-WQ-2602	23 meter depth, 33° 41.64', 118° 11.43'
Nearshore/Offshore Station	R-WQ-2603	23 meter depth, 33° 40.05', 118° 11.80'
Nearshore/Offshore Station	R-WQ-2604	32 meter depth, 33° 38.46', 118° 12.18'

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	R-WQ-2605	47 meter depth, 33° 36.88', 118° 12.55'
Nearshore/Offshore Station	R-WQ-2606	62 meter depth, 33° 35.29', 118° 12.93'
Nearshore/Offshore Station	R-WQ-2701	26 meter depth, 33° 42.46', 118° 14.80'
Nearshore/Offshore Station	R-WQ-2702	26 meter depth, 33° 41.32', 118° 15.07'
Nearshore/Offshore Station	R-WQ-2703	28 meter depth, 33° 40.17', 118° 15.34'
Nearshore/Offshore Station	R-WQ-2704	50 meter depth, 33° 39.03', 118° 15.60'
Nearshore/Offshore Station	R-WQ-2705	100 meter depth, 33° 37.88', 118° 15.87'
Nearshore/Offshore Station	R-WQ-2706	80 meter depth, 33° 36.73', 118° 16.14'
Nearshore/Offshore Station	R-WQ-2801	10 meter depth, 33° 42.17', 118° 17.06'
Nearshore/Offshore Station	R-WQ-2802	30 meter depth, 33° 41.60', 118° 17.34'
Nearshore/Offshore Station	R-WQ-2803	60 meter depth, 33° 40.11', 118° 17.81'
Nearshore/Offshore Station	R-WQ-2804	100 meter depth, 33° 39.46', 118° 18.08'
Nearshore/Offshore Station	R-WQ-2805	100 meter depth, 33° 38.91', 118° 18.24'
Nearshore/Offshore Station	R-WQ-2806	100 meter depth, 33° 38.22', 118° 18.55'
Nearshore/Offshore Station	R-WQ-2901	10 meter depth, 33° 42.86', 118° 19.41'
Nearshore/Offshore Station	R-WQ-2902	30 meter depth, 33° 42.42', 118° 19.79'
Nearshore/Offshore Station	R-WQ-2903	60 meter depth, 33° 41.91', 118° 20.14'
Nearshore/Offshore Station	R-WQ-2904	100 meter depth, 33° 41.27', 118° 20.34'
Nearshore/Offshore Station	R-WQ-2905	100 meter depth, 33° 40.26', 118° 20.77'
Nearshore/Offshore Station	R-WQ-2906	100 meter depth, 33° 39.25', 118° 21.26'
Nearshore/Offshore Station	R-WQ-3001	10 meter depth, 33° 43.93', 118° 21.62'
Nearshore/Offshore Station	R-WQ-3002	30 meter depth, 33° 43.34', 118° 21.79'
Nearshore/Offshore Station	R-WQ-3003	60 meter depth, 33° 42.88', 118° 21.96'
Nearshore/Offshore Station	R-WQ-3004	100 meter depth, 33° 42.06', 118° 22.28'
Nearshore/Offshore Station	R-WQ-3005	100 meter depth, 33° 41.10', 118° 22.86'
Nearshore/Offshore Station	R-WQ-3006	100 meter depth, 33° 40.01', 118° 23.44'
Nearshore/Offshore Station	R-WQ-3051	13 meter depth, 33° 44.18', 118° 23.66'
Nearshore/Offshore Station	R-WQ-3052	30 meter depth, 33° 43.99', 118° 24.03'
Nearshore/Offshore Station	R-WQ-3053	60 meter depth, 33° 43.80', 118° 24.15'
Nearshore/Offshore Station	R-WQ-3054	100 meter depth, 33° 43.14', 118° 24.66'
Nearshore/Offshore Station	R-WQ-3055	100 meter depth, 33° 42.30', 118° 25.32'
Nearshore/Offshore Station	R-WQ-3056	100 meter depth, 33° 41.38', 118° 25.99'
Nearshore/Offshore Station	R-WQ-3101	10 meter depth, 33° 46.26', 118° 25.81'
Nearshore/Offshore Station	R-WQ-3102	30 meter depth, 33° 45.90', 118° 26.12'
Nearshore/Offshore Station	R-WQ-3103	60 meter depth, 33° 45.44', 118° 26.46'
Nearshore/Offshore Station	R-WQ-3104	100 meter depth, 33° 44.72', 118° 26.99'
Nearshore/Offshore Station	R-WQ-3105	100 meter depth, 33° 43.73', 118° 27.67'
Nearshore/Offshore Station	R-WQ-3106	100 meter depth, 33° 42.75', 118° 28.53'

as follows:

Table 12. Nearshore/Offshore Water Quality Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Dissolved oxygen	Mg/L	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Temperature	^{o}C	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Salinity	psu	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Transmissivity	% transmission	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Chlorophyll a	µg/L	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
pH	PH units	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Visual observations [2]	--	--	quarterly

Water quality methods and protocols shall follow those described in the most current edition of the *Field Operations Manual for Marine Water Column, Benthic and Trawl Monitoring in Southern California*. Visual observations shall be recorded at each station.

b. In addition, the Discharger shall also monitor the following 24 nearshore/offshore stations (figure 3):

Table 13. Nearshore/Offshore Monitoring Stations Requiring Additional Monitoring

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	R-WQ-2504	33 meter depth, 33° 38.48', 118° 08.57'
Nearshore/Offshore Station	R-WQ-2505	44 meter depth, 33° 36.75', 118° 09.02'
Nearshore/Offshore Station	R-WQ-2506	60 meter depth, 33° 34.86', 118° 09.54'
Nearshore/Offshore Station	R-WQ-2604	32 meter depth, 33° 38.46', 118° 12.18'
Nearshore/Offshore Station	R-WQ-2605	47 meter depth, 33° 36.88', 118° 12.55'
Nearshore/Offshore Station	R-WQ-2606	62 meter depth, 33° 35.29', 118° 12.93'
Nearshore/Offshore Station	R-WQ-2704	50 meter depth, 33° 39.03', 118° 15.60'
Nearshore/Offshore Station	R-WQ-2705	100 meter depth, 33° 37.88', 118° 15.87'
Nearshore/Offshore Station	R-WQ-2706	80 meter depth, 33° 36.73', 118° 16.14'
Nearshore/Offshore Station	R-WQ-2802	30 meter depth, 33° 41.60', 118° 17.34'
Nearshore/Offshore Station	R-WQ-2803	60 meter depth, 33° 40.11', 118° 17.81'
Nearshore/Offshore Station	R-WQ-2804	100 meter depth, 33° 39.46', 118° 18.08'
Nearshore/Offshore Station	R-WQ-2902	30 meter depth, 33° 42.42', 118° 19.79'
Nearshore/Offshore Station	R-WQ-2903	60 meter depth, 33° 41.91', 118° 20.14'
Nearshore/Offshore Station	R-WQ-2904	100 meter depth, 33° 41.27', 118° 20.34'

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	R-WQ-3002	30 meter depth, 33° 43.34', 118° 21.79'
Nearshore/Offshore Station	R-WQ-3003	60 meter depth, 33° 42.88', 118° 21.96'
Nearshore/Offshore Station	R-WQ-3004	100 meter depth, 33° 42.06', 118° 22.28'
Nearshore/Offshore Station	R-WQ-3052	30 meter depth, 33° 43.99', 118° 24.03'
Nearshore/Offshore Station	R-WQ-3053	60 meter depth, 33° 43.80', 118° 24.15'
Nearshore/Offshore Station	R-WQ-3054	100 meter depth, 33° 43.14', 118° 24.66'
Nearshore/Offshore Station	R-WQ-3102	30 meter depth, 33° 45.90', 118° 26.12'
Nearshore/Offshore Station	R-WQ-3103	60 meter depth, 33° 45.44', 118° 26.46'
Nearshore/Offshore Station	R-WQ-3104	100 meter depth, 33° 44.72', 118° 26.99'

as follows:

Table 14. Additional Monitoring Requirements at 24 Nearshore/Offshore Monitoring Stations

Parameter	Units	Sample Type	Minimum Sampling Frequency
Ammonia	µg/L	Grabs at 0, 15, 30 and 45 meters (or as deep as practical for stations in depths less than 45 m)	quarterly

These discrete water samples shall be collected concurrently with the CTD profiling survey.

c. The Districts shall participate in the Central Region Cooperative Water Quality Survey steering and technical committees. Recommendations for changes in survey design that significantly alter the JWPCP's Water Quality Survey design described above shall be submitted to the Executive Officer for approval prior to implementation.

2. **Nearshore Light Energy Survey**

The Discharger shall monitor the following seven nearshore stations along the 60-foot (18.3-meter) depth contour (figure 4):

Table 15. Nearshore Light Energy Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore Station	R-WQ-L1	Palos Verdes Point, 33° 46.12', 118° 25.82'
Nearshore Station	R-WQ-L2	Long Point, 33° 44.09', 118° 24.22'
Nearshore Station	R-WQ-L3	Portuguese Point, 33° 44.06', 118° 22.72'
Nearshore Station	R-WQ-L4	Bunker Point, 33° 43.40', 118° 21.12'
Nearshore Station	R-WQ-L5	Royal Palms, 33° 42.85', 118° 19.93'
Nearshore Station	R-WQ-L6	West of Point Fermin, 33° 42.36', 118° 18.53'
Nearshore Station	R-WQ-L7	Cabrillo Beach, 33° 41.83', 118° 17.10'

as follows:

Table 16. Nearshore Light Energy Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Photosynthetic light energy	Quanta/sec/cm^2	Underwater sensor	monthly

All samples shall be taken between 10 a.m. and 2 p.m., ideally when the sun is not obscured by clouds (a slight haze is permissible). Measurement of photosynthetic light energy shall be made with a spherical underwater sensor and hemispherical reference cell on deck, both having equal quantum response from 400-700 nanometers.

C. Benthic Sediments Monitoring

1. Local Benthic Trends Survey

This survey addresses the question: Are benthic conditions under the influence of the discharge changing over time? The data collected are used for regular assessment of trends in sediment contamination and biological response along a fixed grid of sites within the influence (or historical influence) of the discharge. The resulting physical and chemical data will be used for assessment of trends in sediment contamination and to draw inferences concerning the relationship between effluent-derived alteration of the benthic habitat and patterns in infaunal community structure.

a. Infaunal Community and Habitat Variables Survey

The Discharger shall monitor the following 44 bottom stations (figure 5):

Table 17. Benthic Infauna and Sediment Chemistry Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-B-0A	305 meter depth, 33° 49.10', 118° 27.25'
Bottom Station	R-B-0B*	152 meter depth, 33° 48.70', 118° 26.50'
Bottom Station	R-B-0C*	61 meter depth, 33° 48.43', 118° 25.83'
Bottom Station	R-B-0D*	30 meter depth, 33° 48.17', 118° 25.36'
Bottom Station	R-B-1A	305 meter depth, 33° 44.72', 118° 26.99'
Bottom Station	R-B-1B*	152 meter depth, 33° 44.97', 118° 26.81'
Bottom Station	R-B-1C*	61 meter depth, 33° 45.44', 118° 26.46'
Bottom Station	R-B-1D*	30 meter depth, 33° 45.90', 118° 26.12'
Bottom Station	R-B-2A	305 meter depth, 33° 43.62', 118° 25.72'
Bottom Station	R-B-2B	152 meter depth, 33° 43.95', 118° 25.55'
Bottom Station	R-B-2C	61 meter depth, 33° 44.26', 118° 25.39'
Bottom Station	R-B-2D	30 meter depth, 33° 44.47', 118° 25.28'
Bottom Station	R-B-3A	305 meter depth, 33° 43.14', 118° 24.66'
Bottom Station	R-B-3B*	152 meter depth, 33° 43.43', 118° 24.44'
Bottom Station	R-B-3C*	61 meter depth, 33° 43.80', 118° 24.15'
Bottom Station	R-B-3D*	30 meter depth, 33° 43.99', 118° 24.03'
Bottom Station	R-B-4A	305 meter depth, 33° 42.70', 118° 23.38'
Bottom Station	R-B-4B	152 meter depth, 33° 43.00', 118° 23.24'

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-B-4C	61 meter depth, 33° 43.40', 118° 23.08'
Bottom Station	R-B-4D	30 meter depth, 33° 43.91', 118° 22.83'
Bottom Station	R-B-5A	305 meter depth, 33° 42.06', 118° 22.28'
Bottom Station	R-B-5B*	152 meter depth, 33° 42.54', 118° 22.08'
Bottom Station	R-B-5C*	61 meter depth, 33° 42.88', 118° 21.96'
Bottom Station	R-B-5D*	30 meter depth, 33° 43.34', 118° 21.79'
Bottom Station	R-B-6A	305 meter depth, 33° 41.99', 118° 21.56'
Bottom Station	R-B-6B*	152 meter depth, 33° 42.18', 118° 21.35'
Bottom Station	R-B-6C*	61 meter depth, 33° 42.47', 118° 21.24'
Bottom Station	R-B-6D*	30 meter depth, 33° 42.98', 118° 20.91'
Bottom Station	R-B-7A	305 meter depth, 33° 41.86', 118° 21.19'
Bottom Station	R-B-7B*	152 meter depth, 33° 42.05', 118° 21.09'
Bottom Station	R-B-7C*	61 meter depth, 33° 42.31', 118° 20.92'
Bottom Station	R-B-7D*	30 meter depth, 33° 42.76', 118° 20.61'
Bottom Station	R-B-8A	305 meter depth, 33° 41.27', 118° 20.34'
Bottom Station	R-B-8B*	152 meter depth, 33° 41.53', 118° 20.24'
Bottom Station	R-B-8C*	61 meter depth, 33° 41.91', 118° 20.14'
Bottom Station	R-B-8D*	30 meter depth, 33° 42.42', 118° 19.79'
Bottom Station	R-B-9A	305 meter depth, 33° 40.58', 118° 19.46'
Bottom Station	R-B-9B*	152 meter depth, 33° 40.89', 118° 19.31'
Bottom Station	R-B-9C*	61 meter depth, 33° 41.32', 118° 19.10'
Bottom Station	R-B-9D*	30 meter depth, 33° 41.97', 118° 18.78'
Bottom Station	R-B-10A	305 meter depth, 33° 39.46', 118° 18.08'
Bottom Station	R-B-10B	152 meter depth 33° 39.73', 118° 17.90'
Bottom Station	R-B-10C	61 meter depth, 33° 40.11', 118° 17.81'
Bottom Station	R-B-10D	30 meter depth, 33° 41.60', 118° 17.34'

as follows:

Table 18. Infauna Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Benthic infauna community [4]	--	0.1 square meter Van Veen grab	Annually
Total organic carbon	mg/L	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Organic nitrogen	mg/L	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Grain size	Phi size	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually

One sample shall be taken at each station for benthic infaunal community analysis. The entire contents of each sample shall be passed through a 1.0 millimeter screen to retrieve the benthic organisms. Sampling methods and protocols shall follow those described in the most current edition of the *Field Operations Manual for Marine Water Column, Benthic and Trawl Monitoring in Southern California*. All organisms contained within the sample shall be identified

to the lowest possible taxon and counted. The resulting data shall be used to describe community structure at each station.

b. Sediment Chemistry Survey

The Discharger shall monitor 24 bottom stations (as indicated with "*" in the bottom station table for the Infaunal Community Survey above) in years one through four of the permit and all 44 bottom stations in year five of the permit as follows:

Table 19. Sediment Chemistry Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Dissolved sulfides	mg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters, porewater)	Annually
Total organic carbon	mg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Organic nitrogen	mg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Grain size	Phi size	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Arsenic	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Cadmium	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Chromium	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Copper	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Lead	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Mercury	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Nickel	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Silver	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Zinc	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Total DDT [5]	pg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
DDT derivatives [6]	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Total PCB [7]	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
PCB derivatives [8]	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Compounds on local 303(d) list	µg/ Kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually

A separate grab sample shall be collected at each station whenever a biological sample is collected. Sub-samples (upper two centimeters) shall be taken from the grab and for the sediment chemistry analyses.

2. **Regional Benthic Survey**

This regional survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in soft-bottom benthic habitats within the Southern California Bight?, and 2) What is the relationship between biological response and contaminant exposure? The data collected will be used to assess the condition of the sea-floor environment and the health of the biological resources in the Bight.

A regional survey of benthic conditions within the Southern California Bight tentatively is scheduled for 2008 (Bight'08) and subsequently every five years. The final survey design will be determined cooperatively by the participants as represented on the Regional Steering Committee. The Districts will provide support to the Bight'08 benthic survey and subsequent surveys by participating in or performing the following activities:

Participation on the Steering Committee
Participation on the relevant Technical Committees (e.g., Information Management, Field Methods and Logistics, Benthos and Chemistry)
Field sampling at sea
Infaunal sample analysis
Sediment chemistry analysis
Data management

The level of participation shall be consistent with that provided by the Districts to the 2003 Regional Benthic Survey (Bight'03) and shall include the field collection, laboratory infaunal analysis and chemical analysis of a minimum of 30 benthic sediment samples.

D. Fish and Invertebrate Monitoring

1. **Local Demersal Fish and Invertebrate Survey**

This survey addresses the question: Is the health of demersal fish and epibenthic invertebrate communities in the vicinity of the discharge changing over time? The data collected are used for regular assessment of temporal trends in community structure along a fixed grid of sites within the vicinity of the discharge. Data collected on trash and debris contribute to the Santa Monica Bay Restoration Project's Sources and Loadings program.

The Discharger shall monitor the following 16 trawling stations along four transverses perpendicular to the shoreline (figure 6):

Table 20. Trawl Sampling Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-T-T0/23	23 meter depth, 33° 48.19', 118° 25.04' (trawl mid-point)
Bottom Station	R-T-T0/61	61 meter depth, 33° 48.57', 118° 25.84' (trawl mid-point)
Bottom Station	R-T-T0/137	137 meter depth, 33° 48.83', 118° 26.36' (trawl mid-point)
Bottom Station	R-T-T0/305	305 meter depth, 33° 49.23', 118° 27.09' (trawl mid-point)
Bottom Station	R-T-T1/23	26 meter depth, 33° 44.65', 118° 25.09' (trawl mid-point)

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-T-T1/61	61 meter depth, 33° 44.16', 118° 25.23' (trawl mid-point)
Bottom Station	R-T-T1/137	137 meter depth, 33° 44.84', 118° 25.34' (trawl mid-point)
Bottom Station	R-T-T1/305	305 meter depth, 33° 43.55', 118° 25.64' (trawl mid-point)
Bottom Station	R-T-T4/23	27 meter depth, 33° 42.79', 118° 20.48' (trawl mid-point)
Bottom Station	R-T-T4/61	61 meter depth, 33° 42.33', 118° 20.92' (trawl mid-point)
Bottom Station	R-T-T4/137	137 meter depth, 33° 44.06', 118° 21.05' (trawl mid-point)
Bottom Station	R-T-T4/305	305 meter depth, 33° 42.00', 118° 21.49' (trawl mid-point)
Bottom Station	R-T-T5/23	23 meter depth, 33° 42.29', 118° 18.98' (trawl mid-point)
Bottom Station	R-T-T5/61	61 meter depth, 33° 41.45', 118° 19.31' (trawl mid-point)
Bottom Station	R-T-T5/137	137 meter depth, 33° 41.11', 118° 19.61' (trawl mid-point)
Bottom Station	R-T-T5/305	305 meter depth, 33° 40.85', 118° 19.85' (trawl mid-point)

as follows:

Table 21. Demersal Fish and Invertebrates Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Demersal fish and invertebrates	--	10-minute otter trawl	semiannually (summer and winter)

Single otter trawls shall be taken at each station, with each trawl running along a line approximately parallel to the isobath. All organisms captures shall be identified to the lowest possible taxon and counted. Fish shall be size classed. Wet-weight biomass shall be estimated for all species. Each individual captured shall be examined for the presence of externally evident signs of disease or anomaly. Estimates of type, quantity and weight or trash and debris in each trawl shall be made. Sampling methods and protocols shall follow those described in the most current edition of the *Field Operations Manual for Marine Water Column, Benthic and Trawl Monitoring in Southern California*. The resulting data shall be used to describe community structure [9] at each station.

2. **Regional Demersal Fish and Invertebrate Survey**

This survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in demersal fish and epibenthic communities within the Southern California Bight?, and 2) What is the relationship between biological response and contaminant exposure? The data collected will be used to assess the condition of the seafloor environment and health of biological resources in the Bight.

A regional survey of trawl-caught demersal fish and epibenthic invertebrates within the Southern California Bight tentatively is scheduled for 2008 (Bight'08) and subsequently every five years. The final survey design will be determined cooperatively by the participants as represented on the Regional Steering Committee. The Districts will provide support to the Bight'08 and subsequent surveys by participating in or performing the following activities:

Participation on the Steering Committee
Participation on the relevant Technical Committees (e.g., Information Management, Field Methods and Logistics, Fish and Invertebrates)
Field sampling at sea

Trawl sample analysis
Data management

The level of participation shall be consistent with that provided by the Districts to the 2003 Regional Survey (Bight'03) and shall include the field collection and processing of trawls at a minimum of 20 sites.

3. **Bioaccumulation Monitoring**

a. Local Bioaccumulation Trends Survey

This survey addresses the question: Is fish tissue contamination in the vicinity of the outfall changing over time? The data collected are used for regular assessment of temporal trends in two sentinel fish species.

The Discharger shall monitor the following 3 zones (figure 7):

Table 22. Bioaccumulation Sampling Zones

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-BA-Z1	**Outfall zone**: inshore of the 150 meter depth contour and between a line bearing 150° magnetic of White Point and a line bearing 180° magnetic off Bunker Point.
Bottom Station	R-BA-Z2	**Intermediate zone**: inshore of the 150 meter depth contour and between a line bearing 160° magnetic off Long Point and a line bearing 245° magnetic off Point Vicente.
Bottom Station	R-BA-Z3	**Distant zone**: inshore of the 150 meter depth contour and between a line bearing 225° magnetic off the southern face of Palos Verdes Point and a line bearing 235° magnetic off the south end of the Redondo Beach Pier.

as follows:

Table 23. Bioaccumulation Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total DDT [5]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
DDT derivatives [6]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
Total PCB [7]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually

Parameter	Units	Sample Type	Minimum Sampling Frequency
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
PCB derivatives [8]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
% moisture	%	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
% lipid	%	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually

Hornyhead turbot within the size range of 150 to 200 millimeters (standard length) are to be targeted. White croaker within the size range of 170 to 220 mm (SL) are to be targeted. Additional parameters for analysis may be added to the list by the Executive Officer.

b. Local Seafood Safety Survey

This survey addresses two questions: 1) Where seafood consumption advisories exist locally, do tissue concentrations of contaminants continue to exceed the Advisory Tissue Concentration (ATC)?, and 2) What are the tissue contaminant trends relative to the ATC in other species not currently subject to local consumption advisories? The data collected will be used to provide information necessary for the management of local seafood consumption advisories.

A regionally coordinated survey shall be conducted covering Santa Monica Bay, the Palos Verdes shelf and slope, and Los Angeles Harbor employing the sampling design proposed by the Santa Monica Bay Restoration Project (SMBRP). The Districts shall provide field sampling and analysis of tissue for the three sampling zones on the Palos Verdes Shelf as follows:

Table 24. Seafood Safety Survey Zones

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-BA-Z1	**Outfall zone**: inshore of the 150 meter depth contour and between a line bearing 150° magnetic of White Point and a line bearing 180° magnetic off Bunker Point.

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	R-BA-Z2	**Intermediate zone**: inshore of the 150 meter depth contour and between a line bearing 160° magnetic off Long Point and a line bearing 245° magnetic off Point Vicente.
Bottom Station	R-BA-Z3	**Distant zone**: inshore of the 150 meter depth contour and between a line bearing 225° magnetic off the southern face of Palos Verdes Point and a line bearing 235° magnetic off the south end of the Redondo Beach Pier.

One species from each of five groups of fish (rockfish, kelpbass, sandbass, surfperches and croakers) shall be sampled from each of the three zones in years one, three and five of the permit. For rockfishes, scorpionfish (*Scorpaena guttata*) is the preferred species, followed by bocaccio (*Sebastes paucispinis*) and then by any other abundant and preferably benthic rockfish species. For surfperches, black surfperch (*Embiotoca jacksoni*) is the preferred species, followed by white surfperch (*Phanerodon furcatus*) and then by walleye surfperch (*Hyperprosopon argenteum*).

For fish tissue analysis, one composite sample of ten individuals of each target shall be collected within each of the three zones. Sampling should take place within the same season of the year (preferably late summer/early fall) and should focus upon a consistent size class of fish. All tissue samples shall be analyzed for:

Table 25. Seafood Safety Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
% moisture	%	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
% lipid	%	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
Arsenic	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
Mercury	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
Total DDT [5]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
DDT derivatives [6]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
Total PCB [7]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5
PCB derivatives [8]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually during years 1, 3 and 5

c. Regional Seafood Safety Survey

This regional survey addresses the question: "Are seafood tissue levels within the Southern California Bight below levels that ensure public safety?" The data collected will be used to assess levels of contaminants in the edible tissue of commercial or recreationally important fish within the Bight relative to Advisory Tissue Concentrations.

A regional survey of edible tissue contaminant levels in fish within the Southern California Bight shall be conducted at least once every ten years, encompassing a broader set of sampling sites and target species than those addressed in the local seafood survey. The objective is to determine whether any unexpected increases or decreases in contaminant levels have occurred in non-target species and/or at unsampled sites. The final survey design may be determined cooperatively by participants represented on a Regional Steering Committee or by the State of California's Office of Environmental Health and Hazard Assessment. Should such a survey occur during the permit period, the Discharger shall provide support to a Regional Seafood Safety Survey by participating in or performing the following activities:

Participation on a Steering Committee
Participation on relevant Technical Committees (e.g., Information Management, Field Methods & Logistics, and Chemistry)
Field sampling at sea
Tissue chemical analysis
Data management

The Districts' participation shall be consistent with that provided by the Discharger to similar regional bioaccumulation surveys.

d. Regional Predator Risk Survey

This regional survey addresses the question: "Are fish body burdens within the Southern California Bight a health risk to higher trophic levels in the marine food web?" The data collected will be used to estimate health risk to marine birds, mammals and wildlife from the consumption of fish tissue.

A regional survey of whole fish body burdens of contaminants within the Southern California Bight took place in 2003 (Bight'03). The final survey design was determined cooperatively by participants represented on the Regional Steering Committee. The Districts provided support to the Bight'03 Predator Risk Survey by participating in or performing the following activities:

Participation on the Steering Committee
Participation on relevant Technical Committees (e.g., Information Management, Field Methods & Logistics, and Chemistry)
Field sampling at sea
Tissue chemical analysis

This level of participation was consistent with that provided by the Districts to the 1998 Regional Predator Risk Survey. The next regional survey is expected to occur in 2008 and the Districts' level of participation shall be consistent with that provided in previous surveys.

E. Kelp Bed Monitoring

This regional survey is to address the question: "Is the extent of kelp beds in the Southern California Bight changing over time and are some beds changing at rates different than others?" The data collected in this regional survey will be used to assess status and trends in kelp bed health and spatial extent. The regional nature of the survey will allow the status of beds local to the discharge to be compared to regional trends.

The Districts shall participate in the Central Region Kelp Survey Consortium (CRKSC) to conduct regional kelp bed monitoring in Southern California coastal waters. The CRKSC design is based upon

quarterly measures of kelp canopy extent using aerial imaging. The Discharger shall provide up to $10,000 per year in financial support to the CRKSC (annual level of support will depend on the number of participants in the program). The Discharger shall participate in the regional management and technical committees responsible for the development of the survey design and implementation of the assessment of kelp bed resources in the Bight. This support is intended to ensure that Palos Verdes kelp beds (CF&G beds 13 and 14) are included in the quarterly surveys of kelp beds in the Bight, and that these beds are included in any data products resulting from those surveys.

In the event that Palos Verdes kelp beds are found to deviate from the broader regional pattern, the Districts will carry out special studies to address unexplained deterioration of local beds.

Participation in this survey provides data to the SMBRP's Kelp Beds program.

Footnotes for Receiving Water Monitoring Program

[1] In addition to reporting the actual concentration of bacterial organisms in each sample collected for the purpose of demonstrating compliance (where applicable), the geometric mean values shall also be determined and reported. The geometric mean values should be calculated using at least five most recent sample results. If sampling occurs more frequently than weekly, all samples during the previous 30-day period shall be used to calculate the geometric mean.

[2] Receiving water observations of water color, turbidity, odor and unusual or abnormal amounts of floating or suspended matter in the water or on the beach, rocks and jetties or beach structures, shall be made and recorded at each receiving water station. The character and extent of such matter shall be described. The dates, times and depths of sampling and observations also shall be reported.

[3] Fecal coliform sampling may be omitted at the inshore stations if the total coliform sampling program demonstrates compliance with the fecal coliform limits.

[4] Community analysis of benthic infauna shall include number of species, number of individuals per species, total numerical abundance per station, benthic response index (BRI) and biological indices, plus utilize appropriate regression analyses, parametric and nonparametric statistics, and multivariate techniques or other appropriate analytical techniques.

[5] *Total DDT* shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

[6] At a minimum, 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

[7] *Total PCB (polychlorinated biphenyls)* shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

[8] At a minimum, PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206 shall be individually quantified.

[9] Analysis of demersal fish and macroinvertebrate communities shall include wet weight of fish and macroinvertebrate species (when combined weight of individuals of a species is greater than or equal to 0.1 kilogram), number of species, number of individuals per species, total numerical abundance per station, number of individuals in each 1-centimeter size class for each species of fish, species richness, species diversity, species evenness, cluster analyses, or other appropriate multivariate statistical techniques approved by the

Executive Officer.

[10] Individuals collected for local bioaccumulation trends survey or local seafood safety survey shall be collected during a single season each year to minimize the variability in reproductive state. It may be impossible to collect the required number of fish every year at each zone. If fish of the target size are absent in a given zone, additional trawls need not be attempted. If target fish are present in a given zone, one additional trawl shall be conducted to attempt to collect the necessary number of individuals. For collection efforts using gear other than trawls, the discharger may fail to achieve the sampling goals because of local absence of a target species. In that case, upon request of the discharger, the Executive Officer may approve temporary relief from requirement to collect that species for the survey year. The request for relief must be submitted to the Executive Officer and be accompanied by documented evidence of the sampling effort expended.

VII. OTHER MONITORING REQUIREMENTS

A. Outfall and Diffuser Inspection

This survey answers the question: Are the outfall structures in serviceable condition ensuring their continued safe operation? The data collected will be used for a periodic assessment of the integrity of the outfall pipes and ballasting system.

Each ocean outfall shall be inspected externally a minimum of once a year. Inspections shall include general observations and photographic/videographic records of the outfall pipes and adjacent ballast material. The inspections may be conducted by remotely operated vehicle, diver, or manned submarine. A summary report of the inspection findings shall be provided. This written report, augmented with videographic and/or photographic images, will provide a description of the observed condition of the outfall structures from shallow water to their respective termini.

B. Sludge Monitoring and Reporting

The Discharger must comply with all requirements of 40 CFR 257, 258, 501, and 503, including all applicable monitoring, record keeping, and reporting requirements.

The Discharger must comply with the monitoring and reporting requirements outlined in Attachment I in this Order, [*Biosolids/Sludge Management]*.

VIII. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.

2. The Discharger shall report with each sample result the applicable Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR 136.

3. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with Waste Discharge Requirements.

4. The Discharger shall attach a cover letter to the Monitoring Report. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

5. Weekly effluent analyses shall be performed on different weekdays during each month. Quarterly influent and effluent analyses shall be performed during the months of February, May, August, and November. Semiannual influent and effluent analyses shall be performed during the months of May and November. Annual influent and effluent analyses shall be performed during the month of August. Should there be instances when monitoring could not be done during these specified months, the Discharger must notify the Regional Water Board , state the reason why the monitoring could not be conducted, and obtain approval from the Executive Officer for an alternate schedule. Results of quarterly, semiannual, and annual analyses shall be reported in the monthly monitoring report following the analysis.

6. Pollutants shall be analyzed using the analytical methods described in 40 CFR 136; or where no methods are specified for a given pollutant, by methods approved by the Regional Water Board, State Board and/or USEPA. The laboratory conducting analyses shall be certified by the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) or approved by the Regional Water Board for that particular parameter. A copy of the laboratory certification shall be submitted with the annual summary report.

7. Water/wastewater samples must be analyzed within allowable holding time limits as specified in 40 CFR 136.3. All QA/QC analyses must be run on the same dates that samples are actually analyzed. The Discharger shall retain the QA/QC documentation in its files and make available for inspection and/or submit them when requested by the Regional Water Board and/or USEPA. Proper chain of custody procedures must be followed and a copy of this documentation shall be submitted with the monthly report.

8. If the Discharger samples and performs analyses (other than for process/operational control, startup, research, or equipment testing) on any influent, effluent, or receiving water constituent more frequently than required by this monitoring program using approved analytical methods, the results of those analyses shall be reported. These results shall be reflected in the calculation of the average used in demonstrating compliance with average effluent, receiving water, etc., limitations.

9. For bacterial analyses, sample dilutions should be performed so the expected range of values is bracketed (for example, with multiple tube fermentation method or membrane filtration method, 2 to 16,000 per 100 ml for total and fecal coliform, at a minimum, and 1 to 1000 per 100 ml for enterococcus). The detection methods used for each analysis shall be reported with the results of the analyses.

    a. Detection methods used for coliforms (total and fecal) shall be those presented in Table 1A of 40 CFR 136 (revised May 14, 1999), unless alternate methods have been approved by USEPA pursuant to 40 CFR 136, or improved methods have been determined by the Executive Officer and/or USEPA.

    b. Detection methods used for enterococcus shall be those presented in the USEPA publication EPA 600/4-85/076, *Test Methods for Escherichia coli and Enterococci in Water By Membrane Filter Procedure* or any improved method determined by the Executive Officer and/or USEPA to be appropriate.

B. Self Monitoring Reports (SMRs)

1. At any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, the Discharger shall submit hard copy SMRs in accordance with the requirements described in subsection B.5 below. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.

2. The Discharger shall report in the SMR the results for all monitoring specified in this MRP under sections III through VII. Addtionally, the Discharger shall report in the SMR the results of any special studies, acute and chronic toxicity testing, TRE/TIE, PMP, and Pollution Prevention Plan required by Special Provisions – VI.C of this Order. The Discharger shall submit monthly, quarterly, semiannual, annual SMRs including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.

3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table 26. Reporting Schedule

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	Submit with monthly SMR
Daily	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	Submit with monthly SMR
Weekly	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	Submit with monthly SMR
Monthly	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1st day of calendar month through last day of calendar month	By the 15th day of the second month after the month of sampling
Quarterly	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31	May 15 August 15 November 15 February 15
Semiannually	Closest of January 1 or July 1 following (or on) permit effective date	January 1 through June 30 July 1 through December 31	August 15 February 15
Annually	January 1 following (or on) permit effective date	January 1 through December 31	April 1

4. Reporting Protocols. The Discharger shall report with each sample result the applicable Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR 136.

   For each numeric effluent limitation identified in Table B of the 2001 Ocean Plan, the Discharger shall select one or more Minimum Levels (ML) and their associated analytical methods from

Appendix II of the 2001 Ocean Plan (Appendix II). Any deviation from MLs in Appendix II must be approved by the Regional Water Board and/or the State Water Board. The "reported" ML is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from Appendix II.

The Discharger must select all MLs from Appendix II that are below the effluent limitation. If the effluent limitation is lower than all the MLs in Appendix II, the Discharger must select the lowest ML from Appendix II.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

b. Sample results less than the reported ML, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The *estimated chemical concentration of the sample shall also be reported.

   For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (± a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

5. The Discharger shall submit hard copy SMRs when required by subsection B.1 above in accordance with the following requirements:

   a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations.

   b. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

   c. SMRs must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below: (Reference the reports to Compliance File No. CI-1758 to facilitate routing to the appropriate staff and file.)

      California Regional Water Quality Control Board
      Los Angeles Region

320 West 4th Street, Suite 200
Los Angeles, CA 90013
Attention: Information Technology Unit

C. Discharge Monitoring Reports (DMRs)

1. As described in SectionVIII.B.1 above, at any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit SMRs that will satisfy federal requirements for submittal of Discharge Monitoring Report (DMRs). Until such notification is given, the Discharger shall submit DMRs in accordance with the requirements described below.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharge shall submit the original DMR and one copy of the DMR to the address listed below:

   State Water Resources Control Board
   Discharge Monitoring Report Processing Center
   Post Office Box 671
   Sacramento, CA 95812

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated or modified cannot be accepted.

D. Other Reports

1. Annual Summary Report

By April 1 of each year, the Discharger shall submit an annual report containing a discussion of the previous year's influent/effluent analytical results and receiving water bacterial monitoring data. The annual report shall contain graphical and tabular summaries of the monitoring analytical data. The annual report shall also contain an overview of any plans for upgrades to the treatment plant's collection system, the treatment processes, or the outfall system. The Discharger shall submit a hard copy annual report to the Regional Water Board in accordance with the requirements described in subsection B.5 above.

2. Receiving Water Monitoring Report

An annual summary of the receiving water monitoring data collected during each sampling year (January-December) shall be prepared and submitted so that it is received by the Regional Water Board by August 1 of the following year. The first annual receiving water monitoring summary report is due by August 1, 2007.

By August 1 of every other year, a biennial receiving water monitoring report instead of the annual summary report shall be prepared and submitted to the Regional Water Board .
This report shall include an in-depth discussion of the results from the Receiving Water Monitoring programs conducted during the previous two calendar years. The report may be limited to discussion of those components of the Receiving Water Monitoring Program that are local in nature. Results of regional surveys need not be included. Temporal and spatial trends in the data shall be analyzed, with particular reference to comparisons between stations with respect to distance from the outfall and comparisons to data collected during previous years. Appropriate statistical tests and indices, subject to approval of the Executive Officer, shall be calculated and included in the biennial report. The first biennial report shall be due on August 1, 2008 covering the period from the permit effective date in 2006 through December 31, 2007.

Submission of reports of the results of regional monitoring programs in which the Regional Water Board and discharger are co-participants will not be the responsibility of the Discharger.

3. **Outfall Inspection Report**

A summary of the Outfall Inspection findings shall be submitted by August 1 of the year following an outfall inspection survey. This written report, augmented with videographic and/or photographic images, will provide a description of the observed external condition of the discharge pipes from shallow water to their respective termini.

Figure 1. Shoreline Monitoring Stations

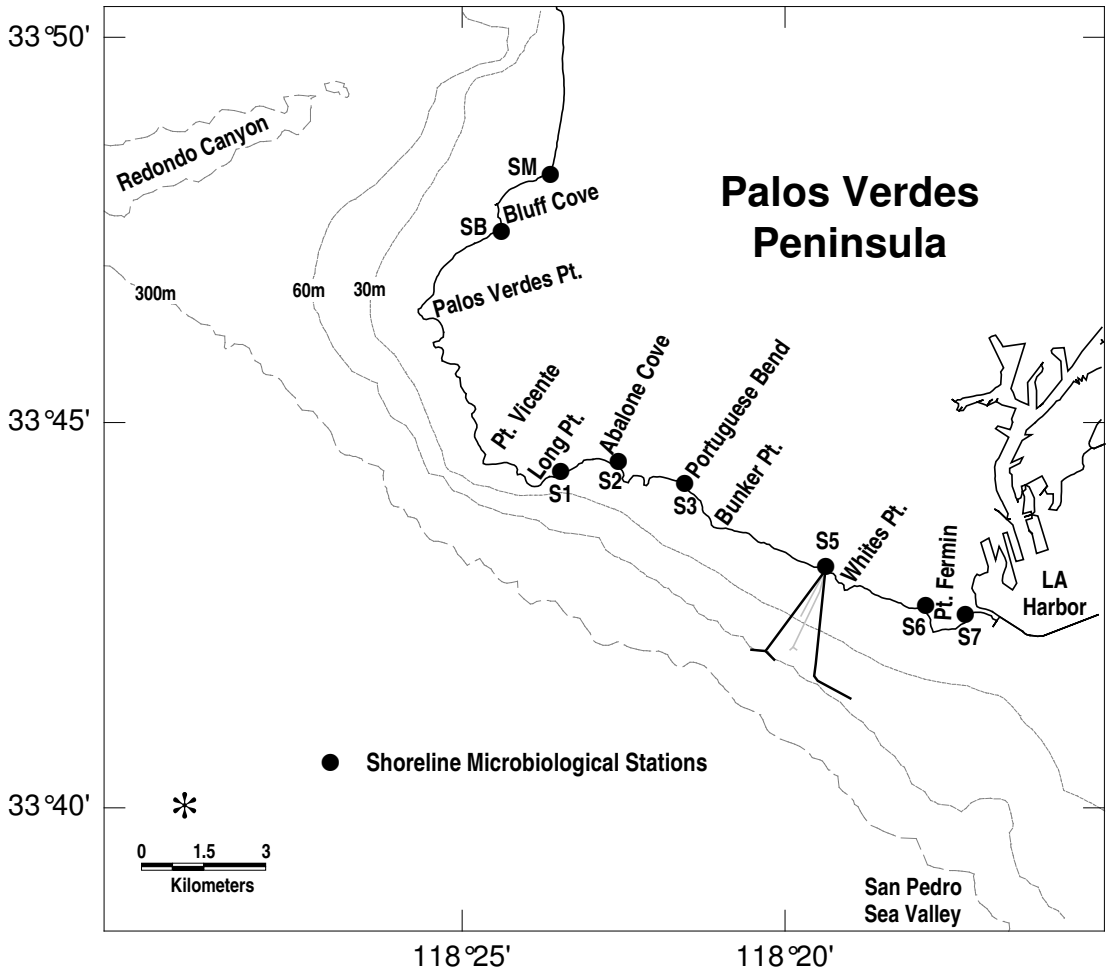


Figure 2. Inshore Monitoring Stations

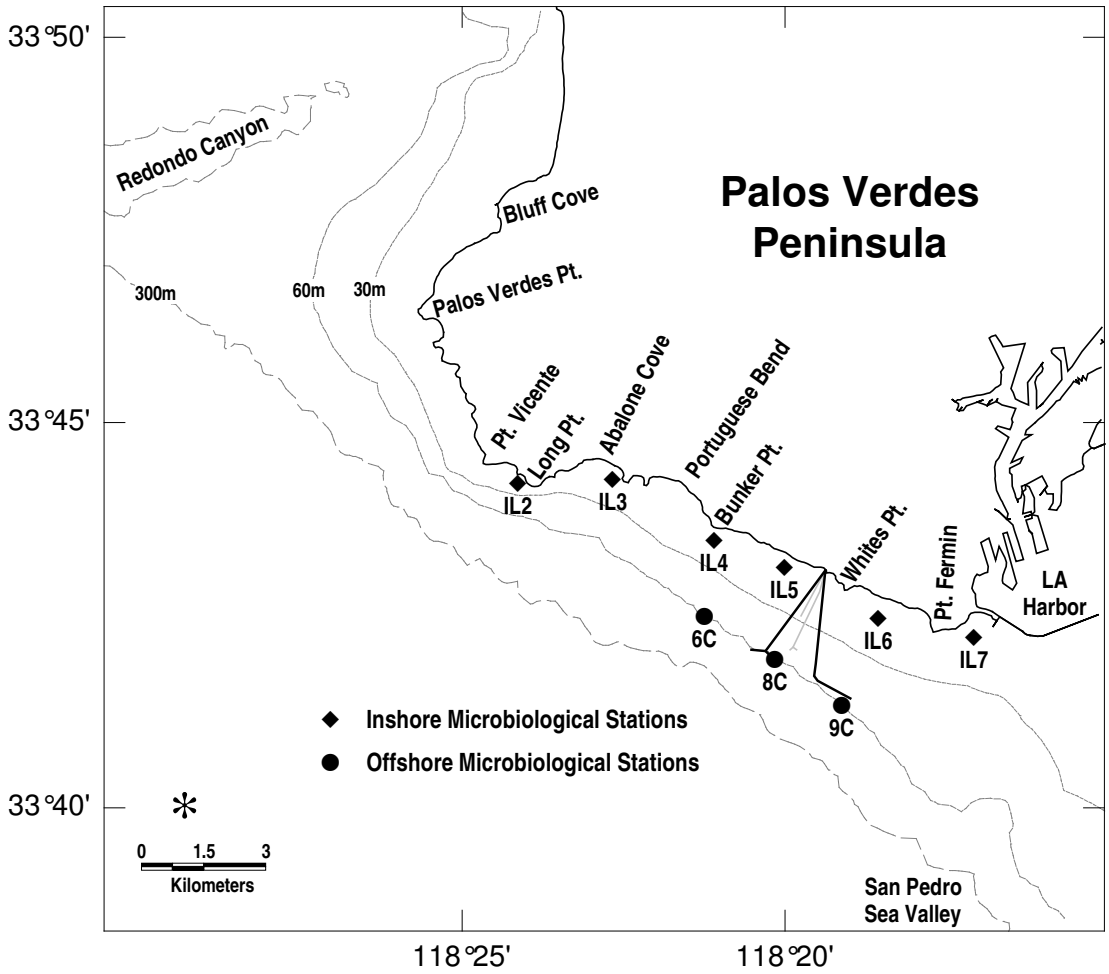


Figure 3. Nearshore/Offshore Water Quality Monitoring Stations

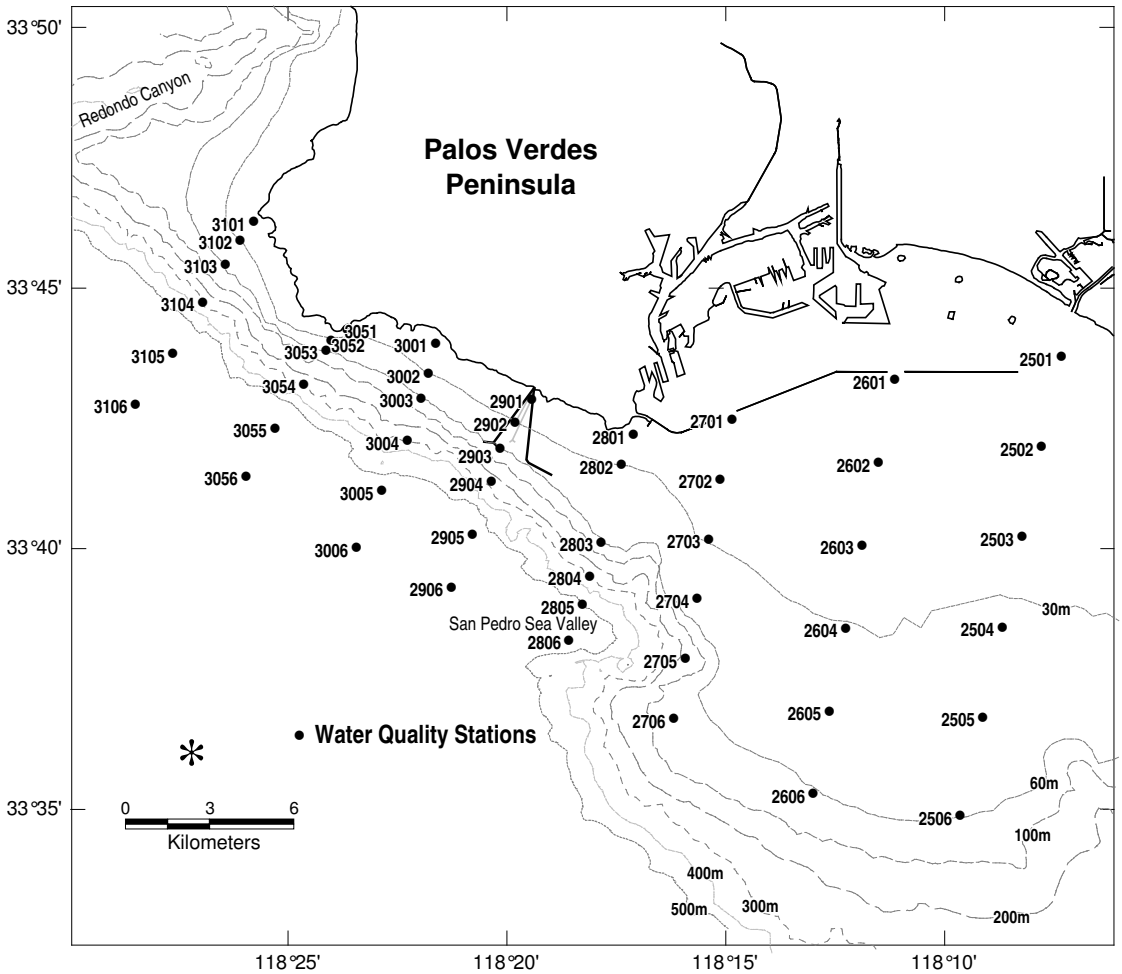


Figure 4. Nearshore Light Energy Profiling Stations

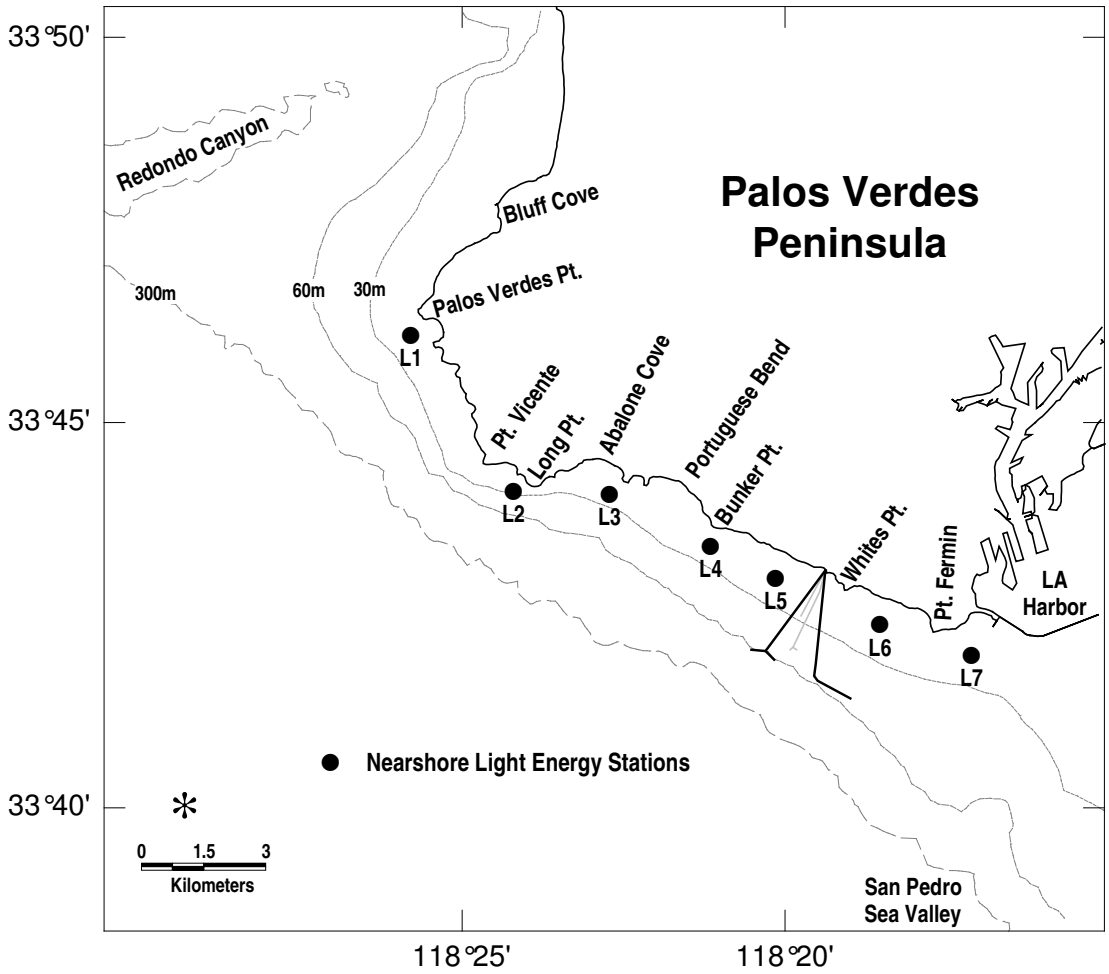


Figure 5. Benthic Infaunal and Sediment Chemistry Sampling Stations

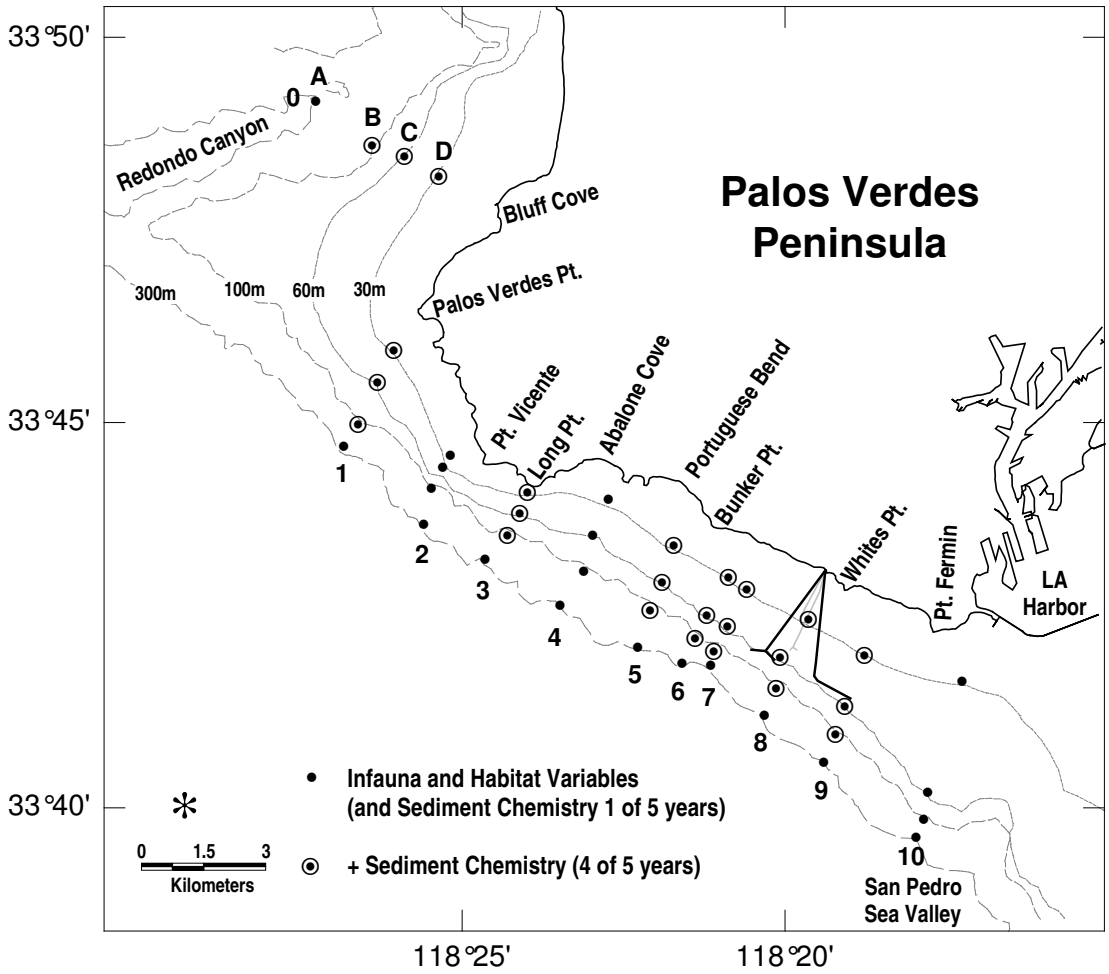


Figure 6. Local Demersal Fish and Invertebrate Stations

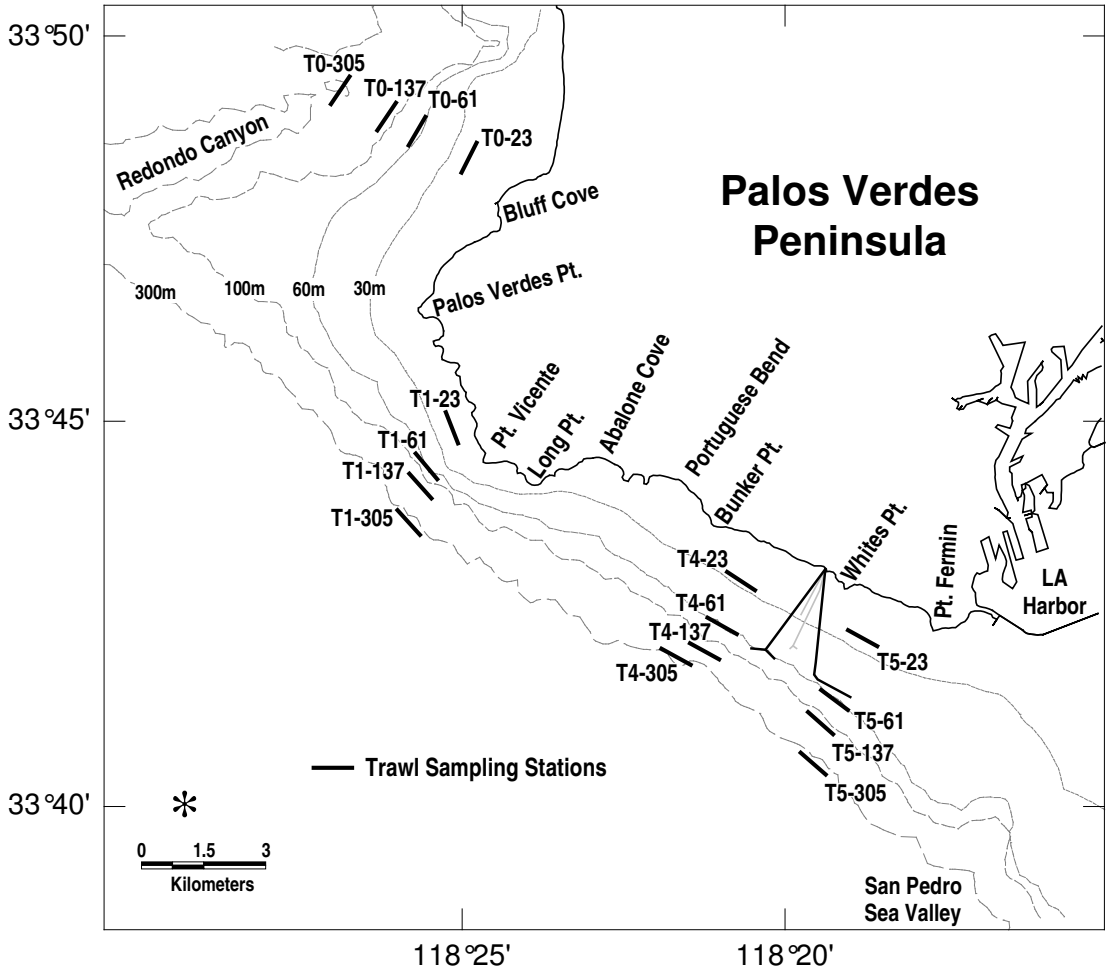
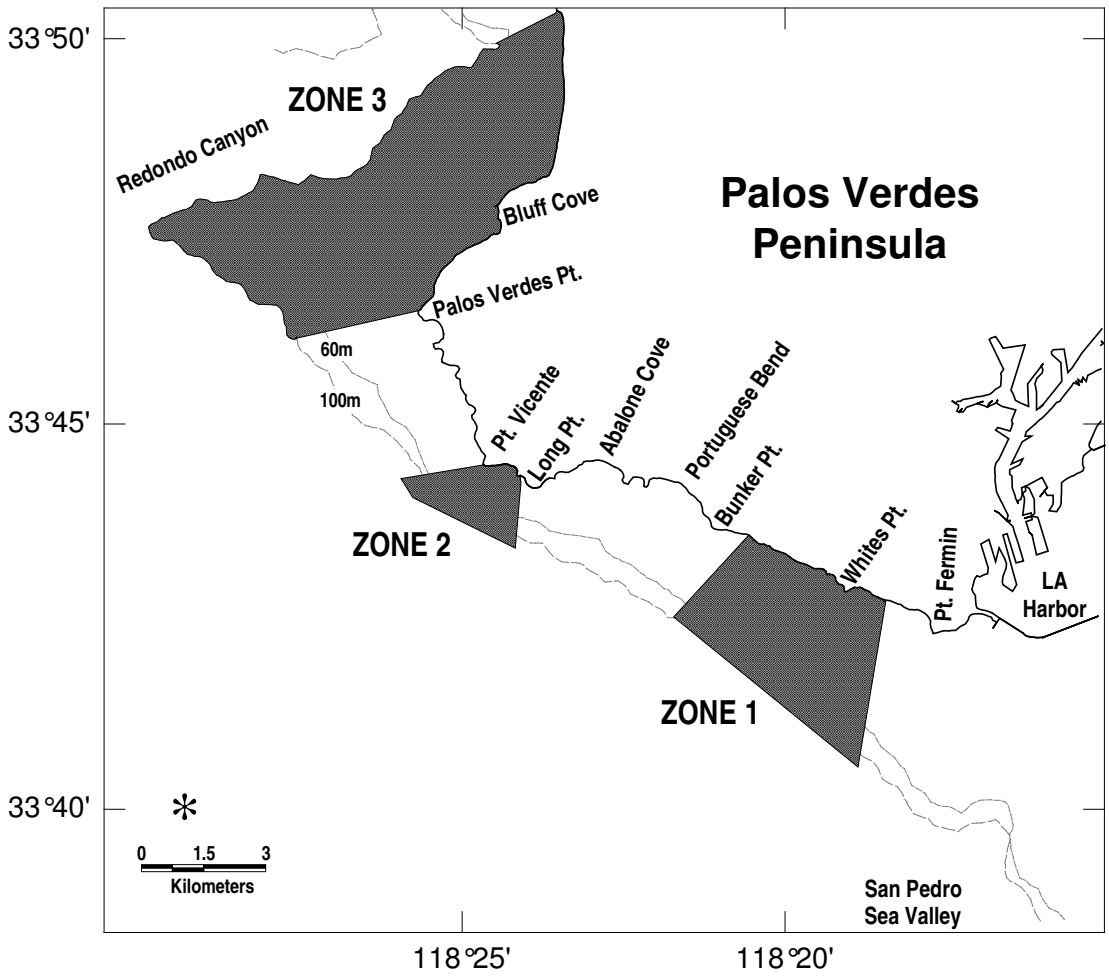


Figure 7. Local Bioaccumulation Sampling Zones



ATTACHMENT F – FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in Section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table 1. Facility Information

WDID	**4B190107013**
Discharger	**County Sanitation Districts of Los Angeles County**
Name of Facility	**Joint Water Pollution Control Plant, Carson**
Facility Address	**24501 South Figueroa Street**
	Carson, CA 90745
	Los Angeles County
Facility Contact, Title and Phone	**Ann Heil, Supervising Engineer, (562) 699-7411 x 2803**
Authorized Person to Sign and Submit Reports	**Ann Heil, Supervising Engineer, (562) 699-7411 x 2803**
Mailing Address	**1955 Workman Mill Road, Whittier, CA 90601**
Billing Address	**1955 Workman Mill Road, Whittier, CA 90601**
Type of Facility	**POTW**
Major or Minor Facility	**Major**
Threat to Water Quality	**1**
Complexity	**A**
Pretreatment Program	**Yes**
Reclamation Requirements	**None**
Facility Permitted Flow	**400 million gallons per day**
Facility Design Flow	**400 million gallons per day**
Watershed	**Santa Monica Bay**
Receiving Water	**Pacific Ocean**
Receiving Water Type	**Ocean**

A. The County Sanitation Districts of Los Angeles County (hereinafter Discharger or Districts) is the owner and operator of the Joint Water Pollution Control Plant (hereinafter Facility or JWPCP), a Municipal POTW.

B. The Facility discharges wastewater to the Pacific Ocean, a water of the United States, at Whites Point, off the Palos Verdes Peninsula and is currently regulated by Order No. 97-090 which was adopted on June 16, 1997. The terms and conditions of the existing Order have been automatically continued and remain in effect until new Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit are adopted pursuant to this Order.

C. The Discharger filed a report of waste discharge and submitted an application for renewal of its WDRs and NPDES permit on November 9, 2001. The application was deemed complete on May 6, 2002. A

site visit was conducted on January 26, 2006, to observe operations and collect additional data to develop permit limitations and conditions.

II. FACILITY DESCRIPTION

A. Description of Wastewater and Biosolids Treatment or Controls

The County Sanitation Districts of Los Angeles County owns and operates the Joint Water Pollution Control Plant, located at 24501 South Figueroa Street in Carson, California. This Order establishes discharge prohibitions, limitations, and conditions to regulate the discharge from JWPCP to the Pacific Ocean; the discharge was currently regulated by Order No. 97-090 (NPDES Permit No. CA0053813) that expired on May 10, 2002 and administratively extended until the adoption of this Order.

On June 8, 1994, a Consent Decree [No. 92 0061 RG (JRx)] was entered in federal court records between the Districts and the USEPA Region 9 and the Regional Water Board. The Consent Decree primarily requires the Districts to construct additional secondary treatment facilities and achieve compliance with full secondary treatment at JWPCP by December 31, 2002. The completion of full secondary treatment facilities was achieved prior to the deadline of December 31, 2002. Since January of 2003 JWPCP has operated as a full secondary plant and has continuously maintained compliance with secondary treatment requirements.

JWPCP is part of a Joint Outfall System with six upstream water reclamation plants - La Cañada, Whittier Narrows, San Jose Creek, Pomona, Los Coyotes and Long Beach. It treats municipal and industrial wastewater. The flow from the six upstream plants can be bypassed, to a limited extent, to JWPCP. The sludge generated from the upstream plants are returned to the joint outfall trunk sewers and conveyed to JWPCP for further treatment. There are approximately five million people in the Joint Outfall System service area.

The treatment system at JWPCP consists of screening, grit removal, primary sedimentation, pure oxygen activated sludge reactors, secondary clarification, and chlorination. Effluent from the primary sedimentation tanks is biologically treated in pure oxygen activated sludge reactors. The secondary treated effluent is then clarified, chlorinated and pumped into the outfall manifold. JWPCP has a dry weather average design treatment capacity of 400 million gallons per day (mgd) and a peak design capacity of 540 mgd. For the period from January 2003 (JWPCP in full secondary treatment mode) to August 2005, effluent discharge flow from JWPCP has averaged 322 mgd with a maximum daily flow of 492 mgd on February 21, 2005.

Solid fractions recovered from wastewater treatment processes include grit, primary screenings, primary sludge and skimmings, thickened waste activated sludge, digested sludge screenings and digester cleaning solids. The fine solids (grit, primary screenings, digested sludge screenings, digester cleaning solids) which are primarily inorganic materials are hauled away to a landfill. The remaining solid fractions (primary sludge and skimmings, thickened waste activated sludge) are anaerobically digested onsite. The digested solids are screened, and dewatered using scroll centrifuges. The dewatered cake contains approximately 25% solids (Class B biosolids). JWPCP generates approximately 11,000 wet tons of Class B biosolids per week. More than half of the biosolids are managed by composting operations in Riverside and Kern County. One quarter of the biosolids are sent to southwestern Arizon for air drying and direct land application. The remaining biosolids are lime stabilized for Class A land application in Kern County, incinerated in a cement kiln in San Bernardino County, and co-disposed with municipal solid waste in Los Angeles County.

Digester gas (containing approximately 65% methane), produced from anaerobic digestion of sludge, is used onsite to fuel a combined cycle power plant (gas turbines followed by boilers and a steam turbine)

which generates 22 MW of electricity for plant equipment and steam for digester heating. The power plant allows JWPCP to be essentially self-sufficient with respect to its energy requirements and even produces surplus electricity for export to Southern California Edison Co. sufficient to power approximately 1,500 homes.

B. Discharge Points and Receiving Waters

After chlorination, the secondary treated effluent travels about 6 miles through tunnels to the outfall manifold and then is discharged to the Pacific Ocean, at Whites Point off the Palos Verdes Peninsula.

JWPCP has fifteen discharge points (Discharge Serial Nos. 001 through 015). Four outfalls (Discharge Serial Nos. 001 through 004) are located at Whites Point, off the Palos Verdes Peninsula. Discharge Serial Nos. 001 and 002 are routinely used for discharge of treated wastewater. Discharge Serial No. 003 is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. Discharge Serial No. 004 serves as a standby outfall to provide additional hydraulic relief during the very heaviest flows. These four outfalls are described as follows:

Discharge Point	Description
Serial No. 001	**Whites Point 120-inch ocean outfall** (Latitude 33 ° 41' 21" N, Longitude 118° 19' 00" W) This outfall routinely discharges approximately 65% of the effluent from the JWPCP. It discharges south of the shoreline off Whites Point, San Pedro. The outfall is 7440 ft long to the beginning of a single L-shaped diffuser leg which is 4440 ft long. Depth at the beginning of the diffuser is 167 ft and at the end of the diffuser is 190 ft.
Serial No. 002	**Whites Point 90-inch ocean outfall** (Latitude 33 ° 42' 03" N, Longitude 118° 20' 17" W) This outfall routinely discharges approximately 35% of the effluent from the JWPCP. It discharges southwest of the shoreline off Whites Point, San Pedro. The outfall is 7982 ft long to the beginning of a y-shaped diffuser with two legs. Each leg is 1208 ft long. Depth at the beginning of the diffusers is 196 ft and at the end of the diffusers is 210 ft.
Serial No. 003	**Whites Point 72-inch ocean outfall** (Latitude 33 ° 42' 05" N, Longitude 118° 20' 20" W) This outfall is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. When used, it discharges off the Whites Point shoreline between Discharge Points 001 and 002 and about 160 ft below the ocean surface. The outfall is about 6500 ft long and connect to one of three legs of a y-shaped diffuser upstream of the y-intersection. Each leg is approximately 200 ft long.
Serial No. 004	**Whites Point 60-inch ocean outfall** (Latitude 33 ° 41' 20" N, Longitude 118° 19' 40" W) This outfall is used as a standby to provide additional hydraulic relief during the heaviest flow. When used, it discharges off the Whites Point shoreline between Discharge Serial Nos. 002 and 003 and about 110 ft below the ocean surface. The outfall is about 5000 ft long and connect to a single, very short diffuser.

Two discharge points (Serial Nos. 006 and 013) have been eliminated following facility modifications. The remaining nine discharge points, with seven of them being bypass points (Discharge Serial Nos. 007-012, and 014) located prior to the headworks, provide for overflow, emergency bypass, and/or hydraulic relief of the JWPCP. This permit does not authorize any discharge from these nine discharge points (Discharge Serial Nos. 005, 007-012, 014, and 015).

In addition to the JWPCP effluent, the waste brine generated by the West Basin Municipal Water Districts's Carson Regional Water Recycling Plant is discharging to the ocean through the JWPCP's outfalls via a waste brine line connected to the JWPCP effluent tunnel. This discharge of waste brine is regulated under separate waste discharge requirements and NPDES permit.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in the existing Order (Order No. 97-090) for discharges from JWPCP and representative monitoring data for conventional and nonconventional pollutants from January 2003 to August 2005 during the term of the previous Order are as follows:

Table 2. Historic Effluent Limitations and Monitoring Data (Conventional and Nonconventional Pollutants)

Parameter (units)	Effluent Limitation In Order No. 97-090			Monitoring Data (From Jan. 2003 to Aug. 2005)		
	Average Monthly	Average Weekly	Maximum Daily	Highest 30-day Average Discharge	Highest 7-day Average Discharge	Highest Daily Discharge
BOD_5 (mg/L)	30	45	---	12	17	46
(lbs/day)	96,400	145,000	---	32,413	49,596	123,520
TSS (mg/L)	30	45	---	21	26	54
(lbs/day)	96,400	145,000	---	57,325	77,946	186,764
O&G (mg/L)	---	---	---	< 5	< 5	< 5
(lbs/day)	---	---	---	< 13,858	< 14,686	< 18,262
Settleable Solids (ml/L)	0.5	0.75	1.5	0.1	0.1	0.1
Turbidity (NTU)	75	100	225	9	11	22
pH (pH units)	6.0 to 9.0			6.09 to 7.70		
Temperature (^oF)	<100			71.2 to 89.7		

Order No 97-090 established effluent limitations for toxic pollutants based on water quality objectives of the Ocean Plan (1990). A summary of existing effluent limitations and monitoring data of toxic pollutants for the period from November 2002 to August 2005 are showed below.

Table 3. Historic Effluent Limitations and Monitoring Data (Toxic Pollutants)

Parameters	units	Effluent Limitation in Order No. 97-090			Monitoring Data (From Nov. 2002 to Aug. 2005)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Marine Aquatic Life Protection								
Arsenic	µg/L	--	--	--	<1	<1	1	2.1
Cadmium	µg/L	167	668	1670	<0.25	< 1	1	1
Chromium (VI)	µg/L	334	1336	3340	<100	<100	--	--
Copper	µg/L	169	676	1690	< 6	< 6	2.3	12
Lead	µg/L	--	--	--	<0.25	< 8	0.3	11
Mercury	µg/L	6.6	26.4	66	< 0.5	< 0.5	--	--
Nickel	µg/L	835	3340	8350	< 25	< 25	7	37
Selenium	µg/L	--	--	--	--	--	4.7	11.9
Silver	µg/L	91	364	910	<0.25	< 5	5	12
Zinc	µg/L	2012	8048	20120	< 25	< 25	13	32
Total Cyanide	µg/L	167	668	1670	< 4	< 4	4	8
Chlorine Residual (Daily) (Outfall 001)	µg/L	334	1336	10020	< 100	< 100	100	4500
Chlorine Residual (Daily) (Outfall 002)	µg/L	334	1336	10020	< 100	< 100	100	3100

Parameters	units	Effluent Limitation in Order No. 97-090			Monitoring Data (From Nov. 2002 to Aug. 2005)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Ammonia	mg/L	--	--	--	--	--	28.4	35.6
Acute Toxicity	TUa	1.5	2	2.5	--	--	0	1
Chronic Toxicity (survival)	TUc	--	--	167	--	--	42	42
Phenols (unchlorinated)	µg/L	--	--	--	< 10	< 50	--	--
2,4-Dimethylphenol	µg/L	--	--	--	< 2	< 10	--	--
2,4-Dinitrophenol	µg/L	--	--	--	< 5	< 25	--	--
2-Methyl-4,6-dinitrophenol	µg/L	--	--	--	< 5	< 25	--	--
2-Nitrophenol	µg/L	--	--	--	< 10	< 50	--	--
4-Nitrophenol	µg/L	--	--	--	< 10	< 50	--	--
Phenols (chlorinated)	µg/L	167	668	1670	< 10	< 50	--	--
2-Chlorophenol	µg/L	--	--	--	< 5	< 25	--	--
2,4-Dichlorophenol	µg/L	--	--	--	< 5	< 25	--	--
4-Chloro-3-methylphenol	µg/L	--	--	--	< 1	< 5	--	--
Pentachlorophenol	µg/L	--	--	--	< 5	< 25	--	--
2,4,6-Trichlorophenol	µg/L	--	--	--	< 10	< 50	--	--
Endosulfan	µg/L	1.5	6	15	< 0.01	< 0.4	--	--
Endosulfan I	µg/L	--	--	--	< 0.01	< 0.04	--	--
Endosulfan II	µg/L	--	--	--	< 0.01	< 0.04	--	--
Endosulfan sulfate	µg/L	--	--	--	< 0.01	< 0.4	--	--
Endrin	µg/L	0.4	1.6	4	< 0.01	< 0.04	--	--
HCH	µg/L	0.7	2.8	7	< 0.01	< 0.01	0.01	0.01
alpha-BHC	µg/L	--	--	--	< 0.01	< 0.01	--	--
Lindane (Gamma-BHC)	µg/L	--	--	--	< 0.01	< 0.01	0.01	0.01
beta-BHC	µg/L	--	--	--	< 0.01	< 0.01	--	--
delta-BHC	µg/L	--	--	--	< 0.01	< 0.01	--	--
Human Health Protection – Noncarcinogens								
Acrolein	µg/L	--	--	--	< 5	< 100	--	--
Antimony	µg/L	--	--	--			1.1	2.6
Bis(2-cl-ethoxy) methane	µg/L	--	--	--	< 5	< 25	--	--
Bis(2-cl-isopropyl) ether	µg/L	--	--	--	< 2	< 10	--	--
Chlorobenzene	µg/L	--	--	--	<0 .5	< 0.5	--	--
Chromium (III) (using total Cr data)	µg/L	--	--	--	< 12	< 12	13	22
Di-n-butyl-phthalate	µg/L	--	--	--	< 5	< 50	--	--
Dichlorobenzene		--	--	--	< 2	< 10	--	--
1,2-Dichlorobenzene	µg/L	--	--	--	< 2	< 10	--	--
1,3-Dichlorobenzene	µg/L	--	--	--	< 1	< 5	--	--
Diethyl phthalate	µg/L	--	--	--	< 2	< 10	--	--
Dimethyl phthalate	µg/L	--	--	--	< 2	< 10	--	--
2-Methyl-4,6-dinitrophenol	µg/L	--	--	--	< 5	< 25	--	--
2,4-Dinitrophenol	µg/L	--	--	--	< 5	< 25	--	--
Ethyl benzene	µg/L	--	--	--	< 0.5	< 0.5	--	--

Parameters	units	Effluent Limitation in Order No. 97-090			Monitoring Data (From Nov. 2002 to Aug. 2005)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Fluoranthene	µg/L	--	--	--	< 1	< 5	--	--
Hexachlorocyclopentadiene	µg/L	--	--	--	< 5	< 25	--	--
Nitrobenzene	µg/L	819	--	--	< 1	< 5	--	--
Thallium	µg/L	--	--	--	< 3	< 20	--	--
Toluene	µg/L	--	--	--	< 0.5	< 0.5	0.2	0.5
Tributyltin	µg/L	0.233	--	--	< 0.001	< 0.0046	0.004	0.0264
1,1,1-Trichloroethane	µg/L	--	--	--	< 0.5	< 0.5	--	--
Human Health Protection – Carcinogens								
Acrylonitrile	µg/L	17	--	--	< 5	< 50	--	--
Aldrin	µg/L	0.004	--	--	< 0.01	< 0.01	--	--
Benzene	µg/L	985	--	--	< 0.5	< 0.5	--	--
Benzidine	µg/L	0.012	--	--	< 0.04	< 5	--	--
Beryllium	µg/L	5.5	--	--	< 0.3	< 3	--	--
Bis(2-chloroethyl) ether	µg/L	7.5	--	--	< 1	< 5	--	--
Diethylhexyl phthalate	µg/L	585	--	--	< 2	< 25	12	20.3
Carbon tetrachloride	µg/L	151	--	--	< 0.5	< 0.5	--	--
Chlordane	µg/L	0.004	--	--	< 0.02	< 0.04	--	--
cis-Chlordane	µg/L	--	--	--	< .01	< .01	--	--
trans-Chlordane	µg/L	--	--	--	< .01	< .01	--	--
trans-Nonchlor	µg/L	--	--	--	< .01	< .01	--	--
Oxychlordane	µg/L	--	--	--	< .01	< .04	--	--
cis-Chlordene	µg/L	--	--	--	< .02	< .02	--	--
trans-Chlordene	µg/L	--	--	--	< .01	< .01	--	--
cis-Nonachlor	µg/L	--	--	--	< .01	< .01	--	--
Dibromochloromethane	µg/L	--	--	--	< 0.5	< 2	0.4	2
Chloroform	µg/L	--	--	--			8	34
Total DDT	µg/L	0.029	--	--	< 0.01	< 0.01	--	--
2,4'-DDE	µg/L	--	--	--	< 0.01	< 0.01	--	--
4,4'-DDE	µg/L	--	--	--	< 0.01	< 0.01	--	--
2,4'-DDD	µg/L	--	--	--	< 0.01	< 0.01	--	--
4,4'-DDD	µg/L	--	--	--	< 0.01	< 0.01	--	--
2,4'-DDT	µg/L	--	--	--	< 0.01	< 0.01	--	--
4,4'-DDT	µg/L	--	--	--	< 0.01	< 0.01	--	--
1,4-Dichlorobenzene	µg/L	--	--	--	< 1	< 5	--	--
3,3'-Dichlorobenzidine	µg/L	1.353	--	--	< 0.04	< 5	--	--
1,2-Dichloroethane	µg/L	22	--	--	< 0.5	< 0.5	--	--
1,1-Dichloroethene	µg/L	--	--	--	< 0.5	< 0.5	--	--
Bromodichloromethane	µg/L	--	--	--	< 0.5	< 0.5	0.9	6
Methylene chloride	µg/L	75	--	--			2	12
1,3-Dichloropropene		--	--	--	< 0.5	< 0.5	--	--
cis-1,3-Dichloropropene	µg/L	--	--	--	< 0.5	< 0.5	--	--
trans-1,3-Dichloropene	µg/L	--	--	--	< 0.5	< 0.5	--	--

Parameters	units	Effluent Limitation in Order No. 97-090			Monitoring Data (From Nov. 2002 to Aug. 2005)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Dieldrin	µg/L	0.007	--	--	< 0.01	< 0.04	--	--
2,4-Dinitrotoluene	µg/L	--	--	--	< 5	< 25	--	--
1,2-Diphenylhydrazine	µg/L	27	--	--	< 1	< 5	--	--
Halomethanes	µg/L	--	--	--	< 0.5	< 0.5	0.4	2.6
Bromoform	µg/L	--	--	--	< 0.5	< 0.5	0.5	0.6
Bromomethane	µg/L	--	--	--	< 0.5	< 1	--	--
Chloromethane	µg/L	--	--	--	< 0.5	< 0.5	0.4	2.6
Heptachlor	µg/L	--	--	--	< 0.01	< 0.01	--	--
Heptachlor epoxide	µg/L	--	--	--	< 0.01	< 0.04	--	--
Hexachlorobenzene	µg/L	0.035	--	--	< 1	< 5	--	--
Hexachlorobutadiene	µg/L	--	--	--	< 1	< 5	--	--
Hexachloroethane	µg/L	--	--	--	< 1	< 5	--	--
Isophorone	µg/L	--	--	--	< 1	< 5	--	--
N-Nitrosodimethylamine	µg/L	--	--	--	< 5	< 25	--	--
N-Nitrosodi-n-propylamine	µg/L	--	--	--	< 5	< 25	--	--
N-Nitrosodiphenylamine	µg/L	--	--	--	< 1	< 5	--	--
PAHs	µg/L	1.47	--	--	< 5	< 50	0.02	0.06
Acenaphthylene	µg/L	--	--	--	< 5	< 50	--	--
Anthracene	µg/L	--	--	--	< 0.02	< 5	--	--
Benzo(a)anthracene	µg/L	--	--	--	< 0.016	< 5	0.03	0.03
Benzo(a)pyrene	µg/L	--	--	--	< 0.013	< 5	--	--
Benzo(b)fluoranthene	µg/L	--	--	--	< 0.017	< 5	--	--
Benzo(ghi)perylene	µg/L	--	--	--	< 0.02	< 5	--	--
Benzo(k)fluoranthene	µg/L	--	--	--	< 0.008	< 5	--	--
Chrysene	µg/L	--	--	--	< 0.02	< 5	0.03	0.03
Dibenzo(a,h)anthracene	µg/L	--	--	--	< 0.02	< 5	--	--
Fluorene	µg/L	--	--	--	< 0.02	< 5	--	--
Indeno(1,2,3-c,d)pyrene	µg/L	--	--	--	< 0.017	< 5	--	--
Phenanthrene	µg/L	--	--	--	< 0.02	< 5	--	--
Pyrene	µg/L	--	--	--	< 0.02	< 5	0.02	0.02
PCBs	µg/L	0.003	--	--	< 0.1	< 0.3	--	--
AROCLOR 1242	µg/L	--	--	--	< 0.1	< 0.1	--	--
AROCLOR 1254	µg/L	--	--	--	< 0.05	< 0.05	--	--
AROCLOR 1016	µg/L	--	--	--	< 0.1	< 0.1	--	--
AROCLOR 1221	µg/L	--	--	--	< 0.1	< 0.3	--	--
AROCLOR 1232	µg/L	--	--	--	< 0.1	< 0.1	--	--
AROCLOR 1248	µg/L	--	--	--	< 0.1	< 0.1	--	--
AROCLOR 1260	µg/L	--	--	--	< 0.1	< 0.1	--	--
TCDD Equivalents	pg/L	0.65	--	--	< .61	< 9	--	--
1,1,2,2-Tetrachloroethane	µg/L	--	--	--	< 0.5	< .5	--	--
Tetrachloroethylene	µg/L	--	--	--	< 0.5	< 0.5	0.5	7
Toxaphene	µg/L	0.035	--	--	< 0.5	< 0.5	--	--
Trichloroethylene	µg/L	--	--	--	< 0.5	< 0.5	--	--
1,1,2-Trichloroethane	µg/L	--	--	--	< 0.5	< 0.5	--	--
2,4,6-Trichlorophenol	µg/L	49	--	--	< 10	< 50	--	--

Parameters	units	Effluent Limitation in Order No. 97-090			Monitoring Data (From Nov. 2002 to Aug. 2005)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Vinyl chloride	µg/L	--	--	--	< 0.5	< 0.5	--	--
Additional Parameters								
Endrin aldehyde	µg/L	--	--	--	< 0.04	< 0.04	--	--
o-Dichlorobenzene	µg/L	--	--	--	< 0.5	< 0.5	0.3	3
m-Dichlorobenzene	µg/L	--	--	--	< 0.5	< 0.5	--	--
p-Dichlorobenzene	µg/L	--	--	--			2	3
1,1-Dichloroethane	µg/L	--	--	--	< 0.5	< 0.5	--	--
o-Xylene	µg/L	--	--	--	< 0.5	< 0.5	--	--
trans-1,2-Dichloroethylene	µg/L	--	--	--	< 0.5	< 0.5	--	--
Chloroethane	µg/L	--	--	--	< 0.5	< 0.5	--	--
2-Chloroethylvinylether	µg/L	--	--	--	< 0.5	< 0.5	--	--
1,2-Dichloropropane	µg/L	--	--	--	< 0.5	< 0.5	--	--
Freon 11 (CCL3F)	µg/L	--	--	--	< 0.5	< 1	--	--
1,2-Dibromoethane	µg/L	--	--	--	< 0.5	< 0.5	--	--
Styrene	µg/L	--	--	--	< 1	< 1	--	--
M+p-Xylene	µg/L	--	--	--	< 1	< 1	--	--
1,4-Dioxane	µg/L	--	--	--	< 10	< 50	17	17
Acenaphthene	µg/L	--	--	--	< 1	< 5	--	--
4-Bromophenyl phenylether	µg/L	--	--	--	< 5	< 25	--	--
Butylbenzyl phthalate	µg/L	--	--	--	< 5	< 50	--	--
2-Chloronaphthalene	µg/L	--	--	--	< 5	< 50	--	--
4-Chlorophenylphenylether	µg/L	--	--	--	< 5	< 25	--	--
2,6-Dinitrotoluene	µg/L	--	--	--	< 5	< 25	--	--
Di-n-octyl phthalate	µg/L	--	--	--	< 5	< 50	--	--
Naphthalene	µg/L	--	--	--	< 1	< 5	--	--
1,2,4-Trichlorobenzene	µg/L	--	--	--	< 5	< 25	--	--

D. Compliance Summary

Monitoring data from 1998 to 2004 indicate that the Discharger has consistently complied with the effluent limitations of Order No. 97-090 except for two exceedances of effluent daily maximum settleable solids limitation of 1.5 ml/L. On January 24, 2000, due to solids washout from the secondary treatment clarifier the final effluent settleable solids level exceeds the daily maximum with a value of 1.8 ml/L. On February 25, 2001, the final effluent settable solids level exceeds the daily maximum with a value of 2.2 ml/L because of extremely high flow through JWPCP caused by extended heavy rainfall.

In accordance with applicable permits, the Districts have reported a number of spills and/or overflows in the JOS service area over the years. In the last three fiscal years (2002-2003, 2003-2004, and 2004-2005), 43 spills were reported in all sewers maintained by the Districts, 25 of which were caused by high intensity rainfall in the area. The appropriate enforcement actions are being evaluated by the Regional Water Board.

<u>90-Day Bypass of Secondary Treatment in 2001:</u>

On April 1, 2001, JWPCP began bypassing secondary treatment to repair corrosion-damaged facilities. The bypass ended 71 days later on June 11, 2001. The Regional Water Board approved this bypass in Resolution No. 00-05 on April 13, 2000 according to the provision B23 of the Standard Provisions, and

40 CFR 122.41(m)(4)(I), on the basis of avoiding possible catastrophic impact resulting from the facilities' failure in the future. Pursuant to this Resolution, the Executive Officer was directed to not pursue enforcement actions against the Districts under the provisions of Order No. 97-090 but to pursue enforcement actions under the provisions of the Consent Decree.

During the bypass period, JWPCP provided enhanced advanced primary treatment to the wastewater with the application of additional amounts of ferric chloride and polymer and implemented operational adjustments to achieve the highest possible quality of effluent. However, despite the Districts efforts, the effluent discharged exceeded the interim limits for BOD, total suspended solids, settleable solids, oil and grease and acute toxicity in several occasions. On October 4, 2002, the Districts were issued an enforcement letter for the Consent Decree stipulated penalties for violations of interim limits contained in the Consent Decree during the bypass period.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the proposed Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the Federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California Water Code (CWC). It shall serve as a NPDES permit for point source discharges from this Facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4 of the CWC.

B. California Environmental Quality Act (CEQA)

This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with Section 13389 of the CWC.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Regional Water Board adopted *Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (hereinafter Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for the Pacific Ocean. In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic water supply use to water bodies that do not have beneficial uses listed in the Basin Plan. Beneficial uses applicable to the Pacific Ocean (Point Vicente Beach, Royal Palms Beach, and Whites Point Beach) in the Palos Verdes Peninsula are as follows:

Table 4. Basin Plan Beneficial Uses of the Applicable Receiving Waters

Discharge Point	Receiving Water Name	Beneficial Use(s)
Serial Nos. 001, 002, 003, and 004	Point Vicente Beach, Royal Palms Beach, and Whites Point Beach	Existing: Navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), and shellfish harvesting (SHELL). Potential: Spawning, reproduction, and/or early development of fish (SPWN).
	Nearshore Zone (The zone bounded by the shoreline and a line 1000 feet from the shoreline or the 30-foot depth contours, whichever is further from the shoreline)	Existing: Industrial service supply (IND), navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), preservation of biological habitats (BIOL), preservation of rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development of fish (SPWN).and shellfish harvesting (SHELL).
	Offshore Zone	Existing: Industrial service supply (IND), navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), preservation of rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development of fish (SPWN).and shellfish harvesting (SHELL).

The Basin Plan relies primarily on the requirements of the *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) for protection of the beneficial uses of the State ocean waters. The Basin Plan, however, may contain additional water quality objectives applicable to the Discharger.

2. **Thermal Plan.** The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for coastal waters.

3. **California Ocean Plan.** The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21. 2005 and it became effective on February 14, 2006. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. The Ocean Plan identifies beneficial uses of ocean waters of the State to be protected as summarized below:

Table 5. Ocean Plan Beneficial Uses of the Pacific Ocean

Discharge Point	Receiving Water Name	Beneficial Use(s)
Serial Nos. 001, 002, 003, and 004	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Area of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting.

In order to protect the beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan.

4. **Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised State and Tribal water quality standards (WQS) become effective for Clean Water Act (CWA) purposes (40 CFR 131.21, 65 FR 24641, April 27, 2000). Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

5. **Stringency of Requirements for Individual Pollutants.** This Order contains restrictions on individual pollutants that are no more stringent than required by the federal CWA. Individual pollutant restrictions consist of technology-based restrictions and water quality-based effluent limitations. The technology-based effluent limitations consist of restrictions on biochemical oxygen demand (BOD), total suspended solids (TSS), and hydrogen ion concentration (pH). Restrictions on BOD, TSS and pH are specified in federal regulations as discussed in Finding F, and the permit's technology-based pollutant restrictions are no more stringent than required by the CWA. Water quality-based effluent limitations have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. All beneficial uses and water quality objectives contained in the Basin Plan and the Ocean Plan were approved under state law and submitted to and approved by USEPA prior to May 30, 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the technology-based requirements of the CWA and the applicable water quality standards for purposes of the CWA.

6. **Antidegradation Policy.** Section 131.12 of 40 CFR requires that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16, which incorporates the requirements of the federal antidegradation policy. Resolution 68-16 requires that existing water quality is maintained unless degradation is justified based on specific findings. As discussed in detail in this Fact Sheet, the permitted discharge is consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution 68-16.

7. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with

some exceptions in which limitations may be relaxed. Some effluent limitations in the Order are less stringent than those in the previous Order. As discussed in this Fact Sheet, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

8. **Monitoring and Reporting Requirements.** Section 122.48 of 40 CFR requires that all NPDES permits specify requirements for recording and reporting monitoring results. Sections 13267 and 13383 of the CWC authorize the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements to implement federal and State requirements. This MRP is provided in Attachment E.

D. Impaired Water Bodies on CWA 303(d) List

On July 25, 2003, USEPA approved the State's 2002 list of impaired waterbodies prepared pursuant to CWA 303(d). The 303(d) list identifies waterbodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations by point sources (water quality-limited waterbodies).

Santa Monica Bay (Offshore and Nearshore) is on the 303(d) list for the following pollutants/stressors, from point and non-point sources: chlordane (sediment), DDT (tissue & sediment, centered on Palos Verdes Shelf), polycyclic aromatic hydrocarbons (sediment), PCBs (tissue & sediment), debris, sediment toxicity, and fish consumption advisory. The 303(d) list also includes the Pacific Ocean shoreline (Point Vicente Beach, Royal Palms Beach, and Whites Point Beach) within the Palos Verdes Hydrologic Subarea as impaired for beach closures. Both DDT (Fish consumption advisory for DDT) and PCBs (Fish consumption advisory for PCBs) are also listed as impairments for Royal Palms Beach, and Whites Point Beach. TMDLs for DDT, PCBs and PAHs have not been scheduled. A TMDL for chlordane is scheduled for 2006.

E. Other Plans, Polices and Regulations

1. **Secondary Treatment Regulations.** Section 133 of 40 CFR establishes the minimum levels of effluent quality to be achieved by secondary treatment. These limitations, established by USEPA, are incorporated into this Order, except where more strigent limitations are required by other applicable plans, policies, or regulations.

2. **Storm Water.** Sewage treatment works with a design flow of 1.0 MGD or greater are required to comply with Water Quality Order No. 97-03-DWQ (NPDES General Permit No. CAS000001), Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity, Excluding Construction Activities. The Discharger shall file a Notice of Intent within 60 days of adoption of this Order (unless already submitted under the previous Order) and comply with Order No. 97-03-DWQ or the Discharger shall provide certification to the Regional Water Board that all storm water is captured and treated on-site and no storm water is discharged or allowed to run off-site from the Facility.

3. **Pretreatment.** Discharges of pollutants that may interfere with operations of a POTW are regulated by USEPA's pretreatment regulations at 40 CFR 403. These regulations require Dischargers to develop and implement pretreatment programs that impose limitations on industrial users of the POTW.

4. **Watershed Management.** This Regional Water Board has been implementing a Watershed Management Approach (WMA) to address water quality protection in Los Angeles and Ventura Counties. The approach is in accordance with USEPA guidance on *Watershed Protection: A*

Project Focus (EPA841-R-95-003, August 1995). The objective is to provide a comprehensive and integrated strategy resulting in water resource protection, enhancement and restoration, while balancing economic and environmental impacts within a hydrologically defined drainage basin or watershed. The Management Approach emphasizes cooperative relationships between regulatory agencies, the regulated community, environmental groups, and other stakeholders in the watershed to achieve the greatest environmental improvements with the resources available. This Order and the accompanying *Monitoring and Reporting Program* (Attachment E) fosters implementation of this approach. The *Monitoring and Reporting Program* requires the Discharger to participate in regional water quality and kelp bed monitoring programs in the Southern California Bight.

5. **Santa Monica Bay Beaches Bacteria Total Maximum Daily Loads (TMDLs).** The Regional Water Board has adopted two TMDLs to reduce bacteria at Santa Monica Bay beaches during dry and wet weather. The Regional Water Board adopted the Dry Weather and Wet Weather TMDLs on January 24, 2002 and December 12, 2002, respectively (Resolution Nos. 2002-004 and 2002-022). These TMDLs were approved by the State Water Board, State OAL and USEPA Region 9 and became effective on July 15, 2003. In these TMDLs, waste load allocations (WLAs) are expressed as the number of sample days at a shoreline monitoring site that may exceed the single sample targets for total coliform, fecal coliform and enterococcus identified under "Numeric Target" in the TMDLs. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection at beaches. The final shoreline compliance point for the WLAs in the TMDLs is the wave wash where there is a freshwater outlet (i.e., publicly owned storm drain or natural creek) to the beach, or at ankle depth at beaches without a freshwater outlet. The Districts, as the owner of JWPCP, are identified as a responsible jurisdiction in these TMDLs. In these TMDLs, JWPCP is assigned a WLA of zero days of exceedance of the single sample bacterial objectives during all three identified periods – summer dry weather, winter dry weather and wet weather. JWPCP's WLA of zero exceedance days requires that no discharge from its outfalls may cause or contribute to any exceedances of the single sample bacteria objectives at the shoreline compliance points identified in the TMDL and, subsequently, in the approved Coordinated Shoreline Monitoring Plan (dated April 7, 2004) submitted by responsible agencies and jurisdictions under the TMDLs.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source discharges to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations; and other requirements in NPDES permits. There are two principal bases for effluent limitations: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 CFR 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Where numeric water quality objectives have not been established, three options exist to protect water quality: 1) 40 CFR 122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a); 2) proposed State criteria or a State policy interpreting narrative criteria supplemented with other relevant information may be used; or 3) an indicator parameter may be established.

A. Discharge Prohibitions

The Order authorizes the discharge of secondary treated wastewater through Discharge Serial Nos. 001 through 004. It does not authorize discharges through Discharge Serial Nos. 005 , 007-012, and 014-015. Discharge prohibitions in this Order are based on the requirements in Section III.H of the Ocean Plan (2001).

B. Technology-Based Effluent Limitations

1. Scope and Authority

Regulations promulgated in 40 CFR Section 125.3(a)(1) require technology-based effluent limitations for municipal Dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in Section 304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in 40 CFR 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH.

2. Applicable Technology-Based Effluent Limitations

Pursuant to Section 301 (b)(1)(B) and 304 (d)(1) of the CWA, USEPA has established standards of performance for secondary treatment at 40 CFR 133. Secondary treatment is defined in terms of three parameters – 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. The following Table summarizes the technology-based requirements for secondary treatment, which are applicable to the Facility:

Table 6. Summary of Technology-based Effluent Limitations for Secondary Treatment Facility by USEPA at 40 CFR 133.102

Constituent	Average Monthly	Average Weekly	Percent Removal
BOD_5	30 mg/L	45 mg/L	85%
TSS	30 mg/L	45 mg/L	85%
pH	6.0 to 9.0		

Table A of the Ocean Plan (2001) also establishes the following technology-based effluent limitations for POTWs, which are applicable to the Facility:

Table 7. Summary of Technology-based Effluent Limitations for POTWs established by the Ocean Plan (2001)

Constituent	Average Monthly	Average Weekly	Instantaneous Maximum	Percent Removal
O&G	25 mg/L	40 mg/L	75 mg/L	--
TSS	--	--	--	75%*
Settleable Solids	1.0 ml/L	1.5 ml/L	3.0 ml/L	--
Turbidity	75 NTU	100 NTU	225 NTU	--
pH	6.0 to 9.0			

* Dischargers shall, as a monthly average, remove 75% of TSS from the influent stream before discharging to the ocean, except that the effluent limitation to be met shall not be lower than 60 mg/L.

All technology-based effluent limitations from Order No. 97-090 for BOD_5, TSS, oil and grease, settleable solids, pH, and turbidity are retained by this Order with minor modifications for settleable solids and turbidity as described below. Limitations for BOD_5, TSS, and pH are based on secondary treatment standards established by the USEPA at 40 CFR 133. The limitations for turbidity are based on limitations established by the 2001 Ocean Plan. To be consistent with the 2001 Ocean Plan, maximum daily limitation for turbidity (225 NTU) in Order No. 97-090 has been changed to instantaneous maximum limitation in this Order. Since the final limitation for settleable solids and the interim limit for oil and grease in Order No. 97-090 are more stringent than those established by the 2001 Ocean Plan, these existing limitations are carried over to this Order (Antibacksliding policy). In addition, instantaneous maximum limits of 3.0 ml/L for settleable solids and 75 mg/L for oil and grease are also prescribed in this Order based on the 2001 Ocean Plan. Given the fact that monitoring data for oil and grease for the blended effluent (primary effluent plus secondary effluent) consistently met the oil and grease interim limitations and JWPCP has been upgraded to full secondary treatment since January 2003, the carryover of the oil and grease interim limitations can be well justified. All technology-based effluent limitations are not dependent upon the dilution ratio for the discharge outfall. The following Table summarizes the technology-based effluent limitations for the discharge from the Facility:

Table 8. Summary of Technology-based Effluent Limitations (Discharge Serial Nos. 001, 002, 003, and 004)

Constituent	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum	Percent Removal
BOD_5	30 mg/L	45 mg/L	--		85%
TSS	30 mg/L	45 mg/L	--		85%
O&G	15 mg/L	22.5 mg/L	45 mg/L	75 mg/L	--
Settleable Solids	0.5 ml/L	0.75 ml/L	1.5 ml/L	3.0 ml/L	--
Turbidity	75 NTU	100 NTU	--	225 NTU	--
pH	6.0 to 9.0				

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

As specified in 40 CFR 122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an excursion above any state water quality standard. The process for determining reasonable potential and the establishment of WQBELs when necessary are intended to protect the designated uses of the receiving water, and achieve applicable water quality objectives and criteria that are contained in the Basin Plan and the 2001 Ocean Plan.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan and the Ocean Plan (2001) establish the beneficial uses for ocean waters of the State. The beneficial uses of the receiving waters affected by the discharge have been described previously in this Fact Sheet. The Ocean Plan (2001) also contains water quality objectives for bacterial characteristics, physical characteristics, chemical characteristics, biological characteristics, and radioactivity. The Basin Plan also contains the bacteria objectives for water bodies designated for water contact recreation that was amended by Resolution No. 01-018. These water quality objective from the Ocean Plan with consideration of the bacteria objective in the Basin Plan were included as receiving water limitations in this Order.

Table B of the Ocean Plan includes the numerical water quality objectives for toxic pollutants.

a. 6-month median, daily maximum, and instantaneous maximum objectives for 21 chemicals and chemical characteristics, including total residual chlorine, acute and chronic toxicity, for the protection of marine aquatic life.

b. 30-day average objectives for 20 non-carcinogenic chemicals for the protection of human health.

c. 30-day average objectives for 42 carcinogenic chemicals for the protection of human health.

3. **Expression of WQBELs**

Pursuant to 40 CFR 122.45(d)(2), for POTW continuous discharges, all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall, unless impracticable, be stated as average weekly and average monthly discharge limitations (AMEL and AWEL). It is impracticable to include only average weekly and average monthly effluent limitations in the permit, because a single daily discharge of certain pollutants, in excess amounts, can cause violations of water quality objectives. The effects of pollutants on aquatic organisms are often rapid. For many pollutants, an average weekly or average monthly effluent limitation alone is not sufficiently protective of beneficial uses. As a result, maximum daily effluent limitations, as referenced in 40 CFR 122.45(d)(1), are included in the permit for certain constituents.

The WQBELs for marine aquatic life toxicants contained in this Order are based on water quality objectives contained in the 2001 Ocean Plan that are expressed as six-month median, daily maximum, and instantaneous maximum water quality objectives. However, in the existing permit (Order No. 97-090), the calculated effluent limitations based on 6-month median objectives for the marine aquatic life toxicants in the 1990 Ocean Plan were prescribed as monthly average limitations. Applying the antibacksliding policy, this Order retains the same approach to set effluent limitations derived from six-month median water quality objectives for marine aquatic life toxicants in Table B of the 2001 Ocean Plan as monthly average limitations. In addition, the weekly average and daily maximum limitations in the existing permit are respectively based on daily maximum and instantaneous maximum water quality objectives for marine aquatic life toxicants in Table B of the 1990 Ocean Plan. To be consistent with the Ocean Plan, daily maximum and instantaneous maximum limitations are prescribed but no weekly average limitations are included in this Order.

4. **Determining the Need for WQBELs**

Order No. 97-090 contains effluent limitations for non-conventional and toxic pollutant parameters in Table B of the Ocean Plan. For this Order, the need for effluent limitations based on water quality objectives in Table B of the 2001 Ocean Plan was reevaluated in accordance with the Reasonable Potential Analysis (RPA) procedures contained in the Ocean Plan Amendment adopted by the State Water Board on April 21, 2005. This statistical RPA method accounts for the averaging period of the water quality objective, accounts for and captures the long-term variability of the pollutant in the effluent, accounts for limitations associated with sparse data sets, accounts for uncertainty associated with censored data sets, and assumes a lognormal distribution of the facility-specific effluent data. The program calculates the upper confidence bound (UCB) of an effluent population percentile after complete mixing. In the evaluation employed in this Order, the UCB is calculated as the one-sided, upper 95 percent confidence bound for the 95th percentile of the effluent distribution after complete mixing. The calculated $UCB_{95/95}$ is then compared to the appropriate objective to determine the potential for an exceedance of that objective and the need for

an effluent limitation. For constituents that have insufficient number of monitoring data or have substantial number of non-detected data with a reporting limit higher than the respective water quality objective, the RPA result is likely to be inconclusive. As suggested by the Ocean Plan, existing effluent limitations for these constituents are retained in the new permit. In addition, the MRP (Attachment E) of this Order also requires the Districts to continue to monitor for these constituents for the determination of reasonable potential for these constituents in future permit renewals and/or updates.

Using this statistical procedure and Best Professional Judgement (BPJ), Regional Water Board staff has determined that the following pollutants, when discharged through the specified outfall, either have reasonable potential to exceed Ocean Plan objectives or have inconclusive results after running the RPA, and, therefore, require effluent limitations:
(see Appendices 1, 2, and 3)

Discharge Serial Nos. 001 and 002

Chlorine residual, acute toxicity, chronic toxicity, aldrin, benzidine, chlordane, DDT, dieldrin, heptachlor, heptachlor epoxide, hexachlorobenzene, PCBs, TCDD equivalents, and toxaphene.

Discharge Serial No. 003

Chlorine residual, chronic toxicity, aldrin, benzidine, chlordane, DDT, dieldrin, heptachlor, heptachlor epoxide, hexachlorobenzene, PCBs, TCDD equivalents, and toxaphene.

Discharge Serial No. 004

Chlorine residual, chronic toxicity, aldrin, benzidine, chlordane, DDT, dieldrin, heptachlor, heptachlor epoxide, hexachlorobenzene, PCBs, TCDD equivalents, toxaphene, and 2,4,6-trichlorophenol.

Additional analysis for chlorine residual: Wastewater disinfection with chlorine usually produces a chlorine residual and the byproducts of chlorination are highly toxic to aquatic life. Although the RPA determination based on daily chlorine residual data shows no RP for chlorine residual, the daily maximum and instantaneous maximum limitations for chlorine residual are prescribed in this Order based on the facts that effluent from JWPCP is routinely chlorinated before discharge, and the observed maximum daily detected effluent concentration for chlorine residual is higher than the daily maximum water quality objective for chlorine residual during the reporting period.

Additional analysis for DDT: The receiving waters in the Palos Verdes Peninsula watershed were impacted by elevated concentration of the now-banned DDT. Between approximately 1950 and 1971, Montrose Chemical Corporation of California, Inc., a DDT manufacturing plant in Los Angeles County, discharged wastewater containing significant concentrations of DDT to the Joint Outfall System and was thus conveyed to JWPCP. DDT was ultimately discharged to the ocean through the Whites Point Outfalls. It is estimated that approximately 1800 tons of DDT were discharged between the late 1950s and the early 1970s. Since DDT is highly persistent in the environment and readily attaches to soil particles, high levels of DDT continue to threaten the Palos Verdes Shelf marine environment. The 2002 Palos Verdes Ocean Monitoring Annual Report prepared by the Discharger indicated that DDT concentration in the sediment adjacent to the Outfall was detected as high as 26,000 ug/kg and DDT concentration in the fish tissue (White Croaker muscle) at near-Outfall reached as high as 33.7 mg/kg. Due to the bioaccumulative effect of DDT through the food chain, bottom-feeding fish in the contaminated areas are particularly at risk for high DDT levels. Since 1985, fish consumption advisories and health warning have been posted in

the southern California for the consumption of bottom-feeding fish such as White Croaker from the contaminated areas. Although DDT has not been detected (MDL = 0.01 ug/L) in the JWPCP effluent since November 2002, based on recent sediment and fish tissue data for DDT mentioned above, Regional Water Board staff continue to prescribe mass emission and concentration WQBELs for DDT in this Order based upon BPJ.

For constituents that have been determined to have no reasonable potential to cause, or contribute to, or deviate from water quality objectives, numerical effluent limitations are not prescribed. Instead, a narrative limit statement to comply with all Ocean Plan objectives requirements is provided. The Discharger is required to monitor for these constituents as stated in the MRP (Attachment E) to gather data for use in reasonable potential analyses for future permit renewals and/or updates.

This Facility began full secondary treatment on November 8, 2002. Effluent data of toxic pollutants provided by the Discharger from November 2002 to August 2005 were used in the analyses. Minimum probable initial dilution ratios of 166:1 for Discharge Serial No. 001 and 002, 150:1 for Discharge Serial No. 003, and 115:1 for Discharge Serial No. 004 were considered in this evaluation.

5. **WQBEL Calculations**

From the Table B water quality objectives of the Ocean Plan, effluent limitations are calculated according to the following equation for all pollutants, except for acute toxicity (if applicable) and radioactivity:

Ce=Co+Dm(Co-Cs)

where

Ce = the effluent limitation (µg/L)
Co = the water quality objective to be met at the completion of initial dilution (µg/L)
Cs = background seawater concentration (µg/L) (see Table below)
Dm = minimum probable initial dilution expressed as parts seawater per part wastewater

The Dm is based on observed waste flow characteristics, receiving water density structure, and the assumption that no currents of sufficient strength to influence the initial dilution process flow across the discharge structure. Prior to issuance of Order No. 97-090, staff of the State Water Board had determined the minimum probable initial dilution for Discharge Serial Nos. 001 and 002 to be 166 to 1. In the existing permit, same dilution ratio of 166:1 has also been applied to Discharge Serial Nos. 003 and 004. However, there is no document to support this application in the file. As requested by the Regional Water Board, the Discharger recalculated initial dilution ratio for Discharge Serial Nos. 003 and 004 using the EPA computer model package Visual Plumes with the UM3 model and submitted the results to the State Water Board for review and approval. In September 2005, the State Water Board approved the minimum probable initial dilution for Discharge Serial Nos. 003 and 004 to be 115 to 1. On December 8, 2005, due to the mistakes in the depth of the port on Discharge Serial No. 003 in the previous dilution report, the Discharger submitted an revised dilution report to the Regional Water Board for approval. The new calculations based on the same computer model resulted in a new dilution ratio of 150:1 for Discharge Serial No. 003. Regional Water Board staff reviewed the calculations and approved this new dilution ratio (150:1) for Discharge Serial No. 003.

Initial dilution is the process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge. For a submerged buoyant discharge,

characteristic of most municipal and industrial wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally. As site- specific water quality data is not available, in accordance with Table B implementing procedures, Cs equals zero for all pollutants, except the following:

Table 9. Pollutants with Background Seawater Concentrations

Constituent	Background Seawater Concentration (Cs)
Arsenic	3 µg/L
Copper	2 µg/L
Mercury	0.0005 µg/L
Silver	0.16 µg/L
Zinc	8 µg/L

As examples, WQBELs for copper (no effluent limitation in this Order), chlorine residual, and chronic toxicity are calculated as follows:

Table 10. Ocean Plan Water Quality Objectives (Co) for Copper, Chlorine, and Chronic Toxicity

Constituents	6-Month Median	Daily Maximum	Instantaneous Maximum	30 Day Average
Copper	3 µg/L	12 µg/L	30 µg/L	--
Chlorine residual	2 µg/L	8 µg/L	60 µg/L	--
Chronic toxicity	N/A	1 TUc	N/A	--

Using the equation, **Ce=Co+Dm(Co-Cs)**, effluent limitations are calculated as follows before rounding to two significant digits. All calculations are based on discharge through Discharge Serial Nos. 001 and 002 and, therefore, a dilution ratio (Dm) of 166:1 is applied.

Copper (not a prescribed effluent limitation in this Order, for showing calculations only)

Ce = 3 + 166 (3-2) = 169 µg/L (prescribed as Monthly Average, see Section 3 above)
Ce = 12 + 166 (12-2) = 1,672 µg/L (Daily Maximum)
Ce = 30 + 166 (30-2) = 4,678 µg/L (Instantaneous Maximum)

Chronic Toxicity

Ce = 1 + 166 (1-0) = 167 TUc (Daily Maximum)

Chlorine Residual

Ce = 2 + 166 (2-0) = 334 µg/L (prescribed as Monthly Average, see Section 3 above)
Ce = 8 + 166 (8-0) = 1,336 µg/L (Daily Maximum)
Ce = 60 + 166 (60-0) = 10,020 µg/L (Instantaneous Maximum)

Based on the implementing procedures described above, effluent limitations have been calculated for all Table B pollutants (excluding acute toxicity and radioactivity) from the Ocean Plan and incorporated into this Order. (see Appendices 1, 2, and 3)

Because of the Reasonable Potential Analysis, many WQBELs established by Order No. 97-090 are not retained in this Order. The WQBELs that are retained have been changed to reflect the changes in water quality objectives in the 2001 Ocean Plan as compared with those in the 1990 Ocean Plan and reflect the revised dilution ratios for Discharge Serial Nos. 003 and 004, respectively.

Determination of radioactivity limitation: Since the descriptive water quality objective for radioactivity in the 2001 California Ocean Plan fails to establish an applicable narrative or numerical effluent limit for radionuclides, Regional Water Board staff used BPJ to establish radioactivity limitations for the effluent using Maximum Contaminant Levels (MCLs) for the drinking water specified in Title 22, California Code of Regulations because it is the only scientifically-based regulatory criteria available.

6. **Whole Effluent Toxicity (WET)**

The existing permit includes technology based effluent limits for acute toxicity and freshwater acute toxicity testing requirements specified in the 1990 Ocean Plan. In 2001, the Ocean Plan was revised to include a new daily maximum acute toxicity water quality objective of 0.3 TUa, implementation procedures for developing water quality based effluent limits for acute toxicity, and acute toxicity testing protocols using marine species, rather than freshwater species. Currently, JWPCP has no acute toxicity data reported on marine species available for conducting the RPA. The 2001 Ocean Plan specifies that the Discharger must conduct chronic toxicity testing for ocean water discharges with dilution ratios ranging from 100:1 to 350:1. It also allow the Regional Water Board to require acute toxicity testing to be conducted by that discharger. Since the applicable dilution ratios (166:1, 150:1, and 115:1) for the JWPCP outfalls are within this range, this Order requires the Discharger to conduct both acute and chronic toxicity tests.

Because of the nature of industrial discharges into the JWPCP sewershed, it is possible that other toxic constituents could be present in the JWPCP effluent, or could have synergistic or additive effects. Also, the JWPCP effluent usually shows a high ammonia concentration and is consistently chlorinated before discharge. Both ammonia and chlorine are very toxic to aquatic organisms. The Regional Water Board has determined that the JWPCP discharge has reasonable potential to exceed the current Ocean Plan objective for acute toxicity. Furthermore, because numeric limits for certain toxic constituents that did not show RA have been removed, the acute toxicity limit provides a backstop to preventing the discharge of toxic pollutants in toxic amounts. Therefore, this Order proposes daily maximum acute toxicity effluent limits and testing protocols consistent with the 2001 Ocean Plan for Discharge Serial Nos. 001 and 002, primary discharge outfalls. Using the new objective of 0.3 TUa for the daily maximum and 10% of the dilution ratio (as the acute toxicity mixing zone), the daily maximum acute toxicity limits are calculated as follows:

$$Ce = Ca + (0.1)\ Dm\ (Ca)$$

where
Ce = the effluent daily maximum limit for acute toxicity.
Ca = the concentration (water quality objective) to be met at the edge of the acute mixing zone.
Dm = minimum probable initial dilution expressed as parts seawater per part wastewater (166:1 for Discharge Serial Nos. 001 and 002).

<u>Acute Toxicity Limit for Discharge at Discharge Serial Nos. 001 and 002</u>

$$Ce = 0.3 + (0.1)(166)(0.3) = 5.28$$

D. Final Effluent Limitations

The following table lists the effluent limitations established by this Order. Effluent limitations were determined according to the standards and equations provided in the Ocean Plan (2001). The mass emission limitations established for Discharge Serial Nos. 001 and 002 have been derived based on the average design flow of 385 mgd in the 1997 JWPCP permit.

1. **Discharge Serial Nos. 001 and 002**
   (Primary discharge outfalls)
   (Initial dilution = 166:1)

Table 11. Summary of Final Effluent Limitations for Discharge Serial Nos. 001 and 002

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations			
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum
BOD_5	mg/L	30	45	--	--
	lbs/day	96,300	144,500	--	--
	% removal	85 %			
TSS	mg/L	30	45	--	--
	lbs/day	96,300	144,500	--	--
	% removal	85 %			
Oil and grease	mg/L	15	22.5	45	75
	lbs/day	48,200	72,200	144,500	--
Settleable solids	ml/L	0.5	0.75	1.5	3.0
Turbidity	NTU	75	100	--	225
PH	pH unit	6.0 to 9.0			
Chlorine residual	µg/L	330	--	1,300	10,000
	lbs/day	1,060	--	4,170	--
Acute toxicity	TUa	--	--	5.3	--
Chronic toxicity	TUc	--	--	167	--
Radioactivity					
Gross alpha	PCi/L	--	--	15	--
Gross beta	PCi/L	--	--	50	--
Combined Radium-226 & Radium-228	PCi/L	--	--	5.0	-
Tritium	PCi/L	--	--	20,000	--
Strontium-90	PCi/L	--	--	8.0	--
Uranium	PCi/L	--	--	20	--
Aldrin	µg/L	0.0037	--	--	--
	lbs/day	0.012	--	--	--

Discharge Serial Nos. 001 and 002

Parameter	Units	Effluent Limitations			
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum
Benzidine	µg/L	0.012	--	--	--
	lbs/day	0.039	--	--	--
Chlordane	µg/L	0.0038	--	--	--
	lbs/day	0.012	--	--	--
DDT	µg/L	0.028	--	--	--
	lbs/day	0.090	--	--	--
Dieldrin	µg/L	0.0067	--	--	--
	lbs/day	0.022	--	--	--
Heptachlor	µg/L	0.0084	--	--	--
	lbs/day	0.027	--	--	--
Heptachlor epoxide	µg/L	0.0033	--	--	--
	lbs/day	0.011	--	--	--
Hexachlorobenzene	µg/L	0.035	--	--	--
	lbs/day	0.11	--	--	--
PCBs	µg/L	0.0032	--	--	--
	lbs/day	0.010	--	--	--
TCDD equivalents	pg/L	0.65	--	--	--
	lbs/day	2.1×10^{-6}	--	--	--
Toxaphene	µg/L	0.035	--	--	--
	lbs/day	0.11	--	--	--

2. **Discharge Serial No. 003**
(Only used for hydraulic relief during times of heavy rains or unusual high flow)
(Initial dilution = 150:1)

Table 12. Summary of Final Effluent Limitations for Discharge Serial No. 003

Discharge Serial No. 003

Parameter	Units	Effluent Limitations			
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum
BOD_5	mg/L	30	45	--	--
	% removal	85 %			
TSS	mg/L	30	45	--	--
	% removal	85 %			
Oil and grease	mg/L	25	40	--	75
Settleable solids	ml/L	0.5	0.75	1.5	3.0
Turbidity	NTU	75	100	--	225
PH	pH unit	6.0 to 9.0			
Chlorine residual	µg/L	300		1200	9,100

Discharge Serial No. 003

Parameter	Units	Effluent Limitations			
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum
Chronic toxicity	TUc	--	--	151	--
Radioactivity					
Gross alpha	PCi/L	--	--	15	--
Gross beta	PCi/L	--	--	50	--
Combined Radium-226 & Radium-228	PCi/L	--	--	5.0	-
Tritium	PCi/L	--	--	20,000	--
Strontium-90	PCi/L	--	--	8.0	--
Uranium	PCi/L	--	--	20	--
Aldrin	µg/L	0.0033	--	--	--
Benzidine	µg/L	0.010	--	--	--
Chlordane	µg/L	0.0034	--	--	--
DDT	µg/L	0.026	--	--	--
Dieldrin	µg/L	0.0060	--	--	--
Heptachlor	µg/L	0.0076	--	--	--
Heptachlor epoxide	µg/L	0.0030	--	--	--
Hexachlorobenzene	µg/L	0.032	--	--	--
PCBs	µg/L	0.0029	--	--	--
TCDD equivalents	pg/L	0.59	--	--	--
Toxaphene	µg/L	0.032	--	--	--

3. **Discharge Serial No. 004**
(Only used for hydraulic relief during times of heavy rains or unusual high flow)
(Initial dilution = 115:1)

Table 13. Summary of Final Effluent Limitations for Discharge Serial No. 004

Discharge Serial No. 004

Parameter	Units	Effluent Limitations			
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum
BOD_5	mg/L	30	45	--	--
	% removal	85 %			
TSS	mg/L	30	45	--	--
	% removal	85 %			

Discharge Serial No. 004

Parameter	Units	Effluent Limitations			
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum
Oil and grease	mg/L	25	40	--	75
Settleable solids	ml/L	0.5	0.75	1.5	3.0
Turbidity	NTU	75	100	--	225
PH	pH unit	6.0 to 9.0			
Chlorine residual	µg/L	230		930	7,000
Chronic toxicity	TUc	--	--	116	--
Radioactivity					
Gross alpha	PCi/L	--	--	15	--
Gross beta	PCi/L	--	--	50	--
Combined Radium-226 & Radium-228	PCi/L	--	--	5.0	-
Tritium	PCi/L	--	--	20,000	--
Strontium-90	PCi/L	--	--	8.0	--
Uranium	PCi/L	--	--	20	--
Aldrin	µg/L	0.0026	--	--	--
Benzidine	µg/L	0.008	--	--	--
Chlordane	µg/L	0.0027	--	--	--
DDT	µg/L	0.020	--	--	--
Dieldrin	µg/L	0.0046	--	--	--
Heptachlor	µg/L	0.0058	--	--	--
Heptachlor epoxide	µg/L	0.0023	--	--	--
Hexachlorobenzene	µg/L	0.024	--	--	--
PCBs	µg/L	0.0022	--	--	--
TCDD equivalents	pg/L	0.45	--	--	--
Toxaphene	µg/L	0.024	--	--	--
2,4,6-Trichlorophenol	µg/L	34	--	--	--

E. Performance Goals

Chapter III, Section F.2, of the 2001 Ocean Plan allows the Regional Water Board to establish more restrictive water quality objectives and effluent limitations than those set forth in the Ocean Plan as necessary for the protection of the beneficial uses of ocean waters.

Pursuant to this provision and to implement the recommendation of the Water Quality Advisory Task Force (*Working Together for an Affordable Clean Water Environment, A final report presented to the California Water Quality Control Board, Los Angeles Region by Water Quality Advisory Task Force, September 30, 1993)* that was adopted by the Regional Water Board on November 1, 1993, performance goals that are more stringent than those based on Ocean Plan objectives are prescribed in this Order. This approach is consistent with the antidegradation policy in that it requires the Discharger to maintain its treatment level and effluent quality, recognizing normal variations in treatment efficiency and sampling and analytical techniques. However, this approach does not address substantial changes in treatment plant operations that could significantly affect the quality of the treated effluent.

While performance goals were previously placed in many POTW permits in the Region, they have not been continued for discharges that are to inland surface waters. For inland surface waters, the California Toxics Rule (40 CFR 131.38) has resulted in effluent limits as stringent as many performance goals. However, the Ocean Plan allows for significant dilution, and the continued use of performance goals serves to maintain existing treatment levels and effluent quality and supports State and federal antidegradation policies.

The performance goals are based upon the actual performance of JWPCP and are specified only as an indication of the treatment efficiency of the facility. Performance goals are intended to minimize pollutant loading (primarily for toxics), while maintaining the incentive for future voluntary improvement of water quality whenever feasible, without the imposition of more stringent limits based on improved performance. They are not considered as enforceable limitations or standards for the regulation of the discharge from the treatment facility. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted.

Procedures for the determination of performance goals

1. For constituents that have been routinely detected in the effluent (at least 20 percent detectable data), performance goals are based on the one-sided, upper 95 percent confidence bound ($UCB_{95/95}$) of the 95th percentile of November 2002 through August 2005 performance data (after complete mixing) using the RPA protocol contained in the 2005 Ocean Plan Amendment. Effluent data are assumed lognormally distributed. Performance goals are calculated according to the equation $C_{PG} = Co+Dm(Co-Cs)$ in the Ocean Plan and by setting $Co=UCB_{95/95}$. If the maximum detected effluent concentration is less than the calculated performance goal, the maximum detected effluent concentration is used as the performance goal. For example, the performance goal for arsenic at Discharge Serial Nos. 001 and 002 is calculated as follows:

   <u>Arsenic</u>

   $Co = UCB_{95/95} = 2.9942$; $Dm = 166$; $Cs = 3$
   C_{PG} = Performance Goal = 2.994 + 166(2.9942-3) = 2.0314 µg/L

2. For constituents where monitoring data have consistently shown nondetectable levels (less than 20 percent detectable data), performance goals are set at five times (for carcinogens and marine aquatic life toxicants) or ten times (for noncarcinogens) the method reporting limit (RL) reported in

the 2004 Annual Report for JWPCP. However, if the maximum detected effluent concentration is less than the calculated value based on RL, the maximum detected effluent concentration is used as the performance goal.

3. For constituents with no RP, if the performance goal derived from above steps exceeds the respective calculated Ocean Plan effluent limit, the calculated effluent limit is then prescribed as the performance goal for that constituent.

The performance goals for Discharge Serial Nos. 001 and 002 are prescribed in this Order. The listed performance goals are not enforceable effluent limitations or standards. However, the Discharger shall maintain, if not improve, its treatment efficiency. Any exceedance of the performance goals shall trigger an investigation into the cause of the exceedance. If the exceedance persists in three successive monitoring periods, the Discharger shall submit a written report to the Regional Water Board on the nature of the exceedance, the results of the investigation as to the cause of the exceedance, and the corrective actions taken or proposed corrective measures with timetable for implementation, if necessary. For chromium (VI), chlorinated phenols, acrylonitrile, bis(2-chloroethyl) ether, n-nitrosodi-n-propylamine, and 2,4,6-trichlorophenol, since performance goals are set to calculated effluent limitations, any single exceedance of these performance goals in any monitoring period shall be reported to the Regional Board.

F. Antidegradation

This Order is consistent with State and federal antidegradation policies in that it does not authorize any increase in pollutant mass emission rates, nor does it authorize a relaxation in the manner of treatment of the discharge. Pollutant limit mass emission rates continue to be based on the design flow rate of the treatment plant under the 1997 permit of 385 mgd. Although the design flow rate of the treatment plant has increased to 400 mgd, this increase has been accompanied by a significant improvement in the level of effluent treatment necessary to achieve full secondary treatment. As a result, both the quantity of discharged pollutants and quality of the discharge are expected to remain relatively constant or improve during this permit term, consistent with antidegradation policies. In conformance with reasonable potential analysis procedures identified in the Ocean Plan, effluent limitations for some constituents are not carried forth in this Order because there is not presently reasonable potential for the constituents to cause or contribute to an exceedance of water quality standards. Without reasonable potential, there is no longer a need to maintain prior WQBELs under WQBEL regulations, antibacksliding provisions, or antidegradation policies. The accompanying MRP (Attachment E) requires continued data collection and if monitoring data show reasonable potential for a constituent to cause or contribute to an exceedance of water quality standards, the permit will be reopened to incorporate appropriate WQBELs. Such an approach ensures that the discharge will adequately protect water quality standards for designated beneficial uses and conforms with antidegradation policies and antibacksliding provisions.

G. Mass Emission Benchmarks

To address relative changes in toxic pollutant loadings from the JWPCP discharge to the marine environment during the five-year permit term, and to collect information that can be used to determine compliance with State and federal antidegradation requirements when a subsequent permit is re-issued to the JWPCP, 12-month average mass emission benchmarks have been established for effluent discharged through Discharge Serial Nos. 001 and 002. The mass emission benchmarks (in metric tons per year; MT/yr) for the JWPCP discharge were determined using November 2002 through August 2005 effluent concentrations and the Discharger's projected end-of-permit flow of 338 MGD (Q). If more than 80 percent of effluent data were nondetect, the pollutant concentration (Ce) associated with the reporting limit reported in the 2004 Annual Report was used to calculate the mass emission

benchmark. If 20 percent or more of effluent data were detected, the pollutant concentration (Ce) associated with the 95th percentile (at upper 95 percent confidence bound) was used to calculate the mass emission benchmark. The following equation is used for the calculation:

$$MT/yr = (Ce\ ug/l)\ (Q\ 10^6\ gal/day)\ (3.785\ l/gal)\ (365\ days/yr)\ (I\ MT/10^{12}\ ug)$$

These mass emission benchmarks are not enforceable WQBELs. They may be re-evaluated and revised during the five-year permit term.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

Receiving water limitations are derived from the water quality objectives for ocean waters established by the Basin Plan and the Ocean Plan and applicable TMDLs.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Section 122.48 of 40 CFR requires all NPDES permits to specify recording and reporting of monitoring results. Sections 13267 and 13383 of the California Water Code authorize the Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program, Attachment E of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for this facility.

A. Influent Monitoring

Influent monitoring is required to:

- Determine compliance with NPDES permit conditions.
- Assess treatment plant performance.
- Assess effectiveness of the Pretreatment Program

Influent monitoring in this Order follows the influent monitoring requirements in the existing Order. The changes in monitoring frequency are summarized in the following Table.

Table 14. Influent Monitoring Programs Comparison Table

Influent Monitoring Program for JWPCP

Parameter	Monitoring Frequency (1997 Permit)	Monitoring Frequency (2006 Permit)
Nitrate nitrogen	**monthly**	**quarterly**
Nitrite nitrogen	**monthly**	**quarterly**
Organic nitrogen	**monthly**	**quarterly**
Total phosphorus (as P)	**monthly**	**quarterly**
Phenolic compounds (chlorinated)	**monthly**	**quarterly**
Phenolic compounds (non-chlorinated)	**monthly**	**quarterly**
N-Nitrosodi-n-propylamine	--	**quarterly**
Methyl-tert-butyl-ether	**--**	**quarterly**

To be consistent with the effluent monitoring program, changes have been made in the influent monitoring program. Justifications for changes are discussed in the effluent monitoring section below.

B. Effluent Monitoring

Effluent monitoring is required to:

- Determine compliance with NPDES permit conditions and water quality standards.
- Assess plant performance, identify operational problems and improve plant performance.
- Provide information on wastewater characteristics and flows for use in interpreting water quality and biological data.

The effluent monitoring in this Order follows the effluent monitoring requirements in the existing Order. The changes in monitoring frequency for primary outfalls, Dicharge Serial Nos. 001 and 002, are summarized in the following table.

Table 15. Effluent Monitoring Programs Comparison Table

Effluent Monitoring Program for Discharge Serial Nos. 001 and 002

Parameter	Monitoring Frequency (1997 Permit)	Monitoring Frequency (2006 Permit)
Settleable solids	**Once every 8 hrs**	**daily**
TOC	**weekly**	**monthly**
Nitrate nitrogen	**monthly**	**quarterly**
Nitrite nitrogen	**monthly**	**quarterly**
Organic nitrogen	**monthly**	**quarterly**
PCBs congeners	**--**	**annually**
Phenolic compounds (chlorinated)	**monthly**	**quarterly**
Phenolic compounds (non-chlorinated)	**monthly**	**quarterly**
N-Nitrosodi-n-propylamine	**--**	**quarterly**
Methyl-tert-butyl-ether	**--**	**quarterly**

Discharge Serial Nos. 001 and 002: Because JWPCP has been operating in full secondary treatment mode since January 2003, monitoring frequencies for some nonconventional pollutants are reduced. The reduction of monitoring frequency to quarterly for phenolic compounds is based on consistent non-detected data reported for these compounds since January 2003, leading to no reasonable potential to exceed respective Ocean Plan objectives. N-nitrosodi-n-propylamine is a new toxic pollutant specified in the 2001 Ocean Plan. Methyl-tert-butyl-ether is currently a pollutant of concern. Therefore, this Order requires quarterly monitoring for both pollutants. To facilitate interpretation of sediment/fish tissue data and TMDL development, PCB congeners are required to be analyzed annually in this Order.

This Order prescribes both acute and chronic toxicity limits for the discharge, thus it requires monitoring for both acute and chronic toxicity.

Discharge Serial Nos. 003 and 004: These two outfalls are used for hydraulic relief during times of heavy rains or unusual high flow. The minimum monitoring frequency is once per discharge, but no more than one analysis need be done during the required monitoring period that is similar to the monitoring requirements for Discharge Serial Nos. 001 and 002. Since the discharge through these two

outfalls is expected to be short duration and the minimum dilution factors for these two outfalls fall within 100:1 to 350:1, only the chronic toxicity testing is required for these two outfalls.

C. Whole Effluent Toxicity Testing Requirements

Acute Toxicity. As required in the Ocean Plan (2001), the acute toxicity testing is using an USEPA approved protocol. Acute toxicity monitoring requirements in this Order use marine test species instead of freshwater species. Acute toxicity monitoring requirements are described in detail in section V.A of the MRP (Attachment E). In brief, the Discharger shall conduct 96-hour static renewal acute toxicity tests on flow-weighted 24-hour composite effluent samples. The presence of acute toxicity shall be estimated as specified in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA 821-R-02-012, 2002), with preference for west coast vertebrate and invertebrate species. Re-screening is required every 24 months. The Discharger shall re-screen with a marine vertebrate species and a marine invertebrate species and continue to monitor with the most sensitive species. After the screening period, monitoring shall be conducted monthly using the most sensitive marine species.

Chronic Toxicity. The Ocean Plan (2001) requires the use critical life stage toxicity tests specified in Appendix III of the Ocean Plan to measure chronic toxicity. A minimum of three test species with approved test protocols shall be used to measure compliance with the toxicity objective. If possible, the test species shall include a fish, an invertebrate, and an aquatic plant. After a screening period, monitoring can be reduced to the most sensitive species. Dilution and control water should be obtained from an unaffected area of the receiving waters. The sensitivity of the test organisms to a reference toxicant shall be determined concurrently with each bioassay test and reported with the test results. Chronic toxicity testing requirements defined in Section V.B of the MRP (Attachment E) are specified on the basis of these Ocean Plan requirements.

D. Receiving Water Monitoring

The conceptual framework for the receiving water monitoring program has three components that comprise a range of spatial and temporal scales: (1) core monitoring; (2) regional monitoring; and (3) special studies.

1. Core monitoring is local in nature and focused on monitoring trends in quality and effects of the point source discharge. In the monitoring program described below these core components are typically referred to as local monitoring.

2. Regional monitoring is focused on questions that are best answered by a region-wide approach that incorporates coordinated survey design and sampling techniques. The major objective of regional monitoring is to collect information required to assess how safe it is to swim in the ocean, how safe it is to eat seafood from the ocean, and whether the marine ecosystem is being protected. Key components of regional monitoring include elements to address pollutant mass emission estimations, public health concerns, monitoring of trends in natural resources, assessment of regional impacts from all contaminant sources, and protection of beneficial uses. The final design of regional monitoring programs is developed by means of steering committees and technical committees comprised of participating agencies and organizations, and is not specified in this permit. Instead, for each regional component, the degree and nature of participation of the Discharger is specified. For this permit, these levels of effort are based upon past participation of the Los Angeles County Sanitation Districts in regional monitoring programs.

   The Discharger shall participate in regional monitoring activities coordinated by the SCCWRP or any other appropriate agency approved by the Regional Water Board . The procedures and time

lines for the Regional Water Board approval shall be the same as detailed for special studies, below.

3. Special studies are focused on refined questions regarding specific effects or development of monitoring techniques and are anticipated to be of short duration and/or small scale, although multiyear studies also may be needed. Questions regarding effluent or receiving water quality, discharge impacts, ocean processes in the area of the discharge, or development of techniques for monitoring the same, arising out of the results of core or regional monitoring, may be pursued through special studies. These studies are by nature ad hoc and cannot be typically anticipated in advance of the five-year permit cycle.

   The Discharger, the Regional Water Board shall consult annually to determine the need for special studies. Each year, the Discharger shall submit proposals for any proposed special studies (For example, endocrine disruptors and their effect on fish populations) to the Regional Water Board by December 15, for the following year's monitoring effort (July through June). The following year, detailed scopes of work for proposals, including reporting schedules, shall be presented by the Discharger at a Spring Regional Water Board meeting, to obtain the Regional Water Board approval and to inform the public. Upon approval by the Regional Water Board , the Discharger shall implement its special study or studies.

The receiving water monitoring program contains the following components:

1. Shoreline/Inshore Microbiological monitoring: Shoreline monitoring is designed to address the question: Are densities of bacteria in water contact zones below those that ensure public safety? Inshore monitoring addresses the question: Are Ocean Plan compliance standards for bacteriological contamination being met.

2. Nearshore/Offshore Water Quality monitoring: This monitoring addresses the question: Are Ocean Plan limits for dissolved oxygen and pH being met. This monitoring also contributes to a regional understanding of seasonal patterns in nearshore water column structure.

3. Benthic Sediments monitoring: The local trends survey addresses the question: Are benthic conditions under the influence of the discharge changing over time? The regional survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in soft-bottom habitats within the Southern California Bight?, and 2) What is the relationship between biological response and contaminant exposure?

4. Fish and Invertebrate monitoring: The local survey addresses the question: Is the health of demersal fish and epibenthic invertebrate communities in the vicinity of the discharge changing over time? The regional survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in demersal fish and epibenthic communities within the Southern California Bight?, and 2) What is the relationship between biological response and contaminant exposure? The local bioaccumulation trends survey addresses the questions: 1) Is fish tissue contamination in the vicinity of the outfall changing over time?, 2) Where seafood consumption advisories exist locally, do tissue concentrations of contaminants continue to exceed the Advisory Tissue Concentration?, and 3) What are the tissue contaminant trends relative to the Advisory Tissue Concentration in other species not currently subject to local consumption advisories? A regional seafood safety survey addresses the question: Are seafood tissue levels within the Southern California Bight below levels that ensure public safety? A regional predator risk survey addresses the question: Are fish body burdens within the Southern California Bight a health risk to higher trophic levels in the marine food web?

5. Kelp Bed monitoring: This regional survey addresses the question: Is the extent of kelp beds in the Southern California Bight changing over time and are some beds changing at rates different than others?

E. Other Monitoring Requirements

1. Outfall and Diffuser Inspection

This survey answers the question: Are the outfall structures in serviceable condition ensuring their continued safe operation? The data collected will be used for a periodic assessment of the integrity of the outfall pipes and ballasting system.

2. Sludge Monitoring and Reporting

Pursuant to 40 CFR 257, 258, 501, and 503, including all applicable monitoring, record keeping, and reporting requirements, the Discharger must comply with the monitoring and reporting requirements outlined in Attachment I in this Order, [Biosolids/Sludge Management].

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which in accordance with 40 CFR 122.41and 122.42, apply to all NPDES discharges and must be included in every NPDES permit, are provided in Attachment D to the Order.

Title 40 CFR Section122.41(a)(1) and (b) through (n) establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR 123.25(a)(12) allows the State to omit or modify conditions to impose more stringent requirements. In accordance with Section 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR 122.41(j)(5) and (k)(2) because the enforcement authority under the CWC is more stringent. In lieu of these conditions, this Order incorporates by reference CWC section 13387(e).

B. Special Provisions

1. Reopener Provisions

This Order may be reopened and modified, revoked, and reissued or terminated in accordance with the provisions of 40 CFR 122, 124, and 125.

2. Special Studies and Additional Monitoring Requirements

a. Treatment Plant Capacity

The treatment plant capacity study required by this Order shall serve as an indicator for the Regional Water Board regarding Facility's increasing hydraulic capacity and growth in the service area.

b. Toxicity Reduction Requirements

If the discharge consistently exceed an effluent limitation for toxicity, the Discharger needs to conduct TIE/TRE detailed in Section V of the MRP (Attachment E). The TRE will help the Discharger identify the possible source(s) of toxicity. Once the source(s) of toxicity is identified, the Discharger shall take all reasonable steps to reduce toxicity to the required level.

3. **Best Management Practices and Pollution Prevention**

a. Storm Water Pollution Prevention Plan (SWPPP)

CWA section 402(p), as amended by the Water Quality Act of 1987, requires NPDES permits for storm water discharges. Pursuant to this requirement, in 1990, USEPA promulgated 40 CFR 122.26 that established requirements for storm water discharges under an NPDES permit. To facilitate compliance with federal regulations, on November 1991, the State Board issued a statewide general permit, *General NPDES Permit No. CAS000001 and Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities.* This permit was amended in September 1992 and reissued on April 17, 1997 as State Board Order No. 97-03-DWQ. JWPCP is covered under this general permit and an updated SWPPP is required.

b. Spill Contingency Plan (SCP)

Since spill or overflow is a common event in the treatment plant service areas, this Order requires the Discharger to review and update, if necessary, SCP after each incident. The Discharger shall ensure that the up-to-date SPC is readily available to the sewage system personnel at all times and that the sewage personnel are familiar with it.

c. Pollutant Minimization Program (PMP)

Pursuant to the Ocean Plan, this Order specifies requirements for development and implementation of a PMP.

4. **Construction, Operation, and Maintenance Specifications**

These provisions ensure the Discharger at all times to properly operate and maintain all facilities and systems installed or used to achieve compliance with this Order.

5. **Special Provisions for Municipal Facilities**

a. Biosolids Requirements

To implement CWA Section 405(d), on February 19, 1993, USEPA promulgated 40 CFR 503 to regulate the use and disposal of municipal sewage sludge. This regulation was amended on September 3, 1999. The regulation requires that producers of sewage sludge meet certain reporting, handling, and disposal requirements. It is the responsibility of the Discharger to comply with said regulations that are enforceable by USEPA, because California has not been delegated the authority to implement this program. The Discharger is also responsible for compliance with WDRs and NPDES permits for the generation, transport and application of biosolids issued by the State Board, other Regional Water Boards, Arizona Department of Environmental Quality or USEPA, to whose jurisdiction the JWPCP biosolids will be

transported and applied. Attachment I of this Order contains Biosolids/sludge Management requirements that comply with the required regulations.

b. Pretreatment Requirements

This permit contains pretreatment requirements consistent with applicable effluent limitations, national standards of performance, and toxic and performance effluent standards established pursuant to Sections 208(b), 301, 302, 303(d), 304, 306, 307, 403, 404, 405, and 501 of the CWA, and amendments thereto. This permit contains requirements for the implementation of an effective pretreatment program pursuant to Section 307 of the CWA; 40 CFR 35 and 403; and/or Section 2233, Title 23, California Code of Regulations. There are more than 2,800 industrial users in its service areas. Over 1,200 are significant industrial users.

c. Spill Reporting Requirements

This Order established a reporting protocol for how different types of spills, overflow or bypasses of raw or partially treated sewage from its collection system or treatment plant covered by this Order shall be reported to regulatory agencies.

VIII. PUBLIC PARTICIPATION

The California Regional Water Quality Control Board, Los Angeles Region (Regional Water Board) is considering the issuance of waste discharge requirements (WDRs) that will serve as a National Pollutant Discharge Elimination System (NPDES) permit for the Joint Water Pollution Control Plant. As a step in the WDR adoption process, the Regional Water Board staff has developed tentative WDRs. The Regional Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through publication in the LA Times on February 16, 2006 and by letter mailed to interested parties on February 3, 2006.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments should be submitted either in person or by mail to the Executive Office at the Regional Water Board at the following address:

EXECUTIVE OFFICER
California Regional Water Quality Control Board, Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

To be fully responded to by staff and considered by the Regional Water Board, written comments should be received at the Regional Water Board offices by 5:00 p.m. on March 9, 2006.

C. Public Hearing

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date: April 6, 2006
Time: 9:00 am
Location:
The Department of Water and Power, Board Room 1555A
111 North Hope Street
Los Angeles, California

Interested persons are invited to attend. At the public hearing, the Regional Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our web address is **http://www.waterboards.ca.gov/losangeles** where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100
Attn: Elizabeth Miller Jennings, Senior Staff Counsel

E. Information and Copying

The Report of Waste Discharge (RWD), related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Regional Water Board by calling (213) 576-6600.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this Order should be directed to Jau Ren Chen at (213) 576-6656.

Appendix 13-F

JOINT WATER POLLUTION CONTROL PLANT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT (2011)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

LOS ANGELES REGION

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 • Fax (213) 576-6640
http://www.waterboards.ca.gov/losangeles

ORDER NO. R4-2011-0151
NPDES NO. CA0053813

WASTE DISCHARGE REQUIREMENTS FOR THE JOINT OUTFALL SYSTEM, JOINT WATER POLLUTION CONTROL PLANT DISCHARGE TO THE PACIFIC OCEAN

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 1. Discharger Information

Discharger	**Joint Outfall System**
Name of Facility	**Joint Water Pollution Control Plant**
Facility Address	**24501 South Figueroa Street**
	Carson, CA 90745
	Los Angeles County
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board have classified this discharge as a major discharge.	

The Joint Outfall System (ownership and operation of the Joint Outfall System is proportionally shared among the signatory parties to the amended Joint Outfall Agreement effective July 1, 1995. These parties include County Sanitation Districts of Los Angeles County Nos. 1, 2, 3, 5, 8, 15, 16,17, 18, 19, 21, 22, 23, 28, 29, and 34, and South Bay Cities Sanitation District of Los Angeles County) was formerly referred to as the County Sanitation Districts of Los Angeles County. The discharge by the Joint Outfall System from the discharge points identified below is subject to waste discharge requirements as set forth in this Order:

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	**Secondary treated wastewater**	**33 º, 41', 21" N**	**118 º, 19', 00" W**	**Pacific Ocean**
002	**Secondary treated wastewater**	**33 º, 42', 03" N**	**118 º, 20', 17" W**	**Pacific Ocean**
003	**Secondary treated wastewater**	**33 º, 42', 05" N**	**118 º, 20', 20" W**	**Pacific Ocean**
004	**Secondary treated wastewater**	**33 º, 41', 20" N**	**118 º, 19', 40" W**	**Pacific Ocean**

Table 3. Administrative Information

This Order was adopted by the Regional Water Board on:	**September 1, 2011**
This Order shall become effective on:	**October 1, 2011**
This Order shall expire on	**August 10, 2016**
The Discharger shall file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, not later than 180 days in advance of the Order expiration date as application for issuance of new waste discharge requirements, no later than:	180 days prior to the Order expiration date (Title 40, Code of Federal Regulations, part 122.21(d))

DOC#2034216

IT IS HEREBY ORDERED, that Order No. R4-2006-0042 is terminated upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the Water Code (commencing with section 13000) and regulations adopted pursuant thereto, and the provisions of the federal Clean Water Act (CWA), and regulations and guidelines adopted pursuant thereto, the Discharger shall comply with the requirements in this Order.

I, Samuel Unger, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on **September 1, 2011**.

Samuel Unger

Samuel Unger, Executive Officer

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Attachment I – Pretreatment Reporting Requirements I-1

I. FACILITY INFORMATION

The following Discharger is subject to the waste discharge requirements set forth in this Order:

Table 4. Facility Information

Discharger	**Joint Outfall System**
Name of Facility	**Joint Water Pollution Control Plant**
Facility Address	**24501 South Figueroa Street**
	Carson, CA 90745
	Los Angeles County
Facility Contact, Title, and Phone	**Ann Heil, Supervising Engineer, (562) 908-4288 x 2803**
Mailing Address	**1955 Workman Mill Road, Whittier, CA 90601**
Type of Facility	**Publicly Owned Treatment Works**
Facility Design Flow	**400 million gallons per day (MGD) monthly average daily dry weather design capacity for secondary treatment and 540 MGD dry weather peak design capacity**

II. FINDINGS

The California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Water Board), finds:

A. Background. The Joint Outfall System (hereinafter Discharger or JOS) is currently discharging under Order No. R4-2006-0042 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0053813, which was adopted on April 6, 2006. The Discharger submitted a Report of Waste Discharge, dated November 9, 2010**,** and applied for a NPDES permit renewal to discharge up to 400 million gallons per day (MGD) of secondary treated wastewater from the Joint Water Pollution Control Plant**,** hereinafter Facility or JWPCP. The application was deemed complete on December 30, 2010**.**

The Joint Outfall System (ownership and operation of the Joint Outfall System is proportionally shared among the signatory parties to the amended Joint Outfall Agreement effective July 1, 1995. These parties include County Sanitation Districts of Los Angeles County Nos. 1, 2, 3, 5, 8, 15, 16,
17, 18, 19, 21, 22, 23, 28, 29, and 34, and South Bay Cities Sanitation District of Los Angeles County) was formerly referred to as the County Sanitation Districts of Los Angeles County.

For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

Compliance with Consent Decree. On June 8, 1994, the Discharger entered into a Consent Decree [No. 92 0061 RG (JRx)] with USEPA Region 9 and the Regional Water Board. The Consent Decree primarily requires the Discharger to construct additional secondary treatment facilities and achieve compliance with full secondary treatment at JWPCP by December 31, 2002. The Discharger achieved full secondary treatment on November 8, 2002. On May 29, 2008 the Discharger submitted a certification that all penalties, costs, and fees had been paid; all remedial measures and supplemental projects required by the Decree had been completed; and compliance for twelve consecutive months with the secondary treatment requirements of 40 CFR Section 133.102 was achieved as of November 8, 2003. On January 7, 2009 the Discharger filed a Notice of Termination of Consent Decree with the court and on January 21, 2009, the court acknowledged that the Consent Decree was terminated.

B. Facility Description. The Discharger owns and operates JWPCP. The secondary treated effluent, after traveling approximately 6 miles through tunnels, is discharged from Discharge Points 001 and 002 to the Pacific Ocean, a water of the United States, at White Point within the Palos Verdes Peninsula Sub-Watershed that is part of the Santa Monica Bay Watershed. Discharge Point 003 is used only during times of heavy rains to provide hydraulic relief and Discharge Point 004 serves as a standby outfall to provide additional hydraulic relief during the heaviest flows.

The treatment system at JWPCP consists of screening, grit removal, primary sedimentation, pure oxygen activated sludge reactors, secondary clarification, and chlorination. Effluent from the primary sedimentation tanks is biologically treated in pure oxygen activated sludge reactors. The secondary effluent is then clarified, chlorinated and pumped into the outfall manifold. JWPCP has a monthly average daily dry weather design treatment capacity of 400 MGD and a dry weather peak design capacity of 540 MGD. The wet weather peak hydraulic capacity is up to 675 MGD. For the period from September 2009 to August 2010, effluent discharge flow from JWPCP has averaged 280 MGD with a maximum daily flow of 428 MGD. JWPCP receives discharges from more than 900 significant industrial users.

Solid fractions recovered from wastewater treatment processes include grit, primary screenings, primary sludge and skimmings, thickened waste activated sludge, digested sludge screenings and digester cleaning solids. The fine solids (grit, primary screenings, digested sludge screenings, digester cleaning solids) which are primarily inorganic materials are hauled away to a landfill. The remaining solid fractions (primary sludge and skimmings, thickened waste activated sludge) are anaerobically digested on-site. The digested solids are screened, and dewatered using scroll centrifuges. The dewatered cake contains approximately 27% solids (Class B biosolids). JWPCP generates approximately 118,000 dry metric tons of Class B biosolids per year. The biosolids are hauled off-site for use in composting and land application, combined with municipal solid waste for co-disposal, or processed into a renewable fuel for cement kilns.

Methane gas generated in the anaerobic digestion process is used to produce power and digester heating steam in a total energy facility that utilizes gas turbines and waste-heat recovery steam generators. The on-site generation of electricity permits the JWPCP to produce its own electricity.

Attachment B provides a location map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

Descriptions of Discharge Points. JWPCP has fifteen discharge/bypass points (Discharge Points 001 through 015). Four outfalls (Discharge Points 001 through 004) are located at White Point, off the Palos Verdes Peninsula. Discharge Points 001 and 002 are routinely used for discharge of treated wastewater. Discharge Point 003 is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. Discharge Point 004 serves as a standby outfall to provide additional hydraulic relief during the very heaviest flows. These four outfalls are described as follows:

Table 5. Detailed Descriptions of NPDES Discharge Points

Discharge Point	Description
001	**White Point 120-inch diameter ocean outfall** This outfall routinely discharges approximately 65% of the effluent from the JWPCP. It discharges south of the shoreline off White Point, San Pedro. The outfall is 7440 ft long to the beginning of a single L-shaped diffuser leg which is 4440 ft long. Depth at the beginning of the diffuser is 167 ft and at the end of the diffuser is 190 ft.
002	**White Point 90-inch diameter ocean outfall** This outfall routinely discharges approximately 35% of the effluent from the JWPCP. It discharges southwest of the shoreline off White Point, San Pedro. The outfall is 7982 ft long to the beginning of a y-shaped diffuser with two legs. Each leg is 1208 ft long. Depth at the beginning of the diffusers is 196 ft and at the end of the diffusers is 210 ft.
003	**White Point 72-inch diameter ocean outfall** This outfall is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. When used, it discharges off the White Point shoreline between Discharge Points 001 and 002 and about 160 ft below the ocean surface. The outfall is about 6500 ft long and connects to one of three legs of a y-shaped diffuser upstream of the y-intersection. Each leg is approximately 200 ft long.
004	**White Point 60-inch diameter ocean outfall** This outfall is used as a standby to provide additional hydraulic relief during the heaviest flow. When used, it discharges off the White Point shoreline between Discharge Points 002 and 003 and about 110 ft below the ocean surface. The outfall is about 5000 ft long and connects to a single, very short diffuser.

Two discharge points (006 and 013) have been eliminated following facility modifications. The remaining nine discharge points, with seven of them being bypass points (Discharge Points 007-012 and 014) located prior to the headworks, provide for overflow, emergency bypass, and/or hydraulic relief of the JWPCP. This permit does not authorize any discharge from these nine discharge points (Discharge Points 005, 007-012, 014, and 015).

JWPCP is part of an integrated network of facilities, known as the Joint Outfall System (JOS), which incorporates JWPCP and six upstream water reclamation plants - La Cañada, Whittier Narrows, San Jose Creek, Pomona, Los Coyotes and Long Beach. It treats municipal and industrial wastewater. The six upstream plants are connected to a common sewer system, which allows for the diversion of desired flows into or around each upstream plant. The flow from the six upstream plants can be bypassed, to a limited extent, to JWPCP. The sludge generated from the upstream plants are returned to the joint outfall trunk sewers and conveyed to JWPCP for further treatment. The JOS serves an urban area of 654 square miles and includes all or part of 78 cities in addition to multiple communities and unincorporated areas. The JOS provides wastewater treatment services to much of Los Angeles County. There are approximately five million people in the JOS service area.

C. Legal Authorities. This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by USEPA and Chapter 5.5, Division 7 of the California Water Code (commencing with Section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4 of the California Water Code (commencing with section 13260).

D. Background and Rationale for Requirements. The Regional Water Board developed the requirements in this Order based on information from the application, monitoring reports and other available information. The Fact Sheet (Attachments F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through I are also incorporated into this Order.

E. California Environmental Quality Act (CEQA). Under California Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of the CEQA, Public Resources Code sections 21100-21177.

F. Technology-based Effluent Limitations. Section 301(b) of the CWA and implementing regulations at part 125.3, title 40 of the Code of Federal Regulations[1] (hereinafter 40 CFR), require that NPDES permits include limitations, which meet applicable technology-based requirements, at a minimum. The discharge authorized by this Order must meet minimum federal technology-based requirements for POTWs at 40 CFR part 133. A detailed discussion of the technology-based effluent limitations development is included in the Fact Sheet (Attachment F).

G. Water Quality-based Effluent Limitations. Section 301(b) of the CWA and 40 CFR part 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve water quality standards. 40 CFR part 122.44(d)(1)(i) requires that permits include water quality-based effluent limitations (WQBELs) for all pollutants, which are or may be discharged at levels having the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives or criteria within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section

[1] All further statutory references are to title 40 of the Code of Federal Regulations unless otherwise indicated and will be abbreviated as "40 CFR part number."

304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed State criterion or policy interpreting the State's narrative criterion, supplemented with other relevant information, as provided in 40 CFR part 122.44(d)(1)(vi). USEPA has applied CWA section 403(c) and 40 CFR part 125, subpart M, following 40 CFR part 122.

H. Water Quality Control Plans. On June 13, 1994, the Regional Water Board adopted a Water Quality Control Plan for the Los Angeles Region (hereinafter Basin Plan), as amended, that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for Pacific Ocean. In addition, the Basin Plan implements State Water Resources Control Board (State Water Board) Resolution No. 88-63, which established State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Basin Plan beneficial uses applicable to the Pacific Ocean are shown in Table 6:

Table 6. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002, 003, and 004	Point Vicente Beach, Royal Palms Beach, and White Point Beach	Existing: Navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), and shellfish harvesting (SHELL). Potential: Spawning, reproduction, and/or early development of fish (SPWN).
	Nearshore Zone (The zone bounded by the shoreline and a line 1000 feet from the shoreline or the 30-foot depth contours, whichever is further from the shoreline)	Existing: Industrial service supply (IND), navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), preservation of biological habitats (BIOL), preservation of rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development of fish (SPWN).and shellfish harvesting (SHELL).
	Offshore Zone	Existing: Industrial service supply (IND), navigation (NAV), contact (REC-1) and non-contact (REC-2) water recreation, commercial and sport fishing (COMM), marine habitat (MAR), wildlife habitat (WILD), preservation of rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development of fish (SPWN).and shellfish harvesting (SHELL).

Requirements of this Order implement the Basin Plan.

I. Impaired Water Bodies on CWA 303(d) List. On June 28, 2007, USEPA approved California's 2006 section 303(d) List of Water Quality Limited Segments. The list (hereinafter referred to as the 303(d) list) identifies water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations by point sources (water quality-limited water bodies).

Santa Monica Bay (Offshore and Nearshore) is on the 303(d) list for the following pollutants/stressors, from point and non-point sources: DDT (dichlorodiphenyltrichloroethane) (tissue & sediment), debris, fish consumption advisory, PCBs (polychlorinated biphenyls) (tissue & sediment), and sediment toxicity. Both DDT (Fish consumption advisory for DDT) and PCBs (Fish consumption advisory for PCBs) are also listed as impairments for Royal Palms Beach, and White Point Beach. Total Maximum Daily Loads (TMDLs) for pollutants/stressors on the 303(d) list for Santa Monica Bay, Royal Palms Beach, and White Point Beach are scheduled for 2019.

The receiving waters in the Palos Verdes Peninsula watershed are impacted primarily because of elevated concentrations of contaminants such as PCBs and DDT. Between approximately 1950 and 1971, Montrose Chemical Corporation of California, Inc., a DDT manufacturing plant in Los Angeles County, discharged wastewater containing significant concentrations of DDT to the Joint Outfall System which were conveyed to JWPCP. The DDT was ultimately discharged to the ocean through the White Point outfalls. PCBs were also discharged from the White Point ocean outfall. Historically, PCBs entered the Joint Outfall System as the result of discharges from several sources in the greater Los Angeles area.

The highest concentrations of DDT and PCB are in a layer of low density sewage-derived sediments around the main sewer outfalls at White Point on the Palos Verdes Shelf. USEPA has designated the DDT/PCB contaminated area as a Superfund site and has been investigating the feasibility of various technologies for remediating the contaminated sediments. In 2009, USEPA signed interim Record of Decision (ROD) that selected a cleanup remedy for Palos Verdes Shelf. The selected remedy has three components: placing a cover of clean silty sand over the portion of the contaminated sediment deposit that has the highest contaminant surface concentrations and appears to be erosive; monitoring the natural recovery that is occurring in other areas of the Shelf; and continuing the Institutional Controls program that uses outreach and education, enforcement and monitoring to minimize consumption of fish that contain DDTs and PCBs.

J. California Thermal Plan. In 1972, the State Water Board adopted a Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan), as amended. This plan contains temperature objectives for coastal and inland surface waters. Requirements of this Order implements the Thermal Plan.

K. California Ocean Plan. In 1972, the State Water Board adopted the *Water Quality Control Plan for Ocean Waters of California, California Ocean Plan* (hereinafter Ocean Plan) and amended it in 1978, 1983, 1988, 1990, 1997, 2000, 2005 and 2009. The latest amendment became effective on October 8, 2010. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean waters of the State. Ocean Plan beneficial uses applicable to ocean waters of the State are shown in Table 7:

Table 7. Ocean Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001, 002, 003, and 004	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Area of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting.

To protect the beneficial uses in ocean water, the Ocean Plan establishes water quality objectives and a program implementation. Requirements of this Order implement the Ocean Plan.

L. Santa Monica Bay Restoration Plan. JWPCP discharges to Santa Monica Bay, one of the most heavily used recreational areas in California. Recognizing the importance of the Bay as a national resource, the State of California and USEPA nominated and Congress included Santa Monica Bay in the National Estuary Program. This led to the formation of the Santa Monica Bay Restoration Project (currently named Santa Monica Bay Restoration Commission) that developed the Bay Restoration Plan (BRP), which serves as a blueprint for restoring and enhancing the Bay. The Regional Water Board plays a lead role in the implementation of the BRP. Three of the proposed priorities of the BRP are reduction of pollutants of concern at the source (including municipal wastewater treatment plants), attainment of full secondary treatment at the City of Los Angeles' Hyperion Treatment Plant and the County Sanitation Districts of Los Angeles County's Joint Water Pollution Control Plant, and implementation of the mass emission approach for discharges of pollutants to the Bay.

M. Alaska Rule. USEPA has revised its regulation that specifies when new and revised State and Tribal water quality standards (WQS) become effective for CWA purposes (40 CFR part 131.21; 65 Federal Register 24641 (April 27, 2000)). Under the revised regulation (hereinafter Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

N. Stringency of Requirements for Individual Pollutants. This Order contains restrictions on individual pollutants that are no more stringent than required by the federal CWA. Individual pollutant restrictions consist of technology-based restrictions and water quality-based effluent limitations. The technology-based effluent limitations consist of restrictions on biochemical oxygen demand (5-day) (BOD_5), total suspended solids (TSS), and pH; and percent removal of BOD_5 and TSS, which implement the minimum applicable federal technology-based requirements for POTWs. Also, effluent limitations consisting of restrictions on oil and grease, settleable solids, and turbidity more stringent than federal technology-based requirements are necessary to implement State treatment standards in Table A of the Ocean Plan. Water quality-based effluent limitations consisting of restrictions on chlorine residual, acute toxicity, chronic toxicity, chlordane, hexachlorobenzene, DDT, PCBs, TCDD equivalents, 3,3-dichlorobenzidine, benzidine and toxaphene have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. Collectively, restrictions on individual pollutants in this Order are no more stringent than required by the CWA.

O. Antidegradation Policy. 40 CFR part 131.12 requires that State water quality standards include an antidegradation policy consistent with the federal antidegradation policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. This resolution incorporates the federal antidegradation policy, where the federal policy applies under federal law. Resolution 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Basin Plan implements and incorporates, by reference, both State and federal antidegradation policies. As discussed in detail in the Fact Sheet (Attachment F), the permitted discharge is consistent with the antidegradation provision of 40 CFR part 131.12 and State Water Board Resolution 68-16.

P. Anti-Backsliding Requirements. CWA sections 402(o)(2)/303(d)(4) and 40 CFR part 122.44(l) prohibit backsliding and require effluent limitations, permit conditions, and standards in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. Some effluent limitations in this Order are less stringent than those in the previous Order. As discussed in detail in the Fact Sheet (Attachment F), this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

Q. Endangered Species Act. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 United States Code sections 1531 to 1544). This Order requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the State. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

R. Monitoring and Reporting. 40 CFR part 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. California Water Code sections 13267 and 13383 authorize the Regional Water Boards to require technical and monitoring reports. This Monitoring and Reporting Program (Attachment E) establishes monitoring and reporting requirements to implement federal and State requirements.

S. Standard and Special Provisions. Standard Provisions that apply to all NPDES permits, in accordance with 40 CFR part 122.41 and additional provisions that apply to POTWs, in accordance with 40 CFR part 122.42, are provided in Attachment D. The Regional Water Board has also included in this Order special provisions applicable to the Discharger. The rationale for the special provisions contained in this Order is provided in the Fact Sheet (Attachment F).

T. Sanitary Sewer Overflows. The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on May 2, 2006, as amended. The General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions. Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating SSOs. The Discharger's collection system is part of the POTW that is subject to this Order. The Discharger must comply with both the General Order including its future amendments and this Order.

U. Sewage Sludge/Biosolids Requirements. Section 405 of the CWA and implementing regulations at 40 CFR part 503 require that producers of sewage sludge/biosolids meet certain reporting, handling, and use or disposal requirements. The State has not been delegated the authority to implement this program; therefore, USEPA is the implementing agency. This Order contains sewage sludge/biosolids requirements pursuant to 40 CFR 503 that are applicable to the Discharger.

V. Pretreatment. In compliance with 40 CFR part 403, the JOS developed a Pretreatment Program. In 1989, USEPA delegated the authority to administer pretreatment programs in California to the State and Regional Water Boards. Thus, this Regional Water Board became the approved authority for pretreatment programs in Los Angeles and Ventura Counties.

This Order includes the JOS's approved Pretreatment Program and requires the JOS to continue implementation and control of the Program throughout the JOS's service area, including contributing jurisdictions. The POTW, as Control Authority, may exercise its authority over the entire service area directly, as provided by State law, or may elect to enter into contracts or other multi-jurisdictional agreements with the contributing jurisdictions. In case the POTW elects to enter into inter-jurisdictional agreements, the POTW must ensure that discharges received from entities outside its political boundaries are regulated to the same extent as are the discharges from within its political boundaries.

W. Performance Goals. Chapter III, Section F.2, of the 2009 Ocean Plan allows the Regional Water Board to establish more restrictive water quality objectives and effluent limitations than those set forth in the Ocean Plan as necessary for the protection of the beneficial uses of ocean waters.

Pursuant to this provision and to implement the recommendation of the Water Quality Advisory Task Force (*Working Together for an Affordable Clean Water Environment, A Final Report presented to the California Water Quality Control Board, Los Angeles Region by Water Quality Advisory Task Force, September 30, 1993)* that was adopted by the Regional Water Board on November 1, 1993, performance goals that are more stringent than those based on Ocean Plan objectives are prescribed in this Order. This approach is consistent with the antidegradation policy in that it requires the Discharger to maintain its treatment level and effluent quality, recognizing normal variations in treatment efficiency and sampling and analytical techniques. However, this approach does not address substantial changes in treatment plant operations that could significantly affect the quality of the treated effluent.

The performance goals are based upon the actual performance of JWPCP and are specified only as an indication of the treatment efficiency of the Facility. Performance goals are intended to minimize pollutant loading (primarily for toxics) while maintaining the incentive for future voluntary improvement of water quality, whenever feasible, without the imposition of more stringent limits based on improved performance. They are not considered as limitations or standards for the regulation of the discharge from the treatment facility. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted. The methodology for calculating performance goals is described in the Fact Sheet (Attachment F).

X. Mass Emission Benchmarks. To address the uncertainty due to potential increases in toxic pollutant loadings from the JWPCP discharge to the marine environment during the five-year permit term, and to establish a framework for evaluating the need for an antidegradation analysis to determine compliance with State and federal antidegradation policies at the time of permit reissuance, 12-month average mass emission benchmarks have been established for effluent discharged through Discharge Points 001 and 002. These mass emission benchmarks are not enforceable water quality based effluent limitations. They may be re-evaluated and revised during the five-year permit term. The methodology for calculating mass emission benchmarks is described in the Fact Sheet (Attachment F).

Y. Notification of Interested Parties. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet of this Order.

Z. Consideration of Public Comment. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet of this Order.

THEREFORE, IT IS HEREBY ORDERED that this Order supersedes Order No. R4-2006-0042, except for enforcement purposes, and in order to meet the provisions contained in division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal Clean Water Act, and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

III. DISCHARGE PROHIBITIONS

A. Ocean Plan Discharge Prohibitions

1. The discharge of any radiological, chemical, or biological warfare agent or high-level radioactive waste into the ocean is prohibited.

2. Waste shall not be discharged to designated Areas of Special Biological Significance (ASBS).

3. Pipeline discharge of sludge to the ocean is prohibited by federal law; the discharge of municipal and industrial waste sludge directly to the ocean, or into a waste stream that discharges to the ocean, is prohibited by the Ocean Plan. Discharge of sludge digester supernatant directly to the ocean, or to a waste stream that discharges to the ocean without further treatment, is prohibited.

   It is the policy of the SWRCB that the treatment, use and disposal of sewage sludge shall be carried out in the manner found to have the least adverse impact on the total natural and human environment. Therefore, if federal law is amended to permit such discharge, which could affect California waters, the SWRCB may consider requests for exceptions to this section under Chapter III of the Ocean Plan, provided further that an Environmental Impact Report on the proposed project shows clearly that any available alternative disposal method will have a greater adverse environmental impact than the proposed project

4. The bypassing of untreated waste containing concentrations of pollutants in excess of those of Table A or Table B of the Ocean Plan to the ocean is prohibited.

B. The bypassing of untreated or partially treated wastes to the ocean is prohibited except as allowed in Standard Provisions I.G of Attachment D.

IV. EFFLUENT LIMITATIONS, PERFORMANCE GOALS, AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations and Performance Goals

Effluent limitations for Discharge Points 001, 002, 003 and 004 are given below. The discharge of an effluent with constituents in excess of effluent limitations is prohibited.

The performance goals for Discharge Points 001 and 002 are prescribed below. The listed performance goals are not enforceable effluent limitations or standards. However, the Discharger shall maintain, if not improve, its treatment efficiency. Any exceedance of the performance goals shall trigger an investigation into the cause of the exceedance. If the exceedance is 50% greater than the performance goal or occurs three times or more in five successive monitoring periods or any single exceedance occurs for aldrin and heptachlor epoxide, the Discharger shall submit a written report to the Regional Water Board on the nature of the exceedance, the results of the investigation as to the cause of the exceedance, and the corrective actions taken or proposed corrective measures with timetable for implementation, if necessary.

1. Final Effluent Limitations and Performance Goals - Discharge Points 001 and 002 (Initial dilution ratio = 166:1)

   The Discharger shall maintain compliance with the following effluent limitations at Discharge Points 001 and 002 when Discharge Points 001 and 002 are solely used as outfalls, with compliance measured at Monitoring Location EFF-001 and Manifold Stations (EFF-002A and 002B) as described in the attached MRP (Attachment E).

Table 8. Effluent Limitations and Performance Goals for Discharge Points 001 and 002
(Footnotes are specified on pages 18 through 21 of this Order.)

Parameter	Units	Effluent Limitations[1, 3]					Performance Goals[2]
		Average Monthly	Average Weekly	Maximum Daily[4]	Instan-taneous Minimum[5]	Instan-taneous Maximum[5]	Average Monthly
Major Wastewater Constituents							
Biochemical Oxygen Demand 5-day @ 20°C[6]	mg/L	30	45	--	--	--	--
	lbs/day	96,300	144,500	--	--	--	--
Total Suspended Solids[6]	mg/L	30	45	--	--	--	--
	lbs/day	96,300	144,500	--	--	--	--
pH[5, 6, 7]	standard units	--	--	--	6.0	9.0	--
Oil and Grease[7]	mg/L	15[8]	22.5[8]	45[8]	--	75	--
	lbs/day	48,200	72,200	144,500	--	--	--
Settleable Solids[7]	ml/L	0.5[8]	0.75[8]	1.5[8]	--	3.0	--
Turbidity[7]	NTU	75	100	--	--	225	--
Marine Aquatic Life Toxicants[9]							
Arsenic[10, 11]	µg/L	--	--	--	--	--	2.5 [a]
Cadmium[10, 11]	µg/L	--	--	--	--	--	0.1 [b]
Chromium (VI)[10,11]	µg/L	--	--	--	--	--	1.5 [b]
Copper[10, 11, 12]	µg/L	--	--	--	--	--	4.9 [a]
Lead[10, 11, 12]	µg/L	--	--	--	--	--	0.4 [a]
Mercury[10, 11]	µg/L	--	--	--	--	--	0.04 [c]
Nickel[10, 11]	µg/L	--	--	--	--	--	13 [c]
Selenium[10, 11]	µg/L	--	--	--	--	--	7.6 [c]
Silver[10, 11, 12]	µg/L	--	--	--	--	--	0.2 [b]
Zinc[10, 11, 12]	µg/L	--	--	--	--	--	37 [a]
Cyanide[11]	µg/L	--	--	--	--	--	19 [a]
Chlorine Residual[13] (at Manifold Stations)	µg/L	330	--	1,300	--	10,000	196 [a]
	lbs/day	1,060	--	4,170	--	--	--
Ammonia as N[11]	mg/L	--	--	--	--	--	40 [c]
Phenolic compounds (non-chlorinated)[11, 14]	µg/L	--	--	--	--	--	3.6 [c]

Parameter	Units	Effluent Limitations[1, 3]					Performance Goals[2]
		Average Monthly	Average Weekly	Maximum Daily[4]	Instan-taneous Minimum[5]	Instan-taneous Maximum[5]	Average Monthly
Phenolic compounds (chlorinated)[11, 15]	µg/L	--	--	--	--	--	1.9 [b]
Endosulfan[11, 16]	µg/L	--	--	--	--	--	0.015 [b]
HCH[11, 17]	µg/L	--	--	--	--	--	0.015 [b]
Endrin[11]	µg/L	--	--	--	--	--	0.01 [b]
Acute toxicity [18]	TUa	--	--	5.3	--	--	--
Chronic toxicity [19]	TUc	--	--	167	--	--	--
Radioactivity							
Gross alpha	pCi/L	--	--	--	--	--	6.3 [a]
Gross beta	pCi/L	--	--	--	--	--	29 [a]
Human Health Toxicants – Non Carcinogens[9]							
Acrolein[11]	µg/L	--	--	--	--	--	5.2 [b]
Antimony[10,11]	µg/L	--	--	--	--	--	9.8 [c]
Bis(2-chloroethoxy) methane[11]	µg/L	--	--	--	--	--	1.3 [b]
Bis(2-chloroisopropyl) ether[11]	µg/L	--	--	--	--	--	1.6 [b]
Chlorobenzene[11]	µg/L	--	--	--	--	--	1.2 [b]
Chromium (III)[10,11]	µg/L	--	--	--	--	--	3.3 [a]
Di-n-butyl-phthalate[11]	µg/L	--	--	--	--	--	4.4 [c]
Dichlorobenzenes[11, 20]	µg/L	--	--	--	--	--	0.5 [c]
Diethyl phthalate[11]	µg/L	--	--	--	--	--	2.1 [b]
Dimethyl phthalate[11]	µg/L	--	--	--	--	--	1.9 [b]
2-Methyl-4,6-dinitrophenol[11]	µg/L	--	--	--	--	--	13 [b]
2,4-Dinitrophenol[11]	µg/L	--	--	--	--	--	17 [b]
Ethyl benzene[11]	µg/L	--	--	--	--	--	1.9 [b]
Fluoranthene[11]	µg/L	--	--	--	--	--	1.9 [b]
Hexachlorocyclopentadiene[11]	µg/L	--	--	--	--	--	7.5 [b]
Nitrobenzene[11]	µg/L	--	--	--	--	--	2.2 [b]
Thallium[10, 11]	µg/L	--	--	--	--	--	0.6 [b]
Toluene[11]	µg/L	--	--	--	--	--	0.5 [c]
Tributyltin[11]	µg/L	--	--	--	--	--	0.01 [b]
1,1,1-Trichloroethane[11]	µg/L	--	--	--	--	--	1.8 [b]
Human Health Toxicants – Carcinogens[9]							
Acrylonitrile[11]	µg/L	--	--	--	--	--	2.7 [b]
Aldrin[11]	µg/L	--	--	--	--	--	0.0037 [d]
Benzene[11]	µg/L	--	--	--	--	--	0.75 [b]
Benzidine	µg/L	0.012	--	--	--	--	[e]
	lbs/day	0.039	--	--	--	--	--
Beryllium [10, 11]	µg/L	--	--	--	--	--	0.15 [b]
Bis(2-chloroethyl) ether[11]	µg/L	--	--	--	--	--	0.95 [b]

Parameter	Units	Effluent Limitations[1, 3]					Performance Goals[2]
		Average Monthly	Average Weekly	Maximum Daily[4]	Instan-taneous Minimum[5]	Instan-taneous Maximum[5]	Average Monthly
Bis(2-ethylhexyl) phthalate[11]	µg/L	--	--	--	--	--	17 [c]
Carbon tetrachloride[11]	µg/L	--	--	--	--	--	1 [b]
Chlordane [21]	µg/L	0.0038	--	--	--	--	[e]
	lbs/day	0.012	--	--	--	--	--
Chlorodibromomethane[11]	µg/L	--	--	--	--	--	0.6 [c]
Chloroform[11]	µg/L	--	--	--	--	--	30 [c]
DDT [22]	µg/L	0.028	--	--	--	--	0.015 [b]
	lbs/day	0.090	--	--	--	--	--
1,4-Dichlorobenzene[11]	µg/L	--	--	--	--	--	1 [c]
3,3'-Dichlorobenzidine	µg/L	1.4	--	--	--	--	[e]
	lbs/day	4.5					--
1,2-Dichloroethane[11]	µg/L	--	--	--	--	--	0.6 [c]
1,1-Dichloroethylene[11]	µg/L	--	--	--	--	--	1.1 [b]
Bromodichloromethane[11]	µg/L	--	--	--	--	--	2 [c]
Dichloromethane[11]	µg/L	--	--	--	--	--	3 [c]
1,3-Dichloropropene[11]	µg/L	--	--	--	--	--	0.65 [b]
Dieldrin[11]	µg/L	--	--	--	--	--	0.005 [b]
2,4-Dinitrotoluene[11]	µg/L	--	--	--	--	--	1 [b]
1,2-Diphenylhydrazine[11]	µg/L	--	--	--	--	--	0.65 [b]
Halomethanes[11, 23]	µg/L	--	--	--	--	--	1 [c]
Heptachlor[11]	µg/L	--	--	--	--	--	0.005 [b]
Heptachlor epoxide[11]	µg/L	--	--	--	--	--	0.0033 [d]
Hexachlorobenzene	µg/L	0.035	--	--	--	--	[e]
	lbs/day	0.11					--
Hexachlorobutadiene[11]	µg/L	--	--	--	--	--	0.7 [b]
Hexachloroethane[11]	µg/L	--	--	--	--	--	0.7 [b]
Isophorone[11]	µg/L	--	--	--	--	--	0.65 [b]
N-Nitrosodimethylamine[11]	µg/L	--	--	--	--	--	0.7 [b]
N-Nitrosodi-N-propylamine[11]	µg/L	--	--	--	--	--	0.6 [b]
N-Nitrosodiphenylamine[11]	µg/L	--	--	--	--	--	0.75 [b]
PAHs[11, 24]	µg/L	--	--	--	--	--	0.95 [b]
PCBs [25]	µg/L	0.0032	--	--	--	--	[e]
	lbs/day	0.010	--	--	--	--	--
TCDD equivalents [26]	**pg/L**	0.65	--	--	--	--	[e]
	lbs/day	2.1×10^{-6}	--	--	--	--	--
1,1,2,2-Tetrachloroethane[11]	µg/L	--	--	--	--	--	0.4 [b]
Tetrachloroethylene[11]	µg/L	--	--	--	--	--	20 [a]
Toxaphene	µg/L	0.035	--	--	--	--	[e]
	lbs/day	0.11	--	--	--	--	--
Trichloroethylene[11]	µg/L	--	--	--	--	--	0.85 [b]
1,1,2-Trichloroethane[11]	µg/L	--	--	--	--	--	0.45 [b]

Parameter	Units	Effluent Limitations[1, 3]					Performance Goals[2]
		Average Monthly	Average Weekly	Maximum Daily[4]	Instan-taneous Minimum[5]	Instan-taneous Maximum[5]	Average Monthly
2,4,6-Trichlorophenol[11]	µg/L	--	--	--	--	--	0.6 [b]
Vinyl chloride[11]	µg/L	--	--	--	--	--	1.3 [b]

2. Final Effluent Limitations – Discharge Point 003 (Initial dilution ratio = 150:1)

   The Discharger shall maintain compliance with the following effluent limitations at Discharge Point 003 when Discharge Point 003 is also used as an outfall, with compliance measured at Monitoring Location EFF-001 and Manifold station EFF-002A as described in the attached MRP.

Table 9. Effluent Limitations for Discharge Point 003
(Footnotes are specified on pages 18 through 21 of this Order.)

Parameter	Units	Effluent Limitations[1,3]					Performance Goals[2]
		Average Monthly	Average Weekly	Maximum Daily[4]	Instan-taneous Minimum[5]	Instan-taneous Maximum[5]	Average Monthly
Major Wastewater Constituents							
Biochemical Oxygen Demand 5-day @ 20°C[6]	mg/L	30	45	--	--	--	--
	lbs/day	96,300	144,500	--	--	--	--
Total Suspended Solids[6]	mg/L	30	45	--	--	--	--
	lbs/day	96,300	144,500	--	--	--	--
pH[5, 6 7]	standard units	--	--	--	6.0	9.0	--
Oil and Grease[7]	mg/L	15[8]	22.5[8]	45[8]	--	75	--
	lbs/day	48,200	72,200	144,500	--	--	--
Settleable Solids[7]	ml/L	0.5[8]	0.75[8]	1.5[8]	--	3.0	--
Turbidity[7]	NTU	75	100	--	--	225	--
Marine Aquatic Life Toxicants[9]							
Chlorine Residual[13]	µg/L	300	--	1,200	--	9,100	--
Acute toxicity [18]	TUa	--	--	4.8	--	--	--
Chronic toxicity[19]	TUc	--	--	151	--	--	--
Human Health Toxicants – Carcinogens[9]							
Benzidine	µg/L	0.010	--	--	--	--	--
Chlordane [21]	µg/L	0.0034	--	--	--	--	--
DDT [22]	µg/L	0.026	--	--	--	--	--
3,3'-Dichlorobenzidine	µg/L	1.2	--	--	--	--	--
Hexachlorobenzene	µg/L	0.032	--	--	--	--	--
PCBs [25]	µg/L	0.0029	--	--	--	--	--
TCDD equivalents [26]	**pg/L**	0.59	--	--	--	--	--
Toxaphene	µg/L	0.032	--	--	--	--	--

3. Final Effluent Limitations – Discharge Point 004 (Initial dilution ratio = 115:1)

The Discharger shall maintain compliance with the following effluent limitations at Discharge Point 004 when Discharge Point 004 is also used as an outfall, with compliance measured at Monitoring Location EFF-001 and Manifold station EFF-002B as described in the attached MRP.

Table 10. Effluent Limitations for Discharge Point 004
(Footnotes are specified on pages 18 through 21 of this Order.)

Parameter	Units	Effluent Limitations[1,3]					Performance Goals[2]
		Average Monthly	Average Weekly	Maximum Daily[4]	Instan-taneous Minimum[5]	Instan-taneous Maximum[5]	Average Monthly
Major Wastewater Constituents							
Biochemical Oxygen Demand 5-day @ 20°C[6]	mg/L	30	45	--	--	--	--
	lbs/day	96,300	144,500	--	--	--	--
Total Suspended Solids[6]	mg/L	30	45	--	--	--	--
	lbs/day	96,300	144,500	--	--	--	--
pH[5, 6 7]	standard units	--	--	--	6.0	9.0	--
Oil and Grease[7]	mg/L	15[8]	22.5[8]	45[8]	--	75	--
	lbs/day	48,200	72,200	144,500	--	--	--
Settleable Solids[7]	ml/L	0.5[8]	0.75[8]	1.5[8]	--	3.0	--
Turbidity[7]	NTU	75	100	--	--	225	--
Marine Aquatic Life Toxicants[9]							
Chlorine Residual[13]	µg/L	230	--	930	--	7,000	--
Acute toxicity [18]	TUa	--	--	3.8	--	--	--
Chronic toxicity[19]	TUc	--	--	116	--	--	--
Human Health Toxicants – Carcinogens[9]							
Benzidine	µg/L	0.008	--	--	--	--	--
Chlordane [21]	µg/L	0.0027	--	--	--	--	--
DDT [22]	µg/L	0.020	--	--	--	--	--
3,3'-Dichlorobenzidine	µg/L	0.93	--	--	--	--	--
Hexachlorobenzene	µg/L	0.024	--	--	--	--	--
PCBs [25]	µg/L	0.0022	--	--	--	--	--
TCDD equivalents [26]	**pg/L**	0.45	--	--	--	--	--
Toxaphene	µg/L	0.024	--	--	--	--	--

Footnotes for Effluent Limitations and Performance Goals (Tables 8, 9 and10)

1. Effluent limitations for conventional, nonconventional, and toxic pollutants were calculated based on effluent limitations in *Table A* and water quality objectives in *Table B* of the Ocean Plan. The minimum dilution ratios used to calculate effluent limitations for nonconventional and toxic pollutants based on water quality objectives in *Table B* of the Ocean Plan are 166:1 (i.e., 166 parts seawater to one part effluent) for Discharge Points 001 and 002, 150:1 for Discharge Point 003, and 115:1 for Discharge Point 004, respectively.

The daily mass emission calculations are based on the average design flow rate of 385 million gallons per day (mgd) specified in the 1997 Joint Water Pollution Control Plant (JWPCP) permit according to the Ocean Plan equation: lbs/day = 0.00834 x Ce (effluent concentration, ug/L) x Q (flow rate, MGD). During storm events when flow exceeds the dry weather design capacity, the mass emission rate limits shall not apply. Only the concentration limits shall apply.

2. The performance goals are based upon the actual performance data (May 2006 to August 2010) of the JWPCP and are specified only as an indication of the treatment efficiency of the plant. They are not considered effluent limitations or standards for the treatment plant. JWPCP shall make best efforts to maintain, if not improve, the effluent quality at the level of these performance goals. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted. Please refer to Fact Sheet for procedures.

3. See Section VII of this Order and Attachment A for definition of terms.

4. The maximum daily effluent concentration limitation shall apply to flow-weighted 24-hour composite samples. It may apply to grab samples if the collection of composite samples for those constituents is not appropriate because of the instability of the constituents.

5. The instantaneous maximum/minimum effluent limitations shall apply to grab sample results.

6. The effluent limitations are based on secondary treatment standards, 40 CFR part 133.102.

7. Based on Ocean Plan Table A effluent limitations.

8. Effluent limitation is the same as that in Order No. R4-2006-0042 and is more stringent than the limitation specified in the Ocean Plan (Antibacksliding Policy).

9. Effluent limitations for these constituents are based on Ocean Plan Table B objectives using initial dilution ratios of 166:1 (i.e., 166 parts of seawater to 1 part effluent) for Discharge Points 001 and 002, 150:1 for Discharge Point 003, and 115:1 for Discharge Point 004, respectively. However, for the calculation of the acute toxicity limitation, only 10% of the initial dilution ratio is used.

10. Represents total recoverable metal value.

11. These constituents did not show reasonable potential to exceed Ocean Plan Table B objectives; therefore, no numerical water quality-based effluent limits are prescribed.

12. These constituents are pollutants of concern identified by the Santa Monica Bay Restoration Plan that are causing or could cause deterioration of designated beneficial uses in Santa Monica Bay. Mass emission performance caps were set in Order No. 97-090. In this Order, 12-month average mass emission benchmarks have been established in the MRP (Attachment E) for these pollutants of concern to serve same purpose.

13. These total chlorine residual limits shall only apply to continuous discharge exceeding two hours.

For intermittent discharges not exceeding two hours, water quality objectives for total chlorine residual shall be determined through the use of the following equation:

$$\log y = -0.43(\log x) + 1.8$$

where: y = the water quality objective (in µg/L) to apply when chlorine is being discharged;
x = the duration of uninterrupted chlorine discharge in minutes.

For intermittent discharges not exceeding two hours, the applicable total chlorine residual limit (daily maximum) shall then be calculated using the above calculated water quality objective according to procedures outlined in Section III.C.4.a of the 2009 Ocean Plan. The minimum dilution ratios shall be 166:1 for Discharge Points 001 and 002, 150:1 for Discharge Point 003, and 115:1 for Discharge Point 004.

14. Nonchlorinated phenolic compounds shall mean the sum of Phenol, 2,4-Dimethylphenol, 2-Nitrophenol, 4-Nitrophenol, 2,4-Dinitrophenol and 2-Methyl-4,6-dinitrophenol.

15. Chlorinated phenolic compounds mean the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-Methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

16. Endosulfan shall mean the sum of endosulfan-alpha, endosulfan-beta, and endosulfan sulfate.

17. HCH shall mean the sum of alpha, beta, gamma (lindane), and delta isomers of hexachlorocyclohexane.

18. Expressed as Acute Toxicity Units (TUa)

$$TUa = 100/LC50$$

Where:
Lethal Concentration, 50 Percent (LC50) is expressed as the estimate of the percent effluent concentration that causes death in 50% of the test population, in the time period prescribed by the toxicity test, as required by this permit.

When it is not possible to measure the LC50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \log (100-S)/1.7$$

Where:
S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

19. Expressed as Chronic Toxicity Units (TUc)

$$TUc = 100/NOEC$$

Where:
NOEC (No Observed Effect Concentration) is expressed as the maximum percent effluent that causes no observable effect on a test organism as determined by the result of a critical life stage toxicity test, as required by this permit.

20. Dichlorobenzenes shall mean the sum of 1,2- and 1,3-dichlorobenzene.

21. Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma and oxychlordane.

22. DDT shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

23. Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

24. PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1, 2-benzanthracene, 3, 4-benzofluoranthene, benzo[k]-fluoranthene, 1, 12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1, 2, 3-cd]pyrene, phenanthrene and pyrene.

25. PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-l232, Aroclor-1242, Aroclor-l248, Aroclor-1254 and Aroclor-1260.

26. TCDD equivalents shall mean the sum of the concentration of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below:

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
1,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

[a.] Numerical effluent quality performance goals are derived statistically using data reported by the Discharger from May 2006 to August 2010. Please refer to Fact Sheet (Attachment F) for calculation procedures.

[b.] More than 80 percent of the monitoring data for these constituents were not detected. Performance goals are set at five times (for carcinogens and marine aquatic life toxicants) or ten times (for noncarcinogens) the method detection limits in the 2010 monitoring reports.

[c.] For this pollutant, the maximum detected effluent concentration (MDEC) from May 2006 to August 2010 is prescribed as the performance goal. Please refer to Fact Sheet (Attachment F) for procedures.

[d.] These constituents were determined to have no reasonable potential to exceed the respective water quality objectives. However, the calculated performance goals are greater than the respective calculated Ocean Plan effluent limitations. Therefore, calculated effluent limitations are prescribed as the performance goals.

[e.] These constituents were determined to have reasonable potential to exceed the respective water quality objectives. Therefore, effluent limitations are prescribed for these constituents. Since the calculated performance goals are greater than the respective effluent limitations, no performance goals are prescribed.

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4. **Percent Removal:** The average monthly percent removal of BOD 5-day 20°C and total suspended solids shall not be less than 85 percent.

5. The temperature of wastes discharged shall not exceed 100°F, which takes into account the very large dilution credit based upon BPJ.

6. The Discharger shall ensure that bacterial concentrations in the effluent discharge do not result in an exceedance of the JWPCP waste load allocation of zero (0) days exceedance of single sample numeric limits or geometric mean limits (based on Basin Plan bacteria objectives for marine waters designated REC-1, see section V.A.1.a. below) at shoreline compliance points, as specified in Regional Water Board Resolution Nos. 2002-004 and 2002-022.

7. Waste discharged to the ocean must be essentially free of:

   a. Material that is floatable or will become floatable upon discharge.

   b. Settleable material or substances that may form sediments which will degrade benthic communities or other aquatic life.

   c. Substances that will accumulate to toxic levels in marine waters, sediments or biota.

d. Substances that significantly decrease the natural light to benthic communities and other marine life.

e. Materials that result in aesthetically undesirable discoloration of the ocean surface.

V. RECEIVING WATER LIMITATIONS

The Discharger shall not cause a violation of the water quality objectives discussed below. Compliance with these water quality objectives shall be determined by samples collected at stations representative of the area within the waste field where the initial dilution is completed.

A. Surface Water Limitations

1. Bacterial Characteristics

a. State/Regional Water Board Water Contact Standards

Within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline, and in areas outside this zone used for water contact sports, as determined by the Regional Water Board (i.e., waters designated as REC-1), but including all kelp beds, the following bacterial objectives shall be maintained throughout the water column:

30-day Geometric Mean Limits
i. Total coliform density shall not exceed 1,000/100 ml.
ii. Fecal coliform density shall not exceed 200/100 ml.
iii. Enterococcus density shall not exceed 35/100 ml.

Single Sample Maximum (SSM)
i. Total coliform density shall not exceed 10,000/100 ml.
ii. Fecal coliform density shall not exceed 400/100 ml.
iii. Enterococcus density shall not exceed 104/100 ml.
iv. Total coliform density shall not exceed 1,000/100 ml, when the fecal coliform/total coliform ratio exceeds 0.1.

If any of the single sample limits are exceeded, the Regional Water Board may require repeat sampling on a daily basis until the sample falls below the single sample limit in order to determine the persistence of the exceedance. When repeat sampling is required because of an exceedance of any single sample limit, values from all samples collected during that 30-day period will be used to calculate the geometric mean.

During a wet-weather event, stormwater runoff will impact shoreline, inshore and offshore stations. The day of rain (0.1 inch and greater) plus three following days worth of bacteriology data should be excluded from Single Sample and Geometric mean limits.

b. The Initial Dilution Zone for any wastewater outfall shall be excluded from designation as kelp beds for purposes of bacterial standards. Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp beds for purposes of bacterial standards.

c. California Department of Public Health (CDPH) Standards

CDPH has established minimum protective bacteriological standards for coastal waters adjacent to public beaches and for public water-contact sports areas in ocean waters. These standards are found in the California Code of Regulations, title 17, section 7958, and they are identical to the objectives contained in subsection a, above. When a public beach or public water-contact sports area fails to meet these standards, CDPH or the local public health officer may post with warning signs or otherwise restrict use of the public beach or public water-contact sports area until the standards are met. The CDPH regulations impose more frequent monitoring and more stringent posting and closure requirements on certain high-use public beaches that are located adjacent to a storm drain that flows in the summer.

For beaches not covered under AB 411 regulations (this incorporation by reference is prospective including future changes to the incorporated provisions as changes take effect), CDPH imposes the same standards as contained in title 17, California Code of Regulations, and requires weekly sampling but allows the county health officer more discretion in making posting and closure decisions.

d. Shellfish Harvesting Standards

At all areas where shellfish may be harvested for human consumption, as determined by the Regional Water Board, the following bacterial objectives shall be maintained throughout the water column:

The median total coliform density for any 6-month period shall not exceed 70 per 100 ml, and not more than 10 percent of the samples for any 6-month period shall exceed 230 per 100 ml.

2. Physical Characteristics

The waste discharged shall not:

a. Cause floating particulates and oil and grease to be visible;

b. Cause aesthetically undesirable discoloration of the ocean surface;

c. Significantly reduce the transmittance of natural light at any point outside the initial dilution zone; or,

d. Change the rate of deposition of inert solids and the characteristics of inert solids in ocean sediments such that benthic communities are degraded.

3. Chemical Characteristics

The waste discharged shall not:

a. Cause the dissolved oxygen concentration at any time to be depressed more than 10 percent from that which occurs naturally, as a result of the discharge of oxygen demanding waste materials;

b. Change the pH of the receiving waters at any time more than 0.2 units from that which occurs naturally;

c. Cause the dissolved sulfide concentration of waters in and near sediments to be significantly increased above that present under natural conditions;

d. Cause the concentration of substances set forth in Chapter II, Table B of the Ocean Plan, in marine sediments to be increased to levels that would degrade indigenous biota;

e. Cause the concentration of organic materials in marine sediments to be increased to levels that would degrade marine life; or,

f. Contain nutrients at levels that will cause objectionable aquatic growths or degrade indigenous biota.

4. Biological Characteristics

The waste discharged shall not:

a. Degrade marine communities, including vertebrate, invertebrate, and plant species;

b. Alter the natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption; or,

c. Cause the concentration of organic materials in fish, shellfish or other marine resources used for human consumption to bioaccumulate to levels that are harmful to human health.

5. Radioactivity

Discharge of radioactive waste shall not degrade marine life.

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions included in Attachment D of this Order.

2. The Discharger shall comply with the following Regional Water Board provisions:

a. Neither the treatment nor the discharge of pollutants shall create pollution, contamination, or nuisance as defined by Section 13050 of the California Water Code.

b. Odors, vectors, and other nuisances of sewage or sludge origin beyond the limits of the treatment plant site or the sewage collection system due to improper operation of facilities, as determined by the Regional Water Board, are prohibited.

c. All facilities used for collection, transport, treatment, or disposal of wastes shall be adequately protected against damage resulting from overflow, washout, or inundation from a storm or flood having a recurrence interval of once in 100 years.

d. Collection, treatment, and disposal systems shall be operated in a manner that precludes public contact with wastewater.

e. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer of the Regional Water Board.

f. The provisions of this order are severable. If any provision of this order is found invalid, the remainder of this Order shall not be affected.

g. Nothing in this Order shall be construed to preclude the institution of any legal action or relieve the Discharger from any responsibilities, liabilities or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the CWA.

h. Nothing in this Order shall be construed to preclude the institution of any legal action or relieve the Discharger from any responsibilities, liabilities or penalties to which the Discharger is or may be subject to under Section 311 of the CWA.

i. The Discharger must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to storm drain systems or other water courses under their jurisdiction; including applicable requirements in the municipal storm water management program developed to comply with NPDES permits issued by the Regional Water Board to local agencies.

j. Discharge of wastes to any point other than specifically described in this Order is prohibited, and constitutes a violation thereof.

k. The Discharger shall comply with all applicable effluent limitations, national standards of performance, toxic effluent standards, and all federal regulations established pursuant to sections 301, 302, 303(d), 304, 306, 307, 316, 403, and 405 of the federal CWA and amendments thereto.

l. These requirements do not exempt the operator of the waste disposal facility from compliance with any other laws, regulations, or ordinances which may be applicable; they do not legalize this waste disposal facility, and they leave unaffected any further restraints on the disposal of wastes at this site which may be contained in other statutes or required by other agencies.

m. Oil or oily material, chemicals, refuse, or other pollutionable materials shall not be stored or deposited in areas where they may be picked up by rainfall and carried off of the property and/or discharged to surface waters. Any such spill of such materials shall be contained and removed immediately.

n. A copy of these waste discharge specifications shall be maintained at the discharge facility so as to be available at all times to operating personnel.

o. If there is any storage of hazardous or toxic materials or hydrocarbons at this facility and if the facility is not manned at all times, a 24-hour emergency response telephone number shall be prominently posted where it can easily be read from the outside.

p. The Discharger shall file with the Regional Water Board a report of waste discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge.

q. In the event of any change in name, ownership, or control of these waste disposal facilities, the discharger shall notify the Regional Water Board of such change and shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Water Board.

r. The CWC provides that any person who violates a waste discharge requirement or a provision of the CWC is subject to civil penalties of up to $5,000 per day, $10,000 per day, or $25,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil penalties of up to $10 per gallon per day or $25 per gallon per day of violation; or some combination thereof, depending on the violation, or upon the combination of violations.

   Violation of any of the provisions of the NPDES program or of any of the provisions of this Order may subject the violator to any of the penalties described herein, or any combination thereof, at the discretion of the prosecuting authority; except that only one kind of penalty may be applied for each kind of violation.

s. Under CWC 13387, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this order, including monitoring reports or reports of compliance or noncompliance, or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained in this order and is subject to a fine of not more than $25,000 or imprisonment of not more than two years, or both. For a second conviction, such a person shall be punished by a fine of not more than $25,000 per day of violation, or by imprisonment of not more than four years, or by both.

t. The discharge of any waste resulting from the combustion of toxic or hazardous wastes to any waste stream that ultimately discharges to waters of the United States is prohibited, unless specifically authorized elsewhere in this Order.

u. The Discharger shall notify the Executive Officer in writing no later than 6 months prior to planned discharge of any chemical, other than the products previously reported to the Executive Officer, which may be toxic to aquatic life. Such notification shall include:

   i. Name and general composition of the chemical,
   ii. Frequency of use,
   iii. Quantities to be used,
   iv. Proposed discharge concentrations, and
   v. USEPA registration number, if applicable.

B. Monitoring and Reporting Program Requirements

1. The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order.

2. Hardcopy reports required to be submitted to the Regional Water Board shall be sent to:

   California Regional Water Quality Control Board
   Los Angeles Region
   320 West 4th Street, Suite 200
   Los Angeles, CA 90013
   Attention: Information Technology Unit

Notifications and report required to be provided to the Regional Water Board shall be made to:

Telephone – (213) 576-6616
Facsimile – (213) 576-6660

3. After notification by the State or Regional Water Board the Discharger may be required to electronically submit self-monitoring reports (SMRs) and discharge monitoring reports (DMRs). Until such a time as electronic submissions are required, the Discharger shall submit SMRs and DMRs in accordance with the requirements in this Order.

   Hardcopy DMRs must be signed and certified as required by the Standard Provisions of this Order (Attachment D). The Discharger shall submit the original hardcopy DMR to:

Standard Mail	FedEx/UPS/ Other Private Carriers
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15th Floor Sacramento, CA 95814

   All hardcopy discharge monitoring results should be reported on the official USEPA pre-printed DMR forms (USEPA Form 3320-1). Forms that are self-generated must be approved by USEPA.

C. Special Provisions

1. Reopener Provisions

a. This Order may be reopened and modified to incorporate new limits based on future reasonable potential analyses to be conducted based on on-going monitoring data collected by the Discharger and evaluated by the Regional Water Board.

b. This Order may be reopened and modified, to incorporate new mass emission limitations based on the current JWPCP's design capacity of 400 MGD provided that the Discharger requests and conducts an antidegradation analysis to demonstrate that the change is warranted.

c. This Order may be reopened and modified, in accordance with the provisions set forth in 40 CFR parts 122 and 124, to incorporate requirements for the implementation of the watershed protection management approach.

d. This Order may be modified, in accordance with the provisions set forth in 40 CFR parts 122 and 124, to include new Minimum Levels (ML).

e. This Order may be reopened and modified to revise effluent limitations as a result of future Basin Plan Amendments or the adoption of a TMDL for Santa Monica Bay Watershed Management Areas.

f. The Regional Water Board may modify, or revoke and reissue this Order if present or future investigations demonstrate that the discharge(s) governed by this Order will cause, have the

potential to cause, or will contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters.

g. This Order may be modified, revoked, and reissued or terminated in accordance with the provisions of 40 CFR parts 122.44, 122.62 to 122.64, 125.62, and 125.64. Causes for taking such actions include, but are not limited to, failure to comply with any condition of this Order, endangerment to human health or the environment resulting from the permitted activity, or acquisition of newly obtained information which would have justified the application of different conditions if known at the time of Order adoption and issuance. The filing of a request by the Discharger for an Order modification, revocation, and issuance or termination, or a notification of planned changes or anticipated noncompliances does not stay any condition of this Order.

h. This Order may be reopened and modified by the Regional Water Board to incorporate conforming monitoring requirements and schedule dates for implementation of the Comprehensive Monitoring Program for Santa Monica Bay (Santa Monica Bay Restoration Commission, January 2007).

2. **Special Studies, Technical Reports and Additional Monitoring Requirements**

a. **Treatment Plant Capacity**

The Discharger shall submit a written report to the Executive Officer of the Regional Water Board within 90 days after the "30-day (monthly) average" daily dry-weather flow equals or exceeds 75 percent of the design capacity (i.e., 400 MGD) of waste treatment and/or disposal facilities. The Discharger's senior administrative officer shall sign a letter, which transmits that report and certifies that the Discharger's policy-making body is adequately informed of the report's contents. The report shall include the following:

i. The average daily flow for the month, the date on which the maximum daily flow (peak flow) occurred, and the rate of that maximum flow;

ii. The Discharger's best estimate of when the monthly average daily dry-weather flow will equal or exceed the design capacity of the POTW; and

iii. The Discharger's plans to provide additional capacity for waste treatment and/or disposal facilities before the waste flow exceeds the capacity of the POTW. This requirement can be satisfied by referencing and attaching to the report relevant portions of the wastewater planning documents developed in response to this requirement that provide a roadmap for infrastructure and program upgrades and strategies to meet projected increases in the Discharger's wastewater treatment capacity.

This requirement is applicable to those facilities which have not reached 75 percent of capacity as of the effective date of this Order. For those facilities that have reached 75 percent of capacity by that date, such report or an updated report shall be filed within 90 days of the issuance of this Order.

3. **Best Management Practices and Pollution Prevention**

a. **Storm Water Pollution Prevention Plan (SWPPP)** - The JWPCP is regulated under the State Water Board Water Quality Order No. 97-03-DWQ, NPDES General Permit No. CAS000001

(General Permit), WDRs for Discharge of Storm Water Associated with Industrial Activities Excluding Construction Activities.

b. **Spill Clean-Up Contingency Plan (SCCP)**

The Discharger shall maintain a SCCP for JWPCP and its sanitary sewage collection system in an up-to-date condition and shall amend the SCCP whenever there is a change (e.g. in the design, construction, operation, or maintenance of the sewage system or sewage facilities) which materially affects the potential for spills. The Discharger shall review and amend the SCCP as appropriate after each spill from JWPCP or in the service area of the Facility. Upon request of the Regional Water Board, the Discharger shall submit the SCCP and any amendments to the Regional Water Board. The Discharger shall ensure that the up-to-date SCCP is readily available to the sewage system personnel at all times and that the sewage system personnel are familiar with it.

Within six months of the adoption of this Order, the Discharger should submit an updated SCCP, which provides the most applicable containment, cleanup and monitoring of sewer spills or overflows that reach water bodies, including dry channels and beach sands, that considers the information developed by the Sanitation Districts of Los Angeles County's efforts to develop a statewide approach, to the Executive Officer of the Regional Board.

The updated SCCP shall include a conceptual monitoring protocol for spills greater than 10,000 gallons to beach sands to (1) define the extent of waste discharged to beach sands and adjacent surface waters and (2) to confirm the conclusion and effectiveness of the clean-up and/or mitigation measures. The plan shall include a protocol for coordination with the local Health Department during such an event. This component of the plan shall be posted on the website for stakeholder review and comment for 30 days prior to EO approval.

c. **Pollutant Minimization Program (PMP)**

Reporting protocols in the Monitoring and Reporting Program, Attachment E, describe sample results that are to be reported as Detected but Not Quantified (DNQ) or Not Detected (ND). Definitions for a reported Minimum Level (ML) and Method Detection Limit (MDL) are provided in Attachment A. These reporting protocols and definitions are used in determining the need to conduct a Pollution Minimization Program (PMP) as follows.

The Discharger shall be required to develop and conduct a PMP as further described below when there is evidence (e.g., sample results reported as DNQ when the effluent limitation is less than the MDL, sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) that a pollutant is present in the effluent above an effluent limitation and either:

i. The concentration of the pollutant is reported as DNQ and the effluent limitation is less than the reported ML; or

ii. The concentration of the pollutant is reported as ND and the effluent limitation is less than the MDL.

The goal of the PMP shall be to reduce all potential sources of a pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to

maintain the effluent concentration at or below the effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Regional Water Board may consider cost-effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to CWC Section 13263.3(d), shall be considered to fulfill the PMP requirements.

The PMP shall include, but not be limited to, the following actions and submittals acceptable to the Regional Water Board:

i. An annual review and semi-annual monitoring of potential sources of the reportable pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling;

ii. Quarterly monitoring for the reportable pollutant(s) in the influent to the wastewater treatment system;

iii. Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable pollutant(s) in the effluent at or below the effluent limitation;

iv. Implementation of appropriate cost-effective control measures for the reportable pollutant(s), consistent with the control strategy; and

v. An annual status report that shall be sent to the Regional Water Board including:

a) All PMP monitoring results for the previous year;

b) A list of potential sources of the reportable pollutant(s);

c) A summary of all actions undertaken pursuant to the control strategy; and

d) A description of actions to be taken in the following year.

4. **Construction, Operation and Maintenance Specification**

a. Wastewater treatment facilities subject to this Order shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Chapter 3, Subchapter 14, Title 23 of the California Code of Regulations (Section 13625 of the California Water Code).

b. The Discharger shall maintain in good working order a sufficient alternate power source for operating the wastewater treatment and disposal facilities. All equipment shall be located to minimize failure due to moisture, liquid spray, flooding, and other physical phenomena. The alternate power source shall be designed to permit inspection and maintenance and shall provide for periodic testing. If such alternate power source is not in existence, the discharger shall halt, reduce, or otherwise control all discharges upon the reduction, loss, or failure of the primary source of power.

c. Emergency Power Facilities

The Discharger shall provide standby or emergency power facilities and/or storage capacity or other means so that in the event of plant upset or outage due to power failure or other cause, discharge of raw or inadequately treated sewage does not occur.

5. **Special Provisions for Municipal Facilities (POTWs Only)**

a. **Biosolids Requirements –** Refer to Attachment H

b. **Pretreament Requirements** – Refer to Attachment I

c. **Spill Reporting Requirements for POTWs**

i. Initial Notification

This requirement is an appropriate mechanism to ensure that the agencies that have first responder duties are notified in a timely manner in order to protect public health and beneficial uses. For spills, overflows, and bypasses from its POTW, the Discharger shall make notifications as required below:

a). In accordance with the requirements of Health and Safety Code section 5411.5, the Discharger shall provide notification to the local health officer or the director of environmental health with jurisdiction over the affected water body of any unauthorized release of sewage or other waste that causes, or probably will cause, a discharge to any waters of the State as soon as possible, but not later than two (2) hours after becoming aware of the release.

b). In accordance with the requirements of Water Code section 13271, the Discharger shall provide notification to the California Emergency Management Agency (Cal EMA) of the release of reportable amounts of hazardous substances or sewage that causes, or probably will cause, a discharge to any waters of the State as soon as possible, but not later than two (2) hours after becoming aware of the release. The California Code of Regulations, Title 23, section 2250, defines a reportable amount of sewage as being 1,000 gallons. The phone number for reporting releases to Cal EMA is (800) 852-7550.

c). The Discharger shall notify the Regional Water Board of any unauthorized release of sewage from its POTW that causes, or probably will cause, a discharge to any waters of the State as soon as possible, but not later than ***two (2)*** hours after becoming aware of the release. This initial notification does not need to be made if the Discharger has notified Cal EMA and the local health officer or the director of environmental health with jurisdiction over the affected water body. The phone number for reporting releases of sewage to the Regional Water Board is (213) 576-6657. The phone numbers for after hours and weekend reporting of releases of sewage to the Regional Water Board are (213) 305-2284 and (213) 305-2253.

At a minimum the following information shall be provided to the Regional Water Board:

1). The location, date and time of the release.

2). The waters of the State that received or will receive the discharge.

3). An estimate of the amount of sewage or other waste released and the amount that reached waters of the State at the time of notification.

4). If ongoing, the estimated flow rate of the release at the time of the notification.

5). The name, organization, phone number, and email address of the reporting representative.

ii. Monitoring

For spills, overflows, and bypasses reported under section VI.C.5.c.i, the Discharger shall monitor as required below.

To define the geographical extent of the impact, the Discharger shall obtain grab samples (if feasible, accessible, and safe): (1) for all spills, overflows, or bypasses of any volume that reach any waters of the State; and (2) for all spills, overflows, or bypasses of 1,000 gallons or more. The Discharger shall analyze the samples for total and fecal coliforms or *E. coli*, *Enterococcus*, and relevant pollutants of concern, upstream and downstream of the point of entry of the spill (if feasible, accessible, and safe). This monitoring shall be done on a daily basis from time the spill is known until the results of two consecutive sets of bacteriological monitoring indicate the return to the background level or the County Department of Public Health authorizes cessation of monitoring.

iii. Twenty-four (24) Hour Reporting

The Regional Water Board initial notification required under section VI.C.5.c.i above shall be followed by:

a). As soon as possible, but not later than twenty-four (24) hours, after becoming aware of an unauthorized discharge of sewage or other waste from its POTW to any waters of the State or of 1,000 gallons or more, the Discharger shall submit a report to the Regional Water Board by email at aanijielo@waterboards.ca.gov. If the discharge is 1,000 gallons or more, this report shall certify that the Cal EMA has been notified of the discharge in accordance with Water Code section 13271 and section VI.C.5.c.i. This report shall also certify that the local health officer or director of environmental health with jurisdiction over the affected water body has been notified of the discharge in accordance with Health and Safety Code section 5411.5 and section VI.C.5.c.i. This report shall also include at a minimum the following information:

1). Agency, NPDES No., Order No., and MRP CI No., if applicable;

2). The location, date and time of the discharge;

3). The waters of the State that received the discharge;

4). A description of the level of treatment of the sewage or other waste discharged;

5). An initial estimate of the amount of sewage or other waste released and the amount that reached waters of the State;

6). The Cal EMA control number and the date and time that notification of the incident was provided to the Cal EMA; and,

7). The name of the local health officer or director of environmental health notified (if contacted directly), the date and time of notification, and the method of notification (e.g., phone, fax, email).

b). A preliminary written report is due five (5) working days after disclosure of the incident reported under section VI.C.5.c.iii.a) (submission to the Regional Water Board of the log number of the SSO Database entry shall satisfy this requirement for a preliminary written report). Within 30 days after submitting this preliminary written report, the Discharger shall submit the final written report to the Regional Water Board. The final written report shall document the information required in section VI.C.5.c.iv, below, and in the Standard Provisions of this Order. The Executive Officer for just cause can grant an extension for submittal of the final written report to the Regional Water Board.

c). The Discharger shall include a certification in the annual summary report (due according to the schedule in the Monitoring and Reporting Program) stating that the sewer system emergency equipment, including alarm systems, backup pumps, standby power generators, and other critical emergency pump station components are maintained and tested in accordance with the Discharger's Preventative Maintenance Plan (PMP). Any deviations from or modifications to the PMP shall be discussed.

iv. Records

The Discharger shall develop and maintain a record of all spills, overflows, or bypasses of raw or partially treated sewage from its POTW. This record shall be made available to the Regional Water Board upon request and a summary shall be included in the annual summary report. The records shall contain:

a). The date and time of each spill, overflow, or bypass;

b). The location of each spill, overflow, or bypass (including latitude and longitude);

c). The estimated volume of each spill, overflow, or bypass including gross volume, amount recovered and not recovered, and monitoring results required by section VI.C.5.c.ii;

d). The cause of each spill, overflow, or bypass;

e). Whether each spill, overflow, or bypass entered a waters of the State and, if so, the name of the water body and whether it entered via a storm drain or other man-made conveyance;

f). Mitigation measures implemented;

g). Corrective measures implemented or proposed to be implemented to prevent/minimize future occurrences; and

h). The mandatory information included in SSO online reporting for finalizing and certifying the SSO report for each spill, overflow, or bypass under the SSO WDR.

v. Activities Coordination

In addition, the Regional Water Board expects that the POTW will coordinate its compliance activities for consistency and efficiency with other entities that have responsibilities under: this NPDES permit, including the Pretreatment Program; an MS4 NPDES permit that may contain spill prevention, sewer maintenance and reporting requirements; or, the SSO WDR.

vi. Consistency with Statewide General Waste Discharge Requirements For Sanitary Sewer Systems (SSO WDR)

The Clean Water Act prohibits the discharge of pollutants from a point source to waters of the United States unless authorized under a NPDES permit. (33 U.S.C. §§1311, 1342.). The State Water Board adopted Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, (Order No. 2006-0003-DWQ) on May 2, 2006, to provide a consistent, Statewide regulatory approach to address Sanitary Sewer Overflows (SSOs). The SSO WDR requires public agencies that own or operate sanitary sewer systems to develop and implement sewer system management plans and report all SSOs to the State Water Board's online SSO Database.

The requirements contained in this Order in Sections VI.C.3.b (Spill Clean-Up Contingency Plan), VI.C.4 (Construction, Operation and Maintenance Specifications), and VI.C.5.c (Spill Reporting Requirements for POTWs) are intended to be consistent with the requirements of the SSO WDR and as outlined in the State Water Board letter dated September 9, 2008 (Modification to Monitoring and Reporting Program). The Regional Water Board recognizes that there may be some overlap between the provisions of this Order and SSO WDR requirements. The requirements of the SSO WDR are considered the minimum thresholds (see Finding 11 of Order No. 2006-0003-DWQ). The Regional Water Board will accept the documentation prepared by the Discharger under the SSO WDR for compliance purposes as satisfying the requirements in sections VI.C.3.b, VI.C.4, and VI.C.5.c provided that any additional or more stringent provisions enumerated in this Order are addressed.

Regardless of the coverage obtained under the SSO WDR, the Discharger's collection system is part of the Publicly Owned Treatment Works that is subject to this Order. As such, pursuant to federal regulations, the Discharger must properly operate and maintain its collection system (40 CFR 122.41(e)), report any non-compliance (40 CFR 122.41(l)(6) and (7), and mitigate any discharge from the collection system in violation of this Order (40 CFR 122.41(d)).

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in this Order will be determined as specified below:

A. General.

Compliance with effluent limitations for reportable pollutants shall be determined using sample reporting protocols defined in the MRP.

1. Compliance with Effluent Limitations expressed as Single Constituent

Dischargers are deemed out of compliance with an effluent limitation if the concentration of the pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level (ML).

2. Compliance with Effluent Limitations expressed as Sum of Several Constituents

   Dischargers are out of compliance with an effluent limitation which applies to the sum of a group of chemicals (e.g., PCB's) if the sum of the individual pollutant concentrations is greater than the effluent limitation. Individual pollutants of the group will be considered to have a concentration of zero if the constituent is reported as "Not Detected" (ND) or "Detected, but Not Quantified" (DNQ).

B. Multiple Sample Data Reduction

The concentration of the pollutant in the effluent may be estimated from the result of a single sample analysis or by a measure of central tendency (arithmetic mean, geometric mean, median, etc.) of multiple sample analyses when all sample results are quantifiable (i.e., greater than or equal to the reported Minimum Level). When one or more sample results are reported as ND or DNQ, the central tendency concentration of the pollutant shall be the median (middle) value of the multiple samples, where DNQ is lower than a quantified value and ND is lower than DNQ. If, in an even number of samples, one or both of the middle values is ND or DNQ, the median will be the lower of the two middle values.

C. Sufficient sampling and analysis shall be required to determine compliance with the effluent limitation. If the analytical result of any single sample (daily discharge) monitored monthly, quarterly, semiannually, or annually, exceeds the AMEL, the Discharger shall increase sampling frequency to weekly until compliance with the AMEL is demonstrated. All analytical results shall be reported as specified in the MRP.

D. Average Monthly Effluent Limitation (AMEL).

If the average (or when applicable, the median determined by section B above for multiple sample data reduction) of daily discharges over a calendar month exceeds the AMEL for a given parameter, an alleged violation will be flagged and the Discharger will be considered out of compliance for each day of that month for that parameter (e.g., resulting in 31 days of non-compliance in a 31-day month). However, an alleged violation of the AMEL will be considered one violation for the purpose of assessing mandatory minimum penalties. The average of daily discharges over a calendar month that exceeds the AMEL for a parameter will be considered out of compliance for that month only. If only a single sample (daily discharge) is taken over a calendar month and the analytical result for that sample exceeds the AMEL, the Discharger will be considered out of compliance for that month. If no sample (daily discharge) is taken over a calendar month, no compliance determination can be made for that month with respect to effluent violation determination, but compliance determination can be made for that month with respect to reporting violation determination.

E. Average Weekly Effluent Limitation (AWEL).

If the average of daily discharges over a calendar week exceeds the AWEL for a given parameter, an alleged violation will be flagged and the Discharger will be considered out of compliance for each day of that week for that parameter (e.g., resulting in seven days of non-compliance). However, an alleged violation of the AWEL will be considered one violation for the purpose of assessing mandatory minimum penalties. The average of daily discharges over a calendar week that exceeds the AWEL for a parameter will be considered out of compliance for that week only. If only a single sample (daily discharge) is taken over a calendar week and the analytical result for that sample exceeds the AWEL, the Discharger will be

considered out of compliance for that week. If no sample (daily discharge) is taken over a calendar week, no compliance determination can be made for that week with respect to effluent violation determination, but compliance determination can be made for that week with respect to reporting violation determination.

A calendar week will begin on Sunday and end on Saturday. Partial calendar weeks at the end of the calendar month will be carried forward to the next month in order to calculate and report a consecutive seven-day average value on Saturday.

F. Maximum Daily Effluent Limitation (MDEL).

If a daily discharge on a calendar day exceeds the MDEL for a given parameter, an alleged violation will be flagged and the Discharger will be considered out of compliance for that day for that parameter. If no sample (daily discharge) is taken over a calendar day, no compliance determination can be made for that day with respect to effluent violation determination, but compliance determination can be made for that day with respect to reporting violation determination.

G. Instantaneous Minimum Effluent Limitation.

If the analytical result of a single grab sample exceeds (is lower than) the instantaneous minimum effluent limitation for a given parameter, an alleged violation will be flagged and the Discharger will be considered out of compliance for that single sample for that parameter. Non-compliance for each single grab sample will be considered separately (e.g., the analytical results of two grab samples taken over a calendar day that are lower than the instantaneous minimum effluent limitation would result in two instances of non-compliance with the instantaneous minimum effluent limitation).

H. Instantaneous Maximum Effluent Limitation.

If the analytical result of a single grab sample exceeds (is higher than) the instantaneous maximum effluent limitation for a given parameter, an alleged violation will be flagged and the Discharger will be considered out of compliance for that single sample for that parameter. Non-compliance for each single grab sample will be considered separately (e.g., the analytical results of two grab samples taken over a calendar day that both are higher than the instantaneous maximum effluent limitation would result in two instances of non-compliance with the instantaneous maximum effluent limitation).

I. Six-month Median Effluent Limitation.

If the median of daily discharges over any 180-day period exceeds the six-month median effluent limitation for a given parameter, an alleged violation will be flagged and the discharger will be considered out of compliance for each day of that 180-day period for that parameter. The next assessment of compliance will occur after the next sample is taken. If only a single sample is taken during a given 180-day period and the analytical result for that sample exceeds the six-month median, the discharger will be considered out of compliance for the 180-day period. For any 180-period during which no sample is taken, no compliance determination can be made for the six-month median limitation.

J. Percent Removal.

A percentage expression of the removal efficiency across a treatment plant for a given pollutant parameter, as determined from the 30-day average values of the raw wastewater influent pollutant concentrations to the facility and the 30-day average values of the effluent pollutant concentrations for a given time period.

Daily discharge percent removal is calculated using the following equation: Percent Removal (%) = [1 − ($C_{Effluent}$ ÷ $C_{Influent}$)] × 100%

K. Mass and Concentration Limitations.

Compliance with mass effluent limitations and concentration effluent limitations for the same parameter shall be determined separately. When the concentration for a parameter in a sample is reported as ND or DNQ, the corresponding mass emission rate determined using that sample concentration shall also be reported as ND or DNQ.

L. Mass Emission Rate.

The daily discharge mass emission rate for any calendar day is calculated using the following equations:

$$\text{Daily Discharge mass emission rate (lb/day)} = \frac{8.337}{N}\sum_{i=1}^{N} Q_i C_i$$

$$\text{Daily Discharge mass emission rate (kg/day)} = \frac{3.785}{N}\sum_{i=1}^{N} Q_i C_i$$

in which "N" is the number of samples taken over any calendar day. If grab samples are taken, "Ci" is the constituent concentration (mg/L) and "Qi" is the flow rate (MGD) associated with each "N" grab sample. If composite samples are taken, "Ci" is the constituent concentration (mg/L) in each composite sample and "Qi" is the average flow rate (MGD) during the period over which sample compositing occurs.

The daily discharge concentration of a constituent shall be determined from the flow-weighted average of the same constituent in the combined waste stream using the following equations:

$$\text{Daily concentration} = \frac{1}{Q_t}\sum_{i=1}^{N} Q_i C_i$$

in which "N" is the number of component waste streams. "Ci" is the constituent concentration (mg/L) and "Qi" is the flow rate (MGD) associated with each "N" component waste stream. "Qt" is the total flow rate of the combined waste stream.

M. Bacterial Standards and Analysis.

1. The geometric mean used for determining compliance with bacterial standards is calculated with the following equation:

   $$\text{Geometric Mean} = (C_1 \text{ x } C_2 \text{ x } \ldots \text{ x } C_n)^{1/n}$$

   where n is the number of days samples were collected during the period and C is the concentration of bacteria (MPN/100 mL or CFU/100 mL) found on each day of sampling.

2. For bacterial analyses, sample dilutions should be performed so the expected range of values is bracketed (for example, with either the multiple tube fermentation method or membrane filtration

method, 2 to 16,000 per 100 ml for total and fecal coliform, at a minimum, and 1 to 1000 per 100 ml for Enterococcus). The detection methods used for each analysis shall be reported with the results of the analyses.

3. Detection methods used for coliforms (total and fecal) and *Enterococcus* shall be those presented in Table 1A of 40 CFR 136 (revised revised July 1, 2009), unless alternate methods have been approved by USEPA pursuant to 40 CFR part 136 or improved methods have been determined by the Executive Officer and/or USEPA.

N. Single Operational Upset.

A single operational upset (SOU) that leads to simultaneous violations of more than one pollutant parameter shall be treated as a single violation and limits the Discharger's liability in accordance with the following conditions:

1. A single operational upset is broadly defined as a single unusual event that temporarily disrupts the usually satisfactory operation of a system in such a way that it results in violation of multiple pollutant parameters.

2. A Discharger may assert SOU to limit liability only for those violations which the Discharger submitted notice of the upset as required in Attachment D – Standard Provisions.

3. For purpose outside of CWC section 13385(h) and (i), determination of compliance and civil liability (including any more specific definition of SOU, the requirements for Dischargers to assert the SOU limitation of liability, and the manner of counting violations) shall be in accordance with USEPA Memorandum "Issuance of Guidance Interpreting Single Operational Upset" (September 27, 1989).

4. For purpose of CWC section 13385(h) and (i), determination of compliance and civil liability (including any more specific definition of SOU, the requirements for Dischargers to assert the SOU limitation of liability, and the manner of counting violations) shall be in accordance with CWC Section 13385(f)(2).

ATTACHMENT A – DEFINITIONS

Acute Toxicity:

a Acute Toxicity (TUa)

Expressed in Toxic Units Acute (TUa)

$$TUa = \frac{100}{\text{96-hr LC 50\%}}$$

b Lethal Concentration 50% (LC 50)

LC 50 (percent waste giving 50% survival of test organisms) shall be determined by static or continuous flow bioassay techniques using standard marine test species as specified in Appendix III of the 2009 Ocean Plan. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC 50 may be determined after the test samples are adjusted to remove the influence of those substances.

When it is not possible to measure the 96-hour LC 50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \frac{\log (100 - S)}{1.7}$$

where:

S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

Areas of Special Biological Significance (ASBS): are those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of Special Biological Significance are also classified as a subset of STATE WATER QUALITY PROTECTION AREAS.

Average Monthly Effluent Limitation (AMEL) means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month. (40 CFR 122.2.)

Average Weekly Effluent Limitation (AWEL) means the highest allowable average of "daily discharges" over a calendar week (Sunday through Saturday), calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. (40 CFR 122.2.)

Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma and oxychlordane.

Chlorinated Phenolic Compounds shall mean, at a minimum, the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

Chronic Toxicity: This parameter shall be used to measure the acceptability of waters for supporting a healthy marine biota until improved methods are developed to evaluate biological response.

a Chronic Toxicity (TUc)

Expressed as Toxic Units Chronic (TUc)

$$TUc = \frac{100}{NOEL}$$

b No Observed Effect Level (NOEL)

The NOEL is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test listed in Appendix III of the Ocean Plan.

Composite Sample, for flow rate measurements, means the arithmetic mean of no fewer than eight individual measurements taken at equal intervals for 24 hours or for the duration of discharge, whichever is shorter.

Composite sample, for other than flow rate measurement, means:

a. No fewer than eight individual sample portions taken at equal time intervals for 24 hours, or the duration of the discharge, whichever is shorter. The volume of each individual sample portion shall be directly proportional to the discharge flow rate at the time of sampling; or,

b. No fewer than eight individual sample portions taken of equal time volume taken over a 24 hour period. The time interval between each individual sample portion shall vary such that the volume of the discharge between each individual sample portion remains constant.

The compositing period shall equal the specified sampling period, or 24 hours, if no period is specified.

For a composite sample, if the duration of the discharge is less than 24 hours but greater than 8 hours, at least eight flow-weighted individual sample portions shall be taken during the duration of the discharge and composited. For a discharge duration of 8 hours or less, eight individual "grab samples" may be substituted and composited.

The composite sample result shall be reported for the calendar day during which composite sampling ends.

Daily Discharge means the "discharge of a pollutant" measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day. (40 CFR 122.2.)

DDT shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

Degrade (Degredation). Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected.

Detected, but Not Quantified (DNQ) means sample results less than the reported Minimum Level, but greater than or equal to the laboratory's MDL.

Dichlorobenzenes shall mean the sum of 1,2- and 1,3-dichlorobenzene.

Downstream Ocean Waters shall mean waters downstream with respect to ocean currents.

Dredged Material: Any material excavated or dredged from the navigable waters of the United States, including material otherwise referred to as "spoil".

Enclosed Bays are indentations along the coast, which enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. This definition includes but is not limited to: Humboldt Bay, Bodega Harbor, Tomales Bay, Drakes Estero, San Francisco Bay, Morro Bay, Los Angeles Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay.

Endosulfan shall mean the sum of endosulfan-alpha, endosulfan-beta, and endosulfan sulfate.

Estuaries and Coastal Lagoons are waters at the mouths of streams that serve as mixing zones for fresh and ocean waters during a major portion of the year. Mouths of streams that are temporarily separated from the ocean by sandbars shall be considered as estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters. The waters described by this definition include but are not limited to the Sacramento-San Joaquin Delta as defined by Section 12220 of the California Water Code, Suisun Bay, Carquinez Strait downstream to Carquinez Bridge, and appropriate areas of the Smith, Klamath, Mad, Eel, Noyo, and Russian Rivers.

Grab Sample means an individual sample collected during a period of time not to exceed 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not occur during hydraulic peaks.

Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

HCH shall mean the sum of alpha, beta, gamma (lindane), and delta isomers of hexachlorocyclohexane.

Initial Dilution is the process which results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge.

For a submerged buoyant discharge, characteristic of most municipal wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

For shallow water submerged discharges, surface discharges, and nonbuoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the waste, or the diluting plume reaches a fixed distance from the discharge to be specified by the Regional Water Board, whichever results in the lower estimate for initial dilution.

Instantaneous Maximum Effluent Limitation: the highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation: the lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Kelp Beds, for purposes of the bacteriological standards of the Ocean Plan, are significant aggregations of marine algae of the genera Macrocystis and Nereocystis. Kelp beds include the total foliage canopy of Macrocystis and Nereocystis plants throughout the water column. Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp beds for purposes of bacteriological standards.

Local Limits means conditional discharge limits imposed by municipalities upon industrial or commercial facilities that discharge to the municipal sewage treatment system.

Mariculture is the culture of plants and animals in marine waters independent of any pollution source.

Material: (a) In common usage: (1) the substance or substances of which a thing is made or composed (2) substantial; (b) For purposes of the California Ocean Plan relating to waste disposal, dredging and the disposal of dredged material and fill, MATERIAL means matter of any kind or description which is subject to regulation as waste, or any material dredged from the navigable waters of the United States. See also, DREDGED MATERIAL.

Maximum Daily Effluent Limitation (MDEL) is the maximum allowable discharge of a pollutant during a calendar day. Where MDELs are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where MDELs are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day. For pollutant measurements, unless otherwise specified, the results to be compared to the MDEL are usually based on composite samples. However, it may apply to grab samples if the collection of composite samples for those constituents is not appropriate because of instability of the constituents.

Method Detection Limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte, as defined in 40 CFR 136 Appendix B.

Minimum Level (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes and processing steps have been followed.

Natural Light is used in this order to mean the transmittance and total irradiance of sunlight. Reduction of natural light may be determined by the Regional Water Board by measurement of light transmissivity or total irradiance, or both, according to the monitoring needs of the Regional Water Board.

Nonchlorinated Phenolic Compounds shall mean, at a minimum, the sum of Phenol, 2, 4-Dimethylphenol, 2-Nitrophenol, and 4-Nitrophenol, 2,4-Dinitrophenol and 4,6-Dinitro-2-Methylphenol.

Nonconventional Pollutants. All pollutants that are not included in the list of conventional or toxic pollutants in 40 CFR 401. Includes pollutants such as chemical oxygen demand (COD), total organic carbon (TOC), nitrogen, and phosphorus.

Not Detected (ND) means those sample results less than the laboratory's MDL.

Ocean Waters are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the

State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the California Ocean Plan will occur in ocean waters.

Overflow means the intentional or unintentional diversion of flow from the collection and transport systems, including pumping facilities.

PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1, 2-benzanthracene, 3, 4-benzofluoranthene, benzo[k]-fluoranthene, 1, 12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1, 2, 3-cd]pyrene, phenanthrene and pyrene.

PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-l232, Aroclor-1242, Aroclor-l248, Aroclor-1254 and Aroclor-1260.

Pollutant Minimization Program (PMP) means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of a pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, in order to maintain the effluent concentration at or below the effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Regional Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to California Water Code section 13263.3(d), shall be considered to fulfill the PMP requirements in Ocean Plan section III.C.9.

Pretreatment. The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a publicly owned treatment works [40 CFR 403.3(q)].

Priority Pollutants are those constituents referred to in 40 CFR 401.15; a list of these pollutants is provided as Appendix A to 40 CFR 423.

Publicly Owned Treatment Works (POTW). The term Publicly Owned Treatment Works or POTW means a treatment works as defined by section 212 of the Clean Water Act, which is owned by a State or municipality (as defined by section 502(4) of the Act). This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality which has jurisdiction over the Indirect Discharges to and the discharges from such treatment works. (40 CFR 403.3(q).)

Reported Minimum Level is derived from the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in their permit. The MLs included in this permit correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board in accordance with Ocean Plan section III.C.5. The ML is based on the proper application of method-specific analytical procedures and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the reported ML. (See Ocean Plan section III.C.6.)

Sanitary Sewer Overflows (SSO). Untreated or partially treated sewage overflows from a sanitary sewer collection system.

Secondary Treatment Standards. Technology-based requirements for direct discharging municipal sewage treatment facilities. Standards are based on a combination of physical and biological processes typical for the treatment of pollutants in municipal sewage. Standards are expressed as a minimum level of effluent quality in terms of: BOD_5, total suspended solids (TSS), and pH (except as provided for special considerations and treatment equivalent to secondary treatment).

Shellfish are organisms identified by the California Department of Public Health as shellfish for public health purposes (i.e., mussels, clams, and oysters).

Significant Difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level.

Six-month Median Effluent Limitation: the highest allowable moving median of all daily discharges for any 180-day period. For intermittent discharges, the daily value shall be considered to equal zero for days on which no discharge occurred.

Sludge means the solids, semi-liquid suspensions of solids, residues, screenings, grit, scum, and precipitates separated from, or created in, wastewater by the unit processes of a treatment system. It also includes, but is not limited to, all supernatant, filtrate, centrate, decantate, and thickener overflow/underflow in the solids handling parts of the wastewater treatment system.

State Water Quality Protection Areas (SWQPAs) are nonterrestrial marine or estuarine areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS) that were previously designated by the State Water Board in Resolution Nos. 74-28, 74-32, and 75-61 are now classified as a subset of State Water Quality Protection Areas and require special protections afforded by the California Ocean Plan.

TCDD Equivalents shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below:

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
1,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

Technology-Based Effluent Limit. A permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration.

Total Maximum Daily Load (TMDL). The amount of pollutant, or property of a pollutant, from point, nonpoint, and natural background sources, that may be discharged to a water quality-limited receiving water. Any pollutant loading above the TMDL results in violation of applicable water quality standards.

Toxicity Reduction Evaluation (TRE) is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A TOXICITY IDENTIFICATION EVALUATION (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with the permit because of factors beyond the reasonable control of the permittee. It does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, careless or improper operation, or those problems the Discharger should have foreseen.

Waste. As used in the California Ocean Plan, waste includes a discharger's total discharge, of whatever origin, i.e., gross, not net, discharge.

Wasteload Allocation (WLA). The proportion of a receiving water's total maximum daily load that is allocated to one of its existing or future point sources of pollution.

Water Quality-Based Effluent Limit (WQBEL). A value determined by selecting the most stringent of the effluent limits calculated using all applicable water quality criteria (e.g., aquatic life, human health, and wildlife) for a specific point source to a specific receiving water for a given pollutant.

Water Quality Criteria. Comprised of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by USEPA or States for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal.

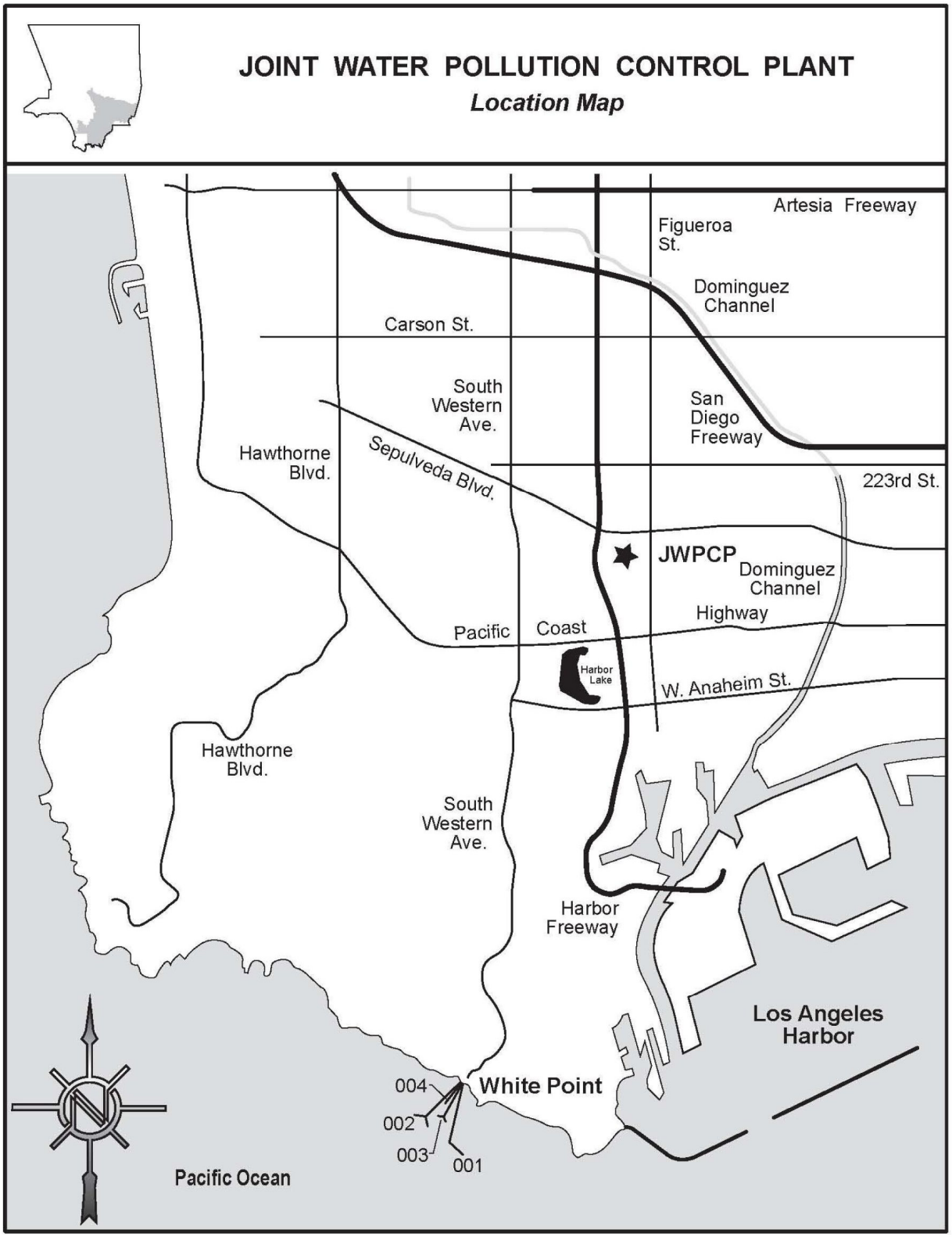
Water Quality Standard. A law or regulation that consists of the beneficial use or uses of a waterbody, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular waterbody, and an antidegradation statement.

Water Reclamation: The treatment of wastewater to render it suitable for reuse, the transportation of treated wastewater to the place of use, and the actual use of treated wastewater for a direct beneficial use or controlled use that would not otherwise occur.

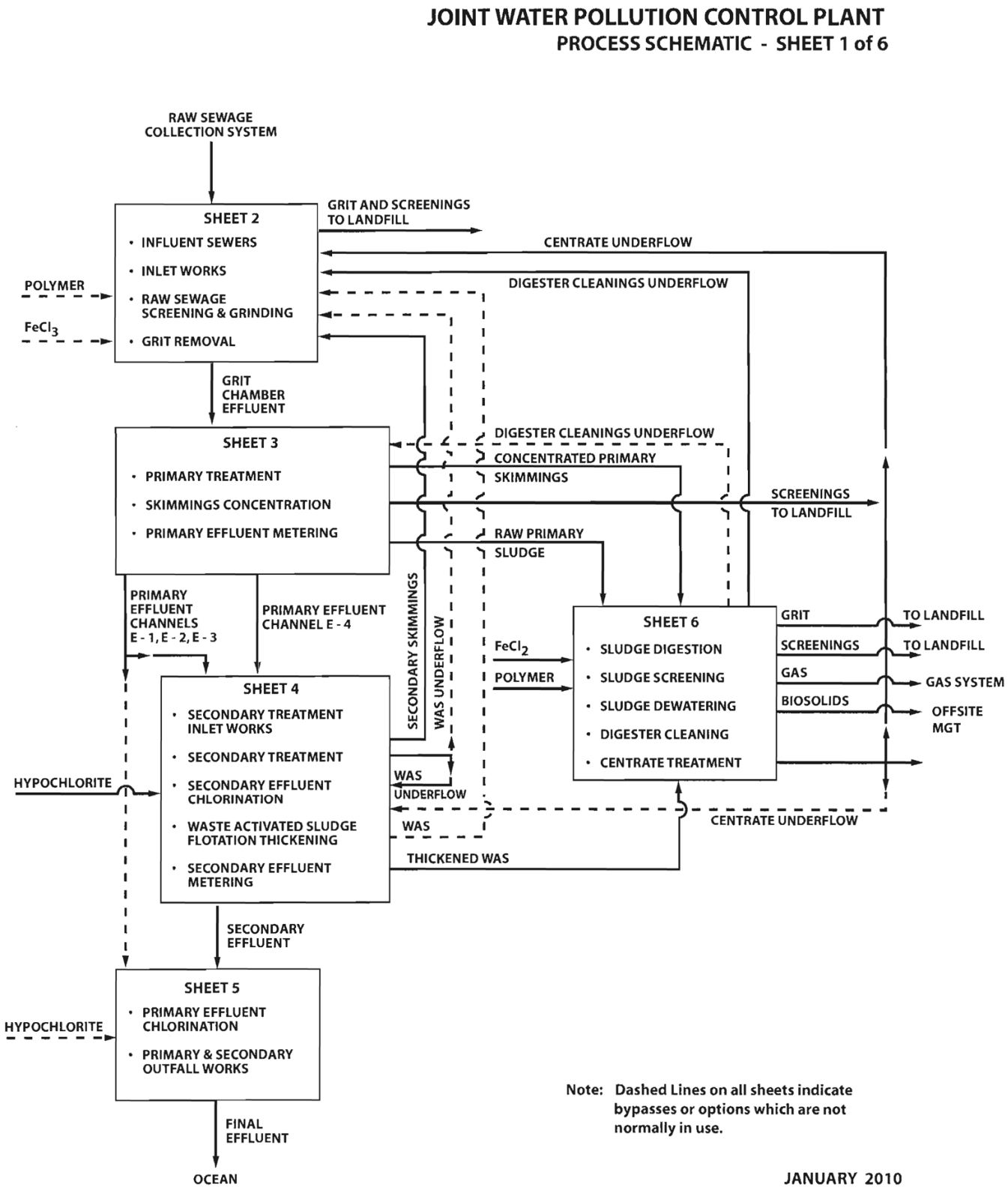
Whole Effluent Toxicity (WET). The total toxic effect of an effluent measured directly with a toxicity test.

Zone of Initial Dilution (ZID) means, for purposes of designating monitoring stations, the region within a horizontal distance equal to a specified water depth (usually depth of outfall or average depth of diffuser) from any point of the diffuser or end of the outfall and the water column above and below that region, including the underlying seabed.

ATTACHMENT B – LOCATION MAP



ATTACHMENT C – FLOW SCHEMATIC



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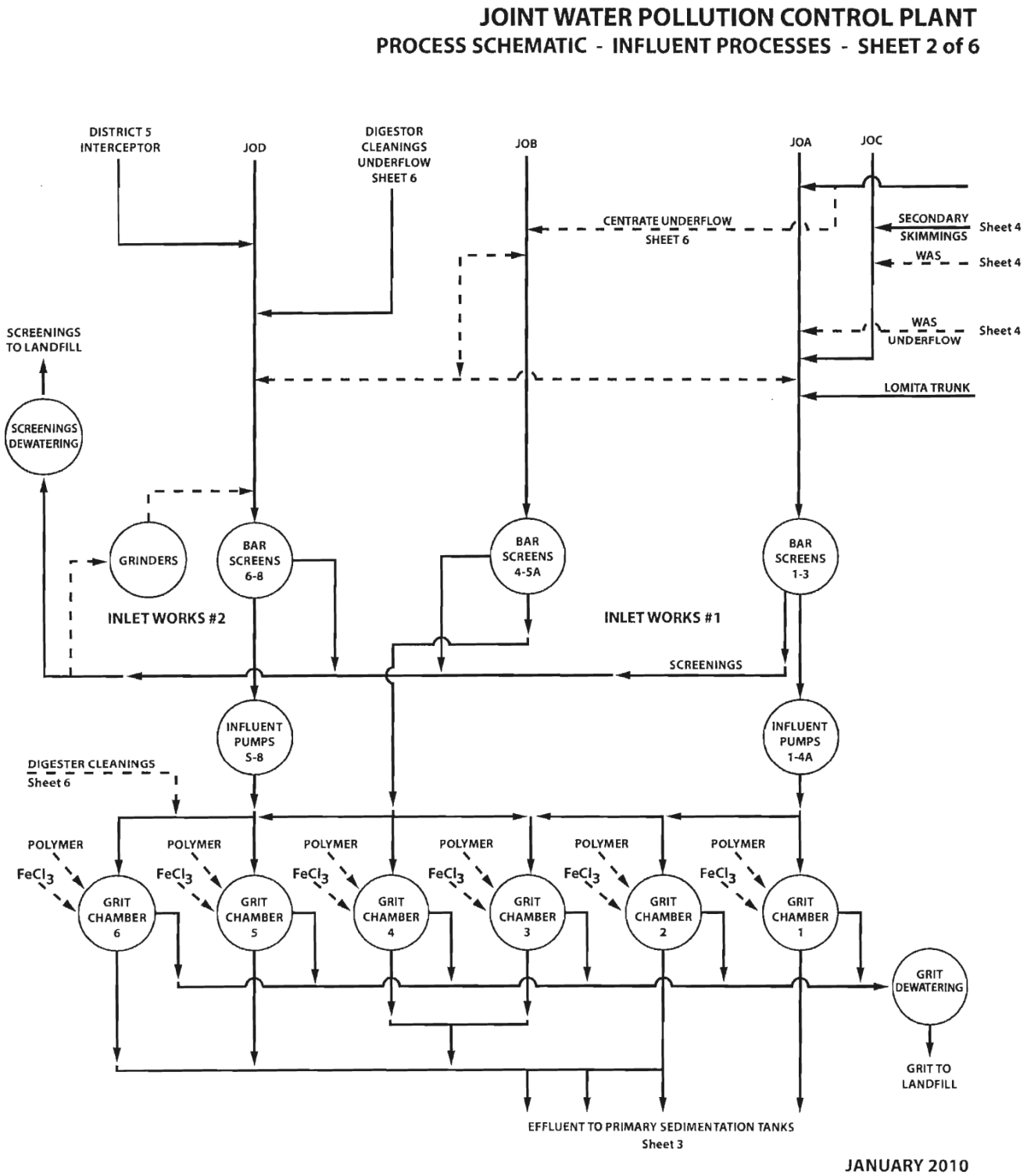

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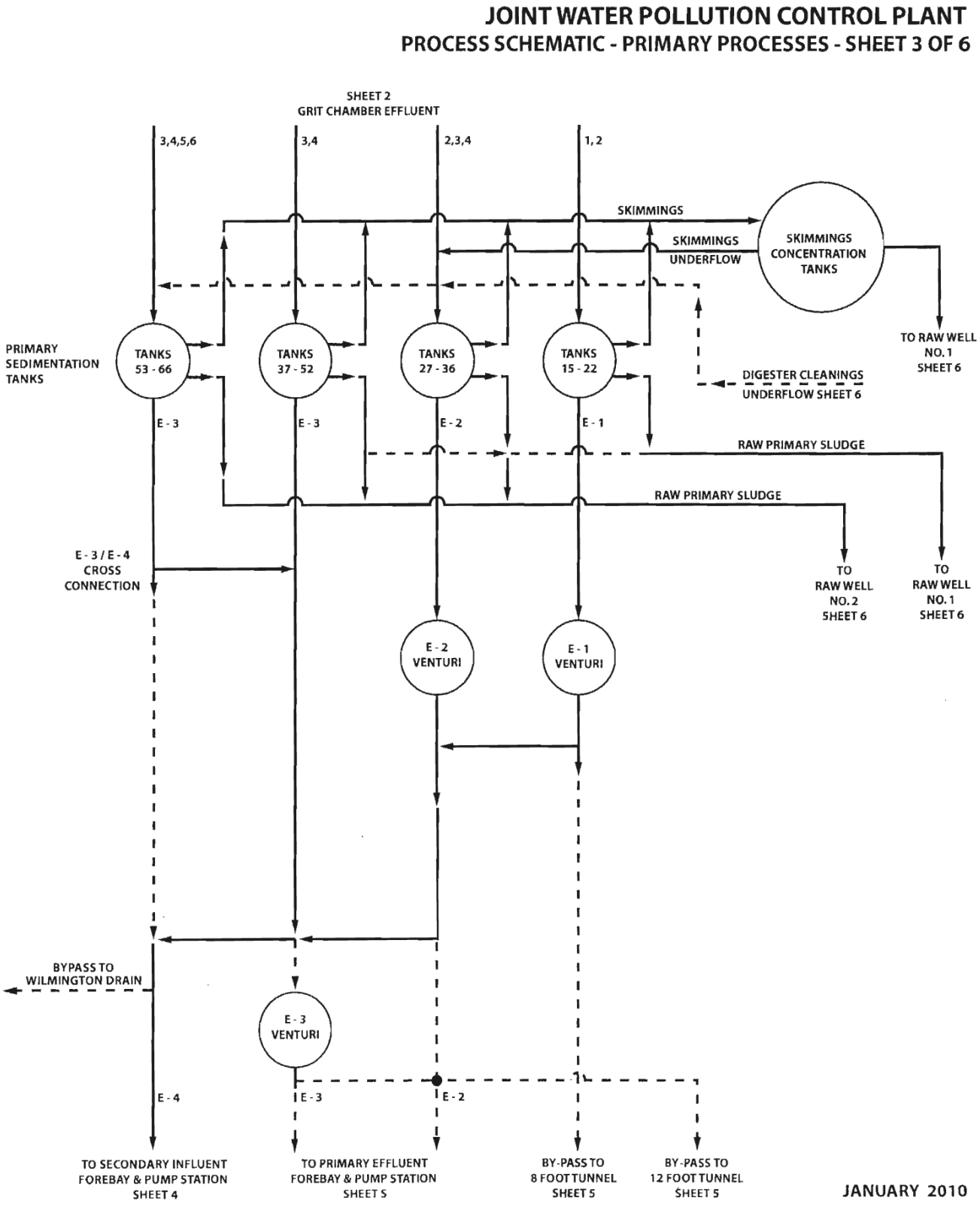

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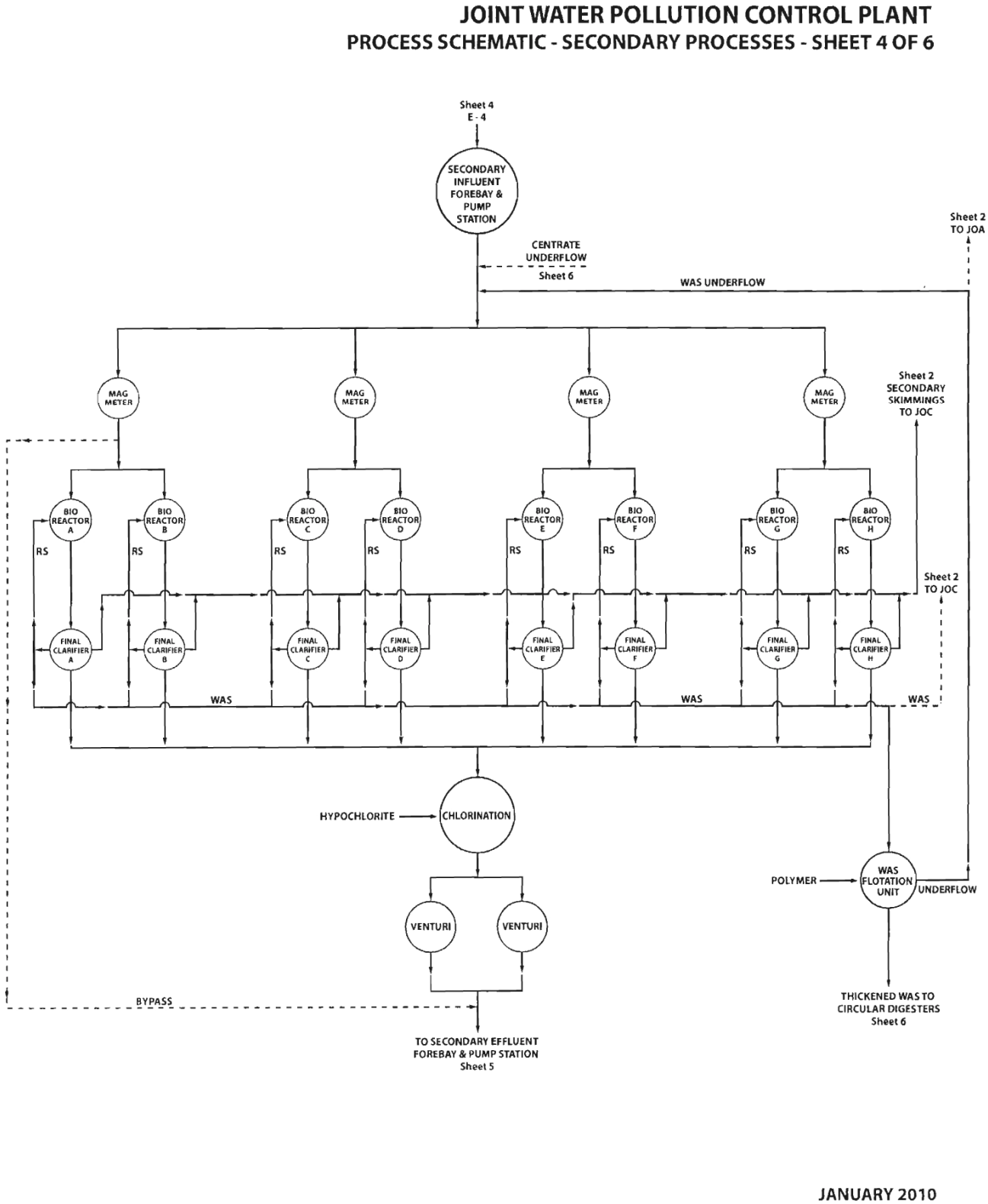

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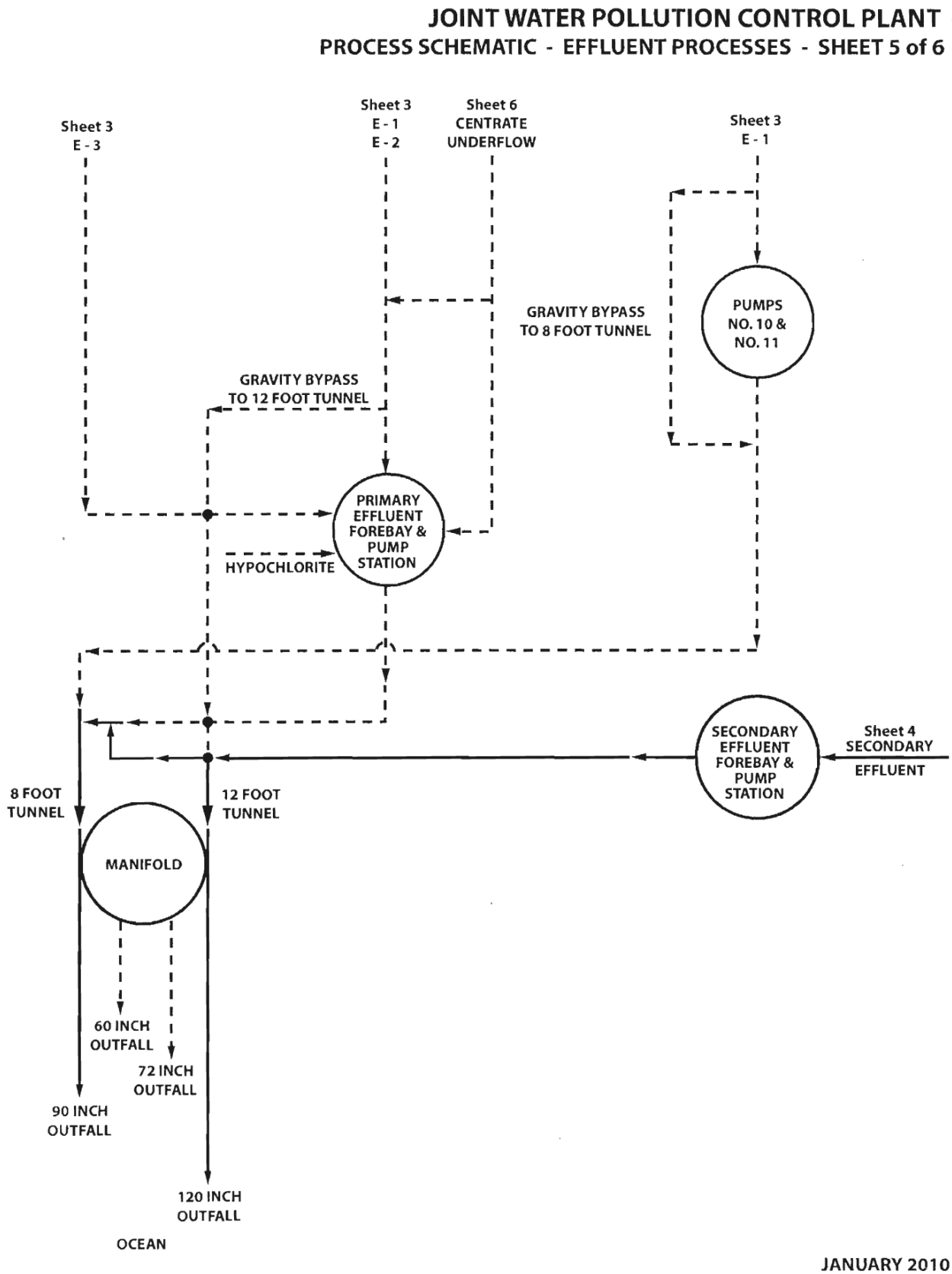

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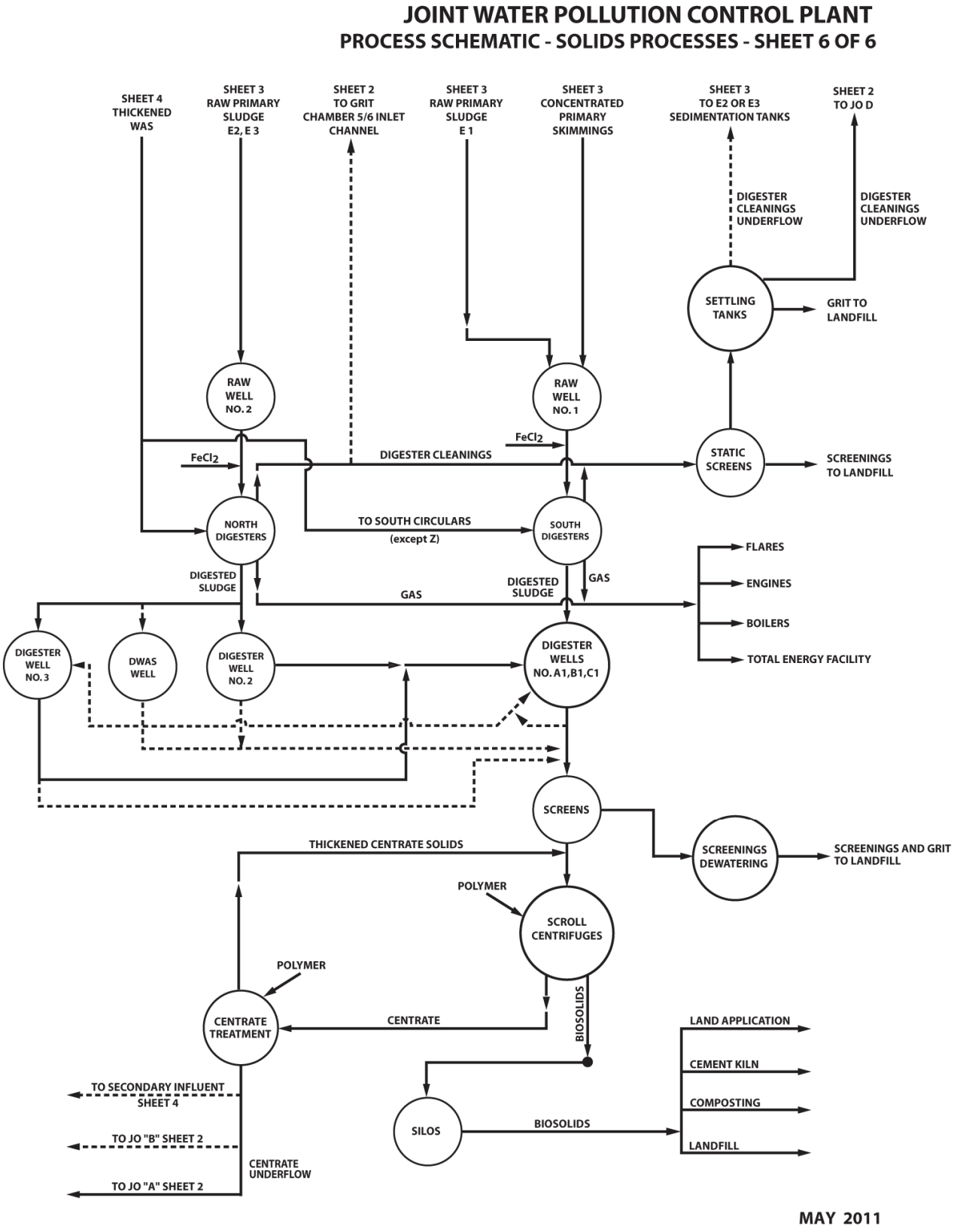

ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (CWC) and is grounds for enforcement action, for permit termination, revocation and reissuance, or denial of a permit renewal application [*40 CFR 122.41(a)*].

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not been modified to incorporate the requirement [*40 CFR 122.41(a)(1)*].

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order [*40 CFR 122.41(c)*].

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment [*40 CFR 122.41(d)*].

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order [*40 CFR 122.41(e)*].

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges [*40 CFR 122.41(g)*].

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations [*40 CFR 122.5(c)*].

F. Inspection and Entry

The Discharger shall allow the Regional Water Quality Control Board (RWQCB), State Water Resources Control Board (SWRCB), United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the

presentation of credentials and other documents, as may be required by law, to [*40 CFR 122.41(i)*] [*CWC 13383(c)*]:

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order [*40 CFR 122.41(i)(1)*];

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order [*40 CFR 122.41(i)(2)*];

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order [*40 CFR 122.41(i)(3)*]; and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the CWC, any substances or parameters at any location [*40 CFR 122.41(i)(4)*].

G. Bypass

1. Definitions

   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility [*40 CFR 122.41(m)(1)(i)*].

   b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production [*40 CFR 122.41(m)(1)(ii)*].

2. Bypass not exceeding limitations – The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3 and I.G.5 below [*40 CFR 122.41(m)(2)*].

3. Prohibition of bypass – Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless [*40 CFR 122.41(m)(4)(i)*]:

   a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage [*40 CFR 122.41(m)(4)(A)*];

   b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance [*40 CFR 122.41(m)(4)(B)*]; and

   c. The Discharger submitted notice to the Regional Water Board as required under Standard Provision – Permit Compliance I.G.5 below [*40 CFR 122.41(m)(4)(C)*].

4. The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above [*40 CFR 122.41(m)(4)(ii)*].

5. Notice

   a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass [*40 CFR 122.41(m)(3)(i)*].

   b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below [*40 CFR 122.41(m)(3)(ii)*].

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation [*40 CFR 122.41(n)(1)*].

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph H.2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review [*40 CFR 122.41(n)(2)*].

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that [*40 CFR 122.41(n)(3)*]:

   a. An upset occurred and that the Discharger can identify the cause(s) of the upset [*40 CFR 122.41(n)(3)(i)*];

   b. The permitted facility was, at the time, being properly operated [*40 CFR 122.41(n)(3)(i)*];

   c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b [*40 CFR 122.41(n)(3)(iii)*]; and

   d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above [*40 CFR 122.41(n)(3)(iv)*].

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof [*40 CFR 122.41(n)(4)*].

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition [*40 CFR 122.41(f)*].

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit [*40 CFR 122.41(b)*].

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the CWC [*40 CFR 122.41(l)(3)*] [*40 CFR 122.61*].

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity [*40 CFR 122.41(j)(1)*].

B. Monitoring results must be conducted according to test procedures under 40 CFR part 136 or, in the case of sludge use or disposal, approved under 40 CFR part 136 unless otherwise specified in 40 CFR part 503 unless other test procedures have been specified in this Order [*40 CFR 122.41(j)(4)*] [*40 CFR 122.44(i)(1)(iv)*].

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time [*40 CFR 122.41(j)(2)*]. It is recommended that the Discharger maintain the results of all analyses indefinitely.

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements [*40 CFR 122.41(j)(3)(i)*];

2. The individual(s) who performed the sampling or measurements [*40 CFR 122.41(j)(3)(ii)*];

3. The date(s) analyses were performed [*40 CFR 122.41(j)(3)(iii)*];

4. The individual(s) who performed the analyses [*40 CFR 122.41(j)(3)(iv)*];

5. The analytical techniques or methods used [*40 CFR 122.41(j)(3)(v)*]; and

6. The results of such analyses [*40 CFR 122.41(j)(3)(vi)*].

C. Claims of confidentiality for the following information will be denied [*40 CFR 122.7(b)*]:

1. The name and address of any permit applicant or Discharger [*40 CFR 122.7(b)(1)*]; and

2. Permit applications and attachments, permits and effluent data [*40 CFR 122.7(b)(2)*].

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, SWRCB, or USEPA within a reasonable time, any information which the Regional Water Board, SWRCB, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, SWRCB, or USEPA copies of records required to be kept by this Order [40 CFR 122.41(h)] [CWC 13267].

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, SWRCB, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below [*40 CFR 122.41(k)*].

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA) [*40 CFR 122.22(a)(3)*].

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above [*40 CFR 122.22(b)(1)*];

   b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (a duly authorized representative may thus be either a named individual or any individual occupying a named position) [*40 CFR 122.22(b)(2)*]; and

c. The written authorization is submitted to the Regional Water Board, State Water Board, or USEPA [*40 CFR 122.22(b)(3)*].

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board, State Water Board or USEPA prior to or together with any reports, information, or applications, to be signed by an authorized representative [*40 CFR 122.22(c)*].

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations" [*40 CFR 122.22(d)*].

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in this Order [*40 CFR 122.41(l)(4)*].

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board, or State Water Board for reporting results of monitoring of sludge use or disposal practices [*40 CFR 122.41(l)(4)(i)*].

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR 136 or, in the case of sludge use or disposal, approved under 40 CFR 136 unless otherwise specified in 40 CFR 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board [*40 CFR 122.41(l)(4)(ii)*].

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order [*40 CFR 122.41(l)(4)(iii)*].

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date [*40 CFR 122.41(l)(5)*].

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the

Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance [*40 CFR 122.41(l)(6)(i)*].

2. The following shall be included as information that must be reported within 24 hours under this paragraph [*40 CFR 122.41(l)(6)(ii)*]:

   a. Any unanticipated bypass that exceeds any effluent limitation in this Order [*40 CFR 122.41(l)(6)(ii)(A)*].

   b. Any upset that exceeds any effluent limitation in this Order [*40 CFR 122.41(l)(6)(ii)(B)*].

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours [*40 CFR 122.41(l)(6)(iii)*].

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when [*40 CFR 122.41(l)(1)*]:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b) [*40 CFR §122.41(l)(1)(i)*]; or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in this Order nor to notification requirements under 40 CFR part 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1) [*40 CFR 122.41(l)(1)(ii)*].

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan [*40 CFR 122.41(l)(1)(iii)*].

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements [*40 CFR 122.41(l)(2)]*.

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above [*40 CFR 122.41(l)(7)*].

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information [*40 CFR 122.41(l)(8)*].

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.

B. The CWA provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The CWA provides that any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions (40 CFR 122.41(a)(2)).

C. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000. (40 CFR 122.41(a)(3)).

D. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this

paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. (40 CFR 122.41(j)(5))

E. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both. (40 CFR 122.41(k)(2)).

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following [*40 CFR 122.42(b)*]:

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to Sections 301 or 306 of the CWA if it were directly discharging those pollutants [*40 CFR 122.42(b)(1)*]; and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order [*40 CFR 122.42(b)(2)*].

Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW [*40 CFR 122.42(b)(3)*].

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (CI-1758)

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations (CFR) at 40 CFR 122.48 requires that all NPDES permits specify monitoring and reporting requirements. CWC sections 13267 and 13383 also authorize the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, which implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. NPDES compliance monitoring focuses on the effects of a specific point source discharge. Generally, it is not designed to assess impacts from other sources of pollution (e.g., nonpoint source runoff, aerial fallout) or to evaluate the current status of important ecological resources in the waterbody. The scale of existing compliance monitoring programs does not match the spatial and, to some extent, temporal boundaries of the important physical and biological processes in the ocean. In addition, the spatial coverage provided by compliance monitoring programs is less than ten percent of the nearshore ocean environment. Better technical information is needed about status and trends in ocean waters to guide management and regulatory decisions, to verify the effectiveness of existing programs, and to shape policy on marine environmental protection.

B. The Regional Water Board and USEPA, working with other groups, have developed a comprehensive basis for effluent and receiving water monitoring appropriate to large publicly owned treatment works (POTWs) discharging to waters of the Southern California Bight. This effort has culminated in the publication by the Southern California Coastal Water Research Project (SCCWRP) of the Model Monitoring Program guidance document (Schiff, K.C., J.S. Brown and S.B. Weisberg. 2001. *Model Monitoring Program for Large Ocean Dischargers in Southern California*. SCCWRP Tech. Rep #357. Southern California Coastal Water Research Project, Westminster, CA. 101 pp.). This guidance provides the principles, framework and recommended design for effluent and receiving water monitoring elements that have guided development of the monitoring program described below.

C. In July 2000, the Santa Monica Bay Restoration Project (SMBRP) published "An Assessment of the Compliance Monitoring System in Santa Monica Bay" to set forth recommendations and priorities for compliance monitoring in Santa Monica Bay. This report reasoned that a reduced level of receiving water monitoring is justified for large POTWs discharging to Santa Monica Bay due to improvements in effluent quality and associated decreases in receiving water impacts. Like the Model Monitoring Program developed by SCCWRP, SMBRP recommendations are focused on providing answers to management questions and allowing a reduction in POTW receiving water monitoring where discharge effects are well understood. The monitoring plan set forth here has been guided by SMBRP recommendations.

D. The conceptual framework for the Model Monitoring Program has three components that comprise a range of spatial and temporal scales: (1) core monitoring; (2) regional monitoring; and (3) special studies.

1. Core monitoring is local in nature and focused on monitoring trends in quality and effects of the point source discharge. This includes effluent monitoring as well as some aspects of receiving water monitoring. In the monitoring program described below these core components are typically referred to as local monitoring.

2. Regional monitoring is focused on questions that are best answered by a region-wide approach that incorporates coordinated survey design and sampling techniques. The major objective of regional monitoring is to collect information required to assess how safe it is to swim in the ocean, how safe it is to eat seafood from the ocean, and whether the marine ecosystem is being protected. Key components of regional monitoring include elements to address pollutant mass emission estimations, public health concerns, monitoring of trends in natural resources, assessment of regional impacts from all

contaminant sources, and protection of beneficial uses. The final design of regional monitoring programs is developed by means of steering committees and technical committees comprised of participating agencies and organizations, and are not specified in this Order. Instead, for each regional component, the degree and nature of participation of the Discharger is specified. For this Order, these levels of effort are based upon past participation of the Joint Outfall System (Discharger or JOS), formerly referred to as the County Sanitation Districts of Los Angeles County, in regional monitoring programs.

The Discharger shall participate in regional monitoring activities coordinated by the SCCWRP or any other appropriate agency approved by the Regional Water Board. The procedures and time lines for the Regional Water Board approval shall be the same as detailed for special studies, below.

3. Special studies are focused on refined questions regarding specific effects or development of monitoring techniques and are anticipated to be of short duration and/or small scale, although multiyear studies also may be needed. Questions regarding effluent or receiving water quality, discharge impacts, ocean processes in the area of the discharge, or development of techniques for monitoring the same, arising out of the results of core or regional monitoring, may be pursued through special studies. These studies are by nature ad hoc and cannot be typically anticipated in advance of the five-year permit cycle.

   The Discharger, the Regional Water Board shall consult annually to determine the need for special studies. Each year, the Discharger shall submit proposals for any proposed special studies to the Regional Water Board by December 31st for the following year's monitoring effort (July through June). The following year, detailed scopes of work for proposals, including reporting schedules, shall be presented at a Spring Regional Water Board meeting, to obtain the Regional Water Board approval and to inform the public. Upon approval by the Regional Water Board, the Discharger shall implement its special study or studies.

E. Discharger participation in regional monitoring programs is required as a condition of this permit. The regional programs which must be conducted under this permit include:

1. Future Southern California Bight regional surveys, including benthic infauna, sediment chemistry, fish communities and fish predator risk.

2. Santa Monica Bay Restoration Project's Seafood Safety Survey – The Local Seafood Safety Survey stipulated in this permit is a contribution to the Santa Monica Bay Restoration Project's Seafood Safety Survey.

3. Central Region Kelp Monitoring Program – coordinated by the Regional Water Board.

4. Central Bight Water Quality Cooperative Program – coordinated monitoring conducted by the Orange County Sanitation District, the County Sanitation Districts of Los Angeles County, the City of Los Angeles and the City of Oxnard through appropriate agencies for water quality monitoring.

F. Bight Regional Monitoring. Regular regional monitoring for the Southern California Bight has been established, occurring at four- to five-year intervals, and coordinated through SCCWRP with discharger agencies and numerous other entities. The fourth regional monitoring program (Bight'08) occurred during summer 2008, although certain components of the program were conducted in subsequent years. The next (fifth) regional monitoring program (Bight'13) is expected to take place during 2013. While participation in regional programs is required under this permit, revisions to the monitoring program of this permit at the direction of the Regional Water Board may be necessary to accomplish the goals of regional monitoring or to allow the performance of special studies to investigate regional or site-specific water issues of concern. These revisions may include a reduction or increase in the number of parameters to be monitored, the

frequency of monitoring, or the number and size of samples to be collected. Such changes may be authorized by the Executive Officer upon written notification to the Discharger.

Discharger participation in regional monitoring programs is required as a condition of this Order. The Discharger shall complete collection and analysis of samples in accordance with the schedule established by the Steering Committee directing the Bight-wide regional monitoring surveys. The level of participation shall be similar to that provided by the Discharger in previous regional surveys conducted in 1994, 1998, 2003 and 2008.

G. Bay Comprehensive Monitoring Program. The Santa Monica Bay Restoration Commission (SMBRC) adopted a new comprehensive monitoring program for Santa Monica Bay in April 2007. This new monitoring program, developed by the Commission's Technical Advisory Committee, culminates efforts that began in the mid 1990s with the identification of key management questions and monitoring priorities. It lays out new monitoring designs for five major habitats within the Bay:

- Pelagic Ecosystem;
- Soft Bottom Ecosystem;
- Hard Bottom Ecosystem;
- Rocky and Sandy Intertidal; and,
- Wetland.

Design for each habitat includes a core monitoring question, a number of related objectives, specific monitoring approaches, indicators, data products, and sampling designs detailing number and locations of stations, sampling frequency and measurements to be collected. The Bay Monitoring Program also includes an implementation plan that includes a detailed schedule, cost estimates for individual Program elements, and recommendations on the Program's management structure, including data management and assessment strategies.

The SMBRC has agreed to lead the effort to further develop the implementation plan for the monitoring program. Regional Water Board staff will participate in this effort. The Bay Monitoring Program is designed to be implemented, in part, through modifications to existing receiving water monitoring programs for major NPDES dischargers into coastal ocean waters. Some elements of this monitoring program already have been implemented, for example, through establishment of periodic Bight-wide regional monitoring surveys (Southern California Bight Pilot Project '94, Bight '98, Bight '03, and Bight '08) and kelp bed monitoring. However, other elements of the program have yet to be implemented.

SMBRC, USEPA, the Regional Water Board, the Discharger, affected NPDES permit holders, and other interested agencies and stakeholders will develop implementation plans to collaboratively fund these elements of the program and determine each party's level of participation. It is anticipated that funding for the program from the JOS will be supplied through a combination of modifications to this Order's Monitoring and Reporting Program, including redirection of existing effort and new monitoring efforts relevant to the JWPCP's discharge, and integration with monitoring efforts conducted by other agencies and interested stakeholders. Redirection of existing monitoring requirements and/or the imposition of additional monitoring efforts conducted under the terms of this Order are subject to a hearing before the Regional Water Board. This Order may be reopened and modified by the Regional Water Board to incorporate conforming monitoring requirements and schedule dates for implementation of the Comprehensive Monitoring Program for Santa Monica Bay (Santa Monica Bay Restoration Commission, January 2007).

Each year, SMBRC shall convene a meeting resulting in a report on progress in implementing the Comprehensive Monitoring Program. This report shall be presented at a Spring Regional Water Board meeting. The Discharger shall provide an informational report summarizing to date its contributing

activities towards coordinated implementation of the Comprehensive Monitoring Program for Santa Monica Bay (SMBRC, January 2007).

H. The Regional Water Board has helped to establish the Central Region Kelp Survey Consortium to conduct regional kelp bed monitoring. This program is designed to require ocean dischargers in the Regional Water Board's jurisdiction to undertake a collaborative program (which may include participation by Orange County ocean dischargers) to monitor kelp beds in the Southern California Bight, patterned after the successful program implemented by the San Diego Regional Water Board since 1985. Data collected in this regional survey will be used to assess status and trends in kelp bed health and spatial extent. The regional nature of the survey will allow the status of beds local to specific dischargers to be compared to regional trends. Additionally, this survey provides data to the Santa Monica Bay Restoration Project's Kelp Beds program. The regional kelp monitoring survey was initiated during 2003.

I. This monitoring program is comprised of requirements to demonstrate compliance with the conditions of the NPDES permit, ensure compliance with State water quality standards, and mandate participation in regional monitoring and/or area-wide studies.

J. The receiving waters in the Palos Verdes Peninsula watershed were impacted by historical discharges of the JWPCP effluents containing elevated concentrations of PCBs and DDT. The highest concentrations of PCB and DDT are in a layer of low density sewage-derived sediments around the main sewer outfalls at White Point on the Palos Verdes Shelf. USEPA has designated the DDT/PCB contaminated area as a superfund site. USEPA may begin the remediation actions on the Palos Verdes Shelf during this permit cycle. Once a detailed remediation plan is available, the Regional Water Board, USEPA and the Discharger will ensure that the JWPCP outfalls are protected from damage and will design a suitable monitoring program to ensure that contaminated sediment is not being resuspended or impacting marine life.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table 1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
Influent Monitoring Station		
--	INF-001	Sampling stations shall be established at each point of inflow to the sewage treatment plant and shall be located upstream of any in-plant return flows and/or where representative samples of the influent can be obtained.
Effluent Monitoring Station		
Discharge Points 001, 002, 003, and 004	EFF-001	The effluent sampling station shall be located downstream of any in-plant return flows but before entering discharge tunnel where representative samples of the effluent can be obtained.
Discharge Points 001, 002, 003, and 004	EFF-002A EFF-002B	These effluent sampling stations shall be located at the outfall manifold at White Point. Samples taken at monitoring location EFF-002A shall be considered representative of discharges from Discharge Points 001 and 003. Samples taken at monitoring location EFF-002B shall be considered representative of discharges from Discharge Points 002 and 004.
Receiving Water Monitoring Station		
- Shoreline Stations for Microbiological Monitoring (Figure 1)		
	RW-SL-SB	Bluff Cove, 33° 47.52', 118° 23.76' (R-M-SB in the former permit)

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
	RW-SL-SM	Malaga Cove, 33° 48.22', 118° 24.44' (R-M-SM in the former permit)
	RW-SL-S1	Long Point, 33° 44.22', 118° 23.62' (R-M-S1 in the former permit)
	RW-SL-S2	Abalone Cove, 33° 44.44', 118° 22.18' (R-M-S2 in the former permit)
	RW-SL-S3	Portuguese Bend, 33° 44.02', 118° 21.40' (R-M-S3 in the former permit)
	RW-SL-S5	White Point, 33° 43.12', 118° 19.35' (R-M-S5 in the former permit)
	RW-SL-S6	Wilder Addition Park, 33° 42.59', 118° 17.95' (R-M-S6 in the former permit)
	RW-SL-S7	Cabrillo Beach, 33° 42.50', 118° 16.86' (R-M-S7 in the former permit)
- Inshore Stations for Microbiological Monitoring (figure 2)		
	RW-IS-IL2	Long Point, 33° 44.20', 118° 24.15' (R-M-IL2 in the former permit)
	RW-IS -IL3	Portuguese Point, 33° 44.25', 118° 22.67' (R-M-IL3 in the former permit)
	RW-IS -IL4	Bunker Point, 33° 43.46', 118° 21.10' (R-M-IL4 in the former permit)
	RW-IS -IL5	Royal Palms, 33° 42.91', 118° 19.85' (R-M-IL5 in the former permit)
	RW-IS -IL6	West of Point Fermin, 33° 42.44', 118° 18.53' (R-M-IL6 in the former permit)
	RW-IS -IL7	Cabrillo Beach, 33° 42.20', 118° 17.04' (R-M-IL7 in the former permit)
- Nearshore/Offshore Stations for Microbiological and Water Quality Monitoring (Figures 2 and 3)		
	RW-OS-6C	6C, 33° 42.47’, 118° 21.24’ (R-M-6C in the former permit)
	RW-OS-8C	8C, 33° 41.91’, 118° 20.14’ (R-M-8C in the former permit)
	RW-OS-9C	9C, 33° 41.32’, 118° 19.10’ (R-M-9C in the former permit)
	RW-OS-2501	10 meter depth, 33° 43.67', 118° 07.21' (R-WQ-2501 in the former permit)
	RW-OS-2502	20 meter depth, 33° 41.94', 118° 07.67' (R-WQ-2502 in the former permit)
	RW-OS-2503	26 meter depth, 33° 40.21', 118° 08.12' (R-WQ-2503 in the former permit)
	RW-OS-2504	33 meter depth, 33° 38.48', 118° 08.57' (R-WQ-2504 in the former permit)
	RW-OS-2505	44 meter depth, 33° 36.75', 118° 09.02' (R-WQ-2505 in the former permit)
	RW-OS-2506	60 meter depth, 33° 34.86', 118° 09.54' (R-WQ-2506 in the former permit)
	RW-OS-2601	19 meter depth, 33° 43.23', 118° 11.06' (R-WQ-2601 in the former permit)
	RW-OS-2602	23 meter depth, 33° 41.64', 118° 11.43' (R-WQ-2602 in the former permit)
	RW-OS-2603	23 meter depth, 33° 40.05', 118° 11.80' (R-WQ-2603 in the former permit)
	RW-OS-2604	32 meter depth, 33° 38.46', 118° 12.18' (R-WQ-2604 in the former permit)
	RW-OS-2605	47 meter depth, 33° 36.88', 118° 12.55' (R-WQ-2605 in the former permit)
	RW-OS-2606	62 meter depth, 33° 35.29', 118° 12.93' (R-WQ-2606 in the former permit)
	RW-OS-2701	26 meter depth, 33° 42.46', 118° 14.80' (R-WQ-2701 in the former permit)
	RW-OS-2702	26 meter depth, 33° 41.32', 118° 15.07' (R-WQ-2702 in the former permit)
	RW-OS-2703	28 meter depth, 33° 40.17', 118° 15.34' (R-WQ-2703 in the former permit)
	RW-OS-2704	50 meter depth, 33° 39.03', 118° 15.60' (R-WQ-2704 in the former permit)
	RW-OS-2705	100 meter depth, 33° 37.88', 118° 15.87' (R-WQ-2705 in the former permit)
	RW-OS-2706	80 meter depth, 33° 36.73', 118° 16.14' (R-WQ-2706 in the former permit)
	RW-OS-2801	10 meter depth, 33° 42.17', 118° 17.06' (R-WQ-2801 in the former permit)
	RW-OS-2802	30 meter depth, 33° 41.60', 118° 17.34' (R-WQ-2802 in the former permit)
	RW-OS-2803	60 meter depth, 33° 40.11', 118° 17.81' (R-WQ-2803 in the former permit)
	RW-OS-2804	100 meter depth, 33° 39.46', 118° 18.08' (R-WQ-2804 in the former permit)
	RW-OS-2805	100 meter depth, 33° 38.91', 118° 18.24' (R-WQ-2805 in the former permit)
	RW-OS-2806	100 meter depth, 33° 38.22', 118° 18.55' (R-WQ-2806 in the former permit)
	RW-OS-2901	10 meter depth, 33° 42.86', 118° 19.41' (R-WQ-2901 in the former permit)
	RW-OS-2902	30 meter depth, 33° 42.42', 118° 19.79' (R-WQ-2902 in the former permit)

Discharge Point Name	Monitoring Location Name	Monitoring Location Description	
	RW-OS-2903	60 meter depth, 33° 41.91', 118° 20.14'	(R-WQ-2903 in the former permit)
	RW-OS-2904	100 meter depth, 33° 41.27', 118° 20.34'	(R-WQ-2904 in the former permit)
	RW-OS-2905	100 meter depth, 33° 40.26', 118° 20.77'	(R-WQ-2905 in the former permit)
	RW-OS-2906	100 meter depth, 33° 39.25', 118° 21.26'	(R-WQ-2906 in the former permit)
	RW-OS-3001	10 meter depth, 33° 43.93', 118° 21.62'	(R-WQ-3001 in the former permit)
	RW-OS-3002	30 meter depth, 33° 43.34', 118° 21.79'	(R-WQ-3002 in the former permit)
	RW-OS-3003	60 meter depth, 33° 42.88', 118° 21.96'	(R-WQ-3003 in the former permit)
	RW-OS-3004	100 meter depth, 33° 42.06', 118° 22.28'	(R-WQ-3004 in the former permit)
	RW-OS-3005	100 meter depth, 33° 41.10', 118° 22.86'	(R-WQ-3005 in the former permit)
	RW-OS-3006	100 meter depth, 33° 40.01', 118° 23.44'	(R-WQ-3006 in the former permit)
	RW-OS-3051	13 meter depth, 33° 44.18', 118° 23.66'	(R-WQ-3051 in the former permit)
	RW-OS-3052	30 meter depth, 33° 43.99', 118° 24.03'	(R-WQ-3052 in the former permit)
	RW-OS-3053	60 meter depth, 33° 43.80', 118° 24.15'	(R-WQ-3053 in the former permit)
	RW-OS-3054	100 meter depth, 33° 43.14', 118° 24.66'	(R-WQ-3054 in the former permit)
	RW-OS-3055	100 meter depth, 33° 42.30', 118° 25.32'	(R-WQ-3055 in the former permit)
	RW-OS-3056	100 meter depth, 33° 41.38', 118° 25.99'	(R-WQ-3056 in the former permit)
	RW-OS-3101	10 meter depth, 33° 46.26', 118° 25.81'	(R-WQ-3101 in the former permit)
	RW-OS-3102	30 meter depth, 33° 45.90', 118° 26.12'	(R-WQ-3102 in the former permit)
	RW-OS-3103	60 meter depth, 33° 45.44', 118° 26.46'	(R-WQ-3103 in the former permit)
	RW-OS-3104	100 meter depth, 33° 44.72', 118° 26.99'	(R-WQ-3104 in the former permit)
	RW-OS-3105	100 meter depth, 33° 43.73', 118° 27.67'	(R-WQ-3105 in the former permit)
	RW-OS-3106	100 meter depth, 33° 42.75', 118° 28.53'	(R-WQ-3106 in the former permit)
- Nearshore Light Energy Monitoring Stations (Figure 4)			
	RW-NS-L1	Palos Verdes Point, 33° 46.10', 118° 25.82'	(R-WQ-L1 in the former permit)
	RW-NS-L2	Long Point, 33° 44.10', 118° 24.22'	(R-WQ-L2 in the former permit)
	RW-NS-L3	Portuguese Point, 33° 44.09', 118° 22.67'	(R-WQ-L3 in the former permit)
	RW-NS-L4	Bunker Point, 33° 43.42', 118° 21.11'	(R-WQ-L4 in the former permit)
	RW-NS-L5	Royal Palms, 33° 42.84', 118° 19.90'	(R-WQ-L5 in the former permit)
	RW-NS-L6	West of Point Fermin, 33° 42.36', 118° 18.56'	(R-WQ-L6 in the former permit)
	RW-NS-L7	Cabrillo Beach, 33° 41.84', 118° 17.12'	(R-WQ-L7 in the former permit)
- Bottom Stations for Benthic Sediments Monitoring (Figure 5)			
	RW-B-0A	305 meter depth, 33° 49.10', 118° 27.25'	(R-B-0A in the former permit)
	RW-B-0B	152 meter depth, 33° 48.70', 118° 26.50'	(R-B-0B in the former permit)
	RW-B-0C	61 meter depth, 33° 48.43', 118° 25.83'	(R-B-0C in the former permit)
	RW-B-0D	30 meter depth, 33° 48.17', 118° 25.36'	(R-B-0D in the former permit)
	RW-B-1A	305 meter depth, 33° 44.72', 118° 26.99'	(R-B-1A in the former permit)
	RW-B-1B	152 meter depth, 33° 44.97', 118° 26.81'	(R-B-1B in the former permit)
	RW-B-1C	61 meter depth, 33° 45.44', 118° 26.46'	(R-B-1C in the former permit)
	RW-B-1D	30 meter depth, 33° 45.90', 118° 26.12'	(R-B-1D in the former permit)
	RW-B-2A	305 meter depth, 33° 43.62', 118° 25.72'	(R-B-2A in the former permit)
	RW-B-2B	152 meter depth, 33° 43.95', 118° 25.55'	(R-B-2B in the former permit)
	RW-B-2C	61 meter depth, 33° 44.26', 118° 25.39'	(R-B-2C in the former permit)
	RW-B-2D	30 meter depth, 33° 44.47', 118° 25.28'	(R-B-2D in the former permit)
	RW-B-3A	305 meter depth, 33° 43.14', 118° 24.66'	(R-B-3A in the former permit)
	RW-B-3B	152 meter depth, 33° 43.43', 118° 24.44'	(R-B-3B in the former permit)

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
	RW-B-3C	61 meter depth, 33° 43.80', 118° 24.15' (R-B-3C in the former permit)
	RW-B-3D	30 meter depth, 33° 43.99', 118° 24.03' (R-B-3D in the former permit)
	RW-B-4A	305 meter depth, 33° 42.70', 118° 23.38' (R-B-4A in the former permit)
	RW-B-4B	152 meter depth, 33° 43.00', 118° 23.24' (R-B-4B in the former permit)
	RW-B-4C	61 meter depth, 33° 43.40', 118° 23.08' (R-B-4C in the former permit)
	RW-B-4D	30 meter depth, 33° 43.91', 118° 22.83' (R-B-4D in the former permit)
	RW-B-5A	305 meter depth, 33° 42.06', 118° 22.28' (R-B-5A in the former permit)
	RW-B-5B	152 meter depth, 33° 42.54', 118° 22.08' (R-B-5B in the former permit)
	RW-B-5C	61 meter depth, 33° 42.88', 118° 21.96' (R-B-5C in the former permit)
	RW-B-5D	30 meter depth, 33° 43.34', 118° 21.79' (R-B-5D in the former permit)
	RW-B-6A	305 meter depth, 33° 41.99', 118° 21.56' (R-B-6A in the former permit)
	RW-B-6B	152 meter depth, 33° 42.18', 118° 21.35' (R-B-6B in the former permit)
	RW-B-6C	61 meter depth, 33° 42.47', 118° 21.24' (R-B-6C in the former permit)
	RW-B-6D	30 meter depth, 33° 42.98', 118° 20.91' (R-B-6D in the former permit)
	RW-B-7A	305 meter depth, 33° 41.86', 118° 21.19' (R-B-7A in the former permit)
	RW-B-7B	152 meter depth, 33° 42.05', 118° 21.09' (R-B-7B in the former permit)
	RW-B-7C	61 meter depth, 33° 42.31', 118° 20.92' (R-B-7C in the former permit)
	RW-B-7D	30 meter depth, 33° 42.76', 118° 20.61' (R-B-7D in the former permit)
	RW-B-8A	305 meter depth, 33° 41.27', 118° 20.34' (R-B-8A in the former permit)
	RW-B-8B	152 meter depth, 33° 41.53', 118° 20.24' (R-B-8B in the former permit)
	RW-B-8C	61 meter depth, 33° 41.91', 118° 20.14' (R-B-8C in the former permit)
	RW-B-8D	30 meter depth, 33° 42.42', 118° 19.79' (R-B-8D in the former permit)
	RW-B-9A	305 meter depth, 33° 40.58', 118° 19.46' (R-B-9A in the former permit)
	RW-B-9B	152 meter depth, 33° 40.89', 118° 19.31' (R-B-9B in the former permit)
	RW-B-9C	61 meter depth, 33° 41.32', 118° 19.10' (R-B-9C in the former permit)
	RW-B-9D	30 meter depth, 33° 41.97', 118° 18.78' (R-B-9D in the former permit)
	RW-B-10A	305 meter depth, 33° 39.46', 118° 18.08' (R-B-10A in the former permit)
	RW-B-10B	152 meter depth 33° 39.73', 118° 17.90' (R-B-10B in the former permit)
	RW-B-10C	61 meter depth, 33° 40.11', 118° 17.81' (R-B-10C in the former permit)
	RW-B-10D	30 meter depth, 33° 41.60', 118° 17.34' (R-B-10D in the former permit)
- Bottom Stations for Bioaccumulation Monitoring (Figure 7)		
	RW-BA-Z1	**Outfall zone:** inshore of the 150 meter depth contour and between a line bearing 150° magnetic of White Point and a line bearing 180° magnetic off Bunker Point. (R-BA-Z1 in the former permit)
	RW-BA-Z2	**Intermediate zone:** inshore of the 150 meter depth contour and between a line bearing 180˚ (true) off 33˚ 44.24' N. lat. 118˚ 22.50' W. long. (Portuguese Point) and a line bearing 270˚ (true) off 33˚ 44.80' N. lat. 118˚ 24.82' W. long.. (R-BA-Z2 in the former permit)
	RW-BA-Z3	**Distant zone:** inshore of the 150 meter depth contour and between a line bearing 225° magnetic off the southern face of Palos Verdes Point and a line bearing 235° magnetic off the south end of the Redondo Beach Pier. (R-BA-Z3 in the former permit)
- Bottom Stations for Fish and Invertebrate Monitoring (Trawl Sampling Stations) (Figure 6)		
	RW-T-T0/23	23 meter depth, 33° 48.19', 118° 25.04' (trawl mid-point) (Former R-T-T0/23)
	RW-T-T0/61	61 meter depth, 33° 48.57', 118° 25.84' (trawl mid-point) (Former R-T-T0/61)
	RW-T-T0/137	137 meter depth, 33° 48.83', 118° 26.36' (trawl mid-point)(Former R-T-T0/137)

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
	RW-T-T0/305	305 meter depth, 33° 49.23', 118° 27.09' (trawl mid-point)(Former R-T-T0/305)
	RW-T-T1/23	26 meter depth, 33° 44.65', 118° 25.09' (trawl mid-point) (Former R-T-T1/23)
	RW-T-T1/61	61 meter depth, 33° 44.16', 118° 25.23' (trawl mid-point) (Former R-T-T1/61)
	RW-T-T1/137	137 meter depth, 33° 44.84', 118° 25.34' (trawl mid-point)(Former R-T-T1/137)
	RW-T-T1/305	305 meter depth, 33° 43.55', 118° 25.64' (trawl mid-point)(Former R-T-T1/305)
	RW-T-T4/23	27 meter depth, 33° 42.79', 118° 20.48' (trawl mid-point) (Former R-T-T4/23)
	RW-T-T4/61	61 meter depth, 33° 42.33', 118° 20.92' (trawl mid-point) (Former R-T-T4/61)
	RW-T-T4/137	137 meter depth, 33° 42.06', 118° 21.05' (trawl mid-point)(Former R-T-T4/137)
	RW-T-T4/305	305 meter depth, 33° 42.00', 118° 21.49' (trawl mid-point)(Former R-T-T4/305)
	RW-T-T5/23	23 meter depth, 33° 42.29', 118° 18.98' (trawl mid-point) (Former R-T-T5/23)
	RW-T-T5/61	61 meter depth, 33° 41.45', 118° 19.31' (trawl mid-point) (Former R-T-T5/61)
	RW-T-T5/137	137 meter depth, 33° 41.11', 118° 19.61' (trawl mid-point)(Former R-T-T5/137)
	RW-T-T5/305	305 meter depth, 33° 40.85', 118° 19.85' (trawl mid-point)(Former R-T-T5/305)

III. INFLUENT MONITORING REQUIREMENTS

(Footnotes are specified on pages E-17 and E-18)

Influent monitoring is required to:

- Determine compliance with NPDES permit conditions.
- Assess treatment plant performance.
- Assess effectiveness of the Pretreatment Program

A. Monitoring Location (INF-001)

1. The Discharger shall monitor influent to the Facility at influent monitoring station INF-001 as follows. If more than one analytical test method is listed for a given parameter, the Discharger must select from the listed methods and corresponding Minimum Level:

Table 2. Influent Monitoring

Influent Monitoring Program				
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**	**Required Analytical Test Method**
Flow	mgd	calculated	daily	--
BOD_5 20°C	mg/L	24-hr composite	daily	[4]
Suspended solids	mg/L	24-hr composite	daily	[4]
pH	pH units	grab	daily	[4]
COD	mg/L	24-hr composite	daily	[4]
Oil and grease	mg/L	grab [5]	monthly	[4]
Ammonia nitrogen	mg/L	24-hr composite	monthly	[4]
Cyanide	µg/L	grab	monthly	[4]
Nitrate nitrogen	mg/L	24-hr composite	quarterly	[4]

Influent Monitoring Program				
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**	**Required Analytical Test Method**
Nitrite nitrogen	mg/L	24-hr composite	quarterly	[4]
Organic nitrogen	mg/L	24-hr composite	quarterly	[4]
Radioactivity [6] (Including gross alpha, gross beta, combined radium-226 and radium-228, tritium, strontium-90 and uranium)	pCi/L	24-hr composite	monthly	--
Total phosphorus (as P)	mg/L	24-hr composite	quarterly	[4]
Tributyltin	ng/L	24-hr composite	quarterly	[4]
Aldrin	µg/L	24-hr composite	quarterly	[4]
Chlordane & related compounds [7]	µg/L	24-hr composite	quarterly	[4]
DDT [8]	µg/L	24-hr composite	quarterly	[4]
Dieldrin	µg/L	24-hr composite	quarterly	[4]
Endosulfan [9]	µg/L	24-hr composite	quarterly	[4]
Endrin	µg/L	24-hr composite	quarterly	[4]
HCH [10]	µg/L	24-hr composite	quarterly	[4]
Heptachlor	µg/L	24-hr composite	quarterly	[4]
Heptachlor epoxide	µg/L	24-hr composite	quarterly	[4]
PCBs [11]	µg/L	24-hr composite	quarterly	[4]
Toxaphene	µg/L	24-hr composite	quarterly	[4]
2,4-Dinitrophenol	µg/L	24-hr composite	quarterly	[4]
2,4,6-Trichlorophenol	µg/L	24-hr composite	quarterly	[4]
2-Methyl-4,6-dinitrophenol	µg/L	24-hr composite	quarterly	[4]
Phenolic compounds (chlorinated) [13]	µg/L	24-hr composite	quarterly	[4]
Phenolic compounds (non-chlorinated) [14]	µg/L	24-hr composite	quarterly	[4]
Bis(2-chloro-ethoxy) methane	µg/L	24-hr composite	quarterly	[4]
Bis(2-chloro-isopropyl) ether	µg/L	24-hr composite	quarterly	[4]
Di-n-butylphthalate	µg/L	24-hr composite	quarterly	[4]
Dichlorobenzenes [15]	µg/L	grab	quarterly	[4]
Diethylphthalate	µg/L	24-hr composite	quarterly	[4]
Dimethylphthalate	µg/L	24-hr composite	quarterly	[4]
Fluoranthene	µg/L	24-hr composite	quarterly	[4]
Hexachlorocyclopentadiene	µg/L	24-hr composite	quarterly	[4]

Influent Monitoring Program				
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**	**Required Analytical Test Method**
Isophorone	µg/L	24-hr composite	quarterly	[4]
Nitrobenzene	µg/L	24-hr composite	quarterly	[4]
Benzidine	µg/L	24-hr composite	quarterly	[4]
Bis(2-chloroethyl) ether	µg/L	24-hr composite	quarterly	[4]
Bis(2-ethylhexyl) phthalate	µg/L	24-hr composite	quarterly	[4]
1,4-Dichlorobenzene	µg/L	grab	quarterly	[4]
3,3'-Dichlorobenzidine	µg/L	24-hr composite	quarterly	[4]
2,4-Dinitrotoluene	µg/L	24-hr composite	quarterly	[4]
1,2-Diphenylhydrazine	µg/L	24-hr composite	quarterly	[4]
Hexachlorobenzene	µg/L	24-hr composite	quarterly	[4]
Hexachlorobutadiene	µg/L	24-hr composite	quarterly	[4]
Hexachloroethane	µg/L	24-hr composite	quarterly	[4]
N-Nitrosodimethylamine	µg/L	24-hr composite	quarterly	[4]
N-Nitrosodi-n-propylamine	µg/L	24-hr composite	quarterly	[4]
N-Nitrosodiphenylamine	µg/L	24-hr composite	quarterly	[4]
PAHs [16]	µg/L	24-hr composite	quarterly	[4]
TCDD equivalents [17]	pg/L	24-hr composite	quarterly	[4]
Acrolein	µg/L	Grab	quarterly	[4]
Acrylonitrile	µg/L	grab	quarterly	[4]
Benzene	µg/L	grab	quarterly	[4]
Carbon tetrachloride	µg/L	Grab	quarterly	[4]
Chlorobenzene	µg/L	grab	quarterly	[4]
Chlorodibromomethane	µg/L	Grab	quarterly	[4]
Chloroform	µg/L	Grab	quarterly	[4]
Dichlorobromomethane	µg/L	Grab	quarterly	[4]
Dichloromethane	µg/L	Grab	quarterly	[4]
1,1-Dichloroethylene	µg/L	grab	quarterly	[4]
1,2-Dichloroethane	µg/L	Grab	quarterly	[4]
1,3-Dichloropropene	µg/L	Grab	quarterly	[4]
Ethylbenzene	µg/L	Grab	quarterly	[4]
Halomethanes [18]	µg/L	Grab	quarterly	[4]
Methyl-tert-butyl-ether	µg/L	Grab	quarterly	[4]

Influent Monitoring Program				
Parameter	**Units**	**Sample Type** [1]	**Minimum Sampling Frequency**	**Required Analytical Test Method**
Toluene	µg/L	Grab	quarterly	[4]
1,1,2,2-Tetrachloroethane	µg/L	Grab	quarterly	[4]
1,1,1-Trichloroethane	µg/L	grab	quarterly	[4]
1,1,2-Trichloroethane	µg/L	grab	quarterly	[4]
Tetrachloroethylene	µg/L	Grab	quarterly	[4]
Trichloroethylene	µg/L	Grab	quarterly	[4]
Vinyl chloride	µg/L	Grab	quarterly	[4]
Antimony	µg/L	24-hr composite	quarterly	[4]
Arsenic	µg/L	24-hr composite	monthly	[4]
Beryllium	µg/L	24-hr composite	quarterly	[4]
Cadmium	µg/L	24-hr composite	monthly	[4]
Chromium (III)	µg/L	calculated	quarterly	[4]
Copper	µg/L	24-hr composite	monthly	[4]
Chromium (VI) [19]	µg/L	Grab	monthly	[4]
Lead	µg/L	24-hr composite	monthly	[4]
Mercury	µg/L	24-hr composite	monthly	[4]
Nickel	µg/L	24-hr composite	monthly	[4]
Selenium	µg/L	24-hr composite	monthly	[4]
Silver	µg/L	24-hr composite	monthly	[4]
Thallium	µg/L	24-hr composite	quarterly	[4]
Zinc	µg/L	24-hr composite	monthly	[4]

IV. EFFLUENT MONITORING REQUIREMENTS

(Footnotes are specified on pages E-17 and E-18)

Effluent monitoring is required to:

- Determine compliance with NPDES permit conditions and water quality standards.
- Assess plant performance, identify operational problems and improve plant performance.
- Provide information on wastewater characteristics and flows for use in interpreting water quality and biological data.

A. Monitoring Location (EFF-001, and Manifold Stations: EFF-002A and EFF-002B)

1. The Discharger shall monitor secondary effluent at effluent monitoring location EFF-001 for all parameters except chlorine residual and bacteria. The chlorine residual and bacteria samples shall be collected at effluent manifold monitoring locations EFF-002A and EFF-002B. Effluent limitations

for chlorine residual and bacteria applicable to discharges through Discharge Points 001 and 003 shall apply at manifold monitoring location EFF-002A. Effluent limitations for chlorine residual and bacteria applicable to discharges through Discharge Points 002 and 004 shall apply at manifold monitoring location EFF-002B. The effluent monitoring program is described as follows:

Table 3. Effluent Monitoring

Effluent Monitoring Program				
Parameter	**Units**	**Sample Type [1]**	**Minimum Sampling Frequency [2]**	**Required Analytical Test Method**
Flow	mgd	recorder/totalizer	continuous [3]	--
BOD_5 20°C	mg/L	24-hr composite	daily	[4]
Suspended solids	mg/L	24-hr composite	daily	[4]
pH	pH units	grab	daily	[4]
Oil and grease	mg/L	grab [5]	daily	[4]
Temperature	°C	grab	daily	[4]
Settleable solids	ml/L	grab	daily	[4]
Total chlorine residual (at manifold stations)	mg/L	grab	daily	[4]
Turbidity	NTU	24-hr composite	daily	[4]
Total coliform (at manifold stations)	CFU/100 ml or MPN/100 ml	grab	daily	[4]
Enterococcus (at manifold stations)	CFU/100 ml or MPN/100 ml	grab	daily	[4]
Fecal coliform (at manifold stations)	CFU/100 ml or MPN/100 ml	grab	5 times/month	[4]
COD	mg/L	24-hr composite	daily	[4]
TOC	mg/L	24-hr composite	monthly	[4]
Ammonia nitrogen	mg/L	24-hr composite	monthly	[4]
Toxicity, acute	TUa	24-hr composite	monthly	[4]
Toxicity, chronic	TUc	24-hr composite	monthly	[4]
Cyanide	µg/L	grab	monthly	[4]
Nitrate nitrogen	mg/L	24-hr composite	quarterly	[4]
Nitrite nitrogen	mg/L	24-hr composite	quarterly	[4]
Organic nitrogen	mg/L	24-hr composite	quarterly	[4]
Radioactivity [6] (Including gross alpha, gross beta, combined radium-226 and radium-228, tritium, strontium-90 and uranium)	pCi/L	24-hr composite	monthly	--
Total phosphorus (as P)	mg/L	24-hr composite	quarterly	[4]
Tributyltin	ng/L	24-hr composite	quarterly	[4]

Effluent Monitoring Program				
Aldrin	µg/L	24-hr composite	quarterly	[4]
Chlordane & related compounds [7]	µg/L	24-hr composite	quarterly	[4]
DDT [8]	µg/L	24-hr composite	quarterly	[4]
Dieldrin	µg/L	24-hr composite	quarterly	[4]
Endosulfan [9]	µg/L	24-hr composite	quarterly	[4]
Endrin	µg/L	24-hr composite	quarterly	[4]
HCH [10]	µg/L	24-hr composite	quarterly	[4]
Heptachlor	µg/L	24-hr composite	quarterly	[4]
Heptachlor epoxide	µg/L	24-hr composite	quarterly	[4]
PCBs [11]	µg/L	24-hr composite	quarterly	[4]
PCBs congeners [12]	µg/L	24-hr composite	annually	[4]
Toxaphene	µg/L	24-hr composite	quarterly	[4]
2,4-Dinitrophenol	µg/L	24-hr composite	quarterly	[4]
2,4,6-Trichlorophenol	µg/L	24-hr composite	quarterly	[4]
2-Methyl-4,6-dinitrophenol	µg/L	24-hr composite	quarterly	[4]
Phenolic compounds (chlorinated) [13]	µg/L	24-hr composite	quarterly	[4]
Phenolic compounds (non-chlorinated) [14]	µg/L	24-hr composite	quarterly	[4]
Bis(2-chloro-ethoxy) methane	µg/L	24-hr composite	quarterly	[4]
Bis(2-chloro-isopropyl) ether	µg/L	24-hr composite	quarterly	[4]
Di-n-butylphthalate	µg/L	24-hr composite	quarterly	[4]
Dichlorobenzenes [15]	µg/L	grab	quarterly	[4]
Diethylphthalate	µg/L	24-hr composite	quarterly	[4]
Dimethylphthalate	µg/L	24-hr composite	quarterly	[4]
Fluoranthene	µg/L	24-hr composite	quarterly	[4]
Hexachlorocyclopentadiene	µg/L	24-hr composite	quarterly	[4]
Isophorone	µg/L	24-hr composite	quarterly	[4]
Nitrobenzene	µg/L	24-hr composite	quarterly	[4]
Benzidine	µg/L	24-hr composite	quarterly	[4]
Bis(2-chloroethyl) ether	µg/L	24-hr composite	quarterly	[4]
Bis(2-ethylhexyl) phthalate	µg/L	24-hr composite	quarterly	[4]
1,4-Dichlorobenzene	µg/L	grab	quarterly	[4]
3,3-Dichlorobenzidine	µg/L	24-hr composite	quarterly	[4]
2,4-Dinitrotoluene	µg/L	24-hr composite	quarterly	[4]

Effluent Monitoring Program				
1,2-Diphenylhydrazine	µg/L	24-hr composite	quarterly	[4]
Hexachlorobenzene	µg/L	24-hr composite	quarterly	[4]
Hexachlorobutadiene	µg/L	24-hr composite	quarterly	[4]
Hexachloroethane	µg/L	24-hr composite	quarterly	[4]
N-Nitrosodimethylamine	µg/L	24-hr composite	quarterly	[4]
N-Nitrosodi-n-propylamine	µg/L	24-hr composite	quarterly	[4]
N-Nitrosodiphenylamine	µg/L	24-hr composite	quarterly	[4]
PAHs [16]	µg/L	24-hr composite	quarterly	[4]
TCDD equivalents [17]	pg/L	24-hr composite	quarterly	[4]
Acrolein	µg/L	grab	quarterly	[4]
Acrylonitrile	µg/L	grab	quarterly	[4]
Benzene	µg/L	grab	quarterly	[4]
Carbon tetrachloride	µg/L	grab	quarterly	[4]
Chlorobenzene	µg/L	grab	quarterly	[4]
Chlorodibromomethane	µg/L	grab	quarterly	[4]
Chloroform	µg/L	grab	quarterly	[4]
Dichlorobromomethane	µg/L	grab	quarterly	[4]
Dichloromethane	µg/L	grab	quarterly	[4]
1,1-Dichloroethylene	µg/L	grab	quarterly	[4]
1,2-Dichloroethane	µg/L	grab	quarterly	[4]
1,3-Dichloropropene	µg/L	grab	quarterly	[4]
Ethylbenzene	µg/L	grab	quarterly	[4]
Halomethanes [18]	µg/L	grab	quarterly	[4]
Methyl-tert-butyl-ether	µg/L	grab	quarterly	[4]
Toluene	µg/L	grab	quarterly	[4]
1,1,2,2-Tetrachloroethane	µg/L	grab	quarterly	[4]
1,1,1-Trichloroethane	µg/L	grab	quarterly	[4]
1,1,2-Trichloroethane	µg/L	grab	quarterly	[4]
Tetrachloroethylene	µg/L	grab	quarterly	[4]
Trichloroethylene	µg/L	grab	quarterly	[4]
Vinyl chloride	µg/L	grab	quarterly	[4]
Antimony	µg/L	24-hr composite	quarterly	[4]
Arsenic	µg/L	24-hr composite	monthly	[4]
Beryllium	µg/L	24-hr composite	quarterly	[4]

Effluent Monitoring Program				
Cadmium	µg/L	24-hr composite	monthly	4
Chromium (III)	µg/L	calculated	quarterly	4
Copper	µg/L	24-hr composite	monthly	4
Chromium (VI) [19]	µg/L	grab	monthly	4
Lead	µg/L	24-hr composite	monthly	4
Mercury	µg/L	24-hr composite	monthly	20
Nickel	µg/L	24-hr composite	monthly	4
Selenium	µg/L	24-hr composite	monthly	4
Silver	µg/L	24-hr composite	monthly	4
Thallium	µg/L	24-hr composite	quarterly	4
Zinc	µg/L	24-hr composite	monthly	4

Footnotes for Influent and Effluent Monitoring Program

1 For 24-hour composite samples, if the duration of the discharge is less than 24 hours but greater than 8 hours, at least eight flow-weighted samples shall be obtained during the discharge period and composited. For discharge durations of less than eight hours, individual "grab samples" may be substituted. A grab sample is an individual sample collected in less than 15 minutes.

2 For Discharge Points 003 and 004, the minimum frequency of analysis shall be once per discharge day, but no more than one analysis need be done during the period indicated. The permit does not require acute toxicity testing of this effluent discharge. During routine maintenance activities if it is reported to the Regional Water Board in advance, sampling and analyses are not required.

3 When continuous monitoring of flow is required, total daily flow and peak daily flow (24-hr basis) shall be reported.

4 Pollutants shall be analyzed using the analytical methods described in 40 CFR part 136; where no methods are specified for a given pollutant, methods approved by this Regional Water Board, or the State Water Board . For any pollutant whose effluent limitation is lower than all the minimum levels (MLs) specified in Appendix II of the Ocean Plan, the analytical method with the lowest ML must be selected.

5 Oil and grease monitoring in the influent and effluent shall consist of a single grab sample at peak flow over a 24-hour period.

6 Analyze these radiochemicals by the following USEPA methods: method 900.0 for gross alpha and gross beta, method 903.0 or 903.1 for radium-226, method 904.0 for radium-228, method 906.0 for tritium, method 905.0 for strontium-90, and method 908.0 for uranium.

Analysis for combined radium-226 & 228 shall be conducted only if gross alpha results for the same sample exceed 15 pCi/L or beta greater than 50 pCi/L. If radium-226 & 228 exceeds 5 pCi/L, analyze for tritium, strontium-90 and uranium.

7 *Chlordane* shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-cis, nonachlor-trans and oxychlordane. Discharger may temporarily suspend the monitoring requirements for alpha and gamma chlordene if standards for these compounds are not available. However, Discharger is required to resume detection and quantification practices as soon as standards for these two compounds become available.

8 *DDT* shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

9 *Endosulfan* shall mean the sum of endosulfan-alpha, endosulfan-beta, and endosulfan sulfate.

10 *HCH* shall mean the sum of alpha, beta, gamma (lindane) and delta isomers of hexachlorocyclohexane.

11 *PCBs (polychlorinated biphenyls)* shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

12 To facilitate interpretation of sediment/fish tissue data and TMDL development, PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206 shall be individually quantified.

13 *Chlorinated phenolic compounds* shall mean the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

14 *Nonchlorinated phenolic compounds* shall mean the sum of Phenol, 2,4-Dimethylphenol, 2-Nitrophenol, and 4-Nitrophenol, 2,4-Dinitrophenol and 2-Methyl-4,6-dinitrophenol.

15 *Dichlorobenzenes* shall mean the sum of 1,2- and 1,3-dichlorobenzene.

16 *PAHs* shall mean the sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene.

17 *TCDD equivalents* shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below. USEPA Method 1613 shall be used to analyze TCDD equivalents.

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
1,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

18 *Halomethanes* shall mean the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).

19 Discharger may, at its option, meet the chromium (VI) limitation by analyzing for total chromium rather than hexavalent chromium.

20 USEPA Method 1631E, with a quantitation level of 0.5 ng/L, shall be used to analyze total mercury.

B. Mass Emission Benchmarks

The following Mass Emission Benchmarks, in metric tons per year (MT/yr), have been established for the discharge through Discharge Points 001 and 002 (methodology described in the Fact Sheet). The Discharger shall monitor and report the mass emission rate for all constituents that have mass emission benchmarks. For each constituent, the 12-month average mass emission rate and the concentration and flow used to calculate that mass emission rate shall be reported in the annual pretreatment report and the annual receiving water monitoring report.

Table 4. 12-Month Average Effluent Mass Emission Benchmarks

Ocean Plan Constituent	12-month Average Mass Emission Benchmarks (MT/yr)
Marine Aquatic Life Toxicants	
Arsenic	0.95
Cadmium	0.47
Chromium (VI)	46.70
Copper	5.78
Lead	3.74
Mercury	0.23
Nickel	22.58
Selenium	5.00
Silver	2.33
Zinc	11.67
Cyanide	4.05
Chlorine Residual	N/A
Ammonia as N	17070
Phenolic compounds (non-chlorinated)	23.35
Phenolic compounds (chlorinated)	23.35
Endosulfan	0.047
HCH	0.0047
Endrin	0.0047
Acute toxicity	N/A
Chronic toxicity	N/A
Radioactivity	N/A
Human Health Toxicants – Non-Carcinogens	
Acrolein	4.67
Antimony	1.61
Bis(2-chloroethoxy) methane	11.67
Bis(2-chloroisopropyl) ether	4.67

Ocean Plan Constituent	12-month Average Mass Emission Benchmarks (MT/yr)
Chlorobenzene	0.23
Chromium (III)	5.60
Di-n-butyl-phthalate	23.35
Dichlorobenzenes	4.67
Diethyl phthalate	4.67
Dimethyl phthalate	4.67
2-Methyl-4,6-dinitrophenol	11.67
2,4-Dinitrophenol	11.67
Ethyl benzene	0.23
Fluoranthene	2.33
Hexachlorocyclopentadiene	11.67
Nitrobenzene	2.33
Thallium	4.67
Toluene	0.23
Tributyltin	0.028
1,1,1-Trichloroethane	0.23
Human Health Toxicants – Carcinogens	
Acrylonitrile	2.33
Aldrin	N/A
Benzene	0.23
Benzidine	N/A
Beryllium	0.47
Bis(2-chloroethyl) ether	2.33
Bis(2-ethylhexyl) phthalate	15.25
Carbon tetrachloride	0.23
Chlordane	N/A
Chlorodibromomethane	1.15
Chloroform	20.78
DDT	N/A
1,4-Dichlorobenzene	2.33
3,3'-Dichlorobenzidine	0.065
1,2-Dichloroethane	0.23
1,1-Dichloroethylene	0.23
Bromodichloromethane	0.84

Ocean Plan Constituent	12-month Average Mass Emission Benchmarks (MT/yr)
Dichloromethane	5.38
1,3-Dichloropropene	0.23
Dieldrin	N/A
2,4-Dinitrotoluene	11.67
1,2-Diphenylhydrazine	2.33
Halomethanes	1.50
Heptachlor	N/A
Heptachlor epoxide	N/A
Hexachlorobenzene	N/A
Hexachlorobutadiene	2.33
Hexachloroethane	2.33
Isophorone	2.33
N-Nitrosodimethylamine	11.67
N-Nitrosodi-N-propylamine	11.67
N-Nitrosodiphenylamine	2.33
PAHs	23.35
PCBs	N/A
TCDD equivalents	N/A
1,1,2,2-Tetrachloroethane	0.23
Tetrachloroethylene	4.41
Toxaphene	N/A
Trichloroethylene	0.23
1,1,2-Trichloroethane	0.23
2,4,6-Trichlorophenol	23.35
Vinyl chloride	0.23

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. Acute Toxicity Testing

1. **Methods and test species**.

The Discharger shall conduct 96-hour static renewal acute toxicity tests on flow-weighted 24-hour composite effluent samples. When conducting toxicity tests in accordance with the specified chronic test methods manual, if daily observations of mortality make it possible to also calculate acute toxicity for the desired exposure period and the dilution series for the toxicity test includes the acute instream waste concentration (IWC), such method may be used to estimate the 96-hour LC50.

The presence of acute toxicity shall be estimated as specified in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA 821-R-02-012, 2002), with preference for West Coast vertebrate and invertebrate species.

2. **Frequency**

a. Screening - The Discharger shall conduct the first acute toxicity test screening for three consecutive months in 2012. Re-screening is required every 24 months. The Discharger shall re-screen with a marine vertebrate species and a marine invertebrate species and continue to monitor with the most sensitive species. If the first suite of re-screening tests demonstrate that the same species is the most sensitive, then the re-screening does not need to include more than one suite of tests. If a different species is the most sensitive or if there is ambiguity, then the Discharger shall proceed with suites of screening tests for a minimum of three, but not to exceed five, suites.

b. Regular toxicity tests - After the screening period, monitoring shall be conducted monthly using the most sensitive marine species.

3. **Toxicity Units.**

The acute toxicity of the effluent shall be expressed and reported in Acute Toxic Units, TUa, where,

$$TU_a = \frac{100}{LC50}$$

The Lethal Concentration, 50 Percent (LC50) is expressed as the estimate of the percent effluent concentration that causes death in 50% of the test population in the time period prescribed by the toxicity test.

B. Chronic Toxicity Testing

1. **Methods and test species**.

The Discharger shall conduct critical life stage chronic toxicity tests on flow-weighted, 24-hour composite effluent samples. The presence of chronic toxicity shall be estimated in accordance to *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/136, 1995). Pursuant to the 2009 California Ocean Plan, upon the approval of the Executive Officer of the Regional Water Board, the Discharger may use a second tier organism (e.g., silverside) if first tier organisms (e.g., topsmelt) are not available. However, the Discharger is required to immediately resume the chronic toxicity test using the original testing organism as soon as this organism becomes available. When a chronic toxicity test method that incorporates a 96-hour acute toxicity endpoint is used to monitor toxicity at the chronic IWC in effluent discharged from Discharge Point 003 or 004, the 96-hour acute toxicity statistical endpoint may also be reported as LC50 and TUa, along with other chronic toxicity test results required by this permit.

2. **Frequency**

a. Screening - The Discharger shall conduct the first chronic toxicity test screening for three consecutive months in 2012. Re-screening is required every 24 months. The Discharger shall re-screen with a marine vertebrate species, a marine invertebrate species, and a marine alga species

and continue to monitor with the most sensitive species. If the first suite of re-screening tests demonstrate that the same species is the most sensitive, then the re-screening does not need to include more than one suite of tests. If a different species is the most sensitive or if there is ambiguity, then the Discharger shall proceed with suites of screening tests for a minimum of three, but not to exceed five, suites.

b. Regular toxicity tests - After the screening period, monitoring shall be conducted monthly using the most sensitive species.

3. **Toxicity Units.**

The chronic toxicity of the effluent shall be expressed and reported in Chronic Toxic Units, TUc, where,

$$TU_c = \frac{100}{NOEC}$$

The No Observable Effect Concentration (NOEC) is expressed as the maximum percent effluent concentration that causes no observable effect on test organisms, as determined by the results of a critical life stage toxicity test.

C. Quality Assurance

1. Concurrent testing with a reference toxicant shall be conducted. Reference toxicant tests shall be conducted using the same test conditions as the effluent toxicity tests (e.g., same test duration, etc).

2. If either the reference toxicant test or effluent test does not meet all test acceptability criteria (TAC) as specified in the test methods manual (EPA-821-R-02-012 and/or EPA/600/R-95/136), then the Discharger must re-sample and re-test within 14 days.

3. Control and dilution water should be receiving water or laboratory water, as appropriate, as described in the manual. If the dilution water used is different from the culture water, a second control using culture water shall be used.

4. A series of at least five dilutions and a control shall be tested. The dilution series shall include the instream waste concentration (IWC), and two dilutions above and two below the IWC. The acute IWC for Discharge Points 001 and 002 is 19% effluent. The chronic IWC for Discharge Points 001 and 002 is 0.60% effluent; the chronic IWC for Discharge Point 003 is 0.662% effluent; the chronic IWC for Discharge Point 004 is 0.86% effluent.

5. Following Paragraph 10.2.6.2 of USEPA's chronic freshwater test methods manual (EPA/821/R-02/013, 2002, as specified in 40 CFR part 136), the Discharger shall review the concentration-response relationship for each multi-concentration test to ensure that calculated test results are interpreted appropriately. All WET test results should be reviewed and reporting following Method Guidance and Recommendations for WET Testing (EPA/821/B-00-004, 2000).

6. Because this Permit requires sublethal hypothesis testing endpoints from test methods in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136, 1995), within-test variability must be reviewed for acceptability and a variability criterion (upper %MSD bound) must be applied, as directed under each test method. Based on this review, only accepted effluent toxicity test results shall be reported on the DMR form. If excessive within-test variability invalidates a test result, then the Discharger must resample and retest within 14 days.

7. pH drift during the toxicity test may contribute to artifactual toxicity when pH-dependent toxicants (e.g., ammonia, metals) are present in an effluent. To determine whether or not pH drift during the toxicity test is contributing to artifactual toxicity, the Discharger shall conduct three sets of parallel toxicity tests, in which the pH of one treatment is controlled at the pH of the effluent and the pH of the other treatment is not controlled, as described in section 11.3.6.1 of the test methods manual, Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA/821/R-02/013, 2002). Toxicity is confirmed to be artifactual and due to pH drift when no toxicity above the chronic WET permit limit or trigger is observed in the treatments controlled at the pH of the effluent. If toxicity is confirmed to be artifactual and due to pH drift, then, following written approval by the permitting authority, the Discharger may use the procedures outlined in section 11.3.6.2 of the test methods manual to control sample pH during the toxicity test.

D. Accelerated Monitoring

If the effluent toxicity test result exceeds the limitation, then the Discharger shall immediately implement accelerated toxicity testing that consists of six additional tests, approximately every two weeks, over a 12-week period. Effluent sampling for the first test of the six additional tests shall commence within 5 working days of receipt of the test results exceeding the toxicity limitation.

1. If all the results of the six additional tests are in compliance with the toxicity limitation, then the Discharger may resume regular monthly testing.

2. If the result of any of the six additional tests exceeds the toxicity limitation, then the Discharger shall continue to monitor once every two weeks until six consecutive biweekly tests are in compliance. At that time, the Discharger may resume regular monthly testing.

3. If the results of any two of the six additional tests (any two tests in a 12-week period) exceed the toxicity limitation, the Discharger shall implement the initial investigation Toxicity Reduction Evaluation (TRE) workplan.

4. If implementation of the initial investigation TRE workplan (see section V.E below) indicates the source of toxicity (e.g., a temporary plant upset, etc.), then the Discharger shall return to the regular testing frequency.

E. Preparation of an Initial Investigation TRE Workplan

The Discharger shall prepare and submit a copy of the Discharger's initial investigation Toxicity Reduction Evaluation (TRE) workplan to the Executive Officer of the Regional Water Board for approval within 90 days of the effective date of this permit. If the Executive Officer does not disapprove the workplan within 60 days, the workplan shall become effective. The Discharger shall use USEPA manual EPA/833B-99/002 (municipal) as guidance, or most current version. At a minimum, the workplan must contain the provisions in Attachment G. This workplan shall describe the steps the Discharger intends to follow if toxicity is detected, and should include, at a minimum:

1. A description of the investigation and evaluation techniques that will be used to identify potential causes and sources of toxicity, effluent variability, and treatment system efficiency.

2. A description of the facility's methods of maximizing in-house treatment efficiency and good housekeeping practices, and a list of all chemicals used in the operation of the facility; and,

3. If a Toxicity Identification Evaluation (TIE) is necessary, an indication of the person who would conduct the TIEs (i.e., an in-house expert or an outside contractor). See section V.F.3 below for guidance manuals.

F. Steps in Toxicity Reduction Evaluation (TRE) and Toxicity Identification Evaluation (TIE)

1. If results of the implementation of the facility's initial investigation TRE workplan indicate the need to continue the TRE/TIE, then the Discharger shall expeditiously develop a more detailed TRE workplan for submittal to the Executive Officer within 15 days of completion of the initial investigation TRE. The detailed workplan shall include, but not be limited to:

   a. Further actions to investigate and identify the cause of toxicity;

   b. Actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and

   c. A schedule for these actions.

2. The following section summarizes the stepwise approach used in conducting the TRE:

   a. Step 1 includes basic data collection.

   b. Step 2 evaluates optimization of the treatment system operation, facility housekeeping, and selection and use of in-plant process chemicals.

   c. If Steps 1 and 2 are unsuccessful, Step 3 implements a Toxicity Identification Evaluation (TIE) and employment of all reasonable efforts using currently available TIE methodologies. The objective of the TIE shall be to identify the substance or combination of substances causing the observed toxicity.

   d. Assuming successful identification or characterization of the toxicant(s), Step 4 evaluates final effluent treatment options.

   e. Step 5 evaluates in-plant treatment options.

   f. Step 6 consists of confirmation once a toxicity control method has been implemented.

3. The Discharger may initiate a Toxicity Identification Evaluation (TIE) as part of a TRE to identify the causes of toxicity using the same species and test method and, as guidance, USEPA test method manuals; Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures (EPA/600/6-91/003, 1991); Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity (EPA/600/R-92/080, 1993); Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity (EPA/600/R-92/081, 1993); and Marine Toxicity Identification Evaluation (TIE): Phase I Guidance Document (EPA/600/R-96-054, 1996).

4. If a TRE/TIE is initiated prior to completion of the accelerated testing required in section V.D. of this program, then the accelerated testing schedule may be terminated, or used as necessary in performing the TRE/TIE, as determined by the Executive Officer.

5. The Regional Water Board recognizes that toxicity may be episodic and identification of causes of and reduction of sources of toxicity may not be successful in all cases. Consideration of enforcement action

by the Board will be based, in part, on the Discharger's actions and efforts to identify and control or reduce sources of consistent toxicity.

G. Ammonia Removal

1. Except with prior approval from the Executive Officer of the Regional Water Board, ammonia shall not be removed from bioassay samples. The Discharger must demonstrate the effluent toxicity is caused by ammonia *because of increasing test pH* when conducting the toxicity test. It is important to distinguish the potential toxic effects of ammonia from other pH sensitive chemicals, such as certain heavy metals, sulfide, and cyanide. The following may be steps to demonstrate that the toxicity is caused by ammonia and not other toxicants before the Executive Officer would allow for control of pH in the test.

    a. There is consistent toxicity in the effluent, and the maximum pH in the toxicity test is in the range to cause toxicity due to increased pH.

    b. Chronic ammonia concentrations in the effluent are greater than 4 mg/L total ammonia.

    c. Conduct graduated pH tests as specified in the toxicity identification evaluation methods. For example, mortality should be higher at pH 8 and lower at pH 6.

    d. Treat the effluent with a zeolite column to remove ammonia. Mortality in the zeolite treated effluent should be lower than the non-zeolite treated effluent. Then add ammonia back to the zeolite-treated samples to confirm toxicity due to ammonia.

2. When it has been demonstrated that toxicity is due to ammonia because of increasing test pH, pH may be controlled using appropriate procedures which do not significantly alter the nature of the effluent, after submitting a written request to the Regional Water Board and receiving written permission expressing approval from the Executive Officer of the Regional Water Board.

H. Reporting

The Discharger shall submit a full report of the toxicity test results, including any accelerated testing conducted during the month, as required by this permit. Test results shall be reported in Acute Toxicity Units (TUa) or Chronic Toxicity Units (TUc), as required, with the self-monitoring report (SMR) for the month in which the test is conducted.

If an initial investigation indicates the source of toxicity and accelerated testing is unnecessary, pursuant to Section V.D, then those results also shall be submitted with the SMR for the period in which the Investigation occurred.

1. The full report shall be received by the Regional Water Board by the 15th day of the second month following sampling.

2. A full laboratory report for all toxicity testing shall be submitted as an attachment to the SMR for the month in which the toxicity test was conducted and shall also include: the toxicity test results reported according to the test methods manual chapter on report preparation and test review; the dates of sample collection and initiation of each toxicity test; all results for effluent parameters monitored concurrently with the toxicity test(s); and progress reports on TRE/TIE investigations. Routine reporting shall include, at a minimum, as applicable for each toxicity test:

    a. Sample collection date(s)

b. Test initiation date

c. Test species

d. End point values for each dilution (e.g. number of young, growth rate, percent survival)

e. LC_{50} value(s) in percent effluent

f. TUa value(s) $\left(TU_a = \frac{100}{LC50}\right)$

g. NOEC value(s) in percent effluent

h. TUc values $\left(TU_c = \frac{100}{NOEC}\right)$

i. Mean percent mortality (+standard deviation) after 96 hours in 100% effluent (if applicable)

j. IC/EC_{25} values(s) in percent effluent

k. NOEC and LOEC (Lowest Observable Effect Concentration) values for reference toxicant test(s)

l. Available water quality measurements for each toxicity test (e.g., pH, dissolved oxygen, temperature, conductivity, hardness, salinity, ammonia).

3. The Discharger shall provide a compliance summary that includes a summary table of toxicity data from at least eleven of the most recent samples for toxicity testing.

4. The Discharger shall notify this Regional Water Board of any exceedance of a toxicity limitation, in writing, 14 days after the receipt of the test results. The notification will describe actions the Discharger has taken or will take to investigate and correct the cause(s) of toxicity. It may also include a status report on any actions required by the permit, with a schedule for actions not yet completed. If no actions have been taken, the reasons shall be given.

VI. RECEIVING WATER MONITORING REQUIREMENTS

(Footnotes are specified on pages E-43 and E-44)

A. Shoreline/Inshore/Offshore Microbiological Monitoring

The shoreline monitoring addresses the question: Are densities of bacteria in water contact zones below those that ensure public safety? The data collected provide public health officials with information necessary for the management of beach postings and closures. Monitoring at these shoreline stations is conducted for the purposes of public health assessment and to ensure protection for public recreational use of coastal ocean waters throughout Santa Monica Bay, and are not intended for use as compliance sites for JWPCP.

The inshore and offshore monitoring addresses the question: Are Ocean Plan compliance standards for bacteriological contamination being met? The data collected at inshore stations will provide the means to

determine whether bacteriological standards for water contact and shellfish harvesting are being met in the area of greatest potential water contact and shellfish harvesting most proximal to the point of discharge. The data collected at the offshore sites will provide the means to determine whether bacteriological standards for water contact are being met in the area of around the discharge point. Data from both inshore and offshore compliance sampling sites are augmented by the frequent (typical daily) manifold bacterial monitoring collected for plant operational purposes and which provides effluent bacterial densities actually discharged through the outfall system.

1. **Shoreline Monitoring**

The Discharger shall monitor the following eight shoreline stations (Figure 1):

Table 5. Shoreline Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description	
Shoreline Station	RW-SL-SB	Bluff Cove, 33° 47.52', 118° 23.76'	(Former R-M-SB)
Shoreline Station	RW-SL-SM	Malaga Cove, 33° 48.22', 118° 24.44'	(Former R-M-SM)
Shoreline Station	RW-SL-S1	Long Point, 33° 44.22', 118° 23.62'	(Former R-M-S1)
Shoreline Station	RW-SL-S2	Abalone Cove, 33° 44.44', 118° 22.18'	(Former R-M-S2)
Shoreline Station	RW-SL-S3	Portuguese Bend, 33° 44.02', 118° 21.40'	(Former R-M-S3)
Shoreline Station	RW-SL-S5	White Point, 33° 43.12', 118° 19.35'	(Former R-M-S5)
Shoreline Station	RW-SL-S6	Wilder Addition Park, 33° 42.59', 118° 17.95'	(Former R-M-S6)
Shoreline Station	RW-SL-S7	Cabrillo Beach, 33° 42.50', 118° 16.86'	(Former R-M-S7)

as follows:

Table 6. Shoreline Microbiological Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total coliform [1]	CFU/100 ml (or MPN/100 ml)	Grab in wave wash zone	weekly
Fecal coliform [1]	CFU/100 ml (or MPN/100 ml)	Grab in wave wash zone	weekly
Enterococcus [1]	CFU/100 ml (or MPN/100 ml)	Grab in wave wash zone	weekly
Visual observation [2]	--	--	weekly

Visual observations shall be recorded at the same time that bacteriological samples are collected. Monitoring at these eight stations is conducted for the purposes of public health assessment and to ensure protection for public recreational use of coastal ocean waters throughout Santa Monica Bay, and are not intended for use as compliance sites for JWPCP.

In the event of stormy weather that makes sampling hazardous or impractical, these samples can be omitted.

2. **Inshore Monitoring**

The Discharger shall monitor the following six inshore stations located along the 30-foot (9.1-meter) depth contour (Figure 2):

Table 7. Inshore Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description	
Inshore Station	RW-IS-IL2	Long Point, 33° 44.20', 118° 24.15'	(Former R-M-IL2)
Inshore Station	RW-IS-IL3	Portuguese Point, 33° 44.25', 118° 22.67'	(Former R-M-IL3)
Inshore Station	RW-IS-IL4	Bunker Point, 33° 43.46', 118° 21.10'	(Former R-M-IL4)
Inshore Station	RW-IS-IL5	Royal Palms, 33° 42.91', 118° 19.85'	(Former R-M-IL5)
Inshore Station	RW-IS-IL6	West of Point Fermin, 33° 42.44', 118° 18.53'	(Former R-M-IL6)
Inshore Station	RW-IS-IL7	Cabrillo Beach, 33° 42.20', 118° 17.04'	(Former R-M-IL7)

as follows:

Table 8. Inshore Microbiological Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total coliform [1]	CFU/100 ml (or MPN/100 ml)	Grabs at 0.5 meters below the surface (designated as surface sample) and within 2 meters of the seabed (designated as bottom sample)	5 times per month
Fecal coliform [1, 3]	CFU/100 ml (or MPN/100 ml)	Grabs at 0.5 meters below the surface (designated as surface sample) and within 2 meters of the seabed (designated as bottom sample)	5 times per month
Enterococcus [1]	CFU/100 ml (or MPN/100 ml)	Grabs at 0.5 meters below the surface (designated as surface sample) and within 2 meters of the seabed (designated as bottom sample)	5 times per month
Visual observation [2]	--	--	5 times per month

Visual observations shall be recorded at the same time that bacteriological samples are collected.

In the event of stormy weather that makes sampling hazardous or impractical, these samples can be omitted. Sampling may be conducted along a deeper depth contour during periods of adverse weather.

If a kelp bed is present at any of the six inshore stations, sampling shall be conducted at the outer edge of the kelp bed rather than at the 30-foot depth contour. The actual depth of all sampling stations shall be reported in the monthly monitoring reports.

3. **Offshore Monitoring**

The Discharger shall monitor the following three offshore stations located along the 200-foot (60-meter) depth contour (Figure 2):

Table 9. Offshore Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Offshore Station	RW-OS-6C	6C, 33° 42.47', 118° 21.24' (Former R-M-6C)
Offshore Station	RW-OS-8C	8C, 33° 41.91', 118° 20.14' (Former R-M-6C)
Offshore Station	RW-OS-9C	9C, 33° 41.32', 118° 19.10' (Former R-M-6C)

as follows:

Table 10. Offshore Microbiological Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total coliform [1]	CFU/100 ml (or MPN/100 ml)	Grab at 0.5 meters below the surface	monthly
Fecal coliform [1, 3]	CFU/100 ml (or MPN/100 ml)	Grab at 0.5 meters below the surface	monthly
Enterococcus [1]	CFU/100 ml (or MPN/100 ml)	Grab at 0.5 meters below the surface	monthly
Visual observation [2]	--	--	monthly

Visual observations shall be recorded at the same time that bacteriological samples are collected.

B. Nearshore/Offshore Water Quality Monitoring

This monitoring addresses the question: Are Ocean Plan and Basin Plan objectives for physical and chemical parameters being met? The data collected will provide the information necessary to demonstrate compliance with the standards. In addition, the data collected by the Discharger are a contribution to the Central Region Cooperative Water Quality Survey. This regionally coordinated survey provides integrated water quality surveys on a quarterly basis. These surveys cover more than 200 kilometers of coast in Ventura, Los Angeles, Orange and San Diego Counties from the nearshore zone to approximately 10 kilometers offshore. This cooperative program contributes to a regional understanding of seasonal patterns in the nearshore water column structure. The regional view provides context for determining the significance and causes of locally observed patterns in the area of wastewater outfalls. The collection of chlorophyll-a profiles during the quarterly survey is a contribution to the Santa Monica Bay Restoration Commission's Pelagic Ecosystem Monitoring program. The light energy survey addresses the compliance question: Is the transmission of natural light within ranges that ensure the protection of benthic algal communities. The data from this survey will be used to determine if discharged wastewater reduces natural light levels sufficient to suppress macroalgal growth.

1. Nearshore/Offshore Monitoring

a. The Discharger shall monitor the following 48 nearshore/offshore stations on the Palos Verdes and San Pedro Shelf (Figure 3):

Table 11. Nearshore/Offshore Water Quality Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	RW-OS-2501	10 meter depth, 33° 43.67', 118° 07.21' (Former R-WQ-2501)
Nearshore/Offshore Station	RW-OS-2502	20 meter depth, 33° 41.94', 118° 07.67' (Former R-WQ-2502)
Nearshore/Offshore Station	RW-OS-2503	26 meter depth, 33° 40.21', 118° 08.12' (Former R-WQ-2503)
Nearshore/Offshore Station	RW-OS-2504	33 meter depth, 33° 38.48', 118° 08.57' (Former R-WQ-2504)
Nearshore/Offshore Station	RW-OS-2505	44 meter depth, 33° 36.75', 118° 09.02' (Former R-WQ-2505)
Nearshore/Offshore Station	RW-OS-2506	60 meter depth, 33° 34.86', 118° 09.54' (Former R-WQ-2506)
Nearshore/Offshore Station	RW-OS-2601	19 meter depth, 33° 43.23', 118° 11.06' (Former R-WQ-2601)
Nearshore/Offshore Station	RW-OS-2602	23 meter depth, 33° 41.64', 118° 11.43' (Former R-WQ-2602)
Nearshore/Offshore Station	RW-OS-2603	23 meter depth, 33° 40.05', 118° 11.80' (Former R-WQ-2603)
Nearshore/Offshore Station	RW-OS-2604	32 meter depth, 33° 38.46', 118° 12.18' (Former R-WQ-2604)
Nearshore/Offshore Station	RW-OS-2605	47 meter depth, 33° 36.88', 118° 12.55' (Former R-WQ-2605)
Nearshore/Offshore Station	RW-OS-2606	62 meter depth, 33° 35.29', 118° 12.93' (Former R-WQ-2606)
Nearshore/Offshore Station	RW-OS-2701	26 meter depth, 33° 42.46', 118° 14.80' (Former R-WQ-2701)
Nearshore/Offshore Station	RW-OS-2702	26 meter depth, 33° 41.32', 118° 15.07' (Former R-WQ-2702)
Nearshore/Offshore Station	RW-OS-2703	28 meter depth, 33° 40.17', 118° 15.34' (Former R-WQ-2703)
Nearshore/Offshore Station	RW-OS-2704	50 meter depth, 33° 39.03', 118° 15.60' (Former R-WQ-2704)
Nearshore/Offshore Station	RW-OS-2705	100 meter depth, 33° 37.88', 118° 15.87' (Former R-WQ-2705)
Nearshore/Offshore Station	RW-OS-2706	80 meter depth, 33° 36.73', 118° 16.14' (Former R-WQ-2706)
Nearshore/Offshore Station	RW-OS-2801	10 meter depth, 33° 42.17', 118° 17.06' (Former R-WQ-2801)
Nearshore/Offshore Station	RW-OS-2802	30 meter depth, 33° 41.60', 118° 17.34' (Former R-WQ-2802)
Nearshore/Offshore Station	RW-OS-2803	60 meter depth, 33° 40.11', 118° 17.81' (Former R-WQ-2803)
Nearshore/Offshore Station	RW-OS-2804	100 meter depth, 33° 39.46', 118° 18.08' (Former R-WQ-2804)
Nearshore/Offshore Station	RW-OS-2805	100 meter depth, 33° 38.91', 118° 18.24' (Former R-WQ-2805)
Nearshore/Offshore Station	RW-OS-2806	100 meter depth, 33° 38.22', 118° 18.55' (Former R-WQ-2806)
Nearshore/Offshore Station	RW-OS-2901	10 meter depth, 33° 42.86', 118° 19.41' (Former R-WQ-2901)
Nearshore/Offshore Station	RW-OS-2902	30 meter depth, 33° 42.42', 118° 19.79' (Former R-WQ-2902)
Nearshore/Offshore Station	RW-OS-2903	60 meter depth, 33° 41.91', 118° 20.14' (Former R-WQ-2903)
Nearshore/Offshore Station	RW-OS-2904	100 meter depth, 33° 41.27', 118° 20.34' (Former R-WQ-2904)
Nearshore/Offshore Station	RW-OS-2905	100 meter depth, 33° 40.26', 118° 20.77' (Former R-WQ-2905)
Nearshore/Offshore Station	RW-OS-2906	100 meter depth, 33° 39.25', 118° 21.26' (Former R-WQ-2906)
Nearshore/Offshore Station	RW-OS-3001	10 meter depth, 33° 43.93', 118° 21.62' (Former R-WQ-3001)
Nearshore/Offshore Station	RW-OS-3002	30 meter depth, 33° 43.34', 118° 21.79' (Former R-WQ-3002)
Nearshore/Offshore Station	RW-OS-3003	60 meter depth, 33° 42.88', 118° 21.96' (Former R-WQ-3003)
Nearshore/Offshore Station	RW-OS-3004	100 meter depth, 33° 42.06', 118° 22.28' (Former R-WQ-3004)
Nearshore/Offshore Station	RW-OS-3005	100 meter depth, 33° 41.10', 118° 22.86' (Former R-WQ-3005)
Nearshore/Offshore Station	RW-OS-3006	100 meter depth, 33° 40.01', 118° 23.44' (Former R-WQ-3006)
Nearshore/Offshore Station	RW-OS-3051	13 meter depth, 33° 44.18', 118° 23.66' (Former R-WQ-3051)
Nearshore/Offshore Station	RW-OS-3052	30 meter depth, 33° 43.99', 118° 24.03' (Former R-WQ-3052)
Nearshore/Offshore Station	RW-OS-3053	60 meter depth, 33° 43.80', 118° 24.15' (Former R-WQ-3053)
Nearshore/Offshore Station	RW-OS-3054	100 meter depth, 33° 43.14', 118° 24.66' (Former R-WQ-3054)
Nearshore/Offshore Station	RW-OS-3055	100 meter depth, 33° 42.30', 118° 25.32' (Former R-WQ-3055)
Nearshore/Offshore Station	RW-OS-3056	100 meter depth, 33° 41.38', 118° 25.99' (Former R-WQ-3056)

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	RW-OS-3101	10 meter depth, 33° 46.26', 118° 25.81' (Former R-WQ-3101)
Nearshore/Offshore Station	RW-OS-3102	30 meter depth, 33° 45.90', 118° 26.12' (Former R-WQ-3102)
Nearshore/Offshore Station	RW-OS-3103	60 meter depth, 33° 45.44', 118° 26.46' (Former R-WQ-3103)
Nearshore/Offshore Station	RW-OS-3104	100 meter depth, 33° 44.72', 118° 26.99' (Former R-WQ-3104)
Nearshore/Offshore Station	RW-OS-3105	100 meter depth, 33° 43.73', 118° 27.67' (Former R-WQ-3105)
Nearshore/Offshore Station	RW-OS-3106	100 meter depth, 33° 42.75', 118° 28.53' (Former R-WQ-3106)

as follows:

Table 12. Nearshore/Offshore Water Quality Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Dissolved oxygen	mg/L	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Temperature	^{o}C	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Salinity	psu	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Transmissivity	% transmission	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Chlorophyll a	µg/L	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
pH	pH units	Continuous profile from surface to bottom (or maximum depth of 100 meters)	quarterly
Visual observations [2]	--	--	quarterly

Water quality methods and protocols shall follow those described in the most current edition of the *Field Operations Manual for Marine Water Column, Benthic and Trawl Monitoring in Southern California*. Visual observations shall be recorded at each station.

b. In addition, the Discharger shall also monitor the following 24 nearshore/offshore stations (Figure 3):

Table 13. Nearshore/Offshore Monitoring Stations Requiring Additional Monitoring

Station Type	Monitoring Location Name	Monitoring Location Description
Nearshore/Offshore Station	RW-OS-2504	33 meter depth, 33° 38.48', 118° 08.57' (Former R-WQ-2504)
Nearshore/Offshore Station	RW-OS-2505	44 meter depth, 33° 36.75', 118° 09.02' (Former R-WQ-2505)
Nearshore/Offshore Station	RW-OS-2506	60 meter depth, 33° 34.86', 118° 09.54' (Former R-WQ-2506)
Nearshore/Offshore Station	RW-OS-2604	32 meter depth, 33° 38.46', 118° 12.18' (Former R-WQ-2604)
Nearshore/Offshore Station	RW-OS-2605	47 meter depth, 33° 36.88', 118° 12.55' (Former R-WQ-2605)
Nearshore/Offshore Station	RW-OS-2606	62 meter depth, 33° 35.29', 118° 12.93' (Former R-WQ-2606)
Nearshore/Offshore Station	RW-OS-2704	50 meter depth, 33° 39.03', 118° 15.60' (Former R-WQ-2704)
Nearshore/Offshore Station	RW-OS-2705	100 meter depth, 33° 37.88', 118° 15.87' (Former R-WQ-2705)
Nearshore/Offshore Station	RW-OS-2706	80 meter depth, 33° 36.73', 118° 16.14' (Former R-WQ-2706)
Nearshore/Offshore Station	RW-OS-2802	30 meter depth, 33° 41.60', 118° 17.34' (Former R-WQ-2802)

Station Type	Monitoring Location Name	Monitoring Location Description	
Nearshore/Offshore Station	RW-OS-2803	60 meter depth, 33° 40.11', 118° 17.81'	(Former R-WQ-2803)
Nearshore/Offshore Station	RW-OS-2804	100 meter depth, 33° 39.46', 118° 18.08'	(Former R-WQ-2804)
Nearshore/Offshore Station	RW-OS-2902	30 meter depth, 33° 42.42', 118° 19.79'	(Former R-WQ-2902)
Nearshore/Offshore Station	RW-OS-2903	60 meter depth, 33° 41.91', 118° 20.14'	(Former R-WQ-2903)
Nearshore/Offshore Station	RW-OS-2904	100 meter depth, 33° 41.27', 118° 20.34'	(Former R-WQ-2904)
Nearshore/Offshore Station	RW-OS-3002	30 meter depth, 33° 43.34', 118° 21.79'	(Former R-WQ-3002)
Nearshore/Offshore Station	RW-OS-3003	60 meter depth, 33° 42.88', 118° 21.96'	(Former R-WQ-3003)
Nearshore/Offshore Station	RW-OS-3004	100 meter depth, 33° 42.06', 118° 22.28'	(Former R-WQ-3004)
Nearshore/Offshore Station	RW-OS-3052	30 meter depth, 33° 43.99', 118° 24.03'	(Former R-WQ-3052)
Nearshore/Offshore Station	RW-OS-3053	60 meter depth, 33° 43.80', 118° 24.15'	(Former R-WQ-3053)
Nearshore/Offshore Station	RW-OS-3054	100 meter depth, 33° 43.14', 118° 24.66'	(Former R-WQ-3054)
Nearshore/Offshore Station	RW-OS-3102	30 meter depth, 33° 45.90', 118° 26.12'	(Former R-WQ-3102)
Nearshore/Offshore Station	RW-OS-3103	60 meter depth, 33° 45.44', 118° 26.46'	(Former R-WQ-3103)
Nearshore/Offshore Station	RW-OS-3104	100 meter depth, 33° 44.72', 118° 26.99'	(Former R-WQ-3104)

as follows:

Table 14. Additional Monitoring Requirements at 24 Nearshore/Offshore Monitoring Stations

Parameter	Units	Sample Type	Minimum Sampling Frequency
Ammonia	µg/L	Grabs at 0, 15, 30 and 45 meters (or as deep as practical for stations in depths less than 45 m)	quarterly

These discrete water samples shall be collected concurrently with the CTD profiling survey.

c. The Discharger shall participate in the Central Region Cooperative Water Quality Survey steering and technical committees. Recommendations for changes in survey design that significantly alter the Water Quality Survey design described above shall be submitted to the Executive Officer for approval prior to implementation.

2. **Nearshore Light Energy Survey**

The Discharger shall monitor the following seven nearshore stations along the 60-foot (18.3-meter) depth contour (Figure 4):

Table 15. Nearshore Light Energy Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description	
Nearshore Station	RW-NS-L1	Palos Verdes Point, 33° 46.10', 118° 25.82'	(Former R-WQ-L1)
Nearshore Station	RW-NS-L2	Long Point, 33° 44.10', 118° 24.22'	(Former R-WQ-L2)
Nearshore Station	RW-NS-L3	Portuguese Point, 33° 44.09', 118° 22.67'	(Former R-WQ-L3)
Nearshore Station	RW-NS-L4	Bunker Point, 33° 43.42', 118° 21.11'	(Former R-WQ-L4)
Nearshore Station	RW-NS-L5	Royal Palms, 33° 42.84', 118° 19.90'	(Former R-WQ-L5)
Nearshore Station	RW-NS-L6	West of Point Fermin, 33° 42.36', 118° 18.56'	(Former R-WQ-L6)
Nearshore Station	RW-NS-L7	Cabrillo Beach, 33° 41.84', 118° 17.12'	(Former R-WQ-L7)

as follows:

Table 16. Nearshore Light Energy Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Photosynthetic light energy	Quanta/sec/cm^2	Underwater sensor	monthly

All samples shall be taken between 10 a.m. and 2 p.m., ideally when the sun is not obscured by clouds (a slight haze is permissible). Sampling during a uniform cloud cover is permissible if sampling during clear weather can not be completed during month. Measurement of photosynthetic light energy shall be made with a spherical underwater sensor and hemispherical reference cell on deck, both having equal quantum response from 400-700 nanometers.

C. Benthic Sediments Monitoring

1. Local Benthic Trends Survey

This survey addresses the question: Are benthic conditions under the influence of the discharge changing over time? The data collected are used for regular assessment of trends in sediment contamination and biological response along a fixed grid of sites within the influence (or historical influence) of the discharge. The resulting physical and chemical data will be used for assessment of trends in sediment contamination and to draw inferences concerning the relationship between effluent-derived alteration of the benthic habitat and patterns in infaunal community structure.

a. Infaunal Community and Habitat Variables Survey

The Discharger shall monitor the following 44 bottom stations (Figure 5):

Table 17. Benthic Infauna and Sediment Chemistry Monitoring Stations

Station Type	Monitoring Location Name	Monitoring Location Description	
Bottom Station	RW-B-0A	305 meter depth, 33° 49.10', 118° 27.25'	(Former R-B-0A)
Bottom Station	**RW-B-0B***	152 meter depth, 33° 48.70', 118° 26.50'	(Former R-B-0B)
Bottom Station	**RW-B-0C***	61 meter depth, 33° 48.43', 118° 25.83'	(Former R-B-0C)
Bottom Station	**RW-B-0D***	30 meter depth, 33° 48.17', 118° 25.36'	(Former R-B-0D)
Bottom Station	RW-B-1A	305 meter depth, 33° 44.72', 118° 26.99'	(Former R-B-1A)
Bottom Station	**RW-B-1B***	152 meter depth, 33° 44.97', 118° 26.81'	(Former R-B-1B)
Bottom Station	**RW-B-1C***	61 meter depth, 33° 45.44', 118° 26.46'	(Former R-B-1C)
Bottom Station	**RW-B-1D***	30 meter depth, 33° 45.90', 118° 26.12'	(Former R-B-1D)
Bottom Station	RW-B-2A	305 meter depth, 33° 43.62', 118° 25.72'	(Former R-B-2A)
Bottom Station	RW-B-2B	152 meter depth, 33° 43.95', 118° 25.55'	(Former R-B-2B)
Bottom Station	RW-B-2C	61 meter depth, 33° 44.26', 118° 25.39'	(Former R-B-2C)
Bottom Station	RW-B-2D	30 meter depth, 33° 44.47', 118° 25.28'	(Former R-B-2D)
Bottom Station	RW-B-3A	305 meter depth, 33° 43.14', 118° 24.66'	(Former R-B-3A)
Bottom Station	**RW-B-3B***	152 meter depth, 33° 43.43', 118° 24.44'	(Former R-B-3B)
Bottom Station	**RW-B-3C***	61 meter depth, 33° 43.80', 118° 24.15'	(Former R-B-3C)
Bottom Station	**RW-B-3D***	30 meter depth, 33° 43.99', 118° 24.03'	(Former R-B-3D)

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	RW-B-4A	305 meter depth, 33° 42.70', 118° 23.38' (Former R-B-4A)
Bottom Station	RW-B-4B	152 meter depth, 33° 43.00', 118° 23.24' (Former R-B-4B)
Bottom Station	RW-B-4C	61 meter depth, 33° 43.40', 118° 23.08' (Former R-B-4C)
Bottom Station	RW-B-4D	30 meter depth, 33° 43.91', 118° 22.83' (Former R-B-4D)
Bottom Station	RW-B-5A	305 meter depth, 33° 42.06', 118° 22.28' (Former R-B-5A)
Bottom Station	**RW-B-5B***	152 meter depth, 33° 42.54', 118° 22.08' (Former R-B-5B)
Bottom Station	**RW-B-5C***	61 meter depth, 33° 42.88', 118° 21.96' (Former R-B-5C)
Bottom Station	**RW-B-5D***	30 meter depth, 33° 43.34', 118° 21.79' (Former R-B-5D)
Bottom Station	RW-B-6A	305 meter depth, 33° 41.99', 118° 21.56' (Former R-B-6A)
Bottom Station	**RW-B-6B***	152 meter depth, 33° 42.18', 118° 21.35' (Former R-B-6B)
Bottom Station	**RW-B-6C***	61 meter depth, 33° 42.47', 118° 21.24' (Former R-B-6C)
Bottom Station	**RW-B-6D***	30 meter depth, 33° 42.98', 118° 20.91' (Former R-B-6D)
Bottom Station	RW-B-7A	305 meter depth, 33° 41.86', 118° 21.19' (Former R-B-7A)
Bottom Station	**RW-B-7B***	152 meter depth, 33° 42.05', 118° 21.09' (Former R-B-7B)
Bottom Station	**RW-B-7C***	61 meter depth, 33° 42.31', 118° 20.92' (Former R-B-7C)
Bottom Station	**RW-B-7D***	30 meter depth, 33° 42.76', 118° 20.61' (Former R-B-7D)
Bottom Station	RW-B-8A	305 meter depth, 33° 41.27', 118° 20.34' (Former R-B-8A)
Bottom Station	**RW-B-8B***	152 meter depth, 33° 41.53', 118° 20.24' (Former R-B-8B)
Bottom Station	**RW-B-8C***	61 meter depth, 33° 41.91', 118° 20.14' (Former R-B-8C)
Bottom Station	**RW-B-8D***	30 meter depth, 33° 42.42', 118° 19.79' (Former R-B-8D)
Bottom Station	RW-B-9A	305 meter depth, 33° 40.58', 118° 19.46' (Former R-B-9A)
Bottom Station	**RW-B-9B***	152 meter depth, 33° 40.89', 118° 19.31' (Former R-B-9B)
Bottom Station	**RW-B-9C***	61 meter depth, 33° 41.32', 118° 19.10' (Former R-B-9C)
Bottom Station	**RW-B-9D***	30 meter depth, 33° 41.97', 118° 18.78' (Former R-B-9D)
Bottom Station	RW-B-10A	305 meter depth, 33° 39.46', 118° 18.08' (Former R-B-10A)
Bottom Station	RW-B-10B	152 meter depth 33° 39.73', 118° 17.90' (Former R-B-10B)
Bottom Station	RW-B-10C	61 meter depth, 33° 40.11', 118° 17.81' (Former R-B-10C)
Bottom Station	RW-B-10D	30 meter depth, 33° 41.60', 118° 17.34' (Former R-B-10D)

as follows:

Table 18. Infauna Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Benthic infauna community [4]	--	0.1 square meter Van Veen grab	Annually
Total organic carbon	mg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Organic nitrogen	mg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Grain size	Phi size	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually

One sample shall be taken at each station for benthic infaunal community analysis. The entire contents of each sample shall be passed through a 1.0 millimeter screen to retrieve the benthic organisms. Sampling methods and protocols shall follow those described in the most current

edition of the *Field Operations Manual for Marine Water Column, Benthic and Trawl Monitoring in Southern California*. All organisms contained within the sample shall be identified to the lowest possible taxon and counted. The resulting data shall be used to describe community structure at each station.

b. Sediment Chemistry Survey

The Discharger shall monitor 24 bottom stations [as indicated with **"*"** in bottom station table (Benthic Infauna and Sediment Chemistry Monitoring Stations) for the Infaunal Community Survey above] in years one, two, four and five of the permit and all 44 bottom stations in year three of the permit as follows:

Table 19. Sediment Chemistry Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Dissolved sulfides	mg/L	0.1 square meter Van Veen grab (upper 2 centimeters, porewater)	Annually
Total organic carbon	% dry wt	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Organic nitrogen	mg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Grain size	Phi size	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Arsenic	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Cadmium	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Chromium	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Copper	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Lead	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Mercury	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Nickel	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Silver	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Zinc	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Total DDT [5]	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
DDT derivatives [6]	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Total PCB [7]	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
PCB derivatives [8]	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually
Compounds on 303(d) list for Santa Monica Bay	µg/kg	0.1 square meter Van Veen grab (upper 2 centimeters)	Annually

A separate grab sample shall be collected at each station whenever a biological sample is collected. Sub-samples (upper two centimeters) shall be taken from the grab for sediment chemistry analyses.

2. **Regional Benthic Survey**

This regional survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in soft-bottom benthic habitats within the Southern California Bight? and 2) What is the relationship between biological response and contaminant exposure? The data collected will be used to assess the condition of the sea-floor environment and the health of the biological resources in the Bight.

Sampling Design - A regional survey of benthic conditions within the Southern California Bight took place in 2008 (Bight'08). The final survey design was determined cooperatively by the participants represented on the Regional Steering Committee. The Discharger provided support to the Bight'08 benthic survey by participating in or performing the following activities:

- Participation on the Steering Committee
- Participation on the relevant Technical Committees (e.g., Information Management, Field Methods and Logistics, Benthos and Chemistry)
- Field sampling at sea
- Infaunal sample analysis
- Sediment chemistry analysis
- Data management

This level of participation in the 2008 survey was consistent with that provided by the Discharger during the 1994, 1998 and 2003 Regional Benthic Surveys. The next regional survey is expected to take place in 2013 and the Discharger's level of participation shall be consistent with that provided in previous survey.

D. Fish and Invertebrate Monitoring

1. **Local Demersal Fish and Invertebrate Survey**

This survey addresses the question: Is the health of demersal fish and epibenthic invertebrate communities in the vicinity of the discharge changing over time? The data collected will be used for regular assessment of temporal trends in community structure along a fixed grid of sites within the vicinity of the discharge. Data also will be collected on trash and debris to contribute to the Santa Monica Bay Restoration Project's Sources and Loadings program.

The Discharger shall monitor the following 16 trawling stations along four transverses perpendicular to the shoreline (Figure 6):

Table 20. Trawl Sampling Stations

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	RW-T-T0/23	23 meter depth, 33° 48.19', 118° 25.04' (trawl mid-point) (Former R-T-T0/23)
Bottom Station	RW-T-T0/61	61 meter depth, 33° 48.57', 118° 25.84' (trawl mid-point) (Former R-T-T0/61)
Bottom Station	RW-T-T0/137	137 meter depth, 33° 48.83', 118° 26.36' (trawl mid-point) (Former R-T-T0/137)

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	RW-T-T0/305	305 meter depth, 33° 49.23', 118° 27.09' (trawl mid-point) (Former R-T-T0/305)
Bottom Station	RW-T-T1/23	26 meter depth, 33° 44.65', 118° 25.09' (trawl mid-point) (Former R-T-T1/23)
Bottom Station	RW-T-T1/61	61 meter depth, 33° 44.16', 118° 25.23' (trawl mid-point) (Former R-T-T1/61)
Bottom Station	RW-T-T1/137	137 meter depth, 33° 44.84', 118° 25.34' (trawl mid-point) (Former R-T-T1/137)
Bottom Station	RW-T-T1/305	305 meter depth, 33° 43.55', 118° 25.64' (trawl mid-point) (Former R-T-T1/305)
Bottom Station	RW-T-T4/23	27 meter depth, 33° 42.79', 118° 20.48' (trawl mid-point) (Former R-T-T4/23)
Bottom Station	RW-T-T4/61	61 meter depth, 33° 42.33', 118° 20.92' (trawl mid-point) (Former R-T-T4/61)
Bottom Station	RW-T-T4/137	137 meter depth, 33° 42.06', 118° 21.05' (trawl mid-point) (Former R-T-T4/137)
Bottom Station	RW-T-T4/305	305 meter depth, 33° 42.00', 118° 21.49' (trawl mid-point) (Former R-T-T4/305)
Bottom Station	RW-T-T5/23	23 meter depth, 33° 42.29', 118° 18.98' (trawl mid-point) (Former R-T-T5/23)
Bottom Station	RW-T-T5/61	61 meter depth, 33° 41.45', 118° 19.31' (trawl mid-point) (Former R-T-T5/61)
Bottom Station	RW-T-T5/137	137 meter depth, 33° 41.11', 118° 19.61' (trawl mid-point) (Former R-T-T5/137)
Bottom Station	RW-T-T5/305	305 meter depth, 33° 40.85', 118° 19.85' (trawl mid-point) (Former R-T-T5/305)

as follows:

Table 21. Demersal Fish and Invertebrates Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Demersal fish and invertebrates	--	10-minute otter trawl	semiannually (summer and winter)

Single otter trawls shall be taken at each station, with each trawl running along a line approximately parallel to the isobath. All organisms captured shall be identified to the lowest possible taxon and counted. Fish shall be size classed. Wet-weight biomass shall be estimated for all species. Each individual captured shall be examined for the presence of externally evident signs of disease or anomaly. Estimates of type, quantity and weight of trash and debris in each trawl shall be made. Sampling methods and protocols shall follow those described in the most current edition of the *Field Operations Manual for Marine Water Column, Benthic and Trawl Monitoring in Southern California*. The resulting data shall be used to describe community structure[9] at each station.

2. **Regional Demersal Fish and Invertebrate Survey**

This survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in demersal fish and epibenthic communities within the Southern California Bight? and 2) What is the relationship between biological response and contaminant exposure? The data collected will be used to assess the condition of the seafloor environment and health of biological resources in the Bight.

A regional survey of trawl-caught demersal fish and epibenthic invertebrates within the Southern California Bight took place in 2008 (Bight'08). The final survey design was determined cooperatively by the participants as represented on the Regional Steering Committee. The Discharger provided support to the Bight'08 surveys by participating in or performing the following activities:

- Participation on the Steering Committee
- Participation on the relevant Technical Committees (e.g., Information Management, Field Methods and Logistics, Fish and Invertebrates)

- Field sampling at sea
- Trawl sample analysis
- Data management

The level of participation in the 2008 survey was consistent with that provided by the Discharger during the 1998 and 2003 Regional Surveys. The next regional survey is expected to take place in 2013 and the Discharger's level of participation shall be consistent with that provided in previous surveys.

3. **Bioaccumulation Monitoring**

a. Local Bioaccumulation Trends Survey

This survey addresses the question: Is fish tissue contamination in the vicinity of the outfall changing over time? The data collected will be used for regular assessment of temporal trends in two sentinel fish species.

The Discharger shall monitor the following 3 zones (Figure 7):

Table 22. Bioaccumulation Sampling Zones

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	RW-BA-Z1	**Outfall zone**: inshore of the 150 meter depth contour and between a line bearing 150° magnetic of White Point and a line bearing 180° magnetic off Bunker Point. (Former R-BA-Z1)
Bottom Station	RW-BA-Z2	**Intermediate zone:** inshore of the 150 meter depth contour and between a line bearing 180° (true) off 33° 44.24' N. lat. 118° 22.50' W. long. (Portuguese Point) and a line bearing 270° (true) off 33° 44.80' N. lat. 118° 24.82' W. long.. (Former R-BA-Z2)
Bottom Station	RW-BA-Z3	**Distant zone:** inshore of the 150 meter depth contour and between a line bearing 225° magnetic off the southern face of Palos Verdes Point and a line bearing 235° magnetic off the south end of the Redondo Beach Pier. (Former R-BA-Z3)

as follows:

Table 23. Bioaccumulation Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total DDT [5]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
DDT derivatives [6]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total PCB [7]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
PCB derivatives [8]	µg/kg	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
% moisture	%	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually
% lipid	%	Composite of liver tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of hornyhead turbot [10]	annually
		Composite of muscle tissue from 10 individuals of white croaker [10]	annually

Hornyhead turbot within the size range of 150 to 200 millimeters (standard length) are to be targeted. White croaker within the size range of 170 to 220 mm (standard length) are to be targeted. Additional parameters for analysis may be added to the list by the Executive Officer.

b. Local Seafood Safety Survey

This survey addresses two questions: 1) Where seafood consumption advisories exist locally, do tissue concentrations of contaminants continue to exceed the Advisory Tissue Concentration (ATC)? and 2) What are the tissue contaminant trends relative to the ATC in other species not currently subject to local consumption advisories? The data collected will be used to provide information necessary for the management of local seafood consumption advisories.

A regionally coordinated survey shall be conducted covering Santa Monica Bay, the Palos Verdes shelf and slope, and Los Angeles Harbor employing the sampling design proposed by the Santa Monica Bay Restoration Commission (SMBRC). The Discharger shall provide field sampling and analysis of tissue for the three sampling zones on the Palos Verdes Shelf as follows:

Table 24. Seafood Safety Survey Zones

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	RW-BA-Z1	**Outfall zone**: inshore of the 150 meter depth contour and between a line bearing 150° magnetic of White Point and a line bearing 180° magnetic off Bunker Point. (Former R-BA-Z1)

Station Type	Monitoring Location Name	Monitoring Location Description
Bottom Station	RW-BA-Z2	**Intermediate zone:** inshore of the 150 meter depth contour and between a line bearing 180˚ (true) off 33˚ 44.24' N. lat. 118˚ 22.50' W. long. (Portuguese Point) and a line bearing 270˚ (true) off 33˚ 44.80' N. lat. 118˚ 24.82' W. long.. (Former R-BA-Z2)
Bottom Station	RW-BA-Z3	**Distant zone:** inshore of the 150 meter depth contour and between a line bearing 225° magnetic off the southern face of Palos Verdes Point and a line bearing 235° magnetic off the south end of the Redondo Beach Pier. (Former R-BA-Z3)

One species from each of five groups of fish (rockfish, kelpbass, sandbass, surfperches and croakers) shall be sampled from each of the three zones in years one, three and five of the permit. For rockfishes, scorpionfish (*Scorpaena guttata*) is the preferred species, followed by bocaccio (*Sebastes paucispinis*) and then by any other abundant and preferably benthic rockfish species. For surfperches, black surfperch (*Embiotoca jacksoni*) is the preferred species, followed by white surfperch (*Phanerodon furcatus*) and then by walleye surfperch (*Hyperprosopon argenteum*).

For fish tissue analysis, one composite sample of ten individuals of each target shall be collected within each of the three zones. Sampling should take place within the same season of the year (preferably late summer/early fall) and should focus upon a consistent size class of fish. All tissue samples shall be analyzed for:

Table 25. Seafood Safety Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
% moisture	%	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
% lipid	%	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
Arsenic	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
Mercury	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
Total DDT [5]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
DDT derivatives [6]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
Total PCB [7]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*
PCB derivatives [8]	µg/kg	Composite of muscle tissue from 10 individuals of each of 5 species [10]	Annually (during years 1, 3 and 5)*

* The year one (1) sampling shall be conducted in 2012.

c. Regional Seafood Safety Survey

This regional survey addresses the question: "Are seafood tissue levels within the Southern California Bight below levels that ensure public safety?" The data collected will be used to assess levels of contaminants in the edible tissue of commercial or recreationally important fish within the Bight relative to Advisory Tissue Concentrations.

Sampling Design - A regional survey of edible tissue contaminant levels in fish within the Southern California Bight shall be conducted at least once every ten years, encompassing a broader set of sampling sites and target species than those addressed in the local seafood survey. The objective is to determine whether any unexpected increases or decreases in contaminant levels have occurred in non-target species and/or at unsampled sites. The final survey design may be determined cooperatively by participants represented on a Regional Steering Committee or by the State of California's Office of Environmental Health and Hazard Assessment. A regional seafood safety survey within the Southern California Bight took place in 2009 (Bight'08). The final survey design was determined cooperatively by participants represented on the Regional Steering Committee and the Surface Water Ambient Monitoring Program (SWAMP). The Discharger provided support to the Bight'08 Seafood Safety Survey by participating in or performing the following activities:

- Participation on a Steering Committee
- Participation on relevant Technical Committees (e.g., Information Management, Field Methods & Logistics, and Chemistry)
- Tissue chemical analysis

The next regional survey is expected to occur in 2018. The Discharger's level of participation shall be consistent with that provided in previous surveys.

d. Regional Predator Risk Survey

This regional survey addresses the question: "Are fish body burdens within the Southern California Bight a health risk to higher trophic levels in the marine food web?" The data collected will be used to estimate health risk to marine birds, mammals and wildlife from the consumption of fish tissue.

The most recent regional survey of whole fish body burdens of contaminants within the Southern California Bight took place in 2003 (Bight'03). The final survey design was determined cooperatively by participants represented on the Regional Steering Committee. The Discharger provided support to the Bight'08 Predator Risk Survey by participating in or performing the following activities:

- Participation on the Steering Committee
- Participation on relevant Technical Committees (e.g., Information Management, Field Methods & Logistics, and Chemistry)
- Tissue chemical analysis

This level of participation in the 2003 survey was consistent with that provided by the Discharger to the 1998 Regional Predator Risk Surveys. The next regional survey is expected to occur in 2013 and the Discharger's level of participation shall be consistent with that provided in previous surveys.

E. Kelp Bed Monitoring

This regional survey is to address the question: "Is the extent of kelp beds in the Southern California Bight changing over time and are some beds changing at rates different than others?" The data collected in this regional survey will be used to assess status and trends in kelp bed health and spatial extent. The regional nature of the survey will allow the status of beds local to the discharge to be compared to regional trends.

The Discharger shall participate in the Central Region Kelp Survey Consortium (CRKSC) to conduct regional kelp bed monitoring in Southern California coastal waters. The CRKSC design is based upon quarterly measures of kelp canopy extent using aerial imaging. The Discharger shall provide up to $10,000 per year in financial support to the CRKSC (annual level of support will depend on the number of participants in the program). The Discharger shall participate in the regional management and technical committees responsible for the development of the survey design and implementation of the assessment of kelp bed resources in the Bight. This support is intended to ensure that Palos Verdes kelp beds (CF&G beds 13 and 14) are included in the quarterly surveys of kelp beds in the Bight, and that these beds are included in any data products resulting from those surveys.

In the event that Palos Verdes kelp beds are found to deviate from the broader regional pattern, the Discharger will carry out special studies to address unexplained deterioration of local beds.

Participation in this survey provides data to the SMBRC's Kelp Beds program.

Footnotes for Receiving Water Monitoring Program

1 In addition to reporting the actual concentration of bacterial organisms in each sample collected for the purpose of demonstrating compliance (where applicable), the geometric mean values shall also be determined and reported. The geometric mean values should be calculated using at least five most recent sample results. If sampling occurs more frequently than weekly, all samples during the previous 30-day period shall be used to calculate the geometric mean. During a wet-weather event, stormwater runoff will impact shoreline, inshore and offshore stations. The day of rain (0.1 inch and greater) plus three following days worth of bacteriology data should be excluded from Single Sample and Geometric mean limits.

2 Receiving water observations of water color, turbidity, odor and unusual or abnormal amounts of floating or suspended matter in the water or on the beach, rocks and jetties or beach structures, shall be made and recorded at each receiving water station. The character and extent of such matter shall be described. The dates, times and depths of sampling and observations also shall be reported.

3 Fecal coliform sampling may be omitted at the inshore stations if the total coliform sampling program demonstrates compliance with the fecal coliform limits.

4 Community analysis of benthic infauna shall include number of species, number of individuals per species, total numerical abundance per station, benthic response index (BRI) and biological indices, plus utilize appropriate regression analyses, parametric and nonparametric statistics, and multivariate techniques or other appropriate analytical techniques.

5 *Total DDT* shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

6 At a minimum, 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

7 *Total PCB (polychlorinated biphenyls)* shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

8 At a minimum, PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206 shall be individually quantified.

9 Community analysis of demersal fish and macroinvertebrate communities shall include wet weight of fish and macroinvertebrate species (when combined weight of individuals of a species is greater than or equal to 0.1

kilogram), number of species, number of individuals per species, total numerical abundance per station, number of individuals in each 1-centimeter size class for each species of fish, species richness, species diversity, species evenness, cluster analyses, or other appropriate multivariate statistical techniques approved by the Executive Officer.

10 Individuals collected for local bioaccumulation trends survey or local seafood safety survey shall be collected during a single season each year to minimize the variability in reproductive state. It may be impossible to collect the required number of fish every year at each zone. If fish of the target size are absent in a given zone, additional trawls need not be attempted. If target fish are present in a given zone, one additional trawl shall be conducted to attempt to collect the necessary number of individuals. For collection efforts using gear other than trawls, the Discharger may fail to achieve the sampling goals because of local absence of a target species. In that case, upon request of the Discharger, the Executive Officer may approve temporary relief from requirement to collect that species for the survey year. The request for relief must be submitted to the Executive Officer and be accompanied by documented evidence of the sampling effort expended.

VII. OTHER MONITORING REQUIREMENTS

A. Special Study – Constituents of Emerging Concern in Effluent

Background

Advancements in analytical technology over the last decade have dramatically increased the number of chemicals that can be detected and greatly decreased the concentrations at which chemicals can be detected. This new ability to detect trace levels of chemical concentrations has expanded the existing understanding of the kinds of contaminants present in water and wastewater. Many man-made chemicals, particularly pesticides, pharmaceuticals and personal care products, have been found in waters across the United States.

Collectively, these compounds are referred to as Emerging Constituents (ECs) or Constituents of Emerging Concern (CECs) because their presence is starting to be revealed by rapid advances in analytical technology. Despite recent improvements in analytical science, there is still scarcity of data and lack of robust methodologies for measuring most CECs. CECs are part of the unregulated chemicals, for which no water quality standards or State notification levels have been established.

Recent publications and media reports on CECs have increased public awareness of the issue, providing an impetus for CEC investigations around the country, including local efforts by the City of Los Angeles and Southern California Coastal Water Research Project (SCCWRP). For instance, starting in 2005, the City of Los Angeles has been conducting a special study as part of Order No. 2005-0020, and results suggest that the presence of natural and synthetic estrogen hormones has caused feminization of male fish (hornyhead turbot) in Santa Monica Bay, especially near the Hyperion Treatment Plant outfall. In January 2010, SCCWRP convened a workshop where 50 scientists, water quality managers, and stakeholders discussed and collaborated on developing an effective CEC monitoring and management strategy that is protective of water quality. Anticipated outcomes of this workshop include recommended lists of CECs for monitoring in recycled water (for groundwater concerns) by the end of 2010, and for monitoring in ambient waters, including ocean waters, by the summer of 2011.

In recent years, this Regional Water Board has incorporated monitoring of a select group of CECs into the NPDES permits issued to POTWs.

CEC Special Study Requirements

1. The Discharger shall initiate an investigation of CECs by conducting a special study. Specifically, within 6 months of the effective date of this Order, the Discharger shall develop a CEC Special Study Work Plan (Work Plan) and submit it for Regional Water Board Executive Officer approval. Immediately upon approval of the Work Plan, the Discharger shall fully implement the Work Plan.

   This Work Plan shall include, but not be limited to, the following:

   a. Identification of CECs to be monitored in the effluent, sample type (e.g., 24-hour composite), sampling frequency, and sampling methodology. The following table identifies the minimum parameters to be monitored.

Table 26. Effluent Monitoring of CECs

Parameter *	Units	Sample Type	Minimum Sampling Frequency	Analytical Test Method and (Minimum Level, units)
17α-Ethinyl Estradiol	ng/L	To be proposed	Annually	To be proposed
17β-Estradiol	ng/L	To be proposed	Annually	To be proposed
Estrone	ng/L	To be proposed	Annually	To be proposed
Bisphenol A	ng/L	To be proposed	Annually	To be proposed
Nonylphenol and nonylphenol polyethoxylates	ng/L	To be proposed	Annually	To be proposed
Octylphenol	ng/L	To be proposed	Annually	To be proposed
Polybrominated diphenyl ethers	ng/L	To be proposed	Annually	To be proposed
Acetaminophen	ng/L	To be proposed	Annually	To be proposed
Amoxicillin	ng/L	To be proposed	Annually	To be proposed
Azithromycin	ng/L	To be proposed	Annually	To be proposed
Carbamazepine	ng/L	To be proposed	Annually	To be proposed
Ciprofloxacin	ng/L	To be proposed	Annually	To be proposed
Dilantin	ng/L	To be proposed	Annually	To be proposed
Gemfibrozil	ng/L	To be proposed	Annually	To be proposed
Ibuprofen	ng/L	To be proposed	Annually	To be proposed
Lipitor	ng/L	To be proposed	Annually	To be proposed
Sulfamethoxazole	ng/L	To be proposed	Annually	To be proposed
Trimethoprim	ng/L	To be proposed	Annually	To be proposed
Salicylic acid	ng/L	To be proposed	Annually	To be proposed
Triclosan	ng/L	To be proposed	Annually	To be proposed
DEET	ng/L	To be proposed	Annually	To be proposed
Caffeine	ng/L	To be proposed	Annually	To be proposed
Iodinated contrast media (i.e., iopromide)	ng/L	To be proposed	Annually	To be proposed
Fire retardants (e.g., TCEP)	ng/L	To be proposed	Annually	To be proposed

* Given the evolving state of research, science, and policy involving CECs, the Regional Water Board Executive Officer may add or remove CECs from the monitoring and reporting program.

Once the SCCWRP's recommended list of CEC monitoring in ambient waters, including ocean waters, is finalized, the above list of minimum parameters to be monitored by the Discharger and the sampling frequency may be re-evaluated and modified by the Executive Officer. At such

time, upon request by the Executive Officer, the Discharger shall monitor the requested CEC parameters at the specified frequency. In the Work Plan, the Discharger may also propose, for consideration and approval by the Executive Officer, surrogate or indicator CECs that may contribute towards a better understanding of CECs in its effluent.

Sample Type - The Discharger shall propose in the Work Plan the appropriate sample type for each type of constituent.

Sampling Period - At minimum, the Discharger shall monitor the specified CECs once per year. The Work Plan shall propose the appropriate sampling month or quarter for each year, consistent with the goals of the analyses. The rationale for selecting the particular sampling month or quarter shall be explained in the Work Plan.

Analytical Test Methodology and QA/QC - The Discharger shall review and consider all available analytical test methodologies and appropriate QA/QC procedures, including but not limited to those listed in USEPA Methods 1694 and 1698 or utilized by the U.S. Geologic Survey, California Department of Public Health, or other federal or State agencies. Based on its review, the Discharger shall propose the most appropriate analytical methodology, considering sensitivity, accuracy, availability, and cost.

b. Characterization of existing CEC data (data collected previous to Special Study) - The Discharger shall propose a characterization of all existing CEC data (associated with its effluent or receiving water) that have been collected for various purposes in the past. At minimum, the characterization shall include:

- an identification of all CECs monitored to date (outside of this Special Study);
- monitoring duration, frequency, and date(s) (for example, from 2000- present, annually);
- analytical methodologies employed;
- RL, MLs, and MDLs achieved for each methodology used; and
- temporal/seasonal trend analyses (using both statistical and graphical demonstration) of CEC data, over time and by season.

c. Evaluation of CEC data collected as part of this Special Study. The Discharger shall propose an evaluation of CEC data (associated with its effluent) to be collected as part of this special study. At minimum, the characterization shall include:

- an identification of CECs that have been monitored;
- monitoring duration, frequency, and date(s);
- RL, MLs and MDLs achieved for each methodology used;
- a brief update on any improvements (or change) in the analytical methodologies and associated RL, MLs and MDLs achieved for each methodology used; and
- temporal/seasonal trend analyses (using both statistical and graphical demonstration) of CEC data collected as part of this special study.

2. Reporting - By April 15th of each year (starting April 15, 2013), the Discharger shall submit to the Regional Water Board Executive Officer an annual report summarizing the monitoring results from the previous calendar year. Each annual report shall include a compilation of effluent monitoring data of CECs listed in the approved Work Plan, MLs, sample type, analytical methodology used, sampling date/time, QA/QC information, and an evaluation of cumulative CEC data collected to date as part of this special study (see above for further details on CEC data evaluation). In addition, the first annual report due April 15, 2013 shall include a characterization of existing CEC data, i.e., all

data collected outside of this special study (see above for further details on existing CEC data characterization).

B. Special Study – Nutrient Loading and Receiving Water Impacts

By July 14, 2012, consistent with the logistics described in section I.D.3 of the MRP, the Discharger shall propose, as a special study, a summary assessment of existing nutrient data (both effluent and receiving water) collected under the Order/Permit during the period of secondary treatment and quantify the resulting effects, if any, of the discharge on receiving water quality for dissolved oxygen, pH, and percent transmission.

C. Outfall and Diffuser Inspection

Each ocean outfall shall be inspected externally a minimum of once a year. Inspections shall include general observations and photographic/videographic records of the outfall pipes and adjacent ballast material. The inspections may be conducted by remotely operated vehicle, diver, or manned submarine. A summary report of the inspection findings shall be provided. This written report, augmented with videographic and/or photographic images, will provide a description of the observed condition of the outfall structures from shallow water to their respective termini.

D. Biosolids and Sludge Management

The Discharger must comply with all Clean Water Act and regulatory requirements of 40 CFR parts 257, 258, 501, and 503, including all applicable monitoring, record keeping, and reporting requirements. The Discharger must comply with the requirements in Attachment H of this Order/Permit.

VIII. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.

2. The Discharger shall inform the Regional Water Board well in advance of any proposed construction or maintenance or modification to the POTW that could potentially affect compliance with applicable requirements.

3. If the Discharger monitors (other than for process/operational control, startup, research, or equipment testing) any influent, effluent, or receiving water constituent more frequently than required by this Permit using approved analytical methods, the results of those analyses shall be included in the monitoring report. These results shall be reflected in the calculation of the average (or median) used in demonstrating compliance with this Order/Permit.

4. The date and time of sampling (as appropriate) shall be reported with the analytical values determined.

5. Weekly effluent analyses shall be performed on different weekdays during each month. Quarterly influent and effluent analyses shall be performed during the months of February, May, August, and November. Semiannual influent and effluent analyses shall be performed during the months of May and November. Annual influent and effluent analyses shall be performed during the month of August.

Should there be instances when monitoring could not be done during these specified months, the Discharger must notify the Regional Water Board, state the reason why the monitoring could not be conducted, and obtain approval from the Executive Officer for an alternate schedule. Results of quarterly, semiannual, and annual analyses shall be reported by the 15th of the second month following the monitoring period.

6. Pollutants shall be analyzed using the analytical methods described in 40 CFR part 136 or where no methods are specified for a particular pollutant, by methods approved by the Regional Water Board Executive Officer, in consultation with the State Water Board's Quality Assurance Program. For any analyses performed for which no procedure is specified in USEPA guidelines or in the MRP, the constituent or parameter analyzed and the method or procedure used must be specified in the monitoring report.

7. The laboratory conducting analyses shall be certified by the California Department of Public Health Environmental Laboratory Accreditation Program (ELAP), in accordance with CWC section 13176, or approved by the Regional Water Board Executive Officer, in consultation with the State Water Board's Quality Assurance Program for that particular parameter and must include quality assurance/quality control (QA/QC) data in their reports. A copy of the laboratory certification shall be provided each time a new/renewal certification is obtained from ELAP and must be submitted with the annual summary report. Each monitoring report must affirm in writing that: "All analyses were conducted at a laboratory certified for such analyses by the California Department of Public Health, or approved by the Regional Water Board Executive Officer (in consultation with the State Water Board's Quality Assurance Program), and in accordance with current USEPA guideline procedures or as specified in this MRP."

8. Water/wastewater samples must be analyzed within allowable holding time limits as specified in 40 CFR part 136.3. All QA/QC analyses must be run on the same dates that samples are actually analyzed. The Discharger shall retain the QA/QC documentation in its files and make available for inspection and/or submit this documentation when requested by the Regional Water Board and/or USEPA. Proper chain of custody procedures must be followed and a copy of this documentation shall be submitted with the monthly report.

9. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments to insure accuracy of measurements.

10. The Discharger shall report with each sample result in the monitoring reports: the analytical method used, the Method Detection Limit (MDL) as determined by the procedure in 40 CFR part 136, and the Reporting Level (RL) [the applicable Minimum Level (ML) or Reported Minimum Level (RML)] for each pollutant. The MLs are those published by the State Water Board in Appendix II of the 2009 Ocean Plan. The ML represents the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interference. When all specific analytical steps are followed and after appropriate application of method specific factors, the ML also represents the lowest standard in the calibration curve for that specific analytical technique. When there is deviation from the analytical method for dilution or concentration of samples, other factors are applied to the ML depending on the sample preparation. The resulting value is the reported Minimum Level.

11. The Discharger shall select the analytical method that provides an ML lower than the effluent limitation or performance goal established for a given parameter or where no such requirement exists, the lowest applicable water quality objective in the Ocean Plan. If the effluent limitation, performance goal, or the lowest applicable water quality objective is lower than all the MLs in Appendix II of the 2009 Ocean Plan, the Discharger must select the method with the lowest ML for

compliance purposes. The Discharger shall include in the annual summary reports a list of the analytical methods and MLs employed for each test.

12. Non-detect levels reported for the JWPCP's effluent are generally higher than effluent limitations or water quality objectives for DDT, chlordane, PCBs and PAHs. Therefore, the Discharger shall strive for lower analytical detection levels than those specified in Appendix II of the 2009 Ocean Plan to facilitate pollutant load quantification for future DDT and PCBs TMDLs.

13. The Discharger shall instruct its laboratories to establish calibration standards so that the ML (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve. In accordance with section 14 below, the Discharger's laboratory may employ a calibration standard lower than the ML in Appendix II of the 2009 Ocean Plan.

14. Upon request by the Discharger, the Regional Water Board, in consultation with the State Water Board's Quality Assurance Program and/or USEPA, may establish an ML that is not contained in Appendix II of the 2009 Ocean Plan, to be included in the Discharger's NPDES permit, in any of the following situations:

    a. When the pollutant under consideration is not included in Appendix II;

    b. When the Discharger agrees to use a test method that is more sensitive than those specified in 40 CFR 136 (most recent revision);

    c. When the Discharger agrees to use an ML lower than those listed in Appendix II;

    d. When the Discharger demonstrates that the calibration standard matrix is sufficiently different from that used to establish the ML in Appendix II and proposes an appropriate ML for their matrix; or

    e. When the Discharger uses a method whose quantification practices are not consistent with the definition of an ML. Examples of such methods are the USEPA-approved method 1613 for dioxins and furans, method 1624 for volatile organic substances, and method 1625 for semi-volatile organic substances. In such cases, the Discharger, Regional Water Board, State Water Board and/or USEPA shall agree on a lowest quantifiable limit, and that limit will substitute for the ML for reporting and compliance determination purposes.

15. The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

    a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

    b. Sample results less than the reported ML, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported. For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc.").

    c. Sample results less than the laboratory's MDL shall be reported as "Not Detected" or ND.

16. For bacterial analyses, sample dilutions should be performed so the expected range of values is bracketed (for example, with multiple tube fermentation method or membrane filtration method, 2 to 16,000 per 100 ml for total and fecal coliforms, at a minimum; and 1 to 1000 per 100 ml for *Enterococcus*). The detection methods used for each analysis shall be reported with the results of the analyses. Detection methods used for coliforms (total and fecal) and *Enterococcus* shall be those presented in Table 1A of 40 CFR part 136 (most recent revision).

17. Records and reports of marine monitoring surveys conducted to meet receiving water monitoring requirements shall include, at a minimum, the following information:

    a. A description of climatic and receiving water characteristics at the time of sampling (weather observations, unusual or abnormal amounts of floating debris, discoloration, wind speed and direction, swell or wave action, time of sampling or measurements, tidal stage and height, etc.).

    b. The date, exact place and description of sampling stations, including differences unique to each station (e.g., date, time, station location, depth, and sample type).

    c. A list of the individuals participating in field collection of samples or data and description of the sample collection and preservation procedures used in the various surveys.

    d. A description of the specific method used for laboratory analysis, the date(s) the analyses were performed and the individuals participating in these analyses.

    e. An in-depth discussion of the results of the survey. All tabulations and computations shall be explained.

18. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with this Permit.

19. All hardcopy reports must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the addresses listed below. (Reference the reports to Compliance File No. CI-1758 to facilitate routing to the appropriate staff and file.)

    California Regional Water Quality Control Board
    Los Angeles Region
    320 W. 4th Street, Suite 200
    Los Angeles, CA 90013
    Attention: Information Technology Unit

B. Self Monitoring Reports (SMRs) and Discharge Monitoring Reports (DMRs)

1. At any time during the term of this Permit, the State or Regional Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program web site (http://www.waterboards.ca.gov/ciwqs/ index.html). Until such notification is given, the Discharger shall submit hard copy SMRs. The CIWQS web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.

2. SMR submittals to CIWQS and hardcopy SMRs include only numeric influent, effluent, and microbiological monitoring data for Shoreline, Inshore, and Offshore Stations. DMR electronic submittals and hardcopies include only influent and effluent data. All other data is to be submitted with the annual or biennial ocean monitoring report. The Discharger shall submit monthly

SMRs/DMRs including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the monitoring reports.

3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule, except where specific monitoring periods and reporting dates are required elsewhere in this permit:

Table 27. Reporting Schedule

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	By the 15th day of the second month after the month of sampling
Daily	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	By the 15th day of the second month after the month of sampling
Weekly	Sunday following permit effective date or on permit effective date if that date is Sunday	Sunday through Saturday	By the 15th day of the second month after the month of sampling
Monthly	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1st day of calendar month through last day of calendar month	By the 15th day of the second month after the month of sampling
Quarterly	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31	May 15 August 15 November 15 February 15
Semiannually	Closest of January 1 or July 1 following (or on) permit effective date	January 1 through June 30 July 1 through December 31	August 15 February 15
Annually	January 1 following (or on) permit effective date	January 1 through December 31	February 15

4. The Discharger shall submit hard copy SMRs in accordance with the following requirements:

   a. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

   b. SMRs must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below. (Reference the reports to Compliance File No. CI-1758 to facilitate routing to the appropriate staff and file.)

      California Regional Water Quality Control Board
      Los Angeles Region
      320 West 4th Street, Suite 200
      Los Angeles, CA 90013
      Attention: Information Technology Unit

5. The Discharger shall submit hard copy DMRs in accordance with the following requirements:

   a. As described in section VIII.B.1 above, at any time during the term of this Order, the State or Regional Water Board may notify the Discharger to electronically submit SMRs that will satisfy federal requirements for submittal of Discharge Monitoring Reports (DMRs). Until such notification is given, the Discharger shall submit DMRs in accordance with the requirements described below.

   b. DMRs must be signed and certified as required by the Standard Provisions (Attachment D). The Discharger shall submit the original DMR to the State Water Board address listed below:

Standard Mail	FedEx/UPS/Other Private Carriers
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15th Floor Sacramento, CA 95814

   c. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated must be approved by USEPA

C. Other Reports

1. Annual Summary Report

By April 1 of each year, the Discharger shall submit an annual report containing a discussion of the previous year's influent/effluent analytical results, as well as graphical and tabular summaries of the monitoring analytical data. The data shall be submitted to the Regional Water Board on hard copy and a CD-ROM disk or other appropriate electronic medium. The submitted data must be IBM compatible, preferably using Microsoft Excel software. The Discharger shall discuss the compliance record and any corrective actions taken or planned that may be needed to bring the discharge into full compliance with Permit requirements.

The first annual report shall be due April 1, 2012, covering the sampling period from January 2011 – December 2011.

2. Receiving Water Monitoring Report

An annual summary of the receiving water monitoring data collected during each sampling year (January-December) shall be prepared and submitted so that it is received by the Regional Water Board by August 1 of the following year. The first annual receiving water monitoring summary report is due by August 1, 2013.

By August 1 of every other year, a detailed receiving water monitoring biennial assessment report (instead of the annual receiving water monitoring summary report) of the data collected during the two previous calendar sampling years (January – December) shall be prepared and submitted to the Regional Water Board. This report shall include an annual data summary and shall also include an in-depth analysis of the biological, chemical, and physical data following recommendations in the Model Monitoring Program guidance document (Schiff, K.C., J.S. Brown and S.B. Weisberg. 2001. *Model Monitoring Program for Large Ocean Dischargers in Southern California*. SCCWRP Tech.

Rep. #357. SCCWRP, Westminster, CA. 101 pp.). Data shall be tabulated, summarized, and graphed where appropriate, analyzed, interpreted, and generally presented in such a way as to facilitate ready understanding of its significance. Spatial and temporal trends shall be examined and compared. The relation of physical and chemical parameters to biological parameters shall be evaluated. See, also, section IV.H of this Monitoring and Reporting Program. All receiving water monitoring data shall be submitted in accordance with the data submittal formats developed for the Southern California Bight Regional Monitoring Surveys.

The first biennial assessment report shall be due August 1, 2012, covering sampling periods of January – December 2010 and January – December 2011. Subsequent reports shall be due August 1, 2014, and August 1, 2016, to cover sampling periods of January 2012 – December 2013 and January 2014 – December 2015, respectively.

3. **Outfall Inspection Report**

By August 1 of each year, a summary report of the outfall inspection findings for the previous calendar year shall be prepared and submitted to the Regional Water Board. This written report, augmented with videographic and/or photographic images, shall provide a description of the observed external condition of the discharge pipes from shallow water to their respective termini.

The first summary report shall be due August 1, 2012, covering the monitoring period from January 2011 – December 2011.

4. **Database Management System**

The Regional Water Board and State Water Resources Control Board are developing a database compliance monitoring management system. The Discharger may be required to submit all monitoring and annual summary reports electronically in a specified format when this system becomes fully operational.

Figure 1. Shoreline Monitoring Stations

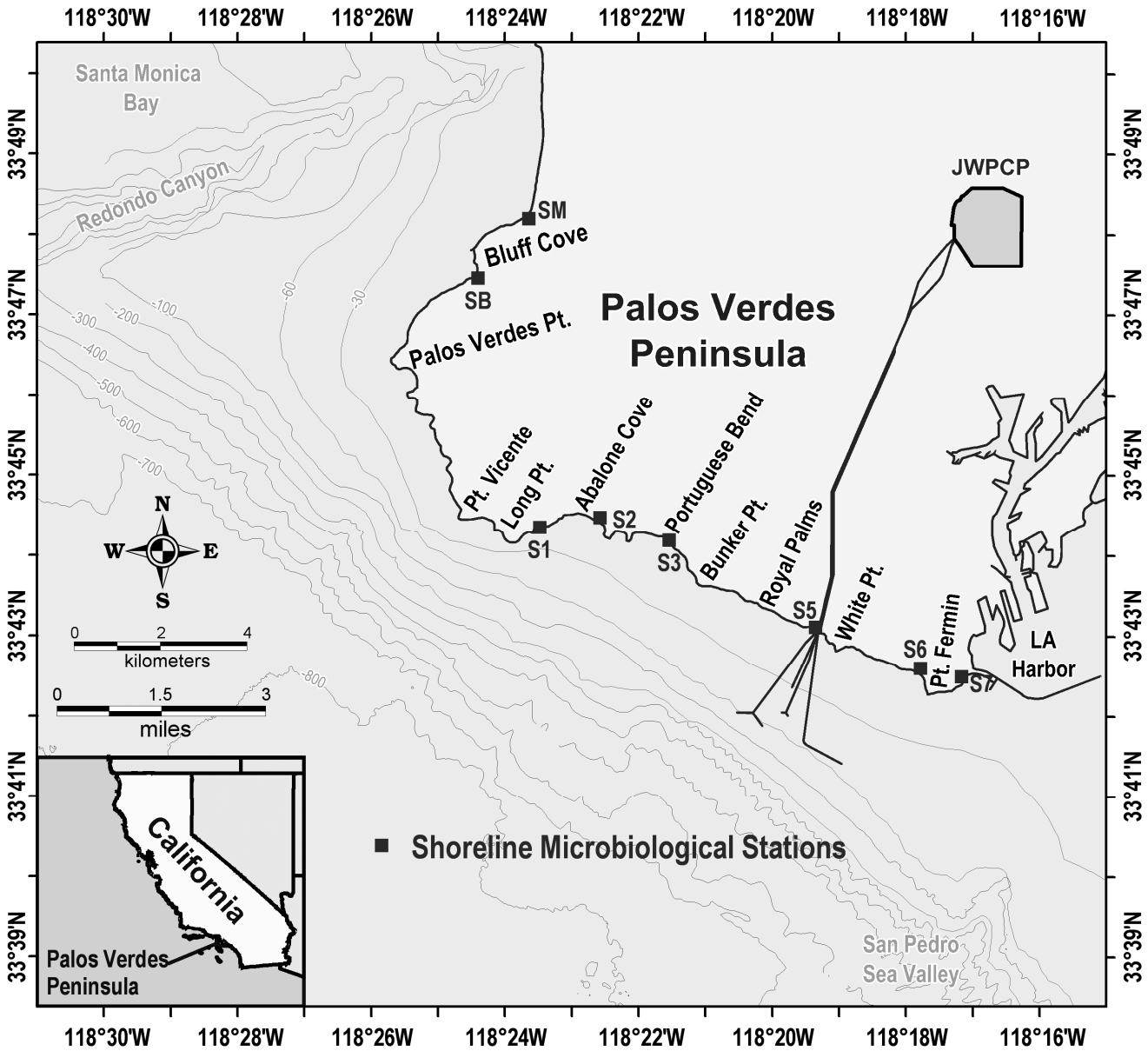


Figure 2. Inshore Monitoring Stations

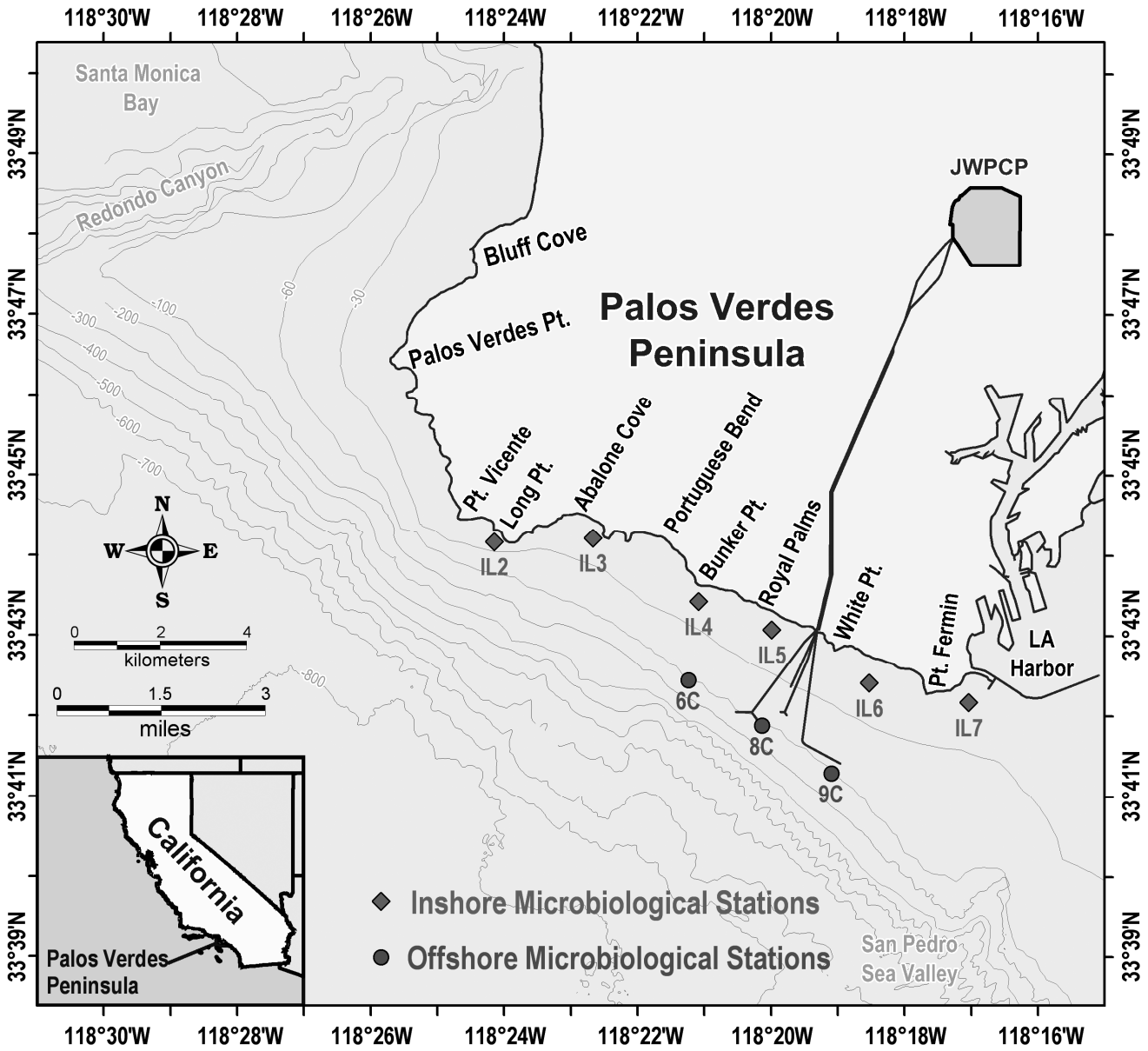


Figure 3. Nearshore/Offshore Water Quality Monitoring Stations

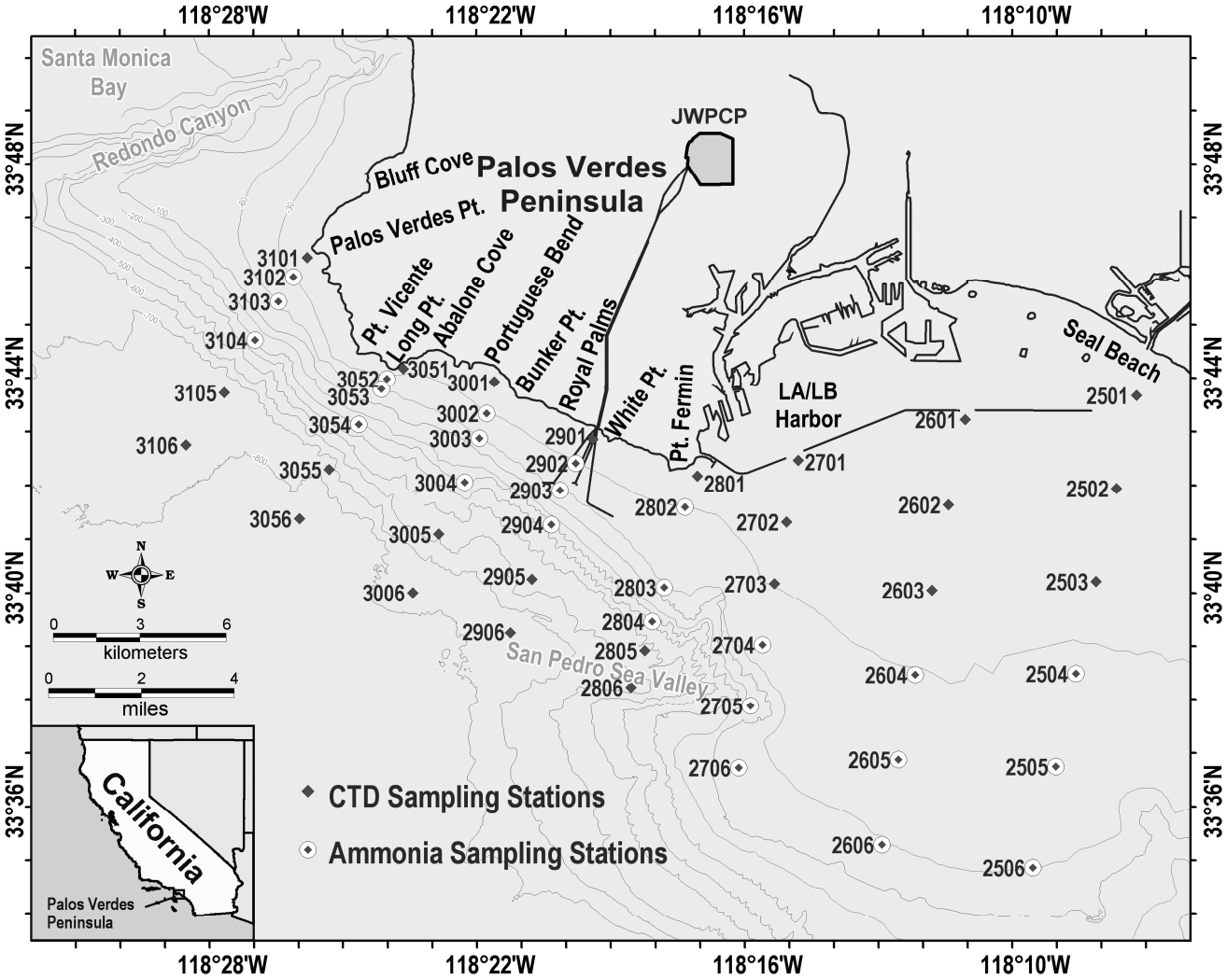


Figure 4. Nearshore Light Energy Profiling Stations

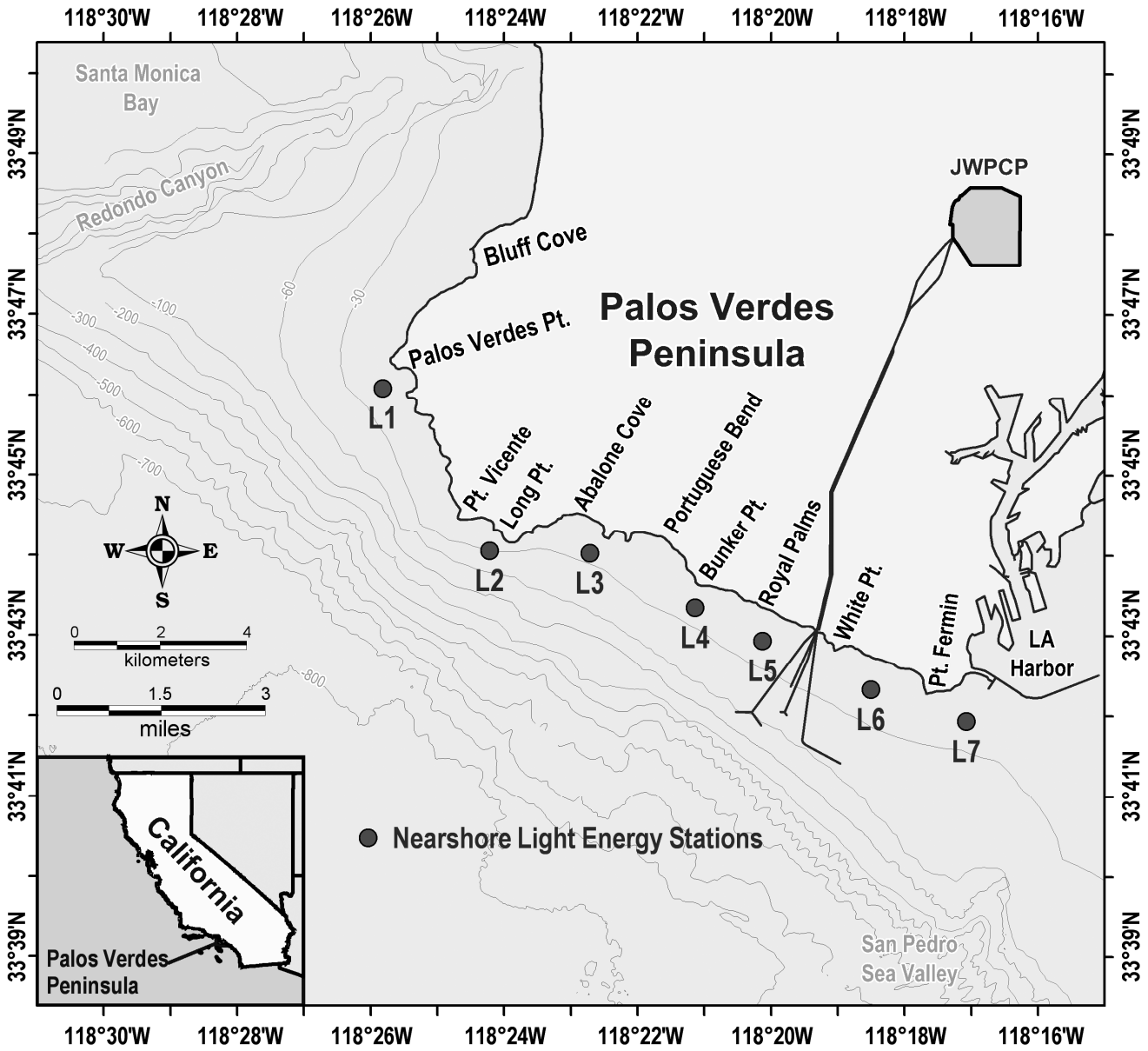


Figure 5. Benthic Infaunal and Sediment Chemistry Sampling Stations

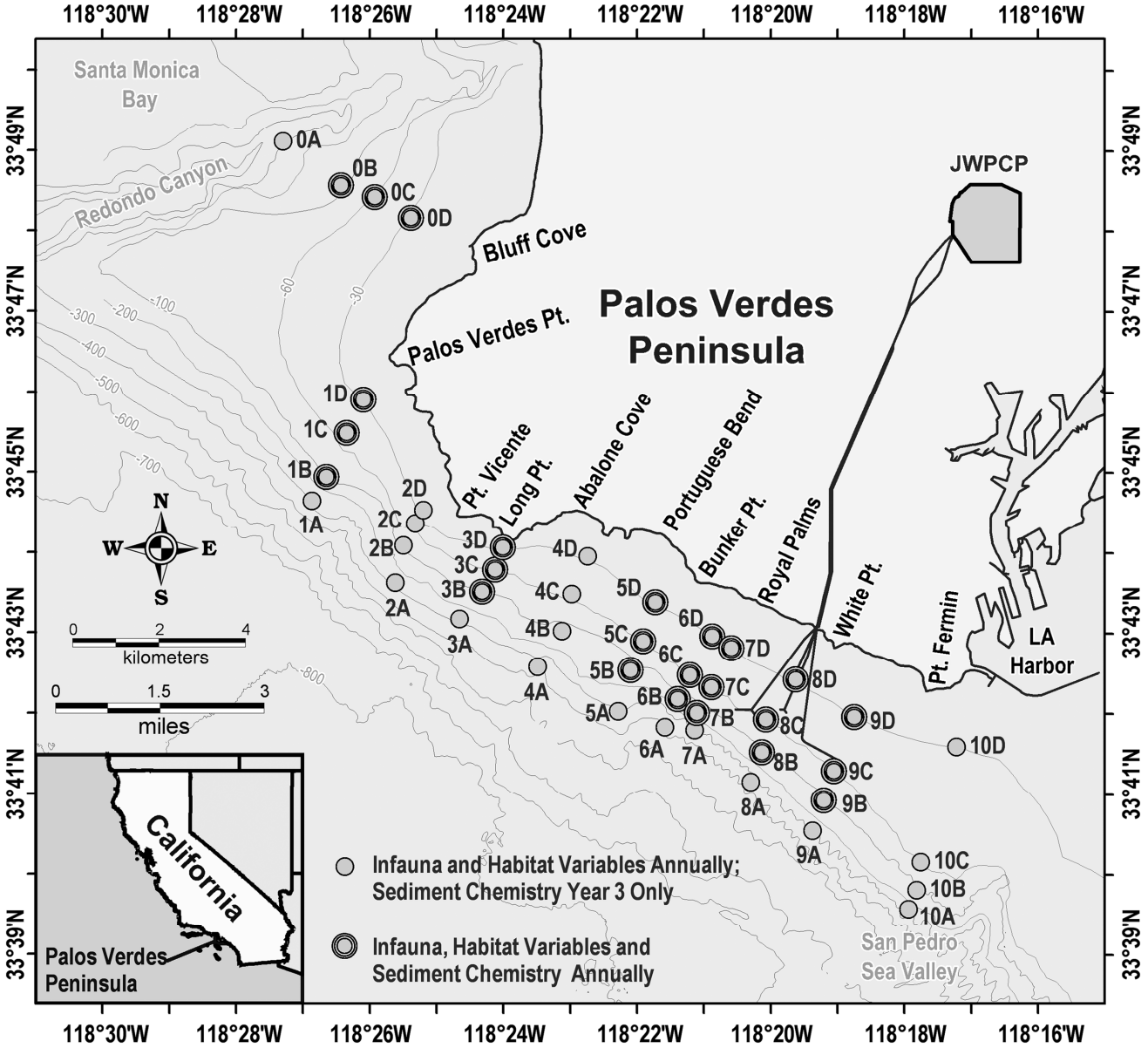


Figure 6. Local Demersal Fish and Invertebrate Stations

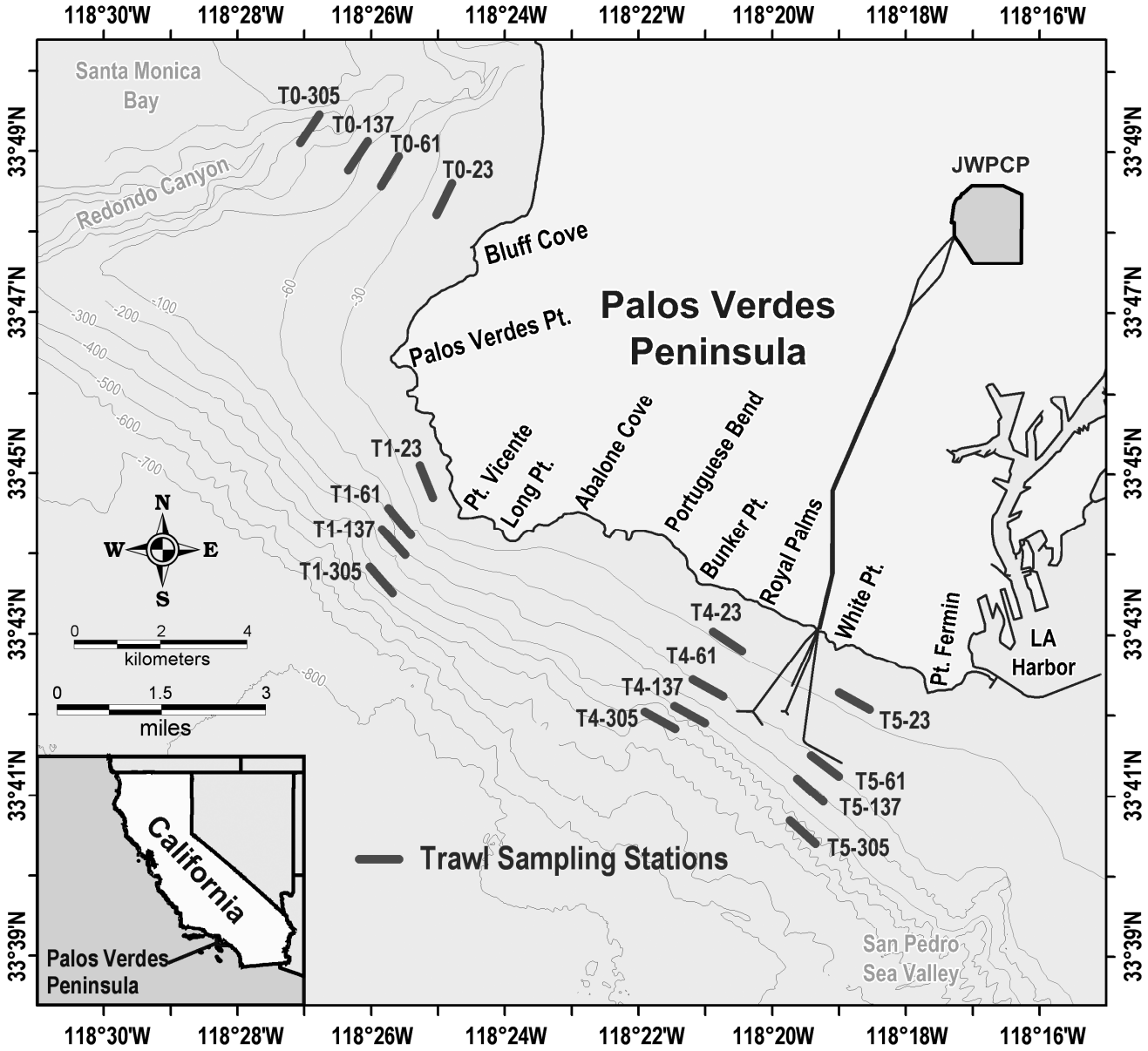
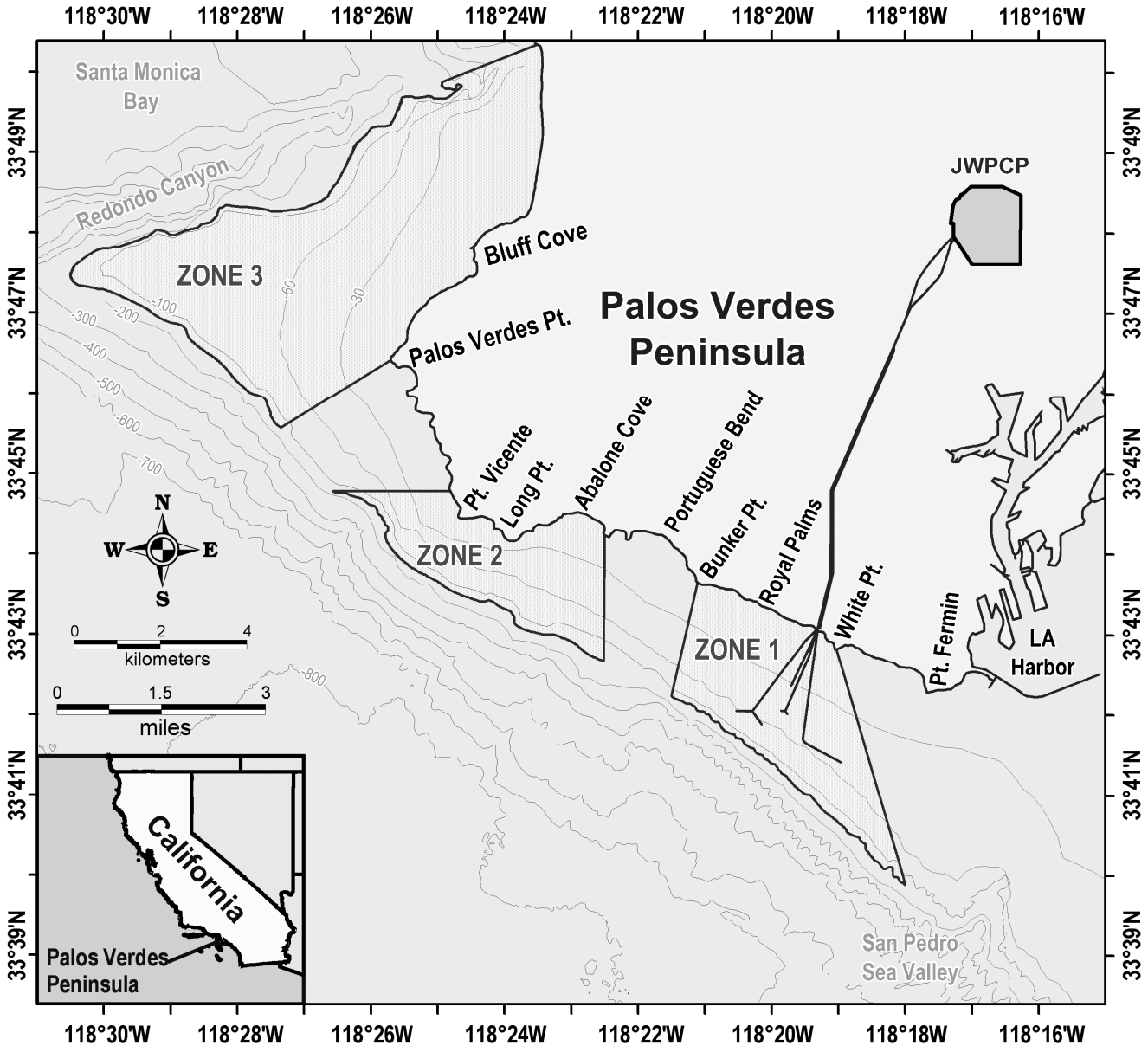


Figure 7. Local Bioaccumulation Sampling Zones



ATTACHMENT F – FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table 1. Facility Information

WDID	**4B190107013**
Discharger	**Joint Outfall System**
Name of Facility	**Joint Water Pollution Control Plant, Carson**
Facility Address	**24501 South Figueroa Street**
	Carson, CA 90745
	Los Angeles County
Facility Contact, Title and Phone	**Ann Heil, Supervising Engineer, (562) 908-4288 x 2803**
Authorized Person to Sign and Submit Reports	**Ann Heil, Supervising Engineer, (562) 908-4288 x 2803**
Mailing Address	**1955 Workman Mill Road, Whittier, CA 90601**
Billing Address	**1955 Workman Mill Road, Whittier, CA 90601**
Type of Facility	**POTW**
Major or Minor Facility	**Major**
Threat to Water Quality	**1**
Complexity	**A**
Pretreatment Program	**Yes**
Reclamation Requirements	**None**
Facility Permitted Flow	**400 million gallons per day as monthly average daily dry weather flow**
Facility Design Flow	**400 million gallons per day as monthly average daily dry weather flow**
Watershed	**Santa Monica Bay Watershed Management Area**
Receiving Water	**Pacific Ocean**
Receiving Water Type	**Ocean waters**

A. The Joint Outfall System (hereinafter Discharger or JOS) is the owner and operator of the Joint Water Pollution Control Plant (hereinafter Facility or JWPCP), a municipal Publicly Owned Treatment Works (POTW). USEPA and the Regional Water Board have classified the JWPCP as a major discharger. It has a Threat to Water Quality and Complexity rating of 1-A pursuant to California Code of Regulations (CCR), Title 23, section 2200.

The Joint Outfall System was formerly referred to as the County Sanitation Districts of Los Angeles County. Ownership and operation of the Joint Outfall System is proportionally shared among the signatory parties to the amended Joint Outfall Agreement effective July 1, 1995. These parties include County Sanitation Districts of Los Angeles County Nos. 1, 2, 3, 5, 8, 15, 16,17, 18, 19, 21, 22, 23, 28, 29, and 34, and South Bay Cities Sanitation District of Los Angeles County.

B. The Facility discharges wastewater to the Pacific Ocean, a water of the United States, at White Point, off the Palos Verdes Peninsula and is currently regulated by Order No. R4-2006-0042 which was issued on April 6, 2006 and expired on May 24, 2011. The terms and conditions of the existing Order have been automatically continued and remain in effect until new Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit are issued pursuant to this Order.

C. The Discharger filed a report of waste discharge and submitted an application for renewal of its WDRs and NPDES permit on November 9, 2010. The application was deemed complete on December 30, 2010**.**

D. On June 8, 1994, a Consent Decree [No. 92 0061 RG (JRx)] was entered in federal court records between the Discharger and the USEPA Region 9 and the Regional Water Board. The Consent Decree primarily requires the Discharger to construct additional secondary treatment facilities and achieve compliance with full secondary treatment at JWPCP by December 31, 2002. The Discharger achieved full secondary treatment on November 8, 2002. On May 29, 2008 the Discharger submitted a certification that all penalties, costs, and fees had been paid; all remedial measures and supplemental projects required by the Decree had been completed; and compliance for twelve consecutive months with the secondary treatment requirements of 40 CFR Section 133.102 was achieved as of November 8, 2003. On January 7, 2009 the Discharger filed a Notice of Termination of Consent Decree with the court and on January 21, 2009, the court acknowledged that the Consent Decree was terminated.

II. FACILITY DESCRIPTION

A. Description of Wastewater and Biosolids Treatment or Controls

The Discharger owns and operates the Joint Water Pollution Control Plant, located at 24501 South Figueroa Street in Carson, California. JWPCP has a monthly average daily dry weather design treatment capacity of 400 million gallons per day (MGD) and a dry weather peak design capacity of 540 MGD of secondary treatment. The wet weather peak hydraulic capacity is up to 675 MGD. For the period from September 2009 to August 2010, secondary effluent discharge flow from JWPCP has averaged 280 MGD with a maximum daily flow of 428 MGD. JWPCP receives discharges from more than 900significant industrial users.

JWPCP is part of an integrated network of facilities, known as the Joint Outfall System, which incorporates JWPCP and six upstream water reclamation plants - La Cañada, Whittier Narrows, San Jose Creek, Pomona, Los Coyotes and Long Beach. The six upstream plants are connected to a common sewer system, which allows for the diversion of desired flows into or around each upstream plant. The flow from the six upstream plants can be bypassed, to a limited extent, to JWPCP. The sludge generated from the upstream plants are returned to the joint outfall trunk sewers and conveyed to JWPCP for further treatment. The Joint Outfall System serves an urban area of 654 square miles and includes all or part of 78 cities in addition to multiple communities and unincorporated areas. The Joint Outfall System provides wastewater treatment services to much of Los Angeles County. There are approximately five million people in the Joint Outfall System service area.

The treatment system at JWPCP consists of screening, grit removal, primary sedimentation, pure oxygen activated sludge reactors, secondary clarification, and chlorination. Effluent from the primary sedimentation tanks is biologically treated in pure oxygen activated sludge reactors. The secondary treated effluent is then clarified, chlorinated and pumped into the outfall manifold. The secondary treated effluent from JWPCP is routinely discharged through Discharge Points 001 and 002 to the Pacific Ocean, a water of the United States, at White Point within the Palos Verdes Peninsula Sub-Watershed that is part of the Santa Monica Bay Watershed.

Solid fractions recovered from wastewater treatment processes include grit, primary screenings, primary sludge and skimmings, thickened waste activated sludge, digested sludge screenings and digester cleaning solids. The fine solids (grit, primary screenings, digested sludge screenings, digester cleaning solids) which are primarily inorganic materials are hauled away to a landfill. The remaining solid fractions (primary sludge and skimmings, thickened waste activated sludge) are anaerobically digested on-site. The digested solids are screened, and dewatered using scroll centrifuges. JWPCP generates approximately 118,000 dry metric tons of Class B biosolids per year. The biosolids are hauled off-site for use in composting and land application, combined with municipal solid waste for co-disposal, or processed into a renewable fuel for cement kilns.

Methane gas generated in the anaerobic digestion process is used to produce power and digester heating steam in a total energy facility that utilizes gas turbines and waste-heat recovery steam generators. The on-site generation of electricity permits the JWPCP to produce its own electricity.

Each treatment process is described in more detail below.

Primary and Secondary Treatment

Primary treatment begins with two inlet works that receive flow from three influent sewers. Inlet Works No. 1 receives approximately 70% of the total plant flow and Inlet Works No. 2 receives the remaining 30%. Six bar screens for Inlet Works No. 1 and three bar screens for Inlet Works No. 2 remove solids by capturing large debris through bars spaced approximately 1 inch apart. Captured debris is continuously removed from each bar screen, by five equally spaced rakes, and deposited into a trough. The trough delivers the debris to one of two dewatering compactors. Water removed in the compactors is returned to the treatment process upstream of the bar screens while the dewatered debris is disposed of in a landfill. Wastewater effluent from the bar screens is directed to one of six grit chambers, which remove heavy inorganic material. Grit slurry is pumped from the chambers and dewatered with the use of cyclones and clarifiers. The water is returned to the inlet of the grit chambers and the dewatered grit is disposed of in a landfill. Wastewater from the grit chambers is then directed to the sedimentation tanks for settleable and floatable solids removal. The JWPCP has 52 primary sedimentation tanks arranged into three sedimentation tank batteries. The wastewater enters each tank through three inlet gates with diffusers. Flow is reduced from roughly 3 feet per second to 3 feet per minute to allow suspended solids to settle. Sludge is directed through draw off lines and pumped to raw sludge transfer stations before transfer to anaerobic digesters. Floatable solids are pushed to the effluent end of the tank where they are pulled up into a skimmings trough, then conveyed to one of four skimmings wet wells. Ultimately the skimmings are directed to one of 24 circular anaerobic digesters, each with a volume of approximately 500,000 cubic feet, for final processing. Anaerobic digestion of the sludge reduces the concentration of pathogens, offensive odors, and the overall amount of solids to be dewatered. It also produces methane as a by-product, which is used to power the JWPCP.

A secondary influent pumping station pumps primary effluent to the secondary treatment facilities. Eight biological reactors, each with a design capacity of 50 MGD, convert finely divided and dissolved organic matter that passes through primary treatment into settleable solids than can be removed by final clarification. Each reactor is subdivided into four stages, each stage with three aerators/mixers to facilitate oxygen dissolution and mixing. The first stage of the reactors is operated as an anaerobic selector, with limited exposure to oxygen to suppress the growth of certain organisms in the activated sludge. In the following three stages, the activated sludge consumes organic matter in the mixed liquor and produces more organisms. The fourth stage of some of the reactors also functions as a pH adjustment stage. The reactors are covered to retain the high purity oxygen gas introduced into the system and permit a high degree of oxygen utilization by the activated sludge.

After passing through the biological reactors, wastewater flows into the final clarifiers to separate the activated sludge solids from the biological reactor's mixed liquor. Each reactor has a bank of 26 sedimentation tanks where floatable material is skimmed off the top, collected, and directed to a sewer line. Solids that settle to the bottom are scraped to two hoppers where the sludge is collected and drawn off to return sludge pumping stations. There is one pumping station per reactor, each consisting of three pumps, that pumps activated sludge to the inlet of the reactors to keep an effective concentration of microorganisms in the reactors. However, a portion of the activated sludge is wasted from the reactor/clarifier system to maintain the desired population of microorganisms in the reactors.

A dissolved air flotation thickening system is used to concentrate the waste activated sludge produced in secondary treatment. Solids on the surface of the flotation tank are collected using skimmers and then pumped to the anaerobic digestion system, located with the primary treatment facilities. The clarified effluent is returned to the secondary influent force main. Secondary effluent is disinfected using a bleach solution to achieve a chlorine residual of approximately 1-2 mg/L and then is either pumped or gravity fed, depending on tidal conditions, to the Pacific Ocean.

Solids Processing

Discharge from the 24 circular digesters is diverted into three pump station wet wells, one of which is the central wet well for transfer of digested sludge to solids processing. The central wet well consists of three individual structures, each with a capacity of 822,800 gallons and equipped with two gas blowers that pump digester gas into the wet well to provide mixing. Sludge is pumped using three digested sludge pumps through rotary screens and into centrifuge feed pumping station wet wells, housing a total of five pumps. The pumps are used to deliver digested sludge to the centrifuges, which are used to separate water from the suspended solids. There are currently 31 low-speed and 8 high-speed centrifuges. The high-speed centrifuges are capable of increasing gravity up to a factor of 3,000, while the low-speed centrifuges increase gravity by a factor of approximately 1,000. Diluted cationic polymer is used in the process to enhance flocculation. The dewatered cake (biosolids) drops through a hopper below each elevated centrifuge onto a conveyor belt, while the waste centrate is collected through a second hopper into a centrate drainage system. Eighteen storage silos, each of which can hold up to 510 tons, store the biosolids prior to conveyance to truck loading stations. Centrate from the centrifuges is collected and gravity flows to the Centrate Treatment System Facility, where solids are concentrated using dissolved air flotation. The clarified effluent from the Centrate Treatment Facility discharges to a wet well, where it gravity flows to the influent of the JWPCP.

Power Generation

The JWPCP is self-reliant with respect to power generation. All of the power and most of the heating steam requirements for the plant are provided by three digester gas fired turbines and one steam turbine. Utility power is available whenever the on-site power plant is out of service.

Digester gas must be dewatered and scrubbed of particulate matter prior to combustion. Digester gas is first scrubbed, using two Venturi scrubbers and non-potable water, and particulate matter is regularly blown-down from the scrubber storage tanks. Two mist eliminators downstream of the Venturi scrubbers remove water droplets from the gas stream, and the digester gas is then further treated using two chillers that condense water vapor. From there, digester gas is directed to a surge tank prior to compression. Natural gas is used to boost the heat input during periods of low digester gas production. Three compressors are used to compress the digester gas, or a mixture of digester gas and natural gas, from approximately 10 inches of water column to approximately 350 pounds per square inch (psig). Prior to combustion in the gas turbine, the high-pressure digester gas is chilled to 40 degrees Fahrenheit, using a refrigeration system, to remove any remaining water vapor. As mentioned above, three gas-fired turbines, each equipped with a 9.9 MW electric generator, are the normal source of

power for the JWPCP. Typically, only two gas turbines are in action while one acts as a standby. During periods when the gas turbines are not operational, digester gas can be burned at two different flare stations, with the South Flare Station consisting of five waste gas flares and the North Flare Station consisting of seven waste gas flares. Waste heat from the gas turbine exhaust is used to produce steam, through the use of heat recovery steam generators, and directed to a steam turbine for power production and digester heating steam. At present, this steam generation system is out of service due to replacement of the steam turbine, which is expected to be completed in the summer of 2011. Until that time, the gas turbines are operated in simple cycle, meaning without waste heat recovery. Currently, digester heating steam is provided by means of four digester gas-fired boilers, along with an additional natural gas-fired boiler available for emergencies. These boilers both supplement and serve as a backup to the waste heat steam generators.

B. Discharge Points and Receiving Waters

After chlorination, the secondary treated effluent travels about 6 miles through tunnels to the outfall manifold and then is discharged to the Pacific Ocean, at White Point off the Palos Verdes Peninsula.

JWPCP has fifteen discharge points (Discharge Points 001 through 015). Four outfalls (Discharge Points 001 through 004) are located at White Point, off the Palos Verdes Peninsula. Discharge Points 001 and 002 are routinely used for discharge of secondary treated wastewater. Discharge Point 003 is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. Discharge Point 004 serves as a standby outfall to provide additional hydraulic relief during the very heaviest flows. These four outfalls are described as follows:

Discharge Point	Description
001	**White Point 120-inch ocean outfall** (Latitude 33 ° 41’ 21” N, Longitude 118° 19’ 00” W) This outfall routinely discharges approximately 65% of the effluent from the JWPCP. It discharges south of the shoreline off White Point, San Pedro. The outfall is 7440 ft long to the beginning of a single L-shaped diffuser leg which is 4440 ft long. Depth at the beginning of the diffuser is 167 ft and at the end of the diffuser is 190 ft.
002	**White Point 90-inch ocean outfall** (Latitude 33 ° 42’ 03” N, Longitude 118° 20’ 17” W) This outfall routinely discharges approximately 35% of the effluent from the JWPCP. It discharges southwest of the shoreline off White Point, San Pedro. The outfall is 7982 ft long to the beginning of a y-shaped diffuser with two legs. Each leg is 1208 ft long. Depth at the beginning of the diffusers is 196 ft and at the end of the diffusers is 210 ft.
003	**White Point 72-inch ocean outfall** (Latitude 33 ° 42’ 05” N, Longitude 118° 20’ 20” W) This outfall is used only during times of heavy rains to provide hydraulic relief for flow in the outfall system. When used, it discharges off the White Point shoreline between Discharge Points 001 and 002 and about 160 ft below the ocean surface. The outfall is about 6500 ft long and connects to one of three legs of a y-shaped diffuser upstream of the y-intersection. Each leg is approximately 200 ft long.
004	**White Point 60-inch ocean outfall** (Latitude 33 ° 41’ 20” N, Longitude 118° 19’ 40” W) This outfall is used as a standby to provide additional hydraulic relief during the heaviest flow. When used, it discharges off the White Point shoreline between Discharge Serial Nos. 002 and 003 and about 110 ft below the ocean surface. The outfall is about 5000 ft long and connect to a single, very short diffuser.

Two discharge points (Serial Nos. 006 and 013) have been eliminated following facility modifications. The remaining nine discharge points, with seven of them being bypass points (Discharge Points 007-012 and 014) located prior to the headworks, provide for overflow, emergency bypass, and/or hydraulic

relief of the JWPCP. This permit does not authorize any discharge from these nine discharge points (Discharge Points 005, 007-012, 014, and 015).

In addition to the JWPCP effluent, the waste brine generated by the West Basin Municipal Water Districts's Carson Regional Water Recycling Plant is discharging to the ocean through the JWPCP's outfalls via a waste brine line connected to the JWPCP effluent tunnel. This discharge of waste brine is regulated under separate waste discharge requirements and a separate NPDES permit.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in the existing Order (Order No. R4-2006-0042) for discharges from JWPCP and representative monitoring data for conventional and nonconventional pollutants from May 2006 to August 2010 during the term of the previous Order are as follows:

Table 2. Historic Effluent Limitations and Monitoring Data (Conventional and Nonconventional Pollutants)

Parameter (units)	Effluent Limitation In Order No. R4-2006-0042				Monitoring Data (From May 2006 to Aug. 2010)		
	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximun	Highest 30-day Average Discharge	Highest 7-day Average Discharge	Highest Daily Discharge
BOD_5 (mg/L)	30	45	--	--	8.6	11	17
TSS (mg/L)	30	45	--	--	17	21	48
O&G (mg/L)	15	22.5	45	75	<1.05	<1.05	6.0
Settleable Solids (ml/L)	0.5	0.75	1.5	3.0	<0.1	0.1	3
Turbidity (NTU)	75	100	--	225	6.9	7.4	19
pH (pH units)	6.0 to 9.0				6.67 to 8.21		
Temperature (^oF)	<100				72.7 to 88.7		

Order No R4-2006-0042 established effluent limitations for toxic pollutants based on water quality objectives of the Ocean Plan. A summary of existing effluent limitations and monitoring data of toxic pollutants for the period from May 2006 to August 2010 are showed below.

Table 3. Historic Effluent Limitations and Monitoring Data (Toxic Pollutants)

Parameters	units	Effluent Limitation in Order No. R4-2006-0042			Monitoring Data (From May. 2006 to Aug. 2010)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Marine Aquatic Life Protection								
Arsenic	µg/L	--	--	--	--	--	1	2.61
Cadmium	µg/L	--	--	--	<0.004	<0.03	0.31	0.81
Chromium (VI)	µg/L	--	--	--	<0.1	<0.6	--	--
Copper	µg/L	--	--	--	--	--	1.95	6.37
Lead	µg/L	--	--	--	<0.01	<0.17	0.25	0.44
Mercury	µg/L	--	--	--	<0.01	<0.03	0.04	0.04
Nickel	µg/L	--	--	--	--	--	1.87	13.4
Selenium	µg/L	--	--	--	--	--	0.37	7.62
Silver	µg/L	--	--	--	<0.01	<0.05	0.25	0.99
Zinc	µg/L	--	--	--	--	--	8.9	75.4

Parameters	units	Effluent Limitation in Order No. R4-2006-0042			Monitoring Data (From May. 2006 to Aug. 2010)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
Total Cyanide	µg/L	--	--	--	<0.5	<0.9	5	36
Chlorine Residual (Daily) (Outfall 001)	µg/L	330	1300	10000	--	--	50	430
Chlorine Residual (Daily) (Outfall 002)	µg/L	330	1300	10000	--	--	50	300
Ammonia as N	mg/L	--	--	--	--	--	11.4	39.8
Acute Toxicity	TUa	--	--	5.3	--	--	1.4	4.5
Chronic Toxicity (survival)	TUc	--	--	167	--	--	42	42
Phenols (unchlorinated)	µg/L	--	--	--	<0.59	<1.73	1	3.6
Phenols (chlorinated)	µg/L	--	--	--	<0.15	<0.6	--	--
Endosulfan	µg/L	--	--	--	<0.003	<0.003	--	--
Endrin	µg/L	--	--	--	<0.001	<0.002	--	--
HCH	µg/L	--	--	--	<0.003	<0.005	0.003	0.02
Human Health Protection – Noncarcinogens								
Acrolein	µg/L	--	--	--	<0.31	<0.94	--	--
Antimony	µg/L	--	--	--	--	--	1.4	9.83
Bis(2-cl-ethoxy) methane	µg/L	--	--	--	<0.13	<1	--	--
Bis(2-cl-isopropyl) ether	µg/L	--	--	--	<0.16	<0.5	--	--
Chlorobenzene	µg/L	--	--	--	<0.1	<0.32	--	--
Chromium (III) (using total Cr data)	µg/L	--	--	--	--	--	0.453	8.09
Di-n-butyl-phthalate	µg/L	--	--	--	<0.36	<0.45	0.52	4.4--
Dichlorobenzene		--	--	--	<0.26	<0.43	0.5	0.5
Diethyl phthalate	µg/L	--	--	--	<0.21	<0.43	--	--
Dimethyl phthalate	µg/L	--	--	--	<0.19	<0.4	--	--
2-Methyl-4,6-dinitrophenol	µg/L	--	--	--	<0.29	<1.31	--	--
2,4-Dinitrophenol	µg/L	--	--	--	<0.33	<1.73	--	--
Ethyl benzene	µg/L	--	--	--	<0.06	<0.24	--	--
Fluoranthene	µg/L	--	--	--	<0.19	<0.37	--	--
Hexachlorocyclopentadiene	µg/L	--	--	--	<0.75	<1.58	--	--
Nitrobenzene	µg/L		--	--	<0.22	<0.68	--	--
Thallium	µg/L	--	--	--	<0.004	<0.06	--	--
Toluene	µg/L	--	--	--	<0.21	<0.21	0.1	0.5
Tributyltin	ng/L		--	--	<1	<1	--	--
1,1,1-Trichloroethane	µg/L	--	--	--	<0.1	<0.32	--	--
Human Health Protection – Carcinogens								
Acrylonitrile	µg/L	--	--	--	<0.2	<0.61	--	--
Aldrin	µg/L	0.0037	--	--	<0.002	<0.002	--	--
Benzene	µg/L	--	--	--	<0.06	<0.22	--	--
Benzidine	µg/L	0.012	--	--	<0.031	<2.76	--	--
Beryllium	µg/L	--	--	--	<0.01	<0.07	--	--
Bis(2-chloroethyl) ether	µg/L	--	--	--	<0.19	<0.53	--	--
Diethylhexyl phthalate	µg/L	--	--	--	<0.7	<5	0.7	16.6
Carbon tetrachloride	µg/L	--	--	--	<0.09	<0.2	--	--
Chlordane	µg/L	0.0038	--	--	<0.001	<0.005	--	--
Dibromochloromethane	µg/L	--	--	--	<0.08	<0.08	0.12	0.6
Chloroform	µg/L	--	--	--	--	--	7	30
Total DDT	µg/L	0.028	--	--	<0.003	<0.003	--	--
1,4-Dichlorobenzene	µg/L	--	--	--	<0.07	<0.48	0.3	1

Parameters	units	Effluent Limitation in Order No. R4-2006-0042			Monitoring Data (From May. 2006 to Aug. 2010)			
		Average Monthly	Average Weekly	Max Daily	Minimum Nondetect	Maximum Nondetect	Minimum Detected	Maximum Detected
3,3'-Dichlorobenzidine	µg/L		--	--	<0.02	<2.78	--	--
1,2-Dichloroethane	µg/L		--	--	<0.08	<0.18	0.6	0.6
1,1-Dichloroethene	µg/L	--	--	--	<0.07	<0.36	--	--
Bromodichloromethane	µg/L	--	--	--	<0.08	<0.08	0.3	2
Methylene chloride	µg/L		--	--	--	--	1.4	3
1,3-Dichloropropene		--	--	--	<0.09	<0.21	--	--
Dieldrin	µg/L	0.0067	--	--	<0.001	<0.001	--	--
2,4-Dinitrotoluene	µg/L	--	--	--	<0.2	<0.33	--	--
1,2-Diphenylhydrazine	µg/L	--	--	--	<0.13	<0.47	--	--
Halomethanes	µg/L	--	--	--	<0.07	<0.32	0.2 (Est.)	1
Heptachlor	µg/L	0.0084	--	--	<0.0009	<0.001	--	--
Heptachlor epoxide	µg/L	0.0033	--	--	<0.001	<0.002	--	--
Hexachlorobenzene	µg/L	0.035	--	--	<0.18	<0.4	--	--
Hexachlorobutadiene	µg/L	--	--	--	<0.14	<0.44	--	--
Hexachloroethane	µg/L	--	--	--	<0.14	<0.45	--	--
Isophorone	µg/L	--	--	--	<0.13	<0.54	--	--
N-Nitrosodimethylamine	µg/L	--	--	--	<0.14	<0.47	0.6 (Est.)	0.6 (Est.)
N-Nitrosodi-n-propylamine	µg/L	--	--	--	<0.12	<0.61	--	--
N-Nitrosodiphenylamine	µg/L	--	--	--	<0.15	<0.45	--	--
PAHs	µg/L	--	--	--	<0.14	<0.46	0.06 (Est.)	0.06 (Est.)
PCBs	µg/L	0.0032	--	--	<0.1	<0.3	--	--
TCDD Equivalents	pg/L	0.65	--	--			--	--
1,1,2,2-Tetrachloroethane	µg/L	--	--	--	<0.08	<0.2	--	--
Tetrachloroethylene	µg/L	--	--	--	<0.1	<0.16	0.18 (Est.)	22
Toxaphene	µg/L	0.035	--	--	<0.04	<0.06	--	--
Trichloroethylene	µg/L	--	--	--	<0.1	<0.31	--	--
1,1,2-Trichloroethane	µg/L	--	--	--	<0.08	<0.17	--	--
2,4,6-Trichlorophenol	µg/L	--	--	--	<0.12	<0.6	--	--
Vinyl chloride	µg/L	--	--	--	<0.05	<0.4	--	--

Est.: Estimated concentration. Sample results are less than the reported ML, but greater than or equal to the MDL.

D. Compliance Summary

Monitoring data from 2006 to 2010 indicate that the Discharger has fully complied with the effluent limitations in Order No. R4-2006-0042. However, there are some reporting deficiencies during the reporting period.

In accordance with applicable permits, the Discharger have reported a number of spills and/or overflows in the JOS service area over the past five years. In the period from 2006 to 2010, 43 spills were reported in all JOS sewers maintained by the Discharger, 6 of which were caused by high intensity rainfall in the area. The appropriate enforcement actions are being evaluated by the Regional Water Board for these violations.

E. Planned Changes

The Discharger has no significant planned changes.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California Water Code (CWC). It shall serve as a NPDES permit for point source discharges from this Facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4, Division 7 of the CWC (commencing with Section 13260).

B. California Environmental Quality Act (CEQA)

This action to adopt an NPDES permit is exempt from the provisions of the CEQA (Public Resources Code sections 21100 through 21177) in accordance with section 13389 of the CWC.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** On June 13, 1994, the Regional Water Board adopted the *Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (hereinafter Basin Plan), as amended, that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for the Pacific Ocean. In addition, the Basin Plan implements State Water Resources Control Board (State Water Board) Resolution No. 88-63 which established State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Basin Plan beneficial uses applicable to the Pacific Ocean (Point Vicente Beach, Royal Palms Beach, and White Point Beach) in the Palos Verdes Peninsula are as follows:

Table 4. Basin Plan Beneficial Uses of the Applicable Receiving Waters

Discharge Point	Receiving Water Name	Beneficial Use(s)
Points 001, 002, 003, and 004	Point Vicente Beach, Royal Palms Beach, and White Point Beach	Existing: Navigation (NAV); contact (REC-1) and non-contact (REC-2) water recreation; commercial and sport fishing (COMM); marine habitat (MAR); wildlife habitat (WILD); and, shellfish harvesting (SHELL). Potential: Spawning, reproduction, and/or early development of fish (SPWN).
	Nearshore Zone (The zone bounded by the shoreline and a line 1000 feet from the shoreline or the 30-foot depth contours, whichever is further from the shoreline)	Existing: Industrial service supply (IND); navigation (NAV); contact (REC-1) and non-contact (REC-2) water recreation; commercial and sport fishing (COMM); marine habitat (MAR); wildlife habitat (WILD); preservation of biological habitats (BIOL); preservation of rare, threatened, or endangered species (RARE); migration of aquatic organisms (MIGR); spawning, reproduction, and/or early development of fish (SPWN); and, shellfish harvesting (SHELL).

Discharge Point	Receiving Water Name	Beneficial Use(s)
Points 001, 002, 003, and 004	Offshore Zone	Existing: Industrial service supply (IND); navigation (NAV); contact (REC-1) and non-contact (REC-2) water recreation; commercial and sport fishing (COMM); marine habitat (MAR); wildlife habitat (WILD); preservation of rare; threatened, or endangered species (RARE); migration of aquatic organisms (MIGR); spawning, reproduction; and/or early development of fish (SPWN); and, shellfish harvesting (SHELL).

Requirements of this Order/Permit implement the Basin Plan. The Basin Plan relies primarily on the requirements of *the Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) for protection of the beneficial uses of the State ocean waters. The Basin Plan, however, may contain additional water quality objectives applicable to the Discharger.

2. **California Thermal Plan.** In 1972, the State Water Board adopted the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California* (hereinafter Thermal Plan), as amended. This plan contains temperature objectives for coastal and inland surface waters. Requirements of this Order implement the Thermal Plan.

3. **California Ocean Plan.** The State Water Board adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, 2005 and 2009. The State Water Board adopted the latest amendment (2009 California Ocean Plan) on September 15, 2009. The Office of Administration Law and the USEPA approved it on March 10, 2010 and October 8, 2010, respectively. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. Ocean Plan beneficial uses applicable to ocean waters of the State are shown in the following table.

Table 5. Ocean Plan Beneficial Uses of the Pacific Ocean

Discharge Point	Receiving Water Name	Beneficial Use(s)
Points 001, 002, 003, and 004	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Area of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and, shellfish harvesting.

To protect the beneficial uses in ocean water, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan.

4. **Santa Monica Bay Restoration Plan**. The JWPCP discharges to Santa Monica Bay, one of the most heavily used recreational areas in California. Recognizing the importance of the Bay as a national resource, the State of California and USEPA nominated and Congress included Santa Monica Bay in the National Estuary Program. This led to the formation of the Santa Monica Bay Restoration Project (currently named Santa Monica Bay Restoration Commission) that developed the Bay Restoration Plan (BRP) which serves as a blueprint for restoring and enhancing the Bay. The Regional Water Board plays a lead role in the implementation of the BRP. Three of the proposed priorities of the BRP are reduction of pollutants of concern at the source (including municipal wastewater treatment plants), attainment of full secondary treatment at the City of Los Angeles' Hyperion Treatment Plant and the County Sanitation Districts of Los Angeles County's

Joint Water Pollution Control Plant, and implementation of the mass emission approach for discharges of pollutants to the Bay.

5. **Alaska Rule.** USEPA has revised its regulation that specifies when new and revised State and Tribal water quality standards (WQS) become effective for CWA purposes (40 CFR part 131.21; 65 Federal Register 24641 (April 27, 2000)). Under the revised regulation (hereinafter Alaska Rule), new and revised standards submitted to USEPA after May 30, 2000 must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000 may be used for CWA purposes, whether or not approved by USEPA.

6. **Stringency of Requirements for Individual Pollutants.** This Order contains restrictions on individual pollutants that are no more stringent than required by the federal CWA. Individual pollutant restrictions consist of technology-based effluent limitations and water quality-based effluent limitations. The technology-based effluent limitations consist of restrictions on biochemical oxygen demand (5-day) (BOD_5), total suspended solids (TSS), and pH, and percent removal of BOD_5 and TSS, which implement the minimum, applicable federal technology-based requirements for POTWs. Also, effluent limitations consisting of restrictions on oil and grease, settleable solids, and turbidity more stringent than federal technology-based requirements are necessary to implement State treatment standards in Table A of the Ocean Plan. Water quality-based effluent limitations consisting of restrictions on chlorine residual, acute toxicity, chronic toxicity, benzidine, chlordane, DDT, 3,3'-dichlorobenzidine, hexachlorobenzene, PCBs, TCCD equivalents and toxaphene have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. Collectively, restrictions on individual pollutants in this Order are no more stringent than required by the CWA.

7. **Antidegradation Policy.** Part 131.12 of 40 CFR requires that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. This resolution incorporates the requirements of the federal antidegradation policy, where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. As discussed in detail in the Fact Sheet (Attachment F), the permitted discharge is consistent with the antidegradation provision of 40 CFR part 131.12 and State Water Board Resolution No. 68-16.

8. **Anti-Backsliding Requirements.** CWA sections 402(o)(2)/303(d)(4) and 40 CFR part 122.44(l) prohibit backsliding and require effluent limitations, permit conditions, and standards in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations and conditions may be relaxed. Some effluent limitations in this Order are less stringent than those in the previous Order. As discussed in this Fact Sheet, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

   This Order is consistent with State and federal antidegradation policies in that it does not authorize a change in pollutant mass emission rates, nor does it authorize a relaxation in the manner of treatment of the discharge. Pollutant limit mass emission rates continue to be based on the design flow rate of the treatment plant under the 1997 permit of 385 MGD. Although the design flow rate of the treatment plant has increased to 400 MGD, this increase has been accompanied by a significant improvement in the level of treatment necessary to achieve full secondary treatment. As a result, both the quantity of discharged pollutants and quality of the discharge are expected to

remain relatively constant or improve during this permit term, consistent with antidegradation policies. In conformance with reasonable potential analysis procedures identified in State Water Board and USEPA documents, effluent limitations for some constituents are not carried forward in this Order/Permit because there is not presently reasonable potential for the constituents to cause or contribute to an exceedance of water quality standards. Without reasonable potential, there is no longer a need to maintain prior WQBELs under NPDES regulations, antibacksliding provisions, and antidegradation policies. The accompanying monitoring and reporting program requires continued data collection and if monitoring data show reasonable potential for a constituent to cause or contribute to an exceedance of water quality standards, the Order/Permit will be reopened to incorporate WQBELs. Such an approach ensures that the discharge will adequately protect water quality standards for designated beneficial uses and conform to antidegradation policies and antibacksliding provisions.

9. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 United States Code sections 1531 to 1544). This Order/Permit requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the State. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

10. **Monitoring and Reporting Requirements.** 40 CFR part 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. California Water Code sections 13267 and 13383 authorize the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment E) establishes monitoring and reporting requirements to implement federal and State requirements.

D. Impaired Water Bodies on CWA 303(d) List

On June 28, 2007, the USEPA approved the State's 2006 303(d) List of Water Quality Limited Segments (hereinafter 303(d) list). The 303(d) list identifies water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations by point sources (water quality limited water bodies).

Santa Monica Bay (Offshore and Nearshore) is on the 303(d) list for the following pollutants/stressors, from point and non-point sources: DDT (dichlorodiphenyltrichloroethane) (tissue & sediment), debris, fish consumption advisory, PCBs (polychlorinated biphenyls) (tissue & sediment), and sediment toxicity. Both DDT (Fish consumption advisory for DDT) and PCBs (Fish consumption advisory for PCBs) are also listed as impairments for Royal Palms Beach, and White Point Beach. TMDLs for pollutants/stressors on the 303(d) list for Santa Monica Bay, Royal Palms Beach, and White Point Beach are scheduled for 2019. Santa Monica Bay Beaches Bacteria TMDLs were approved by USEPA in 2003, as described in the following section.

E. Other Plans, Polices and Regulations

1. **Secondary Treatment Regulations.** 40 CFR part 133 establishes the minimum levels of effluent quality to be achieved by secondary treatment at publicly owned treatment works. These technology-based effluent limitations, established by USEPA, are incorporated into this Order/Permit except where more stringent limitations are required by other applicable plans, policies, or regulations.

2. **Storm Water.** Sewage treatment works with a design flow of 1.0 MGD or greater are required to comply with Water Quality Order No. 97-03-DWQ (NPDES General Permit No. CAS000001), Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity, Excluding Construction Activities. The Discharger shall file a Notice of Intent within 60 days of adoption of this Order (unless already submitted under the previous Order) and comply with Order No. 97-03-DWQ or the Discharger shall provide certification to the Regional Water Board that all storm water is captured and treated on-site and no storm water is discharged or allowed to run off-site from the Facility.

3. **Sanitary Sewer Overflows**. The State Water Board issued Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on May 2, 2006. The amended General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions. Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating SSOs. The requirements contained in this Order are generally consistent with the requirements in the SSO WDR. The Discharger's collection system is part of the POTW that is subject to this Order**.** The Discharger must comply with both the General Order including its future amendments and this Order.

4. **Pretreatment.** Section 402 of the CWA and implementing regulations at 40 CFR part 403 establish pretreatment requirements for POTWs which receive pollutants from non-domestic users. This Order contains pretreatment program requirements pursuant to 40 CFR part 403 that are applicable to the Discharger. These regulations require dischargers to develop and implement pretreatment programs that impose limitations on industrial users of the POTW.

5. **Watershed Management.** This Regional Water Board has been implementing a Watershed Management Approach (WMA) to address water quality protection in Los Angeles and Ventura Counties. The approach is in accordance with USEPA guidance on *Watershed Protection: A Project Focus* (EPA841-R-95-003, August 1995). The objective is to provide a comprehensive and integrated strategy resulting in water resource protection, enhancement and restoration, while balancing economic and environmental impacts within a hydrologically defined drainage basin or watershed. The Watershed Management Approach emphasizes cooperative relationships between regulatory agencies, the regulated community, environmental groups, and other stakeholders in the watershed to achieve the greatest environmental improvements with the resources available. This Order and the accompanying Monitoring and Reporting Program (Attachment E) fosters implementation of this approach. The Monitoring and Reporting Program requires the Discharger to participate in regional monitoring programs in the Southern California Bight.

6. **Santa Monica Bay Beaches Bacteria Total Maximum Daily Loads (TMDLs).** The Regional Water Board has adopted two TMDLs to reduce bacteria at Santa Monica Bay beaches during dry and wet weather. The Regional Water Board adopted the Dry Weather and Wet Weather TMDLs on January 24, 2002 and December 12, 2002, respectively (Resolution Nos. 2002-004 and 2002-022). These TMDLs were approved by the State Water Board, State OAL and USEPA Region 9 and became effective on July 15, 2003.

   In these TMDLs, waste load allocations (WLAs) are expressed as the number of sample days at a shoreline monitoring site that may exceed the single sample targets for total coliform, fecal coliform and enterococcus identified under "Numeric Target" in the TMDLs. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection at beaches. The final

shoreline compliance point for the WLAs in the TMDLs is the wave wash where there is a freshwater outlet (i.e., publicly owned storm drain or natural creek) to the beach, or at ankle depth at beaches without a freshwater outlet.

The JWPCP which is owned and operated by JOS, is identified as a responsible jurisdiction in these TMDLs. In these TMDLs, JWPCP is assigned a WLA of zero days of exceedance of the single sample bacterial objectives during all three identified periods – summer dry weather, winter dry weather and wet weather. JWPCP's WLA of zero exceedance days requires that no discharge from its outfalls may cause or contribute to any exceedances of the single sample bacteria objectives at the shoreline compliance points identified in the TMDL and, subsequently, in the approved Coordinated Shoreline Monitoring Plan (dated April 7, 2004) submitted by responsible agencies and jurisdictions under the TMDLs.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations: 40 CFR part 122.44(a) requires that permits include applicable technology-based limitations and standards, and 40 CFR part 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Where numeric water quality objectives have not been established, 40 CFR 122.44(d) specifies that WQBELs may be established using one or more of the following options: 1) using USEPA criteria guidance under CWA section 304(a), 2) using a calculated numeric water quality criterion that may be derived using a proposed State criterion or a State policy or regulation interpreting narrative criterion supplemented with other relevant information, or 3) establishment of effluent limitations on an indicator parameter for the pollutant of concern.

A. Discharge Prohibitions

Discharge prohibitions in this Order are based on the requirements in Section III.I of the California Ocean Plan (2009).

B. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and implementing regulations at 40 CFR part 125.3 require that NPDES permits include limitations which meet applicable technology-based requirements, at a minimum. The discharge authorized by this Order must meet minimum federal technology-based requirements for POTWs at 40 CFR 133 and other technology requirements based on Best Professional Judgment (BPJ) in accordance with 40 CFR part 125.3. A detailed discussion of technology-based effluent limitations development is included in this Fact Sheet (Attachment F).

2. Applicable Technology-Based Effluent Limitations

Pursuant to Section 301(b)(1)(B) and 304 (d)(1) of the CWA, USEPA has established standards of performance for secondary treatment at 40 CFR 133. Secondary treatment is defined in terms of three parameters – 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. The following table summarizes the technology-based requirements for secondary treatment, which are applicable to the Facility:

Table 6. Summary of Technology-based Effluent Limitations for Secondary Treatment Facility by USEPA at 40 CFR part 133.102

Constituent	Average Monthly	Average Weekly	Percent Removal
BOD_5	30 mg/L	45 mg/L	85%
TSS	30 mg/L	45 mg/L	85%
pH	6.0 to 9.0		

Also, Table A of the Ocean Plan (2009) also establishes the following technology-based effluent limitations for POTWs, which are applicable to the Facility:

Table 7. Summary of Technology-based Effluent Limitations for POTWs established by the Ocean Plan (2009)

Constituent	Average Monthly	Average Weekly	Instantaneous Maximum	Percent Removal
O&G	25 mg/L	40 mg/L	75 mg/L	--
TSS	--	--	--	75%*
Settleable Solids	1.0 ml/L	1.5 ml/L	3.0 ml/L	--
Turbidity	75 NTU	100 NTU	225 NTU	--
pH	6.0 to 9.0			

* Dischargers shall, as a monthly average, remove 75% of TSS from the influent stream before discharging to the ocean, except that the effluent limitation to be met shall not be lower than 60 mg/L.

All technology-based effluent limitations from Order No. R4-2006-0042 for BOD_5, TSS, oil and grease, settleable solids, pH, and turbidity are retained by this Order. Limitations for BOD_5, TSS, and pH are based on secondary treatment standards established by the USEPA at 40 CFR part 133. The limitations for turbidity are based on limitations established by the 2009 Ocean Plan. Instantaneous maximum limitations of 3.0 ml/L for settleable solids and 75 mg/L for oil and grease are also prescribed in this Order based on the 2009 Ocean Plan. Since the average monthly, average weekly and maximum daily limitations for settleable solids and oil and grease in Order No. R4-2006-0042 are more stringent than those established by the 2009 Ocean Plan, these limitations in Order No. R4-2006-0042 are carried over to this Order (Antibacksliding policy). Each technology-based effluent limitation is independent of the dilution ratio for the discharge outfall. The following Table summarizes the technology-based effluent limitations for the discharge from the Facility:

Table 8. Summary of Technology-based Effluent Limitations - Discharge Points 001, 002, 003, and 004

Constituent	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum	Percent Removal
BOD_5	30 mg/L	45 mg/L	--		85%
TSS	30 mg/L	45 mg/L	--		85%
Oil and Grease	15 mg/L	22.5 mg/L	45 mg/L	75 mg/L	--
Settleable Solids	0.5 ml/L	0.75 ml/L	1.5 ml/L	3.0 ml/L	--
Turbidity	75 NTU	100 NTU	--	225 NTU	--
pH	6.0 to 9.0				

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

Section 301(b) of the CWA and 40 CFR part 122.44(d) require that permits include limitations more stringent than applicable technology-based requirements where necessary to achieve water quality standards and State requirements. 40 CFR part 122.44(d)(1)(i) requires that permits include water quality-based effluent limitations (WQBELs) for all pollutants which are or may be discharged at levels having the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives or criteria within a standard. USEPA has applied CWA section 403(c) and 40 CFR 125, Subpart M, following 40 CFR part 122.

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan and achieve applicable water quality objectives and criteria that are contained in other State plans and policies, or any applicable water quality standards contained in the Ocean Plan.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan and the Ocean Plan (2009) establish the beneficial uses for ocean waters of the State. The beneficial uses of the receiving waters affected by the discharge have been described previously in this Fact Sheet. The Ocean Plan contains water quality objectives for bacterial characteristics, physical characteristics, chemical characteristics, biological characteristics, and radioactivity. The Basin Plan also contains the bacteria objectives for water bodies designated for water contact recreation as amended by Resolution No. 01-018. Bacteria objectives from the Ocean Plan and the Basin Plan were included as receiving water limitations in this Order.

Table B of the Ocean Plan includes the numerical water quality objectives for toxic pollutants:

a. 6-month median, daily maximum, and instantaneous maximum objectives for 21 chemicals and chemical characteristics, including total residual chlorine, acute and chronic toxicity, for the protection of marine aquatic life.
b. 30-day average objectives for 20 non-carcinogenic chemicals for the protection of human health.
c. 30-day average objectives for 42 carcinogenic chemicals for the protection of human health.

3. Expression of WQBELs

Pursuant to 40 CFR part 122.45(d)(2), for POTW continuous discharges, all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall, unless impracticable, be stated as average weekly and average monthly discharge limitations. It is impracticable to include only average weekly and average monthly effluent limitations in the permit because a single daily discharge of certain pollutants, in excess amounts, can cause violations of water quality objectives. The effects of pollutants on aquatic organisms are often rapid. For many pollutants, an average weekly or average monthly effluent limitation alone is not sufficiently protective of beneficial uses. As a result, maximum daily effluent limitations, as referenced in 40 CFR 122.45(d), are included in the permit for certain constituents.

The WQBELs for marine aquatic life toxicants contained in this Order are based on water quality objectives contained in the 2009 Ocean Plan that are expressed as six-month median, daily maximum, and instantaneous maximum water quality objectives. However, in the existing permit (Order No. R4-2006-0042), the calculated effluent limitations based on 6-month median objectives

for the marine aquatic life toxicants in the 2001 Ocean Plan were prescribed as monthly average limitations. Applying the antibacksliding policy, this Order retains the same approach to set effluent limitations derived from six-month median water quality objectives for marine aquatic life toxicants in Table B of the 2009 Ocean Plan as monthly average limitations. In addition, to be consistent with the Ocean Plan, daily maximum and instantaneous maximum limitations are also prescribed in this Order for the marine aquatic life toxicants.

4. **Determining the Need for WQBELs**

Order No. R4-2006-0042 contains effluent limitations for non-conventional and toxic pollutant parameters in Table B of the Ocean Plan. For this Order, the need for effluent limitations based on water quality objectives in Table B of the 2009 Ocean Plan was reevaluated in accordance with the Reasonable Potential Analysis (RPA) procedures contained in Appendix VI of the 2009 Ocean Plan. This statistical RPA method (RPcalc version 2.0) accounts for the averaging period of the water quality objective, accounts for and captures the long-term variability of the pollutant in the effluent, accounts for limitations associated with sparse data sets, accounts for uncertainty associated with censored data sets, and assumes a lognormal distribution of the facility-specific effluent data. The program calculates the upper confidence bound (UCB) of an effluent population percentile after complete mixing. In the evaluation employed in this Order, the UCB is calculated as the one-sided, upper 95 percent confidence bound for the 95th percentile of the effluent distribution after complete mixing. The calculated $UCB_{95/95}$ is then compared to the appropriate objective to determine the potential for an exceedance of that objective and the need for an effluent limitation. For constituents that have an insufficient number of monitoring data or have a substantial number of non-detected data with a reporting limit higher than the respective water quality objective, the RPA result is likely to be inconclusive. As suggested by the Ocean Plan, existing effluent limitations for these constituents are retained in the new permit. In addition, the MRP (Attachment E) of this Order also requires the Discharger to continue to monitor for these constituents for the determination of reasonable potential for these constituents in future permit renewals and/or updates.

Using this statistical procedure, in combination with effluent data provided by the Discharger from May 2006 to August 2010, and minimum initial dilution ratios of 166:1 for Discharge Points 001 and 002, 150:1 for Discharge Point 003 and 115:1 for Discharge Point 004 as well as implementing Best Professional Judgment (BPJ), Regional Water Board staff has determined that the following pollutants, when discharged through the specified outfall, either have reasonable potential to exceed Ocean Plan objectives or have inconclusive results after running the RPA, and, therefore, require effluent limitations:

<u>Discharge Points 001 and 002</u>

Chlorine residual, acute toxicity, chronic toxicity, benzidine, chlordane, DDT, 3,3'-dichlorobenzidine, hexachlorobenzene, PCBs, TCDD equivalents, and toxaphene.

<u>Discharge Point 003</u>

Chlorine residual, acute toxicity, chronic toxicity, benzidine, chlordane, DDT, 3,3'-dichlorobenzidine, hexachlorobenzene, PCBs, TCDD equivalents, and toxaphene.

<u>Discharge Point 004</u>

Chlorine residual, acute toxicity, chronic toxicity, benzidine, chlordane, DDT, 3,3'-dichlorobenzidine, hexachlorobenzene, PCBs, TCDD equivalents, and toxaphene.

Additional analysis for chlorine residual: Wastewater disinfection with chlorine usually produces the chlorine residual and the byproducts of chlorination are highly toxic to aquatic life. Although the RPA determination based on daily chlorine residual data shows no RP for chlorine residual, the daily maximum and instantaneous maximum limitations for chlorine residual are prescribed in this Order based on the facts that effluent from JWPCP is routinely chlorinated before discharge and there is the potential of having the effluent concentration of chlorine residual being higher than the water quality objectives for chlorine residual in the Ocean Plan.

In general, for constituents that have been determined to have no reasonable potential to cause or contribute to excursions of water quality objectives, no numerical effluent limitations are prescribed; instead, a narrative statement to comply with all Ocean Plan requirements is provided and the Discharger is required to monitor for these constituents to gather data for use in reasonable potential analyses for future permit renewals and/or updates.

5. **303(d) Listed Constituents and Discharge Limitations – DDT and PCBs**

At various locations in Santa Monica Bay, DDT and PCBs are found in sediments at levels that can be harmful to marine organisms. In addition, DDT and PCBs are found in certain Bay-captured seafood species at levels posing potential health risks to humans. A brief description of these pollutants and their occurrence in Santa Monica Bay is given below.

In the U.S., DDT, an organochlorine insecticide, was widely used in agricultural and urban settings until they were banned in 1973. PCBs, a large group of industrial and commercial chemicals, were widely used as coolants and lubricants in transformers, capacitors and other electronic equipment until the late 1970s when their manufacture was banned. Because of their stable properties, DDT and PCBs persist in the environment, the result of historical uses which no longer occur. They have low water solubility and are generally found in sediments and fish tissue.

Bight ’98 surveys included efforts to assess the spatial extent of anthropogenic contaminant accumulation in benthic sediments and their effects on marine biota in the Southern California Bight. These surveys showed that while elevated levels of DDT and PCBs continue to be measured in sediments near JWPCP outfalls, much of this is reflective of historical deposition and not the levels of contaminants associated with recent discharges. These surveys also concluded that DDT and PCBs in sediments are a dominant source of contaminant exposure levels in bottom living fish. DDT continues to be found in fish tissue at levels of concern throughout the Bight, although these levels are declining over time. Monitoring data show that effluent levels of DDT and PCBs discharged from the JWPCP outfalls remain at non-detect concentrations.

Nearshore and offshore waters of Santa Monica Bay are on California’s 2006 CWA 303(d) list of water quality limited segments for DDT (sediment and tissue, centered on Palos Verdes Shelf) and PCBs (sediment and tissue). TMDLs for DDT and PCBs will be established by the USEPA by March 2012 per the LA Region Consent. As TMDLs for these two constituents have not been completed, the Order continues forward mass emission and concentration WQBELs contained in the 2006 Order. These limits are based on Ocean Plan water quality objectives and effluent limitation calculation procedures, and, for Discharge Points 001 through 004, the average design flow rate (385 MGD) of the JWPCP in 1997. Current performance for DDT and PCBs in the JWPCP effluent are set at non-detect concentrations. The Ocean Plan RPA result for PCBs is inconclusive. The prescription of DDT effluent limitations are based on BPJ.

DDT	Effluent Concentration (ug/L)	Effluent Limitation (ug/L) carried over from R4-2006-0042
Outfalls 001 and 002	<0.003	0.028
Outfall 003	<0.003	0.026
Outfall 004	<0.003	0.020

PCBs	Effluent Concentration (ug/L)	Effluent Limitation (ug/L) carried over from R4-2006-0042
Outfalls 001 and 002	<0.1 - <0.3	0.0032
Outfall 003	<0.1 - <0.3	0.0029
Outfall 004	<0.1 - <0.3	0.0022

6. **WQBEL Calculations**

From the Table B water quality objectives in the Ocean Plan, effluent limitations are calculated according to the following equation for all pollutants, except for acute toxicity (if applicable):

Ce=Co+Dm(Co-Cs)

where

Ce = the effluent limitation (µg/L)
Co = the water quality objective to be met at the completion of initial dilution (µg/L)
Cs = background seawater concentration (µg/L) (see Table below)
Dm = minimum probable initial dilution expressed as parts seawater per part wastewater

The Dm is based on observed waste flow characteristics, receiving water density structure, and the assumption that no currents of sufficient strength to influence the initial dilution process flow across the discharge structure. Prior to issuance of the existing Order (Order No. R4-2006-0042), staff of the State Water Board had determined the minimum probable initial dilution for Discharge Points 001 and 002 to be 166 to 1. In the permits prior to Order R4-2006-0042, same dilution ratio of 166:1 has also been applied to Discharge Points 003 and 004. However, there is no document to support this application in the file. As requested by the Regional Water Board, the Discharger recalculated initial dilution ratio for Discharge Points 003 and 004 using the EPA computer model package Visual Plumes with the UM3 model and submitted the results to the State Water Board for review and approval. In September 2005, the State Water Board approved the minimum probable initial dilution for Discharge Points 003 and 004 to be 115 to 1. On December 8, 2005, due to the mistakes in the depth of the port on Discharge Point 003 in the previous dilution report, the Discharger submitted a revised dilution report to the Regional Water Board for approval. The new calculations based on the same computer model resulted in a new dilution ratio of 150:1 for Discharge Point 003. Regional Water Board staff reviewed the calculations and approved this new dilution ratio (150:1) for Discharge Point 003.

Initial dilution is the process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge. For a submerged buoyant discharge, characteristic of most municipal and industrial wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally. As site-specific water quality data is not available,

in accordance with Table B implementing procedures, Cs equals zero for all pollutants, except the following:

Table 9. Pollutants with Background Seawater Concentrations

Constituent	Background Seawater Concentration (Cs)
Arsenic	3 µg/L
Copper	2 µg/L
Mercury	0.0005 µg/L
Silver	0.16 µg/L
Zinc	8 µg/L

As examples, WQBELs for copper (no effluent limitation in this Order), chlorine residual, and chronic toxicity are calculated as follows:

Table 10. Ocean Plan Water Quality Objectives (Co) for Copper, Chlorine Residual, and Chronic Toxicity

Constituents	6-Month Median	Daily Maximum	Instantaneous Maximum	30 Day Average
Copper	3 µg/L	12 µg/L	30 µg/L	--
Chlorine residual	2 µg/L	8 µg/L	60 µg/L	--
Chronic toxicity	N/A	1 TUc	N/A	--

Using the equation, **Ce=Co+Dm(Co-Cs)**, effluent limitations are calculated as follows before rounding to two significant digits. All calculations are based on discharge through Discharge Points 001 and 002 and, therefore, a dilution ratio (Dm) of 166:1 is applied.

Copper (not a prescribed effluent limitation in this Order, for showing calculations only)

Ce = 3 + 166 (3-2) = 169 µg/L (prescribed as Monthly Average, see Section 3 above)
Ce = 12 + 166 (12-2) = 1,672 µg/L (Daily Maximum)
Ce = 30 + 166 (30-2) = 4,678 µg/L (Instantaneous Maximum)

Chronic Toxicity

Ce = 1 + 166 (1-0) = 167 TUc (Daily Maximum)

Chlorine Residual

Ce = 2 + 166 (2-0) = 334 µg/L (prescribed as Monthly Average, see Section 3 above)
Ce = 8 + 166 (8-0) = 1,336 µg/L (Daily Maximum)
Ce = 60 + 166 (60-0) = 10,020 µg/L (Instantaneous Maximum)

Based on the implementing procedures described above, effluent limitations have been calculated for all Table B pollutants (excluding acute toxicity) from the Ocean Plan and incorporated into this Order when applicable.

Based on the results of the Reasonable Potential Analysis, many WQBELs established in Order No. R4-2006-0042 are not retained in this Order.

7. **Whole Effluent Toxicity (WET)**

This Order includes water quality-based effluent limitations for acute toxicity and chronic toxicity at Discharge Points 001 through 004. While the 2009 Ocean Plan specifies that the Discharger must conduct chronic toxicity testing for ocean water discharges with minimum initial dilution ratios ranging from 100:1 to 350:1, it also allows the Regional Water Board to require acute toxicity testing to be conducted by that discharger for the protection of beneficial uses of ocean water. Since the applicable dilution ratios (166:1, 150:1, and 115:1) for the JWPCP outfalls are within this range, this Order requires the Discharger to conduct both acute and chronic toxicity tests.

In view of the nature of industrial discharges into the JWPCP sewershed, it is possible that other toxic constituents could be present in the JWPCP effluent, or could have synergistic or additive effects. Also, the JWPCP effluent usually shows a relatively high ammonia concentration and is consistently chlorinated before discharge. Both ammonia and chlorine are very toxic to aquatic organisms. Although RP for acute toxicity is only present for the discharge from Discharge Point 004 that has a dilution ratio of 115:1, the Regional Water Board has determined that the JWPCP discharge may have reasonable potential to exceed the Ocean Plan objective for acute toxicity based on the above discussions. Furthermore, because numeric limitations for certain toxic constituents that did not show RP have been removed, the acute toxicity limitation provides a backstop to preventing the discharge of toxic pollutants in toxic amounts. Therefore, in addition to the daily maximum chronic toxicity effluent limitations, this Order also includes daily maximum acute toxicity effluent limitations and testing protocols consistent with the 2009 Ocean Plan for Discharge Points 001 through 004.

Using the objective of 0.3 TUa for the daily maximum and 10% of the dilution ratio (as the acute toxicity mixing zone), the daily maximum acute toxicity limitation for Discharge Points 001 and 002 is calculated as follows:

$$Ce = Ca + (0.1)\ Dm\ (Ca)$$

where

Ce = the effluent daily maximum limit for acute toxicity.

Ca = the concentration (water quality objective) to be met at the edge of the acute mixing zone.

Dm = minimum probable initial dilution expressed as parts seawater per part wastewater (166:1 for Discharge Points 001 and 002) (This equation applies only when Dm >24)

<u>Acute Toxicity Limit for Discharge at Discharge Points 001 and 002</u>

$$Ce = 0.3 + (0.1)(166)(0.3) = 5.28$$

D. Final Effluent Limitations

1. **Satisfaction of Anti-Backsliding Requirements**

All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order. The effluent limitations of the following marine aquatic life toxicants, and non-carcinogenic and carcinogenic human health toxicants have been deleted because they did not show reasonable potential to cause or contribute to an excursion above the respective water quality objectives for: (1) Discharge Points 001 and 002 – radioactivity, aldrin, dieldrin, heptachlor, and heptachlor epoxide; (2) Discharge Point 003 – radioactivity, aldrin, dieldrin, heptachlor, and

heptachlor epoxide; and (3) Discharge Point 004 – radioactivity, aldrin, dieldrin, heptachlor, heptachlor epoxide and 2,4,6-trichlorophenol. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

2. **Satisfaction of Antidegradation Policy**

On October 28, 1968, the State Water Board adopted Resolution No. 68-16, Maintaining High Quality Water, which established an antidegradation policy for State and Regional Water Boards. The State Water Board has, in State Water Board Order No. 86-17 and an October 7, 1987 guidance memorandum, interpreted Resolution No. 68-16 to be fully consistent with the federal antidegradation policy. Similarly, CWA sections 402(o)/303(d)(4) and USEPA regulations at 40 CFR part 131.12 require that all permitting actions be consistent with the federal antidegradation policy. Together, the State and federal policies are designed to ensure that a water body will not be degraded resulting from the permitted discharge. The provisions of this Order/Permit are consistent with the antidegradation policies.

This Order is consistent with State and federal antidegradation policies in that it does not authorize any increase in pollutant mass emission rates, nor does it authorize a relaxation in the manner of treatment of the discharge. Pollutant limit mass emission rates continue to be based on the design flow rate of the treatment plant under the 1997 permit of 385 mgd. Although the design flow rate (monthly average daily dry weather flow) of the treatment plant has increased to 400 mgd, this increase has been accompanied by a significant improvement in the level of effluent treatment necessary to achieve full secondary treatment. As a result, both the quantity of discharged pollutants and quality of the discharge are expected to remain relatively constant or improve during this permit term, consistent with antidegradation policies. In conformance with reasonable potential analysis procedures identified in the Ocean Plan, effluent limitations for some constituents are not carried forth in this Order because there is not presently reasonable potential for the constituents to cause or contribute to an exceedance of water quality standards. Without reasonable potential, there is no longer a need to maintain prior WQBELs under WQBEL regulations, antibacksliding provisions, or antidegradation policies. The accompanying MRP (Attachment E) requires continued data collection and if monitoring data show reasonable potential for a constituent to cause or contribute to an exceedance of water quality standards, the permit will be reopened to incorporate appropriate WQBELs. Such an approach ensures that the discharge will adequately protect water quality standards for designated beneficial uses and conforms to antidegradation policies and antibacksliding provisions.

3. **Stringency of Requirements for Individual Pollutants**

This Order contains both technology-based and water quality-based effluent limitations for individual pollutants. The technology-based effluent limitations consist of restrictions on BOD_5, TSS, and pH. Restrictions on BOD_5, TSS, and pH are discussed in section IV.B.2 of this Fact Sheet. This Order's technology-based pollutant restrictions implement the minimum applicable federal technology-based requirements.

Water quality-based effluent limitations have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. The scientific procedures for calculating individual water quality-based effluent limitations for priority pollutants are based on the 2009 Ocean Plan, which was approved by USEPA on October 8, 2010. All beneficial uses and water quality objectives contained in the Basin Plan were approved under State law and approved by USEPA. Collectively, this Order's restrictions on individual pollutants

are no more stringent than required to implement the requirements of the CWA and applicable water quality standards.

The following tables list the effluent limitations established by this Order. Effluent limitations were determined according to the standards and equations provided in the Ocean Plan (2009). The mass emission limitations established for Discharge Points 001 and 002 have been derived based on the average design flow of 385 mgd in the 1997 JWPCP permit.

Table 11. Summary of Final Effluent Limitations for Discharge Points 001 and 002
(Footnotes are specified on pages F-31 through F-33 of this Fact Sheet)

Discharge Points 001 and 002 (dilution ratio = 166:1)							
Parameter	**Units**	**Effluent Limitations[1, 3]**				**Performance Goals[2]**	**Basis**
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
Major Wastewater Constituents							
Biochemical Oxygen Demand 5-day @ 20°C[6]	mg/L	30	45	--	--	--	Existing/ Secondary treatment standard
	lbs/day	96,300	144,500	--	--	--	
	% removal	85	--			--	
Total Suspended Solids[6]	mg/L	30	45	--	--	--	Existing/ Secondary treatment standard
	lbs/day	96,300	144,500	--	--	--	
	% removal	85	--			--	
pH[5, 6, 7]	standard units	6.0 (instantaneous min.) – 9.0 (instantaneous max.)				--	Existing/ Secondary treatment standard/ Ocean Plan
Oil and Grease[7]	mg/L	15[8]	22.5[8]	45[8]	75	--	Existing/ Carry-over/ Ocean Plan
	lbs/day	48,200	72,200	144,500	--	--	
Settleable Solids[7]	ml/L	0.5[8]	0.75[8]	1.5[8]	3.0	--	Existing/ Carry-over/ Ocean Plan
Turbidity[7]	NTU	75	100	--	225	--	Existing/ Carry-over/ Ocean Plan
Marine Aquatic Life Toxicants[9]							
Arsenic[10, 11]	µg/L	--	--	--	--	2.5 [a]	No RP
Cadmium[10, 11]	µg/L	--	--	--	--	0.1 [b]	No RP
Chromium (VI)[10,11]	µg/L	--	--	--	--	1.5 [b]	No RP
Copper[10, 11, 12]	µg/L	--	--	--	--	4.9 [a]	No RP
Lead[10, 11, 12]	µg/L	--	--	--	--	0.4 [a]	No RP
Mercury[10, 11]	µg/L	--	--	--	--	0.04 [c]	No RP
Nickel[10, 11]	µg/L	--	--	--	--	13 [c]	No RP
Selenium[10, 11]	µg/L	--	--	--	--	7.6 [c]	No RP

Discharge Points 001 and 002 (dilution ratio = 166:1)							
Parameter	**Units**	**Effluent Limitations[1, 3]**				**Performance Goals[2]**	**Basis**
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
Silver[10, 11, 12]	µg/L	--	--	--	--	0.2 [b]	No RP
Zinc[10, 11, 12]	µg/L	--	--	--	--	37 [a]	No RP
Cyanide[11]	µg/L	--	--	--	--	19 [a]	No RP
Chlorine Residual[13] (at Manifold Stations)	µg/L	330	--	1,300	10,000	196 [a]	RP by BPJ/ Ocean Plan
	lbs/day	1,060	--	4,170	--	--	
Ammonia as N[11]	mg/L	--	--	--	--	40 [c]	No RP
Phenolic compounds (non-chlorinated)[11, 14]	µg/L	--	--	--	--	3.6 [c]	No RP
Phenolic compounds (chlorinated)[11, 15]	µg/L	--	--	--	--	1.9 [b]	No RP
Endosulfan[11, 16]	µg/L	--	--	--	--	0.015 [b]	No RP
HCH[11, 17]	µg/L	--	--	--	--	0.015 [b]	No RP
Endrin[11]	µg/L	--	--	--	--	0.01 [b]	No RP
Acute toxicity [18]	TUa	--	--	5.3	--	--	RP by BPJ/ Ocean Plan
Chronic toxicity [19]	TUc	--	--	167	--	--	RP by BPJ/ Ocean Plan
Radioactivity							
Gross alpha	pCi/L	--	--	--	--	6.3 [a]	No RP
Gross beta	pCi/L	--	--	--	--	29 [a]	No RP
Human Health Toxicants – Non Carcinogens[9]							
Acrolein[11]	µg/L	--	--	--	--	5.2 [b]	No RP
Antimony[10,11]	µg/L	--	--	--	--	9.8 [c]	No RP
Bis(2-chloroethoxy) methane[11]	µg/L	--	--	--	--	1.3 [b]	No RP
Bis(2-chloroisopropyl) ether[11]	µg/L	--	--	--	--	1.6 [b]	No RP
Chlorobenzene[11]	µg/L	--	--	--	--	1.2 [b]	No RP
Chromium (III)[10,11]	µg/L	--	--	--	--	3.3 [a]	No RP
Di-n-butyl-phthalate[11]	µg/L	--	--	--	--	4.4 [c]	No RP
Dichlorobenzenes[11, 20]	µg/L	--	--	--	--	0.5 [c]	No RP
Diethyl phthalate[11]	µg/L	--	--	--	--	2.1 [b]	No RP
Dimethyl phthalate[11]	µg/L	--	--	--	--	1.9 [b]	No RP
2-Methyl-4,6-dinitrophenol[11]	µg/L	--	--	--	--	13 [b]	No RP
2,4-Dinitrophenol[11]	µg/L	--	--	--	--	17 [b]	No RP
Ethyl benzene[11]	µg/L	--	--	--	--	1.9 [b]	No RP
Fluoranthene[11]	µg/L	--	--	--	--	1.9 [b]	No RP
Hexachlorocyclopentadiene[11]	µg/L	--	--	--	--	7.5 [b]	No RP
Nitrobenzene[11]	µg/L	--	--	--	--	2.2 [b]	No RP
Thallium[10, 11]	µg/L	--	--	--	--	0.6 [b]	No RP
Toluene[11]	µg/L	--	--	--	--	0.5 [c]	No RP
Tributyltin[11]	ng/L	--	--	--	--	0.01 [b]	No RP

Discharge Points 001 and 002 (dilution ratio = 166:1)							
Parameter	**Units**	**Effluent Limitations[1, 3]**				**Performance Goals[2]**	**Basis**
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
1,1,1-Trichloroethane[11]	µg/L	--	--	--	--	1.8 [b]	No RP
Human Health Toxicants – Carcinogens[9]							
Acrylonitrile[11]	µg/L	--	--	--	--	2.7 [b]	No RP
Aldrin[11]	µg/L	--	--	--	--	0.0037 [d]	No RP
Benzene[11]	µg/L	--	--	--	--	0.75 [b]	No RP
Benzidine	µg/L	0.012	--	--	--	[e]	Existing/ Carry-over/ Ocean Plan
	lbs/day	0.039	--	--	--	--	
Beryllium [10, 11]	µg/L	--	--	--	--	0.15 [b]	No RP
Bis(2-chloroethyl) ether[11]	µg/L	--	--	--	--	0.95 [b]	No RP
Bis(2-ethylhexyl) phthalate[11]	µg/L	--	--	--	--	17 [c]	No RP
Carbon tetrachloride[11]	µg/L	--	--	--	--	1 [b]	No RP
Chlordane [21]	µg/L	0.0038	--	--	--	[e]	Existing/ Carry-over/ Ocean Plan
	lbs/day	0.012	--	--	--	--	
Chlorodibromomethane[11]	µg/L	--	--	--	--	0.6 [c]	No RP
Chloroform[11]	µg/L	--	--	--	--	30 [c]	No RP
DDT [22]	µg/L	0.028	--	--	--	0.015 [b]	Existing/BPJ/ Carry-over/ Ocean Plan
	lbs/day	0.090	--	--	--	--	
1,4-Dichlorobenzene[11]	µg/L	--	--	--	--	1 [c]	No RP
3,3'-Dichlorobenzidine	µg/L	1.4	--	--	--	[e]	Ocean Plan
	lbs/day	4.5				--	
1,2-Dichloroethane[11]	µg/L	--	--	--	--	0.6 [c]	No RP
1,1-Dichloroethylene[11]	µg/L	--	--	--	--	1.1 [b]	No RP
Bromodichloromethane[11]	µg/L	--	--	--	--	2 [c]	No RP
Dichloromethane[11]	µg/L	--	--	--	--	3 [c]	No RP
1,3-Dichloropropene[11]	µg/L	--	--	--	--	0.65 [b]	No RP
Dieldrin[11]	µg/L	--	--	--	--	0.005 [b]	No RP
2,4-Dinitrotoluene[11]	µg/L	--	--	--	--	1 [b]	No RP
1,2-Diphenylhydrazine[11]	µg/L	--	--	--	--	0.65 [b]	No RP
Halomethanes[11, 23]	µg/L	--	--	--	--	1 [c]	No RP
Heptachlor[11]	µg/L	--	--	--	--	0.005 [b]	No RP
Heptachlor epoxide[11]	µg/L	--	--	--	--	0.0033 [d]	No RP
Hexachlorobenzene	µg/L	0.035	--	--	--	[e]	Existing/ Carry-over/ Ocean Plan
	lbs/day	0.11				--	
Hexachlorobutadiene[11]	µg/L	--	--	--	--	0.7 [b]	No RP
Hexachloroethane[11]	µg/L	--	--	--	--	0.7 [b]	No RP
Isophorone[11]	µg/L	--	--	--	--	0.65 [b]	No RP
N-Nitrosodimethylamine[11]	µg/L	--	--	--	--	0.7 [b]	No RP

Discharge Points 001 and 002 (dilution ratio = 166:1)							
Parameter	**Units**	**Effluent Limitations[1, 3]**				**Performance Goals[2]**	**Basis**
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
N-Nitrosodi-N-propylamine[11]	µg/L	--	--	--	--	0.6 [b]	No RP
N-Nitrosodiphenylamine[11]	µg/L	--	--	--	--	0.75 [b]	No RP
PAHs[11, 24]	µg/L	--	--	--	--	0.95 [b]	No RP
PCBs [25]	µg/L	0.0032	--	--	--	[e]	Existing/ Carry-over/ Ocean Plan
	lbs/day	0.010	--	--	--	--	
TCDD equivalents [26]	**pg/L**	0.65	--	--	--	[e]	Existing/ Carry-over/ Ocean Plan
	lbs/day	2.1×10^{-6}	--	--	--	--	
1,1,2,2-Tetrachloroethane[11]	µg/L	--	--	--	--	0.4 [b]	No RP
Tetrachloroethylene[11]	µg/L	--	--	--	--	20 [a]	No RP
Toxaphene	µg/L	0.035	--	--	--	[e]	Existing/ Carry-over/ Ocean Plan
	lbs/day	0.11	--	--	--	--	
Trichloroethylene[11]	µg/L	--	--	--	--	0.85 [b]	No RP
1,1,2-Trichloroethane[11]	µg/L	--	--	--	--	0.45 [b]	No RP
2,4,6-Trichlorophenol[11]	µg/L	--	--	--	--	0.6 [b]	No RP
Vinyl chloride[11]	µg/L	--	--	--	--	1.3 [b]	No RP

Table 12. Summary of Final Effluent Limitations for Discharge Point 003
(Footnotes are specified on pages F-31 through F-33 of this Fact Sheet.)

Discharge Point 003 (dilution ratio = 150:1)							
Parameter	**Units**	**Effluent Limitations[1,3]**				**Performance Goals[2]**	**Basis**
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
Major Wastewater Constituents							
Biochemical Oxygen Demand 5-day @ 20°C[6]	mg/L	30	45	--	--	--	Existing/ Secondary treatment standard
	lbs/day	96,300	144,500	--	--	--	
	% removal	85	--			--	
Total Suspended Solids[6]	mg/L	30	45	--	--	--	Existing/ Secondary treatment standard
	lbs/day	96,300	144,500	--	--	--	
	% removal	85	--			--	
pH[5, 6 7]	standard units	6.0 (instantaneous min.) – 9.0 (instantaneous max.)				--	Existing/ Secondary treatment standard/ Ocean Plan

Discharge Point 003 (dilution ratio = 150:1)							
Parameter	**Units**	**Effluent Limitations[1,3]**				**Performance Goals[2]**	**Basis**
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
Oil and Grease[7]	mg/L	15[8]	22.5[8]	45[8]	75	--	Existing/ Carry-over/ Ocean Plan
	lbs/day	48,200	72,200	144,500	--	--	
Settleable Solids[7]	ml/L	0.5[8]	0.75[8]	1.5[8]	3.0	--	Existing/ Carry-over/ Ocean Plan
Turbidity[7]	NTU	75	100	--	225	--	Existing/ Carry-over/ Ocean Plan
Marine Aquatic Life Toxicants[9]							
Chlorine Residual[13]	µg/L	300	--	1,200	9,100	--	RP by BPJ/ Ocean Plan
Acute toxicity [18]	TUa	--	--	4.8	--	--	RP by BPJ/ Ocean Plan
Chronic toxicity[19]	TUc	--	--	151	--	--	RP by BPJ/ Ocean Plan
Human Health Toxicants – Carcinogens[9]							
Benzidine	µg/L	0.010	--	--	--	--	Existing/ Carry-over/ Ocean Plan
Chlordane [21]	µg/L	0.0034	--	--	--	--	Existing/ Carry-over/ Ocean Plan
DDT [22]	µg/L	0.026	--	--	--	--	Existing/BPJ/ Carry-over/ Ocean Plan
3,3'-Dichlorobenzidine	µg/L	1.2	--	--	--	--	Ocean Plan
Hexachlorobenzene	µg/L	0.032	--	--	--	--	Existing/ Carry-over/ Ocean Plan
PCBs [25]	µg/L	0.0029	--	--	--	--	Existing/ Carry-over/ Ocean Plan
TCDD equivalents [26]	**pg/L**	0.59	--	--	--	--	Existing/ Carry-over/ Ocean Plan
Toxaphene	µg/L	0.032	--	--	--	--	Existing/ Carry-over/ Ocean Plan

Table 13. Summary of Final Effluent Limitations for Discharge Point 004
(Footnotes are specified on pages F-31 through F-33 of this Fact Sheet.)

Discharge Point 004 (dilution ratio = 115:1)							
Parameter	**Units**	**Effluent Limitations[1,3]**				**Performance Goals[2]**	
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
Major Wastewater Constituents							
Biochemical Oxygen Demand 5-day @ 20°C[6]	mg/L	30	45	--	--	--	Existing/ Secondary treatment standard
	lbs/day	96,300	144,500	--	--	--	
	% removal	85	--			--	
Total Suspended Solids[6]	mg/L	30	45	--	--	--	Existing/ Secondary treatment standard
	lbs/day	96,300	144,500	--	--	--	
	% removal	85	--			--	
pH[5, 6 7]	standard units	6.0 (instantaneous min.) – 9.0 (instantaneous max.)				--	Existing/ Secondary treatment standard/ Ocean Plan
Oil and Grease[7]	mg/L	15[8]	22.5[8]	45[8]	75	--	Existing/ Carry-over/ Ocean Plan
	lbs/day	48,200	72,200	144,500	--	--	
Settleable Solids[7]	ml/L	0.5[8]	0.75[8]	1.5[8]	3.0	--	Existing/ Carry-over/ Ocean Plan
Turbidity[7]	NTU	75	100	--	225	--	Existing/ Carry-over/ Ocean Plan
Marine Aquatic Life Toxicants[9]							
Chlorine Residual[13]	µg/L	230	--	930	7,000	--	RP by BPJ/ Ocean Plan
Acute toxicity [18]	TUa	--	--	3.8	--	--	RP/ Ocean Plan
Chronic toxicity[19]	TUc	--	--	116	--	--	RP by BPJ/ Ocean Plan
Human Health Toxicants – Carcinogens[9]							
Benzidine	µg/L	0.008	--	--	--	--	Existing/ Carry-over/ Ocean Plan
Chlordane [21]	µg/L	0.0027	--	--	--	--	Existing/ Carry-over/ Ocean Plan
DDT [22]	µg/L	0.020	--	--	--	--	Existing/BPJ Carry-over/ Ocean Plan
3,3'-Dichlorobenzidine	µg/L	0.93	--	--	--	--	Ocean Plan

Discharge Point 004 (dilution ratio = 115:1)							
Parameter	**Units**	**Effluent Limitations[1,3]**				**Performance Goals[2]**	
		Average Monthly	**Average Weekly**	**Maximum Daily[4]**	**Instan-taneous Maximum[5]**	**Average Monthly**	
Hexachlorobenzene	µg/L	0.024	--	--	--	--	Existing/ Carry-over/ Ocean Plan
PCBs [25]	µg/L	0.0022	--	--	--	--	Existing/ Carry-over/ Ocean Plan
TCDD equivalents [26]	**pg/L**	0.45	--	--	--	--	Existing/ Carry-over/ Ocean Plan
Toxaphene	µg/L	0.024	--	--	--	--	Existing/ Carry-over/ Ocean Plan

Footnotes (Tables 11, 12 and 13)

1. Effluent limitations for conventional, nonconventional, and toxic pollutants were calculated based on effluent limitations in *Table A* and water quality objectives in *Table B* of the Ocean Plan. The minimum dilution ratios used to calculate effluent limitations for nonconventional and toxic pollutants based on water quality objectives in *Table B* of the Ocean Plan are 166:1 (i.e., 166 parts seawater to one part effluent) for Discharge Points 001 and 002, 150:1 for Discharge Point 003 and 115:1 for Discharge Point 004, respectively.

   The daily mass emission calculations are based on the average design flow rate of 385 million gallons per day (mgd) specified in the 1997 Joint Water Pollution Control Plant (JWPCP) permit according to the Ocean Plan equation: lbs/day = 0.00834 x Ce (effluent concentration, ug/L) x Q (flow rate, mgd). During storm events when flow exceeds the dry weather design capacity, the mass emission rate limits shall not apply. Only the concentration limits shall apply.

2. The performance goals are based upon the actual performance data (May 2006 to August 2010) of the JWPCP and are specified only as an indication of the treatment efficiency of the plant. They are not considered effluent limitations or standards for the treatment plant. JWPCP shall make best efforts to maintain, if not improve, the effluent quality at the level of these performance goals. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted. Please refer to Fact Sheet for procedures.

3. See section VII of this Order and Attachment A for definition of terms.

4. The maximum daily effluent concentration limitation shall apply to flow-weighted 24-hour composite samples. It may apply to grab samples if the collection of composite samples for those constituents is not appropriate because of the instability of the constituents.

5. The instantaneous maximum (minimum) effluent limitations shall apply to grab sample results.

6. The effluent limitations are based on secondary treatment standards, 40 CFR 133.102.

7. Based on Ocean Plan Table A effluent limitations.

8. Effluent limitation is the same as that in Order No. R4-2006-0042 and is more stringent than the limitation specified in the Ocean Plan (Antibacksliding Policy).

9. Effluent limitations for these constituents are based on Ocean Plan Table B objectives using initial dilution ratios of 166:1 (i.e., 166 parts of seawater to 1 part effluent) for Discharge Points 001 and 002, 150:1 for Discharge Point 003, and 115:1 for Discharge Point 004, respectively.

10. Represents total recoverable metal value.

11. These constituents did not show reasonable potential to exceed Ocean Plan Table B objectives; therefore, no numerical water quality-based effluent limits are prescribed.

12. These constituents are pollutants of concern identified by the Santa Monica Bay Restoration Plan that are causing or could cause deterioration of designated beneficial uses in Santa Monica Bay. Mass emission performance caps were set in Order No. 97-090. In this Order, 12-monthe average mass emission benchmarks have been established in the MRP (Attachment E) for these pollutants of concern to serve same purpose.

13. These total chlorine residual limits shall only apply to continuous discharge exceeding two hours.

For intermittent discharges not exceeding two hours, water quality objectives for total chlorine residual shall be determined through the use of the following equation:

$$\log y = -0.43(\log x) + 1.8$$

where: y = the water quality objective (in µg/L) to apply when chlorine is being discharged;
x = the duration of uninterrupted chlorine discharge in minutes.

For intermittent discharges not exceeding two hours, the applicable total chlorine residual limit (daily maximum) shall then be calculated using the above calculated water quality objective according to procedures outlined in Section III.C.4.a of the 2009 Ocean Plan. The minimum dilution ratios shall be 166:1 for Discharge Points 001 and 002, 150:1 for Discharge Point 003, and 115:1 for Discharge Point 004.

14. Nonchlorinated phenolic compounds shall mean the sum of Phenol, 2,4-Dimethylphenol, 2-Nitrophenol, and 4-Nitrophenol, 2,4-Dinitrophenol and 2-Methyl-4,6-dinitrophenol.

15. Chlorinated phenolic compounds mean the sum of 2-Chlorophenol, 2,4-Dichlorophenol, 4-Chloro-3-methylphenol, 2,4,6-Trichlorophenol, and Pentachlorophenol.

16. Endosulfan shall mean the sum of endosulfan-alpha, endosulfan-beta, and endosulfan sulfate.

17. HCH shall mean the sum of alpha, beta, gamma (lindane), and delta isomers of hexachlorocyclohexane.

18. Expressed as Acute Toxicity Units (TUa)

$$TUa = 100/LC50$$

Where:
Lethal Concentration, 50 Percent (LC50) is expressed as the estimate of the percent effluent concentration that causes death in 50% of the test population, in the time period prescribed by the toxicity test, as required by this permit.

When it is not possible to measure the LC 50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \log (100-s)/1.7$$

Where:
S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

19. Expressed as Chronic Toxicity Units (TUc)

$$TUc = 100/NOEC$$

where:

NOEC (No Observed Effect Concentration) is expressed as the maximum percent effluent that causes no observable effect on a test organism as determined by the result of a critical life stage toxicity test, as required by this permit.

20. Dichlorobenzenes shall mean the sum of 1,2- and 1,3-dichlorobenzene.

21. Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma and oxychlordane.

22. DDT shall mean the sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD and 2,4'-DDD.

23. Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

24. PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]-fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1, 2, 3-cd]pyrene, phenanthrene and pyrene.

25. PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-l232, Aroclor-1242, Aroclor-l248, Aroclor-1254 and Aroclor-1260.

26. TCDD equivalents shall mean the sum of the concentration of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below:

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
l,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

a. Numerical effluent quality performance goals are derived statistically using data reported by the Discharger from May 2006 to August 2010. Please refer to Fact Sheet (Attachment F) for calculation procedures.

b. More than 80 percent of the monitoring data for these constituents were not detected. Performance goals are set at five times (for carcinogens and marine aquatic life toxicants) or ten times (for noncarcinogens) the method detection limits in the 2010 monitoring reports.

c. For this pollutant, the maximum detected effluent concentration (MDEC) from May 2006 to August 2010 is prescribed as the performance goal. Please refer to Fact Sheet (Attachment F) for procedures.

d. These constituents were determined to have no reasonable potential to exceed the respective water quality objectives. However, the calculated performance goals are greater than the respective calculated Ocean Plan effluent limitations. Therefore, calculated effluent limitations are prescribed as the performance goals.

e. These constituents were determined to have reasonable potential to exceed the respective water quality objectives. Therefore, effluent limitations are prescribed for these constituents. Since the calculated performance goals are greater than the respective effluent limitations, no performance goals are prescribed.

E. Performance Goals

Chapter III, Section F.1, of the 2009 Ocean Plan allows the Regional Water Board to establish more restrictive water quality objectives and effluent limitations than those set forth in the Ocean Plan as necessary for the protection of the beneficial uses of ocean waters.

Pursuant to this provision and to implement the recommendation of the Water Quality Advisory Task Force (*Working Together for an Affordable Clean Water Environment, A final report presented to the California Water Quality Control Board, Los Angeles Region by Water Quality Advisory Task Force, September 30, 1993)* that was adopted by the Regional Water Board on November 1, 1993, performance goals that are more stringent than those based on Ocean Plan objectives are prescribed in this Order. This approach is consistent with the antidegradation policy in that it requires the Discharger to maintain its treatment level and effluent quality, recognizing normal variations in treatment efficiency and sampling and analytical techniques. However, this approach does not address substantial changes in treatment plant operations that could significantly affect the quality of the treated effluent.

While performance goals were previously placed in many POTW permits in the Region, they have not been continued for discharges that are to inland surface waters. For inland surface waters, the California Toxics Rule (40 CFR 131.38) has resulted in effluent limits as stringent as many performance goals. However, the Ocean Plan allows for significant dilution, and the continued use of performance goals serves to maintain existing treatment levels and effluent quality and supports State and federal antidegradation policies.

The performance goals are based upon the actual performance of JWPCP and are specified only as an indication of the treatment efficiency of the facility. Performance goals are intended to minimize pollutant loading (primarily for toxics), while maintaining the incentive for future voluntary improvement of water quality whenever feasible, without the imposition of more stringent limits based on improved performance. They are not considered as enforceable limitations or standards for the regulation of the discharge from the treatment facility. The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted.

Procedures for the Determination of Performance Goals

1. For constituents that have been routinely detected in the effluent (at least 20 percent detectable data), performance goals are based on the one-sided, upper 95 percent confidence bound ($UCB_{95/95}$) of the 95th percentile of May 2006 through August 2010 performance data using the RPA protocol contained in the 2009 Ocean Plan. Effluent data are assumed lognormally distributed. Performance goals are calculated according to the equation $C_{PG} = Co+Dm(Co-Cs)$ in the Ocean Plan and by setting $Co=UCB_{95/95}$.

    a. If the maximum detected effluent concentration is greater than the calculated performance goal, then the calculated performance goal is used as the performance goal.

    b. If the maximum detected effluent concentration is less than the calculated performance goal, the maximum detected effluent concentration is used as the performance goal.

    For example, the performance goal for arsenic at Discharge Points 001 and 002 is calculated as follows:

Arsenic

$Co = UCB_{95/95} = 2.9973$; $Dm = 166$; $Cs = 3$
C_{PG} = Performance Goal = 2.9973 + 166(2.9973-3) = 2.5491 µg/L

2. For constituents where monitoring data have consistently shown nondetectable levels (less than 20 percent detectable data), performance goals are set at five times (for carcinogens and marine aquatic life toxicants) or ten times (for noncarcinogens) the method detection limit (MDL) reported in the 2010 Annual Report. However, if the maximum detected effluent concentration is less than the calculated value based on MDL, the maximum detected effluent concentration is used as the performance goal.

3. For constituents with no effluent limitations, if the performance goal derived from above steps exceeds the respective calculated Ocean Plan effluent limitation, then the calculated effluent limitation is prescribed as the performance goal for that constituent.

4. For constituents with effluent limitations, if the performance goal derived from above steps exceeds the respective effluent limitation, then the performance goal is not prescribed.

The performance goals for Discharge Points 001 and 002 are prescribed in this Order. The listed performance goals are not enforceable effluent limitations or standards. However, the Discharger shall maintain, if not improve, its treatment efficiency. Any exceedance of the performance goals shall trigger an investigation into the cause of the exceedance. If the exceedance occurs three times or more in five successive monitoring periods or any single exceedance occurs for aldrin and heptachlor, the Discharger shall submit a written report to the Regional Water Board on the nature of the exceedance, the results of the investigation as to the cause of the exceedance, and the corrective actions taken or proposed corrective measures with timetable for implementation, if necessary.

F. Mass Emission Benchmarks

To address relative changes in toxic pollutant loadings from the JWPCP discharge to the marine environment during the five-year permit term, and to collect information that can be used to determine compliance with State and federal antidegradation requirements when a subsequent permit is re-issued to the JWPCP, 12-month average mass emission benchmarks have been established for effluent discharged through Discharge Points 001 and 002. The mass emission benchmarks (in metric tons per year; MT/yr) for the JWPCP discharge were determined using November 2002 through August 2005 effluent concentrations and the Discharger's projected end-of-permit (2006) flow of 338 MGD (Q). If more than 80 percent of effluent data were nondetect, the pollutant concentration (Ce) associated with the reporting limit reported in the 2004 Annual Report was used to calculate the mass emission benchmark. If 20 percent or more of effluent data were detected, the pollutant concentration (Ce) associated with the 95th percentile (at upper 95 percent confidence bound) was used to calculate the mass emission benchmark. The following equation is used for the calculation:

$$MT/yr = (Ce\ ug/L) \times (Q\ 10^6\ gal/day) \times (3.785\ L/gal) \times (365\ days/yr) \times (1\ MT/10^{12}\ ug)$$

These mass emission benchmarks are not enforceable WQBELs. They may be re-evaluated and revised during the five-year permit term.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

Receiving water limitations are derived from the water quality objectives for ocean waters established by the Basin Plan and the Ocean Plan and applicable TMDLs.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Part 122.48 of 40 CFR requires all NPDES permits to specify recording and reporting of monitoring results. Sections 13267 and 13383 of the California Water Code authorize the Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program, Attachment E of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for this facility.

A. Influent Monitoring

Influent monitoring is required to:

- Determine compliance with NPDES permit conditions.
- Assess treatment plant performance.
- Assess effectiveness of the Pretreatment Program

Influent monitoring in this Order follows the influent monitoring requirements in the previous Order.

B. Effluent Monitoring

The Discharger is required to conduct monitoring of the permitted discharges in order to evaluate compliance with permit limitations and conditions. Monitoring requirements are specified in the Monitoring and Reporting Program (Attachment E). This Order requires compliance with the Monitoring and Reporting Program, and is based on 40 CFR parts 122.48, 122.44(i), and 122.41(j). The Monitoring and Reporting Program is a standard requirement in almost all NPDES permits (including this Order) issued by the Regional Water Board or USEPA. In addition to containing definition of terms, it specifies general sampling/analytical protocols and the requirements of reporting spills, violation, and routine monitoring data in accordance with NPDES regulations, the California Water Code, and Regional Water Board and USEPA policies. The Monitoring and Reporting Program also contains sampling program specific for the Discharger's wastewater treatment plant. It defines the sampling stations and frequency, pollutants to be monitored, and additional reporting requirements. Pollutants to be monitored include all pollutants for which effluent limitations are specified.

The effluent monitoring in this Order follows the effluent monitoring requirements in the previous Order.

Discharge Points 001 and 002: JWPCP has been operating in full secondary treatment mode since January 2003. The reasonable potential analyses on the monitoring data reported during the last permit term did not show RP for any parameter (except acute toxicity for Discharge Point 004) and only had inconclusive results for seven parameters (benzidine, chlordane, hexachlorobenzene, PCBs, TCDD equivalents, 3,3'-dichlorobenzene, and toxaphene). Therefore, this Order retains all monitoring frequency requirements in the previous Order. The minimum monitoring frequency is quarterly. However, some metals require monthly monitoring because they were consistently detected in the effluent. In addition, to facilitate interpretation of sediment/fish tissue data and TMDL development, PCB congeners are continuously required to be analyzed annually in this Order.

This Order prescribes both acute and chronic toxicity limits for the discharge from Discharge Points 001 and 002, thus it requires monitoring for both acute and chronic toxicity.

Discharge Points 003 and 004: These two outfalls are used for hydraulic relief during times of heavy rains or unusual high flow. The minimum monitoring frequency is once per discharge, but no more than one analysis need be done during the required monitoring period that is similar to the monitoring requirements for Discharge Points 001 and 002. Since both acute toxicity and chronic toxicity effluent limitations are prescribed for these outfalls, both acute and chronic toxicity testings are required for these two outfalls.

Toxicity Monitoring (Discharge Points 001, 002, 003, and 004): Since both chronic and acute toxicity effluent limitations are prescribed for these outfalls, both acute and chronic toxicity monitoring are required for these four outfalls. However, to be representative of the effluent discharged to the ocean, this Order retains the current practice of dechlorination of the effluent sample prior to toxicity testing. The Discharger has been chlorinating JWPCP effluent since the 1960's. At that time, only primary treatment was provided and the outfalls were located in shallower water and closer to shore, with lower dilution, so there were instances of high shoreline bacteria counts due to the discharge of JWPCP effluent. Although the Discharger has constructed upgrades to JWPCP and its outfalls that reduced its impact on the shoreline, chlorination of JWPCP effluent has continued to provide an additional degree of public health protection.

Chlorine is added to the effluent as it leaves the treatment facility and enters the 6-mile tunnels that convey it to a manifold on White Point. The effluent then travels through the Dischargers' 1.5-mile long outfall structure before being released to the ocean. During conveyance, the chlorine reacts with organic matter in the wastewater and in the conveyance structure. Due to practical considerations, analysis of chronic and acute toxicity is conducted on treated effluent before it is released to the tunnels. Because samples are collected before the chlorine in the effluent has had an opportunity to react with any organic matter, the samples are dechlorinated prior to analysis for toxicity. This allows the actual toxicity of the samples, exclusive of any toxicity caused by the temporary presence of chlorine, to be determined.

However, since chlorine is such a strong toxicant, separate standards have been established under the Ocean Plan to specifically address chlorine residual. The Discharger is required to conduct daily grab sample testing for chlorine residual at the last accessible point prior to discharge, the manifold at White Point, which is still prior to the 1.5-mile outfall structure. At the manifold, although there is typically a small chlorine residual present, the effluent fully meets the Ocean Plan chlorine residual standards. Since chlorine residual is monitored and reported daily, any exceedance of the protective chlorine residual limit will be identified and reported so dechlorination of the effluent sample prior to toxicity testing will not result in a failure to report chlorine residual-related toxicity.

C. Receiving Water Monitoring

1. Surface Water

   Receiving water monitoring is required to determine compliance with receiving water limitations and to characterize the water quality of the receiving water. Requirements are based on the Ocean Plan and Basin Plan. The conceptual framework for the receiving water monitoring program has three components that comprise a range of spatial and temporal scales: (a) core monitoring; (b) regional monitoring; and (c) special studies.

   a. Core monitoring is local in nature and focused on monitoring trends in quality and effects of the point source discharge. This includes effluent monitoring as well as many aspects of receiving

water monitoring. In the monitoring program described below these core components are typically referred to as local monitoring.

b. Regional monitoring is focused on questions that are best answered by a region-wide approach that incorporates coordinated survey design and sampling techniques. The major objective of regional monitoring is to collect information required to assess how safe it is to swim in the ocean, how safe it is to eat seafood from the ocean, and whether the marine ecosystem is being protected. Key components of regional monitoring include elements to address pollutant mass emission estimations, public health concerns, monitoring of trends in natural resources, assessment of regional impacts from all contaminant sources, and protection of beneficial uses. The final design of regional monitoring programs is developed by means of steering committees and technical committees comprised of participating agencies and organizations, and is not specified in this permit. Instead, for each regional component, the degree and nature of participation of the Discharger is specified. For this permit, these levels of effort are based upon past participation of the Discharger in regional monitoring programs.

   The Discharger shall participate in regional monitoring activities coordinated by the SCCWRP or any other appropriate agency approved by the Regional Water Board. The procedures and timelines for the Regional Water Board approval shall be the same as detailed for special studies, described below.

c. Special studies are focused on refined questions regarding specific effects or development of monitoring techniques and are anticipated to be of short duration and/or small scale, although multiyear studies also may be needed. Questions regarding effluent or receiving water quality, discharge impacts, ocean processes in the area of the discharge, or development of techniques for monitoring the same, arising out of the results of core or regional monitoring, may be pursued through special studies. These studies are by nature ad hoc and cannot be typically anticipated in advance of the five-year permit cycle.

   The Discharge and the Regional Water Board shall consult annually to determine the need for special studies. Each year, the Discharger shall submit proposals for any proposed special studies to the Regional Water Board by December 31, for the following year's monitoring effort (July through June). The following year, detailed scopes of work for proposals, including reporting schedules, shall be presented at a Spring Regional Water Board meeting, to obtain the Regional Water Board approval and to inform the public. Upon approval by the Regional Water Board, the Discharger shall implement its special study or studies. (Note: The CEC and Nutrient special studies have different deadlines for submitting a Workplan.)

d. The receiving water monitoring program contains the following components:

   i. Shoreline/Inshore/Offshore Microbiological Monitoring: Shoreline monitoring is designed to address the question: "Are densities of bacteria in water contact zones below those that ensure public safety?" The inshore and offshore monitoring addresses the question: "Are Ocean Plan compliance standards for bacteriological contamination being met?"

   ii. Nearshore/Offshore Water Quality Monitoring: This monitoring addresses the question: "Are Ocean Plan and Basin Plan objectives for physical and chemical parameters being met?" This monitoring also contributes to a regional understanding of seasonal patterns in nearshore water column structure.

   iii. Benthic Sediments Monitoring: The local trends survey addresses the question: "Are benthic conditions under the influence of the discharge changing over time?" The regional

survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in soft-bottom habitats within the Southern California Bight? and 2) What is the relationship between biological response and contaminant exposure?

iv. Fish and Invertebrate Monitoring: The local survey addresses the question: "Is the health of demersal fish and epibenthic invertebrate communities in the vicinity of the discharge changing over time?" The regional survey addresses the questions: 1) What is the extent, distribution, magnitude and trend of ecological change in demersal fish and epibenthic communities within the Southern California Bight? and 2) What is the relationship between biological response and contaminant exposure? The local bioaccumulation trends survey addresses the questions: "Is fish tissue contamination in the vicinity of the outfall changing over time?" The local seafood survey addresses the questions: 1) Where seafood consumption advisories exist locally, do tissue concentrations of contaminants continue to exceed the Advisory Tissue Concentration?, and 2) What are the tissue contaminant trends relative to the Advisory Tissue Concentration in other species not currently subject to local consumption advisories? The regional seafood safety survey addresses the question: "Are seafood tissue levels within the Southern California Bight below levels that ensure public safety?" A regional predator risk survey addresses the question: "Are fish body burdens within the Southern California Bight a health risk to higher trophic levels in the marine food web?"

v. Kelp Bed Monitoring: This regional survey addresses the question: " Is the extent of kelp beds in the Southern California Bight changing over time and are some beds changing at rates different than others?"

D. Other Monitoring Requirements

1. Outfall and Diffuser Inspection

The annual inspection is required to ensure a periodic assessment of the integrity of the outfall pipes and ballasting system.

2. Biosolids and Sludge Management

Attachment H establishes monitoring and reporting requirements for the storage, handling and disposal practices of biosolids/sludge generated from the operation of this POTW.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR part 122.41, and additional conditions applicable to specified categories of NPDES permits in accordance with 40 CFR part 122.42, are provided in Attachment D to the Order/Permit. 40 CFR part 122.41(a) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions are incorporated into this Order/Permit expressly.

B. Special Provisions

1. Reopener Provisions

These provisions are based on 40 CFR part 123.25. The Regional Water Board may reopen the Permit to modify conditions and requirements. Causes for modifications can include, but are not limited to, the promulgation of new regulations, modification in sludge use or disposal practices, or adoption of new regulations by the State Water Board or Regional Water Board, including revisions to the Ocean Plan and Basin Plan.

2. **Special Studies and Additional Monitoring Requirements**

a. Treatment Plant Capacity

The treatment plant capacity study required by this Order shall serve as an indicator for the Regional Water Board regarding the Facility's increasing hydraulic capacity and growth in the service area.

3. **Best Management Practices and Pollution Prevention**

a. Storm Water Pollution Prevention Plan (SWPPP)

CWA section 402(p), as amended by the Water Quality Act of 1987, requires NPDES permits for storm water discharges. Pursuant to this requirement, in 1990, USEPA promulgated 40 CFR 122.26 that established requirements for storm water discharges under an NPDES permit. To facilitate compliance with federal regulations, on November 1991, the State Board issued a statewide general permit, *General NPDES Permit No. CAS000001 and Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities.* This permit was amended in September 1992 and reissued on April 17, 1997 as State Board Order No. 97-03-DWQ. JWPCP is covered under this general permit and an updated SWPPP is required.

b. Spill Clean-up Contingency Plan (SCCP)

Since spills or overflows are a common event in the POTW and its service areas, this Order requires the Discharger to review and update, if necessary, SCCP after each incident. The Discharger shall ensure that the up-to-date SCCP is readily available to the sewage system personnel at all times and that the sewage personnel are familiar with it.

c. Pollutant Minimization Program (PMP)

This provision is based on the requirements of section III.C.9 of the Ocean Plan.

4. **Construction, Operation, and Maintenance Specifications**

This provision is based on the requirements of 40 CFR part 122.41(e) and the previous Order.

5. **Special Provisions for Municipal Facilities**

a. Sludge (Biosolids) Requirements

Section 405 of the CWA and implementing regulations at 40 CFR 503 require that producers of sewage sludge/biosolids meet certain reporting, handling, and use or disposal requirements. The State has not been delegated the authority to implement this program; therefore, USEPA is the implementing agency. This permit contains sewage sludge/biosolids requirements that are applicable to the Discharger. The Discharger is also responsible for compliance with WDRs

and NPDES permits for the generation, transport and application of biosolids issued by the State Water Board, other Regional Water Boards, Arizona Department of Environmental Quality or USEPA, to whose jurisdiction the JWPCP biosolids will be transported and applied.

b. Pretreatment Requirements for POTWs

Section 402 of the CWA and implementing regulations at 40 CFR part 403 establish pretreatment requirements for POTWs which receive pollutants from non-domestic users. This permit contains pretreatment program requirements that are applicable to the Discharger.

c. Spill Reporting Requirements

This permit established a reporting protocol for how different types of spills, overflows, and bypasses of raw or partially treated sewage from the POTW shall be reported to regulatory agencies.

In addition, the State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on May 2, 2006. The amended General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions. Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating SSOs. The Discharger's collection system is part of the POTW that is subject to this Order. The Discharger must comply with both the General Order and this permit.

VIII. PUBLIC PARTICIPATION

The California Regional Water Quality Control Board, Los Angeles Region (Regional Water Board) is considering the issuance of waste discharge requirements (WDRs) that will serve as a National Pollutant Discharge Elimination System (NPDES) permit for the Joint Water Pollution Control Plant. As a step in the WDR adoption process, the Regional Water Board staff has developed tentative WDRs. The Regional Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through publication in the newspapers and by letter mailed to interested parties.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments should be submitted either in person or by mail to the Executive Office at the Regional Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Regional Water Board, written comments should be received at the Regional Water Board offices by 5:00 p.m. on **June 15, 2011**.

C. Public Hearing

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date: September 1, 2011
Time: 9:00 am
Location: Metropolitan Water District, Board Room
700 N. Alameda Street
Los Angeles, California

Interested persons are invited to attend. At the public hearing, the Regional Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our web address is **http://www.waterboards.ca.gov/losangeles** where you can access the current agenda for changes in dates and locations.

D. Nature of Hearing

This will be a formal adjudicative hearing pursuant to section 648 et seq. of title 23 of the California Code of Regulations. Chapter 5 of the California Administrative Procedure Act (commencing with section 11500 of the Government Code) will not apply to this proceeding.

Ex Parte Communications Prohibited: As a quasi-adjudicative proceeding, no board member may discuss the subject of this hearing with any person, except during the public hearing itself. Any communications to the Regional Board must be directed to staff.

E. Parties to the Hearing

The following are the parties to this proceeding:

1. The applicant/permittee

Any other persons requesting party status must submit a written or electronic request to staff not later than 20 business days before the hearing. All parties will be notified if other persons are so designated.

F. Public Comments and Submittal of Evidence

Persons wishing to comment upon or object to the tentative waste discharge requirements, or submit evidence for the Board to consider, are invited to submit them in writing to the above address. To be evaluated and responded to by staff, included in the Board's agenda folder, and fully considered by the Board, written comments must be received no later than close of business June 15, 2011. Comments or evidence received after that date will be submitted, ex agenda, to the Board for consideration, but only included in administrative record with express approval of the Chair during the hearing. Additionally, if the Board receives only supportive comments, the permit may be placed on the Board's consent calendar, and approved without an oral testimony.

G. Hearing Procedure

The meeting, in which the hearing will be a part of, will start at 9:00 a.m. Interested persons are invited to attend. Staff will present the matter under consideration, after which oral statements from parties or interested persons will be heard. For accuracy of the record, all important testimony should be in writing. The Board will include in the administrative record written transcriptions of oral testimony that is actually presented at the hearing. Oral testimony may be limited to 3 minutes maximum or less for each speaker, depending on the number of persons wishing to be heard. Parties or persons with similar concerns or opinions are encouraged to choose one representative to speak. At the conclusion of testimony, the Board will deliberate in open or close session, and render a decision.

Parties or persons with special procedural requests should contact staff. Any procedure not specified in this hearing notice will be waived pursuant to section 648(d) of title 23 of the California Code of Regulations. Objections to any procedure to be used during this hearing must be submitted in writing not later than close of 15 business days prior to the date of the hearing. Procedural objections will not be entertained at the hearing.

H. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

I. Information and Copying

The Report of Waste Discharge (RWD), related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Regional Water Board by calling (213) 576-6600.

J. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

K. Additional Information

Requests for additional information or questions regarding this Order should be directed to Jau Ren Chen at (213) 576-6656.

ATTACHMENT G – GENERIC TOXICITY REDUCTION EVALUATION (TRE) WORKPLAN (POTW)

1. Information and Data Acquisition

a. Operations and performance review

i. NPDES permit requirements
   (1) Effluent limitations
   (2) Special conditions
   (3) Monitoring data and compliance history

ii. POTW design criteria
   (1) Hydraulic loading capacities
   (2) Pollutant loading capacities
   (3) Biodegradation kinetics calculations/assumptions

iii. Influent and effluent conventional pollutant data
   (1) Biochemical oxygen demand (BOD_5)
   (2) Chemical oxygen demand (COD)
   (3) Suspended solids (SS)
   (4) Ammonia
   (5) Residual chlorine
   (6) pH

iv. Process control data
   (1) Primary sedimentation - hydraulic loading capacity and BOD_5 and SS removal
   (2) Activated sludge - Food-to-microorganism (F/M) ratio, mean cell residence time (MCRT), mixed liquor suspended solids (MLSS), sludge yield, and BOD_5 and COD removal
   (3) Secondary clarification - hydraulic and solids loading capacity, sludge volume index and sludge blanket depth

v. Operations information
   (1) Operating logs
   (2) Standard operating procedures
   (3) Operations and maintenance practices

vi. Process sidestream characterization data
   (1) Sludge processing sidestreams
   (2) Tertiary filter backwash
   (3) Cooling water

vii. Combined sewer overflow (CSO) bypass data
   (1) Frequency
   (2) Volume

viii. Chemical coagulant usage for wastewater treatment and sludge processing
   (1) Polymer
   (2) Ferric chloride
   (3) Alum

b. POTW influent and effluent characterization data

i. Toxicity
ii. Priority pollutants
iii. Hazardous pollutants
iv. SARA 313 pollutants
v. Other chemical-specific monitoring results

c. Sewage residuals (raw, digested, thickened and dewatered sludge and incinerator ash) characterization data

i. EP toxicity
ii. Toxicity Characteristic Leaching Procedure (TCLP)
iii. Chemical analysis

d. Industrial waste survey (IWS)

i. Information on IUs with categorical standards or local limits and other significant non-categorical IUs
ii. Number of IUs
iii. Discharge flow
iv. Standard Industrial Classification (SIC) code
v. Wastewater flow
   (1) Types and concentrations of pollutants in the discharge
   (2) Products manufactured
vi. Description of pretreatment facilities and operating practices
vii. Annual pretreatment report
viii. Schematic of sewer collection system
ix. POTW monitoring data
   (1) Discharge characterization data
   (2) Spill prevention and control procedures
   (3) Hazardous waste generation
x. IU self-monitoring data
   (1) Description of operations
   (2) Flow measurements
   (3) Discharge characterization data
   (4) Notice of sludge loading
   (5) Compliance schedule (if out of compliance)
xi. Technically based local limits compliance reports
xii. Waste hauler monitoring data manifests
xiii. Evidence of POTW treatment interferences (i.e., biological process inhibition)

ATTACHMENT H

BIOSOLIDS/SLUDGE MANAGEMENT

(Note: "Biosolids" refers to non-hazardous sewage sludge, as defined at 40 CFR 503.9. Sewage sludge that is hazardous, as defined at 40 CFR 261, must be disposed of in accordance with the Resource Conservation and Recovery Act (RCRA).)

I. General Requirements

A. All biosolids generated by the Discharger at the Joint Water Pollution Control Plant (JWPCP) shall be used or disposed of in compliance with applicable portions of Clean Water Act and Safe Drinking Water Act, including: 40 CFR 503–for biosolids that are land applied, placed in a surface disposal site (dedicated land disposal site, monofill, or sludge-only parcel at a municipal landfill), or incinerated; 40 CFR 258–for biosolids disposed of in a municipal solid waste landfill (with other materials); and 40 CFR 257–for all biosolids use and disposal practices not covered under 40 CFR 258 or 503.

40 CFR 503, Subpart B (land application), sets forth requirements for biosolids that are applied for the purpose of enhancing plant growth or for land reclamation. 40 CFR 503, Subpart C (surface disposal), sets forth requirements for biosolids that are placed on land for the purpose of disposal.

The Discharger is responsible for assuring that all biosolids produced at JWPCP are used or disposed of in accordance with these rules, whether the Discharger uses or disposes of the biosolids itself, or transfers the biosolids to another party for further treatment, use, or disposal. The Discharger is responsible for informing subsequent preparers, appliers, and disposers of the requirements that they must meet under these rules.

B. Duty to Mitigate: The Discharger shall take all reasonable steps to prevent or minimize any biosolids use or disposal which has a likelihood of adversely affecting human health or the environment.

C. No biosolids shall be allowed to enter wetlands or other waters of the United States.

D. Biosolids treatment, storage, use or disposal shall not contaminate groundwater.

E. Biosolids treatment, storage, use or disposal shall not create a nuisances such as objectionable odors or flies.

F. The Discharger shall assure that haulers transporting biosolids off-site for treatment, storage, use, or disposal take all necessary measures to keep the biosolids contained. Trucks hauling biosolids shall be cleaned as necessary after loading and after unloading, so as to have no biosolids on the exterior of the truck or wheels. Trucks hauling biosolids out of Los Angeles County shall be tarped. All haulers must have spill clean-up procedures. Trucks hauling biosolids shall not be used for hauling food or feed crops after unloading the biosolids unless the Discharger submits a hauling description, to be approved by USEPA, describing how trucks will be thoroughly cleaned prior to adding food or feed.

G. If biosolids are stored for over two years from the time they are generated by the Discharger or their contractor, the permittee must ensure compliance with all the requirements for surface disposal under 40 CFR 503 Subpart C, or must submit a written notification to EPA with the information in 503.20 (b), demonstrating the need for longer temporary storage.

H. Any biosolids treatment, disposal, or storage site shall have facilities adequate to divert surface runoff from adjacent areas, to protect the site boundaries from erosion, and to prevent any conditions that would cause drainage from the materials to escape from the site. Adequate protection is defined as protection from at least a 100-year storm and the highest tidal stage which may occur.

I. There shall be adequate screening at the plant headworks and/or at the biosolids treatment units to ensure that all pieces of metal, plastic, glass and other inert objects with a diameter greater than 3/8 inches are removed.

J. Sewage sludge containing more than 50 mg/kg PCBs shall be disposed of in accordance with 40 CFR 761.

K. The Discharger shall ensure compliance with the requirements in State Water Board Order No. 2004-10-DWQ, "General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural and Land Reclamation Activities" for those sites receiving the Discharger's biosolids which a Regional Water Board has placed under this general order, or the requirements in individual Waste Discharge Requirements (WDRs) issued by a Regional Water Board for sites receiving the Discharger's biosolids, where the Regional Water Board has named the Discharger as a responsible party. The Discharger shall require biosolids management agents/contractors to comply with the above-mentioned requirements for those sites where the biosolids management agent/contractor is the named responsible party pursuant to the general order or individual WDRs.

L. The Discharger shall comply if named as a party, or require its biosolids management agents/contractors to comply if they are the named party, with WDRs issued by Regional Water Boards to which jurisdiction the biosolids are transported and applied, and with the State of Arizona's biosolids rule for biosolids transported to Arizona for treatment and/or use.

II. Inspection and Entry:

The Regional Water Board, Arizona Department of Environmental Quality (ADEQ), USEPA, or an authorized representative thereof, upon the presentation of credentials, shall be allowed by the Discharger, directly or through contractual arrangements with their biosolids management contractors, to:

A. Enter upon all premises where biosolids produced by the Discharger are treated, stored, used, or disposed of, either by the Discharger or another party to whom the Discharger transfers biosolids for further treatment, storage, use, or disposal,

B. Have access to and copy any records that must be kept by either the Discharger or another party to whom the Discharger transfers biosolids for further treatment, storage, use, or disposal, under the conditions of this Order or 40 CFR 503.

C. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations used in biosolids treatment, storage, use, or disposal by either the Discharger or another party to whom the Discharger transfers biosolids for further treatment, storage, use, or disposal.

III. Monitoring:

A. Biosolids shall be monitored for the following constituents, at the frequency stipulated in Table 1 of 40 CFR 503.16: arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, organic nitrogen, ammonia nitrogen, and total solids. If biosolids are removed for use or disposal on a routine basis, sampling should be scheduled at regular intervals throughout the year. If biosolids are stored for an extended period prior to use or disposal, sampling may occur at regular intervals, or samples of the accumulated stockpile may be collected prior to use or disposal, corresponding to the tons accumulated in the stockpile over that period.

Monitoring shall be conducted using the methods in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), or as otherwise required under 40 CFR 503.8(b). All results must be reported on a 100% dry weight basis and records of all analyses must state on each page of the analytical results whether the reported results are expressed on an "as-is" or a "100% dry weight" basis.

B. The Discharger shall sample biosolids twice per year for the pollutants listed under CWA section 307(a) using best practicable detection limits.

For accumulated, previously untested biosolids, the Discharger shall develop a representative sampling plan, which addresses the number and location of sampling points, and collect representative samples.

Test results shall be expressed in mg pollutant per kg biosolids on a 100% dry weight basis.

Biosolids to be land applied shall be tested for Organic-N, ammonium-N, and nitrate-N at the frequencies required above.

C. Class 1 facilities (facilities with pretreatment programs or others designated as Class 1 by the Regional Administrator) and Federal facilities with >5 mgd influent flow shall sample biosolids for pollutants listed under Section 307(a) of the Clean Water Act (as required in the pretreatment section of the permit for POTWs with pretreatment programs.) Class 1 facilities and Federal facilities with >5 mgd influent flow shall test dioxins/dibenzofurans using a method detection limit of <1 pg/g during their next sampling period if they have not done so within the past 5 years and once per 5 years thereafter.

D. The biosolids shall be tested annually, or more frequently if necessary, to determine hazardousness in accordance with California Law.

IV. Pathogen and Vector Control

A. Prior to land application, the Discharger shall demonstrate that the biosolids meet Class A or Class B pathogen reduction levels by one of the methods listed under 40 CFR 503.32.

B. Prior to disposal in a surface disposal site, the Discharger shall demonstrate that the biosolids meet Class B levels pathogen reduction levels, or ensure that the site is covered at the end of each operating day. If pathogen reduction is demonstrated using a "Process to Further Reduce Pathogens" or one of the "Processes to Significantly Reduce Pathogens", the Discharger shall maintain daily records of the operating parameters used to achieve this reduction. If pathogen reduction is demonstrated by testing for fecal coliform and/or pathogens, samples must be collected at the frequency specified in Table 1 of 40 CFR 503.16. If Class B is demonstrated using fecal coliform, at least seven grab samples must be collected during each monitoring period and a geometric mean calculated from these samples.

The following holding times between sample collection and analysis shall not be exceeded:

- fecal coliform – 6 hours when cooled to <4 degrees C (extended to 24 hours when cooled to <4 degrees C for Class A composted, Class B aerobically digested, and Class B anaerobically digested sample types);
- Salmonella spp. Bacteria – 24 hours when cooled to <4 degrees C (unless using Method 1682- 6 hours when cooled to <10 degrees C);
- enteric viruses – 6 hours when cooled to <10 degrees C (extended to 24 hours when cooled to <4 degrees C or 2 weeks when frozen);
- helminth ova – 6 hours when cooled to <10 degrees C (extended to one month when cooled to <4 degrees C).

C. For biosolids that are land applied or placed in a surface disposal site, the Discharger shall track and keep records of the operational parameters used to achieve Vector Attraction Reduction requirements in under 40 CFR 503.33 (b).

V. Surface Disposal

If biosolids are placed in a surface disposal site (dedicated land disposal site or monofill), a qualified groundwater scientist shall develop a groundwater monitoring program for the site, or shall certify that the placement of biosolids on the site will not contaminate an aquifer.

VI. Landfill Disposal

Biosolids placed in a municipal landfill shall be tested by the Paint Filter Test (SW-846, Method 9095) at the frequency specified in Table 1 of 40 CFR 503.16, or more often if necessary to demonstrate that there are no free liquids.

VII. Notifications

The Discharger either directly or through contractual arrangements with their biosolids management contractors shall comply with the following notification requirements:

A. Notification of non-compliance:

The Discharger shall notify USEPA and the State (for both Discharger and use or disposal site) of any non-compliance within 24 hours, if the non-compliance may seriously endanger health or the environment. For other instances of non-compliance, the Discharger shall notify USEPA and the State of the non-compliance in writing within 5 working days of becoming aware of the non-

compliance. The Discharger shall require their biosolids management contractors to notify USEPA and the State of any non-compliance within these same time-frames.

B. Interstate Notification

If biosolids are shipped to another State or Tribal Land, the Discharger shall send 60 days prior notice of the shipment to the permitting authorities in the receiving State or Tribal Land, and the USEPA Regional Office.

C. Land Application Notification

Prior to using any biosolids from this facility (other than composted biosolids) at a new or previously unreported site, the Discharger shall notify USEPA and the State. This notification shall include a description and topographic map of the proposed site(s), names and addresses of the applier and site owner, and a listing of any State or local permits which must be obtained. It shall also include a description of the crops or vegetation to be grown, proposed loading rates, and a determination of agronomic rates.

Within a given monitoring period, if any biosolids do not meet the applicable metals concentration limits specified under 40 CFR 503.13, then the Discharger (or its contractor) must pre-notify USEPA, and determine the cumulative metals loading at that site to date, as required by 40 CFR 503.12.

D. Surface Disposal Notification

Prior to disposal at a new or previously unreported site, the Discharger shall notify USEPA and the State. The notice shall include a description and topographic map of the proposed site, depth to groundwater, whether the site is lined or unlined, site operator and site owner, and any State or local permits. It shall also describe procedures for ensuring grazing and public access restrictions for three years following site closure. The notice shall include a groundwater monitoring plan or description of why groundwater monitoring is not required.

VIII. Reporting

The Discharger shall furnish this Regional Water Board with a copy of any report submitted to USEPA, State Water Board or other Regional Water Board, with respect to municipal sludge or biosolids. The Discharger shall submit an annual biosolids report to the USEPA Region 9 Biosolids Coordinator and the State by February 19 of each year for the period covering the previous calendar year. The report shall include:

A. The amount of biosolids generated that year, in dry metric tons, and the amount accumulated from previous years.

B. Results of all pollutant monitoring required under Monitoring above. Results must be reported on a 100% dry weight basis.

C. Demonstrations of pathogen and vector attraction reduction methods, as required under 40 CFR 503.17 and 503.27, and certifications.

D. Names, mailing addresses, and street addresses of persons who received biosolids for storage,

further treatment, disposal in a municipal landfill, deep well injection, or other use or disposal method not covered above, and tonnage delivered to each.

E. The following information must be submitted by the Discharger, unless the Discharger requires its biosolids management contractors to report this information directly to the USEPA Region 9 Biosolids Coordinator.

1. For land application sites:

   - Locations of land application sites (with field names and numbers) used that calendar year, size of each field applied to, applier, and site owner.

   - Volumes applied to each field (in wet tons and dry metric tons), nitrogen applied, and calculated plant available nitrogen.

   - Crops planted, dates of planting and harvesting.

   - For biosolids exceeding 40 CFR 503.13 Table 3 metals concentrations, the locations of sites where the biosolids were applied and cumulative metals loading at the sites to date.

   - Certifications of management practices at 40 CFR 503.14.

   - Certifications of site restrictions at 40 CFR 503(b)(5).

2. For surface disposal sites:

   - Locations of sites, site operator and site owner, size of parcel on which biosolids were disposed.

   - Results of any required groundwater monitoring.

   - Certifications of management practices at 40 CFR 503.24.

3. For closed sites, the date of site closure and certifications of management practices for three years following site closure.

F. All Reports shall be submitted to:

Regional Biosolids Coordinator
U.S. Environmental Protection Agency
CWA Compliance Office (WTR-7)
75 Hawthorne Street
San Francisco, CA 94105-3901

Biosolids Program Coordinator
Arizona Department of Environmental Quality
Mail Code: 5415B-1
1110 West Washington Street
Phoenix, AZ 85007

ATTACHMENT I

PRETREATMENT PROGRAM REQUIREMENTS

1. The Discharger shall be responsible and liable for the performance of all Control Authority pretreatment requirements contained in 40 CFR 403, including any subsequent revisions to that part. Where 40 CFR 403 or subsequent revisions place mandatory actions upon the Discharger, as Control Authority, but do not specify a timetable for completion, the Discharger shall complete the mandatory actions within 180 days of the effective date of this Order, or the effective date of the revisions to 40 CFR 403, whichever is later. For violations of pretreatment requirements, the Discharger shall be subject to enforcement actions, penalties, fines, and other remedies imposed by the USEPA, the Regional Water Board, or other appropriate parties as provided in the CWA and/or the California Water Code. The Regional Water Board or USEPA may initiate enforcement action against a nondomestic user for noncompliance with applicable standards and requirements, as provided in the CWA and/or the California Water Code.

2. The Discharger shall implement and enforce in its entire service area, including contributing jurisdictions, its approved pretreatment program, and all subsequent revisions, which are hereby made enforceable conditions of this Order. The Discharger shall enforce the requirements promulgated pursuant to CWA sections 307(b), 307(c), 307(d), and 402(b) with timely, appropriate, and effective enforcement actions. The Discharger shall cause all nondomestic users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements, or, in the case of a new nondomestic user, upon commencement of discharge.

3. The Discharger shall perform the pretreatment functions required by 40 CFR 403, including, but not limited to:

a. Implement the necessary legal authorities as required by 40 CFR 403.8(f)(1);

b. Enforce the pretreatment requirements under 40 CFR 403.5 and 403.6;

c. Implement the programmatic functions as required by 40 CFR 403.8(f)(2); and

d. Provide the requisite funding and personnel to implement the pretreatment program as required by 40 CFR 403.8(f)(3).

4. By **March 1** of each year, the Discharger shall submit an annual report to the Regional Water Board and USEPA describing its pretreatment activities over the previous calendar year (January through December 31). In the event the Discharger is not in compliance with any condition or requirement of this Order, or any pretreatment compliance inspection/audit requirements, the Discharger shall include the reasons for noncompliance and state how and when it will comply with such conditions and requirements. The annual report shall contain, but not be limited to, the following information:

a. A summary of analytical results from representative flow-proportioned 24-hour composite sampling of the Discharger's influent and effluent for those pollutants USEPA has identified under CWA section 307(a) which are known or suspected to be discharged by nondomestic users. Representative grab sampling shall be employed for pollutants that may degrade after collection, or where the use of automatic sampling equipment may otherwise result in unrepresentative sampling. Such pollutants include, but are not limited to, cyanide, oil and grease, volatile organic compounds, chlorine, phenol, sulfide, pH, and temperature. This will

consist of an annual full priority pollutant scan in August. Wastewater sampling and analysis shall be performed in accordance with the minimum frequency of analysis required by the MRP (Attachment E). The Discharger shall also provide influent and effluent monitoring data for non-priority pollutants, which the Discharger believes may be causing or contributing to interference or pass through. The Discharger is not required to sample and analyze for asbestos. Sludge sampling and analysis is addressed elsewhere in this Order. Wastewater sampling and analysis shall be performed in accordance with 40 CFR 136.

b. A discussion of upset, interference, or pass through, if any, at the Discharger's facilities, which the Discharger knows or suspects were caused by nondomestic users of the POTW system. The discussion shall include the reasons why the incidents occurred, any corrective actions taken, and, if known, the name and address of the responsible nondomestic user(s). The discussion shall also include a review of the applicable local pollutant limitations to determine whether any additional limitations or changes to existing limitations, are necessary to prevent pass-through, interference, or noncompliance with sludge disposal requirements.

c. An updated list of the Discharger's SIUs including their names and addresses, and a list of deletions, additions and SIU name changes keyed to the previously submitted list. The Discharger shall provide a brief explanation for each change. The list shall identify the SIUs subject to federal categorical standards by specifying which set(s) of standards are applicable to each SIU. The list shall also indicate which SIUs are subject to local limitations.

d. The Discharger shall characterize the compliance status of each SIU by providing a list or table for the following:

Name of SIU;

Category, if subject to categorical standards;

Type of wastewater treatment or control processes in place;

Number of samples taken by SIU during the year;

Number of samples and inspections by Discharger during the year;

For an SIU subject to discharge requirements for total toxic organics, whether all required certifications were provided;

A list of pretreatment standards (categorical or local) violated during the year, or any other violations;

SIUs in significant noncompliance (SNC) as defined at 40 CFR 403.8(f)(2)(viii), at any time during the year;

A summary of enforcement actions or any other actions taken against SIUs during the year. Describe the type of action, final compliance date, and the amount of fines and/or penalties collected, if any. Describe any proposed actions for bringing SIUs into compliance.

e. A brief description of any programs the Discharger implements to reduce pollutants from nondomestic users not classified as SIUs;

f. A brief description of any significant changes in operating the pretreatment program which differ from the previous year, including, but not limited to, changes in the program's

administrative structure, local limits, monitoring program, legal authority, enforcement policy, funding, and staffing levels;

g. A summary of the annual pretreatment program budget, including the cost of pretreatment program functions and equipment purchases;

h. A summary of activities to involve and inform the public of the pretreatment program, including a copy of the newspaper notice, if any, required by 40 CFR 403.8(f)(2)(vii);

i. A description of any changes in sludge disposal methods;

j. A discussion of any concerns not described elsewhere in the annual report.

5. Any substantial modifications to the approved Pretreatment Program, as defined in 40 CFR 403.18(b), shall be submitted in writing to the Regional Water Board and USEPA and shall not become effective until Regional Water Board and USEPA approval is obtained.

6. Semiannual SIU Status Report

The Discharger shall submit a semiannual SIU noncompliance status report to the Regional Water Board, State Water Board, and USEPA. The report shall cover the period of January 1 through June 30 and shall be submitted no later than September 1. (All required information for semiannual SIU noncompliance status reporting covering the period July 1 through December 31 shall be included in the annual report that is due March 1.) The report shall contain:

a. The names and addresses of all SIUs which violated any discharge or reporting requirements during the semi-annual reporting period;

b. A description of the violations, including whether the discharge violations were for categorical standards or local limits;

c. A description of the enforcement actions or other actions taken to remedy the noncompliance;

d. The status of enforcement actions or other actions taken in response to SIU noncompliance identified in previous reports.

7. The Discharger is required to describe in the annual report any programs the POTW implements to reduce pollutants from non-domestic sources.

8. Nonindustrial Source Control and Public Education Programs

The Discharger shall continue to develop and implement its nonindustrial source control program and public education program. The purpose of these programs is to reduce nonindustrial toxic pollutants and pesticides into the POTW. These programs shall be periodically reviewed and addressed in the annual report.

9. Signatory Requirements and Report Submittal

a. The semi-annual and annual reports must be signed by a principal executive officer, ranking elected official or other duly authorized employee if such employee is responsible for the overall operation of the POTW. Any person signing these reports must make the following certification (40 CFR 403.6(a)(2)(ii)):

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

b. An original copy of the Annual Report and Semi-Annual Report must be sent to the Pretreatment Program Coordinator of the Regional Water Board and the duplicate copies of the Reports must be sent to USEPA through the following addresses:

Information and Technology Unit
Attn: Pretreatment Program Coordinator
California Regional Water Quality Control Board, Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Pretreatment Program
U.S. Environmental Protection Agency, Region 9
CWA Compliance Office (WTR-7)
75 Hawthorne Street
San Francisco, CA 94105-3901

Appendix 13-G

UNDERWATER SOUND ANALYSIS

Appendix 13-G
UNDERWATER SOUND ANALYSIS

Introduction

This appendix summarizes the underwater sound analysis related to construction of the riser and diffuser that could be located on either the San Pedro Shelf or the Palos Verdes Shelf. Impact driving is anticipated for placement of the jack-up barge, the upper casing, and the lower casing. This appendix is intended to provide a summary of the analysis.

Installation Data Summary

The following is a summary of information on procedures causing sound disturbances.

Jack-Up Barge

The jack-up barge will be secured to the sea floor with 18-inch diameter piles, which will be driven with an impact driver. Driving is expected to occur over 5 days and up to 10 hours per day. The impact interval is expected to be 1.5 seconds.

16-Foot-Diameter Outer Steel Riser Tube

The 16-foot-diameter riser tube will be driven into the sea floor with a traditional impact driver or by using a drop-and-release method. Driving is expected to occur over 15 days and up to 10 hours per day. The impact interval is expected to be 15 seconds.

13-Foot-Diameter Inner Steel Riser Tube

The 13-foot-diameter riser tube will be driven into the sea floor with a traditional impact driver or by using a drop-and-release method. Driving is expected to occur over 15 days and up to 10 hours per day. The impact interval is expected to be 15 seconds.

Impact Analysis

Over the past several years, methods for evaluating underwater sound from pile driving have been developed by the California Department of Transportation (Caltrans 2009) and the National Marine Fisheries Service (NMFS 2009). This analysis has been conducted in general conformance with these methods. These analysis methods use an empirical approach that relies on data from previous similar installations. The riser driving does not fall within the range of projects that have been analyzed before because of the large size of the steel tubes and the location of the installation (open ocean several miles offshore). Accordingly, some degree of extrapolation and estimation using engineering judgment has been used for the riser assumptions.

Underwater sound is evaluated in terms of the following primary metrics expressed in decibels (dB). (Refer to Caltrans 2009 for a detailed discussion of metrics and underwater sound fundamentals):

- Peak level
- Root mean square (RMS) level
- Sound exposure level (SEL)
- Accumulated sound exposure level ($SEL_{accumulated}$)

Impact thresholds used in this analysis come from a summary of thresholds published on the Washington Department of Transportation website (WSDOT 2009). The WSDOT threshold summary is included at the end of this document. The $SEL_{accumulated}$ is based on the SEL from a single strike and the number of strikes per day.

Jack-Up Barge

According to NMFS guidance (NMFS 2009), SEL values below 150 dB do not accumulate for the purposes of assessing injury potential. In practice, this means that the distance to the 150-dB SEL limit is the maximum distance at which there is injury potential for fish. It also means that once there are 5,000 strikes in a day, the distance within which an impact to fish can occur does not increase. Assuming that driving occurs continuously 10 hours per day over 5 days with an impact interval of 1.5 seconds, there could be any many as 24,000 strikes per day. Table 1 (included at the end of this document) summarizes the impact analysis. The table shows the distance at which the underwater sound level attenuates to the impact level. In other words, this is the distance within which the threshold is exceeded.

16-Foot-Diameter Outer Steel Riser Tube

Assuming that driving occurs continuously 10 hours per day over 15 days with an impact interval of 15 seconds, there could be any many as 2,400 strikes per day. Table 2 (included at the end of this document) summarizes the impact analysis. There are no data on underwater sound generated by the drop-and-release method. In general, it is likely that this method would produce less sound because there is no direct striking of the tube except for the impact at the sea bottom. It can be conservatively assumed here that underwater sound would be equal to or less than the sound from impact driving.

13-Foot-Diameter Inner Steel Riser Tube

Driving assumptions for the 13-foot-diameter riser tube are the same as those for the 16-foot-diameter riser tube. Table 3 (included at the end of this document) summarizes the impact analysis.

References

Caltrans (California Department of Transportation). 2009. Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/bio/files/Guidance_Manual_2_09.pdf>.

NMFS (National Marine Fisheries Service). 2009. Spreadsheet to estimate the levels of underwater sound received by fishes that are exposed to elevated levels of underwater sound produced during pile driving. Available: <http://www.wsdot.wa.gov/NR/rdonlyres/1C4DD9F8-681F-49DC-ACAF-ABD307DAEAD2/0/BA_NMFSpileDrivCalcs.xls>.

WSDOT (Washington Department of Transportation). 2009. Marine mammal, fish, and Marbled Murrelet injury and disturbance thresholds for marine construction activity. Olympia, WA. Available: <http://www.wsdot.wa.gov/NR/rdonlyres/216F21DA-A91B-43F2-8423-CD42885EE0EC/0/BA_MarineNoiseThrshlds.pdf>.

Marine Mammal, Fish, and Marbled Murrelet Injury and Disturbance Thresholds for Marine Construction Activity

Functional Hearing Group	Airborne Noise Thresholds	Underwater Noise Thresholds	
	In air Sound Pressure Level (RMS)	Impact Pile Driving Disturbance Threshold	Injury Threshold
Cetaceans	NA	160 dB RMS	180 dB RMS****
Pinnipeds	Disturbance: 90 dB RMS (un-weighted) for harbor seals, and 100 dB RMS (un-weighted) for sea lions and all other pinnipeds (re: 20 $\mu Pa^2 sec$)**	160 dB RMS	190 dB RMS****
Fish ≥ 2 grams	NA	Behavior effects threshold 150 dB RMS***	187 dB Cumulative SEL★★
Fish < 2 grams	NA		183 dB Cumulative SEL★★
Fish all sizes	NA		Peak 206 dB
Foraging marbled murrelets★★★	Injury: 92 dBA*	150dB RMS★	180 dB peak

* Noise levels measured in air are typically used to assess impacts on humans and thus are weighted (A-weighting) to reduce the contribution of low and high frequencies and correspond to how humans hear. Noise levels measured underwater are not weighted and thus measure the unaltered frequency range of interest, which may extend below and above the audible range of many organisms.

** Personal communication (email) on March 11, 2009 with Jaclyn Daly, Fisheries Biologist, National Marine Fisheries Service, Office of Protected Resources, 1315 East-West Hwy, Rm 3525, Silver Spring, MD 20910. This is the in air SPL at which pinniped haulout disturbance has been documented.

*** Hastings 2002, as cited in BA Manual

RMS - Root-mean-square: For pile driving, this is the square root of the mean square of a single pile driving impulse pressure event.

**** Source: Southal et al. 2007; 71 FR 3260 Jan. 20, 2006

★Although listed as a disturbance threshold, the USFWS considers this to be a noise disturbance threshold guideline, not criteria, for foraging marbled murrelets and for underwater exposure only.

★★Source: Memorandum on the Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities (available: http://www.wsdot.wa.gov/Environment/Biology/BA#Noise)

Potentially useful websites for calculating underwater noise distance to thresholds: Greeneridge calculator: http://www.greeneridge.com/radii.html (data inputs: Range = 10 [if source level, range = 1], B = 15, C = 0.003 for marine mammals, C = 0 for fish); Online math calculator: http://www.easycalculation.com/statistics/root-mean-square.php

For pile driving, these are the thresholds that NMFS has determined would result in Level A Harassment (injury) and Level B Harassment (disturbance) to marine mammals, as described in 70 FR 1871, 71 FR 3260, and 73 FR 41318.

Table 1. 18-Inch Diameter Steel Pipe Piles for Jack-up Barge

Distance (m)	Peak	RMS	SEL	SEL_{accum} [2]
10[1]	208	187	176	220
12	206	185	174	218
19	201	180	169	213
95	182	161	150	194
100	181	160	NA	NA
110	180	159	NA	NA
246	171	150	NA	NA

206 dB-peak	peak injury threshold for fish
190 dB-RMS	injury threshold for pinnipeds
180 dB-RMS	injury threshold for cetaceans
160 dB-RMS	disturbance threshold for pinnipeds
150 dB-RMS	disturbance threshold for cetaceans, noise disturbance guideline for foraging marbled murrelets
150 dB-SEL	level at which SEL no longer accumulatives re: fish injury
187 dB-SEL_{accum}	injury threshold for fish > 2 g (Per NOAA guidance injury effect limited to 150 dB-SEL distance)
183 dB-SEL_{accum}	injury threshold for fish < 2 g (Per NOAA guidance injury effect limited to 150 dB-SEL distance)
180 dB-peak	injury threshold for foraging marbled murrelets

[1] Direct values from San Joaquin River 20 inch steel pipe data (Caltrans 2009)

[2] Assumes 24,000 strikes per day, however 5,000 strikes results in maximum accumulated SEL due to 150 dB limit.

Note: Per NOAA guidance SEL below 150 dB does not accumulate.

Attenuation rate of 8 dB per doubling of distance based on deep water situations in reported in Caltrans 2009.

Table 2. 16-foot Diameter Riser

Distance (m)	Peak	RMS	SEL	SEL_{accum}*	Comment
10	223	211	197		Developed from San Rafael 166 inch (13.8 ft) data (Caltrans 2009; Woodbury 2009)
	+3	+3	+3		Adjustment for larger 16 ft steel tube (+3 dB)
10	226	214	200	234	Source level for 16 ft steel tube
20	218	206	192	226	
56	206	194	180	214	
80	202	190	176	210	
190	192	180	166	200	
550	180	168	154	188	
575	179	167	153	187	
758	176	164	150	184	
1100	172	160	NA	NA	
2547	162	150	NA	NA	

206 dB-peak	peak injury threshold for fish
190 dB-RMS	injury threshold for pinnipeds
180 dB-RMS	injury threshold for cetaceans
160 dB-RMS	disturbance threshold for pinnipeds
150 dB-RMS	disturbance threshold for cetaceans, noise disturbance guideline for foraging marbled murrelets
150 dB-SEL	level at which SEL no longer accumulatives re: fish injury
187 dB-SEL_{accumu}	injury threshold for fish > 2 g
183 dB-SEL_{accumu}	injury threshold for fish > 2 g (Per NOAA guidance injury effect limited to 150 dB-SEL distance)
180 dB-peak	injury threshold for foraging marbled murrelets

*Assumes on 2400 strikes per day

Note: Per NOAA guidance SEL below 150 dB does not accumulate.

Attenuation rate of 8 dB per doubling of distance based on deep water situations in reported in Caltrans 2009.

Table 3. 13-foot Diameter Riser

Distance (m)	Peak	RMS	SEL	SEL_{accum}*	Comment
10	223	211	197		Developed from San Rafael 166 inch (13.8 ft) data (Caltrans 2009; Woodbury 2009)
	-1	-1	-1		Adjustment for smaller 13 ft steel tube (-1 dB)
10	222	210	196	240	Source level for 13 ft steel tube
20	214	202	188	232	
40	206	194	180	224	
55	202	190	176	220	
130	192	180	166	210	
375	180	168	154	198	
430	179	167	153	197	
536	176	164	150	194	
750	172	160	NA	NA	
1802	162	150	NA	NA	

206 dB-peak	peak injury threshold for fish
190 dB-RMS	injury threshold for pinnipeds
180 dB-RMS	injury threshold for cetaceans
160 dB-RMS	disturbance threshold for pinnipeds
150 dB-RMS	disturbance threshold for cetaceans, noise disturbance guideline for foraging marbled murrelets
150 dB-SEL	level at which SEL no longer accumulatives re: fish injury
187 dB-SEL_{accumu}	injury threshold for fish > 2 g (Per NOAA guidance injury effect limited to 150 dB-SEL distance)
183 dB-SEL_{accumu}	injury threshold for fish < 2 g (Per NOAA guidance injury effect limited to 150 dB-SEL distance)
180 dB-peak	injury threshold for foraging marbled murrelets

*Assumes 2400 strikes per day

Note: Per NOAA guidance SEL below 150 dB does not accumulate.

Attenuation rate of 8 dB per doubling of distance based on deep water situations in reported in Caltrans 2009.

Appendix 16-A

PUBLIC SERVICE PROVIDERS

Appendix 16-A
PUBLIC SERVICE PROVIDERS

Introduction

This appendix provides support information for the Public Services Chapter of the Clearwater Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS). It provides the location of public service providers in the Joint Outfall System (JOS) service area, and outlines their services and planning efforts to accommodate anticipated growth. The information contained in this appendix was compiled mainly from questionnaires received from the public service providers in the service area. Copies of the questionnaires and provider responses are provided as Attachment A to this appendix.

Regional and Local Setting

Police Protection

Police protection within the JOS service area is provided by the Los Angeles County Sheriff's Department, the Port of Los Angeles Police, and police departments for the cities of Los Angeles, Long Beach, and Pomona.

Los Angeles County Sheriff's Department

The Los Angeles County Sheriff's Department is divided into eleven divisions, each headed by a division chief. Units in Field Operations Region II and III are primarily responsible for providing basic police service to the contract cities and unincorporated county areas that fall within the geographical boundaries of these divisions (Los Angeles County Sheriff's Department 2010a).

The Carson Sheriff's Station from Region II provides service for unincorporated county areas in Gardena, Torrance, and Rancho Dominguez and the contract city of Carson (Los Angeles County Sheriff's Department 2010b). The department's standard acceptable response times for the Carson Station are as follows (Tse pers. comm.):

- Emergency calls – immediate
- Immediate calls – 7 minutes
- Alarm calls – 20 minutes
- Non-emergency calls – 20 minutes
- Report calls – 20 minutes

The Carson Station is scheduled to be remodeled in the near future (Tse pers. comm.).

The Cerritos and Industry Stations are located in Region III. The Cerritos Sheriff's Station is staffed with 58 sworn and 20 civilian employees and provides high-quality public safety services, emphasizing community-oriented policing to the city of Cerritos' 51,488 residents (Los Angeles County Sheriff's

Department 2010c). The department's standard acceptable response times for the Cerritos Station are as follows (Tse pers. comm.):

- Emergency calls – 3.6 minutes
- Immediate calls – 6.8 minutes
- Alarm calls – not applicable
- Non-emergency calls – 15.7 minutes
- Report calls – 15.7 minutes

The Industry Station provides police services to the cities of Industry, La Puente, La Habra Heights, and the unincorporated county communities of East and West Valinda, Valinda, Bassett/North Whittier, and Hacienda Heights. The service area encompasses approximately 65 square miles and a population of more than 243,000 (Los Angeles County Sheriff's Department 2010d). The department's standard acceptable response times for the Industry Station are as follows (Tse pers. comm.):

- Emergency calls – 10 minutes
- Immediate calls – 10 minutes
- Alarm calls – 20 minutes
- Non-emergency calls – 60 minutes
- Report calls – 60 minutes

Plans to construct new facilities include additional office space to be provided at a warehouse across the street from the Industry Station (Tse pers. comm.).

Los Angeles Police Department

The Los Angeles Police Department (LAPD) has four bureaus and 25 divisions. The Harbor Division within the South Bureau provides primary service to the project. The Harbor Community Police Station is located at 2175 John S. Gibson Boulevard in the community of San Pedro at the entrance of the Port of Los Angeles. The Harbor area has a population of approximately 171,000, encompasses 27 square miles, and is home to four distinct communities: San Pedro, Wilmington, Harbor City, and Harbor Gateway (LAPD 2004).

During periods of statistically high crime activity, the number of field officers has increased. Officers employ radio-dispatched cruisers and traffic control motorcycles to patrol the proposed project vicinity. LAPD provides support to the Port of Los Angeles Police and responds to Port incidents under the following special circumstances: 1) complex crimes including homicides and major traffic incidents 2) special investigations including narcotics, organized crime, and terrorism and 3) unusual occurrences as identified by City protocol, such as events that require special resources, expertise, or staffing beyond current competencies.

Los Angeles Port Police

The Los Angeles Port Police are responsible for patrol and surveillance of the Port and neighboring Port Area communities. The Los Angeles Port Police enforce federal, state, and local public safety statutes as well as environmental and maritime safety regulations. Their primary goal is to protect the Port against all hazards through identification and elimination to ensure the free flow and protection of commerce, and

to identify, apprehend, and prosecute persons who would direct criminal activity toward Los Angeles Harbor Department (LAHD) properties, customers, or port users (POLA 2010).

Standard acceptable response times are as follows (Provinchain pers. com 2010):

- Emergency calls – 3 minutes or less
- Immediate calls – 5 minutes or less
- Alarm calls – 10 minutes or less
- Non-emergency calls – 10 minutes or less
- Report calls – 10 minutes or less

A new Port Police headquarters located on the corner of 5th Street and Center Street in the community of San Pedro has an expected completion date of spring 2011 (Provinchain pers. comm. 2010).

Long Beach Police Department

The Long Beach Police Department has four patrol divisions. The East Division, at 23 square miles, comprises approximately 40 percent of the city of Long Beach. It is bound on the south by the Port of Long Beach, the west by Cherry Avenue and the city of Signal Hill, the north by the city of Lakewood, and the east by Hawaiian Gardens, Los Alamitos, and Seal Beach. There are 141 sworn and three civilian employees at the East Patrol Division who serve almost 170,000 people and answer over 55,000 dispatches each year (LBPD 2010a). Each patrol division is divided into beats. Individual officers are assigned to patrol beats within their division to get to know the specific police service needs of area residents and businesses (LBPD 2010b). The East Patrol Division has an unspecified number of patrol beats. The proposed project is located in Beat 18, within the East Patrol Division, and is staffed with a minimum of one police officer for every watch. This ensures 24-hour police coverage for each beat in the city (Levy pers. comm.). The East Patrol Division substation is the smallest of the substations, and there are no current plans to construct additional stations (LBPD 2010a; Levy pers. comm.).

Pomona Police Department

The Pomona Police Department serves an estimated 150,000 people within 24 square miles (City of Pomona 2010). Patrol service represents the primary function of the police department. The department's target response times are as follows (Wright pers. comm.):

- Emergency calls – less than 4 minutes
- Immediate calls – less than 8 minutes
- Alarm calls – less than 26 minutes for commercial businesses
- Non-emergency calls – less than 34 minutes
- Report calls – less than 34 minutes

The department is tentatively planning a new facility across the street from the current Main Station (Wright pers. comm.).

Fire Protection

Fire protection within the JOS service area is provided by the Port of Los Angeles Fire Department, Los Angeles County Fire Department, Los Angeles Fire Department, and Long Beach Fire Department.

Los Angeles County Fire Department

The Los Angeles County Fire Department has 170 fire stations spread throughout the county. The Los Angeles County Fire Department does not maintain a standard service radius for the primary and secondary responding stations. The department uses national guidelines of a 5-minute response time for the first arriving unit for fire and EMS responses and 8 minutes for the advanced life support unit in urban areas (Todd pers. comm.).

The Los Angeles County Fire Department has been working with the city of Carson to address the need for an additional fire station on the west side of the city in the vicinity of Del Amo and Main Street. In addition, the department's current 5-year facility plan has identified 20 new fire stations all of which are planned to be built in the urban expansion areas of the county (Malibu/Santa Monica Mountains area, Santa Clarita and Antelope Valley). Actual station development is contingent upon the pace of development in the vicinity of the planned station and the availability of funding (Todd pers. comm.).

Los Angeles Fire Department

The Los Angeles Fire Department is a full-spectrum life safety agency that has 114 stations protecting more than 4 million people who live in the city of Los Angeles (LAFD 2010a; LAFD 2010b). The Los Angeles Fire Department's 3,586 uniformed personnel protect life, property, and the environment through their direct involvement in fire prevention, firefighting, emergency medical care, technical rescue, hazardous materials mitigation, disaster response, public education, and community service. A total of 1,104 uniformed firefighters (including 242 serving as firefighter/paramedics) are always on duty at fire department facilities across the department's 471-square-mile jurisdiction (LAFD 2010a). Each station has a delineated area called a "first district." This is the area where a fire company is normally the first to arrive in response to an alarm. The estimated response time for service to the project area is 4 to 6 minutes (Herrera pers. comm. 2010c).

The Port of Los Angeles is under the jurisdiction of the Los Angeles Fire Department, which operates five stations located in the 7,500-acre port complex. Los Angeles Fire Department Fire Stations 38 and 40 provide primary service to the project (Herrera pers. comm. 2010a). The estimated response time for service to the project area is 4 to 6 minutes (Herrera pers. comm. 2010a; Herrera pers. comm. 2010b; Fry pers. comm.).

There are no plans to construct additional fire facilities (Herrera pers. comm. 2010a).

Long Beach Fire Department

The Long Beach Fire Department has 23 stations serving approximately 490,100 residents within 52.3 square miles in the city of Long Beach. This includes 7 miles of beaches and 22 square miles of waterways. Fire facilities include two fire boat stations in the Port of Long Beach, one urban search and rescue station, and one airport fire station. Fire fighting apparatus includes 21 engines and five ladder trucks with four-member staffing on all engines and trucks; nine paramedic rescue ambulances with two firefighter/paramedics present on all paramedic rescue ambulances; five basic life support ambulances;

one hazardous materials task force; seven beach rescue units; one dive rescue unit; and two multi-casualty incident units (LBFD 2009).

There are no plans to construct any future stations in the project area.

United States Coast Guard

The United States Coast Guard (USCG) is a military, multimission, maritime service within the Department of Homeland Security. Its core roles are to protect the public, the environment, and the United States' economic and security interests in any maritime region in which those interests may be at risk, including international waters and America's coasts, ports, and inland waterways (USCG 2008). The USCG mission includes maritime safety, maritime law enforcement, protection of natural resources, maritime mobility, national defense, and homeland security. The USCG maintains a post in the Port of Los Angeles on Terminal Island. The USCG's primary responsibility at the Port is to ensure the safety of vessel traffic in the channels of the Port and in coastal waters.

The USCG 11th District supports the Port area. The USCG 11th District handles marine safety issues including search and rescue, homeland security, law enforcement, commercial vessel inspections, and mariner licenses (USCG 2009).

The USCG 11th District encompasses the states of California, Arizona, Nevada, and Utah, the coastal and offshore water out over 1,000 miles, and the offshore waters of Mexico and Central American down to South America. The 11th District includes 48 units and it employs over 2,600 active duty, reserve, and civilian employees (USCG 2009).

School Services

School districts in the Clearwater Program service area include the Los Angeles Unified School District, ABC Unified School District, Whittier City School District, Pomona Unified School District, and Long Beach Unified School District. The program and project elements proposed in the MFP would have no impact on schools and school districts (see Attachment A).

Printed References

City of Pomona. 2010. City of Pomona Official Website. Available: <http://www.ci.pomona.ca.us/city_departments/police/operations_division.php>. Accessed: March 12, 2010.

LAFD (Los Angeles Fire Department). 2010a. LAFD – About the Los Angeles Fire Department. Available: < http://lafd.org/about.htm>. Accessed: March 12, 2010.

LAFD (Los Angeles Fire Department). 2010b. LAFD – Neighborhood Fire Stations. Available: <http://lafd.org/fsloc.htm>. Accessed: March 12, 2010.

LAPD (Los Angeles Police Department). 2004. Official Website of the Los Angeles Police Department About Harbor. Available: <http://www.lapdonline.org/harbor_community_police_station/content_basic_view/1709>. Accessed: March 3, 2010.

LBFD (Long Beach Fire Department). 2009. LBFD Info. Available: <http://www.longbeach.gov/civica/filebank/blobdload.asp?BlobID=21340>. Accessed March 21, 2010

LBPD (Long Beach Police Department). 2010a. City of Long Beach, CA – East Division. Available: <http://www.longbeach.gov/police/about/patrol_bureau_deputy_chief/east_division.asp>. Accessed: March 11, 2010.

LBPD (Long Beach Police Department). 2010b. City of Long Beach, CA – About Patrol Bureau. Available: <http://www.longbeach.gov/police/about/patrol_bureau_deputy_chief/ about_patrol_bureau.asp>. Accessed: March 19, 2010.

Los Angeles County Sheriff's Department. 2010a; Los Angeles County Sheriff's Dept. – Field Operations Region II. Available: <http://www.lasd.org/divisions/for2/index.html>. Accessed: March 16, 2010.

Los Angeles County Sheriff's Department. 2010b. Los Angeles County Sheriff's Dept. – Carson Station. Available: <http://www.lasd.org/stations/for2/carson/index.html>. Accessed: March 16, 2010.

Los Angeles County Sheriff's Department. 2010c. Los Angeles County Sheriff's Dept. – Cerritos Station. Available: <http://www.lasd.org/stations/for3/cerritos/index.html>. Accessed: March 16, 2010.

Los Angeles County Sheriff's Department. 2010d. Los Angeles County Sheriff's Dept. – Industry Station. Available: <http://www.lasd.org/stations/for3/industry/index.html>. Accessed: March 16, 2010.

Port of Los Angeles (POLA). 2010. The Port of Los Angeles Security. Available: <http://www.portoflosangeles.org/security/port_police.asp>. Accessed: March 15, 2010.

USCG (United States Coast Guard). 2008. USCG: Missions. Last revised: November 5, 2008. Available: <http://www.uscg.mil/top/missions/>. Accessed: March 17, 2010.

USCG (United States Coast Guard). 2009. USCG: Eleventh Coast Guard District. Last revised: 12/31/2009. Available: <http://www.uscg.mil/D11/>. Accessed: March 3, 2010.

Personal Communications

Fry, Craig. Assistant Chief. Los Angeles Fire Department, Los Angeles, CA. March 15, 2010 – Phone Conversation.

Herrera, C. Kenneth (a). Captain II. Los Angeles Fire Department, Harbor City, CA. March 5, 2010 – Email.

Herrera, C. Kenneth (b). Captain II. Los Angeles Fire Department, Harbor City, CA. March 15, 2010 – Email.

Herrera, C. Kenneth (c). Captain II. Los Angeles Fire Department, Harbor City, CA. March 26, 2010 – Email.

Levy, Josef. Patrol Bureau Administrative Lieutenant. Long Beach Police Department, Long Beach, CA. March 12, 2010 – Email.

Provinchain, Cheryl. Senior Management Analyst. Los Angeles Port Police, San Pedro, CA. March 8, 2010 – Email.

Todd, John. Chief, Forestry Division. County of Los Angeles Fire Department, Los Angeles, CA. March 5, 2010 – Letter.

Tse, Gary. Director. Los Angeles County Sheriff's Department, Monterey Park, CA. March 12, 2010 – Letter

Wright, Jerry. Lieutenant. Pomona Police Department, Pomona, CA. March 11, 2010 – Email.

Attachment A

PROVIDER RESPONSES

County of Los Angeles
Sheriff's Department Headquarters
4700 Ramona Boulevard
Monterey Park, California 91754-2169

Leroy D. Baca, Sheriff

March 12, 2010

Ms. Tanya Jones
ICF International
1 Ada Parkway, Suite 100
Irvine, California 92618

Dear Ms. Jones:

QUESTIONNAIRE RESPONSE
SANITATION DISTRICTS OF LOS ANGELES COUNTY
CLEARWATER PROGRAM MASTER FACILITIES PLAN

This is in response to your notice dated February 17, 2010, requesting comments from the Carson Sheriff's Station, Cerritos Sheriff's Station, and the Industry Sheriff's Station regarding the questionnaire for the Clearwater Program Master Facilities Plan, initial study. Please see the attached documents from the responding Sheriff's Station regarding their responses to the questionnaire on the subject project.

Questionnaire responses provided by:

- Carson Sheriff's Station for the Joint Water Pollution Control Plant (JWPCP).
- Cerritos Sheriff's Station for the Los Coyotes Water Reclamation Plant (LCWRP).
- Industry Sheriff's Station for the San Jose Creek Water Reclamation Plant (SJCWRP).

We reserve the right to address these issues in future reviews. Should you have any additional questions regarding this matter, please contact Mr. Chin Kim, of my staff at (626) 300-3136.

Sincerely,

LEROY D. BACA, SHERIFF

Gary T. K. Tse, Director
Facilities Planning Bureau

RECEIVED
MAR 16 2010
By

Clearwater Program Master Facilities Plan Questionnaire

Name of Responder: **Craig R. Calzada, Carson Sheriff's Station**

Title: **Sergeant**

Date: **March 4, 2010**

Agency/Contact Information:

1. The department website shows a total of 25 Los Angeles County Sheriff's Patrol Stations. What patrol police stations would provide primary service to the project site?
   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):

   b. LCWRP (located at 16515 Piuma Avenue):

   c. SJCWRP (located at 1965 Workman Mill Road, Whittier):

   d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard): **Carson Station**

   e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street): **Carson Station**

2. Are there beat/patrol areas to which officers are assigned? **Yes, we have patrol areas in which deputies are assigned.**

3. What is the department's standard acceptable response time for: **Industry Station**
   a. Emergency calls **Immediately**
   b. Immediate calls **7 minutes**
   c. Alarm calls **20 minutes**
   d. Non-emergency calls **20 minutes**
   e. Report calls **20 minutes**

4. What is the estimated response time for service to the project site for emergency calls:
   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):
   b. LCWRP (located at 16515 Piuma Avenue):
   c. SJCWRP (located at 1965 Workman Mill Road, Whittier):
   d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard): **Immediately**
   e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street): **Immediately**

5. Is there a standard approved officer to population ratio? **Each Contract City (Carson) sets the ratio they feel is necessary for their particular city.**

6. Would the Sheriff's Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the project as described above? **No**

7. Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located? **Yes, Carson Station is scheduled to be remodeled in the near future.**

8. Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance? **For easier access, we would recommend an access card or entry code be given to us to be kept by the area cars or field supervisor.**

9. Would the department recommend any project safety components to be included in the Clearwater program as it is described above? **We would recommend video cameras and recording equipment in the event any criminal activity occurs. We would be able to retrieve the video evidence to aid with the investigation.**

10. Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness or evacuation plans? Would it require the preparation of any new plans? **The additional truck traffic described in the tunneling portion of the project may impact our response times to calls. All the surface streets surrounding the project area are major thoroughfares we use daily. The additional traffic would delay our arrival.**

11. Please provide any additional information you feel would be pertinent. **No additional comments.**

Clearwater Program Master Facilities Plan Questionnaire

Name of Responder: **Ernest Bedoy, Industry Sheriff's Station**

Title: **Sergeant**

Date: **March 10, 2010**

Agency/Contact Information:

1. The department website shows a total of 25 Los Angeles County Sheriff's Patrol Stations. What patrol police stations would provide primary service to the project site?
   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):

   b. LCWRP (located at 16515 Piuma Avenue):

   c. SJCWRP (located at 1965 Workman Mill Road, Whittier): **Industry Sheriff's Station**

   d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):

   e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

2. Are there beat/patrol areas to which officers are assigned? **Yes**

3. What is the department's standard acceptable response time for: **Industry Station**
   a. Emergency calls **10 minutes**
   b. Immediate calls **10 minutes**
   c. Alarm calls **20 minutes**
   d. Non-emergency calls **60 minutes**
   e. Report calls **60 minutes**

4. What is the estimated response time for service to the project site for emergency calls:
   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):
   b. LCWRP (located at 16515 Piuma Avenue):
   c. SJCWRP (located at 1965 Workman Mill Road, Whittier): **10 minutes**
   d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):
   e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

5. Is there a standard approved officer to population ratio? **No**

6. Would the Sheriff's Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the project as described above? **No**

7. Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located? **Yes, additional office space will be at a warehouse across the street from our current Station.**

8. Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance? **No**

9. Would the department recommend any project safety components to be included in the Clearwater program as it is described above? **Possibly**

10. Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness or evacuation plans? Would it require the preparation of any new plans? **No**

11. Please provide any additional information you feel would be pertinent. **N/A**

Clearwater Program Master Facilities Plan Questionnaire

Name of Responder: **Gary R. De Cew, Cerritos Sheriff's Station**

Title: **Sergeant**

Date: **March 4, 2010**

Agency/Contact Information:

1. The department website shows a total of 25 Los Angeles County Sheriff's Patrol Stations. What patrol police stations would provide primary service to the project site?
   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):

   b. LCWRP (located at 16515 Piuma Avenue): **Cerritos Sheriff's Station, 18135 Bloomfield Ave, Cerritos, CA 90703**

   c. SJCWRP (located at 1965 Workman Mill Road, Whittier):

   d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):

   e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

2. Are there beat/patrol areas to which officers are assigned? **Yes**

3. What is the department's standard acceptable response time for: **Cerritos Station Actual Averages (YTD)**
   a. Emergency calls **36 minutes**
   b. Immediate calls **6.8 minutes**
   c. Alarm calls **N/A**
   d. Non-emergency calls **15.7 minutes**
   e. Report calls **15.7 minutes**

4. What is the estimated response time for service to the project site for emergency calls:
   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):
   b. LCWRP (located at 16515 Piuma Avenue): **3.6 minutes**
   c. SJCWRP (located at 1965 Workman Mill Road, Whittier):
   d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):
   e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

5. Is there a standard approved officer to population ratio? **Yes**

6. Would the Sheriff's Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the project as described above?

7. Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located?

8. Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance?

9. Would the department recommend any project safety components to be included in the Clearwater program as it is described above?

10. Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness or evacuation plans? Would it require the preparation of any new plans?

11. Please provide any additional information you feel would be pertinent.

Chin

ICF INTERNATIONAL

RECEIVED
FEB 22 2010
FACILITIES PLANNING BUREAU
ADMINISTRATIVE SERVICES DIVISION

February 17, 2010

Michael Parker
Captain
Los Angeles County Sheriff's Department
4700 Ramona Blvd.
Monterey Park, CA 91754

Subject: Sanitation Districts of Los Angeles County Clearwater Program Master Facilities Plan Environmental Impact Report/Environmental Impact Statement

Dear Captain Parker:

The Sanitation Districts of Los Angeles County (Sanitation Districts) are preparing a master facilities plan to guide the development and management of wastewater conveyance and treatment facilities within the Joint Outfall System (JOS) that serves 73 cities and unincorporated areas of Los Angeles County, and parts of the city of Los Angeles. The plan, known as the Clearwater Program Master Facilities Plan, is designed to meet the wastewater management needs of the JOS through the year 2050. ICF International is preparing the Clearwater Program environmental impact report/environmental impact statement (EIR/EIS) on behalf of the Sanitation Districts and the Army Corps of Engineers. The draft EIR/EIS will be used to inform decision makers and the public about the environmental effects of the Clearwater Program. ICF International has been retained by the Districts to assist with preparation of the environmental document for the Clearwater Program.

The purpose of this letter and attached questionnaire is to obtain your input for the Clearwater Program with regard to police and security and the ability of the Los Angeles County Sheriff's Department to provide services. To do this, I have included details regarding proposed actions within your jurisdiction below and attached a list of questions that require your attention. Your responses to these questions will provide ICF International with the needed information to appropriately evaluate potential impacts of the project on public services. Please address the numbered items on the attached questionnaire and return them to me by March 5, 2010. Feel free to add any additional information you think would be pertinent.

Please contact me at (949) 333-6642 or tjones2@icfi.com or Nicole Williams at (949) 333-6614 or nwilliams@icfi.com if you have any questions regarding the Clearwater Program or this letter. You can also obtain additional information regarding the Clearwater Program, including the Notice of Preparation and the Notice of Intent, at www.clearwaterprogram.org. Thank you in advance for your assistance with this matter.

Sincerely,

Tanya Jones
Environmental Analyst

Attachments:
1. Summary of proposed actions within the jurisdiction of the Los Angeles County Sheriff's Department and Figures
2. Questionnaire

1 Ada Parkway, Suite 100 — Irvine, CA 92618 — 949.333.6600 — 949.333.6601 fax — icfi.com — jonesandstokes.com

Ans File cc: GARY, Chin

1. **Proposed Actions within the Jurisdiction of the Los Angeles County Sheriff's Department**

The Clearwater Program would result in six actions within the Los Angeles County Sheriff's Department's jurisdiction. None of the actions would require an increase in the number of Sanitation District employees. Furthermore, many of the actions would consist of the construction and operation of wastewater treatment facilities that would be located primarily underground at existing facilities.

The first action would be the construction of approximately 40 miles of new sewers throughout the greater Los Angeles area. The exact locations of the new sewers are unknown at this time, but construction would include trenching to depths of five to 25 feet within the public-right-of-way of existing streets. This construction would be similar to normal utility placement and replacement work. Once operational, the sewers would simply convey wastewater. Therefore, it is not anticipated that the construction or operation of the sewers would constrain or deplete County Sheriff services.

The second action would be new construction at the Joint Water Pollution Control Plant (JWPCP) to add approximately six tanks for anaerobic digestion. The JWPCP is located in the city of Carson on approximately 350 acres and is surrounded by West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east. The construction and operation of the JWPCP would not result in additional employees and would not result in changes to access at the JWPCP. The improvements would be constructed within the existing footprint of the JWPCP boundary. See the attached figure. Therefore, it is not anticipated that the construction or operation of the facilities at the JWPCP would constrain or deplete County Sheriff services.

The third action would be new construction at the Los Coyotes Water Reclamation Plant (LCWRP) to upgrade existing facilities. The LCWRP is located at 16515 Piuma Avenue and is surrounded by Southern California Edison to the north, the 91 Freeway to the south, the 605 Freeway to the east, and the San Gabriel River to the west. The construction and operation of the LCWRP would not result in additional employees and would not result in changes to access at the LCWRP. All associated construction would be done within the footprint of the existing LCWRP boundaries. Once construction is complete, the majority of the new wastewater facilities would be underground. See the attached figure. Therefore, it is not anticipated that the construction or operation of the facilities at the LCWRP would constrain or deplete County Sherriff services.

The fourth action would be new construction at the San Jose Creek Water Reclamation Plant (SJCWRP) to expand the facility an additional 25 MGD and to update existing facilities. The SJCWRP is located at 1965 Workman Mill Road and is surrounded by San Jose Creek to the north, the 60 Freeway to the south, Workman Mill Road to the east, and the San Gabriel River to the west. The construction and operation of the SJCWRP would not result in additional employees and would not result in changes to access at the SJCWRP. All associated construction would be done within the footprint of the existing SJCWRP boundaries. Once construction is complete, a portion of the new wastewater facilities would be underground and others would be located adjacent to existing wastewater treatment plant facilities. See the attached figure. Therefore, it is not anticipated that the construction or operation of the facilities at the SJCWRP would constrain or deplete County Sherriff services.

The final two actions include the construction of a tunnel and ocean outfall to discharge treated effluent into the Pacific Ocean. Tunneling activities would occur between 4.5 to 7 years. One shaft site would be constructed within the JWPCP property boundary to support the construction of the tunnel. The shaft site would be located either at the JWPCP East shaft site on approximately 25 acres near the northwest corner of Main Street and Lomita Boulevard in the city of Carson or at the JWPCP West shaft site on approximately 17 acres to the south and 1 acre to the north of West Lomita Boulevard near Figueroa Street in the city of Los Angeles Wilmington-Harbor City community. Access to the JWPCP East shaft site would be off Figueroa Street or Sepulveda Boulevard at the existing JWPCP

entrance, therefore construction trucks and crews would drive through the JWPCP. Access to the JWPCP West shaft site would likely occur from Figueroa Street via Lomita Boulevard, Pacific Coast Highway or Sepulveda Boulevard. It is estimated that approximately ten construction workers would be needed to construct the shaft. The shaft construction work would likely occur in one 10-hour shift, 5 days per week. Shaft construction would last about 10 to 12 months and require a number of truck trips per day.

The JWPCP shaft site would serve as the main point of entry and exit for construction equipment and personnel into the tunnel. Tunneling activities would occur 20 to 24 hours a day, but would generally include maintenance activities during the nighttime shifts. Approximately 35 to 40 construction workers would be located at the shaft site during tunneling and fewer construction workers would be required during the nighttime shift. Construction of the tunnel would occur at the surface only at the shaft sites, as it would be tunneled through the subsurface. All construction workers would be specifically trained to work within tunnels and would have standard operating procedures in case of a tunneling-construction related emergency. Furthermore, the Sanitation Districts would have security on site at all times during construction and would not regularly rely on Sheriff services. The Districts' contractor will prepare and abide by a Confined Space Entry Program addressing all potential physical and environmental hazards and contain procedures for safe entry into confined spaces, including, but not limited to the following:

- Training of personnel
- Controlled access to the space
- Ventilation of the space
- Personal protective equipment
- Rescue plan provision

Contractors are also required to operate and maintain their own safety equipment, including, but not limited to:

- Life lines
- Harnesses
- Respiratory protective equipment
- Personal protective equipment
- Shoring
- Barricades

Tunneling operations must comply with strict CalOSHA and Federal OSHA requirements regarding ventilation and safety. The construction contractor will have to prepare emergency and evacuation plans that all construction workers will be trained on and abide by. The emergency plan will outline duties and responsibilities of all personnel on the project during an emergency. The plan will include ventilation controls, firefighting equipment, rescue procedures, evacuation plans and communications. Therefore, it is not anticipated that the construction of the tunnel and shaft site would constrain or deplete County Sherriff services.

Once operational, the shaft would be converted into a below ground drop structure. A low profile or flush above ground means of access to the tunnel may be necessary for future operations and maintenance activities; however, they would not include manned or habitable structures. The tunnel would be located at depths between approximately 30 and 400 feet below ground surface and would continually discharge treated effluent into the

Pacific Ocean. Therefore, it is not anticipated that operation of the tunnel and ancillary structures and equipment would constrain or deplete County Sheriff services.

FIGURE 3-9

CLEARWATER Program

Joint Water Pollution Control Plant Proposed Facilities

Source: Sanitation Districts of Los Angeles County

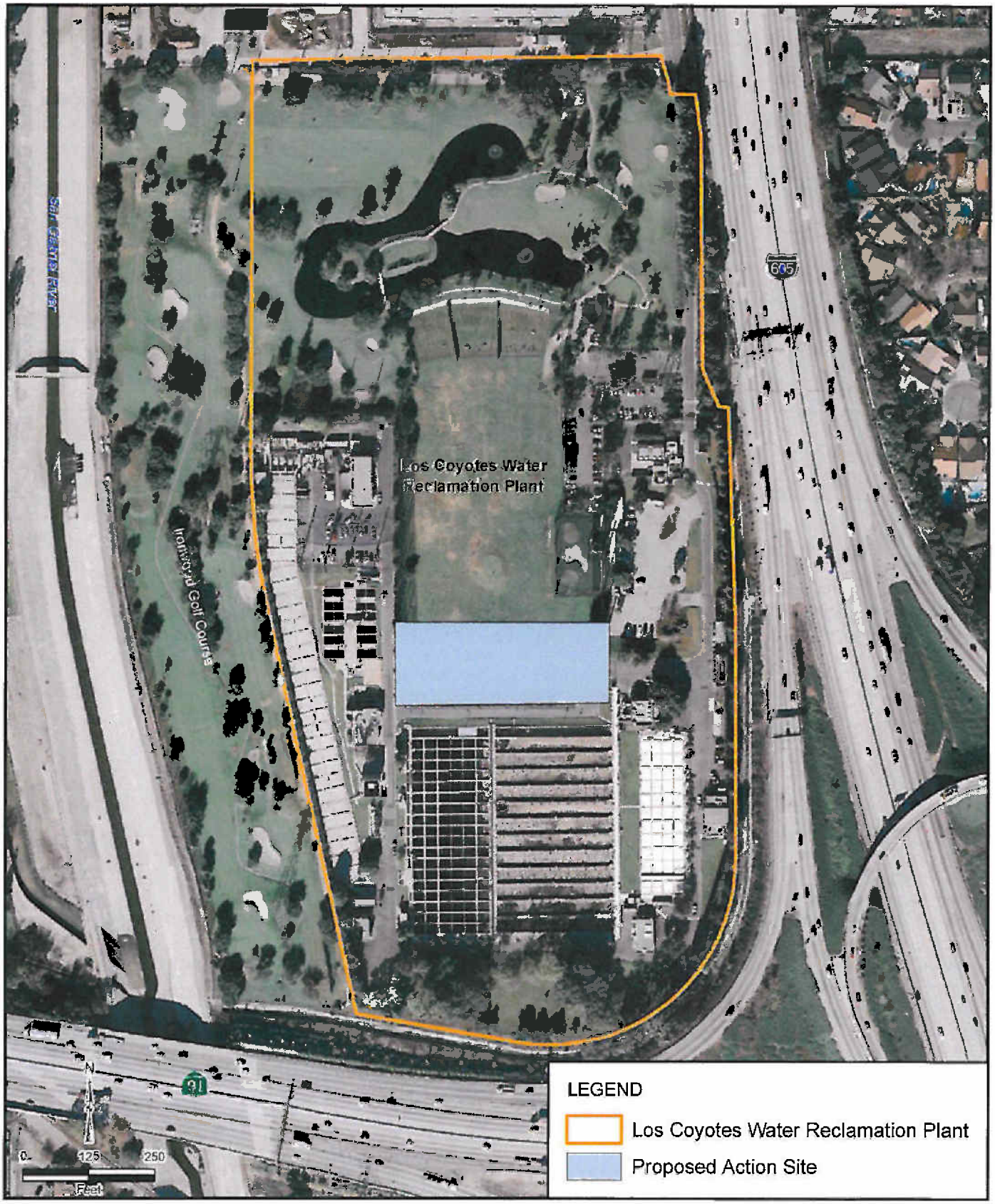

FIGURE 3-7

Los Coyotes Water Reclamation Plant Proposed Facilities

CLEARWATER Program

Source: Sanitation Districts of Los Angeles County

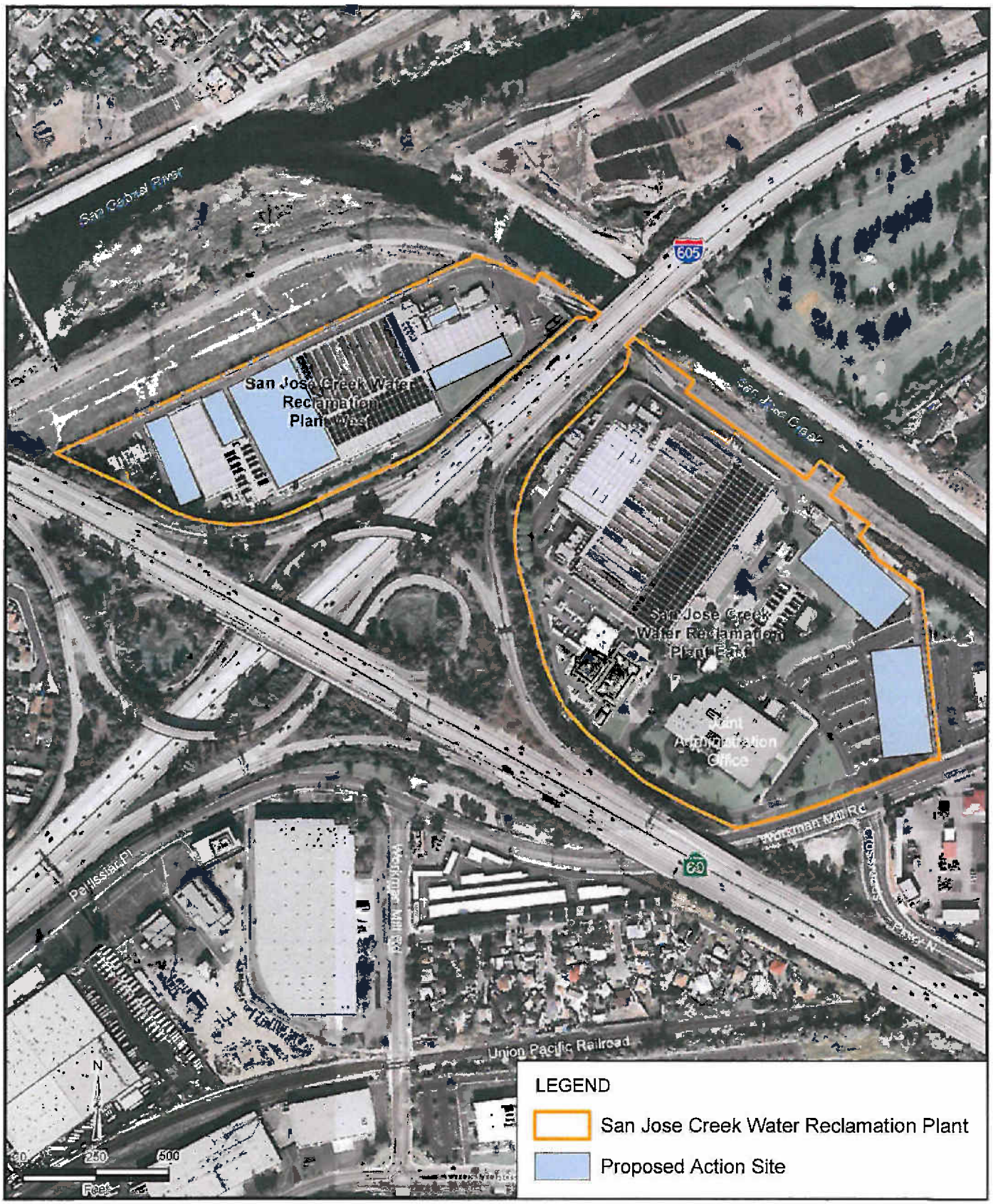

FIGURE 3-5

San Jose Creek Water Reclamation Plant Proposed Facilities

CLEARWATER Program

Source: Sanitation Districts of Los Angeles County

FIGURE 3-17

JWPCP East Shaft Site

CLEARWATER Program

Source: Sanitation Districts of Los Angeles County

FIGURE 3-21

JWPCP West Shaft Site

CLEARWATER Program

Source: Sanitation Districts of Los Angeles County

2. Questionnaire

Name of Responder:

Title:

Date:

Agency/Contact Information:

1. The department website shows a total of 25 Los Angeles County Sheriff's Patrol Stations. What patrol police stations would provide primary service to the project sites?
    a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):

    b. LCWRP (located at 16515 Piuma Avenue):

    c. SJCWRP (located at 1965 Workman Mill Road, Whittier):

    d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):

    e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

2. Are there beat/patrol areas to which officers are assigned?

3. What is the department's standard acceptable response time for:
    a. Emergency calls
    b. Immediate calls
    c. Alarm calls
    d. Non-emergency calls
    e. Report calls

4. What is the estimated response time for service to the project site for emergency calls:
    a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor Freeway to the east):

    b. LCWRP (located at 16515 Piuma Avenue):

    c. SJCWRP (located at 1965 Workman Mill Road, Whittier):

    d. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):

    e. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

5. Is there a standard approved officer to population ratio?

6. Would the Sheriff's Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the project as described above?

7. Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of

these projects and where will they be located?

8. Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance?

9. Would the department recommend any project safety components to be included in the Clearwater Program as it is described above?

10. Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness or evacuation plans? Would it require the preparation of any new plans?

11. Please provide any additional information you feel would be pertinent.

Sanitation Districts of Los Angeles County Clearwater Program Master Facilities Plan Environmental Impact Report/Environmental Impact Statement

Name of Responder: **Cheryl Provinchain**
Title: **Senior Management Analyst I**
Date: **March 8, 2010**
Agency/Contract Information: **Los Angeles Port Police**
524 S. Palos Verdes Street
San Pedro, CA 90731
Cheryl Provinchain – 310.221.4725

1) What police stations would provide primary service to the locations identified below?

a. Tunnel (located between 100 feet and 400 feet below ground surface; extending south from the TraPac Container Terminal to the Pacific Ocean?

b. TraPac shaft site (located south of the intersection of Harry Bridges Boulevard and Wilmington Boulevard):

c. LAXT shaft site (located on Terminal Island on Ferry Street):

d. Southwest Marine shaft site (located to the west of South Seaside Avenue and to the south of the existing Southwest Marine ship building warehouses):

Main Port Police station located at: 425 S. Palos Verdes Street, San Pedro, CA 90731

2) Are there beat/patrol areas to which officers are assigned?

Yes

3) What is the department's standard acceptable response time for:

a. Emergency calls – **3 minutes or less**
b. Immediate calls – **5 minutes or less**
c. Alarm calls – **10 minutes or less**
d. Non-emergency calls – **10 minutes or less**
e. Report calls – **10 minutes or less**

4) What is the estimated response time for service to the locations identified below for emergency calls:

   a. Tunnel (located between 100 feet and 400 feet below ground surface; extending south from the TraPac Container Terminal to the Pacific Ocean):

      3 minutes

   b. TraPac shaft site (located south of the intersection of Harry Bridges Boulevard and Wilmington Boulevard):

      3 minutes

   c. LAXT shaft site (located on Terminal Island on Ferry Street):

      3 minutes

   d. Southwest Marine shaft site (located to the west of South Seaside Avenue and to the south of the existing Southwest Marine ship building warehouses):

      3 minutes

5) Is there a standard approved officer to population ratio?

   No

6) Would the Port Police Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the Clearwater Program as described above?

   No

7) Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located?

   Yes. A new Port Police headquarters is currently under construction which is expected to be completed and occupied by Spring 2011. It will be located on the corner of 5th and Center Streets in San Pedro, California.

8) Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance?

   Maybe. The Southwest Marine site is a Port of Los Angeles (POLA) controlled property used for movie and filming activities. Port Police provides access and security during filming operations. Port Police would need to determine if this project would change our security profile during filming activities and

whether construction personnel would have independent access to the Southwest Marine site, or whether their access would be through a separate gate or lock/access control device. Additionally, POLA's Wharfingers Division may need to be aware of this project's potential impact to filming operations.

9) Would the department recommend any project safety components to be included in the Clearwater Program as it is described above?

POLA/Port Police requires "Hot Work" permits for any welding or flame producing/boiler activities.

10) Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness or evacuation plans? Would it require the preparation of any new plans?

No.

11) Please provide any additional information you fee would be pertinent.

Port Police will need round-the-clock-24/7 contact information for site managers or company representatives in case we need to request evacuations or other public safety notifications/activities.

2. Questionnaire

Name of Responder: Lt. Josef Levy

Title: Patrol Bureau Administrative Lieutenant

Date: March 11, 2010

Agency/Contact Information: LBPD Patrol Bureau Administrative Office: 562-570-7214

1. The department website shows a total of four patrol divisions. What patrol division would provide primary service to the LBWRP located at 7400 East Willow Street?
   This location would be served by the East Division substation
2. Are there beat/patrol areas to which officers are assigned?
   This site is located within Beat 18. It is department policy that all beats each be staffed with a minimum one (1) police officer for every Watch. This ensures 24-hour police coverage for each beat in the City.
3. What is the department's standard acceptable response time for:
   a. Emergency calls
   b. Immediate calls
   c. Alarm calls
   d. Non-emergency calls
   e. Report calls

   It is the LBPD's goal to respond to Emergency and Priority 1 calls within 5 minutes or less.

4. What is the estimated response time for service to the project site located at 7400 East Willow Street for emergency calls? It is LBPD's goal to respond to Emergency and Priority 1 calls within 5 minutes or less.

5. Is there a standard approved officer to population ratio? No.

6. Would the Police Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the Clearwater Program as described above? None identified at this time.

7. Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located? None identified at this time.

8. Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance? N/A

9. Would the department recommend any project safety components to be included in the Clearwater Program as it is described above? N/A

10. Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness, or evacuation plans? Would it require the preparation of any new plans? N/A

11. Please provide any additional information you feel would be pertinent.
    Please ensure safe ingress and egress for public safety vehicles.

1. Questionnaire

Name of Responder: Jerry Wright

Title: Lieutenant

Date: March 4, 2010

Agency/Contact Information: Pomona Police Department
490 W. Mission Blvd
Pomona Ca. 91766
(909) 629-2156

1. The department website shows a total of 11 police facilities. What police facility would provide primary service to the project site located at 295 Humane Way?
   Main Station at 490 W. Mission Blvd.

2. Are there beat/patrol areas to which officers are assigned?
   The city is divided into beats, one covers the proposed construction site.

3. What is the department's standard acceptable response time for: (Acceptable and actual times are different. We strive to get officers to calls as soon a practical). Below are the times we strive for.
   a. Emergency calls Less than 4 minutes
   b. Immediate calls Less than 8 minutes
   c. Alarm calls For commercial businesses less than 26 minutes
   d. Non-emergency calls Less than 34 minutes
   e. Report calls Less than 34 minutes

2. What is the estimated response time for service to the project site located at 295 Humane Way for emergency calls? Less than 4 minutes

3. Is there a standard approved officer to population ratio?
   There is no specific standard set by any official agency. We are operating at a .9 officer per thousand population.

4. Would the Police Department require new personnel, equipment, or facility expansions to adequately serve the construction or operation of the Clearwater Program as described above?
   Unless there is something out of the ordinary with your construction site vs. others that have operated in Pomona, I don't see a need for additional personnel on our part.

5. Are there any plans to construct, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located?
   The only construction we have planned is possibly a new police facility which will be located across the street from our current main station. This should not interfere with your project.

6. Are there any safety codes or access requirements pertaining to law enforcement with which the Clearwater Program would have to be designed in conformance?
   None directly related to the police department, however all city, county and state code will have to be followed.

7. Would the department recommend any project safety components to be included in the Clearwater Program as it is described above?
   Providing there is nothing out of the ordinary about this construction site there are no requirements we as a police department have, however other codes must be followed. As far as site security a good security system such as a well fenced in site, cameras, alarms, or even an on-site security guard can greatly reduce the likelihood of possible loss due to theft.

8. Would the Clearwater Program, as it is described above, conflict with any emergency response, preparedness or evacuation plans? Would it require the preparation of any new plans?
   Providing the entrance and exit are as displayed on the site map there will be no interference with our agency. We do however share a driveway with the Humane Society so that can not be blocked.

9. Please provide any additional information you feel would be pertinent.

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

(323) 890-4330

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

March 5, 2010

Tanya Jones, Project Coordinator
ICF International
1 Ada, Suite 100
Irvine, CA 92618

Dear Ms. Jones:

NOTICE OF PREPARATION, SUBJECT: PUBLIC SERVICE INFORMATION REQUEST FOR THE CLEARWATER PROGRAM EIRS/EIS, LACO (FFER #201000041)

The Notice of Preparation has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department. The following are their comments:

PLANNING DIVISION:

1. The Department website shows a total of 168 stations serving the Los Angeles area. What station would be the primary responding unit to the following locations should it be needed? Please list the equipment (e.g. number and types of trucks, hazardous materials unit, etc.) and personnel at the stations.

   (Correction Note: The L.A. County Fire Department currently has 170 Fire Stations).

   a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor freeways to the east):

      - Fire Station 36 is the jurisdictional station (1st-due) for this location. It is located at 127 W. 223rd Street, Carson, CA 90745. It is staffed with two 4-person-engine companies and a 2-person paramedic squad. This station is approximately 2.3 miles from the Proposed Action Site located near Figueroa Street and Lomita Blvd. and approximately 1.7 miles from the site located near Figueroa Street and Sepulveda Blvd.

b. LCWRP (located at 16515 Piuma Avenue):

- Fire Station 115 is the jurisdictional station (1st-due) for the project site. It is located at 11317 Alondra Blvd., Norwalk, CA 90650, approximately 1.2 miles from the project site. It is staffed with two 4-person-engine company.

c. SJCWRP (located at 1965 Workman Mill Road):

- Fire Station 87 is the jurisdictional station (1st-due) for the San Jose Creek Water Reclamation Plant East. It is located at 140 S. Second Avenue, Industry, CA 91746, approximately 2.5 miles from the project site. It is staffed with a 4-person engine company.
- Fire Station 90 is the jurisdictional station (1st-due) for the San Jose Creek Water Reclamation Plant West. It is located at 10115 E. Rush Street, So. El Monte, CA 91733, approximately 2.3 miles from the project site. It is staffed with a 3-person engine company and a 2-person paramedic squad.

d. POWRP (located at 295 Humane Way):

- Fire Station 184 is the jurisdictional station (1st-due) for the project site. It is located at 1980 W. Orange Grove, Pomona, CA 91766, approximately .85 miles from the project site. It is staffed with 3-person engine company.

e. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):

- Fire Station 36 is the jurisdictional station (1st-due). It is located at 127 W. 223rd Street, Carson, CA 90745, approximately 1.8 miles from the project site. It is staffed with two 4-person-engine companies and a 2-person paramedic squad.

f. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

- Fire Station 36 is the jurisdictional station (1st-due) for the project site located north of Lomita Blvd. It is located at 127 W. 223rd Street, Carson, CA 90745, approximately 2.3 miles from the project site. It is staffed with two 4-person-engine companies and a 2-person paramedic squad.
- The project site located south of Lomita Blvd. is in the City of Los Angeles and not served by the Los Angeles County Fire Department.

2. Which station would be the secondary responding station in an emergency to the following locations?

a. JWPCP (located at West Sepulveda Boulevard to the north, Main Street to the east, West Lomita Boulevard to the south, and the 110 Harbor freeway to the east):

- Fire Station 127 is the second due station for this location. It is located at 2049 223rd Street, Carson, CA 90810. It is staffed with a 6-person light force (which is a 4-person truck and a 2-person engine company which responds as a unit). This station is approximately 3.6 miles from the Proposed Action Site located at Figueroa Street and Lomita Blvd. and approximately 3.2 miles from the site located near Figueroa Street and Sepulveda Blvd.

b. LCWRP (located at 16515 Piuma Avenue):

- Fire Station 98 is the second due station for this project site. It is located at 9814 Maplewood Avenue, Bellflower, CA 90706, approximately 2.3 miles from the project site. It is staffed with 3-person engine company and a 2- person paramedic squad.

c. SJCWRP (located at 1965 Workman Mill Road):

- For the project sites located at the above San Jose Creek Water Reclamation Plant East, Fire Station 168 is the second due station. It is located at 3207 Cogswell Road, El Monte, CA 91732, approximately 4.4 miles from the project sites. It is staffed with a 3-person engine company.
- For the project sites located at the above San Jose Creek Water Reclamation Plant West, Fire Station 87 is the second due station. It is located at 140 S. Second Avenue, Industry, CA 91746, approximately 4.3 miles from the project sites. It is staffed with a 4-person engine company.

d. POWRP (located at 295 Humane Way):

- Fire Station 187 is the second due station. It is located at 3325 Temple Avenue, CA 91768, approximately 1.9 miles from the project site. It is staffed with a 4-person quint, which is a combination engine/ladder truck apparatus.

e. JWPCP East shaft site (northwest corner of Main Street and Lomita Boulevard):

- Fire Station 127 is the second due station. It is located at 2049 E. 223rd Street, Carson, CA 90810, approximately 3.2 miles from the project site. It is staffed with a 6-person light force.

f. JWPCP West shaft site (West Lomita Boulevard near Figueroa Street):

- Fire Station 127 is the second due station for the project site located north of Lomita Blvd. It is located at 2049 E. 223rd Street, Carson, CA 90810, approximately 3.6 miles from the project site. It is staffed with a 6-person light force.
- The project site located south of Lomita Blvd. is in the City of Los Angeles and not served by the Los Angeles County Fire Department.

3. Does your department maintain a standard service radius for the primary responding station and the secondary responding station?

   a. No.

4. What is the estimated response time for service to the project site(s) from both the primary and secondary responding stations? Is there any department policy that outlines standard acceptable response time?

   a. The Fire Department uses national guidelines of a 5-minute response time for the 1st-arriving unit for fire and EMS responses and 8 minutes for the advanced life support (Paramedic) unit in urban areas.

5. Would the project as it is described above conflict with any emergency response plans, emergency preparedness plans, or evacuation plans? Would it require the preparation of a new plan?

   a. No.

6. Are there any plans to construct future stations, or are any additional stations being constructed? If yes, what is the timeline of these projects and where will they be located?

   a. The Fire Department has been working with the City of Carson to address the need for an additional Fire Station on the West side of the City in the vicinity of Del Amo and Main Street.

   b. In addition, the Fire Department's current five-year facility plan has identified 20 new Fire Stations all of which are planned to be built in the urban expansion areas of the County (Malibu/Santa Monica Mountains area, Santa Clarita and Antelope Valleys). Actual station development is contingent upon, among other things, the pace of development in the vicinity if the planned station and the availability of sufficient funding for station development and ongoing staffing cost.

7. Would your department require new hires or expansion of existing facilities or construction of new facilities to adequately serve the project as it is described above?

   a. No. The project is not expected to create a need for additional staffing or facilities.

8. Please provide any additional information you feel would be pertinent.

   a. We have no additional comments.

LAND DEVELOPMENT UNIT:

1. The proposed construction of this project must comply with all applicable code and ordinance requirements for access, water mains, fire flows and fire hydrants.

2. Specific fire and life safety requirements for the proposed construction of this project will be addressed during at the building plans review process by the Fire Department Engineering Section Building Plan Check Unit.

3. The Fire Prevention Division, Land Development Unit has no comments regarding this project at this time.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed.

HEALTH HAZARDOUS MATERIALS DIVISION:

1. We have no comments at this time.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

JOHN R. TODD, CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

JRT:lj

Jones, Tanya

From: C Kenneth Herrera [kenneth.herrera@lacity.org]
Sent: Friday, March 26, 2010 9:51 AM
To: Jones, Tanya
Subject: Re: Clearwater Program Request for Information

Follow Up Flag: Follow up
Flag Status: Flagged

Tanya,

Here are the answers to the second questioner:

1. The numbers in parentheses are the # of personnel on the apparatus.
  a. Engine 48 (4), Light Force 48 (6), Engine 101 (4), Rescue 101 (2), Hazmat Squad 48 (4)
  b. Engine 48 (4), Light Force 48 (6), Engine 101 (4), Rescue 101 (2), Hazmat Squad 48 (4)

2. Secondary Responding Stations
  a. Engine 85 (4), Ligh Force 85 (4), USAR 85 (2), Engine 112 (4), Engine 36 (4)
  b. Engine 85 (4), Light Force 85 (4), USAR 85 (2), Engine 112 (4), Engine 36 (4)

3. Yes, each station has a delineated area called a "First In District". This is the area that a fire company is normally the 1st to arrive in response to an alarm.

4. 4 to 6 minutes

5. No

6. No plans at this time to add additional fire facilities.

7. No, there is no need for an expansion of existing facilities

8. If you need any additional information or need a tour of any of our facilities or need to look at our apparatus and equipment please do not hesitate to contact the Battalion 6 office: (310-548-7516)

C. Kenneth Herrera, Captain II
Los Angeles Fire Department
Fire Station 85 "C" Platoon
310-548-7585
kenneth.herrera@lacity.org

CITY OF LONG BEACH

FIRE DEPARTMENT

3205 Lakewood Boulevard • Long Beach, CA 90808-1733 • Telephone (562) 570-2500 • FAX (562) 570-2506

DAVID W. ELLIS
FIRE CHIEF

March 10, 2010

Ms. Tanya Jones
Environmental Analyst
ICF International
1 Ada Parkway, Suite 100
Irvine, CA 92618

RE: Sanitation Districts of Los Angeles County Clearwater Program Master Facilities Plan Environmental Impact Report/Environmental Impact Statement

Dear Ms. Jones,

Attached is the information you requested regarding the Long Beach Fire Department's ability to respond to fire and emergencies. I trust the information contained on the attached will assist the Clearwater Program with their environmental impact report/environmental impact statement (EIR/EIS) for the Sanitation Districts and the Army Corps of Engineers.

Please feel free to contact me at (562) 570-2537 if you have any questions.

Sincerely,

Kenneth Portolan
Assistant Chief
Operations Bureau

KP:pck

Attachment

2. Questionnaire

Name of Responder: Kenneth Portolan

Title: Assistant Chief

Date: March 10, 2010

Agency/Contact Information (telephone and email):
Phone: (562) 570-2537 email: kenneth.portolan@longbeach.gov

1. The Department website shows a total of 25 stations serving the City. What station would be the primary responding unit to the LBWRP located at 7400 East Willow Street should it be needed? Please list the equipment (e.g. number and types of trucks, hazardous materials unit, etc.) and personnel at this station.

   Station 5, Engine w/4 personnel

2. Which station would be the secondary responding station in an emergency?

   Station 18, Engine w/4 personnel

3. Does your department maintain a standard service radius for the primary responding station and the secondary responding station?

   Yes

4. What is the estimated response time for service to the project site from both the primary and secondary responding stations? Is there any Department policy that outlines standard acceptable response time?

   See attached sheet for info

5. Would the Clearwater Program conflict with any emergency response plans, emergency preparedness plans, or evacuation plans? Would it require the preparation of any new plans?

   No

6. Are there any plans to construct any future stations, or are additional stations currently being constructed? If yes, what is the timeline of these projects and where will they be located?

   Not in the affected area

7. Would your department require new hires or the expansion of existing facilities or construction of new facilities to adequately serve the Clearwater Program?

   No

8. Please provide any additional information you feel would be pertinent.

Response Time Profile for Fire District Zone Area 5F

Response Calls (1) ... 20 calls in Zone Area 5F for 2009 of which 5 were initially BLS calls ... 13 ALS calls ... 2 Fire calls

Reporting Period: Calendar Year 2009

	Initial Call Type Category (3) Total Calls with Unit Arrival Onscene			Average (5) Unit Response Time (dispatch to arrival) EMS - BLS Call	Average (5) Unit Response Time (dispatch to arrival) EMS - ALS Call	Average (5) Unit Response Time (dispatch to arrival) Fire Call
Station Unit (2)	**EMS - BLS (4)**	**EMS - ALS (4)**	**Fire (4)**			
E5	5	7		05:52	08:14	
T14		1			07:41	
R14		1			09:56	
R17	1	5		11:05	09:35	
BLS17	1	3		10:15	12:22	
E18		5	2		07:46	07:26
T19						
LF19		1			06:40	
Totals	**7**	**23**	**2**			
Average Incident Response Time (6)				**05:52**	**07:39**	**07:26**
Average Incident Total Response Time (7)				**06:49**	**08:39**	**08:54**

Notes: (1) Responses based on number of calls dispatched to Fire District Zone Area 5F.

(2) These units represent a sampling of those units normally assigned to stations located in Fire District Zone Areas adjacent or near to Zone Area 5F.

(3) Call Type Category based on initial response tier and dispatch call assignment.

(4) EMS - BLS designates Alpha and Bravo calls ... EMS - ALS designates Charlie calls ... Fire designates fire alarms, structure, and non-structure fire calls.

(5) **Average Unit Response Time** is based on the time interval between the units dispatch time and its arrival onscene time.

(6) **Average Incident Response Time** is based on the time interval between the initial or earliest dispatch time of the call and the arrival time of the first unit onscene.

(7) **Average Incident Total Response Time** is based on the time interval between the call receive time at the Alarm Office and the arrival time of the first unit onscene.

(8) All Average Times are in **mm:ss** (minutes:seconds) format.

(9) Response Time interval indicated as zero (no arrival, ON-VIEW, etc.) are excluded in deriving averages.

File: ResponseTimeProfileFireDistrictZoneArea5F2009.xls

2. Public Services Questionnaire

Name of Responder: LCDR John P. Hennigan

Title: CG Sector Los Angeles – Long Beach, Waterways Management Division Chief

Date: 05 March 2010

Agency/Contact Information (telephone and email):

John.P.Hennigan@uscg.mil
310-521-38601

1. Is USCG staff currently used to patrol and secure the shipping lanes? If so, typically how many staff are used and how often are the shipping lanes patrolled?

The Coast Guard conducts random patrols of ports and shipping lanes. Times and frequency of patrols are not public information. Any construction project would need to address safety of shipping and should not rely on Coast Guard patrols. This is not a Coast Guard responsibility. It is the responsibility of the project.

2. Would the USCG require new personnel, equipment, or facility expansions to adequately serve the project?

Coast Guard involvement would take place with existing personnel, equipment, facilities to issue maritime advisories and re-route vessels as needed with the Vessel Traffic Service.

3. Based on the previous meetings it is anticipated a shipping lane modification would be required for any work located on San Pedro Shelf. The modification would be done per 33 C.F.R Part 167 Section 167.15. The project is also expected to apply and receive a Private Aids to Navigation Permit. Are there any other maritime shipping, security, or safety regulations applicable to the construction or operation of the project on the San Pedro Shelf, the Palos Verdes Shelf, or at the existing ocean outfalls?

Our primary permitted action would be as a supporting agency providing information to the Army Corps of Engineers permit. The Private Aids to Navigation permit would be for any mooring buoys used in the area to secure barges, etc and would require among other things, proper lighting of the buoy.. Alternative #1 will be the most difficult, by far, to manage vessel traffic and may require the shipping lane modification. Active oversight from the Vessel Traffic Service will be also be needed to route vessels around the construction site. Alternatives 2 and 3 will be out of the way from commercial vessel traffic and as such will not require active re-routing.

The Coast Guard Captain of the port may also need to issue a deviation to the Regulated Navigation Area rules which require certain vessels to keep engines ready for immediate maneuver and maintain passing distances of at least .25NM from other vessels. (See 33CFR165.1152(b))

Further, all involved vessels and barges would need to comply with normal Coast Guard inspection requirements.

4. Please confirm a shipping lane modification would not be required for the work on the Palos Verdes Shelf.

Shipping lanes modifications would not be necessary for work at Alternative Sites 2 and 3 which are outside the Precautionary area and the shipping lanes. Lane modification would likely be required at Alternative 1 since it located in the middle of traffic flow.

5. Are there any safety or security requirements the USCG would require or recommend for the project?

Covered under previous meetings minutes.

6. Would the project conflict with any emergency, safety, or security plans the USCG has in place? Would it require the preparation of any new plans?

No new plans would be required.

7. Do you have any additional information to add based on the meeting minutes and summary email?

Nothing additional at this time.

8. Please provide any additional information you feel would be pertinent.

Alternatives 2 and 3 are much more preferable in terms of traffic management. Or moving Alternative 1 slightly South East, out of the Precautionary area would also be preferable.

ICF INTERNATIONAL

Fax Transmission

Date:	March 4, 2010
Attention:	ABC Unified School District Chit Bao Director of MOT
Fax Number:	562-865-8550
Phone Number:	562-926-5566 x)22403
Number of Pages:	5 (including this page)
From:	Tanya Jones Clearwater Program Environmental Analyst
Subject:	**Public Service Information Request for the Clearwater Program EIR/EIS**

Good Morning,

Please see the attached letter describing the Clearwater Program environmental impact report/statement (EIR/EIS) and the information needs questionnaire developed to obtain your agency's input for the Public Services Chapter of the EIR/EIS. Please review the letter and respond to the questionnaire either via email (tjones2@icfi.com), phone (949 333 6642), or fax (949 333 6601) by March 5th. Please let me know if you have any questions or concerns. I look forward to hearing from you and I appreciate your assistance with this matter.

Warmest Regards,

Tanya Jones
Environmental Analyst

1 Ada Parkway, Suite 100 — Irvine, CA 92618 — 949.333 6600 — 949.333.6601 fax — icfi.com

Chit Bao
February 17, 2010
Page 3

2. **Questionnaire**

Name of Responder: Robert Kay

Title: Supervisor of Facilities and Maintenance

Date: 3/5/10

Agency/Contact Information (telephone and email):

1. How many ABCUSD schools are located in the City of Cerritos? 17 schools (we also have schools in Artesia, Hawaiian Gardens and Lakewood
2. Identify the schools located within 0.25 mile of the LCWRP located at 16515 Piuma Avenue. 0
3. If schools are not located within 0.25 mile of the above location, please identify the nearest school to the location (distance and name). Gahr HS = .75 mile 12111 Artesia Blvd, Cerritos CA 90703
   Hiemes ES = 1.5 miles Artesia, CA
4. Approximately how many students are attending each school identified above?
   Gahr HS = 1800 students approx.
5. Based on the Clearwater Program description above, would the Clearwater Program impact any school operations? Bus travel and travel to and from school could be impacted by road closures and detours.
6. Would the Clearwater Program require the construction of any new school facilities?
   Not to our knowledge.
7. Please provide any additional information you feel would be pertinent.
   Please make sure to notify Robert Kay @ (562) 254-5031 and by written notice to our District office of any pending construction on adjacent streets of construction within our District schools / facilities, so we may prepare for possible delays and provide alternate route planning for our bus drivers, parents and employees if needed.

Los Angeles Unified School District
Facilities Services Division

OFFICE OF THE SUPERINTENDENT **FACILITIES SERVICES DIVISION**

DATE: April 28, 2010

TO: ICF, International
1 Ada Parkway, Suite 100
Irvine, CA 92618
Attn: Tanya Jones, Environmental Analyst

FROM: Rena Perez, Director
Master Planning & Demographics

SUBJECT: Environmental Impact Report Information Requested for the Sanitation Districts of Los Angeles County Clearwater Program Master Facilities Plan:

1) ***JWPCP EAST SHAFT SITE ON APPROXIMATELY 25 ACRES NEAR THE NORTHWEST CORNER OF MAIN STREET AND LOMITA BOULEVARD IN THE CITY OF CARSON.***
2) ***JWPCP WEST SHAFT SITE ON APPROXIMATELY 17 ACRES TO THE SOUTH AND 1 ACRE TO THE NORTH OF WEST LOMITA BOULEVARD NEAR FIGUEROA STREET IN THE CITY OF LOS ANGELES.***
3) ***TRAPAC SHAFT SITE WOULD BE LOCATED ON LESS THAN 1 ACRE WITHIN THE PORT OF LOS ANGELES, SOUTH OF THE INTERSECTION OF HARRY BRIDGES BOULEVARD AND WILMINGTON BOULEVARD..***
4) ***ANGELS GATE SHAFT SITE WOULD BE LOCATED ON APPROXIMATELY 3 ACRES AT THE SOUTHERN BOUNDARY OF ANGELS GATE PARK NEAR THE INTERSECTION OF SOUTH GAFFEY STREET AND SHEPARD STREET.***
5) ***ROYAL PALMS BEACH SHAFT SITE WOULD BE LOCATED ON APPROXIMATELY 1.1 ACRES AT ROYAL PALMS BEACH. ACCESS TO THE ROYAL PALMS BEACH SHAFT SITE WOULD BE OFF THE WEST PASEO DEL MAR.***
6) ***JOINT WATER POLLUTION CONTROL PLANT PROPOSED NEW CONSTRUCTION, LOCATED IN THE CITY OF CARSON AND IS SURROUNDED BY WEST SEPULVEDA BOULEVARD TO THE NORTH, MAIN STREET TO THE EAST, WEST LOMITA BOULEVARD TO THE SOUTH, AND THE HARBOR FREEWAY (110) TO THE WEST.***

Included please find a ***LAUSD Schools Enrollments and Capacities Report*** for the schools that may be impacted by the development project(s) in question. This report contains data on each school's current and projected capacities, enrollments, and school calendars, and is designed to address any questions pertaining to overcrowding and factors related to school capacity.

Please note that the data in this report *already take into account* portable classrooms on site, additions being built onto existing schools, student permits and transfers, specific educational programs running at the schools, and any other operational activities or educational programming that affects the capacities and enrollments of LAUSD's schools. **Enrollment and capacity data are updated annually and become available after December 1 of each year.**

Additional information can be found in LAUSD's 2010 "Strategic Execution Plan" at www.laschools.org/sep/, on LAUSD's Facilities main webpage at www.laschools.org/, or on LAUSD's general website, at www.lausd.net.

Los Angeles Unified School District - Facilities Services Division:
333 S. Beaudry Ave., 23rd Floor, Los Angeles, CA 90017
Telephone (213) 241-8044 • Fax (213) 241-2076

Los Angeles Unified School District
Facilities Services Division

OFFICE OF THE SUPERINTENDENT **FACILITIES SERVICES DIVISION**

MASTER PLANNING AND DEMOGRAPHICS RESPONSE TO SPECIFIC QUESTIONS

Questions: 1	Please see enclosed list with names, address, and school type for LAUSD schools within City of Carson, Community of San Pedro, Community of Wilmington.
Questions: 3, 4	Please see LAUSD Schools Enrollments and Capacities Report details for schools serving each of the identified sites. Each Report lists schools who's attendance boundaries include the locations outlined in the RFI ;
Questions: 7	Please refer to the Enrollments and Capacities Report for identification of any new schools planned to relieve known overcrowding. LAUSD is currently using the 2010 Strategic Execution Plan (SEP) for long-range planning and implementation of the school construction program. Information about fees and student generation rates is available by contacting the LAUSD Developer Fee Office at (213) 743-3670.

ATTACHMENTS

1. LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES REPORT

2. BOUNDARY DESCRIPTIONS FOR SCHOOLS SERVING PROPOSED PROJECT
   Attendance area boundary descriptions for existing schools identified as serving the proposed project.

Sincerely,

Rena Perez, Director

Los Angeles Unified School District - Facilities Services Division:
333 S. Beaudry Ave., 23rd Floor, Los Angeles, CA 90017
Telephone (213) 241-8044 • Fax (213) 241-2076

Question 1:

	Location Code	School Name	School Type	Street Address	City	ZIP Code
1A.						
	8578	EAGLE TREE CONTN HS	Cont SH	22628 S MAIN ST	CARSON, CA	90745
	7329	232ND PL	Elem	23240 ARCHIBALD AVE	CARSON, CA	90745
	2089	AMBLER AVE	Elem	319 E SHERMAN DR	CARSON, CA	90746
	2146	ANNALEE AVE	Elem	19410 S ANNALEE AVE	CARSON, CA	90746
	2473	BONITA ST	Elem	21929 BONITA ST	CARSON, CA	90745
	2530	BROADACRES AVE	Elem	19424 S BROADACRES AVE	CARSON, CA	90746
	2836	CARSON ST	Elem	161 E CARSON ST	CARSON, CA	90745
	2890	CATSKILL AVE	Elem	23536 CATSKILL AVE	CARSON, CA	90745
	3384	DEL AMO	Elem	21228 WATER ST	CARSON, CA	90745
	3452	DOLORES ST	Elem	22526 DOLORES ST	CARSON, CA	90745
	3466	DOMINGUEZ	Elem	21250 SANTA FE AVE	CARSON, CA	90810
	4829	LEAPWOOD AVE	Elem	19302 LEAPWOOD AVE	CARSON, CA	90746
	7205	TOWNE AVE	Elem	18924 TOWNE AVE	CARSON, CA	90746
	2815	CAROLDALE LRNG COMM	Span	22424 CAROLDALE AVE	CARSON, CA	90745
	8090	CARNEGIE MIDDLE	Middle	21820 BONITA ST	CARSON, CA	90745
	8103	CURTISS MIDDLE	Middle	1254 E HELMICK ST	CARSON, CA	90746
	8487	WHITE MIDDLE	Middle	22102 S FIGUEROA ST	CARSON, CA	90745
	8575	CARSON SH	High	22328 S MAIN ST	CARSON, CA	90745
	9514	DOLORES EEC	Pre-K	22309 CATSKILL AVE	CARSON, CA	90745
1B.						
	9385	HARBOR CAS	Adult	950 W SANTA CRUZ ST	SAN PEDRO, CA	90731
	8852	ANGEL'S GATE HS	Cont SH	3607 S GAFFEY ST	SAN PEDRO, CA	90731
	3767	15TH ST	Elem	1527 S MESA ST	SAN PEDRO, CA	90731
	6616	7TH ST	Elem	1570 W SEVENTH ST	SAN PEDRO, CA	90732
	2288	BANDINI ST	Elem	425 N BANDINI ST	SAN PEDRO, CA	90731
	2315	BARTON HILL	Elem	423 N PACIFIC AVE	SAN PEDRO, CA	90731
	2685	CABRILLO AVE	Elem	732 S CABRILLO AVE	SAN PEDRO, CA	90731
	4836	LELAND ST	Elem	2120 S LELAND ST	SAN PEDRO, CA	90731
	6013	PARK WESTERN PL	Elem	1214 PARK WESTERN PL	SAN PEDRO, CA	90732
	7035	TAPER AVE	Elem	1824 TAPER AVE	SAN PEDRO, CA	90731
	7767	WHITE POINT EL	Elem	1410 SILVIUS AVE	SAN PEDRO, CA	90731
	6137	POINT FERMIN MAG	Elem Mag	3333 KERCKHOFF AVE	SAN PEDRO, CA	90731
	6870	SOUTH SHORES MAG	Elem Mag	2060 W 35TH ST	SAN PEDRO, CA	90732
	1957	WILLENBERG SP ED CTR	Spec Ed	308 WEYMOUTH AVE	SAN PEDRO, CA	90732
	8104	DANA MIDDLE	Middle	1501 S CABRILLO AVE	SAN PEDRO, CA	90731
	9180	HARBOR OCC CTR	Opportunity	740 N PACIFIC AVE	SAN PEDRO, CA	90731
	8850	SAN PEDRO SH	High	1001 W 15TH ST	SAN PEDRO, CA	90731
	8589	CDS COOPER	Opportunity	2210 TAPER AVE	SAN PEDRO, CA	90731
	9468	HARBOR OCC CTR-AEWC	Opportunity	740 N PACIFIC AVE	SAN PEDRO, CA	90731
	9484	SAN PEDRO CAS-AEWC	Opportunity	1001 W 15TH ST	SAN PEDRO, CA	90731
	9472	SP/WILM SKL CTR-AEWC	Opportunity	920 W 36TH ST	SAN PEDRO, CA	90731
	9508	CABRILLO EEC	Pre-K	741 W EIGHTH ST	SAN PEDRO, CA	90731
	9548	PARK WESTERN EEC	Pre-K	1220 PARK WESTERN PL	SAN PEDRO, CA	90732
	9885	SAN PEDRO CAS EEC	Pre-K	950 W SANTA CRUZ ST	SAN PEDRO, CA	90731
	9886	SAN PEDRO/WILM EEC	Pre-K	3605 S GAFFEY ST	SAN PEDRO, CA	90731
1C.						
	9019	BANNING-CARSON ADULT	Adult	1527 LAKME AVE	WILMINGTON, CA	90744
	8531	AVALON HS	Cont SH	1425 N AVALON BLVD	WILMINGTON, CA	90744
	2527	BROAD AVE	Elem	24815 BROAD AVE	WILMINGTON, CA	90744
	2301	DE LA TORRE JR (ISLAND)	Elem	500 N ISLAND AVE	WILMINGTON, CA	90744
	4014	FRIES AVE	Elem	1301 FRIES AVE	WILMINGTON, CA	90744
	4315	GULF AVE	Elem	828 W L ST	WILMINGTON, CA	90744
	4466	HAWAIIAN AVE	Elem	540 HAWAIIAN AVE	WILMINGTON, CA	90744
	7781	WILMINGTON PARK	Elem	1140 MAHAR AVE	WILMINGTON, CA	90744
	8490	WILMINGTON MIDDLE	Middle	1700 GULF AVE	WILMINGTON, CA	90744
	8529	BANNING SH	High	1527 LAKME AVE	WILMINGTON, CA	90744
	8518	HARBOR TCHR PREP ACD	High	1111 FIGUEROA PL	WILMINGTON, CA	90744
	2206	BROAD AVE CSPP	Pre-K	24815 BROAD AVE	WILMINGTON, CA	90744
	7782	WILMINGTON PARK SPS	Pre-K	1140 MAHAR AVE	WILMINGTON, CA	90744
	9522	HAWAIIAN EEC	Pre-K	501 HAWAIIAN AVE	WILMINGTON, CA	90744
	2317	ISLAND EL LAUP	Pre-K	500 N ISLAND AVE	WILMINGTON, CA	90744
	9585	WILMINGTON EEC	Pre-K	1419 YOUNG ST	WILMINGTON, CA	90744

LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES

PROJECT SERVED: JWPCP East Shaft Site on approximately 25 acres near the northwest corner of Main St. and Lomita Blvd. in the City of Carson.

SCHOOL YEAR: 2009-2010

(Current and projected enrollments/capacities reflect data from School Year (SY) 2009-2010. SEE DISCLAIMER BELOW.)

1	2	3	4	5	6	7	8	9	10	11	12
Location Code	School Name	Current Calendar	Current Capacity	Resident Enrollment	Actual Enrollment	**Current seating overage/(shortage)**	Overcrowded **Now**?	Projected Capacity	Projected Enrollment	**Projected seating overage/(shortage)**	Overcrowding Projected in **Future**?
2527	BROAD AVE EL	4 TRK	1309	894	846	415	**Yes**	856	842	14	**Yes**
8490	WILMINGTON MS	1 TRK	1798	2067	1988	(269)	**Yes**	1697	2021	(324)	**Yes**
8529	BANNING SH	1 TRK	2813	3653	3337	(840)	**Yes**	2813	3385	(572)	**Yes**

	Schools Planned to Relieve Known Overcrowding	13
	SOUTH REGION SPAN K-8 #1	1278
	SOUTH REGION HS #4	1809

DISCLAIMER: CURRENT AND PROJECTED DATA ARE UPDATED ANNUALLY AND BECOME AVAILABLE AFTER DECEMBER 1ST OF EACH CALENDAR YEAR.

NOTES:

[1] School's ID code.

[2] School's name

[3] The current calendar the school is operating on. Schools operate on a 'multi-track' calendar (listed as 3 TRK or 4 TRK), because of overcrowded conditions.

[4] School's current operating capacity, or the maximum number of students the school can serve while operating on its current calendar.

[5] The total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

-Multi-track calendars are utilized as one method of providing relief to overcrowded schools by increasing enrollment capacities.

-A key goal of the Superintendent and Board of Education is to return all schools to a traditional 2-semester calendar (1 TRK).

[6] The number of students actually attending the school now, including secondary-grades magnet students.

[7] Current seating overage or (shortage): equal to (current capacity) - (resident enrollment).

[8] Current overcrowding status of school or service area. The school or area is currently overcrowded if any of these conditions exist:

-A school is currently on a multi-track calendar.

-There is currently a seating shortage.

-There is currently a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats.

[9] The capacity the school will have after shifting to a 2-semester (1 TRK) calendar and implementing LAUSD operational goals.

[10] Projected 4-year total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

[11] Projected seating overage or (shortage): equal to (projected capacity) - (projected enrollment).

[12] Projected overcrowding status of school. The school will be considered overcrowded in the future if any of these conditions exist:

-A school remains on a multi-track calendar.

-There is a seating shortage in the future.

-There is a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats in the future.

[13] The anticipated capacity of new schools planned for the area. While these new seats will help offset projected overcrowding at the existing schools listed in this report, there may be other overcrowded schools not listed here that are also targeted to be relieved by these new schools. Therefore, it should not be assumed that these planned school capacities will be allocated solely towards offsetting overcrowding at the existing schools listed here.

* Independent Charter: Capacity and enrollment information is not reported.

LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES

PROJECT SERVED: JWPCP West Shaft Site on approximately 17 acres to the south and 1 acre to the north of West Lomita Blvd. near Figueroa St., in the City of Los Angeles.
SCHOOL YEAR: 2009-2010
(Current and projected enrollments/capacities reflect data from School Year (SY) 2009-2010. SEE DISCLAIMER BELOW.)

1	2	3	4	5	6	7	8	9	10	11	12
Location Code	School Name	Current Calendar	Current Capacity	Resident Enrollment	Actual Enrollment	**Current seating overage/(shortage)**	Overcrowded **Now**?	Projected Capacity	Projected Enrollment	**Projected seating overage/(shortage)**	Overcrowding Projected in **Future**?
2527	BROAD AVE EL	4 TRK	1309	894	846	415	**Yes**	856	842	14	**Yes**
4315	GULF EL	4 TRK	1124	1067	996	57	**Yes**	836	1051	(215)	**Yes**
8490	WILMINGTON MS	1 TRK	1798	2067	1988	(269)	**Yes**	1697	2021	(324)	**Yes**
8529	BANNING SH	1 TRK	2813	3653	3337	(840)	**Yes**	2813	3385	(572)	**Yes**

	Schools Planned to Relieve Known Overcrowding	13
	SOUTH REGION SPAN K-8 #1	1278
	SOUTH REGION HS #4	1809

DISCLAIMER: CURRENT AND PROJECTED DATA ARE UPDATED ANNUALLY AND BECOME AVAILABLE AFTER DECEMBER 1ST OF EACH CALENDAR YEAR.

NOTES:

[1] School's ID code.

[2] School's name

[3] The current calendar the school is operating on. Schools operate on a 'multi-track' calendar (listed as 3 TRK or 4 TRK), because of overcrowded conditions.

[4] School's current operating capacity, or the maximum number of students the school can serve while operating on its current calendar.

[5] The total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.
- -Multi-track calendars are utilized as one method of providing relief to overcrowded schools by increasing enrollment capacities.
- -A key goal of the Superintendent and Board of Education is to return all schools to a traditional 2-semester calendar (1 TRK).

[6] The number of students actually attending the school now, including secondary-grades magnet students.

[7] Current seating overage or (shortage): equal to (current capacity) - (resident enrollment).

[8] Current overcrowding status of school or service area. The school or area is currently overcrowded if any of these conditions exist:
- -A school is currently on a multi-track calendar.
- -There is currently a seating shortage.
- -There is currently a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats.

[9] The capacity the school will have after shifting to a 2-semester (1 TRK) calendar and implementing LAUSD operational goals.

[10] Projected 4-year total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

[11] Projected seating overage or (shortage): equal to (projected capacity) - (projected enrollment).

[12] Projected overcrowding status of school. The school will be considered overcrowded in the future if any of these conditions exist:
- -A school remains on a multi-track calendar.
- -There is a seating shortage in the future.
- -There is a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats in the future.

[13] The anticipated capacity of new schools planned for the area. While these new seats will help offset projected overcrowding at the existing schools listed in this report, there may be other overcrowded schools not listed here that are also targeted to be relieved by these new schools. Therefore, it should not be assumed that these planned school capacities will be allocated solely towards offsetting overcrowding at the existing schools listed here.

* Independent Charter: Capacity and enrollment information is not reported.

LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES

PROJECT SERVED: Angels Gate Shaft Site would be located on approximately 3 acres at the southern boundary of Angels Gate Park near the intersection of south Gaffey St., and Shepard Street.

SCHOOL YEAR: 2009-2010

(Current and projected enrollments/capacities reflect data from School Year (SY) 2009-2010. SEE DISCLAIMER BELOW.)

1	2	3	4	5	6	7	8	9	10	11	12
Location Code	School Name	Current Calendar	Current Capacity	Resident Enrollment	Actual Enrollment	**Current seating overage/(shortage)**	Overcrowded **Now**?	Projected Capacity	Projected Enrollment	**Projected seating overage/(shortage)**	Overcrowding Projected in **Future**?
4836	LELAND EL	1 TRK	671	701	526	(30)	**Yes**	625	652	(27)	**Yes**
8104	DANA MS	1 TRK	2017	1809	1768	208	**No**	1802	1781	21	**Yes**
8850	SAN PEDRO SH	1 TRK	3600	3371	3385	229	**No**	3098	3287	(189)	**Yes**

Schools Planned to Relieve Known Overcrowding	13
SOUTH REGION HS #15	810

DISCLAIMER: CURRENT AND PROJECTED DATA ARE UPDATED ANNUALLY AND BECOME AVAILABLE AFTER DECEMBER 1ST OF EACH CALENDAR YEAR.

NOTES:

[1] School's ID code.

[2] School's name

[3] The current calendar the school is operating on. Schools operate on a 'multi-track' calendar (listed as 3 TRK or 4 TRK), because of overcrowded conditions.

[4] School's current operating capacity, or the maximum number of students the school can serve while operating on its current calendar.

[5] The total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

-Multi-track calendars are utilized as one method of providing relief to overcrowded schools by increasing enrollment capacities.

-A key goal of the Superintendent and Board of Education is to return all schools to a traditional 2-semester calendar (1 TRK).

[6] The number of students actually attending the school now, including secondary-grades magnet students.

[7] Current seating overage or (shortage): equal to (current capacity) - (resident enrollment).

[8] Current overcrowding status of school or service area. The school or area is currently overcrowded if any of these conditions exist:

-A school is currently on a multi-track calendar.

-There is currently a seating shortage.

-There is currently a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats.

[9] The capacity the school will have after shifting to a 2-semester (1 TRK) calendar and implementing LAUSD operational goals.

[10] Projected 4-year total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

[11] Projected seating overage or (shortage): equal to (projected capacity) - (projected enrollment).

[12] Projected overcrowding status of school. The school will be considered overcrowded in the future if any of these conditions exist:

-A school remains on a multi-track calendar.

-There is a seating shortage in the future.

-There is a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats in the future.

[13] The anticipated capacity of new schools planned for the area. While these new seats will help offset projected overcrowding at the existing schools listed in this report, there may be other overcrowded schools not listed here that are also targeted to be relieved by these new schools. Therefore, it should not be assumed that these planned school capacities will be allocated solely towards offsetting overcrowding at the existing schools listed here.

* Independent Charter: Capacity and enrollment information is not reported.

LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES

PROJECT SERVED: Joint Water Pollution Control Plant proposed new construction, located in the City of Carson and is surrounded by West Sepulveda Blvd. to the north, Main St. to the east, West Lomita Blvd. to the south, and the Harbor Freeway (110) to the west.

SCHOOL YEAR: 2009-2010

(Current and projected enrollments/capacities reflect data from School Year (SY) 2009-2010. SEE DISCLAIMER BELOW.)

1	2	3	4	5	6	7	8	9	10	11	12
Location Code	School Name	Current Calendar	Current Capacity	Resident Enrollment	Actual Enrollment	**Current seating overage/(shortage)**	Overcrowded **Now**?	Projected Capacity	Projected Enrollment	**Projected seating overage/(shortage)**	Overcrowding Projected in **Future**?
7329	232ND PL EL	1 TRK	645	479	488	166	**No**	538	382	156	**No**
2527	BROAD AVE EL	4 TRK	1309	894	846	415	**Yes**	856	842	14	**Yes**
4315	GULF EL	4 TRK	1124	1067	996	57	**Yes**	836	1051	(215)	**Yes**
8490	WILMINGTON MS	1 TRK	1798	2067	1988	(269)	**Yes**	1697	2021	(324)	**Yes**
8529	BANNING SH	1 TRK	2813	3653	3337	(840)	**Yes**	2813	3385	(572)	**Yes**

	Schools Planned to Relieve Known Overcrowding	13
	SOUTH REGION SPAN K-8 #1	1278
	SOUTH REGION HS #4	1809

DISCLAIMER: CURRENT AND PROJECTED DATA ARE UPDATED ANNUALLY AND BECOME AVAILABLE AFTER DECEMBER 1ST OF EACH CALENDAR YEAR.

NOTES:

[1] School's ID code.

[2] School's name

[3] The current calendar the school is operating on. Schools operate on a 'multi-track' calendar (listed as 3 TRK or 4 TRK), because of overcrowded conditions.

[4] School's current operating capacity, or the maximum number of students the school can serve while operating on its current calendar.

[5] The total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

-Multi-track calendars are utilized as one method of providing relief to overcrowded schools by increasing enrollment capacities.

-A key goal of the Superintendent and Board of Education is to return all schools to a traditional 2-semester calendar (1 TRK).

[6] The number of students actually attending the school now, including secondary-grades magnet students.

[7] Current seating overage or (shortage): equal to (current capacity) - (resident enrollment).

[8] Current overcrowding status of school or service area. The school or area is currently overcrowded if any of these conditions exist:

-A school is currently on a multi-track calendar.

-There is currently a seating shortage.

-There is currently a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats.

[9] The capacity the school will have after shifting to a 2-semester (1 TRK) calendar and implementing LAUSD operational goals.

[10] Projected 4-year total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

[11] Projected seating overage or (shortage): equal to (projected capacity) - (projected enrollment).

[12] Projected overcrowding status of school. The school will be considered overcrowded in the future if any of these conditions exist:

-A school remains on a multi-track calendar.

-There is a seating shortage in the future.

-There is a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats in the future.

[13] The anticipated capacity of new schools planned for the area. While these new seats will help offset projected overcrowding at the existing schools listed in this report, there may be other overcrowded schools not listed here that are also targeted to be relieved by these new schools. Therefore, it should not be assumed that these planned school capacities will be allocated solely towards offsetting overcrowding at the existing schools listed here.

* Independent Charter: Capacity and enrollment information is not reported.

LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES

PROJECT SERVED: Royal Palms Beach Shaft Site would be located on approximately 1.1 acres at Royal Palms Beach. Access to the Royal Palms Beach Shaft site would be off the West Paseo Del Mar.

SCHOOL YEAR: 2009-2010

(Current and projected enrollments/capacities reflect data from School Year (SY) 2009-2010. SEE DISCLAIMER BELOW.)

1	2	3	4	5	6	7	8	9	10	11	12
Location Code	School Name	Current Calendar	Current Capacity	Resident Enrollment	Actual Enrollment	**Current seating overage/(shortage)**	Overcrowded **Now**?	Projected Capacity	Projected Enrollment	**Projected seating overage/(shortage)**	Overcrowding Projected in **Future**?
6870	S SHORES PER ARTS MG (Grade K only)	1 TRK	N/A	508	507	N/A	**N/A**	N/A	N/A	N/A	**N/A**
7767	WHITE POINT EL	1 TRK	552	324	378	228	**No**	428	259	169	**No**
8104	DANA MS	1 TRK	2017	1809	1768	208	**No**	1802	1781	21	**Yes**
8850	SAN PEDRO SH	1 TRK	3600	3371	3385	229	**No**	3098	3287	(189)	**Yes**

	Schools Planned to Relieve Known Overcrowding	13
	SOUTH REGION HS #15	810

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NOTES:

[1] School's ID code.

[2] School's name

[3] The current calendar the school is operating on. Schools operate on a 'multi-track' calendar (listed as 3 TRK or 4 TRK), because of overcrowded conditions.

[4] School's current operating capacity, or the maximum number of students the school can serve while operating on its current calendar.

[5] The total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

-Multi-track calendars are utilized as one method of providing relief to overcrowded schools by increasing enrollment capacities.

-A key goal of the Superintendent and Board of Education is to return all schools to a traditional 2-semester calendar (1 TRK).

[6] The number of students actually attending the school now, including secondary-grades magnet students.

[7] Current seating overage or (shortage): equal to (current capacity) - (resident enrollment).

[8] Current overcrowding status of school or service area. The school or area is currently overcrowded if any of these conditions exist:

-A school is currently on a multi-track calendar.

-There is currently a seating shortage.

-There is currently a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats.

[9] The capacity the school will have after shifting to a 2-semester (1 TRK) calendar and implementing LAUSD operational goals.

[10] Projected 4-year total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

[11] Projected seating overage or (shortage): equal to (projected capacity) - (projected enrollment).

[12] Projected overcrowding status of school. The school will be considered overcrowded in the future if any of these conditions exist:

-A school remains on a multi-track calendar.

-There is a seating shortage in the future.

-There is a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats in the future.

[13] The anticipated capacity of new schools planned for the area. While these new seats will help offset projected overcrowding at the existing schools listed in this report, there may be other overcrowded schools not listed here that are also targeted to be relieved by these new schools. Therefore, it should not be assumed that these planned school capacities will be allocated solely towards offsetting overcrowding at the existing schools listed here.

* Independent Charter: Capacity and enrollment information is not reported.

LAUSD SCHOOLS ENROLLMENTS AND CAPACITIES

PROJECT SERVED: TraPac Shaft Site would be located on less than 1 acre within the Port of Los Angeles, south of the intersection of Harry Bridges Blvd. and Wilmington Blvd.

SCHOOL YEAR: 2009-2010

(Current and projected enrollments/capacities reflect data from School Year (SY) 2009-2010. SEE DISCLAIMER BELOW.)

1	2	3	4	5	6	7	8	9	10	11	12
Location Code	School Name	Current Calendar	Current Capacity	Resident Enrollment	Actual Enrollment	**Current seating overage/(shortage)**	Overcrowded **Now**?	Projected Capacity	Projected Enrollment	**Projected seating overage/(shortage)**	Overcrowding Projected in **Future**?
4466	HAWAIIAN EL	1 TRK	1067	914	913	153	**No**	707	890	(183)	**Yes**
8110	DODSON MS	1 TRK	2104	1628	1847	476	**No**	1877	1767	110	**No**
8490	WILMINGTON MS	1 TRK	1798	2067	1988	(269)	**Yes**	1697	2021	(324)	**Yes**
8529	BANNING SH	1 TRK	2813	3653	3337	(840)	**Yes**	2813	3385	(572)	**Yes**

	Schools Planned to Relieve Known Overcrowding	13
	SOUTH REGION SPAN K-8 #1	1278
	SOUTH REGION HS #4	1809

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NOTES:

[1] School's ID code.

[2] School's name

[3] The current calendar the school is operating on. Schools operate on a 'multi-track' calendar (listed as 3 TRK or 4 TRK), because of overcrowded conditions.

[4] School's current operating capacity, or the maximum number of students the school can serve while operating on its current calendar.

[5] The total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

-Multi-track calendars are utilized as one method of providing relief to overcrowded schools by increasing enrollment capacities.

-A key goal of the Superintendent and Board of Education is to return all schools to a traditional 2-semester calendar (1 TRK).

[6] The number of students actually attending the school now, including secondary-grades magnet students.

[7] Current seating overage or (shortage): equal to (current capacity) - (resident enrollment).

[8] Current overcrowding status of school or service area. The school or area is currently overcrowded if any of these conditions exist:

-A school is currently on a multi-track calendar.

-There is currently a seating shortage.

-There is currently a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats.

[9] The capacity the school will have after shifting to a 2-semester (1 TRK) calendar and implementing LAUSD operational goals.

[10] Projected 4-year total number of students living in the school's attendance area and who are eligible to attend the school. Includes secondary-grades magnet students.

[11] Projected seating overage or (shortage): equal to (projected capacity) - (projected enrollment).

[12] Projected overcrowding status of school. The school will be considered overcrowded in the future if any of these conditions exist:

-A school remains on a multi-track calendar.

-There is a seating shortage in the future.

-There is a seating overage of LESS THAN or EQUAL TO a 'safety margin' of 30 seats in the future.

[13] The anticipated capacity of new schools planned for the area. While these new seats will help offset projected overcrowding at the existing schools listed in this report, there may be other overcrowded schools not listed here that are also targeted to be relieved by these new schools. Therefore, it should not be assumed that these planned school capacities will be allocated solely towards offsetting overcrowding at the existing schools listed here.

* Independent Charter: Capacity and enrollment information is not reported.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Information Technology Division

LOC. CODE: 7329

SUBJECT: UPDATE BOUNDARY DESCRIPTION FOR TWO HUNDRED THIRTY-SECOND PLACE SCHOOL
EFFECTIVE DECEMBER 14, 1972 (UPDATED 7-1-95).

Reconfiguration has changed the grade levels serviced by this school and the boundary description has been updated to reflect this change. This updating does not change the intent of the boundary as it was approved on December 14, 1972. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES K-5)

228TH STREET * MAIN STREET * SEPULVEDA BOULEVARD * HARBOR FREEWAY.

For assistance, please call Demographic and Boundary Unit, Information Technology Division, at (213) 625-6181.

APPROVED: JOHN K. NAGATA, Assistant Superintendent, Information Technology Division

DISTRIBUTION:

School	Demographic and Boundary Unit
Heritage School	School Traffic and Safety Education Section
Pupil Statistics	Department of Transportation, City of L. A.
Transportation Branch	

LOS ANGELES UNIFIED SCHOOL DISTRICT
Information Technology Division

LOC. CODE: 2527

SUBJECT: UPDATE BOUNDARY DESCRIPTION FOR BROAD AVENUE SCHOOL EFFECTIVE JULY 1, 1993 (UPDATED 7-1-95).

Reconfiguration has changed the grade levels serviced by this school and the boundary description has been updated to reflect this change. This updating does not change the intent of the boundary as it was approved on July 1, 1993. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES K-5)

SEPULVEDA BOULEVARD * MARBELLA AVENUE (BOTH SIDES EXCLUDED) * REALTY STREET (BOTH SIDES EXCLUDED) * RAVENNA AVENUE (BOTH SIDES EXCLUDED) * SEPULVEDA BOULEVARD * WILMINGTON AVENUE * LOMITA BOULEVARD * McFARLAND AVENUE EXTENDED * PACIFIC COAST HIGHWAY * AVALON BOULEVARD * Q STREET * WILMINGTON BOULEVARD * LOMITA BOULEVARD * VERMONT AVENUE.

OPTIONAL: BROAD AVENUE AND CATSKILL AVENUE SCHOOLS

SEPULVEDA BOULEVARD * RAVENNA AVENUE AND EXTENSION (BOTH SIDES) * REALTY STREET (BOTH SIDES) * MARBELLA AVENUE (BOTH SIDES).

For assistance, please call Demographic and Boundary Unit, Information Technology Division, at (213) 625-6181.

APPROVED: JOHN K. NAGATA, Assistant Superintendent, Information Technology Division

DISTRIBUTION:

School	Demographic and Boundary Unit
Heritage School	School Traffic and Safety Education Section
Pupil Statistics	Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Facilities Services Division

LOC. CODE: 4315

SUBJECT: NEW SERVICE BOUNDARY DESCRIPTION FOR GULF AVENUE SCHOOL EFFECTIVE JULY 1, 2006.

The area described below has been approved by the superintendent as the attendance area served by the above-mentioned school. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This boundary supersedes boundary effective September 1, 1971 (updated 7-1-1995).

This is an official copy for your file.

(GRADES K – 5)

LOMITA BOULEVARD * WILMINGTON BOULEVARD * Q STREET * NEPTUNE AVENUE * DENNI STREET * RAVENNA AVENUE (BOTH SIDES) * OPP STREET * RONAN AVENUE (BOTH SIDES) * ANAHEIM STREET * BIXBY SLOUGH * PACIFIC COAST HIGHWAY * HARBOR FREEWAY.

For assistance, please call Master Planning & Demographics, Facilities Services Division, at (213) 893-6850.

APPROVED: JOSEPH A. MEHULA, Chief Facilities Executive, Facilities Services Division

DISTRIBUTION:

School	Master Planning and Demographics
Pupil Statistics	School Traffic and Safety Education Section
Transportation Branch	Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Facilities Services Division

LOC. CODE: 4466

SUBJECT: NEW SERVICE BOUNDARY DESCRIPTION FOR HAWAIIAN AVENUE SCHOOL EFFECTIVE JULY 1, 2006.

The area described below has been approved by the superintendent as the attendance area served by the above-mentioned school. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This boundary supersedes boundary effective November 1, 1955 (clarified 1-25-1963, 2-21-1991; updated 7-1-1995).

This is an official copy for your file.

(GRADES K – 5)

ANAHEIM STREET * NEPTUNE AVENUE (BOTH SIDES EXCLUDED) * HARRY BRIDGES BOULEVARD * FRIES AVENUE AND EXTENSION TO NORTHWEST END OF SLIP No. 5 * SLIP No. 5 * EAST BASIN * TURNING BASIN * A LINE EXTENDED WESTERLY, SOUTH OF UNION OIL COMPANY REFINERY * A LINE EXTENDED NORTHERLY, WEST OF UNION OIL COMPANY REFINERY.

For assistance, please call Master Planning & Demographics, Facilities Services Division, at (213) 893-6850.

APPROVED: JOSEPH A. MEHULA, Chief Facilities Executive, Facilities Services Division

DISTRIBUTION:

School	Master Planning and Demographics
Pupil Statistics	School Traffic and Safety Education Section
Transportation Branch	Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Facilities Services Division

LOC. CODE: 4836

SUBJECT: NEW SERVICE BOUNDARY DESCRIPTION FOR LELAND STREET SCHOOL EFFECTIVE JULY 1, 2009.

The area described below has been approved by the superintendent as the attendance area served by the above-mentioned school. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This boundary supersedes boundary effective July 1, 1992 (updated 7-1-1995).

This is an official copy for your file.

(GRADES K – 5)

15TH STREET AND EXTENSION * GAFFEY STREET * 19TH STREET * CRESCENT AVENUE AND EXTENSION * 22ND STREET AND EXTENSION (BOTH SIDES EXCLUDED) * MAIN CHANNEL * OUTER HARBOR * PACIFIC OCEAN * ROXBURY STREET AND EXTENSION * 36TH STREET * ALMA STREET * 27TH STREET * LELAND STREET * 25TH STREET (PORTSMOUTH HOMES EXCLUDED) * WESTERN AVENUE * 19TH STREET * WEYMOUTH AVENUE * 17TH STREET * PATTON AVENUE.

For assistance, please call Master Planning & Demographics, Facilities Services Division, at (213) 893-6850.

APPROVED: JOSEPH A. MEHULA, Chief Facilities Executive, Facilities Services Division

DISTRIBUTION:
School
Transportation Branch
Master Planning and Demographics
Office of Environmental Health and Safety
Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Educational Housing Branch

LOC. CODE: 6870

SUBJECT: NEW SERVICE BOUNDARY DESCRIPTION FOR SOUTH SHORES MAGNET CENTER for ENRICHED STUDIES EFFECTIVE JULY 1, 1982

The territory described below has been approved by the superintendent as the district to be served by your school. The description starts at the most northwesterly corner and follows the streets in clockwise order. Unless noted otherwise, the center of the street is the official boundary.

This boundary becomes effective on September 1, 1980 (Clarification 6-8-82) and supersedes boundary description effective February 2, 1959 (Clarified 9-4-68)

This is your OFFICIAL COPY and is to be retained in your files until it is superseded.

(K ONLY)

CUMBRE DRIVE (BOTH SIDES) AND EXTENSION NORTH OF AMIRANTE DRIVE * MANTIS AVENUE (BOTH SIDES) * MORSE DRIVE (BOTH SIDES) * WESTERN AVENUE * A LINE SOUTHERLY FROM THE INTERSECTION OF WESTERN AVENUE AND PASEO DEL MAR * PACIFIC OCEAN * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY.

APPROVED: (signed) WILLIAM V. TASCHER, Director, Educational Housing Branch

LOS ANGELES UNIFIED SCHOOL DISTRICT
Facilities **S**ervices **D**ivision

LOC. CODE: 7767

SUBJECT: NEW SERVICE BOUNDARY DESCRIPTION FOR WHITE POINT SCHOOL EFFECTIVE JULY 1, 2008.

The area described below has been approved by the superintendent as the attendance area served by the above-mentioned school. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This boundary supersedes boundary effective July 1, 2001.

This is an official copy for your file.

(GRADES K - 5)

25th STREET (INCLUDING ALL OF PORTSMOUTH HOMES) * 25TH STREET * LELAND STREET * 27TH STREET * ALMA STREET * 36TH STREET * ROXBURY STREET AND EXTENSION * PACIFIC OCEAN * A LINE NORTHERLY TO THE INTERSECTION OF WESTERN AVENUE AND PASEO DEL MAR * WESTERN AVENUE.

(GRADES 1 - 5)

CUMBRE DRIVE (BOTH SIDES) AND EXTENSION NORTH OF AMIRANTE DRIVE * MANTIS AVENUE (BOTH SIDES) * MORSE DRIVE (BOTH SIDES) * WESTERN AVENUE AND EXTENSION * PACIFIC OCEAN * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY.

For assistance, please call Master Planning & Demographics, Facilities Services Division, at (213) 893-6850.

APPROVED: JOSEPH A. MEHULA, Chief Facilities Executive, Facilities Services Division

DISTRIBUTION:
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Transportation Branch
Master Planning and Demographics
Office of Environmental Health and Safety
Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Information Technology Division

LOC. CODE: 8104

SUBJECT: UPDATE BOUNDARY DESCRIPTION FOR RICHARD HENRY DANA MIDDLE SCHOOL EFFECTIVE JULY 1, 1975 (UPDATED 7-1-95).

Reconfiguration has changed the grade levels serviced by this school and the boundary description has been updated to reflect this change. This updating does not change the intent of the boundary as it was approved on July 1, 1975. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES 6-8)

FIRST STREET (BOTH SIDES EXCLUDED, INCLUDING ALL OF MIRACOSTA STREET, MIRABEAU AVENUE AND ELLERY DRIVE) * WESTERN AVENUE * FIRST STREET * GAFFEY STREET * BATTERY STREET AND EXTENSION * HARBOR FREEWAY * A LINE EXTENDED EASTERLY, SOUTH OF UNION OIL COMPANY REFINERY, TO WEST BASIN * WEST BASIN * TURNING BASIN * MAIN CHANNEL * PACIFIC OCEAN * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY.

OPTIONAL: DANA AND WILMINGTON MIDDLE SCHOOLS

STUDENTS LIVING ON TERMINAL ISLAND.

For assistance, please call Demographic and Boundary Unit, Information Technology Division, at (213) 625-6181.

APPROVED: JOHN K. NAGATA, Assistant Superintendent, Information Technology Division

DISTRIBUTION:
School
Heritage School
Pupil Statistics
Transportation Branch
Demographic and Boundary Unit
School Traffic and Safety Education Section
Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Information Technology Division

LOC. CODE: 8110

SUBJECT: UPDATE BOUNDARY DESCRIPTION FOR RUDECINDA S. DODSON MIDDLE SCHOOL EFFECTIVE AUGUST 4, 1989 (UPDATED 7-1-95).

Reconfiguration has changed the grade levels serviced by this school and the boundary description has been updated to reflect this change. This updating does not change the intent of the boundary as it was approved on August 4, 1989. The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES 6-8)

SOUTH BOUNDARY OF GREEN HILLS MEMORIAL PARK CEMETERY * WESTERN AVENUE * AGAJANIAN DRIVE AND EXTENSIONS * A LINE EXTENDED SOUTHERLY, WEST OF UNION OIL COMPANY REFINERY * A LINE EXTENDED EASTERLY, SOUTH OF UNION OIL COMPANY REFINERY * HARBOR FREEWAY * BATTERY STREET AND EXTENSION * GAFFEY STREET * FIRST STREET * WESTERN AVENUE * FIRST STREET (BOTH SIDES), INCLUDING ALL OF ELLERY DRIVE, MIRABEAU AVENUE AND MIRACOSTA STREET * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY.

OPTIONAL: DODSON AND FLEMING MIDDLE SCHOOLS

LEESDALE AVENUE EXTENDED NORTH OF HARBOR HILLS HOUSING PROJECT, INCLUDING ALL OF VIA MADONNA * WESTERN AVENUE * SOUTH BOUNDARY OF GREEN HILLS MEMORIAL PARK CEMETERY * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY.

OPTIONAL: DODSON AND WILMINGTON MIDDLE SCHOOLS

(THIS OPTION DEPENDENT ON SPACE AVAILABLE AT WILMINGTON MIDDLE SCHOOL.)

ANAHEIM STREET * FRIES AVENUE AND EXTENSION TO NORTHWEST END OF SLIP #5 * SLIP #5 * EAST BASIN * TURNING BASIN * WEST BASIN * A LINE EXTENDED WESTERLY, SOUTH OF UNION OIL COMPANY REFINERY * A LINE EXTENDED NORTHERLY, WEST OF UNION OIL COMPANY REFINERY.

For assistance, please call Demographic and Boundary Unit, Information Technology Division, at (213) 625-6181.

APPROVED: JOHN K. NAGATA, Assistant Superintendent, Information Technology Division

DISTRIBUTION:
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Demographic and Boundary Unit
School Traffic and Safety Education Section
Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Facilities Services Divisions

LOC. CODE: 8490

SUBJECT: CLARIFICATION OF THE BOUNDARY DESCRIPTION FOR WILMINGTON MIDDLE SCHOOL EFFECTIVE AUGUST 4, 1989 (UPDATED 7-1-95) (CLARIFIED 3-14-03).

This clarification of the existing boundary description does not change the intent of the boundary as it was approved on August 4, 1989 (updated 7-1-95). (Changes have been highlighted by "strikeout" and/or boldface type.) The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES 6-8)

SEPULVEDA BOULEVARD * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY * EAST BASIN * SLIP #5 * FRIES AVENUE AND EXTENSION * ANAHEIM STREET * BIXBY SLOUGH * PACIFIC COAST HIGHWAY * HARBOR FREEWAY * LOMITA BOULEVARD * VERMONT AVENUE.

OPTIONAL: WILMINGTON AND CARNEGIE MIDDLE SCHOOLS

(THIS OPTION DEPENDENT ON SPACE AVAILABLE AT WILMINGTON MIDDLE SCHOOL.)

WATSONCENTER ROAD AND EXTENSION * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY * SEPULVEDA BOULEVARD * AVALON BOULEVARD.

OPTIONAL: WILMINGTON, CARNEGIE, AND WHITE MIDDLE SCHOOLS

(THIS OPTION DEPENDENT ON SPACE AVAILABLE AT WILMINGTON MIDDLE SCHOOL.)

231ST STREET AND EXTENSIONS (BOTH SIDES, INCLUDING 23100 DOLORES STREET) **TO ANCHOR AVENUE * 231ST STREET** * BAYPORT STREET ~~(BOTH SIDES)~~ * AVALON BOULEVARD * SEPULVEDA BOULEVARD * MAIN STREET.

OPTIONAL: WILMINGTON AND DANA MIDDLE SCHOOLS

STUDENTS LIVING ON TERMINAL ISLAND.

(OVER)

OPTIONAL: WILMINGTON AND DODSON MIDDLE SCHOOLS

(THIS OPTION DEPENDENT ON SPACE AVAILABLE AT WILMINGTON MIDDLE SCHOOL.)

ANAHEIM STREET * FRIES AVENUE AND EXTENSION TO NORTHWEST END OF SLIP #5 * SLIP #5 * EAST BASIN * TURNING BASIN * WEST BASIN * A LINE EXTENDED WESTERLY, SOUTH OF UNION OIL COMPANY REFINERY * A LINE EXTENDED NORTHERLY, WEST OF UNION OIL COMPANY REFINERY.

For assistance, please call Master Planning & Demographics, Facilities Services Division, at (213) 633-7606.

APPROVED: JAMES A. McCONNELL, Jr., Chief Facilities Executive, Facilities Services Division

DISTRIBUTION:

School	Master Planning and Demographics
Pupil Statistics	School Traffic and Safety Education Section
Transportation Branch	Department of Transportation, City of L. A.

long beach unified school district

BUSINESS DEPARTMENT - Business Services
Facilities Development & Planning Branch
Donald K. Allen Building Services Facility
2425 Webster Ave., Long Beach, CA 90810
(562) 997-7550 Fax (562) 595-8644

March 16, 2010

Via email: tjones2@icfi.com

Tanya Jones
Environmental Analyst
ICF International
1 Ada Parkway, Suite 100
Irvine, California 92618

Re: RESPONSE TO ICF INTERNATIONAL'S REQUEST FOR INFORMATION REGARDING EDUCATIONAL FACILITIES; SANITATION DISTRICTS OF LOS ANGELES CLEARWATER PROGRAM MASTER FACILITIES PLAN EIR/EIS

Dear Ms. Jones,

The Long Beach Unified School District (LBUSD) understands that ICF International is preparing an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Sanitation Districts of Los Angeles County's Clearwater Program Master Facilities Plan pursuant to the California Environmental Quality Act (CEQA) and the national Environmental Policy Act (NEPA).

LBUSD is responsible for providing school facilities and public education services to approximately 88,000 students in more than 90 public schools in the cities of Long Beach, Lakewood, Signal Hill, and Avalon on Catalina Island.

ICF International requested information from the LBUSD in conjunction with its pending analysis of the project's potential impacts on schools. The information items requested are answered below.

SCHOOL FACILITIES INFORMATION

Each bullet below shows the information request (in italics) followed by the LBUSD response:

- *How many LBUSD schools are located in the City of Long Beach?*
  - 73 K-12th grade schools within the City of Long Beach,
  - 9 K-12th grade schools in the City of Lakewood,
  - 3 K-5th grade schools, and 1 6-8th grade school (under construction) in the City of Signal Hill,
  - 1 K-12th grade school in Avalon Catalina,
  - 1 9-12th grade school in the City of Carson.

  A list of all LBUSD schools and their addresses is attached.

Mary Stanton	Felton Williams	John McGinnis	Jon Meyer	David Barton
District 1	District 2	District 3	District 4	District 5
President	Vice President	Member	Member	Member

- *Identify schools located within 0.25 miles of the LBWRP located at 7400 East Willow Street.*
  - There are no LBUSD schools located within 0.25 miles of 7400 E. Willow Street.

- *Identify the nearest school to the location at 7400 E. Willow Street.*
  - Emerson Elementary School, 2625 Josie Avenue, Long Beach, is the closest to the LBWRP site.

- *How many students are attending each school identified above?*
  - Emerson Elementary School: 637 students.

- *Would the Sanitation Districts of Los Angeles's project impact any school operations?*
  - During construction of any new sewer lines, impacts to bussing and school services could be impacted. The LBUSD Facilities Branch requests advance notification be sent to the contact below before any sewer construction begins near any of the LBUSD schools on the attached list.

    Carri M. Matsumoto, Executive Director
    Facilities Development and Planning Branch
    2425 Webster Avenue
    Long Beach, CA 90810

- *Would the project require the construction of any new facilities?.*
  - Please see attached list of proposed new schools to determine if services in those areas are adequate.

CONCLUSION

The LBUSD looks forward to the review of the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Sanitation Districts of Los Angeles County's Clearwater Program Master Facilities Plan. Please feel free to contact me at (562) 997-7550 if you need additional information, or have any questions regarding the information provided.

Sincerely,

Carri M. Matsumoto
Executive Director
Facilities Development & Planning Branch
Long Beach Unified School District

Enclosure; List of LBUSD Schools

Long Beach Unified School District Schools Sites and Properties

ELEMENTARY SCHOOLS

No.	Site #	Site	Address	City
1	410	Addams Elementary	532 Pine Avenue	Long Beach, CA 90805
2	404	Alvarado Elementary	1900 East Twenty-First St.	Signal Hill, CA 90755
3	411	Avalon K-12	200 Falls Canyon Road	Avalon, CA 90704
4	412	Barton Elementary	1100 E. Del Amo Blvd.	Long Beach, CA 90807
5	413	Birney Elementary	710 W. Spring Street	Long Beach, CA 90806
6	414	Bixby Elementary	5251 East Stearns Street	Long Beach, CA 90815
7	415	Bryant Elementary	4101 E. Fountain Street	Long Beach, CA 90804
8	416	Buffum Elementary	2350 Ximeno Avenue	Long Beach, CA 90815
9	417	Burbank Elementary	2225 East Fourth Street	Long Beach, CA 90814
10	419	Burnett Elementary	565 East Hill Street	Long Beach, CA 90806
11	420	Burroughs Elementary	1260 E. 33rd Street	Signal Hill, CA 90755
12	421	Carver Elementary	5335 E. Pavo Street	Long Beach, CA 90808
13	403	Chavez Elementary	730 W. Street	Long Beach, CA 90802
14	422	Cleveland Elementary	4760 Hackett Avenue	Long Beach, CA 90715
15	455	Dooley Elementary	5075 Long Beach Blvd.	Long Beach, CA 90805
16	424	Edison Elementary	625 Main Avenue	Long Beach, CA 90812
17	425	Emerson Elementary	2625 Josie Avenue	Long Beach, CA 90815
18	427	Fremont Elementary	4000 E. Fourth Street	Long Beach, CA 90814
19	428	Gant Elementary	1854 North Britton Drive	Long Beach, CA 90815
20	429	Garfield Elementary	2240 Baltic Avenue	Long Beach, CA 90810
21	431	Grant Elementary	1225 East 64th Street	Long Beach, CA
22	432	Harte Elementary	1671 E. Philips Street	Long Beach, CA 90805
23	433	Henry Elementary	3720 Canehill Avenue	Long Beach, CA 90800
24	434	Holmes Elementary	5020 Barlin Avenue	Lakewood, CA 90712
25	407	International Elementary	700 Locust Avenue	Long Beach, CA 90813
26	435	Keller Elementary	7020 E. Brittain Street	Long Beach, CA 90808
27	466	Kettering Elementary	510 Silvera Street	Long Beach, CA 90814
28	436	King Elementary	145 East Artesia Blvd.	Long Beach, CA 90805
29	437	Lafayette Elementary	2445 Chestnut Avenue	Long Beach, CA 90806
30	438	Lee Elementary	1620 Temple Avenue	Long Beach, CA 90804
31	439	Lincoln Elementary	1175 E. Eleventh Street	Long Beach, CA 90813
32	440	Longfellow Elementary	5800 Olive Avenue	Long Beach, CA 90807
33	441	Los Cerritos Elementary	515 W. San Antonio Drive	Long Beach, CA 90807
34	442	Lowell Elementary	5201 E. Broadway	Long Beach, CA 90803
35	443	MacArthur Elementary	6011 Centralia Street	Lakewood, CA 90713
36	444	Madison Elementary	2801 East Bomberry St.	Lakewood, CA 90712
37	445	Mann Elementary	257 Coronado Avenue	Long Beach, CA 90805
38	446	McKinley Elementary	6822 Paramount Blvd.	Long Beach, CA 90805
39	449	Naples Elementary	5537 The Toledo Street	Long Beach, CA 90803
40	450	Prisk Elementary	2375 Fanwood Avenue	Lakewood, CA 90715
41	451	Riley Elementary	3319 Sandwood Street	Lakewood, CA 90712
42	452	Roosevelt Elementary	1574 Linden Avenue	Long Beach, CA 90815
43	453	Signal Hill Elementary	2255 Walnut Avenue	Signal Hill, CA 90755
44	454	Stevenson Elementary	515 Lime Avenue	Long Beach, CA 90812
45	457	Tucker Elementary	2221 Argonne Avenue	Long Beach, CA 90815
46	458	Twain Elementary	5021 E. Centralia Street	Long Beach, CA 90808
47	459	Webster Elementary	1755 West 32nd Way	Long Beach, CA 90810
48	460	Whittier Elementary	1761 Walnut Avenue	Long Beach, CA 90713
49	461	Willard Elementary	1055 Freeman Avenue	Long Beach, CA 90804

MIDDLE and K-8 SCHOOLS

No.	Site #	Site	Address	City
50	615	Bancroft Middle	6011 Centralia Street	Long Beach, CA 90713
51	418	Burcham K-8	5610 E. Monlaco Street	Long Beach, CA 90808
52	467	Butler K-8	1400 E. 20th Street	Long Beach, CA 90806
53	423	Cubberley K-8	3200 Monogram Avenue	Long Beach, CA 90808
54	624	DeMille Middle	7025 Parkcrest Street	Long Beach, CA 90808
55	611	Franklin Middle	540 Cerritos Avenue	Long Beach, CA 90802
56	430	Gompers K-8	5206 Briercrest	Lakewood, CA 90713
57	612	Hamilton Middle	1060 East 70th Street	Long Beach, CA 90805
58	626	Hill Middle	1100 Iroquis Avenue	Long Beach, CA 90815
59	625	Hoover Middle	3501 Country Club Drive	Lakewood, CA 92712
60	464	Hudson K-8	2335 Webster Avenue	Long Beach, CA 90810
61	613	Hughes Middle	3846 California Avenue	Long Beach, CA 90807
62	614	Jefferson Middle	730 Euclid Avenue	Long Beach, CA 90804
63	616	Lindbergh Middle	1022 E. Market Street	Long Beach, CA 90805
64	635	Lindsey Middle	5075 Daisy Avenue	Long Beach, CA 90805
65	617	Marshall Middle	5870 E. Wardlow Road	Long Beach, CA 90808
66	447	Monroe K-8	4400 Ladoga Avenue	Long Beach, CA 90713
67	448	Muir Elementary	3038 Delta Avenue	Long Beach, CA 90810
68	465	Newcomb K-8	3351 Val Verde Avenue	Lakewood, CA 90808
69	492	Powell K-8	150 Victoria Street	Long Beach, CA 90805
70	406	Robinson K-8	2750 Pine Avenue	Long Beach, CA 90806
71	618	Rogers Middle	365 Monrovia Avenue	Long Beach, CA 90803
72	619	Stanford Middle	5871 Los Arcos Street	Long Beach, CA 90815
73	620	Stephens Middle	1830 W. Columbia Street	Long Beach, CA 90810
74	463	Tincher K-8	1701 Petaluma Avenue	Long Beach, CA 90815
75	622	Washington Middle	1450 Cedar Avenue	Long Beach, CA 90813

HIGH SCHOOLS

No.	Site #	Site	Address	City
76	657	Cabrillo High	2001 Santa Fe Avenue	Long Beach, CA 90810
77	641	CAMS	1000 E. Victoria Street	Carson, CA 90747
78	652	Jordan High	6500 Atlantic Avenue	Long Beach, CA 90805
79	659	Jordan Academy	171 W. Bort Street	Long Beach, CA 90805
80	653	Lakewood High	4400 Briercrest Avenue	Lakewood, CA 90713
81	658	Millikan High	2800 Snowden Avenue	Long Beach, CA 90815
82	670	PAAL	1545 Long Beach Blvd.	Long Beach, CA 90813
83	654	Polytechnic High	1600 Atlantic Avenue	Long Beach, CA 90813
84	682	Reid Continuation	2152 W. Hill Street	Long Beach, CA 90810
85	681	Renaissance	235 E. 8th Street	Long Beach, CA 90813
86	059	ROP	3701 E. Willow Street	Long Beach, CA 90815
87	656	Wilson High	4400 E. 10th Street	Long Beach, CA 90804

LBUSD PROPERTIES OWNED and POSSIBLE FUTURE SCHOOLS

No.	Site #	Site	Address	City
88		6-8 Middle School (under construction at GTE)	1951 Cherry Avenue	Signal Hill, CA
89		Browning (Future School)	3230 Hill Street	Long Beach, CA 90755

LOS ANGELES UNIFIED SCHOOL DISTRICT
Information Technology Division

LOC. CODE: 8529

SUBJECT: UPDATE BOUNDARY DESCRIPTION FOR PHINEAS BANNING SENIOR HIGH SCHOOL EFFECTIVE MAY 1, 1971 (CLARIFIED 8-3-90) (UPDATED 7-1-95).

Reconfiguration has changed the grade levels serviced by this school and the boundary description has been updated to reflect this change. This updating does not change the intent of the boundary as it was approved on May 1, 1971 (clarified 8-3-90). The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES 9-12)

TURMONT STREET (BOTH SIDES EXCLUDED) * CENTRAL AVENUE * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY * EAST BASIN * TURNING BASIN * WEST BASIN * A LINE EXTENDED WESTERLY, SOUTH OF UNION OIL COMPANY REFINERY * A LINE EXTENDED NORTHERLY, WEST OF UNION OIL COMPANY REFINERY * BIXBY SLOUGH * PACIFIC COAST HIGHWAY * HARBOR FREEWAY * LOMITA BOULEVARD * VERMONT AVENUE * SEPULVEDA BOULEVARD * LOS ANGELES CITY DEPARTMENT OF WATER AND POWER RIGHT-OF-WAY * WATSONCENTER ROAD * LUCERNE STREET AND EXTENSION (BOTH SIDES EXCLUDED) * SAN DIEGO FREEWAY * AVALON BOULEVARD.

OPTIONAL: BANNING AND SAN PEDRO SENIOR HIGH SCHOOLS

STUDENTS LIVING ON TERMINAL ISLAND.

For assistance, please call Demographic and Boundary Unit, Information Technology Division, at (213) 625-6181.

APPROVED: JOHN K. NAGATA, Assistant Superintendent, Information Technology Division

DISTRIBUTION:
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Demographic and Boundary Unit
School Traffic and Safety Education Section
Department of Transportation, City of L. A.

LOS ANGELES UNIFIED SCHOOL DISTRICT
Information Technology Division

LOC. CODE: 8850

SUBJECT: CORRECTION OF THE BOUNDARY DESCRIPTION FOR SAN PEDRO HIGH SCHOOL EFFECTIVE FEBRUARY 4, 1964 (CLARIFIED 5-1-68) (UPDATED 7-1-95) (CORRECTED 8-15-74,10-7-96).

This correction of the existing boundary description does not change the intent of the boundary as it was approved on February 4, 1964 (clarified 5-1-68); (corrected 8-15-74); (updated 7-1-95).
The description starts at the most northwesterly corner and follows the streets in clockwise order. Boundaries are on the center of the street unless otherwise noted.

This is an official copy for your file.

(GRADES 9 - 12)

SOUTH BOUNDARY OF GREEN HILLS MEMORIAL PARK CEMETERY AND EXTENSION * WESTERN AVENUE * A LINE EASTERLY THROUGH AND INCLUDING 2230 AND 2231 TAPER AVENUE, 2550 AND 2551 GAFFEY STREET, TO A POINT EAST OF GAFFEY STREET * A LINE EXTENDED SOUTHERLY, WEST OF UNION OIL COMPANY REFINERY * A LINE EXTENDED EASTERLY, SOUTH OF UNION OIL COMPANY REFINERY, AND EXTENSION TO WEST BASIN * WEST BASIN * TURNING BASIN * MAIN CHANNEL * PACIFIC OCEAN * LOS ANGELES UNIFIED SCHOOL DISTRICT BOUNDARY.

OPTIONAL: SAN PEDRO AND BANNING HIGH SCHOOLS

STUDENTS LIVING ON TERMINAL ISLAND.

For assistance, please call Demographic and Boundary Unit, Information Technology Division, at (213) 625-5454.

APPROVED: JOHN K. NAGATA, Assistant Superintendent, Information Technology Division

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Transportation Branch
Demographic and Boundary Unit
School Traffic and Safety Education Section
Department of Transportation, City of L. A.

Answers to Questionnaire:

Name of Responder: Adriana Perez
Adriana.perez1@pusd.org
Title: Project Planner
Date: 03/104/2010

Agency/Contact Information:
Scott Stark, Director
Capital Facilities Program Management
Pomona Unified School District
(909) 397-4800 Ex. 3920

1. How many PUSD Schools are located in the City of Pomona?

Elementary Schools: 25
Middle Schools: 6
High Schools: 5
Alternative Schools: 4

2. Identify the schools located 0.25 mile of the POWRP located at 295 humane Way (surrounded by railroad of way and industrial uses to the north, the Humane Society and Humane Way to the east, and Elephant Hill to the west)

NONE

3. If schools are not located within 0.25 mile of the above location, please identify the nearest school to the location (distance and name).

Westmont Elementary, ~ 0.79 miles
Marshall Middle, ~ 0.90 miles

4. Approximately how many students are attending each school identified above?

Enrollment as of 03/04/2010
Westmont Elementary: 585
Marshall Elementary: 669

5. Based on the Clearwater program description above, would it impact any schools operations?

With the program description as described, we do not foresee any major operational impacts to our schools. However, with the absence of an EIR and the exact locations of the new sewers, the impacts may become significant.

6. Would the Clearwater Program require the construction of any new facilities?

No

7. Please provide any additional information you feel would be pertinent.

None at this time

Tanya Jones

2. **Questionnaire**

Name of Responder: Jon E. McNeil

Title: Asst. Superintendent

Date: 3/10/10

Agency/Contact Information (telephone and email):

1. How many WCSD schools are located in the City of Whittier? 6
2. Identify the schools located within 0.25 mile of the SJCWRP located at 1965 Workman Mill Road (surrounded by San Jose Creek to the north, the 60 Freeway to the south, Workman Mill Road to the east, and the San Gabriel River to the west)?
3. If schools are not located within 0.25 mile of the above location, please identify the nearest school to the location (distance and name). Andrewo School 0.66 Mile
4. Approximately how many students are attending each school identified above? 473
5. Based on the Clearwater Program description above, would it impact any school operations? NO
6. Would the Clearwater Program require the construction of any new facilities? NO
7. Please provide any additional information you feel would be pertinent.

We want to know if the streets around the School will be impacted

Appendix 18-A
TRAFFIC COUNTS

Intersection Turning Movement

Prepared by:

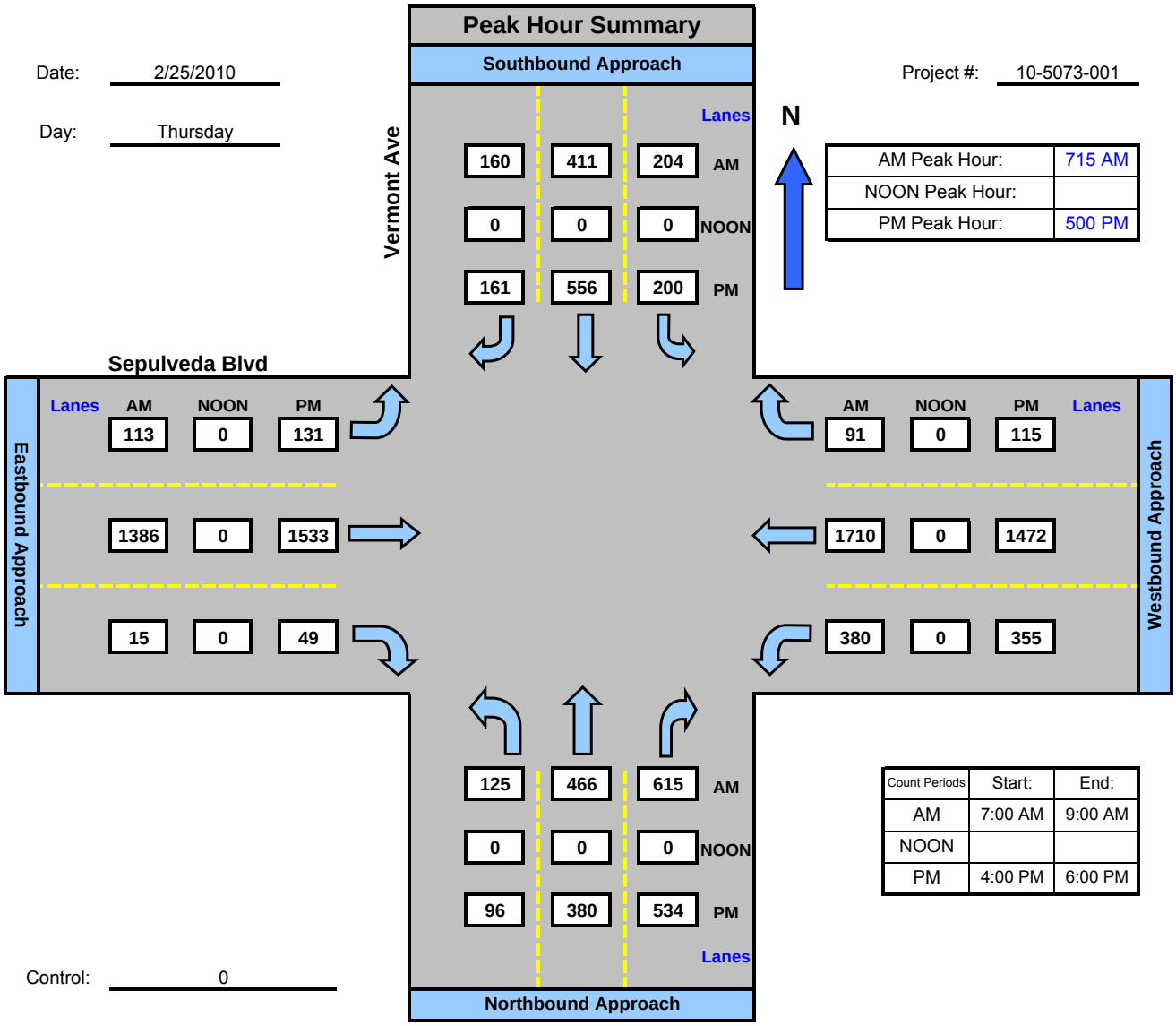
National Data & Surveying Services

Vermont Ave and Sepulveda Blvd , City of Carson

Date: 2/25/2010

Day: Thursday

Project #: 10-5073-001



AM Peak Hour:	715 AM
NOON Peak Hour:	
PM Peak Hour:	500 PM

Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

Intersection Turning Movement

Prepared by:

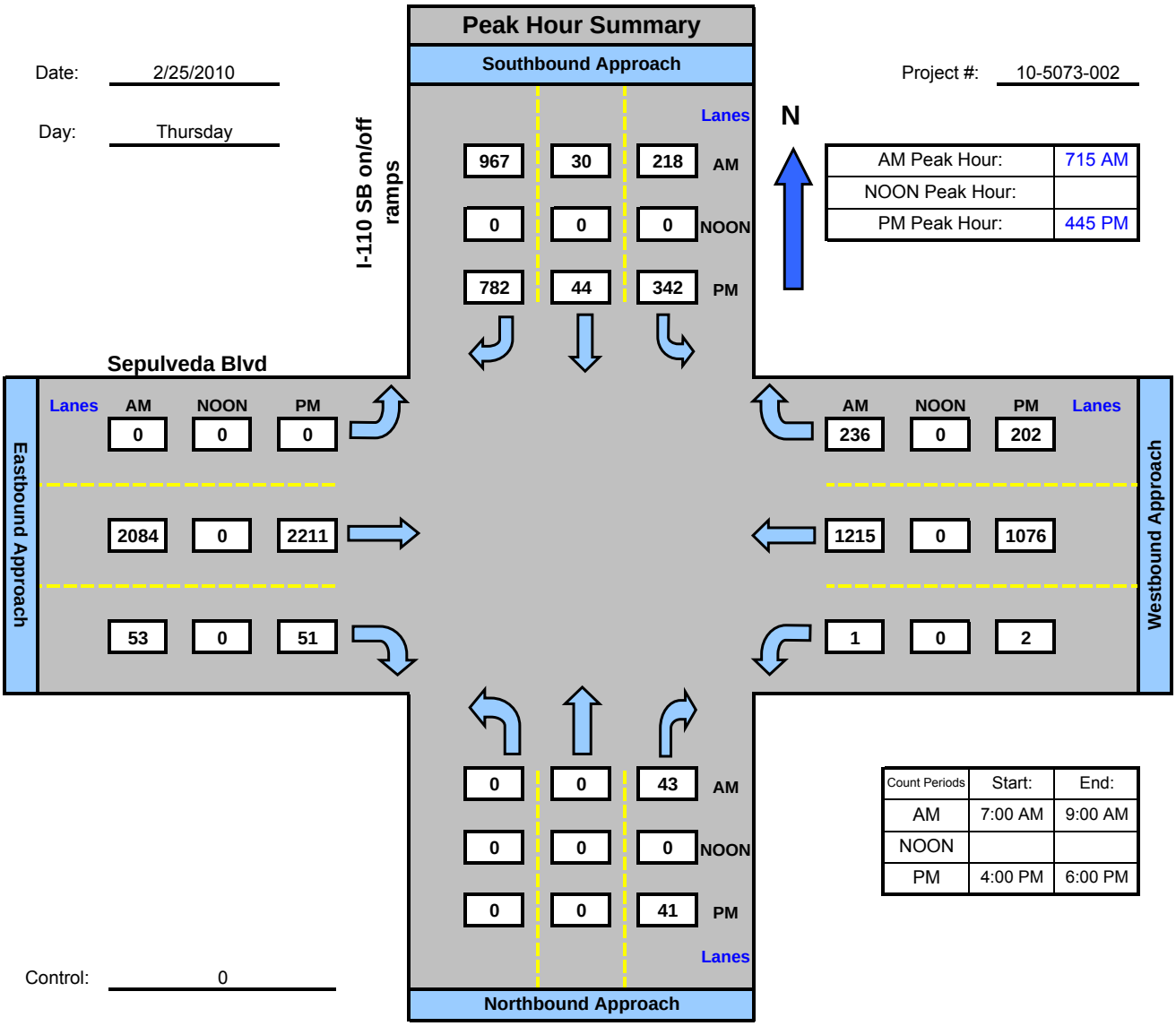
National Data & Surveying Services

I-110 SB on/off ramps and Sepulveda Blvd , City of Carson

Date: 2/25/2010

Day: Thursday

Project #: 10-5073-002



AM Peak Hour:	715 AM
NOON Peak Hour:	
PM Peak Hour:	445 PM

Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

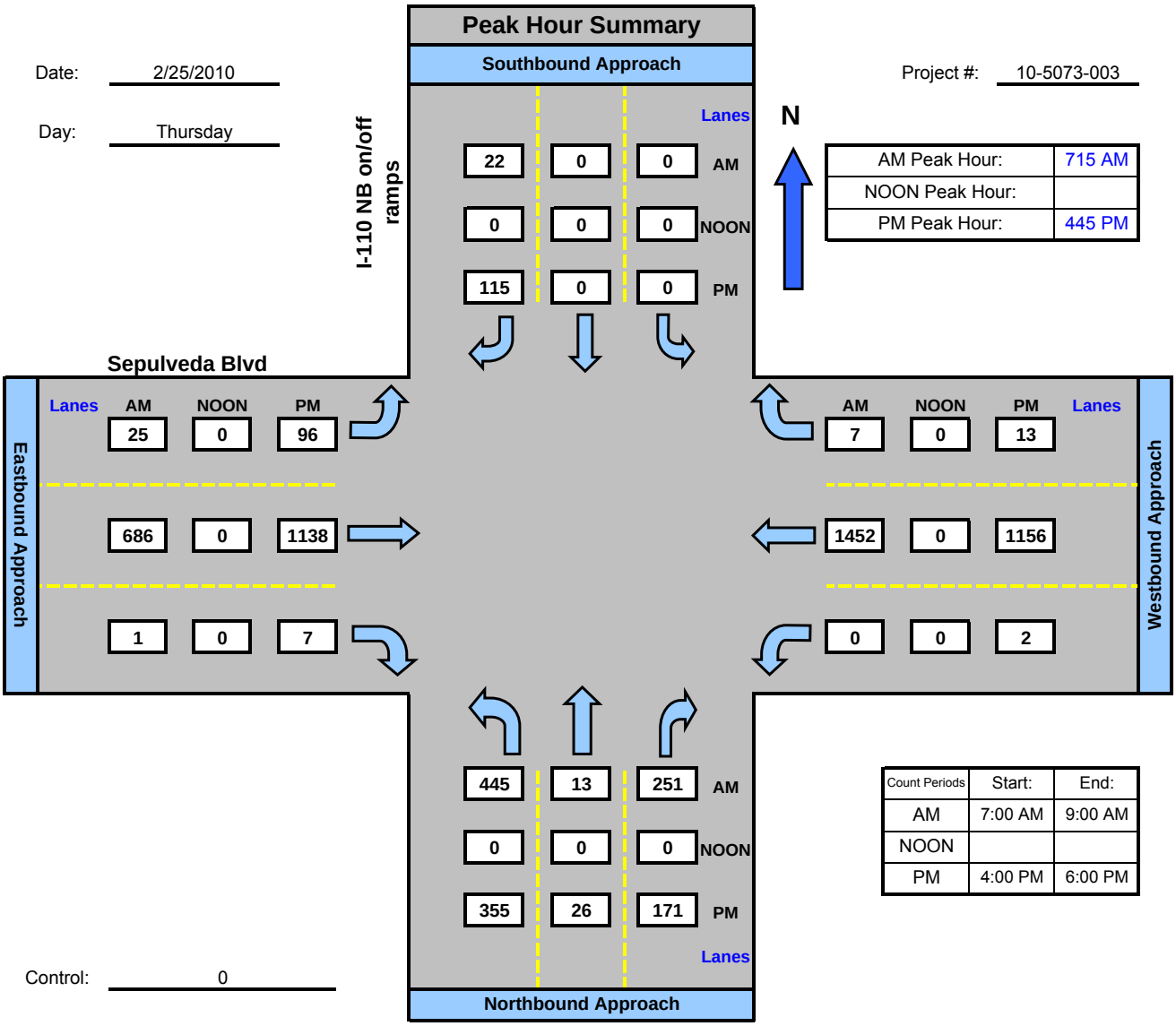
I-110 NB on/off ramps and Sepulveda Blvd , City of Carson

Date: 2/25/2010

Day: Thursday

Project #: 10-5073-003

AM Peak Hour:	715 AM
NOON Peak Hour:	
PM Peak Hour:	445 PM



Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-004

Location: Sepulveda Blvd & Figueroa St City: Carson Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	39	44	33	16	30	47	15	111	17	15	184	16
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	1	2	0	0	0	0	0	1	1	0	1	0
	Bobtails	0	0	0	0	0	0	1	1	0	0	1	0
	Small Trucks	1	1	0	1	0	0	0	4	0	0	7	0
	Big Trucks	1	1	0	0	1	2	1	1	0	1	1	0
7:15	CARS	34	62	38	11	53	55	31	166	13	30	265	18
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	1	0	1	2	0	2	0	0	2	1
	Bobtails	0	0	0	0	0	0	0	0	0	0	2	0
	Small Trucks	0	2	0	0	0	1	0	4	0	0	10	1
	Big Trucks	3	2	0	0	0	1	2	2	0	0	3	0
7:30	CARS	38	85	42	20	80	76	39	173	14	33	274	33
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	0	0	1	1	1	0	1	0	0	0	1
	Bobtails	0	0	0	0	1	0	0	0	0	0	2	0
	Small Trucks	3	0	0	0	1	0	0	2	1	0	3	0
	Big Trucks	1	0	0	0	1	1	0	2	0	0	0	1
7:45	CARS	28	85	69	26	64	49	43	248	6	40	292	30
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	2	0	0	0	0	0	0	0	0	3	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	4	0
	Small Trucks	2	0	0	0	0	0	0	4	0	0	9	0
	Big Trucks	0	0	0	1	0	0	2	3	0	2	3	0
8:00	CARS	23	75	53	14	59	35	26	142	10	20	186	30
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	1	2	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	1	0	0	0	1	0	0	3	0
	Small Trucks	2	0	1	0	0	0	0	0	0	1	8	1
	Big Trucks	1	0	0	0	0	1	0	3	0	0	6	0
8:15	CARS	38	40	30	11	38	43	18	162	15	34	215	11
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	1	4	0	0	0	0	1	0	0	0	0	2
	Bobtails	0	0	0	0	0	0	0	3	0	0	2	0
	Small Trucks	2	0	0	0	0	0	1	10	0	0	10	1
	Big Trucks	0	0	0	0	2	1	1	2	2	0	6	0
8:30	CARS	28	48	37	9	37	17	16	129	14	15	211	7
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	0	0	0	0	0	1	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	3	1
	Small Trucks	0	0	1	0	0	0	0	2	1	1	4	2
	Big Trucks	0	1	3	0	0	1	0	2	2	0	3	1
8:45	CARS	14	28	21	13	48	25	15	119	5	17	163	7
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	0	0
	Small Trucks	1	0	1	0	0	0	0	4	2	0	7	0
	Big Trucks	2	0	0	1	0	0	0	9	1	1	4	1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	242	467	323	120	409	347	203	1250	94	204	1790	152
Motorcycles	0	0	0	0	1	0	0	1	0	0	2	0
Buses	3	10	1	1	2	3	2	4	1	0	7	4
Bobtails	0	0	0	1	1	0	1	11	0	0	17	1
Small Trucks	11	3	3	1	1	1	1	30	4	2	58	5
Big Trucks	8	4	3	2	4	7	6	24	5	4	26	3
TOTALS	264	484	330	125	418	358	213	1320	104	210	1900	165
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	123	307	202	71	256	215	139	729	43	123	1017	111
Motorcycles	0	0	0	0	1	0	0	0	0	0	1	0
Buses	1	4	1	1	2	3	0	3	0	0	5	2
Bobtails	0	0	0	1	1	0	0	3	0	0	11	0
Small Trucks	5	2	0	1	1	3	4	10	0	2	12	1
Big Trucks	7	2	1	0	1	1	0	10	1	1	30	2
TOTALS	136	315	204	74	262	222	143	755	44	126	1076	116
PEAK HR. FACTOR:	0.880			0.758			0.765			0.860		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-004

Location: Sepulveda Blvd & Figueroa St City: Carson Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	28	50	75	28	36	17	29	236	34	11	183	18
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	2	0	1	0	0	1	0	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	4	0	0	1	0
	Small Trucks	0	0	0	0	0	0	0	5	1	0	7	0
	Big Trucks	1	0	0	0	0	1	0	2	0	0	3	0
16:15	CARS	26	87	72	29	52	21	40	231	23	23	202	14
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	1
	Bobtails	0	0	0	0	0	0	0	7	0	0	2	0
	Small Trucks	1	0	0	0	0	1	0	11	1	2	4	0
	Big Trucks	3	1	0	0	0	0	1	2	0	1	3	0
16:30	CARS	31	64	46	32	44	20	32	228	13	26	192	17
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	1	1
	Bobtails	0	0	0	0	0	0	0	7	0	0	0	1
	Small Trucks	0	0	0	0	0	0	0	11	0	1	5	1
	Big Trucks	0	0	0	0	0	0	0	3	0	0	5	1
16:45	CARS	17	64	69	36	56	17	47	259	17	35	209	33
	Motorcycles	1	0	0	0	0	0	1	0	0	0	1	0
	Buses	0	0	1	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	11	0	0	1	0
	Small Trucks	0	0	0	1	0	0	0	7	0	0	6	1
	Big Trucks	1	1	1	0	0	0	1	1	0	0	4	0
17:00	CARS	23	85	58	32	54	30	37	242	23	22	215	16
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	0	1	0	0	0	0	0	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	2	0
	Small Trucks	1	1	0	1	0	0	0	2	0	0	7	1
	Big Trucks	0	0	0	0	2	1	0	1	0	1	2	0
17:15	CARS	22	81	75	25	72	33	42	254	24	16	255	13
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	1	0	0	0	0	0	1	0	0	6	0
	Small Trucks	0	0	0	1	0	0	0	3	0	0	9	0
	Big Trucks	0	0	0	1	0	0	0	3	0	0	3	0
17:30	CARS	24	60	58	24	59	30	37	236	17	33	239	20
	Motorcycles	0	2	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	2	0
	Small Trucks	0	0	0	1	0	0	0	2	1	0	3	0
	Big Trucks	0	0	0	0	0	0	0	1	0	0	3	1
17:45	CARS	16	66	60	26	69	20	37	271	17	22	222	20
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	1
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	3	0
	Small Trucks	0	0	0	0	0	0	0	2	1	0	6	0
	Big Trucks	0	0	1	0	0	0	0	1	0	0	0	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	187	557	513	232	442	188	301	1957	168	188	1717	151
Motorcycles	1	2	0	0	1	0	1	1	0	0	1	1
Buses	0	4	2	1	2	0	1	0	0	0	3	2
Bobtails	0	1	0	0	0	0	0	30	0	0	17	1
Small Trucks	2	1	0	4	0	1	0	43	4	3	47	3
Big Trucks	5	2	2	1	2	2	2	14	0	2	23	2
TOTALS	195	567	517	238	447	191	305	2045	172	193	1808	160
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	86	290	260	117	241	110	163	991	81	106	918	82
Motorcycles	1	2	0	0	1	0	1	0	0	0	1	0
Buses	0	0	2	0	0	0	0	0	0	0	1	0
Bobtails	0	1	0	0	0	0	0	12	0	0	11	0
Small Trucks	1	1	1	1	2	1	1	6	0	1	12	1
Big Trucks	1	1	0	4	0	0	0	14	1	0	25	2
TOTALS	89	295	263	122	244	111	165	1023	82	107	968	85
PEAK HR. FACTOR:	0.904			0.903			0.923			0.960		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-005

Location: Sepulveda Blvd & Main St City: Carson Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	24	47	18	14	43	24	26	114	22	30	154	12
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	1	1	1	0	1	0	0	1	1	1	1	2
	Bobtails	0	0	0	0	0	0	0	1	0	0	2	0
	Small Trucks	0	0	0	0	0	0	0	4	0	0	7	0
	Big Trucks	1	0	0	0	0	0	0	2	0	0	2	0
7:15	CARS	36	83	26	29	68	36	29	167	16	50	231	19
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	1	1	2	6	1	0	0	3	0	0	2	2
	Bobtails	0	0	0	0	1	0	0	0	0	0	1	0
	Small Trucks	3	1	0	0	1	0	0	6	0	1	9	0
	Big Trucks	1	0	1	0	2	0	0	3	0	1	2	0
7:30	CARS	29	87	38	29	70	44	21	179	31	55	292	18
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	1	1	0	0	1	1	0	0	2
	Bobtails	0	1	1	0	0	0	0	0	0	0	2	0
	Small Trucks	2	0	4	0	0	0	0	2	0	0	1	0
	Big Trucks	0	1	0	2	0	1	1	1	2	1	1	0
7:45	CARS	29	93	40	33	105	37	34	237	34	38	226	22
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	2	1	0	0	1	0	1	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	1	0	0	3	0
	Small Trucks	2	0	1	0	0	2	0	2	0	0	9	0
	Big Trucks	2	2	0	2	1	0	1	4	4	2	2	2
8:00	CARS	29	60	30	26	64	26	38	152	24	35	172	21
	Motorcycles	0	0	0	0	0	0	0	0	0	1	0	0
	Buses	0	1	2	1	1	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	1	1	0	2	0
	Small Trucks	3	0	0	0	0	0	0	1	0	0	4	0
	Big Trucks	0	1	0	0	2	2	0	2	2	0	4	1
8:15	CARS	21	66	29	31	70	23	24	155	29	43	212	21
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	1	1	1	0	1	1	0	0	0	1	0	1
	Bobtails	0	0	0	0	0	0	0	2	1	0	3	0
	Small Trucks	2	0	2	0	1	0	1	4	1	1	7	0
	Big Trucks	1	0	0	0	0	0	0	2	4	0	11	0
8:30	CARS	22	49	16	19	45	19	21	117	25	30	179	15
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	1	0	0	2	0	0	0	0	0	0	0
	Bobtails	1	0	0	0	0	0	0	2	1	0	3	0
	Small Trucks	1	0	0	0	0	0	0	4	1	3	5	0
	Big Trucks	2	1	0	0	2	0	1	4	0	0	2	0
8:45	CARS	26	61	18	10	50	14	13	117	18	34	133	13
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	1	0	1	0	1	0	0	0	0	0	1
	Bobtails	0	0	0	0	0	0	0	2	0	0	0	0
	Small Trucks	3	0	1	1	0	0	0	5	0	0	4	0
	Big Trucks	5	1	0	0	1	0	0	6	5	2	1	0

MOVEMENT TOTALS

CARS	216	546	215	191	515	223	206	1238	199	315	1599	141
Motorcycles	0	1	0	0	1	0	0	1	0	1	2	0
Buses	3	9	7	9	7	3	0	6	3	2	4	8
Bobtails	1	1	1	0	1	0	0	9	3	0	16	0
Small Trucks	16	1	8	1	2	2	1	28	2	5	46	0
Big Trucks	12	6	1	4	8	3	3	24	17	6	25	3
TOTALS	248	564	232	205	534	231	210	1306	224	329	1692	152
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =

CARS	123	323	134	117	307	143	122	735	105	178	921	80
Motorcycles	0	1	0	0	0	0	0	0	0	1	1	0
Buses	1	5	5	8	3	1	0	5	2	0	3	4
Bobtails	0	1	1	0	1	0	0	2	1	0	8	0
Small Trucks	3	4	1	4	5	3	2	10	8	4	9	3
Big Trucks	10	1	5	0	1	2	0	11	0	1	23	0
TOTALS	137	335	146	129	317	149	124	763	116	184	965	87

PEAK HR. FACTOR:	0.898	0.822	0.789	0.831

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-005

Location: Sepulveda Blvd & Main St City: Carson Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	26	65	34	34	97	26	35	218	41	34	147	23
	Motorcycles	0	0	0	0	0	0	0	2	0	0	0	0
	Buses	0	2	0	0	0	0	0	1	0	0	1	0
	Bobtails	1	0	0	0	0	0	0	2	2	0	1	0
	Small Trucks	1	1	3	0	0	0	0	4	1	0	3	0
	Big Trucks	0	1	0	1	1	0	0	2	0	1	1	0
16:15	CARS	39	74	33	39	85	21	40	234	51	37	194	25
	Motorcycles	0	0	0	0	1	0	0	0	0	0	1	0
	Buses	0	1	0	0	2	0	0	0	0	0	1	0
	Bobtails	0	1	0	0	0	0	0	8	0	0	1	0
	Small Trucks	3	1	1	0	0	0	0	10	1	2	4	0
	Big Trucks	1	1	1	0	0	0	0	3	1	1	3	1
16:30	CARS	35	81	32	31	76	21	34	204	44	35	163	37
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	2	4	0	1	2	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	6	1	0	2	0
	Small Trucks	2	0	1	0	0	2	0	9	2	0	5	0
	Big Trucks	0	1	1	2	1	0	0	1	1	0	3	0
16:45	CARS	40	74	40	49	112	38	56	279	46	37	202	24
	Motorcycles	0	0	0	0	2	1	0	1	0	2	0	0
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	4	5	0	2	0
	Small Trucks	2	0	1	0	0	0	0	3	3	1	2	0
	Big Trucks	0	3	3	0	0	0	0	4	0	1	5	1
17:00	CARS	43	88	31	34	98	26	46	240	45	38	177	31
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	1
	Buses	0	1	1	0	0	0	0	0	1	0	0	0
	Bobtails	3	0	0	0	0	0	0	1	0	0	1	0
	Small Trucks	2	0	0	1	0	0	0	1	0	1	7	0
	Big Trucks	0	1	0	0	0	0	0	2	0	0	1	0
17:15	CARS	40	85	35	41	99	29	36	270	22	40	203	29
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	1	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	4	0
	Small Trucks	2	0	0	0	1	0	0	1	3	0	5	0
	Big Trucks	0	0	0	0	0	0	0	2	1	0	2	0
17:30	CARS	32	95	37	44	92	22	26	241	33	44	188	26
	Motorcycles	0	0	0	1	1	0	0	0	0	0	0	0
	Buses	1	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	1	0	0	0	0	0	0	0	2	0
	Small Trucks	1	0	1	0	0	1	0	0	3	1	3	0
	Big Trucks	0	0	0	0	2	0	0	0	0	1	2	0
17:45	CARS	42	102	24	46	111	28	35	299	45	38	181	30
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	1	0	0	2	0	0	0	0	0	0	0
	Bobtails	1	0	0	0	0	0	0	0	0	1	2	0
	Small Trucks	2	0	1	0	0	0	0	0	2	1	3	0
	Big Trucks	0	0	0	0	0	0	0	1	0	1	0	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	297	664	266	318	770	211	308	1985	327	303	1455	225
Motorcycles	0	1	0	1	4	1	0	3	0	2	2	1
Buses	3	11	1	2	9	0	0	1	1	0	2	0
Bobtails	5	1	1	0	0	0	0	23	8	1	15	0
Small Trucks	15	2	8	1	1	3	0	28	15	6	32	0
Big Trucks	1	7	5	3	4	0	0	15	3	5	17	2
TOTALS	321	686	281	325	788	215	308	2055	354	317	1523	228
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	155	342	143	168	401	115	164	1030	146	159	770	110
Motorcycles	0	0	0	1	3	1	0	1	0	2	0	1
Buses	1	3	1	1	3	0	0	0	1	0	0	0
Bobtails	3	0	1	0	0	0	0	7	5	0	9	0
Small Trucks	0	4	3	0	2	0	0	8	1	2	10	1
Big Trucks	7	0	2	1	1	1	0	5	9	3	17	0
TOTALS	166	349	150	171	410	117	164	1051	162	166	806	112
PEAK HR. FACTOR:	0.978			0.860			0.858			0.958		

Intersection Turning Movement

Prepared by:

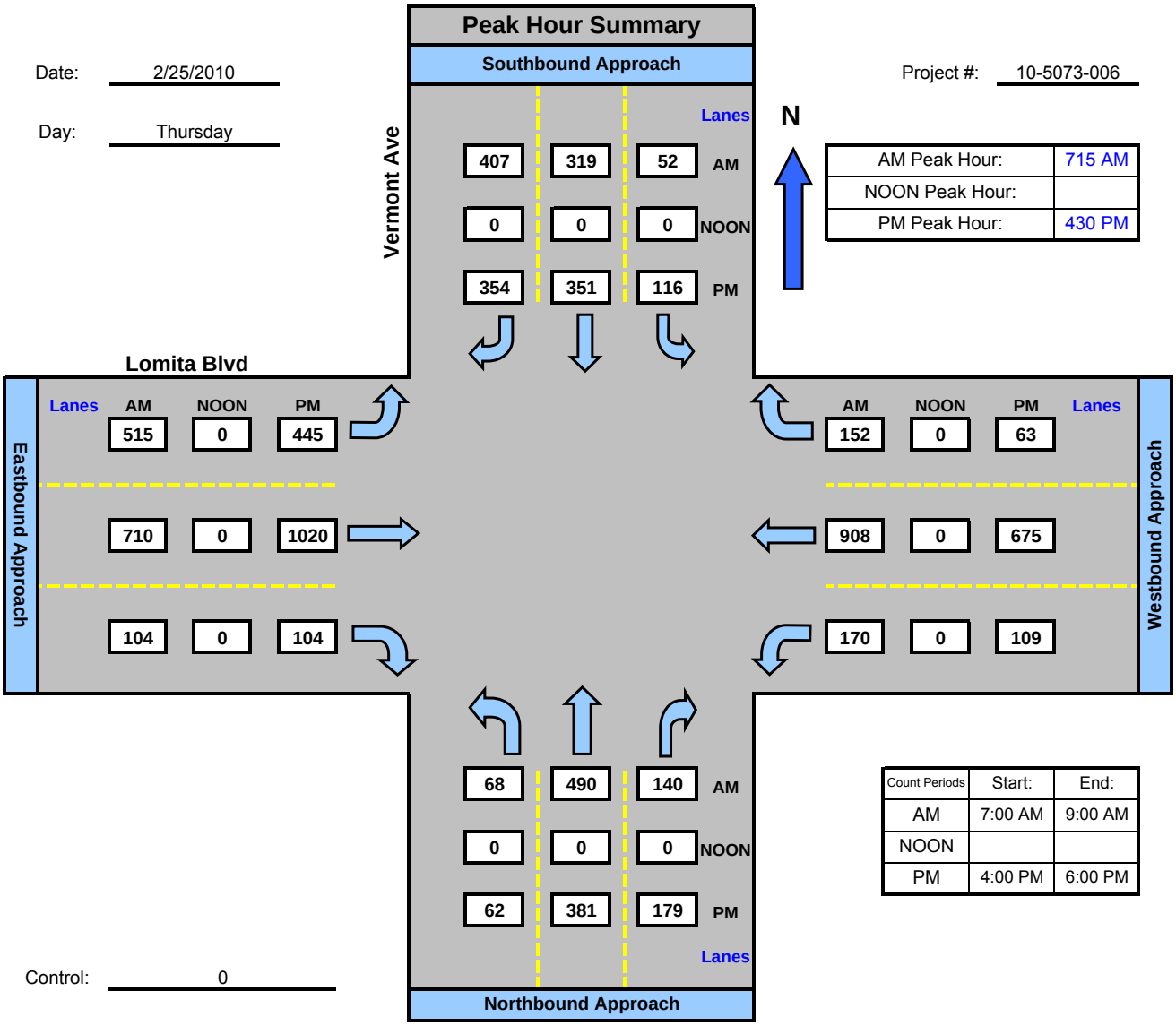
National Data & Surveying Services

Vermont Ave and Lomita Blvd , City of Harbor City

Date: 2/25/2010

Day: Thursday

Project #: 10-5073-006



AM Peak Hour:	715 AM
NOON Peak Hour:	
PM Peak Hour:	430 PM

Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-007

Location: Lomita Blvd & Figueroa St City: Harbor City Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	30	34	6	7	12	29	73	86	26	3	129	21
	Motorcycles	0	0	0	1	0	0	0	0	0	0	0	0
	Buses	0	2	0	0	1	0	0	0	0	0	1	1
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	2	0	0	0	0	0	1	0	0	0	0
	Big Trucks	0	0	0	0	0	0	0	1	1	0	0	0
7:15	CARS	42	33	4	15	14	58	63	101	23	6	183	28
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	1	0	4	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	2	0	0
	Small Trucks	1	0	0	0	0	0	0	0	0	0	1	0
	Big Trucks	1	0	1	0	0	0	0	4	0	0	0	0
7:30	CARS	61	46	6	15	34	71	73	107	30	11	208	28
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	1	0	0	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	0	0
	Small Trucks	0	0	1	0	0	1	0	0	0	0	1	0
	Big Trucks	0	0	0	0	0	0	2	1	1	0	0	0
7:45	CARS	82	55	4	10	42	59	85	145	26	6	195	26
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	3	0	0	0	0	0	1	0	0	4	0
	Bobtails	0	0	0	0	1	0	0	0	0	1	1	0
	Small Trucks	0	1	0	0	0	0	0	1	0	1	2	0
	Big Trucks	0	0	0	0	1	1	0	0	0	0	0	0
8:00	CARS	45	44	11	12	24	48	88	109	19	6	148	11
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	1	1	0	0	0	0	2	4	0	0	2	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	1	1	0	0	0	0	0
	Big Trucks	0	1	0	0	0	2	0	1	0	0	3	0
8:15	CARS	48	26	7	8	18	45	57	96	17	6	148	23
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	3	0	0	0	0	1	0	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	1	0	2	0	0	0	0	0
	Big Trucks	0	0	0	0	1	2	0	1	1	0	1	0
8:30	CARS	36	28	3	15	13	32	60	81	22	4	124	17
	Motorcycles	2	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	0	0	0	0	0	2	1	0	0	0	0
	Bobtails	0	0	0	0	1	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	1	3	3	0	1	0	0
	Big Trucks	0	3	0	0	0	0	0	1	0	0	1	0
8:45	CARS	30	15	3	10	18	34	36	82	25	10	123	11
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	1	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	1	0
	Big Trucks	2	0	0	0	1	0	0	1	0	0	2	2

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	374	281	44	92	175	376	535	807	188	52	1258	165
Motorcycles	2	0	0	1	0	0	0	0	0	0	3	0
Buses	1	10	0	0	1	2	5	10	0	0	9	1
Bobtails	0	0	0	0	2	0	0	2	0	3	2	0
Small Trucks	1	3	1	0	1	3	6	5	0	2	5	0
Big Trucks	3	4	1	0	3	5	2	10	3	0	7	2
TOTALS	381	298	46	93	182	386	548	834	191	57	1284	168
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	230	178	25	52	114	236	309	462	98	29	734	93
Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
Buses	1	5	0	0	0	2	2	9	0	0	7	0
Bobtails	0	0	0	0	1	0	0	2	0	3	1	0
Small Trucks	1	1	1	0	1	3	2	6	1	0	3	0
Big Trucks	1	1	1	0	0	2	1	1	0	1	4	0
TOTALS	233	185	27	52	116	243	314	480	99	33	750	93
PEAK HR. FACTOR:	0.767			0.842			0.865			0.880		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-007

Location: Lomita Blvd & Figueroa St City: Harbor City Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	45	26	4	22	36	30	92	174	46	8	126	18
	Motorcycles	0	0	1	0	0	0	0	0	0	0	0	0
	Buses	1	2	0	0	0	0	1	0	0	0	0	0
	Bobtails	0	0	2	0	0	0	0	1	0	0	0	0
	Small Trucks	0	0	1	0	0	0	0	1	0	0	0	0
	Big Trucks	1	1	0	0	0	0	0	0	0	0	0	0
16:15	CARS	46	21	5	28	25	35	124	173	38	8	110	20
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	3	0	0	0	0
	Bobtails	0	0	1	0	0	0	0	0	0	0	1	0
	Small Trucks	3	1	0	0	1	1	0	0	0	0	0	0
	Big Trucks	1	1	0	0	0	1	0	0	0	0	1	0
16:30	CARS	32	25	11	23	27	39	82	167	41	10	125	11
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	1	0	0	0	0
	Big Trucks	1	1	0	0	0	0	1	1	0	0	0	0
16:45	CARS	32	31	4	14	37	48	112	167	32	2	119	5
	Motorcycles	0	1	0	0	0	0	0	0	0	1	2	0
	Buses	0	0	0	0	0	0	2	1	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	1	0	0	0	0	0	0
	Big Trucks	1	1	0	0	0	0	1	1	0	0	2	0
17:00	CARS	57	46	7	24	40	28	80	153	54	4	123	20
	Motorcycles	0	0	0	0	1	0	0	0	0	0	1	0
	Buses	0	0	0	0	0	0	0	1	0	0	0	1
	Bobtails	0	0	0	0	0	0	0	1	0	0	0	0
	Small Trucks	1	1	1	0	0	0	1	0	0	0	1	1
	Big Trucks	0	0	1	0	1	0	0	1	1	1	0	0
17:15	CARS	41	48	10	32	36	48	116	181	39	10	140	9
	Motorcycles	0	0	0	0	0	0	0	0	1	0	0	0
	Buses	0	0	0	0	0	0	1	1	0	0	0	0
	Bobtails	0	1	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	1	0
	Big Trucks	0	1	0	0	1	0	0	0	1	0	0	0
17:30	CARS	46	28	6	21	41	33	87	171	35	13	146	10
	Motorcycles	2	2	0	0	0	0	0	0	0	0	0	1
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	1	0	0	0	0	0	0	0	1	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
17:45	CARS	24	35	10	21	58	36	101	181	47	9	126	6
	Motorcycles	1	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	1	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	1	0	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	1	0
	Big Trucks	1	0	0	0	0	0	1	1	0	0	0	0

MOVEMENT TOTALS

CARS	323	260	57	185	300	297	794	1367	332	64	1015	99
Motorcycles	3	3	1	0	1	0	0	0	1	1	3	1
Buses	1	4	0	0	1	0	4	7	0	0	0	1
Bobtails	0	1	3	0	0	0	0	2	0	1	1	0
Small Trucks	5	2	2	0	1	2	1	2	1	0	3	1
Big Trucks	5	5	1	0	2	1	3	4	2	1	3	0
TOTALS	337	275	64	185	305	300	802	1382	336	67	1025	102
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =

CARS	168	157	33	98	175	145	384	686	175	36	535	45
Motorcycles	3	2	0	0	1	0	0	0	1	0	1	1
Buses	0	0	0	0	1	0	1	3	0	0	0	1
Bobtails	0	1	0	0	0	0	0	1	0	1	0	0
Small Trucks	1	1	1	0	2	0	1	2	2	1	0	0
Big Trucks	2	1	1	0	0	0	1	0	1	0	3	1
TOTALS	174	162	35	98	179	145	387	692	179	38	539	48
PEAK HR. FACTOR:	0.814			0.902			0.925			0.919		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-008

Location: Main St/Wilmington Blvd & Lomita Blvd City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	25	59	12	11	43	40	27	65	4	7	92	14
	Motorcycles	0	0	0	0	0	0	0	0	1	0	0	0
	Buses	0	3	0	0	2	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	0	0
	Big Trucks	0	2	1	1	2	0	0	0	1	1	0	0
7:15	CARS	31	94	17	17	41	57	23	71	8	14	109	7
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	3	1	1	1	0	0	1	2	1	1	1
	Bobtails	0	0	0	0	0	1	0	0	0	0	1	0
	Small Trucks	0	0	0	0	0	1	1	0	0	1	0	0
	Big Trucks	0	0	1	0	1	0	2	3	0	0	0	2
7:30	CARS	36	115	33	20	71	68	27	76	5	12	135	8
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	1	1	0	0	2	0	0	0	0	1	1	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	0	0
	Small Trucks	0	0	0	0	0	2	1	0	0	0	0	0
	Big Trucks	0	0	0	0	4	0	0	1	0	0	0	0
7:45	CARS	36	111	22	19	74	55	29	96	10	15	92	9
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	1	3	0	0	1	1	0	0	1	1	1	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	2	0
	Small Trucks	1	0	0	0	0	0	0	0	0	0	2	0
	Big Trucks	2	3	1	0	1	1	0	0	0	0	0	0
8:00	CARS	21	108	5	15	59	40	19	75	12	8	88	14
	Motorcycles	0	0	0	0	0	1	0	0	0	0	0	0
	Buses	0	1	0	0	2	0	0	0	0	0	2	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	1	0	0	0	0
	Big Trucks	0	0	0	1	1	1	1	4	0	0	4	2
8:15	CARS	22	83	15	13	66	51	30	83	6	16	97	4
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	0	0
	Big Trucks	0	2	0	0	1	1	0	1	0	0	1	0
8:30	CARS	12	61	12	7	48	33	22	59	9	7	94	11
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	1	1	2	0	0	0	0
	Big Trucks	0	2	1	0	4	0	0	2	0	0	1	0
8:45	CARS	21	64	5	5	58	34	27	63	8	13	72	9
	Motorcycles	0	0	0	0	0	1	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	1	0
	Small Trucks	0	0	0	0	0	1	0	0	0	0	0	0
	Big Trucks	1	1	1	0	0	2	1	1	0	0	3	0

MOVEMENT TOTALS

CARS	204	695	121	107	460	378	204	588	62	92	779	76
Motorcycles	0	2	0	0	0	2	0	0	1	0	1	0
Buses	2	14	1	1	11	1	0	1	5	3	5	1
Bobtails	0	0	0	0	0	1	0	2	0	0	4	0
Small Trucks	1	0	0	0	0	5	3	3	0	1	2	0
Big Trucks	3	10	5	2	14	5	4	12	1	1	9	4
TOTALS	210	721	127	110	485	392	211	606	69	97	800	81
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =

CARS	124	428	77	71	245	220	98	318	35	49	424	38
Motorcycles	0	2	0	0	0	1	0	0	0	0	0	0
Buses	2	8	1	1	6	1	0	1	3	3	5	1
Bobtails	0	0	0	0	0	1	0	2	0	0	3	0
Small Trucks	2	3	2	1	7	2	3	8	0	0	4	4
Big Trucks	1	0	0	0	0	3	2	1	0	1	2	0
TOTALS	129	441	80	73	258	228	103	330	38	53	438	43
PEAK HR. FACTOR:	0.869			0.837			0.866			0.850		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-008

Location: Main St/Wilmington Blvd & Lomita Blvd City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	16	69	18	23	90	44	24	86	14	13	87	14
	Motorcycles	0	0	1	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	2	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	1	0	0	0	0
	Big Trucks	0	1	2	0	0	0	0	1	0	0	1	0
16:15	CARS	20	104	16	22	105	40	18	109	8	18	67	14
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	2	1	0	2	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	4	0	0	0	0
	Small Trucks	0	1	0	0	0	0	0	0	0	0	1	0
	Big Trucks	0	0	0	0	1	1	0	1	0	0	0	0
16:30	CARS	16	88	16	18	84	47	25	95	6	10	92	9
	Motorcycles	0	0	1	0	0	0	0	0	0	0	0	0
	Buses	0	4	0	0	2	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	1	0	0	0	0
	Big Trucks	0	2	1	0	0	0	2	2	1	0	0	1
16:45	CARS	15	104	16	31	115	50	27	105	5	23	65	13
	Motorcycles	0	0	0	0	0	3	0	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	0	0
	Big Trucks	0	2	0	0	1	1	2	0	0	1	2	0
17:00	CARS	15	75	14	33	101	47	23	90	13	12	73	13
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	1	0	0	0	1	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	1	0	0	0	0
	Small Trucks	0	0	0	0	0	1	0	1	0	0	1	0
	Big Trucks	1	0	0	0	1	0	0	1	0	0	0	0
17:15	CARS	21	97	12	25	115	46	23	98	13	18	102	11
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	1	0	0	0	0	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
17:30	CARS	20	111	16	19	112	45	31	104	12	27	88	14
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	1
17:45	CARS	13	113	16	27	131	55	25	104	6	25	92	7
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	2	0	0	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	1	0
	Small Trucks	0	0	0	0	0	1	0	0	0	0	0	0
	Big Trucks	1	0	0	0	2	0	0	1	0	0	0	0

MOVEMENT TOTALS

CARS	136	761	124	198	853	374	196	791	77	146	666	95
Motorcycles	0	0	2	0	1	3	0	0	0	0	1	0
Buses	0	11	1	0	9	1	0	0	4	0	0	0
Bobtails	0	0	0	0	0	0	0	7	0	0	1	0
Small Trucks	1	1	0	0	0	2	0	3	0	0	2	0
Big Trucks	2	5	3	0	5	2	4	6	1	1	3	2
TOTALS	139	778	130	198	868	382	200	807	82	147	673	97
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =

CARS	69	396	58	104	459	193	102	396	44	82	355	45
Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
Buses	0	4	0	0	4	1	0	0	2	0	0	0
Bobtails	0	0	0	0	0	0	0	1	0	0	1	0
Small Trucks	2	0	0	0	3	0	0	2	0	0	0	1
Big Trucks	1	0	0	0	0	2	0	1	0	0	1	0
TOTALS	72	400	58	104	466	196	102	400	46	82	358	46

PEAK HR. FACTOR:	0.895	0.878	0.932	0.927

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-009

Location: PCH & Figueroa St City: Wilmington Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	56	84	33	2	10	8	275	176	7	6	192	99
	Motorcycles	0	1	0	0	0	0	1	0	0	0	1	0
	Buses	4	0	3	0	0	0	1	6	1	0	2	3
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	1	0	0	0	0	1	5	0	1	1	4
	Big Trucks	2	1	0	0	0	0	1	9	1	0	1	3
7:15	CARS	53	104	42	3	19	7	221	205	10	19	262	136
	Motorcycles	0	0	0	0	0	0	0	2	0	0	1	0
	Buses	2	2	2	0	0	0	1	3	1	0	6	1
	Bobtails	0	0	0	0	0	1	0	3	0	0	0	0
	Small Trucks	0	1	0	0	0	0	1	1	0	0	1	3
	Big Trucks	1	2	1	0	2	0	3	9	1	0	7	4
7:30	CARS	37	107	47	8	39	17	256	219	29	36	258	99
	Motorcycles	0	0	0	0	0	0	1	1	0	0	2	0
	Buses	1	0	3	0	0	0	0	2	0	0	2	0
	Bobtails	0	0	0	0	1	0	0	0	0	0	0	1
	Small Trucks	1	2	0	0	0	0	4	1	0	0	1	2
	Big Trucks	1	1	1	0	0	0	4	3	1	0	10	4
7:45	CARS	49	147	43	6	52	20	207	232	23	41	253	118
	Motorcycles	1	1	0	0	0	0	2	2	0	0	0	0
	Buses	3	1	0	0	0	0	1	0	2	0	4	1
	Bobtails	0	0	0	0	1	0	0	0	0	0	0	0
	Small Trucks	0	1	0	1	0	0	1	0	0	1	1	1
	Big Trucks	1	1	3	1	0	0	2	13	0	1	8	7
8:00	CARS	59	99	50	3	21	14	242	209	13	20	250	95
	Motorcycles	0	0	0	0	0	0	1	1	0	0	0	1
	Buses	3	1	2	0	0	0	2	1	1	0	0	1
	Bobtails	0	0	0	0	0	0	0	1	0	0	0	1
	Small Trucks	1	0	0	0	0	0	4	0	0	1	2	1
	Big Trucks	2	2	0	0	0	0	2	4	0	1	3	6
8:15	CARS	56	99	46	1	24	13	245	175	18	13	216	89
	Motorcycles	1	1	0	0	0	0	0	2	0	0	1	0
	Buses	2	3	1	0	0	0	3	2	1	0	2	1
	Bobtails	0	0	0	0	0	0	1	2	0	0	0	0
	Small Trucks	1	0	0	0	0	1	1	3	0	0	1	5
	Big Trucks	1	0	1	0	1	0	2	2	0	0	5	4
8:30	CARS	49	52	29	6	10	14	254	213	21	5	192	120
	Motorcycles	0	0	0	0	0	0	1	0	0	0	0	0
	Buses	3	0	0	0	0	0	1	0	0	0	0	1
	Bobtails	0	0	0	1	0	0	0	0	0	0	0	0
	Small Trucks	2	0	1	0	0	0	4	1	0	0	1	3
	Big Trucks	1	3	1	1	0	0	5	4	0	1	5	2
8:45	CARS	55	52	35	1	28	25	243	192	12	15	195	96
	Motorcycles	1	0	0	0	0	0	0	0	0	0	1	0
	Buses	2	0	2	0	0	0	1	0	2	0	0	1
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	1	1	0	0	0	0	2	2	0	0	3	3
	Big Trucks	0	5	1	0	1	1	4	7	1	5	9	7

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	414	744	325	30	203	118	1943	1621	133	155	1818	852
Motorcycles	3	3	0	0	0	0	6	8	0	0	6	1
Buses	20	7	13	0	0	0	10	14	8	0	16	9
Bobtails	0	0	0	1	2	1	1	6	0	0	0	2
Small Trucks	6	6	1	1	0	1	18	13	0	3	11	22
Big Trucks	9	15	8	2	4	1	23	51	4	8	48	37
TOTALS	452	775	347	34	209	121	2001	1713	145	166	1899	923
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	198	457	182	20	131	58	926	865	75	116	1023	448
Motorcycles	1	1	0	0	0	0	4	6	0	0	3	1
Buses	9	4	7	0	0	0	4	6	4	0	12	3
Bobtails	0	0	0	0	2	1	0	4	0	0	0	2
Small Trucks	5	6	5	1	2	0	11	29	2	2	28	21
Big Trucks	2	4	0	1	0	0	10	2	0	2	5	7
TOTALS	215	472	194	22	135	59	955	912	81	120	1071	482
PEAK HR. FACTOR:	0.877			0.667			0.935			0.951		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-009

Location: PCH & Figueroa St City: Wilmington Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	49	76	46	15	28	15	186	258	4	20	93	86
	Motorcycles	0	0	0	0	0	0	2	3	0	0	1	0
	Buses	2	2	3	0	0	0	1	0	1	0	1	1
	Bobtails	0	3	0	0	0	0	1	0	0	0	0	1
	Small Trucks	0	1	2	0	0	1	1	1	0	0	0	1
	Big Trucks	0	0	0	0	0	0	8	1	0	0	2	8
16:15	CARS	43	82	66	9	32	18	228	295	8	18	169	120
	Motorcycles	0	0	0	0	1	0	1	2	0	0	0	0
	Buses	1	0	0	0	0	0	1	0	1	0	2	3
	Bobtails	0	1	0	0	0	0	0	0	0	0	2	0
	Small Trucks	1	1	0	0	1	0	1	0	0	0	1	2
	Big Trucks	0	1	0	1	0	0	2	2	0	0	0	2
16:30	CARS	56	85	45	11	29	13	221	287	6	24	166	104
	Motorcycles	0	0	0	0	0	0	0	3	0	0	2	0
	Buses	2	0	2	0	0	0	2	4	2	0	0	0
	Bobtails	1	0	2	0	0	0	1	0	0	0	0	2
	Small Trucks	3	0	0	0	0	0	1	2	0	0	1	1
	Big Trucks	0	1	0	0	0	0	5	1	2	0	0	2
16:45	CARS	42	88	59	15	42	17	228	298	12	12	192	110
	Motorcycles	0	1	0	0	0	1	1	0	0	0	0	0
	Buses	1	0	0	0	0	0	0	2	0	0	2	1
	Bobtails	0	0	1	0	0	0	0	3	0	0	0	0
	Small Trucks	0	0	0	0	0	0	0	1	0	0	0	1
	Big Trucks	2	1	0	0	0	0	5	4	0	0	3	2
17:00	CARS	56	116	59	11	39	14	206	311	14	23	182	132
	Motorcycles	0	0	0	0	1	0	0	2	0	0	0	0
	Buses	1	0	2	2	0	0	0	1	0	0	0	0
	Bobtails	0	2	1	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	1	2	0	0	0	0
	Big Trucks	0	0	0	2	0	0	1	2	0	0	0	0
17:15	CARS	52	92	52	12	44	26	212	302	14	24	193	103
	Motorcycles	0	1	1	1	0	0	0	1	0	0	0	0
	Buses	1	0	0	0	0	0	0	0	2	0	1	1
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	3	1	0	0	0	1
	Big Trucks	1	1	0	1	0	0	5	0	0	0	0	3
17:30	CARS	61	92	51	10	30	26	194	320	19	16	170	116
	Motorcycles	0	3	0	0	0	0	0	0	0	0	0	0
	Buses	3	0	2	0	0	0	2	0	1	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	0	2	0	0	0	0	1
	Big Trucks	0	0	0	0	0	0	5	1	0	0	0	1
17:45	CARS	48	86	64	22	40	18	222	337	22	20	202	103
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	1	1	0	0	0	1	0
	Bobtails	0	0	0	0	0	1	1	1	0	0	0	0
	Small Trucks	0	0	0	1	0	0	1	4	0	0	0	0
	Big Trucks	1	0	1	1	0	0	5	1	0	0	1	2

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	407	717	442	105	284	147	1697	2408	99	157	1367	874
Motorcycles	0	6	1	1	2	1	4	11	0	0	3	0
Buses	11	2	9	2	0	1	7	7	7	0	7	6
Bobtails	1	6	4	0	0	1	3	4	0	0	2	3
Small Trucks	4	2	2	1	1	1	10	11	0	0	2	7
Big Trucks	4	4	1	5	0	0	36	12	2	0	6	20
TOTALS	427	737	459	114	287	151	1757	2453	108	157	1387	910
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	217	386	226	55	153	84	834	1270	69	83	747	454
Motorcycles	0	5	1	1	1	0	0	3	0	0	0	0
Buses	5	0	4	2	0	1	3	1	3	0	2	1
Bobtails	0	2	1	0	0	1	1	1	0	0	0	0
Small Trucks	2	1	1	4	0	0	16	4	0	0	1	6
Big Trucks	0	0	0	1	0	0	7	7	0	0	0	2
TOTALS	224	394	233	63	154	86	861	1286	72	83	750	463
PEAK HR. FACTOR:	0.898			0.902			0.932			0.961		

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FEHR AND PEERS
PROJECT: WILMINGTON WATERFRONT PROJECT
DATE: WEDNESDAY JANUARY 24, 2008
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S FIGUEROA STREET
E/W C STREET

	1 SBRT			2 SBTH			3 SBLT			4 WBRT			5 WBTH			6 WBLT		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
700-715	14	0	14	5	2	7	0	0	0	5	0	5	1	0	1	0	0	0
715-730	28	0	28	3	3	6	0	0	0	5	2	7	3	0	3	0	0	0
730-745	37	10	47	28	7	35	0	0	0	7	0	7	0	0	0	0	0	0
745-800	26	4	30	23	6	29	0	0	0	9	0	9	2	0	2	0	0	0
800-815	22	2	24	16	3	19	0	0	0	8	1	9	1	0	1	0	0	0
815-830	13	3	16	18	2	20	0	0	0	6	1	7	3	0	3	0	0	0
830-845	11	2	13	9	1	10	0	0	0	2	0	2	0	0	0	0	0	0
845-900	14	3	17	21	2	23	0	0	0	10	0	10	1	0	1	0	0	0
900-915	12	2	14	13	0	13	0	0	0	5	0	5	0	0	0	0	0	0
915-930	5	0	5	3	2	5	0	0	0	4	0	4	0	0	0	0	0	0
930-945	5	3	8	12	10	22	0	0	0	3	0	3	0	0	0	0	0	0
945-1000	15	1	16	11	1	12	0	0	0	3	0	3	0	0	0	0	0	0
HOUR TOTALS																		
700-800	105	14	119	59	18	77	0	0	0	26	2	28	6	0	6	0	0	0
715-815	113	16	129	70	19	89	0	0	0	29	3	32	6	0	6	0	0	0
730-830	98	19	117	85	18	103	0	0	0	30	2	32	6	0	6	0	0	0
745-845	72	11	83	66	12	78	0	0	0	25	2	27	6	0	6	0	0	0
800-900	60	10	70	64	8	72	0	0	0	26	2	28	5	0	5	0	0	0
815-815	50	10	60	61	5	66	0	0	0	23	1	24	4	0	4	0	0	0
830-930	42	7	49	46	5	51	0	0	0	21	0	21	1	0	1	0	0	0
845-945	36	8	44	49	14	63	0	0	0	22	0	22	1	0	1	0	0	0
900-1000	37	6	43	39	13	52	0	0	0	15	0	15	0	0	0	0	0	0

PEAK HOUR
715-815
940

	7 NBRT			8 NBTH			9 NBLT			10 EBRT			11 EBTH			12 EBLT			ALL MOVEMENTS TOTALS		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
700-715	0	0	0	9	2	11	27	13	40	52	13	65	0	0	0	12	1	13	125	31	156
715-730	0	0	0	23	3	26	35	22	57	42	14	56	0	0	0	21	1	22	160	45	205
730-745	0	0	0	19	2	21	29	21	50	39	24	63	0	0	0	30	1	31	189	65	254
745-800	0	0	0	25	4	29	23	25	48	57	19	76	0	0	0	31	2	33	196	60	256
800-815	0	0	0	17	1	18	26	19	45	55	24	79	0	0	0	28	2	30	173	52	225
815-830	0	0	0	11	1	12	13	25	38	40	15	55	0	0	0	19	0	19	123	47	170
830-845	0	0	0	11	2	13	24	34	58	26	35	61	0	0	0	14	2	16	97	76	173
845-900	0	0	0	15	0	15	11	34	45	28	25	53	0	0	0	13	1	14	113	65	178
900-915	0	0	0	9	3	12	12	38	50	31	35	66	0	0	0	17	1	18	99	79	178
915-930	0	0	0	13	2	15	14	29	43	29	35	64	0	0	0	14	4	18	82	72	154
930-945	0	0	0	17	5	22	16	40	56	36	37	73	0	0	0	18	0	18	107	95	202
945-1000	0	0	0	14	3	17	16	44	60	29	28	57	0	0	0	14	3	17	102	80	182
HOUR TOTALS																					
700-800	0	0	0	76	11	87	114	81	195	190	70	260	0	0	0	94	5	99	670	201	871
715-815	0	0	0	84	10	94	113	87	200	193	81	274	0	0	0	110	6	116	718	222	940
730-830	0	0	0	72	8	80	91	90	181	191	82	273	0	0	0	108	5	113	681	224	905
745-845	0	0	0	64	8	72	86	103	189	178	93	271	0	0	0	92	6	98	589	235	824
800-900	0	0	0	54	4	58	74	112	186	149	99	248	0	0	0	74	5	79	506	240	746
815-815	0	0	0	46	6	52	60	131	191	125	110	235	0	0	0	63	4	67	432	267	699
830-930	0	0	0	48	7	55	61	135	196	114	130	244	0	0	0	58	8	66	391	292	683
845-945	0	0	0	54	10	64	53	141	194	124	132	256	0	0	0	62	6	68	401	311	712
900-1000	0	0	0	53	13	66	58	151	209	125	135	260	0	0	0	63	8	71	390	326	716

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FERH AND PEERS
PROJECT: WILMINGTON WATERFRONT PROJECT
DATE: WEDNESDAY JANUARY 24, 2008
PERIOD: 4:00 PM TO 7:00 PM
INTERSECTION: N/S FIGUEROA STREET
E/W C STREET

	1 SBRT			2 SBTH			3 SBLT			4 WBRT			5 WBTH			6 WBLT		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
400-415	22	2	24	24	1	25	0	0	0	4	0	4	2	0	2	0	0	0
415-430	14	1	15	25	2	27	0	0	0	2	0	2	2	0	2	0	0	0
430-445	13	1	14	25	1	26	0	0	0	7	0	7	2	0	2	0	0	0
445-500	12	0	12	25	1	26	0	0	0	7	0	7	4	0	4	0	0	0
500-515	18	2	20	32	1	33	0	0	0	3	0	3	2	0	2	0	0	0
515-530	11	2	13	23	2	25	0	0	0	3	0	3	1	0	1	0	0	0
530-545	12	0	12	21	0	21	0	0	0	5	0	5	2	0	2	0	0	0
545-600	6	0	6	25	1	26	0	0	0	2	1	3	1	0	1	0	0	0
600-615	10	1	11	20	0	20	0	0	0	1	0	1	2	0	2	0	0	0
615-630	7	0	7	11	0	11	0	0	0	1	0	1	1	0	1	0	0	0
630-645	4	0	4	15	0	15	0	0	0	2	0	2	1	0	1	0	0	0
645-700	10	0	10	11	0	11	0	0	0	1	0	1	0	0	0	0	0	0
HOUR TOTALS																		
400-500	61	4	65	99	5	104	0	0	0	20	0	20	10	0	10	0	0	0
415-515	57	4	61	107	5	112	0	0	0	19	0	19	10	0	10	0	0	0
430-530	54	5	59	105	5	110	0	0	0	20	0	20	9	0	9	0	0	0
445-545	53	4	57	101	4	105	0	0	0	18	0	18	9	0	9	0	0	0
500-600	47	4	51	101	4	105	0	0	0	13	1	14	6	0	6	0	0	0
515-615	39	3	42	89	3	92	0	0	0	11	1	12	6	0	6	0	0	0
530-630	35	1	36	77	1	78	0	0	0	9	1	10	6	0	6	0	0	0
545-645	27	1	28	71	1	72	0	0	0	6	1	7	5	0	5	0	0	0
600-700	31	1	32	57	0	57	0	0	0	5	0	5	4	0	4	0	0	0

PEAK HOUR
400-500
966

	7 NBRT			8 NBTH			9 NBLT			10 EBRT			11 EBTH			12 EBLT			ALL MOVEMENTS TOTALS		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
400-415	0	0	0	34	4	38	34	10	44	62	24	86	0	0	0	32	0	32	214	41	255
415-430	0	0	0	33	2	35	63	14	77	78	16	94	0	0	0	30	1	31	247	36	283
430-445	0	0	0	28	1	29	57	10	67	64	17	81	0	0	0	27	0	27	223	30	253
445-500	0	0	0	18	0	18	41	6	47	35	4	39	0	0	0	22	0	22	164	11	175
500-515	0	0	0	26	1	27	48	10	58	21	15	36	0	0	0	18	1	19	168	30	198
515-530	0	0	0	19	1	20	53	5	58	14	9	23	0	0	0	26	1	27	150	20	170
530-545	0	0	0	19	1	20	26	7	33	24	10	34	0	0	0	16	0	16	125	18	143
545-600	0	0	0	10	0	10	33	10	43	15	5	20	0	0	0	15	2	17	107	19	126
600-615	0	0	0	16	1	17	28	8	36	15	7	22	0	0	0	17	0	17	109	17	126
615-630	0	0	0	9	0	9	19	7	26	10	12	22	0	0	0	19	0	19	77	19	96
630-645	0	0	0	2	1	3	20	14	34	21	10	31	0	0	0	13	0	13	78	25	103
645-700	0	0	0	7	2	9	21	15	36	18	6	24	0	0	0	17	0	17	85	23	108
HOUR TOTALS																					
400-500	0	0	0	113	7	120	195	40	235	239	61	300	0	0	0	111	1	112	848	118	966
415-515	0	0	0	105	4	109	209	40	249	198	52	250	0	0	0	97	2	99	802	107	909
430-530	0	0	0	91	3	94	199	31	230	134	45	179	0	0	0	93	2	95	705	91	796
445-545	0	0	0	82	3	85	168	28	196	94	38	132	0	0	0	82	2	84	607	79	686
500-600	0	0	0	74	3	77	160	32	192	74	39	113	0	0	0	75	4	79	550	87	637
515-615	0	0	0	64	3	67	140	30	170	68	31	99	0	0	0	74	3	77	491	74	565
530-630	0	0	0	54	2	56	106	32	138	64	34	98	0	0	0	67	2	69	418	73	491
545-645	0	0	0	37	2	39	100	39	139	61	34	95	0	0	0	64	2	66	371	80	451
600-700	0	0	0	34	4	38	88	44	132	64	35	99	0	0	0	66	0	66	349	84	433

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FEHR AND PEERS
PROJECT: WILMINGTON WATERFRONT PROJECT
DATE: WEDNESDAY JANUARY 24, 2008
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S FIGUEROA STREET
E/W JOHN GIBSON/HARRY BRIDGES BLVD

	1 SBRT			2 SBTH			3 SBLT			4 WBRT			5 WBTH			6 WBLT		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
700-715	7	1	8	5	7	12	44	9	53	28	14	42	116	15	131	6	2	8
715-730	15	1	16	2	5	7	37	13	50	48	19	67	118	9	127	5	9	14
730-745	15	4	19	7	17	24	40	5	45	22	22	44	140	6	146	2	13	15
745-800	24	0	24	4	17	21	52	9	61	25	30	55	129	14	143	6	10	16
800-815	22	1	23	1	14	15	40	9	49	29	19	48	91	13	104	1	12	13
815-830	19	1	20	1	10	11	43	8	51	16	30	46	85	12	97	1	12	13
830-845	14	3	17	0	18	18	35	13	48	25	40	65	80	20	100	2	13	15
845-900	11	0	11	0	19	19	28	8	36	13	31	44	88	11	99	0	14	14
900-915	16	0	16	3	22	25	29	22	51	10	38	48	32	8	40	0	12	12
915-930	4	1	5	1	23	24	31	2	33	14	29	43	79	14	93	0	11	11
930-945	7	0	7	1	30	31	30	13	43	15	48	63	56	7	63	0	14	14
945-1000	13	1	14	0	19	19	22	9	31	22	45	67	47	9	56	0	9	9
HOUR TOTALS																		
700-800	61	6	67	18	46	64	173	36	209	123	85	208	503	44	547	19	34	53
715-815	76	6	82	14	53	67	169	36	205	124	90	214	478	42	520	14	44	58
730-830	80	6	86	13	58	71	175	31	206	92	101	193	445	45	490	10	47	57
745-845	79	5	84	6	59	65	170	39	209	95	119	214	385	59	444	10	47	57
800-900	66	5	71	2	61	63	146	38	184	83	120	203	344	56	400	4	51	55
815-815	60	4	64	4	69	73	135	51	186	64	139	203	285	51	336	3	51	54
830-930	45	4	49	4	82	86	123	45	168	62	138	200	279	53	332	2	50	52
845-945	38	1	39	5	94	99	118	45	163	52	146	198	255	40	295	0	51	51
900-1000	40	2	42	5	94	99	112	46	158	61	160	221	214	38	252	0	46	46

PEAK HOUR
715-815
1661

	7 NBRT			8 NBTH			9 NBLT			10 EBRT			11 EBTH			12 EBLT			ALL MOVEMENTS TOTALS		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
700-715	1	0	1	0	0	0	1	0	1	4	0	4	52	3	55	5	0	5	269	51	320
715-730	0	0	0	2	0	2	0	0	0	6	0	6	85	2	87	22	2	24	340	60	400
730-745	0	0	0	0	0	0	0	0	0	5	0	5	91	4	95	19	1	20	341	72	413
745-800	0	0	0	0	0	0	0	0	0	2	0	2	125	5	130	21	0	21	388	85	473
800-815	0	0	0	0	0	0	0	0	0	1	1	2	103	4	107	14	0	14	302	73	375
815-830	0	0	0	2	0	2	0	0	0	0	1	1	86	4	90	12	0	12	265	78	343
830-845	0	1	1	0	1	1	0	0	0	0	2	2	59	10	69	9	2	11	224	123	347
845-900	0	0	0	1	0	1	0	1	1	0	2	2	73	11	84	8	0	8	222	97	319
900-915	1	0	1	0	1	1	0	0	0	0	4	4	61	10	71	10	0	10	162	117	279
915-930	1	0	1	0	0	0	0	0	0	2	2	4	73	5	78	14	0	14	219	87	306
930-945	0	1	1	1	0	1	0	0	0	3	0	3	89	9	98	16	1	17	218	123	341
945-1000	1	1	2	0	1	1	1	0	1	0	2	2	75	12	87	7	1	8	188	109	297
HOUR TOTALS																					
700-800	1	0	1	2	0	2	1	0	1	17	0	17	353	14	367	67	3	70	1338	268	1606
715-815	0	0	0	2	0	2	0	0	0	14	1	15	404	15	419	76	3	79	1371	290	1661
730-830	0	0	0	2	0	2	0	0	0	8	2	10	405	17	422	66	1	67	1296	308	1604
745-845	0	1	1	2	1	3	0	0	0	3	4	7	373	23	396	56	2	58	1179	359	1538
800-900	0	1	1	3	1	4	0	1	1	1	6	7	321	29	350	43	2	45	1013	371	1384
815-815	1	1	2	3	2	5	0	1	1	0	9	9	279	35	314	39	2	41	873	415	1288
830-930	2	1	3	1	2	3	0	1	1	2	10	12	266	36	302	41	2	43	827	424	1251
845-945	2	1	3	2	1	3	0	1	1	5	8	13	296	35	331	48	1	49	821	424	1245
900-1000	3	2	5	1	2	3	1	0	1	5	8	13	298	36	334	47	2	49	787	436	1223

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FERH AND PEERS
PROJECT: WILMINGTON WATERFRONT PROJECT
DATE: WEDNESDAY JANUARY 24, 2008
PERIOD: 4:00 PM TO 7:00 PM
INTERSECTION: N/S FIGUEROA STREET
E/W HARRY BRIDGES BOULEVARD

	1 SBRT			2 SBTH			3 SBLT			4 WBRT			5 WBTH			6 WBLT		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
400-415	18	2	20	1	11	12	36	5	41	32	10	42	106	9	115	0	16	16
415-430	23	0	23	1	8	9	56	9	65	55	11	66	124	5	129	0	11	11
430-445	26	1	27	5	9	14	56	6	62	44	10	54	111	7	118	1	12	13
445-500	18	0	18	4	6	10	41	7	48	52	12	64	170	8	178	4	11	15
500-515	34	0	34	3	7	10	23	7	30	40	7	47	161	2	163	7	6	13
515-530	24	1	25	0	7	7	12	5	17	37	6	43	139	3	142	1	9	10
530-545	18	0	18	7	4	11	9	4	13	26	8	34	117	11	128	2	9	11
545-600	26	0	26	3	3	6	9	2	11	26	11	37	90	7	97	1	9	10
600-615	17	0	17	0	5	5	17	3	20	21	7	28	66	10	76	1	13	14
615-630	16	2	18	1	11	12	4	4	8	10	6	16	55	10	65	0	10	10
630-645	16	0	16	0	1	1	18	3	21	17	14	31	54	11	65	0	9	9
645-700	6	0	6	1	4	5	16	1	17	16	17	33	43	6	49	0	9	9
HOUR TOTALS																		
400-500	85	3	88	11	34	45	189	27	216	183	43	226	511	29	540	5	50	55
415-515	101	1	102	13	30	43	176	29	205	191	40	231	566	22	588	12	40	52
430-530	102	2	104	12	29	41	132	25	157	173	35	208	581	20	601	13	38	51
445-545	94	1	95	14	24	38	85	23	108	155	33	188	587	24	611	14	35	49
500-600	102	1	103	13	21	34	53	18	71	129	32	161	507	23	530	11	33	44
515-615	85	1	86	10	19	29	47	14	61	110	32	142	412	31	443	5	40	45
530-630	77	2	79	11	23	34	39	13	52	83	32	115	328	38	366	4	41	45
545-645	75	2	77	4	20	24	48	12	60	74	38	112	265	38	303	2	41	43
600-700	55	2	57	2	21	23	55	11	66	64	44	108	218	37	255	1	41	42

PEAK HOUR
415-515
1801

	7 NBRT			8 NBTH			9 NBLT			10 EBRT			11 EBTH			12 EBLT			ALL MOVEMENTS TOTALS		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
400-415	1	0	1	0	0	0	1	0	1	0	3	3	114	12	126	23	2	25	332	70	402
415-430	0	0	0	5	0	5	0	0	0	1	1	2	117	3	120	18	1	19	400	49	449
430-445	0	1	1	8	0	8	2	0	2	1	0	1	99	20	119	17	0	17	370	66	436
445-500	9	0	9	9	0	9	8	0	8	2	2	4	118	5	123	13	0	13	448	51	499
500-515	3	1	4	3	5	8	1	0	1	4	0	4	84	1	85	18	0	18	381	36	417
515-530	4	1	5	4	0	4	1	0	1	2	1	3	72	4	76	17	0	17	313	37	350
530-545	3	0	3	2	0	2	2	0	2	5	1	6	60	1	61	19	0	19	270	38	308
545-600	1	0	1	3	0	3	1	0	1	3	0	3	57	5	62	13	0	13	233	37	270
600-615	0	0	0	1	1	2	1	0	1	1	0	1	44	13	57	9	0	9	178	52	230
615-630	1	0	1	2	0	2	0	0	0	0	1	1	38	6	44	6	0	6	133	50	183
630-645	0	0	0	0	0	0	1	0	1	0	2	2	42	7	49	2	1	3	150	48	198
645-700	7	0	7	5	0	5	7	0	7	3	1	4	26	15	41	9	0	9	139	53	192
HOUR TOTALS																					
400-500	10	1	11	22	0	22	11	0	11	4	6	10	448	40	488	71	3	74	1550	236	1786
415-515	12	2	14	25	5	30	11	0	11	8	3	11	418	29	447	66	1	67	1599	202	1801
430-530	16	3	19	24	5	29	12	0	12	9	3	12	373	30	403	65	0	65	1512	190	1702
445-545	19	2	21	18	5	23	12	0	12	13	4	17	334	11	345	67	0	67	1412	162	1574
500-600	11	2	13	12	5	17	5	0	5	14	2	16	273	11	284	67	0	67	1197	148	1345
515-615	8	1	9	10	1	11	5	0	5	11	2	13	233	23	256	58	0	58	994	164	1158
530-630	5	0	5	8	1	9	4	0	4	9	2	11	199	25	224	47	0	47	814	177	991
545-645	2	0	2	6	1	7	3	0	3	4	3	7	181	31	212	30	1	31	694	187	881
600-700	8	0	8	8	1	9	9	0	9	4	4	8	150	41	191	26	1	27	600	203	803

WILTEC

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INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FEHR AND PEERS
PROJECT: WILMINGTON WATERFRONT PROJECT
DATE: WEDNESDAY JANUARY 24, 2008
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S FRIES AVENUE
E/W HARRY BRIDGES BOULEVARD

	1 SBRT			2 SBTH			3 SBLT			4 WBRT			5 WBTH			6 WBLT		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
700-715	3	0	3	0	0	0	0	0	0	0	0	0	93	8	101	2	0	2
715-730	9	0	9	3	1	4	1	3	4	5	0	5	109	26	135	3	1	4
730-745	18	0	18	3	1	4	1	0	1	1	0	1	82	25	107	0	0	0
745-800	5	1	6	7	0	7	0	0	0	6	0	6	86	28	114	4	0	4
800-815	6	0	6	6	2	8	2	1	3	2	0	2	95	29	124	2	1	3
815-830	5	0	5	0	0	0	0	0	0	0	0	0	65	47	112	2	0	2
830-845	5	0	5	2	0	2	0	0	0	0	0	0	70	37	107	3	0	3
845-900	3	0	3	1	0	1	0	0	0	1	0	1	65	30	95	1	0	1
900-915	8	0	8	4	0	4	1	0	1	1	0	1	61	24	85	0	0	0
915-930	9	2	11	5	0	5	1	0	1	1	0	1	54	32	86	1	0	1
930-945	13	1	14	6	1	7	0	0	0	1	0	1	48	0	48	0	0	0
945-1000	11	0	11	4	0	4	2	1	3	5	0	5	58	62	120	2	0	2
HOUR TOTALS																		
700-800	35	1	36	13	2	15	2	3	5	12	0	12	370	87	457	9	1	10
715-815	38	1	39	19	4	23	4	4	8	14	0	14	372	108	480	9	2	11
730-830	34	1	35	16	3	19	3	1	4	9	0	9	328	129	457	8	1	9
745-845	21	1	22	15	2	17	2	1	3	8	0	8	316	141	457	11	1	12
800-900	19	0	19	9	2	11	2	1	3	3	0	3	295	143	438	8	1	9
815-815	21	0	21	7	0	7	1	0	1	2	0	2	261	138	399	6	0	6
830-930	25	2	27	12	0	12	2	0	2	3	0	3	250	123	373	5	0	5
845-945	33	3	36	16	1	17	2	0	2	4	0	4	228	86	314	2	0	2
900-1000	41	3	44	19	1	20	4	1	5	8	0	8	221	118	339	3	0	3

PEAK HOUR
715-815
1209

	7 NBRT			8 NBTH			9 NBLT			10 EBRT			11 EBTH			12 EBLT			ALL MOVEMENTS TOTALS		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
700-715	1	3	4	2	1	3	10	21	31	11	1	12	68	9	77	2	1	3	192	44	236
715-730	2	5	7	1	0	1	12	29	41	13	2	15	72	15	87	1	0	1	231	82	313
730-745	4	2	6	5	0	5	9	12	21	10	3	13	85	3	88	5	1	6	223	47	270
745-800	4	10	14	1	1	2	9	19	28	15	2	17	112	7	119	8	1	9	257	69	326
800-815	4	10	14	1	4	5	4	12	16	11	1	12	91	9	100	7	0	7	231	69	300
815-830	1	6	7	4	2	6	12	23	35	12	1	13	90	12	102	8	1	9	199	92	291
830-845	3	9	12	2	1	3	11	17	28	7	4	11	57	17	74	8	0	8	168	85	253
845-900	4	10	14	2	0	2	3	45	48	15	3	18	61	13	74	8	0	8	164	101	265
900-915	5	4	9	1	0	1	6	15	21	2	2	4	61	13	74	11	3	14	161	61	222
915-930	1	22	23	5	2	7	7	28	35	9	4	13	55	19	74	13	1	14	161	110	271
930-945	2	7	9	7	1	8	5	52	57	21	4	25	60	23	83	24	4	28	187	93	280
945-1000	3	8	11	4	2	6	5	31	36	8	3	11	36	9	45	15	0	15	153	116	269
HOUR TOTALS																					
700-800	11	20	31	9	2	11	40	81	121	49	8	57	337	34	371	16	3	19	903	242	1145
715-815	14	27	41	8	5	13	34	72	106	49	8	57	360	34	394	21	2	23	942	267	1209
730-830	13	28	41	11	7	18	34	66	100	48	7	55	378	31	409	28	3	31	910	277	1187
745-845	12	35	47	8	8	16	36	71	107	45	8	53	350	45	395	31	2	33	855	315	1170
800-900	12	35	47	9	7	16	30	97	127	45	9	54	299	51	350	31	1	32	762	347	1109
815-815	13	29	42	9	3	12	32	100	132	36	10	46	269	55	324	35	4	39	692	339	1031
830-930	13	45	58	10	3	13	27	105	132	33	13	46	234	62	296	40	4	44	654	357	1011
845-945	12	43	55	15	3	18	21	140	161	47	13	60	237	68	305	56	8	64	673	365	1038
900-1000	11	41	52	17	5	22	23	126	149	40	13	53	212	64	276	63	8	71	662	380	1042

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FEHR AND PEERS
PROJECT: WILMINGTON WATERFRONT PROJECT
DATE: WEDNESDAY JANUARY 24, 2008
PERIOD: 4:00 PM TO 7:00 PM
INTERSECTION: N/S FRIES AVENUE
E/W HARRY BRIDGES BOULEVARD

	1 SBRT			2 SBTH			3 SBLT			4 WBRT			5 WBTH			6 WBLT		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
400-415	2	0	2	2	0	2	2	0	2	0	1	1	104	26	130	0	1	1
415-430	4	1	5	1	1	2	1	0	1	0	1	1	139	20	159	0	0	0
430-445	1	0	1	4	0	4	3	0	3	7	3	10	148	27	175	2	0	2
445-500	7	0	7	2	0	2	1	0	1	0	0	0	167	15	182	0	0	0
500-515	6	0	6	2	0	2	3	0	3	2	0	2	141	17	158	0	1	1
515-530	5	0	5	0	0	0	1	0	1	0	0	0	141	16	157	0	0	0
530-545	4	0	4	0	0	0	1	0	1	0	0	0	112	16	128	1	0	1
545-600	3	0	3	0	0	0	1	0	1	0	1	1	85	22	107	4	0	4
600-615	3	0	3	0	0	0	3	0	3	2	0	2	64	23	87	0	0	0
615-630	4	0	4	1	0	1	2	0	2	0	1	1	61	21	82	2	0	2
630-645	2	0	2	1	0	1	4	0	4	1	0	1	38	14	52	0	0	0
645-700	3	0	3	0	0	0	2	0	2	0	0	0	33	14	47	0	0	0
HOUR TOTALS																		
400-500	14	1	15	9	1	10	7	0	7	7	5	12	558	88	646	2	1	3
415-515	18	1	19	9	1	10	8	0	8	9	4	13	595	79	674	2	1	3
430-530	19	0	19	8	0	8	8	0	8	9	3	12	597	75	672	2	1	3
445-545	22	0	22	4	0	4	6	0	6	2	0	2	561	64	625	1	1	2
500-600	18	0	18	2	0	2	6	0	6	2	1	3	479	71	550	5	1	6
515-615	15	0	15	0	0	0	6	0	6	2	1	3	402	77	479	5	0	5
530-630	14	0	14	1	0	1	7	0	7	2	2	4	322	82	404	7	0	7
545-645	12	0	12	2	0	2	10	0	10	3	2	5	248	80	328	6	0	6
600-700	12	0	12	2	0	2	11	0	11	3	1	4	196	72	268	2	0	2

PEAK HOUR
400-500
1459

	7 NBRT			8 NBTH			9 NBLT			10 EBRT			11 EBTH			12 EBLT			ALL MOVEMENTS TOTALS		
15-MIN COUNTS	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL	CARS	TRUCKS	TOTAL
400-415	4	3	7	9	0	9	5	8	13	4	1	5	133	2	135	9	0	9	274	42	316
415-430	9	12	21	12	0	12	9	10	19	9	0	9	137	28	165	6	0	6	327	73	400
430-445	5	7	12	6	0	6	7	6	13	5	2	7	137	23	160	9	0	9	334	68	402
445-500	4	2	6	4	0	4	15	1	16	3	0	3	107	5	112	8	0	8	318	23	341
500-515	3	1	4	3	0	3	8	0	8	1	0	1	90	7	97	1	1	2	260	27	287
515-530	2	2	4	0	0	0	5	1	6	3	0	3	80	5	85	2	0	2	239	24	263
530-545	1	5	6	1	0	1	6	6	12	4	0	4	69	14	83	5	0	5	204	41	245
545-600	5	2	7	2	0	2	12	7	19	3	0	3	40	5	45	1	0	1	156	37	193
600-615	4	14	18	1	1	2	9	9	18	3	0	3	54	10	64	3	0	3	146	57	203
615-630	0	5	5	0	0	0	3	12	15	1	0	1	27	8	35	2	0	2	103	47	150
630-645	1	5	6	0	0	0	1	11	12	2	0	2	28	12	40	5	0	5	83	42	125
645-700	4	19	23	1	0	1	1	10	11	6	0	6	25	9	34	7	1	8	82	53	135
HOUR TOTALS																					
400-500	22	24	46	31	0	31	36	25	61	21	3	24	514	58	572	32	0	32	1253	206	1459
415-515	21	22	43	25	0	25	39	17	56	18	2	20	471	63	534	24	1	25	1239	191	1430
430-530	14	12	26	13	0	13	35	8	43	12	2	14	414	40	454	20	1	21	1151	142	1293
445-545	10	10	20	8	0	8	34	8	42	11	0	11	346	31	377	16	1	17	1021	115	1136
500-600	11	10	21	6	0	6	31	14	45	11	0	11	279	31	310	9	1	10	859	129	988
515-615	12	23	35	4	1	5	32	23	55	13	0	13	243	34	277	11	0	11	745	159	904
530-630	10	26	36	4	1	5	30	34	64	11	0	11	190	37	227	11	0	11	609	182	791
545-645	10	26	36	3	1	4	25	39	64	9	0	9	149	35	184	11	0	11	488	183	671
600-700	9	43	52	2	1	3	14	42	56	12	0	12	134	39	173	17	1	18	414	199	613

Intersection Turning Movement

Prepared by:

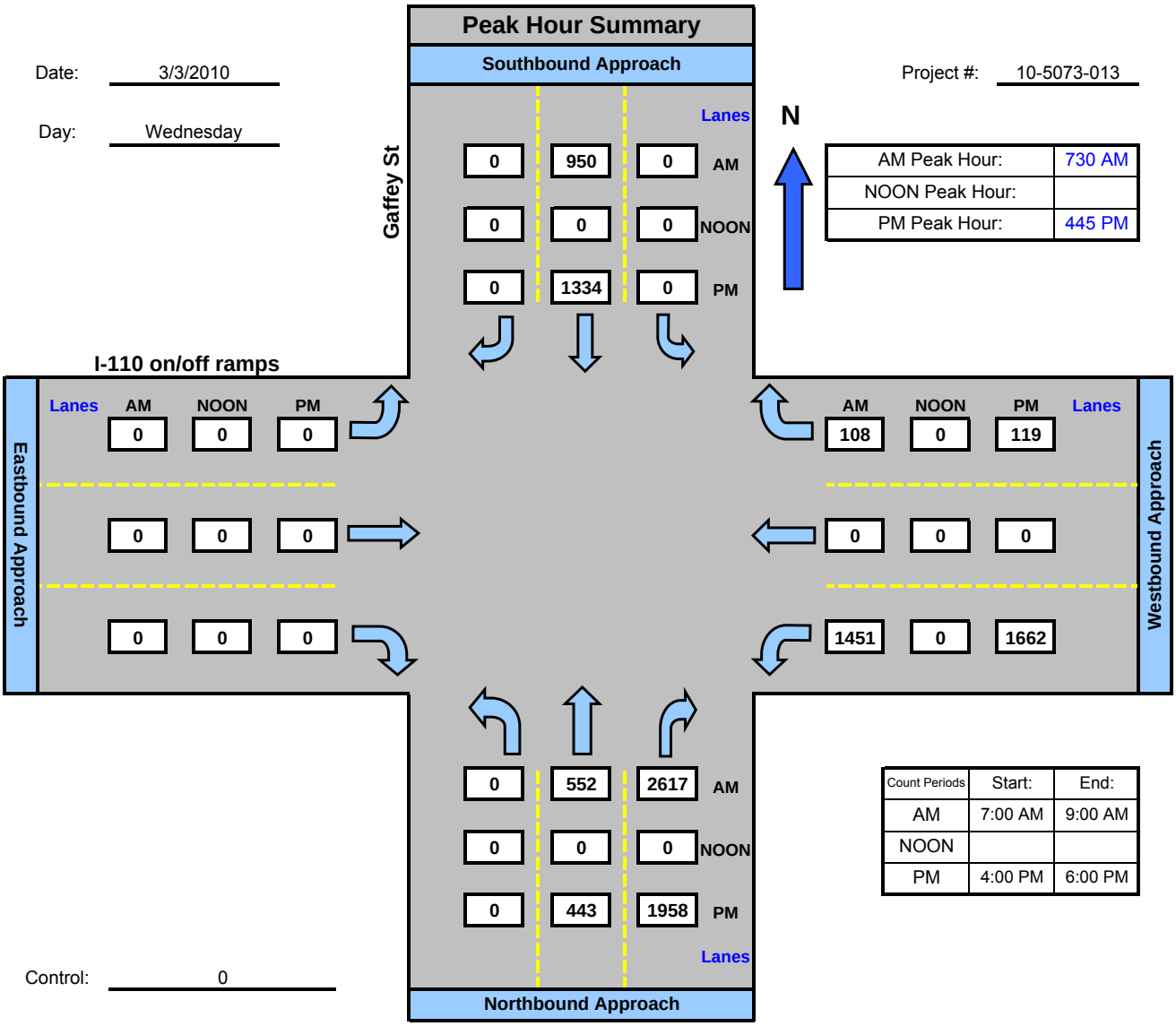
National Data & Surveying Services

Gaffey St and I-110 on/off ramps , City of Wilmington

Date: 3/3/2010

Day: Wednesday

Project #: 10-5073-013



AM Peak Hour:	730 AM
NOON Peak Hour:	
PM Peak Hour:	445 PM

Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

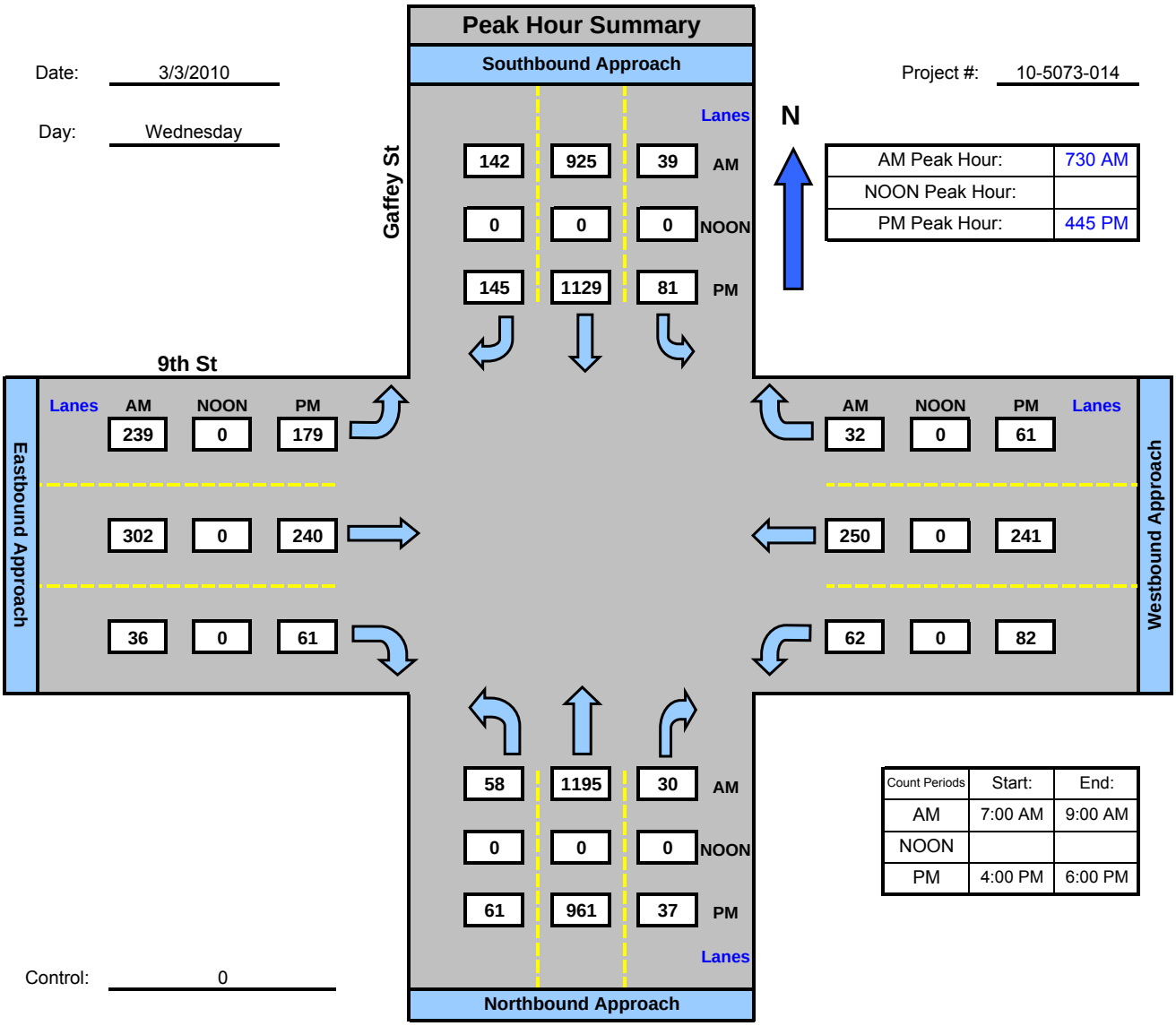
Gaffey St and 9th St , City of Wilmington

Date: 3/3/2010

Day: Wednesday

Project #: 10-5073-014

AM Peak Hour:	730 AM
NOON Peak Hour:	
PM Peak Hour:	445 PM



Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Gaffey St and Paseo del Mar , City of Wilmington

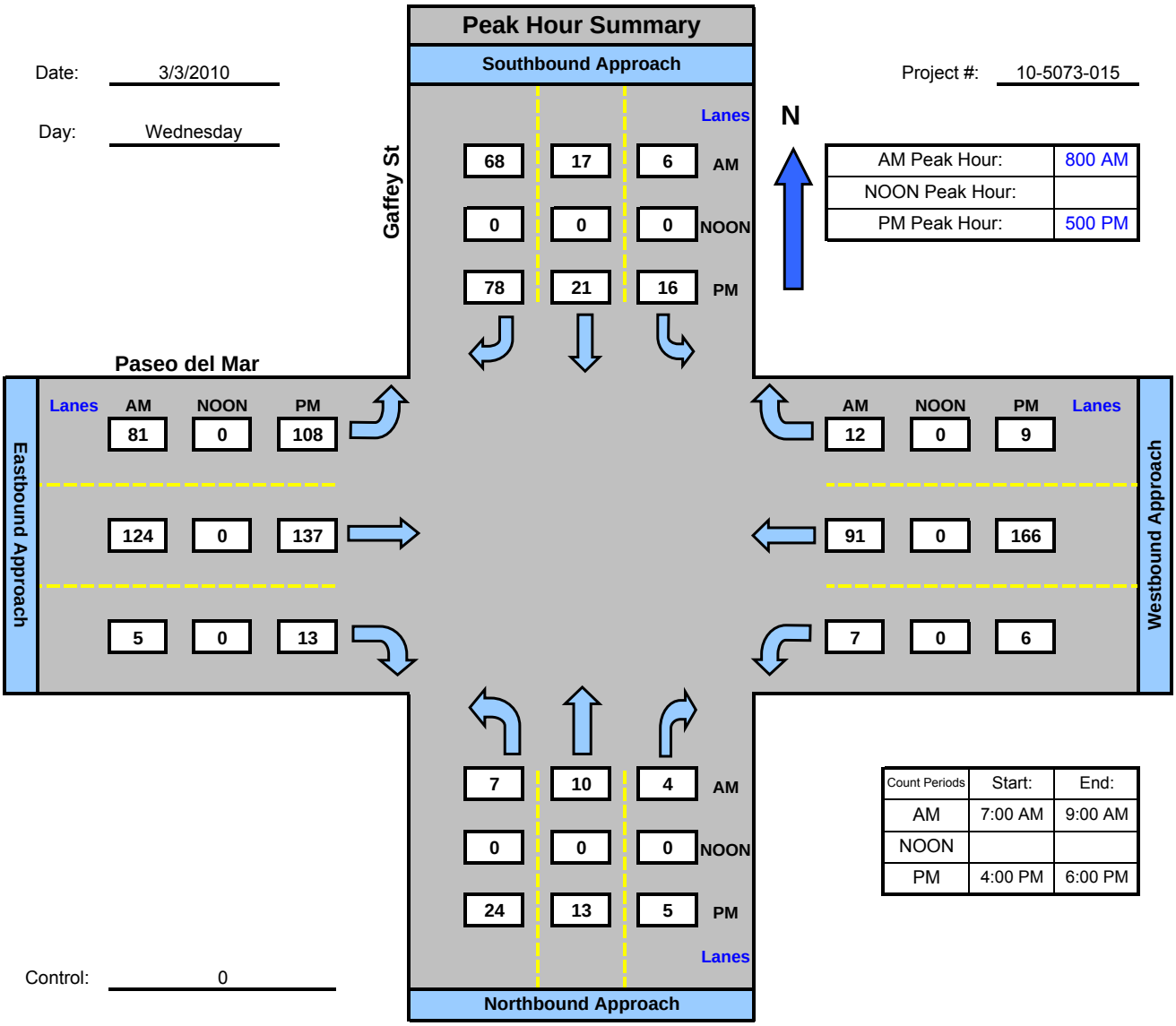
Date: 3/3/2010

Day: Wednesday

Project #: 10-5073-015

Peak Hour Summary

AM Peak Hour:	800 AM
NOON Peak Hour:	
PM Peak Hour:	500 PM



Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

Intersection Turning Movement

Prepared by:

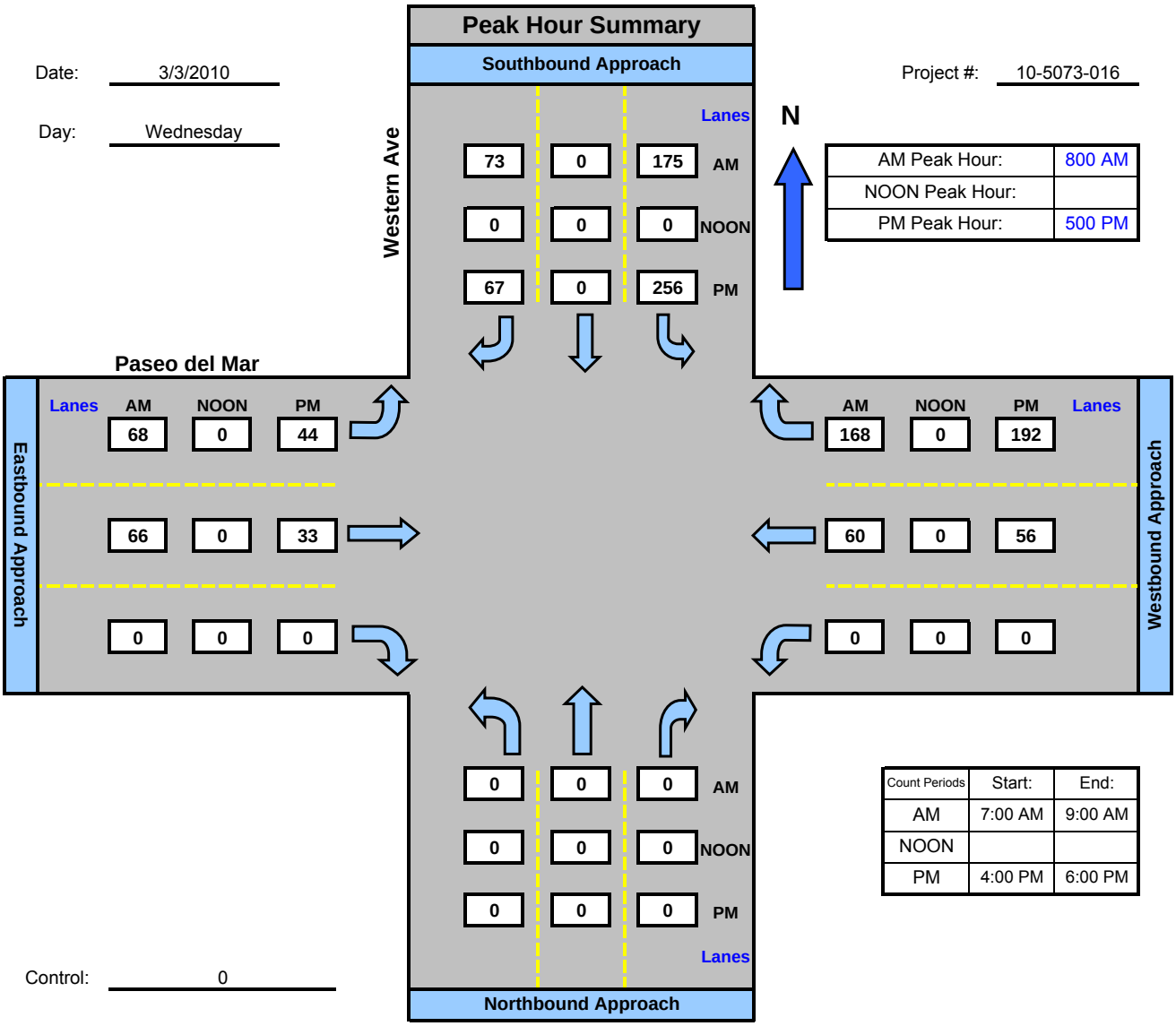
National Data & Surveying Services

Western Ave and Paseo del Mar , City of Wilmington

Date: 3/3/2010

Day: Wednesday

Project #: 10-5073-016



AM Peak Hour:	800 AM
NOON Peak Hour:	
PM Peak Hour:	500 PM

Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

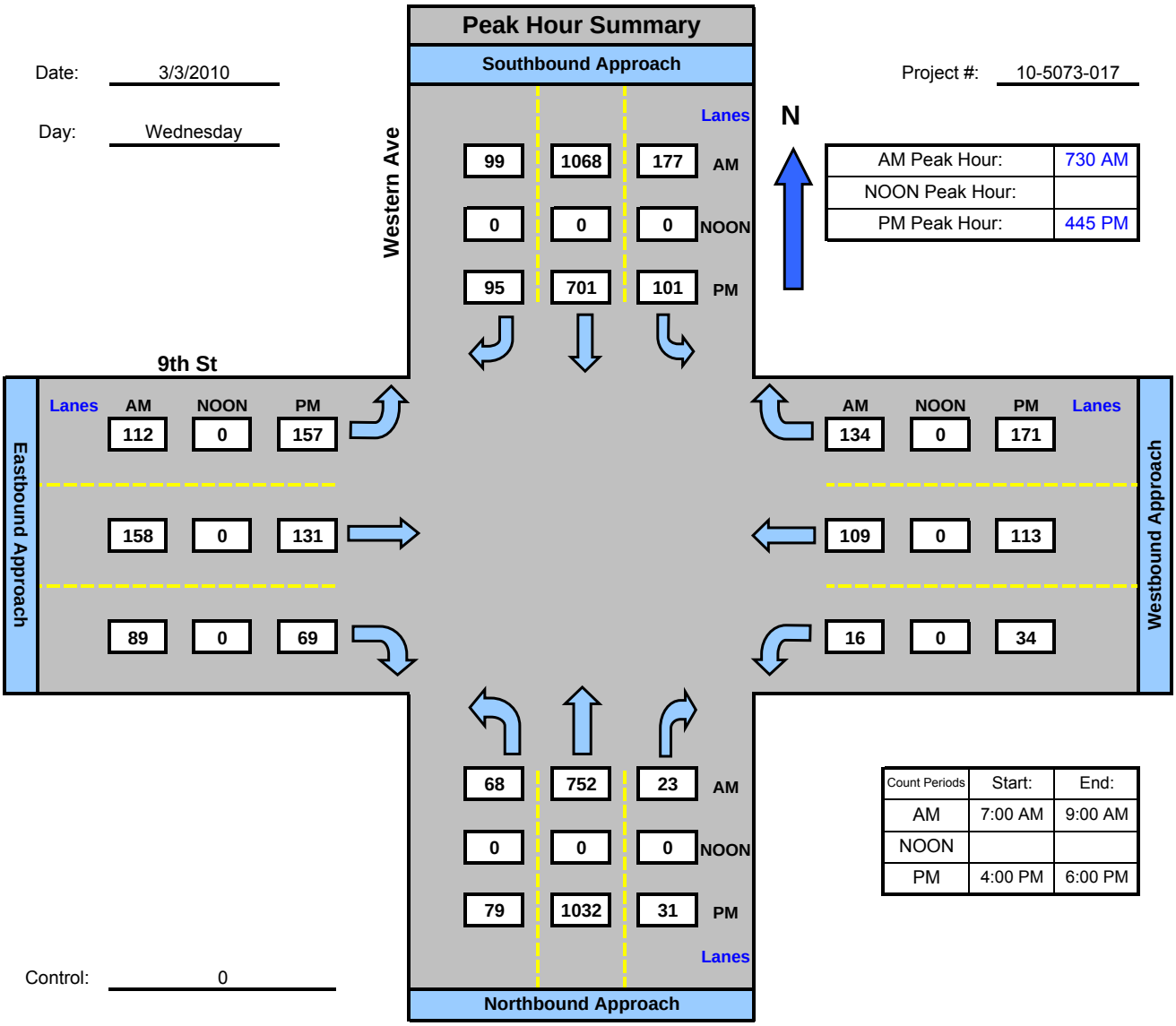
Western Ave and 9th St , City of Wilmington

Date: 3/3/2010

Day: Wednesday

Project #: 10-5073-017

AM Peak Hour:	730 AM
NOON Peak Hour:	
PM Peak Hour:	445 PM



Count Periods	Start:	End:
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Control: 0

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-018

Location: Ferry St & SR-47 EB On/Off Ramps City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	0	11	7	0	76	0	0	0	0	74	0	0
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	5	0	0	0	0	3	0	0
	Small Trucks	0	0	3	0	13	0	0	0	0	3	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
7:15	CARS	0	19	8	0	71	0	0	0	0	84	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	0	0	0	10	0	0	0	0	0	0	0
	Small Trucks	0	2	4	0	7	0	0	0	0	2	0	0
	Big Trucks	0	0	0	0	2	0	0	0	0	2	0	0
7:30	CARS	0	11	9	2	64	0	0	0	0	100	0	1
	Motorcycles	0	0	0	0	0	0	0	0	0	1	0	0
	Buses	0	0	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	0	1	0	4	0	0	0	0	7	0	0
	Small Trucks	0	0	13	0	9	0	0	0	0	1	0	0
	Big Trucks	0	0	0	0	2	0	0	0	0	0	0	0
7:45	CARS	0	19	13	2	50	0	0	0	0	97	0	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	1	0	7	0	0	0	0	6	0	0
	Small Trucks	0	3	7	0	7	0	0	0	0	7	0	0
	Big Trucks	0	1	1	0	6	0	0	0	0	1	0	0
8:00	CARS	0	16	12	0	35	0	0	0	0	33	0	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	0	1	0	6	0	0	0	0	4	0	0
	Small Trucks	0	1	7	0	5	0	0	0	0	2	0	0
	Big Trucks	0	2	1	0	2	0	0	0	0	0	0	0
8:15	CARS	0	39	21	2	22	0	0	0	0	27	0	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	6	0	0	0	0	6	0	0
	Small Trucks	0	0	6	0	13	0	0	0	0	8	0	0
	Big Trucks	0	1	1	0	1	0	0	0	0	2	0	0
8:30	CARS	0	11	8	0	16	0	0	0	0	25	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	1	0	0
	Buses	0	1	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	1	3	0	15	0	0	0	0	6	0	0
	Small Trucks	0	3	5	0	13	0	0	0	0	3	0	0
	Big Trucks	0	0	0	1	1	0	0	0	0	2	0	2
8:45	CARS	0	9	13	1	16	0	0	0	0	28	0	2
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	12	4	0	19	0	0	0	0	5	0	0
	Small Trucks	0	4	11	0	20	0	0	0	0	5	0	0
	Big Trucks	0	3	1	0	2	0	0	0	0	1	0	0

MOVEMENT TOTALS

CARS	0	135	91	7	350	0	0	0	0	468	0	6
Motorcycles	0	0	0	0	1	0	0	0	0	2	0	0
Buses	0	4	0	0	0	0	0	0	0	5	0	0
Bobtails	0	13	10	0	72	0	0	0	0	37	0	0
Small Trucks	0	13	56	0	87	0	0	0	0	31	0	0
Big Trucks	0	7	4	1	16	0	0	0	0	8	0	2
TOTALS	0	172	161	8	526	0	0	0	0	551	0	8
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 700 AM

PEAK VOLUMES =

CARS	0	60	37	4	261	0	0	0	0	355	0	2
Motorcycles	0	0	0	0	1	0	0	0	0	1	0	0
Buses	0	2	0	0	0	0	0	0	0	2	0	0
Bobtails	0	0	2	0	26	0	0	0	0	16	0	0
Small Trucks	0	1	1	0	10	0	0	0	0	3	0	0
Big Trucks	0	5	27	0	36	0	0	0	0	13	0	0
TOTALS	0	68	67	4	334	0	0	0	0	390	0	2

PEAK HR. FACTOR:	0.734	0.889	0.000	0.875

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-018

Location: Ferry St & SR-47 EB On/Off Ramps City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	0	57	46	0	10	0	0	0	0	10	0	0
	Motorcycles	0	0	1	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	10	24	0	10	0	0	0	0	4	0	0
	Small Trucks	0	9	28	0	11	0	0	0	0	3	0	0
	Big Trucks	0	0	1	0	0	0	0	0	0	0	0	0
16:15	CARS	0	86	83	0	11	0	0	0	0	11	0	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	10	23	0	4	0	0	0	0	4	0	0
	Small Trucks	0	12	26	1	1	0	0	0	0	1	0	0
	Big Trucks	0	1	2	0	0	0	0	0	0	0	0	0
16:30	CARS	0	86	40	0	12	0	0	0	0	24	0	1
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	1	4	0	4	0	0	0	0	2	0	0
	Small Trucks	0	2	11	0	3	0	0	0	0	1	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
16:45	CARS	0	79	70	1	13	0	0	0	0	40	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	3	0	3	0	0	0	0	2	0	0
	Small Trucks	0	4	4	0	4	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
17:00	CARS	0	42	41	1	18	0	0	0	0	29	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	1	1	0	4	0	0	0	0	0	0	0
	Small Trucks	0	0	4	0	2	0	0	0	0	0	0	0
	Big Trucks	0	0	1	0	0	0	0	0	0	1	0	0
17:15	CARS	0	42	30	0	20	0	0	0	0	42	0	2
	Motorcycles	0	2	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	4	0	4	0	0	0	0	0	0	0
	Small Trucks	0	0	2	0	1	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	2	0	0
17:30	CARS	0	22	23	0	24	0	0	0	0	44	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	1	0	0
	Bobtails	0	0	0	0	6	0	0	0	0	1	0	1
	Small Trucks	0	0	1	0	2	0	0	0	0	0	0	0
	Big Trucks	0	0	1	0	0	0	0	0	0	0	0	0
17:45	CARS	0	20	23	1	9	0	0	0	0	26	0	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	1	0	4	0	0	0	0	3	0	0
	Small Trucks	0	0	2	0	2	0	0	0	0	1	0	0
	Big Trucks	0	0	1	0	1	0	0	0	0	0	0	0

MOVEMENT TOTALS

CARS	0	434	356	3	117	0	0	0	0	226	0	5
Motorcycles	0	3	1	0	0	0	0	0	0	0	0	0
Buses	0	4	0	0	0	0	0	0	0	4	0	0
Bobtails	0	22	60	0	39	0	0	0	0	16	0	1
Small Trucks	0	27	78	1	26	0	0	0	0	6	0	0
Big Trucks	0	1	6	0	1	0	0	0	0	3	0	0
TOTALS	0	491	501	4	183	0	0	0	0	255	0	6
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 400 AM

PEAK VOLUMES =

CARS	0	308	239	1	46	0	0	0	0	85	0	2
Motorcycles	0	1	1	0	0	0	0	0	0	0	0	0
Buses	0	2	0	0	0	0	0	0	0	2	0	0
Bobtails	0	21	54	0	21	0	0	0	0	12	0	0
Small Trucks	0	1	3	0	0	0	0	0	0	0	0	0
Big Trucks	0	27	69	1	19	0	0	0	0	5	0	0
TOTALS	0	360	366	2	86	0	0	0	0	104	0	2

PEAK HR. FACTOR:	0.744	0.710	0.000	0.631

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-019

Location: Ferry St & Pilchard St City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	0	15	0	0	127	23	1	0	0	0	0	0
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	8	0	0	0	0	0	0	0
	Small Trucks	0	3	0	0	15	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	1	0	1	0	0	0	0	0
7:15	CARS	0	21	0	0	134	20	5	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	9	0	0	0	0	0	0	0
	Small Trucks	0	8	0	0	11	0	0	0	0	0	0	0
	Big Trucks	0	1	0	0	3	3	0	0	0	0	0	0
7:30	CARS	2	10	0	0	132	26	6	0	0	0	0	0
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	2	0	0	9	0	0	0	0	0	0	0
	Small Trucks	0	11	0	0	9	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	4	0	0	0	0	0	0	0
7:45	CARS	0	29	0	0	125	24	1	0	1	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	1	0	0	13	0	0	0	0	0	0	0
	Small Trucks	0	9	0	0	14	0	0	0	0	0	0	0
	Big Trucks	0	5	0	0	7	0	0	0	0	0	0	0
8:00	CARS	0	24	0	0	60	8	1	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	1	0	0	9	1	0	0	0	0	0	0
	Small Trucks	0	8	0	0	7	0	0	0	0	0	0	0
	Big Trucks	0	3	0	0	1	1	3	0	0	0	0	0
8:15	CARS	0	46	0	0	47	2	10	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	12	0	0	0	0	0	0	0
	Small Trucks	0	7	0	0	21	0	0	0	0	0	0	0
	Big Trucks	0	3	0	0	4	0	2	0	0	0	0	0
8:30	CARS	0	14	0	0	31	3	2	0	1	0	0	0
	Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	6	0	0	19	1	0	0	0	0	0	0
	Small Trucks	0	7	0	0	14	1	0	0	0	0	0	0
	Big Trucks	0	0	0	0	3	1	1	0	0	0	0	0
8:45	CARS	0	20	0	0	40	1	1	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	14	0	0	26	0	0	0	0	0	0	0
	Small Trucks	0	17	0	0	25	0	0	0	0	0	0	0
	Big Trucks	0	4	0	0	4	0	1	0	0	0	0	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	2	179	0	0	696	107	27	0	2	0	0	0
Motorcycles	0	0	0	0	3	0	0	0	0	0	0	0
Buses	0	4	0	0	5	0	0	0	0	0	0	0
Bobtails	0	24	0	0	105	2	0	0	0	0	0	0
Small Trucks	0	70	0	0	116	1	0	0	0	0	0	0
Big Trucks	0	16	0	0	27	5	8	0	0	0	0	0
TOTALS	2	293	0	0	952	115	35	0	2	0	0	0
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 700 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	2	75	0	0	518	93	13	0	1	0	0	0
Motorcycles	0	0	0	0	2	0	0	0	0	0	0	0
Buses	0	2	0	0	2	0	0	0	0	0	0	0
Bobtails	0	3	0	0	39	0	0	0	0	0	0	0
Small Trucks	0	6	0	0	15	3	1	0	0	0	0	0
Big Trucks	0	31	0	0	49	0	0	0	0	0	0	0
TOTALS	2	117	0	0	625	96	14	0	1	0	0	0

PEAK HR. FACTOR:	0.661	0.985	0.625	0.000

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-019

Location: Ferry St & Pilchard St City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	0	94	0	0	18	2	1	0	0	0	0	0
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	34	0	0	13	2	0	0	0	0	0	0
	Small Trucks	0	36	0	0	13	0	0	0	1	0	0	0
	Big Trucks	0	0	0	0	1	0	1	0	0	0	0	0
16:15	CARS	0	111	0	0	19	2	36	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	31	0	0	7	0	0	0	0	0	0	0
	Small Trucks	0	38	0	0	2	0	0	0	0	0	0	0
	Big Trucks	0	2	0	0	0	0	0	0	0	0	0	0
16:30	CARS	0	89	0	0	31	1	42	0	0	0	0	0
	Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	7	0	0	6	0	0	0	0	0	0	0
	Small Trucks	0	14	0	0	3	0	0	0	0	0	0	0
	Big Trucks	0	1	0	0	1	0	0	0	0	0	0	0
16:45	CARS	1	90	0	0	45	6	53	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	4	0	0	6	0	0	0	0	0	0	0
	Small Trucks	2	6	0	0	5	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
17:00	CARS	0	69	0	0	44	2	14	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	2	0	0	4	0	0	0	0	0	0	0
	Small Trucks	0	5	0	0	2	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	1	0	0	0	0	0
17:15	CARS	0	60	0	0	52	10	6	0	0	0	0	0
	Motorcycles	0	2	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	6	0	0	4	0	0	0	0	0	0	0
	Small Trucks	0	1	0	0	2	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	2	0	0	0	0	0	0	0
17:30	CARS	0	38	0	0	60	3	4	0	0	0	1	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	7	0	0	0	0	0	0	0
	Small Trucks	0	1	0	0	1	0	0	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	1	0	0	0	0	0
17:45	CARS	0	43	0	0	36	3	6	0	0	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	1	0	0	7	1	0	0	0	0	0	0
	Small Trucks	0	2	0	0	3	0	0	0	0	0	0	0
	Big Trucks	0	1	0	0	2	0	0	0	0	0	0	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	1	594	0	0	305	29	162	0	0	0	1	0
Motorcycles	0	4	0	0	0	0	0	0	0	0	0	0
Buses	0	4	0	0	4	0	0	0	0	0	0	0
Bobtails	0	85	0	0	54	3	0	0	0	0	0	0
Small Trucks	2	103	0	0	31	0	0	0	1	0	0	0
Big Trucks	0	4	0	0	6	0	3	0	0	0	0	0
TOTALS	3	794	0	0	400	32	165	0	1	0	1	0
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 400 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	1	384	0	0	113	11	132	0	0	0	0	0
Motorcycles	0	2	0	0	0	0	0	0	0	0	0	0
Buses	0	2	0	0	2	0	0	0	0	0	0	0
Bobtails	0	76	0	0	32	2	0	0	0	0	0	0
Small Trucks	0	3	0	0	2	0	1	0	0	0	0	0
Big Trucks	2	94	0	0	23	0	0	0	1	0	0	0
TOTALS	3	561	0	0	172	13	133	0	1	0	0	0
PEAK HR. FACTOR:	0.770			0.746			0.632			0.000		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-020

Location: Ferry St & Terminal Way City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	11	0	1	0	4	120	12	0	7	0	0	0
	Motorcycles	0	0	0	0	0	1	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	7	0	0	0	0	0	0
	Small Trucks	0	0	0	0	0	13	1	0	1	0	0	0
	Big Trucks	0	0	0	0	0	1	1	0	0	0	0	0
7:15	CARS	14	1	0	0	4	132	13	1	3	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	1	0	0	0	0	9	0	0	0	0	0	0
	Small Trucks	3	0	0	0	0	14	9	0	2	0	0	0
	Big Trucks	0	0	0	0	0	3	1	0	0	0	0	0
7:30	CARS	11	2	0	0	5	130	10	0	3	0	0	0
	Motorcycles	0	0	0	0	0	1	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	10	1	0	1	0	0	0
	Small Trucks	0	0	0	0	0	11	11	0	2	0	0	0
	Big Trucks	0	0	0	0	0	3	1	0	0	0	0	0
7:45	CARS	6	2	0	0	4	120	26	0	2	0	1	0
	Motorcycles	0	0	0	0	0	1	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	1	0	0	0	0	12	1	0	0	0	0	0
	Small Trucks	0	1	0	0	0	14	9	0	0	0	0	0
	Big Trucks	0	0	0	0	0	5	4	0	0	0	0	0
8:00	CARS	4	1	0	0	6	60	25	0	7	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	2	0	0	0	0	9	1	0	4	0	0	0
	Small Trucks	0	0	0	0	0	8	9	0	1	0	0	0
	Big Trucks	0	0	0	0	0	1	3	0	0	0	0	0
8:15	CARS	5	1	0	0	3	45	40	0	2	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	3	1	0	0	0	12	0	0	0	0	0	0
	Small Trucks	0	1	0	0	0	21	7	0	0	0	0	0
	Big Trucks	1	0	0	0	0	3	2	0	0	0	0	0
8:30	CARS	1	2	0	0	2	32	14	1	3	0	0	0
	Motorcycles	0	0	0	0	0	1	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	1	0	0	0	0	0
	Bobtails	5	2	0	0	0	19	2	0	2	0	0	0
	Small Trucks	2	1	0	0	0	14	6	0	2	0	0	0
	Big Trucks	0	0	0	0	0	2	0	0	0	0	0	0
8:45	CARS	8	1	0	0	0	34	20	0	2	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	5	0	0	0	0	24	12	0	4	0	0	0
	Small Trucks	1	0	0	0	0	24	15	0	0	0	0	0
	Big Trucks	0	0	0	0	0	4	3	0	0	0	0	0

MOVEMENT TOTALS

CARS	60	10	1	0	28	673	160	2	29	0	1	0
Motorcycles	0	0	0	0	0	4	0	0	0	0	0	0
Buses	0	4	0	0	5	0	1	0	0	0	0	0
Bobtails	17	3	0	0	0	102	17	0	11	0	0	0
Small Trucks	6	3	0	0	0	119	67	0	8	0	0	0
Big Trucks	1	0	0	0	0	22	15	0	0	0	0	0
TOTALS	84	20	1	0	33	920	260	2	48	0	1	0
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 700 AM

PEAK VOLUMES =

CARS	42	5	1	0	17	502	61	1	15	0	1	0
Motorcycles	0	0	0	0	0	3	0	0	0	0	0	0
Buses	0	2	0	0	2	0	0	0	0	0	0	0
Bobtails	2	0	0	0	0	38	2	0	1	0	0	0
Small Trucks	0	0	0	0	0	12	7	0	0	0	0	0
Big Trucks	3	1	0	0	0	52	30	0	5	0	0	0
TOTALS	47	8	1	0	19	607	100	1	21	0	1	0
PEAK HR. FACTOR:	0.700			0.960			0.726			0.250		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-020

Location: Ferry St & Terminal Way City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	1	8	0	0	8	13	84	1	15	0	0	0
	Motorcycles	0	0	0	0	0	0	1	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	12	2	0	0	0	12	32	0	4	0	0	0
	Small Trucks	1	0	0	0	0	15	35	0	3	0	0	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
16:15	CARS	3	13	0	0	3	12	90	1	26	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	2	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	18	0	0	0	0	7	25	0	6	0	0	0
	Small Trucks	1	0	0	0	0	4	37	0	0	0	0	0
	Big Trucks	0	0	0	0	0	0	1	0	1	0	0	0
16:30	CARS	2	11	0	0	9	24	73	0	5	0	0	0
	Motorcycles	0	0	0	0	0	0	1	0	0	0	0	0
	Buses	0	0	0	0	1	0	0	0	0	0	0	0
	Bobtails	10	1	0	0	0	5	8	0	1	0	0	0
	Small Trucks	0	0	0	0	0	5	12	0	1	0	0	0
	Big Trucks	0	0	0	0	0	0	1	0	0	0	0	0
16:45	CARS	5	5	0	0	6	34	77	0	14	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	0	0	0	0	0	0	0	0
	Bobtails	7	0	0	0	0	7	4	0	0	0	0	0
	Small Trucks	0	0	0	0	2	4	7	0	0	0	0	0
	Big Trucks	0	0	0	0	0	1	0	0	0	0	0	0
17:00	CARS	4	1	0	0	2	46	72	2	15	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	3	0	0	0	0	3	2	0	0	0	0	0
	Small Trucks	0	0	0	0	1	2	5	0	0	0	0	0
	Big Trucks	1	0	0	0	0	0	1	0	0	0	0	0
17:15	CARS	6	2	0	0	4	49	56	0	13	0	0	0
	Motorcycles	0	0	0	0	0	0	2	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	5	0	0	0	0	5	9	0	5	0	0	0
	Small Trucks	0	0	0	0	0	1	2	0	0	0	0	0
	Big Trucks	0	0	0	0	0	2	0	0	0	0	0	0
17:30	CARS	0	2	0	0	4	54	39	0	3	0	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	1	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	4	0	0	0	0	7	1	0	6	0	0	0
	Small Trucks	1	0	0	0	0	1	1	0	2	0	0	0
	Big Trucks	0	0	0	0	0	0	1	0	0	0	0	0
17:45	CARS	5	0	0	0	3	27	37	1	8	1	0	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	1	0	0	1	0	0	0	0	0	0	0
	Bobtails	6	0	0	0	0	8	0	0	3	0	0	0
	Small Trucks	0	0	0	0	0	2	1	0	1	0	0	0
	Big Trucks	0	0	0	0	0	2	1	0	0	0	0	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	26	42	0	0	39	259	528	5	99	1	0	0
Motorcycles	0	0	0	0	0	0	4	0	2	0	0	0
Buses	1	5	0	0	5	0	0	0	0	0	0	0
Bobtails	65	3	0	0	0	54	81	0	25	0	0	0
Small Trucks	3	0	0	0	3	34	100	0	7	0	0	0
Big Trucks	1	0	0	0	0	5	5	0	1	0	0	0
TOTALS	96	50	0	0	47	352	718	5	134	1	0	0
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 400 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	11	37	0	0	26	83	324	2	60	0	0	0
Motorcycles	0	0	0	0	0	0	2	0	2	0	0	0
Buses	0	2	0	0	2	0	0	0	0	0	0	0
Bobtails	47	3	0	0	0	31	69	0	11	0	0	0
Small Trucks	0	0	0	0	0	1	2	0	1	0	0	0
Big Trucks	2	0	0	0	2	28	91	0	4	0	0	0
TOTALS	60	42	0	0	30	143	488	2	78	0	0	0
PEAK HR. FACTOR:	0.708			0.801			0.751			0.000		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-021

Location: Earle St & Terminal Way City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	0	1	8	0	0	0	0	7	0	37	93	0
	Motorcycles	0	0	0	0	0	0	0	0	0	1	1	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	6	2	0
	Small Trucks	0	0	1	0	0	0	0	2	0	2	10	2
	Big Trucks	0	0	0	0	0	0	0	1	0	0	0	0
7:15	CARS	0	1	6	0	1	0	0	15	0	40	108	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	7	7	0
	Small Trucks	0	0	5	0	0	0	0	5	0	0	12	0
	Big Trucks	0	0	0	0	0	0	0	0	0	1	0	0
7:30	CARS	0	0	4	1	5	1	2	6	0	69	74	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	1	0	6	9	0
	Small Trucks	0	0	6	0	1	0	0	5	0	0	8	0
	Big Trucks	0	0	0	1	0	0	0	0	0	0	1	0
7:45	CARS	0	0	8	0	1	0	2	18	0	65	59	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	0	0	6	5	0
	Small Trucks	0	0	2	0	0	0	0	4	0	1	11	0
	Big Trucks	0	0	1	0	0	0	0	1	0	1	3	0
8:00	CARS	0	0	16	0	0	0	2	15	0	20	51	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	1	0	1	0	7	8	0
	Small Trucks	0	0	1	0	0	0	0	7	0	0	6	0
	Big Trucks	0	0	1	0	0	0	0	1	0	1	0	0
8:15	CARS	0	1	17	0	0	0	0	25	2	16	29	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	1	0	10	5	0
	Small Trucks	0	0	1	0	0	0	0	7	0	2	20	0
	Big Trucks	0	0	0	0	0	0	0	1	1	0	2	0
8:30	CARS	0	0	8	0	3	1	1	11	0	10	22	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	1	0	5	0	14	12	0
	Small Trucks	0	0	1	0	1	0	0	7	0	2	16	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	1	0
8:45	CARS	0	0	10	1	1	1	1	12	1	11	25	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	19	0	18	16	0
	Small Trucks	0	0	2	0	0	0	0	9	0	2	21	0
	Big Trucks	0	0	0	1	0	0	0	1	0	0	3	0

MOVEMENT TOTALS

CARS	0	3	77	2	11	3	8	109	3	268	461	2
Motorcycles	0	0	0	0	0	0	0	0	0	1	4	0
Buses	0	0	0	0	0	0	0	0	0	0	0	0
Bobtails	0	0	0	0	0	2	0	27	0	74	64	0
Small Trucks	0	0	19	0	2	0	0	46	0	9	104	2
Big Trucks	0	0	2	2	0	0	0	5	1	3	10	0
TOTALS	0	3	98	4	13	5	8	187	4	355	643	4
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 700 AM

PEAK VOLUMES =

CARS	0	2	26	1	7	1	4	46	0	211	334	0
Motorcycles	0	0	0	0	0	0	0	0	0	1	3	0
Buses	0	0	0	0	0	0	0	0	0	0	0	0
Bobtails	0	0	0	0	0	0	0	1	0	25	23	0
Small Trucks	0	0	1	1	0	0	0	2	0	2	4	0
Big Trucks	0	0	14	0	1	0	0	16	0	3	41	2
TOTALS	0	2	41	2	8	1	4	65	0	242	405	2

PEAK HR. FACTOR:	0.896	0.306	0.690	0.927

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-021

Location: Earle St & Terminal Way City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	0	3	33	0	0	0	0	66	0	6	9	0
	Motorcycles	0	0	1	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	1	0	1	1	1	38	1	13	5	0
	Small Trucks	0	0	2	0	0	0	0	38	0	0	12	1
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
16:15	CARS	1	4	21	0	1	0	1	93	1	7	13	0
	Motorcycles	0	0	0	0	0	0	0	2	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	2	0	0	30	1	12	1	0
	Small Trucks	0	0	4	0	0	0	0	30	0	1	3	0
	Big Trucks	0	0	1	0	1	0	1	1	0	0	0	0
16:30	CARS	0	3	42	0	1	0	1	38	0	19	9	0
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	2	0	0	0	0	3	0	8	2	1
	Small Trucks	0	0	2	0	0	0	0	12	0	1	3	0
	Big Trucks	0	0	0	0	0	0	0	1	0	0	0	0
16:45	CARS	1	9	51	1	1	0	0	30	0	31	9	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	4	0	13	1	0
	Small Trucks	0	0	2	0	2	0	0	5	0	0	5	0
	Big Trucks	0	0	0	0	1	0	0	0	0	1	0	0
17:00	CARS	0	1	34	0	3	0	1	42	1	31	8	1
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	2	0	7	2	0
	Small Trucks	0	0	2	0	0	0	0	3	0	0	3	0
	Big Trucks	0	0	0	0	0	0	0	0	0	0	0	0
17:15	CARS	1	1	23	0	0	0	0	44	0	46	11	0
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	14	2	0	0	0	2	0	14	1	0
	Small Trucks	0	0	0	0	0	0	0	2	0	0	1	0
	Big Trucks	0	0	0	0	0	0	0	0	0	2	1	0
17:30	CARS	0	0	16	0	1	0	0	27	0	48	10	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	5	0	0	0	0	0	0	25	1	0
	Small Trucks	0	0	1	0	0	0	0	1	0	1	1	0
	Big Trucks	0	1	0	0	0	0	0	1	0	0	0	0
17:45	CARS	0	0	14	0	0	0	0	27	0	29	7	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	1	0	0	1	0	1	1	14	0	0
	Small Trucks	0	0	0	0	0	0	0	2	0	0	2	0
	Big Trucks	0	0	0	0	0	0	0	1	0	0	2	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	3	21	234	1	7	0	3	367	2	217	76	1
Motorcycles	0	0	1	0	0	0	0	4	0	0	0	0
Buses	0	0	0	0	0	0	0	0	0	0	0	0
Bobtails	0	0	23	2	3	2	1	80	3	106	13	1
Small Trucks	0	0	13	0	2	0	0	93	0	3	30	1
Big Trucks	0	1	1	0	2	0	1	4	0	3	3	0
TOTALS	3	22	272	3	14	2	5	548	5	329	122	3
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 400 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	2	19	147	1	3	0	2	227	1	63	40	0
Motorcycles	0	0	1	0	0	0	0	3	0	0	0	0
Buses	0	0	0	0	0	0	0	0	0	0	0	0
Bobtails	0	0	3	0	3	1	1	75	2	46	9	1
Small Trucks	0	0	1	0	2	0	1	2	0	1	0	0
Big Trucks	0	0	10	0	2	0	0	85	0	2	23	1
TOTALS	2	19	162	1	10	1	4	392	3	112	72	2
PEAK HR. FACTOR:	0.726			0.600			0.623			0.775		

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-022

Location: Ocean Blvd/Seaside Ave & Navy Way City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00	CARS	3	0	7	0	0	0	0	342	44	6	367	0
	Motorcycles	0	0	0	0	0	0	0	0	0	1	2	0
	Buses	0	0	0	0	0	0	0	1	0	0	1	0
	Bobtails	0	0	0	0	0	0	0	1	0	0	5	0
	Small Trucks	0	0	0	0	0	0	0	3	2	0	28	0
	Big Trucks	0	0	0	0	0	0	0	3	0	0	5	0
7:15	CARS	4	0	7	0	0	0	0	477	67	20	502	0
	Motorcycles	0	0	0	0	0	0	0	0	1	0	1	0
	Buses	0	0	1	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	1	0	0	0	0	5	0	0	10	0
	Small Trucks	0	0	1	0	0	0	0	8	8	0	35	0
	Big Trucks	0	0	0	0	0	0	0	3	1	0	11	0
7:30	CARS	3	0	17	0	0	0	0	503	70	21	521	0
	Motorcycles	0	0	0	0	0	0	0	4	0	0	1	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	2	0	0	0	0	6	5	0	11	0
	Small Trucks	0	0	0	0	0	0	0	15	8	0	33	0
	Big Trucks	0	0	0	0	0	0	0	4	0	1	5	0
7:45	CARS	2	0	9	0	0	0	0	475	56	18	461	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	1	0	0	0	0	0	0	0	0	0
	Bobtails	0	0	0	0	0	0	0	12	1	0	10	0
	Small Trucks	0	0	0	0	0	0	0	20	8	1	31	0
	Big Trucks	1	0	0	0	0	0	0	3	0	1	5	0
8:00	CARS	8	0	18	0	0	0	0	426	16	13	352	0
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	0	1	0	0	0	0	1	0	0	0	0
	Bobtails	0	0	1	0	0	0	0	5	3	0	14	0
	Small Trucks	0	0	0	0	0	0	0	23	4	0	32	0
	Big Trucks	0	0	0	0	0	0	0	6	0	0	3	0
8:15	CARS	7	0	11	0	0	0	0	433	24	9	360	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	0	0	0	0	0	0	0	0	0	0
	Bobtails	5	0	8	0	0	0	0	12	5	0	10	0
	Small Trucks	5	0	18	0	0	0	0	22	5	0	49	0
	Big Trucks	0	0	0	0	0	0	0	4	0	0	8	0
8:30	CARS	6	0	10	0	0	0	0	310	24	14	301	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0
	Buses	0	0	1	0	0	0	0	1	0	0	0	0
	Bobtails	4	0	14	0	0	0	0	28	6	1	20	0
	Small Trucks	6	0	40	0	0	0	0	26	7	0	49	0
	Big Trucks	0	0	0	0	0	0	0	13	0	0	6	0
8:45	CARS	3	0	15	0	0	0	0	320	15	5	282	0
	Motorcycles	0	0	0	0	0	0	0	0	0	0	1	0
	Buses	0	0	1	0	0	0	0	2	0	0	0	0
	Bobtails	7	0	18	0	0	0	0	30	9	0	32	0
	Small Trucks	7	0	54	0	0	0	0	28	11	1	65	0
	Big Trucks	0	0	1	0	0	0	0	7	0	0	6	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	36	0	94	0	0	0	0	3286	316	106	3146	0
Motorcycles	0	0	0	0	0	0	0	5	1	1	5	0
Buses	0	0	5	0	0	0	0	5	0	0	1	0
Bobtails	16	0	44	0	0	0	0	99	29	1	112	0
Small Trucks	18	0	113	0	0	0	0	145	53	2	322	0
Big Trucks	1	0	1	0	0	0	0	43	1	2	49	0
TOTALS	71	0	257	0	0	0	0	3583	400	112	3635	0
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	17	0	51	0	0	0	0	1881	209	72	1836	0
Motorcycles	0	0	0	0	0	0	0	5	1	0	2	0
Buses	0	0	3	0	0	0	0	1	0	0	0	0
Bobtails	0	0	4	0	0	0	0	28	9	0	45	0
Small Trucks	1	0	0	0	0	0	0	16	1	2	24	0
Big Trucks	0	0	1	0	0	0	0	66	28	1	131	0
TOTALS	18	0	59	0	0	0	0	1997	248	75	2038	0

PEAK HR. FACTOR:	0.688	0.000	0.913	0.891

NATIONAL DATA AND SURVEYING SERVICES

Axle Count

Project # 10-5073-022

Location: Ocean Blvd/Seaside Ave & Navy Way City: San Pedro Date: 2/25/2010 Day: Thursday

		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
16:00	CARS	7	0	39	0	0	0	0	348	6	1	341	0
	Motorcycles	0	0	0	0	0	0	0	3	0	0	0	0
	Buses	0	0	0	0	0	0	0	2	0	0	0	0
	Bobtails	12	0	41	0	0	0	0	32	3	0	19	0
	Small Trucks	8	0	37	0	0	0	0	42	4	0	39	0
	Big Trucks	0	0	1	0	0	0	0	4	1	0	3	0
16:15	CARS	28	0	57	0	0	0	0	510	14	0	419	0
	Motorcycles	1	0	3	0	0	0	0	0	1	1	0	0
	Buses	0	0	1	0	0	0	0	1	0	0	2	0
	Bobtails	10	0	39	0	0	0	0	32	3	0	19	0
	Small Trucks	6	0	49	0	0	0	0	48	13	0	34	0
	Big Trucks	0	0	0	0	0	0	0	5	1	0	4	0
16:30	CARS	33	0	50	0	0	0	0	482	23	2	386	0
	Motorcycles	0	0	0	0	0	0	0	2	0	0	0	0
	Buses	0	0	0	0	0	0	0	1	0	0	0	0
	Bobtails	15	0	41	0	0	0	0	21	3	0	14	0
	Small Trucks	7	0	54	0	0	0	0	30	11	0	23	0
	Big Trucks	0	0	0	0	0	0	0	4	0	0	4	0
16:45	CARS	73	0	130	0	0	0	0	753	44	8	656	0
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	0	1	0	0	0	0	1	0	0	0	0
	Bobtails	7	0	20	0	0	0	0	15	2	0	12	0
	Small Trucks	4	0	30	0	0	0	0	14	9	0	25	0
	Big Trucks	0	0	0	0	0	0	0	2	0	0	1	0
17:00	CARS	41	0	61	0	0	0	0	562	28	7	534	0
	Motorcycles	0	0	0	0	0	0	0	2	0	0	0	0
	Buses	0	0	1	0	0	0	0	0	0	0	0	0
	Bobtails	2	0	9	0	0	0	0	2	2	0	9	0
	Small Trucks	2	0	7	0	0	0	0	15	1	1	22	0
	Big Trucks	0	0	0	0	0	0	0	1	0	0	2	0
17:15	CARS	12	0	33	0	0	0	0	605	30	8	474	0
	Motorcycles	0	0	0	0	0	0	0	2	0	0	0	0
	Buses	0	0	0	0	0	0	0	1	0	0	1	0
	Bobtails	3	0	7	0	0	0	0	13	1	0	13	0
	Small Trucks	2	0	11	0	0	0	0	10	6	0	12	0
	Big Trucks	0	0	0	0	0	0	0	3	1	0	2	0
17:30	CARS	4	0	16	0	0	0	0	515	35	6	411	0
	Motorcycles	0	0	0	0	0	0	0	4	0	0	0	0
	Buses	0	0	1	0	0	0	0	1	0	0	0	0
	Bobtails	2	0	8	0	0	0	0	5	4	0	12	0
	Small Trucks	1	0	6	0	0	0	0	18	7	0	7	0
	Big Trucks	1	0	1	0	0	0	0	4	1	1	1	0
17:45	CARS	8	0	25	0	0	0	0	526	18	10	412	0
	Motorcycles	0	0	0	0	0	0	0	1	0	0	0	0
	Buses	0	0	0	0	0	0	0	1	0	0	1	0
	Bobtails	1	0	3	0	0	0	0	6	5	0	7	0
	Small Trucks	1	0	11	0	0	0	0	19	8	0	10	0
	Big Trucks	0	0	0	0	0	0	0	4	2	0	2	0

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	206	0	411	0	0	0	0	4301	198	42	3633	0
Motorcycles	1	0	3	0	0	0	0	15	1	1	0	0
Buses	0	0	4	0	0	0	0	8	0	0	4	0
Bobtails	52	0	168	0	0	0	0	126	23	0	105	0
Small Trucks	31	0	205	0	0	0	0	196	59	1	172	0
Big Trucks	1	0	2	0	0	0	0	27	6	1	19	0
TOTALS	291	0	793	0	0	0	0	4673	287	45	3933	0
	NL	*NT*	*NR*	*SL*	*ST*	*SR*	*EL*	*ET*	*ER*	*WL*	*WT*	*WR*

PM Peak Hr Begins at: 415 AM

PEAK VOLUMES =

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
CARS	175	0	298	0	0	0	0	2307	109	17	1995	0
Motorcycles	1	0	3	0	0	0	0	5	1	1	0	0
Buses	0	0	3	0	0	0	0	3	0	0	2	0
Bobtails	34	0	109	0	0	0	0	70	10	0	54	0
Small Trucks	0	0	0	0	0	0	0	12	1	0	11	0
Big Trucks	19	0	140	0	0	0	0	107	34	1	104	0
TOTALS	229	0	553	0	0	0	0	2504	155	19	2166	0
PEAK HR. FACTOR:	0.738			0.000			0.790			0.778		

Appendix 18-B
LEVELS OF SERVICE

EXISTING (2010) LEVEL OF SERVICE WORKSHEETS

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	125	466	615	204	411	160	380	1710	91	113	1386	15
AMBIENT												
RELATED												
PROJECT												
TOTAL	125	466	615	204	411	160	380	1710	91	113	1386	15
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 206
B: 204

EastBound
A: 467
B: 113

WestBound
A: 600
B: 380

NorthBound
A: 235
B: 125

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{235 + 204 + 380 + 467}{1375} = 0.935$$

LOS = E

Developed by Chun Wong, 12/94

EXAM

October 24, 2011 ,Monday 06:04:33 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

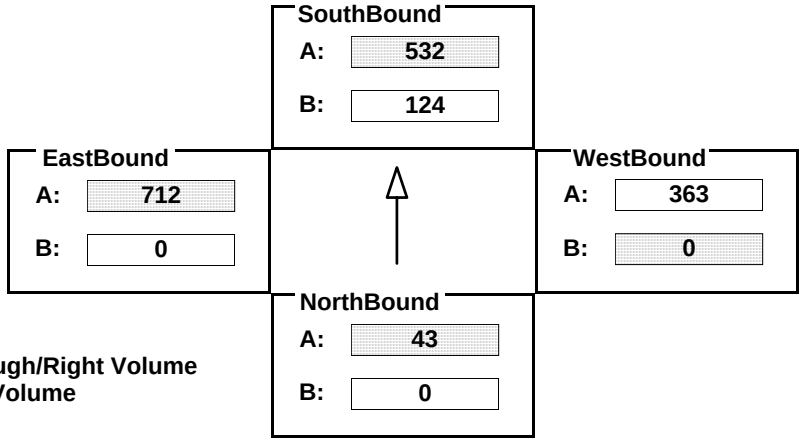
Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING			43	218	30	967	1	1215	236		2084	53
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	43	218	30	967	1	1215	236	0	2084	53

LANE						1		1	1				2				3		1	0				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{43 + 532 + 0 + 712}{1500} = 0.858$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **EXISTING CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	22	1,600	0.014 *	N-S(1):	0.286
	TH	0.00	0	0	0.000	N-S(2):	0.292 *
	LT	0.00	0	0	0.000	E-W(1):	0.143
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.320 *
	TH	3.00	1,452	4,800	0.304 *		
	LT	0.00	0	0	0.000	V/C:	0.612
Northbound	RT	1.00	251	1,600	0.157	Lost Time:	0.100
	TH	1.00	13	1,600	0.286	ITS:	0.000
	LT	0.00	445	1,600	0.278 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.712
	TH	3.00	686	4,800	0.143		
	LT	1.00	25	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	115	1,600	0.072 *	N-S(1):	0.238
	TH	0.00	0	0	0.000	N-S(2):	0.294 *
	LT	0.00	0	0	0.000	E-W(1):	0.240
Westbound	RT	0.00	13	0	0.000	E-W(2):	0.304 *
	TH	3.00	1,156	4,800	0.244 *		
	LT	0.00	2	1,600	0.001	V/C:	0.598
Northbound	RT	1.00	171	1,600	0.106	Lost Time:	0.100
	TH	1.00	26	1,600	0.238	ITS:	0.000
	LT	0.00	355	1,600	0.222 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.698
	TH	3.00	1,138	4,800	0.239		
	LT	1.00	96	1,600	0.060 *	LOS:	B

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **EXISTING CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	226	1,600	0.000	N-S(1):	0.147
	TH	2.00	265	3,200	0.083 *	N-S(2):	0.173 *
	LT	1.00	75	1,600	0.047	E-W(1):	0.319
Westbound	RT	1.00	120	1,600	0.052	E-W(2):	0.437 *
	TH	2.00	1,112	3,200	0.348 *		
	LT	1.00	127	1,600	0.079	V/C:	0.610
Northbound	RT	1.00	206	1,600	0.089	Lost Time:	0.100
	TH	2.00	321	3,200	0.100	ITS:	0.000
	LT	1.00	144	1,600	0.090 *		
Eastbound	RT	1.00	45	1,600	0.000	ICU:	0.710
	TH	2.00	768	3,200	0.240		
	LT	1.00	143	1,600	0.089 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	111	1,600	0.000	N-S(1):	0.211 *
	TH	2.00	244	3,200	0.076	N-S(2):	0.132
	LT	1.00	126	1,600	0.079 *	E-W(1):	0.391
Westbound	RT	1.00	87	1,600	0.015	E-W(2):	0.414 *
	TH	2.00	995	3,200	0.311 *		
	LT	1.00	107	1,600	0.067	V/C:	0.625
Northbound	RT	1.00	265	1,600	0.132 *	Lost Time:	0.100
	TH	2.00	296	3,200	0.093	ITS:	0.000
	LT	1.00	90	1,600	0.056		
Eastbound	RT	1.00	83	1,600	0.024	ICU:	0.725
	TH	2.00	1,038	3,200	0.324		
	LT	1.00	165	1,600	0.103 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **EXISTING CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	152	1,600	0.056	N-S(1):	0.193 *
	TH	2.00	321	3,200	0.100 *	N-S(2):	0.193 *
	LT	1.00	137	1,600	0.086 *	E-W(1):	0.359
Westbound	RT	1.00	91	1,600	0.014	E-W(2):	0.388 *
	TH	2.00	992	3,200	0.310 *		
	LT	1.00	185	1,600	0.116	V/C:	0.581
Northbound	RT	1.00	156	1,600	0.040	Lost Time:	0.100
	TH	2.00	341	3,200	0.107 *	ITS:	0.000
	LT	1.00	148	1,600	0.093 *		
Eastbound	RT	1.00	118	1,600	0.028	ICU:	0.681
	TH	2.00	779	3,200	0.243		
	LT	1.00	124	1,600	0.078 *	LOS:	B

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	118	1,600	0.023	N-S(1):	0.218
	TH	2.00	414	3,200	0.129 *	N-S(2):	0.238 *
	LT	1.00	173	1,600	0.108	E-W(1):	0.436 *
Westbound	RT	1.00	112	1,600	0.016	E-W(2):	0.361
	TH	2.00	824	3,200	0.258		
	LT	1.00	169	1,600	0.106 *	V/C:	0.674
Northbound	RT	1.00	153	1,600	0.043	Lost Time:	0.100
	TH	2.00	352	3,200	0.110	ITS:	0.000
	LT	1.00	174	1,600	0.109 *		
Eastbound	RT	1.00	173	1,600	0.054	ICU:	0.774
	TH	2.00	1,057	3,200	0.330 *		
	LT	1.00	164	1,600	0.103	LOS:	C

* - Denotes critical movement

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	68	490	140	52	319	407	170	908	152	515	710	104
AMBIENT												
RELATED												
PROJECT												
TOTAL	68	490	140	52	319	407	170	908	152	515	710	104
LANE	1	2	1	1	1	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 407
B: 52

EastBound
A: 355
B: 515

WestBound
A: 454
B: 170

NorthBound
A: 245
B: 68

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{68 + 407 + 454 + 515}{1500} = 0.963$$

LOS = E

Developed by Chun Wong, 12/94

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: Lomita Bl I/S No: 7

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	235	191	28	52	116	247	34	761	93	317	490	99
AMBIENT												
RELATED												
PROJECT												
TOTAL	235	191	28	52	116	247	34	761	93	317	490	99
LANE	1	2	1	1	2	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 247
B: 52

EastBound
A: 245
B: 317

WestBound
A: 381
B: 34

NorthBound
A: 96
B: 235

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{235 + 247 + 381 + 317}{1500} = 0.787$$

LOS = C

Developed by Chun Wong, 12/94

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Main St/Wilmington Bl W/E: Lomita Bl I/S No: 8

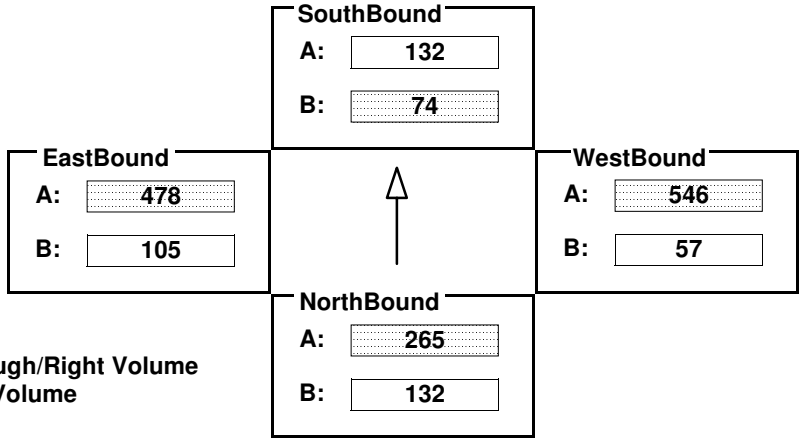
AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	132	449	81	74	264	232	57	445	44	105	332	41
AMBIENT												
RELATED												
PROJECT												
TOTAL	132	449	81	74	264	232	57	445	44	105	332	41
LANE	1	1	1	1	2	1	1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	OLA		Split	Auto		Split	Auto	

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{265 + 74 + 546 + 478}{1425} = 0.956$$

LOS = E

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	226	480	201	23	135	59	122	1088	492	969	920	85
AMBIENT												
RELATED												
PROJECT												
TOTAL	226	480	201	23	135	59	122	1088	492	969	920	85
LANE	1	1	1	1	1	1	1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 135
B: 23

EastBound
A: 503
B: 533

WestBound
A: 527
B: 122

NorthBound
A: 341
B: 226

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{341 + 23 + 527 + 533}{1425} = 0.999$$

LOS = E

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1010 I-110 Ramps/C St & Figueroa St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.324
Loss Time (sec):	0	Average Delay (sec/veh):	10.7
Optimal Cycle:	0	Level Of Service:	B

Street Name:	Figueroa St							I-110 Ramps/C St					
Approach:	North Bound			South Bound			East Bound			West Bound			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R	
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign			
Rights:	Include			Include			Include			Include			
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	
Lanes:	1 0	2 0	0	0 0	1 1	0	1 0	1! 0	1	0 0	0 0	1	
Volume Module:													
Base Vol:	164	166	0	0	201	177	130	0	234	0	0	11	
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Initial Bse:	164	166	0	0	201	177	130	0	234	0	0	11	
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Volume:	164	166	0	0	201	177	130	0	234	0	0	11	
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0	
Reduced Vol:	164	166	0	0	201	177	130	0	234	0	0	11	
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
FinalVolume:	164	166	0	0	201	177	130	0	234	0	0	11	
Saturation Flow Module:													
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lanes:	1.00	2.00	0.00	0.00	1.06	0.94	1.07	0.00	1.93	0.00	0.00	1.00	
Final Sat.:	507	1084	0	0	625	611	1179	xxxx	1817	0	0	527	
Capacity Analysis Module:													
Vol/Sat:	0.32	0.15	xxxx	xxxx	0.32	0.29	0.11	0.00	0.13	xxxx	xxxx	0.02	
Crit Moves:	****				****				****			****	
Delay/Veh:	12.7	10.2	0.0	0.0	11.3	10.0	10.4	9.4	9.5	0.0	0.0	9.3	
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
AdjDel/Veh:	12.7	10.2	0.0	0.0	11.3	10.0	10.4	9.4	9.5	0.0	0.0	9.3	
LOS by Move:	B	B	*	*	B	B	B	A	A	*	*	A	
ApproachDel:	11.4			10.7			10.2			9.3			
Delay Adj:	1.00			1.00			1.00			1.00			
ApprAdjDel:	11.4			10.7			10.2			9.3			
LOS by Appr:	B			B			B			A			
AllWayAvgQ:	0.4	0.2	0.0	0.0	0.4	0.4	0.2	0.2	0.2	0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St/TraPAC Gate W/E: Harry Bridge Bl I/S No: 11

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	3	7	6	180	66	173	55	508	164	126	374	14
AMBIENT												
RELATED												
PROJECT												
TOTAL	3	7	6	180	66	173	55	508	164	126	374	14
LANE		1			1			1		2			1		1		1		1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 173
B: 180

EastBound
A: 194
B: 126

WestBound
A: 254
B: 55

NorthBound
A: 8
B: 3

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{8 + 180 + 254 + 126}{1500} = 0.379$$

LOS = A

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EXAM

March 12, 2010 ,Friday 03:18:08 PM

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INTERSECTION DATA SUMMARY SHEET

N/S: Fries Av W/E: Harry Bridge Bl I/S No: 12

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	61	18	2	5	15	47	28	595	10	16	384	55
AMBIENT												
RELATED												
PROJECT												
TOTAL	61	18	2	5	15	47	28	595	10	16	384	55
LANE	1				1			1			1			1			1			1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 62
B: 5

EastBound
A: 252
B: 16

WestBound
A: 331
B: 28

NorthBound
A: 20
B: 61

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{61 + 62 + 331 + 16}{1500} = 0.313$$

LOS = A

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EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING		552	2617		950		1451		108			
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	552	2617	0	950	0	1451	0	108			
LANE		2	2		3		2		1			
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Free		Perm			Split					

Critical Movements Diagram

SouthBound
A: 317
B: 0

EastBound
A: 0
B: 0

WestBound
A: 520
B: 520

NorthBound
A: 276
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 317 + 520 + 0}{1500} = 0.558$$

LOS = A

Developed by Chun Wong, 12/94

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	58	1195	30	39	925	142	62	250	32	239	302	36
AMBIENT												
RELATED												
PROJECT												
TOTAL	58	1195	30	39	925	142	62	250	32	239	302	36
LANE	1	1	1	1	1	1	1	1	1	1	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 534
B: 39

EastBound
A: 302
B: 239

WestBound
A: 282
B: 62

NorthBound
A: 613
B: 58

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{613 + 39 + 282 + 239}{1500} = 0.782$$

LOS = C

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.178
Loss Time (sec):	0	Average Delay (sec/veh):	8.5
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0		1 0 0	1 0		1 0 2	0 1		1 0 1	0 1	
Volume Module:												
Base Vol:	7	10	4	6	17	68	7	91	12	81	124	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	7	10	4	6	17	68	7	91	12	81	124	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	7	10	4	6	17	68	7	91	12	81	124	5
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	10	4	6	17	68	7	91	12	81	124	5
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	10	4	6	17	68	7	91	12	81	124	5
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.71	0.29	1.00	0.20	0.80	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	584	470	188	593	144	577	606	1325	758	635	697	803
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.02	0.01	0.12	0.12	0.01	0.07	0.02	0.13	0.18	0.01
Crit Moves:	****			****			****			****		
Delay/Veh:	8.6	8.0	8.0	8.6	8.0	8.0	8.5	8.3	7.3	9.0	8.8	7.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.6	8.0	8.0	8.6	8.0	8.0	8.5	8.3	7.3	9.0	8.8	7.1
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.2			8.1			8.2			8.8		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.2			8.1			8.2			8.8		
LOS by Appr:	A			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 3.2 Worst Case Level Of Service: B[11.1]

Street Name:	Western Ave									Paseo del Mar							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1
Volume Module:																				
Base Vol:	0	0	0		68	0		66			60		168		0	0		175		73
Growth Adj:	1.00	1.00	1.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
Initial Bse:	0	0	0		68	0		66			60		168		0	0		175		73
User Adj:	1.00	1.00	1.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00	1.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
PHF Volume:	0	0	0		68	0		66			60		168		0	0		175		73
Reduct Vol:	0	0	0		0	0		0			0		0		0	0		0		0
FinalVolume:	0	0	0		68	0		66			60		168		0	0		175		73
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx		6.4	xxxx		6.2			4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
FollowUpTim:	xxxxx	xxxx	xxxxx		3.5	xxxx		3.3			2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx		463	xxxx		175			248	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Potent Cap.:	xxxx	xxxx	xxxxx		561	xxxx		874			1330	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Move Cap.:	xxxx	xxxx	xxxxx		542	xxxx		874			1330	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Volume/Cap:	xxxx	xxxx	xxxx		0.13	xxxx		0.08			0.05	xxxx	xxxx	xxxx	xxxx	xxxx				
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx		0.4	xxxx		0.2			0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Control Del:	xxxxx	xxxx	xxxxx		12.6	xxxx		9.5			7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
LOS by Move:	*	*	*		B	*		A			A	*	*	*	*	*				
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	xxxx		xxxxx			xxxx	xxxx	xxxxx		xxxx	xxxx		xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	xxxx		xxxxx			xxxxx	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	xxxx		xxxxx			xxxxx	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
Shared LOS:	*	*	*		*	*		*			*	*	*		*	*		*		
ApproachDel:	xxxxxx					11.1					xxxxxx					xxxxxx				
ApproachLOS:	*					B					*					*				

Note: Queue reported is the number of cars per lane.

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	68	752	23	177	1068	99	16	109	134	112	158	89
AMBIENT												
RELATED												
PROJECT												
TOTAL	68	752	23	177	1068	99	16	109	134	112	158	89
LANE	1	1	1	1	1	1	1	1	1	1	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 584
B: 177

EastBound
A: 124
B: 112

WestBound
A: 109
B: 16

NorthBound
A: 388
B: 68

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{68 + 584 + 109 + 112}{1425} = 0.613$$

LOS = B

EXAM

March 12, 2010 ,Friday 03:18:08 PM

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INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: SR-47 EB On/Off Ramps I/S No: 18

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING		75	94	4	373		407		2			
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	75	94	4	373	0	407	0	2			
LANE		1	1	1	2		1		1			
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Var	Auto		Prot-Var			Split	OLA				

Critical Movements Diagram

SouthBound
A: 187
B: 4

EastBound
A: 0
B: 0

WestBound
A: 205
B: 205

NorthBound
A: 75
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 187 + 205 + 0}{1375} = 0.285$$

LOS = A

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EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Pilchard St I/S No: 19

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	2	150			680	96				14		1
AMBIENT												
RELATED												
PROJECT												
TOTAL	2	150	0	0	680	96				14	0	1

LANE	1		2					1		1		1														1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm		Perm	Auto			Split	

Critical Movements Diagram

SouthBound
A: 388
B: 0

EastBound
A: 15
B: 14

WestBound
A: 0
B: 0

NorthBound
A: 75
B: 2

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{2 + 388 + 0 + 15}{1500} = 0.270$$

LOS = A

Developed by Chun Wong, 12/94

EXAM

October 24, 2011 ,Monday 06:04:33 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Terminal Way I/S No: 20

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	50	11	1	0	21	663				130	1	26
AMBIENT												
RELATED												
PROJECT												
TOTAL	50	11	1	0	21	663	0	0	0	130	1	26

LANE	1		2			1		1		1			1											1	1				1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm	OLA			Split	Free

Critical Movements Diagram

SouthBound
A: 598
B: 0

EastBound
A: 66
B: 66

WestBound
A: 0
B: 0

NorthBound
A: 6
B: 50

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{50 + 598 + 0 + 66}{1500} = 0.476$$

LOS = A

Developed by Chun Wong, 12/94

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Earle St W/E: Terminal Way I/S No: 21

AM/PM: AM Comments: EXAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	2	55	2	9	1	248	448	4	4	81	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	2	55	2	9	1	248	448	4	4	81	0
LANE		1			1			1			1		1		1		1		1		1		1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 6
B: 2

EastBound
A: 41
B: 4

WestBound
A: 226
B: 248

NorthBound
A: 55
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{55 + 2 + 248 + 41}{1500} = 0.231$$

LOS = A

Developed by Chun Wong, 12/94

EXAM

March 12, 2010 ,Friday 03:18:08 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Navy Wy | W/E: Ocean Bl/Seaside Av | I/S No: 22

AM/PM: AM | Comments: EXAM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	18	0	63				76	2174	0	0	2067	277
AMBIENT												
RELATED												
PROJECT												
TOTAL	18	0	63				76	2174	0	0	2067	277
LANE	2					1							2		3							3		1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Split	Free					Prot-Fix			Prot-Fix	OLA	

Critical Movements Diagram

SouthBound
A: 0
B: 0

EastBound
A: 689
B: 0

WestBound
A: 725
B: 42

NorthBound
A: 0
B: 10

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{10 + 0 + 42 + 689}{1425} = 0.520$$

LOS = A

Developed by Chun Wong, 12/94

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	96	380	534	200	556	161	355	1472	115	131	1533	49
AMBIENT												
RELATED												
PROJECT												
TOTAL	96	380	534	200	556	161	355	1472	115	131	1533	49
LANE	1	2	1	1	2	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	OLA		Prot-Fix	Auto		Prot-Fix	Auto		Prot-Fix	Auto	

Critical Movements Diagram

SouthBound
A: 278
B: 200

EastBound
A: 527
B: 131

WestBound
A: 529
B: 355

NorthBound
A: 190
B: 96

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{190 + 200 + 355 + 527}{1375} = 0.925$$

LOS = E

Developed by Chun Wong, 12/94

CalcaDB

October 24, 2011 ,Monday 05:58:09 PM

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING			41	342	44	782	2	1076	202		2211	51
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	41	342	44	782	2	1076	202	0	2211	51
LANE						1		1	1			2				3		1				2		1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL				Split	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 430
B: 193

EastBound
A: 754
B: 0

WestBound
A: 320
B: 0

NorthBound
A: 41
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{41 + 430 + 0 + 754}{1500} = 0.817$$

LOS = D

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **EXISTING CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	22	1,600	0.014 *	N-S(1):	0.286
	TH	0.00	0	0	0.000	N-S(2):	0.292 *
	LT	0.00	0	0	0.000	E-W(1):	0.143
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.320 *
	TH	3.00	1,452	4,800	0.304 *		
	LT	0.00	0	0	0.000	V/C:	0.612
Northbound	RT	1.00	251	1,600	0.157	Lost Time:	0.100
	TH	1.00	13	1,600	0.286	ITS:	0.000
	LT	0.00	445	1,600	0.278 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.712
	TH	3.00	686	4,800	0.143		
	LT	1.00	25	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	115	1,600	0.072 *	N-S(1):	0.238
	TH	0.00	0	0	0.000	N-S(2):	0.294 *
	LT	0.00	0	0	0.000	E-W(1):	0.240
Westbound	RT	0.00	13	0	0.000	E-W(2):	0.304 *
	TH	3.00	1,156	4,800	0.244 *		
	LT	0.00	2	1,600	0.001	V/C:	0.598
Northbound	RT	1.00	171	1,600	0.106	Lost Time:	0.100
	TH	1.00	26	1,600	0.238	ITS:	0.000
	LT	0.00	355	1,600	0.222 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.698
	TH	3.00	1,138	4,800	0.239		
	LT	1.00	96	1,600	0.060 *	LOS:	B

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **EXISTING CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	226	1,600	0.000	N-S(1):	0.147
	TH	2.00	265	3,200	0.083 *	N-S(2):	0.173 *
	LT	1.00	75	1,600	0.047	E-W(1):	0.319
Westbound	RT	1.00	120	1,600	0.052	E-W(2):	0.437 *
	TH	2.00	1,112	3,200	0.348 *		
	LT	1.00	127	1,600	0.079	V/C:	0.610
Northbound	RT	1.00	206	1,600	0.089	Lost Time:	0.100
	TH	2.00	321	3,200	0.100	ITS:	0.000
	LT	1.00	144	1,600	0.090 *		
Eastbound	RT	1.00	45	1,600	0.000	ICU:	0.710
	TH	2.00	768	3,200	0.240		
	LT	1.00	143	1,600	0.089 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	111	1,600	0.000	N-S(1):	0.211 *
	TH	2.00	244	3,200	0.076	N-S(2):	0.132
	LT	1.00	126	1,600	0.079 *	E-W(1):	0.391
Westbound	RT	1.00	87	1,600	0.015	E-W(2):	0.414 *
	TH	2.00	995	3,200	0.311 *		
	LT	1.00	107	1,600	0.067	V/C:	0.625
Northbound	RT	1.00	265	1,600	0.132 *	Lost Time:	0.100
	TH	2.00	296	3,200	0.093	ITS:	0.000
	LT	1.00	90	1,600	0.056		
Eastbound	RT	1.00	83	1,600	0.024	ICU:	0.725
	TH	2.00	1,038	3,200	0.324		
	LT	1.00	165	1,600	0.103 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **EXISTING CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	152	1,600	0.056	N-S(1):	0.193 *
	TH	2.00	321	3,200	0.100 *	N-S(2):	0.193 *
	LT	1.00	137	1,600	0.086 *	E-W(1):	0.359
Westbound	RT	1.00	91	1,600	0.014	E-W(2):	0.388 *
	TH	2.00	992	3,200	0.310 *		
	LT	1.00	185	1,600	0.116	V/C:	0.581
Northbound	RT	1.00	156	1,600	0.040	Lost Time:	0.100
	TH	2.00	341	3,200	0.107 *	ITS:	0.000
	LT	1.00	148	1,600	0.093 *		
Eastbound	RT	1.00	118	1,600	0.028	ICU:	0.681
	TH	2.00	779	3,200	0.243		
	LT	1.00	124	1,600	0.078 *	LOS:	B

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	118	1,600	0.023	N-S(1):	0.218
	TH	2.00	414	3,200	0.129 *	N-S(2):	0.238 *
	LT	1.00	173	1,600	0.108	E-W(1):	0.436 *
Westbound	RT	1.00	112	1,600	0.016	E-W(2):	0.361
	TH	2.00	824	3,200	0.258		
	LT	1.00	169	1,600	0.106 *	V/C:	0.674
Northbound	RT	1.00	153	1,600	0.043	Lost Time:	0.100
	TH	2.00	352	3,200	0.110	ITS:	0.000
	LT	1.00	174	1,600	0.109 *		
Eastbound	RT	1.00	173	1,600	0.054	ICU:	0.774
	TH	2.00	1,057	3,200	0.330 *		
	LT	1.00	164	1,600	0.103	LOS:	C

* - Denotes critical movement

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	62	381	179	116	351	354	109	675	63	445	1020	104
AMBIENT												
RELATED												
PROJECT												
TOTAL	62	381	179	116	351	354	109	675	63	445	1020	104
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 354
B: 116

EastBound
A: 510
B: 445

WestBound
A: 338
B: 109

NorthBound
A: 191
B: 62

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{62 + 354 + 338 + 445}{1500} = 0.799$$

LOS = C

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: Lomita Bl I/S No: 7

AM/PM: PM Comments: EXPM

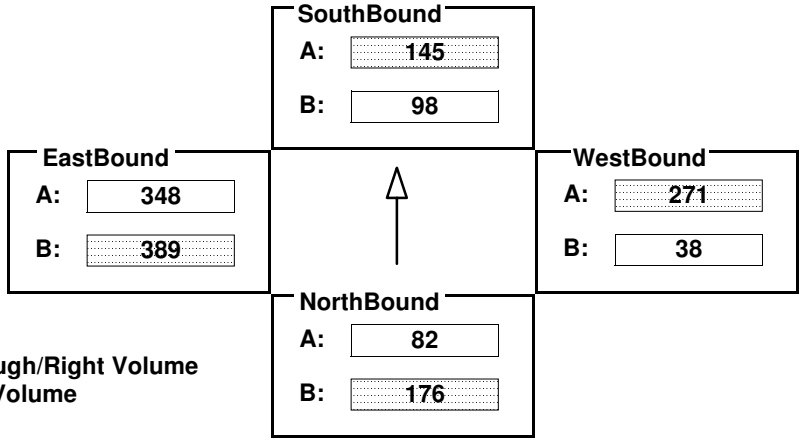
COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	176	163	36	98	180	145	38	542	50	389	695	180
AMBIENT												
RELATED												
PROJECT												
TOTAL	176	163	36	98	180	145	38	542	50	389	695	180
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{176 + 145 + 271 + 389}{1500} = 0.654$$

LOS = B

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Main St/Wilmington Bl W/E: Lomita Bl I/S No: 8

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	73	404	58	104	470	199	82	359	46	102	401	48
AMBIENT												
RELATED												
PROJECT												
TOTAL	73	404	58	104	470	199	82	359	46	102	401	48
LANE	1	1	1	1	2	1	1			1		
SIGNAL	Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: OLA		Phasing: Split	RTOR: Auto		Phasing: Split	RTOR: Auto	

Critical Movements Diagram

SouthBound
A: 235
B: 104

EastBound
A: 551
B: 102

WestBound
A: 487
B: 82

NorthBound
A: 231
B: 73

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{231 + 104 + 487 + 551}{1425} = 0.964$$

LOS = E

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	229	394	237	66	154	87	83	752	466	871	1294	75
AMBIENT												
RELATED												
PROJECT												
TOTAL	229	394	237	66	154	87	83	752	466	871	1294	75
LANE	1	1	1	1	1	1	1	2	1	2	1	1

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 154
B: 66

EastBound
A: 685
B: 479

WestBound
A: 466
B: 83

NorthBound
A: 316
B: 229

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{229 + 154 + 466 + 479}{1425} = 0.932$$

LOS = E

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1010 I-110 Ramps/C St & Figueroa St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.648
Loss Time (sec):	0	Average Delay (sec/veh):	13.6
Optimal Cycle:	0	Level Of Service:	B

Street Name:	Figueroa St							I-110 Ramps/C St					
Approach:	North Bound			South Bound			East Bound			West Bound			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R	
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign			
Rights:	Include			Include			Include			Include			
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	
Lanes:	1 0	2 0	0	0 0	1 1	0	1 0	1! 0	1	0 0	0 0	1	
Volume Module:													
Base Vol:	327	133	0	0	122	88	155	0	394	0	0	1	
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Initial Bse:	327	133	0	0	122	88	155	0	394	0	0	1	
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Volume:	327	133	0	0	122	88	155	0	394	0	0	1	
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0	
Reduced Vol:	327	133	0	0	122	88	155	0	394	0	0	1	
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
FinalVolume:	327	133	0	0	122	88	155	0	394	0	0	1	
Saturation Flow Module:													
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lanes:	1.00	2.00	0.00	0.00	1.16	0.84	1.00	0.00	2.00	0.00	0.00	1.00	
Final Sat.:	505	1069	0	0	616	479	1143	xxxx	1880	0	0	499	
Capacity Analysis Module:													
Vol/Sat:	0.65	0.12	xxxx	xxxx	0.20	0.18	0.14	0.00	0.21	xxxx	xxxx	0.00	
Crit Moves:	****				****				****			****	
Delay/Veh:	21.1	10.1	0.0	0.0	10.7	9.9	11.3	10.5	10.6	0.0	0.0	9.5	
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
AdjDel/Veh:	21.1	10.1	0.0	0.0	10.7	9.9	11.3	10.5	10.6	0.0	0.0	9.5	
LOS by Move:	C	B	*	*	B	A	B	B	B	*	*	A	
ApproachDel:	17.9			10.4			11.2			9.5			
Delay Adj:	1.00			1.00			1.00			1.00			
ApprAdjDel:	17.9			10.4			11.2			9.5			
LOS by Appr:	C			B			B			A			
AllWayAvgQ:	1.6	0.1	0.0	0.0	0.2	0.2	0.4	0.4	0.4	0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St/TraPAC Gate W/E: Harry Bridge Bl I/S No: 11

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	28	41	28	248	86	131	72	554	330	70	403	20
AMBIENT												
RELATED												
PROJECT												
TOTAL	28	41	28	248	86	131	72	554	330	70	403	20
LANE		1			1			1		2			1		1		1		1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 131
B: 248

EastBound
A: 212
B: 70

WestBound
A: 330
B: 72

NorthBound
A: 49
B: 28

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{49 + 248 + 330 + 70}{1500} = 0.465$$

LOS = A

Developed by Chun Wong, 12/94

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Fries Av W/E: Harry Bridge Bl I/S No: 12

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	142	26	58	12	9	50	4	687	10	42	610	22
AMBIENT												
RELATED												
PROJECT												
TOTAL	142	26	58	12	9	50	4	687	10	42	610	22
LANE	1				1			1			1			1				1			1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 59
B: 12

EastBound
A: 400
B: 42

WestBound
A: 357
B: 4

NorthBound
A: 84
B: 142

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{142 + 59 + 4 + 400}{1500} = 0.403$$

LOS = A

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING		443	1958		1334		1662		119			
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	443	1958	0	1334	0	1662	0	119			
LANE		2	2		3		2		1			
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Free		Perm			Split					

Critical Movements Diagram

SouthBound
A: 445
B: 0

EastBound
A: 0
B: 0

WestBound
A: 594
B: 594

NorthBound
A: 222
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 445 + 594 + 0}{1500} = 0.693$$

LOS = B

Developed by Chun Wong, 12/94

EXPM

March 11, 2010 ,Thursday 04:58:46 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	61	961	37	81	1129	145	82	241	61	179	240	61
AMBIENT												
RELATED												
PROJECT												
TOTAL	61	961	37	81	1129	145	82	241	61	179	240	61
LANE	1	1	1	1	1	1	1	1	1	1	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 637
B: 81

EastBound
A: 240
B: 179

WestBound
A: 302
B: 82

NorthBound
A: 499
B: 61

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{61 + 637 + 302 + 179}{1500} = 0.786$$

LOS = C

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.211
Loss Time (sec):	0	Average Delay (sec/veh):	9.1
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 2 0 1			1 0 1 0 1		
Volume Module:												
Base Vol:	24	13	5	16	21	78	6	166	9	108	137	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	24	13	5	16	21	78	6	166	9	108	137	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	24	13	5	16	21	78	6	166	9	108	137	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	24	13	5	16	21	78	6	166	9	108	137	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	24	13	5	16	21	78	6	166	9	108	137	13
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.72	0.28	1.00	0.21	0.79	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	544	439	169	556	141	524	575	1251	711	596	650	741
Capacity Analysis Module:												
Vol/Sat:	0.04	0.03	0.03	0.03	0.15	0.15	0.01	0.13	0.01	0.18	0.21	0.02
Crit Moves:	****					****		****			****	
Delay/Veh:	9.2	8.4	8.4	9.0	8.6	8.6	8.8	9.0	7.6	9.8	9.4	7.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.2	8.4	8.4	9.0	8.6	8.6	8.8	9.0	7.6	9.8	9.4	7.4
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.9			8.7			8.9			9.5		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.9			8.7			8.9			9.5		
LOS by Appr:	A			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.0	0.2	0.2	0.0

Note: Queue reported is the number of cars per lane.

```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #1016 Western Ave & Paseo del Mar
******************************************************************************
Average Delay (sec/veh):      2.1       Worst Case Level Of Service: B[ 11.8]
******************************************************************************
Street Name:           Western Ave                      Paseo del Mar
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    44    0    33    56  192     0     0  256    67
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    44    0    33    56  192     0     0  256    67
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    44    0    33    56  192     0     0  256    67
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    44    0    33    56  192     0     0  256    67
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   560 xxxx   256   323 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   493 xxxx   788  1248 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   476 xxxx   788  1248 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.09 xxxx  0.04  0.04 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.3 xxxx   0.1   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  13.3 xxxx   9.8   8.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     A     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx             11.8           xxxxxx           xxxxxx
ApproachLOS:         *                B                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	79	1032	31	101	701	95	34	113	171	157	131	69
AMBIENT												
RELATED												
PROJECT												
TOTAL	79	1032	31	101	701	95	34	113	171	157	131	69

LANE	1		1		1			1		1		1			1		1			1		1		1	0	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 398
B: 101

EastBound
A: 100
B: 157

WestBound
A: 120
B: 34

NorthBound
A: 532
B: 79

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{532 + 101 + 120 + 157}{1425} = 0.639$$

LOS = B

Developed by Chun Wong, 12/94

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St | W/E: SR-47 EB On/Off Ramps | I/S No: 18

AM/PM: PM | Comments: EXPM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	391	440	3	107	0	112	0	2			
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	391	440	3	107	0	112	0	2			
LANE			1			1	1	2			1	1							
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Var	Auto		Prot-Var			Split	OLA				

Critical Movements Diagram

SouthBound
A: 54
B: 3

EastBound
A: 0
B: 0

WestBound
A: 57
B: 57

NorthBound
A: 411
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{411 + 3 + 57 + 0}{1375} = 0.343$$

LOS = A

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Pilchard St I/S No: 19

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

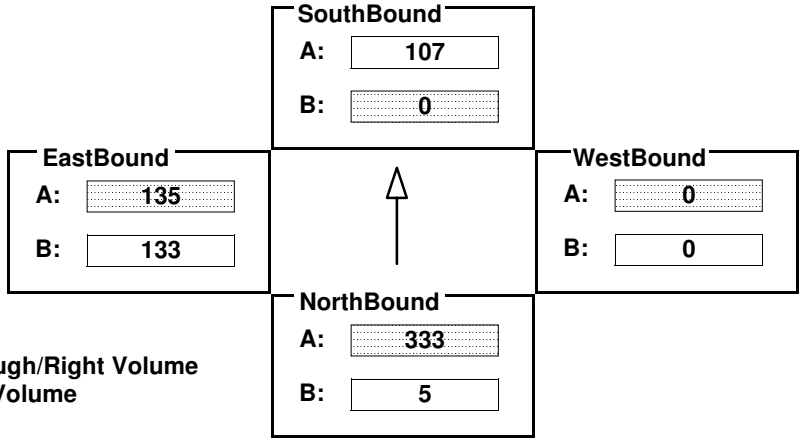
Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	5	665	0	0	200	13				133		2
AMBIENT												
RELATED												
PROJECT												
TOTAL	5	665	0	0	200	13	0	0	0	133	0	2

LANE	1		2					1		1		1														1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm		Perm	Auto			Split	

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{333 + 0 + 0 + 135}{1500} = 0.312$$

LOS = A

CalcaDB

October 24, 2011 ,Monday 05:58:09 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Terminal Way I/S No: 20

AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

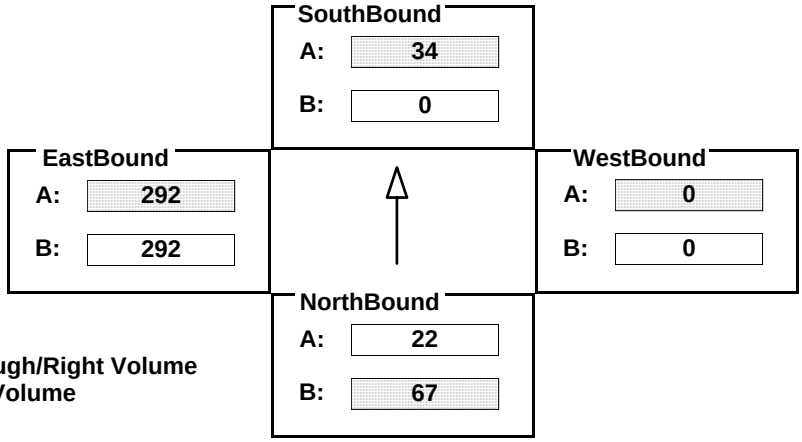
Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	67	44	0	0	34	174				582	2	83
AMBIENT												
RELATED												
PROJECT												
TOTAL	67	44	0	0	34	174				582	2	83

LANE	1		2			1		1		1			1											1	1				1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm	OLA			Split	Free

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{67 + 34 + 0 + 292}{1500} = 0.262$$

LOS = A

CalcaDB

March 11, 2010 ,Thursday 04:58:46 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Earle St | W/E: Terminal Way | I/S No: 21

AM/PM: PM | Comments: EXPM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	2	19	172	1	12	1	119	96	3	4	485	3
AMBIENT												
RELATED												
PROJECT												
TOTAL	2	19	172	1	12	1	119	96	3	4	485	3
LANE		1			1			1			1		1		1		1		1		1		1		1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 7
B: 1

EastBound
A: 244
B: 4

WestBound
A: 50
B: 119

NorthBound
A: 172
B: 2

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{172 + 1 + 119 + 244}{1500} = 0.357$$

LOS = A

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Navy Wy W/E: Ocean Bl/Seaside Av I/S No: 22

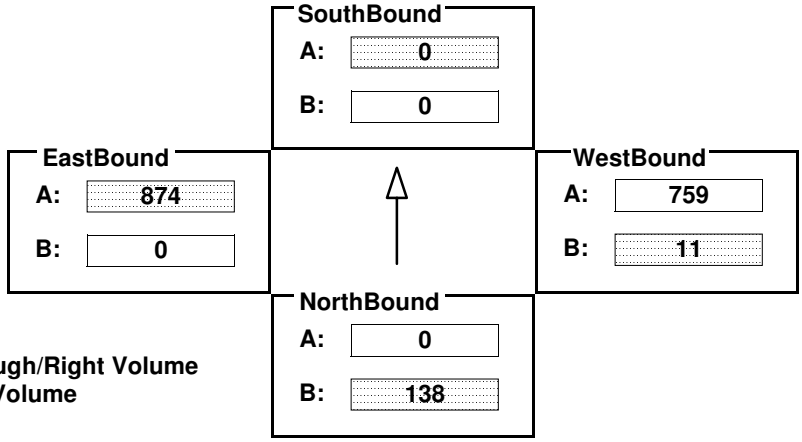
AM/PM: PM Comments: EXPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	251	0	707				20	2277	0	0	2621	190
AMBIENT												
RELATED												
PROJECT												
TOTAL	251	0	707				20	2277	0	0	2621	190
LANE	2					1							2		3							3		1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Split	Free					Prot-Fix			Prot-Fix	OLA	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{138 + 0 + 11 + 874}{1425} = 0.718$$

LOS = C

CUMULATIVE BASE (2017) LEVEL OF SERVICE WORKSHEETS

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	131	487	643	213	430	167	397	1789	95	119	1455	17
AMBIENT												
RELATED												
PROJECT												
TOTAL	131	487	643	213	430	167	397	1789	95	119	1455	17
LANE	1	2	1	1	2	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	OLA		Prot-Fix	Auto		Prot-Fix	Auto		Prot-Fix	Auto	

Critical Movements Diagram

SouthBound
A: 215
B: 213

EastBound
A: 491
B: 119

WestBound
A: 628
B: 397

NorthBound
A: 246
B: 131

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{246 + 213 + 397 + 491}{1375} = 0.980$$

LOS = E

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	45	228	31	1011	1	1271	247	0	2185	55
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	45	228	31	1011	1	1271	247	0	2185	55

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 556
B: 130

EastBound
A: 747
B: 0

WestBound
A: 380
B: 0

NorthBound
A: 45
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{45 + 556 + 0 + 747}{1500} = 0.899$$

LOS = D

Project Title: LA07-2153 JWPCP Outfall System MFP
Intersection: Sepulveda Bl & NB I-110 Off Ramp
Description: 2017 ALT 1&2 NO PROJECT CONDITIONS

Date/Time: AM PEAK HOUR (7:30-8:30)

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.299
	TH	0.00	0	0	0.000	N-S(2):	0.305 *
	LT	0.00	0	0	0.000	E-W(1):	0.151
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.334 *
	TH	3.00	1,519	4,800	0.318 *		
	LT	0.00	0	0	0.000	V/C:	0.639
Northbound	RT	1.00	262	1,600	0.164	Lost Time:	0.100
	TH	1.00	14	1,600	0.299	ITS:	0.000
	LT	0.00	465	1,600	0.291 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.739
	TH	3.00	723	4,800	0.151		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: PM PEAK HOUR (5:00-6:00)

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	120	1,600	0.075 *	N-S(1):	0.249
	TH	0.00	0	0	0.000	N-S(2):	0.307 *
	LT	0.00	0	0	0.000	E-W(1):	0.251
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.321 *
	TH	3.00	1,223	4,800	0.258 *		
	LT	0.00	2	1,600	0.001	V/C:	0.628
Northbound	RT	1.00	179	1,600	0.111	Lost Time:	0.100
	TH	1.00	27	1,600	0.249	ITS:	0.000
	LT	0.00	371	1,600	0.232 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.728
	TH	3.00	1,194	4,800	0.250		
	LT	1.00	100	1,600	0.063 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	236	1,600	0.000	N-S(1):	0.155
	TH	2.00	279	3,200	0.087 *	N-S(2):	0.181 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.336
Westbound	RT	1.00	126	1,600	0.054	E-W(2):	0.458 *
	TH	2.00	1,164	3,200	0.364 *		
	LT	1.00	133	1,600	0.083	V/C:	0.639
Northbound	RT	1.00	215	1,600	0.093	Lost Time:	0.100
	TH	2.00	339	3,200	0.106	ITS:	0.000
	LT	1.00	151	1,600	0.094 *		
Eastbound	RT	1.00	47	1,600	0.000	ICU:	0.739
	TH	2.00	809	3,200	0.253		
	LT	1.00	151	1,600	0.094 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	118	1,600	0.000	N-S(1):	0.222 *
	TH	2.00	256	3,200	0.080	N-S(2):	0.139
	LT	1.00	134	1,600	0.084 *	E-W(1):	0.410
Westbound	RT	1.00	91	1,600	0.015	E-W(2):	0.437 *
	TH	2.00	1,052	3,200	0.329 *		
	LT	1.00	112	1,600	0.070	V/C:	0.659
Northbound	RT	1.00	277	1,600	0.138 *	Lost Time:	0.100
	TH	2.00	312	3,200	0.098	ITS:	0.000
	LT	1.00	94	1,600	0.059		
Eastbound	RT	1.00	87	1,600	0.025	ICU:	0.759
	TH	2.00	1,089	3,200	0.340		
	LT	1.00	173	1,600	0.108 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	159	1,600	0.059	N-S(1):	0.202
	TH	2.00	342	3,200	0.107 *	N-S(2):	0.205 *
	LT	1.00	143	1,600	0.089	E-W(1):	0.378
Westbound	RT	1.00	95	1,600	0.015	E-W(2):	0.405 *
	TH	2.00	1,038	3,200	0.324 *		
	LT	1.00	193	1,600	0.121	V/C:	0.610
Northbound	RT	1.00	163	1,600	0.042	Lost Time:	0.100
	TH	2.00	360	3,200	0.113	ITS:	0.000
	LT	1.00	156	1,600	0.098 *		
Eastbound	RT	1.00	123	1,600	0.028	ICU:	0.710
	TH	2.00	821	3,200	0.257		
	LT	1.00	130	1,600	0.081 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	123	1,600	0.023	N-S(1):	0.232
	TH	2.00	445	3,200	0.139 *	N-S(2):	0.253 *
	LT	1.00	181	1,600	0.113	E-W(1):	0.458 *
Westbound	RT	1.00	117	1,600	0.017	E-W(2):	0.380
	TH	2.00	873	3,200	0.273		
	LT	1.00	177	1,600	0.111 *	V/C:	0.711
Northbound	RT	1.00	160	1,600	0.045	Lost Time:	0.100
	TH	2.00	381	3,200	0.119	ITS:	0.000
	LT	1.00	182	1,600	0.114 *		
Eastbound	RT	1.00	182	1,600	0.057	ICU:	0.811
	TH	2.00	1,109	3,200	0.347 *		
	LT	1.00	171	1,600	0.107	LOS:	D

* - Denotes critical movement

NPAM12

March 25, 2010 ,Thursday 10:34:30 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Lomita Bl | I/S No: 6

AM/PM: AM | Comments: 2017NPAM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	71	512	146	54	335	426	178	985	159	538	756	109
AMBIENT												
RELATED												
PROJECT												
TOTAL	71	512	146	54	335	426	178	985	159	538	756	109
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 426
B: 54

EastBound
A: 378
B: 538

WestBound
A: 493
B: 178

NorthBound
A: 256
B: 71

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{71 + 426 + 493 + 538}{1500} = 1.019$$

LOS = F

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	258	1,600	0.058 *	N-S(1):	0.097
	TH	2.00	123	3,200	0.038	N-S(2):	0.212 *
	LT	1.00	54	1,600	0.034	E-W(1):	0.188
Westbound	RT	1.00	97	1,600	0.044	E-W(2):	0.467 *
	TH	2.00	832	3,200	0.260 *		
	LT	1.00	36	1,600	0.023	V/C:	0.679
Northbound	RT	1.00	29	1,600	0.007	Lost Time:	0.100
	TH	2.00	203	3,200	0.063	ITS:	0.000
	LT	1.00	246	1,600	0.154 *		
Eastbound	RT	1.00	104	1,600	0.000	ICU:	0.779
	TH	2.00	527	3,200	0.165		
	LT	1.00	331	1,600	0.207 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	152	1,600	0.000	N-S(1):	0.118
	TH	2.00	189	3,200	0.059 *	N-S(2):	0.174 *
	LT	1.00	102	1,600	0.064	E-W(1):	0.271
Westbound	RT	1.00	52	1,600	0.001	E-W(2):	0.442 *
	TH	2.00	602	3,200	0.188 *		
	LT	1.00	40	1,600	0.025	V/C:	0.616
Northbound	RT	1.00	38	1,600	0.011	Lost Time:	0.100
	TH	2.00	173	3,200	0.054	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	188	1,600	0.060	ICU:	0.716
	TH	2.00	787	3,200	0.246		
	LT	1.00	407	1,600	0.254 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	243	1,600	0.077	N-S(1):	0.228 *
	TH	2.00	278	3,200	0.087	N-S(2):	0.173
	LT	1.00	84	1,600	0.053 *	E-W(1):	0.149
Westbound	RT	1.00	46	1,600	0.003	E-W(2):	0.232 *
	TH	2.00	502	3,200	0.157 *		
	LT	1.00	63	1,600	0.039	V/C:	0.460
Northbound	RT	0.00	85	0	0.000	Lost Time:	0.100
	TH	2.00	474	3,200	0.175 *	ITS:	0.000
	LT	1.00	138	1,600	0.086		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.560
	TH	2.00	351	3,200	0.110		
	LT	1.00	120	1,600	0.075 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	208	1,600	0.046	N-S(1):	0.241 *
	TH	2.00	493	3,200	0.154	N-S(2):	0.202
	LT	1.00	137	1,600	0.086 *	E-W(1):	0.203
Westbound	RT	1.00	48	1,600	0.000	E-W(2):	0.212 *
	TH	2.00	410	3,200	0.128 *		
	LT	1.00	97	1,600	0.061	V/C:	0.453
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	435	3,200	0.155 *	ITS:	0.000
	LT	1.00	76	1,600	0.048		
Eastbound	RT	1.00	50	1,600	0.008	ICU:	0.553
	TH	2.00	453	3,200	0.142		
	LT	1.00	134	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

March 25, 2010 ,Thursday 10:34:30 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: AM Comments: 2017NPAM

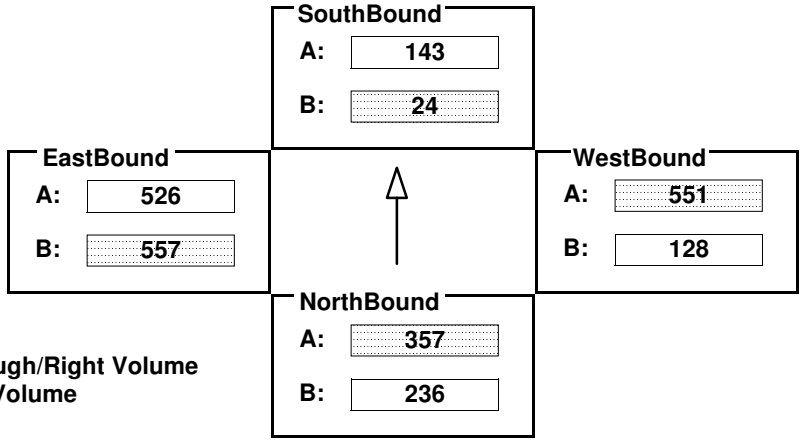
COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	236	505	210	24	143	62	128	1138	515	1013	962	89
AMBIENT												
RELATED												
PROJECT												
TOTAL	236	505	210	24	143	62	128	1138	515	1013	962	89
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{357 + 24 + 551 + 557}{1425} = 1.045$$

LOS = F

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: C St I/S No: 10

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	63	32	566	74	68	159	759	336	92	130	209	236
AMBIENT												
RELATED												
PROJECT												
TOTAL	63	32	566	74	68	159	759	336	92	130	209	236
LANE	2	2	1	1	1	1	2	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Free	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Free

Critical Movements Diagram

SouthBound
A: 159
B: 74

EastBound
A: 105
B: 130

WestBound
A: 168
B: 417

NorthBound
A: 16
B: 35

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{35 + 159 + 417 + 105}{1200} = 0.597$$

LOS = A

CalcaDB

March 25, 2010 ,Thursday 10:34:30 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Fries Av W/E: Harry Bridge Bl I/S No: 12

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	67	27	15	19	34	62	3	988	18	94	765	51
AMBIENT												
RELATED												
PROJECT												
TOTAL	67	27	15	19	34	62	3	988	18	94	765	51

LANE	1				1			1				1					1			1				1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 96
B: 19

EastBound
A: 690
B: 94

WestBound
A: 509
B: 3

NorthBound
A: 42
B: 67

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{67 + 96 + 3 + 690}{1500} = 0.571$$

LOS = A

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	697	2970	0	1110	0	1673	0	113	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	697	2970	0	1110	0	1673	0	113	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 370
B: 0

EastBound
A: 0
B: 0

WestBound
A: 595
B: 595

NorthBound
A: 349
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 370 + 595 + 0}{1500} = 0.643$$

LOS = B

CalcaDB

March 25, 2010 ,Thursday 10:34:30 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	85	1313	31	52	1025	150	66	282	64	253	339	65
AMBIENT												
RELATED												
PROJECT												
TOTAL	85	1313	31	52	1025	150	66	282	64	253	339	65
LANE	1	1	1	1	1	1	1	1	1	1	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 588
B: 52

EastBound
A: 339
B: 253

WestBound
A: 347
B: 66

NorthBound
A: 672
B: 85

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{672 + 52 + 347 + 253}{1500} = 0.883$$

LOS = D

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.144
Loss Time (sec):	0	Average Delay (sec/veh):	8.5
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 2 0 1			1 0 1 0 1		
Volume Module:												
Base Vol:	7	10	4	6	18	71	85	130	5	7	95	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	7	10	4	6	18	71	85	130	5	7	95	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	7	10	4	6	18	71	85	130	5	7	95	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	10	4	6	18	71	85	130	5	7	95	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	10	4	6	18	71	85	130	5	7	95	13
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.71	0.29	1.00	0.20	0.80	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	579	466	186	589	144	570	631	1382	796	603	660	754
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.02	0.01	0.12	0.12	0.13	0.09	0.01	0.01	0.14	0.02
Crit Moves:	****					****	****				****	
Delay/Veh:	8.7	8.0	8.0	8.6	8.1	8.1	9.1	8.3	7.1	8.5	8.8	7.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.7	8.0	8.0	8.6	8.1	8.1	9.1	8.3	7.1	8.5	8.8	7.3
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.2			8.1			8.6			8.6		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.2			8.1			8.6			8.6		
LOS by Appr:	A			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 3.4 Worst Case Level Of Service: B[11.4]

Street Name:	Western Ave									Paseo del Mar							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1
Volume Module:																				
Base Vol:	0	0	0			78	0			69	63	176			0	0	183			79
Growth Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
Initial Bse:	0	0	0			78	0			69	63	176			0	0	183			79
User Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Volume:	0	0	0			78	0			69	63	176			0	0	183			79
Reduct Vol:	0	0	0			0	0			0	0	0			0	0	0			0
FinalVolume:	0	0	0			78	0			69	63	176			0	0	183			79
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	xxxx			6.2	4.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	xxxx			3.3	2.2	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			485	xxxx			183	262	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Potent Cap.:	xxxx	xxxx	xxxxx			545	xxxx			865	1314	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Move Cap.:	xxxx	xxxx	xxxxx			525	xxxx			865	1314	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Volume/Cap:	xxxx	xxxx	xxxx			0.15	xxxx			0.08	0.05	xxxx	xxxx		xxxx	xxxx	xxxx			
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			0.5	xxxx			0.3	0.2	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx			13.1	xxxx			9.5	7.9	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
LOS by Move:	*	*	*			B	*			A	A	*	*		*	*	*			
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*			*	*	*			*	*	*			*	*	*		
ApproachDel:	xxxxxx					11.4					xxxxxx					xxxxxx				
ApproachLOS:	*					B					*					*				

Note: Queue reported is the number of cars per lane.

CalcaDB

March 25, 2010 ,Thursday 10:34:30 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	73	798	27	192	1124	104	20	131	144	117	182	97
AMBIENT												
RELATED												
PROJECT												
TOTAL	73	798	27	192	1124	104	20	131	144	117	182	97
LANE	1	1	1	1	1	1	1	1	1	1	1	0
SIGNAL	Phasing: Prot-Fix	RTOR: Auto		Phasing: Prot-Fix	RTOR: Auto		Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto	

Critical Movements Diagram

SouthBound
A: 614
B: 192

EastBound
A: 140
B: 117

WestBound
A: 131
B: 20

NorthBound
A: 413
B: 73

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{73 + 614 + 131 + 117}{1425} = 0.656$$

LOS = B

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CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: SR-47 EB On/Off Ramps I/S No: 18

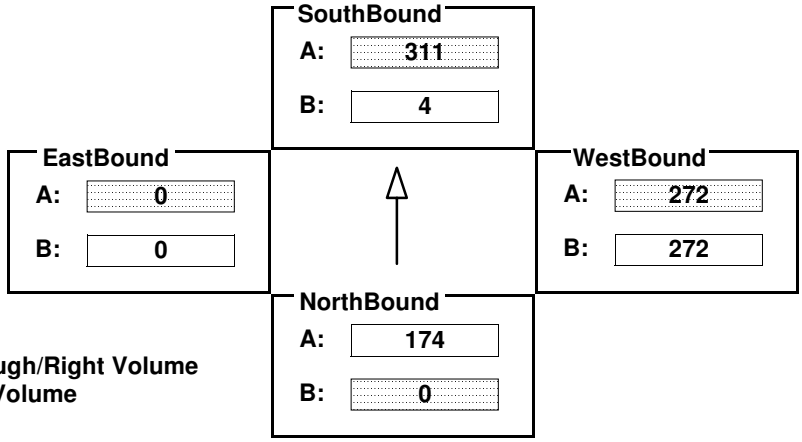
AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	174	289	4	622	0	541	0	2	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	174	289	4	622	0	541	0	2	0	0	0
LANE			1			1	1	2			1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Var	Auto		Prot-Var			Split	OLA				

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 311 + 272 + 0}{1375} = 0.424$$

LOS = A

NPAM12

March 25, 2010 ,Thursday 10:34:30 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Pilchard St I/S No: 19

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

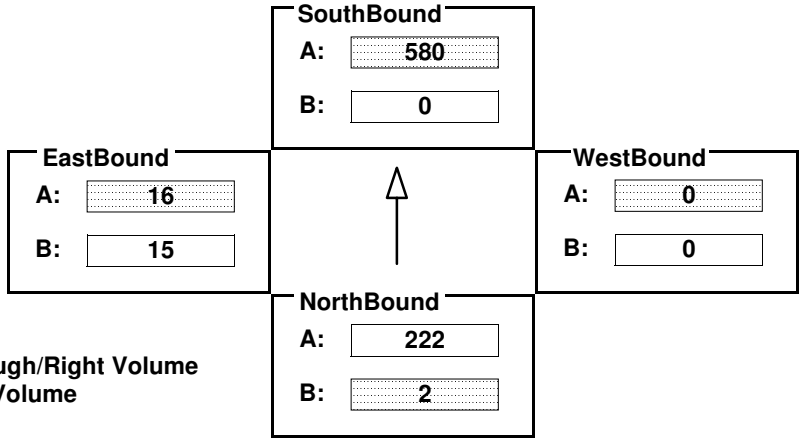
Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	2	444	0	0	1059	100	0	0	0	15	0	1
AMBIENT												
RELATED												
PROJECT												
TOTAL	2	444	0	0	1059	100	0	0	0	15	0	1

LANE	1		2					1		1		1																1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm		Perm	Auto			Split	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{2 + 580 + 0 + 16}{1500} = 0.399$$

LOS = A

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CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Terminal Way I/S No: 20

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	52	84	1	0	109	954				351	1	27
AMBIENT												
RELATED												
PROJECT												
TOTAL	52	84	1	0	109	954	0	0	0	351	1	27

LANE	1		2			1		1		1			1										1	1				1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm	OLA			Split	Free

Critical Movements Diagram

SouthBound
A: 778
B: 0

EastBound
A: 176
B: 176

WestBound
A: 0
B: 0

NorthBound
A: 42
B: 52

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{52 + 778 + 0 + 176}{1500} = 0.671$$

LOS = B

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Earle St W/E: Terminal Way I/S No: 21

AM/PM: AM Comments: 2017NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	2	58	2	9	1	259	730	4	4	300	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	2	58	2	9	1	259	730	4	4	300	0
LANE		1			1			1			1		1		1		1		1		1		1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 6
B: 2

EastBound
A: 150
B: 4

WestBound
A: 367
B: 259

NorthBound
A: 58
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{58 + 2 + 259 + 150}{1500} = 0.313$$

LOS = A

CalcaDB

March 25, 2010 ,Thursday 10:34:30 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Navy Wy | W/E: Ocean Bl/Seaside Av | I/S No: 22

AM/PM: AM | Comments: 2017NPAM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	286	0	316	0	0	0	79	2619	0	0	2447	376
AMBIENT												
RELATED												
PROJECT												
TOTAL	286	0	316	0	0	0	79	2619	0	0	2447	376
LANE	2					1							2		3							3			1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Split	Free					Prot-Fix			Prot-Fix	OLA	

Critical Movements Diagram

SouthBound
A: 0
B: 0

EastBound
A: 816
B: 0

WestBound
A: 873
B: 44

NorthBound
A: 0
B: 157

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{157 + 0 + 873 + 0}{1425} = 0.723$$

LOS = C

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CalcaDB

March 25, 2010 ,Thursday 10:38:19 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	102	397	558	209	581	170	371	1553	120	138	1607	52
AMBIENT												
RELATED												
PROJECT												
TOTAL	102	397	558	209	581	170	371	1553	120	138	1607	52
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 291
B: 209

EastBound
A: 553
B: 138

WestBound
A: 558
B: 371

NorthBound
A: 199
B: 102

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{199 + 209 + 371 + 553}{1375} = 0.969$$

LOS = E

CalcaDB

October 24, 2011 ,Monday 06:51:10 PM

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	43	358	46	818	2	1139	211	0	2316	53
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	43	358	46	818	2	1139	211	0	2316	53

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 450
B: 202

EastBound
A: 790
B: 0

WestBound
A: 338
B: 0

NorthBound
A: 43
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{43 + 450 + 0 + 790}{1500} = 0.855$$

LOS = D

Project Title: LA07-2153 JWPCP Outfall System MFP
Intersection: Sepulveda Bl & NB I-110 Off Ramp
Description: 2017 ALT 1&2 NO PROJECT CONDITIONS

Date/Time: AM PEAK HOUR (7:30-8:30)

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.299
	TH	0.00	0	0	0.000	N-S(2):	0.305 *
	LT	0.00	0	0	0.000	E-W(1):	0.151
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.334 *
	TH	3.00	1,519	4,800	0.318 *		
	LT	0.00	0	0	0.000	V/C:	0.639
Northbound	RT	1.00	262	1,600	0.164	Lost Time:	0.100
	TH	1.00	14	1,600	0.299	ITS:	0.000
	LT	0.00	465	1,600	0.291 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.739
	TH	3.00	723	4,800	0.151		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: PM PEAK HOUR (5:00-6:00)

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	120	1,600	0.075 *	N-S(1):	0.249
	TH	0.00	0	0	0.000	N-S(2):	0.307 *
	LT	0.00	0	0	0.000	E-W(1):	0.251
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.321 *
	TH	3.00	1,223	4,800	0.258 *		
	LT	0.00	2	1,600	0.001	V/C:	0.628
Northbound	RT	1.00	179	1,600	0.111	Lost Time:	0.100
	TH	1.00	27	1,600	0.249	ITS:	0.000
	LT	0.00	371	1,600	0.232 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.728
	TH	3.00	1,194	4,800	0.250		
	LT	1.00	100	1,600	0.063 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	236	1,600	0.000	N-S(1):	0.155
	TH	2.00	279	3,200	0.087 *	N-S(2):	0.181 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.336
Westbound	RT	1.00	126	1,600	0.054	E-W(2):	0.458 *
	TH	2.00	1,164	3,200	0.364 *		
	LT	1.00	133	1,600	0.083	V/C:	0.639
Northbound	RT	1.00	215	1,600	0.093	Lost Time:	0.100
	TH	2.00	339	3,200	0.106	ITS:	0.000
	LT	1.00	151	1,600	0.094 *		
Eastbound	RT	1.00	47	1,600	0.000	ICU:	0.739
	TH	2.00	809	3,200	0.253		
	LT	1.00	151	1,600	0.094 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	118	1,600	0.000	N-S(1):	0.222 *
	TH	2.00	256	3,200	0.080	N-S(2):	0.139
	LT	1.00	134	1,600	0.084 *	E-W(1):	0.410
Westbound	RT	1.00	91	1,600	0.015	E-W(2):	0.437 *
	TH	2.00	1,052	3,200	0.329 *		
	LT	1.00	112	1,600	0.070	V/C:	0.659
Northbound	RT	1.00	277	1,600	0.138 *	Lost Time:	0.100
	TH	2.00	312	3,200	0.098	ITS:	0.000
	LT	1.00	94	1,600	0.059		
Eastbound	RT	1.00	87	1,600	0.025	ICU:	0.759
	TH	2.00	1,089	3,200	0.340		
	LT	1.00	173	1,600	0.108 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	159	1,600	0.059	N-S(1):	0.202
	TH	2.00	342	3,200	0.107 *	N-S(2):	0.205 *
	LT	1.00	143	1,600	0.089	E-W(1):	0.378
Westbound	RT	1.00	95	1,600	0.015	E-W(2):	0.405 *
	TH	2.00	1,038	3,200	0.324 *		
	LT	1.00	193	1,600	0.121	V/C:	0.610
Northbound	RT	1.00	163	1,600	0.042	Lost Time:	0.100
	TH	2.00	360	3,200	0.113	ITS:	0.000
	LT	1.00	156	1,600	0.098 *		
Eastbound	RT	1.00	123	1,600	0.028	ICU:	0.710
	TH	2.00	821	3,200	0.257		
	LT	1.00	130	1,600	0.081 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	123	1,600	0.023	N-S(1):	0.232
	TH	2.00	445	3,200	0.139 *	N-S(2):	0.253 *
	LT	1.00	181	1,600	0.113	E-W(1):	0.458 *
Westbound	RT	1.00	117	1,600	0.017	E-W(2):	0.380
	TH	2.00	873	3,200	0.273		
	LT	1.00	177	1,600	0.111 *	V/C:	0.711
Northbound	RT	1.00	160	1,600	0.045	Lost Time:	0.100
	TH	2.00	381	3,200	0.119	ITS:	0.000
	LT	1.00	182	1,600	0.114 *		
Eastbound	RT	1.00	182	1,600	0.057	ICU:	0.811
	TH	2.00	1,109	3,200	0.347 *		
	LT	1.00	171	1,600	0.107	LOS:	D

* - Denotes critical movement

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: PM Comments: 2017NPPM

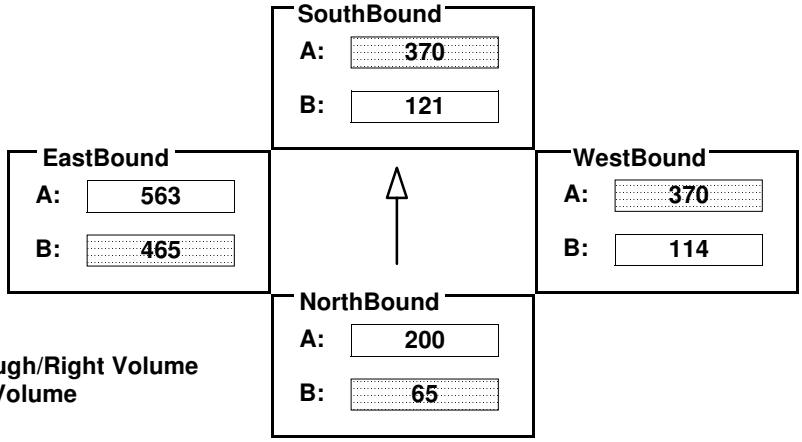
COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	65	400	187	121	368	370	114	741	66	465	1126	109
AMBIENT												
RELATED												
PROJECT												
TOTAL	65	400	187	121	368	370	114	741	66	465	1126	109
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{65 + 370 + 370 + 465}{1500} = 0.847$$

LOS = D

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	258	1,600	0.058 *	N-S(1):	0.097
	TH	2.00	123	3,200	0.038	N-S(2):	0.212 *
	LT	1.00	54	1,600	0.034	E-W(1):	0.188
Westbound	RT	1.00	97	1,600	0.044	E-W(2):	0.467 *
	TH	2.00	832	3,200	0.260 *		
	LT	1.00	36	1,600	0.023	V/C:	0.679
Northbound	RT	1.00	29	1,600	0.007	Lost Time:	0.100
	TH	2.00	203	3,200	0.063	ITS:	0.000
	LT	1.00	246	1,600	0.154 *		
Eastbound	RT	1.00	104	1,600	0.000	ICU:	0.779
	TH	2.00	527	3,200	0.165		
	LT	1.00	331	1,600	0.207 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	152	1,600	0.000	N-S(1):	0.118
	TH	2.00	189	3,200	0.059 *	N-S(2):	0.174 *
	LT	1.00	102	1,600	0.064	E-W(1):	0.271
Westbound	RT	1.00	52	1,600	0.001	E-W(2):	0.442 *
	TH	2.00	602	3,200	0.188 *		
	LT	1.00	40	1,600	0.025	V/C:	0.616
Northbound	RT	1.00	38	1,600	0.011	Lost Time:	0.100
	TH	2.00	173	3,200	0.054	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	188	1,600	0.060	ICU:	0.716
	TH	2.00	787	3,200	0.246		
	LT	1.00	407	1,600	0.254 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2017 ALT 1&2 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	243	1,600	0.077	N-S(1):	0.228 *
	TH	2.00	278	3,200	0.087	N-S(2):	0.173
	LT	1.00	84	1,600	0.053 *	E-W(1):	0.149
Westbound	RT	1.00	46	1,600	0.003	E-W(2):	0.232 *
	TH	2.00	502	3,200	0.157 *		
	LT	1.00	63	1,600	0.039	V/C:	0.460
Northbound	RT	0.00	85	0	0.000	Lost Time:	0.100
	TH	2.00	474	3,200	0.175 *	ITS:	0.000
	LT	1.00	138	1,600	0.086		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.560
	TH	2.00	351	3,200	0.110		
	LT	1.00	120	1,600	0.075 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	208	1,600	0.046	N-S(1):	0.241 *
	TH	2.00	493	3,200	0.154	N-S(2):	0.202
	LT	1.00	137	1,600	0.086 *	E-W(1):	0.203
Westbound	RT	1.00	48	1,600	0.000	E-W(2):	0.212 *
	TH	2.00	410	3,200	0.128 *		
	LT	1.00	97	1,600	0.061	V/C:	0.453
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	435	3,200	0.155 *	ITS:	0.000
	LT	1.00	76	1,600	0.048		
Eastbound	RT	1.00	50	1,600	0.008	ICU:	0.553
	TH	2.00	453	3,200	0.142		
	LT	1.00	134	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	239	414	248	69	162	91	87	786	487	911	1353	78
AMBIENT												
RELATED												
PROJECT												
TOTAL	239	414	248	69	162	91	87	786	487	911	1353	78
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 162
B: 69

EastBound
A: 716
B: 501

WestBound
A: 487
B: 87

NorthBound
A: 331
B: 239

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{239 + 162 + 487 + 501}{1425} = 0.975$$

LOS = E

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: C St I/S No: 10

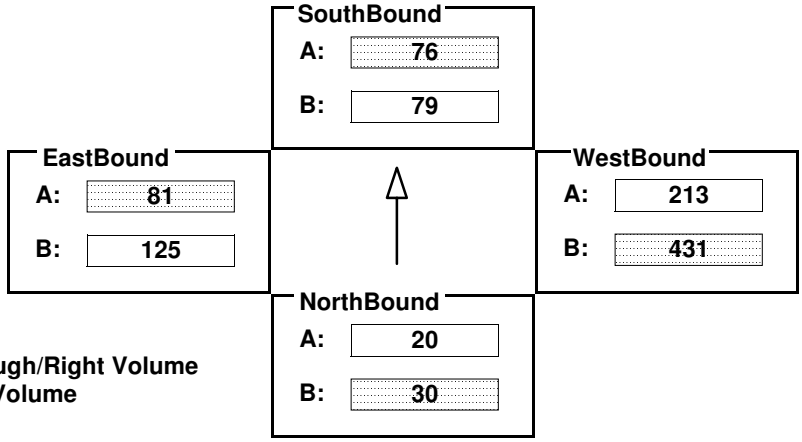
AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	54	39	747	79	56	76	783	426	114	125	161	204
AMBIENT												
RELATED												
PROJECT												
TOTAL	54	39	747	79	56	76	783	426	114	125	161	204
LANE	2	2	1	1	1	1	2	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	Free		Perm	Auto		Prot-Fix	Auto		Prot-Fix	Free	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{30 + 76 + 431 + 81}{1200} = 0.515$$

LOS = A

CalcaDB

March 25, 2010 ,Thursday 10:38:19 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Fries Av | W/E: Harry Bridge Bl | I/S No: 12

AM/PM: PM | Comments: 2017NPPM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	62	47	14	22	52	70	1	1093	31	76	1125	61
AMBIENT												
RELATED												
PROJECT												
TOTAL	62	47	14	22	52	70	1	1093	31	76	1125	61
LANE	1				1			1			1			1			1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 122
B: 22

EastBound
A: 821
B: 76

WestBound
A: 565
B: 1

NorthBound
A: 61
B: 62

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{62 + 122 + 1 + 821}{1500} = 0.671$$

LOS = B

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	560	2166	0	1511	0	1875	0	124	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	560	2166	0	1511	0	1875	0	124	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 504
B: 0

EastBound
A: 0
B: 0

WestBound
A: 666
B: 666

NorthBound
A: 280
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 504 + 666 + 0}{1500} = 0.780$$

LOS = C

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

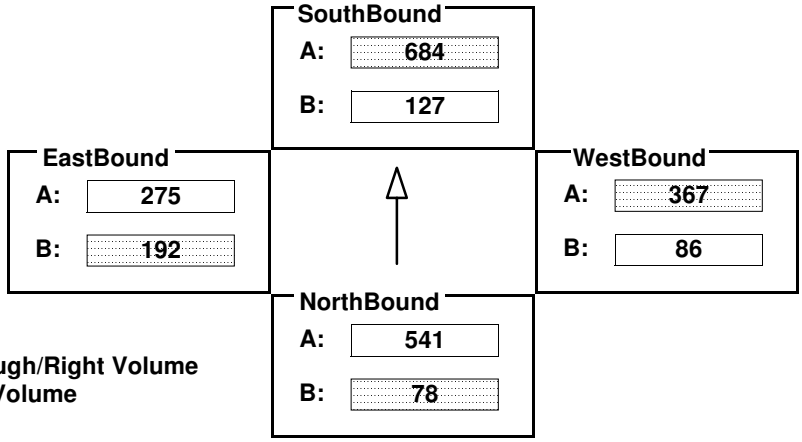
AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	78	1042	40	127	1211	157	86	277	90	192	275	79
AMBIENT												
RELATED												
PROJECT												
TOTAL	78	1042	40	127	1211	157	86	277	90	192	275	79
LANE	1		1		1			1			1			1			1			1			1	
	Phasing		RTOR	Phasing		RTOR	Phasing		RTOR	Phasing		RTOR
SIGNAL	Perm		Auto	Perm		Auto	Perm		Auto	Perm		Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{78 + 684 + 367 + 192}{1500} = 0.881$$

LOS = D

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.279
Loss Time (sec):	0	Average Delay (sec/veh):	9.4
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0		1 0 0	1 0		1 0 2	0 1		1 0 1	0 1	
Volume Module:												
Base Vol:	25	14	5	17	22	82	113	143	14	6	174	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	14	5	17	22	82	113	143	14	6	174	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	14	5	17	22	82	113	143	14	6	174	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	14	5	17	22	82	113	143	14	6	174	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	25	14	5	17	22	82	113	143	14	6	174	9
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.74	0.26	1.00	0.21	0.79	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	537	441	157	549	139	517	589	1280	729	570	623	704
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.03	0.03	0.16	0.16	0.19	0.11	0.02	0.01	0.28	0.01
Crit Moves:	****					****	****				****	
Delay/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.3	7.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.3	7.6
LOS by Move:	A	A	A	A	A	A	A	A	A	A	B	A
ApproachDel:	8.9			8.8			9.2			10.1		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.9			8.8			9.2			10.1		
LOS by Appr:	A			A			A			B		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.4	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 2.2 Worst Case Level Of Service: B[12.1]

Street Name:	Western Ave									Paseo del Mar							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1
Volume Module:																				
Base Vol:	0	0	0			47	0			35	59	201			0	0	268			71
Growth Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
Initial Bse:	0	0	0			47	0			35	59	201			0	0	268			71
User Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Volume:	0	0	0			47	0			35	59	201			0	0	268			71
Reduct Vol:	0	0	0			0	0			0	0	0			0	0	0			0
FinalVolume:	0	0	0			47	0			35	59	201			0	0	268			71
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	xxxx			6.2	4.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	xxxx			3.3	2.2	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			587	xxxx			268	339	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Potent Cap.:	xxxx	xxxx	xxxxx			475	xxxx			776	1231	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Move Cap.:	xxxx	xxxx	xxxxx			458	xxxx			776	1231	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Volume/Cap:	xxxx	xxxx	xxxx			0.10	xxxx			0.05	0.05	xxxx	xxxx		xxxx	xxxx	xxxx			
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			0.3	xxxx			0.1	0.2	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx			13.8	xxxx			9.9	8.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
LOS by Move:	*	*	*			B	*			A	A	*	*		*	*	*			
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*			*	*			*	*	*			*	*	*			
ApproachDel:	xxxxxx					12.1					xxxxxx					xxxxxx				
ApproachLOS:	*					B					*					*				

Note: Queue reported is the number of cars per lane.

CalcaDB

March 25, 2010 ,Thursday 10:38:19 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	88	1084	37	113	738	99	41	137	187	164	155	75
AMBIENT												
RELATED												
PROJECT												
TOTAL	88	1084	37	113	738	99	41	137	187	164	155	75
LANE	1	1	1	1	1	1	1	1	1	1	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 419
B: 113

EastBound
A: 115
B: 164

WestBound
A: 137
B: 41

NorthBound
A: 561
B: 88

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{561 + 113 + 137 + 164}{1425} = 0.684$$

LOS = B

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: SR-47 EB On/Off Ramps I/S No: 18

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	531	704	3	272	0	197	0	2	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	531	704	3	272	0	197	0	2	0	0	0

LANE			1			1		1		2					1						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Var	Auto	Prot-Var		Split	OLA		

Critical Movements Diagram

SouthBound
A: 136
B: 3

EastBound
A: 0
B: 0

WestBound
A: 100
B: 100

NorthBound
A: 654
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{654 + 3 + 100 + 0}{1375} = 0.551$$

LOS = A

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Pilchard St I/S No: 19

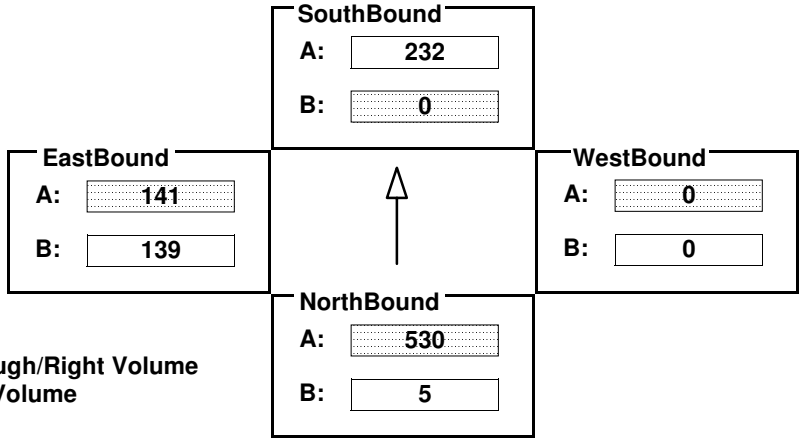
AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	5	1061	0	0	449	14	0	0	0	139	0	2
AMBIENT												
RELATED												
PROJECT												
TOTAL	5	1061	0	0	449	14	0	0	0	139	0	2
LANE	1	2		1	1	1						1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm			Perm	Auto					Split		

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{530 + 0 + 0 + 141}{1500} = 0.447$$

LOS = A

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Terminal Way I/S No: 20

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	70	137	0	0	96	362				888	2	87
AMBIENT												
RELATED												
PROJECT												
TOTAL	70	137	0	0	96	362	0	0	0	888	2	87

LANE	1		2			1		1		1			1											1	1				1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm	OLA			Split	Free

Critical Movements Diagram

SouthBound
A: 96
B: 0

EastBound
A: 445
B: 445

WestBound
A: 0
B: 0

NorthBound
A: 69
B: 70

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{70 + 96 + 0 + 445}{1500} = 0.407$$

LOS = A

CalcaDB

March 25, 2010 ,Thursday 10:38:19 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Earle St W/E: Terminal Way I/S No: 21

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	2	20	180	1	13	1	124	280	3	4	782	3
AMBIENT												
RELATED												
PROJECT												
TOTAL	2	20	180	1	13	1	124	280	3	4	782	3
LANE		1			1			1			1		1		1		1		1		1		1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 8
B: 1

EastBound
A: 392
B: 4

WestBound
A: 142
B: 124

NorthBound
A: 180
B: 2

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{180 + 1 + 124 + 392}{1500} = 0.465$$

LOS = A

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Navy Wy W/E: Ocean Bl/Seaside Av I/S No: 22

AM/PM: PM Comments: 2017NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	464	0	1050	0	0	0	21	2621	0	0	3107	233
AMBIENT												
RELATED												
PROJECT												
TOTAL	464	0	1050	0	0	0	21	2621	0	0	3107	233
LANE	2					1							2		3							3			1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Split	Free					Prot-Fix			Prot-Fix	OLA	

Critical Movements Diagram

SouthBound
A: 0
B: 0

EastBound
A: 1036
B: 0

WestBound
A: 874
B: 12

NorthBound
A: 0
B: 255

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{255 + 0 + 12 + 1036}{1425} = 0.914$$

LOS = E

CUMULATIVE BASE (2019) LEVEL OF SERVICE WORKSHEETS

CalcaDB

March 18, 2010 ,Thursday 07:27:02 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Sepulveda Bl | I/S No: 1

AM/PM: AM | Comments: 2019NPAM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	132	493	651	216	435	169	402	1811	96	121	1473	17
AMBIENT												
RELATED												
PROJECT												
TOTAL	132	493	651	216	435	169	402	1811	96	121	1473	17
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 218
B: 216

EastBound
A: 497
B: 121

WestBound
A: 636
B: 402

NorthBound
A: 249
B: 132

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{249 + 216 + 402 + 497}{1375} = 0.992$$

LOS = E

Developed by Chun Wong, 12/94

NPAM34

October 24, 2011 ,Monday 06:54:50 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: AM Comments: 2019NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	46	231	32	1024	1	1287	250	0	2212	56
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	46	231	32	1024	1	1287	250	0	2212	56

LANE						1		1	1				2				3		1	0				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 563
B: 131

EastBound
A: 756
B: 0

WestBound
A: 384
B: 0

NorthBound
A: 46
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{46 + 563 + 0 + 756}{1500} = 0.910$$

LOS = E

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.303
	TH	0.00	0	0	0.000	N-S(2):	0.308 *
	LT	0.00	0	0	0.000	E-W(1):	0.153
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.338 *
	TH	3.00	1,538	4,800	0.322 *		
	LT	0.00	0	0	0.000	V/C:	0.646
Northbound	RT	1.00	266	1,600	0.166	Lost Time:	0.100
	TH	1.00	14	1,600	0.303	ITS:	0.000
	LT	0.00	471	1,600	0.294 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.746
	TH	3.00	732	4,800	0.153		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	122	1,600	0.076 *	N-S(1):	0.253
	TH	0.00	0	0	0.000	N-S(2):	0.311 *
	LT	0.00	0	0	0.000	E-W(1):	0.254
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.325 *
	TH	3.00	1,238	4,800	0.261 *		
	LT	0.00	2	1,600	0.001	V/C:	0.636
Northbound	RT	1.00	181	1,600	0.113	Lost Time:	0.100
	TH	1.00	28	1,600	0.253	ITS:	0.000
	LT	0.00	376	1,600	0.235 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.736
	TH	3.00	1,209	4,800	0.253		
	LT	1.00	102	1,600	0.064 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	239	1,600	0.000	N-S(1):	0.156
	TH	2.00	283	3,200	0.088 *	N-S(2):	0.183 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.340
Westbound	RT	1.00	128	1,600	0.055	E-W(2):	0.463 *
	TH	2.00	1,178	3,200	0.368 *		
	LT	1.00	134	1,600	0.084	V/C:	0.646
Northbound	RT	1.00	218	1,600	0.094	Lost Time:	0.100
	TH	2.00	343	3,200	0.107	ITS:	0.000
	LT	1.00	152	1,600	0.095 *		
Eastbound	RT	1.00	48	1,600	0.000	ICU:	0.746
	TH	2.00	819	3,200	0.256		
	LT	1.00	152	1,600	0.095 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	119	1,600	0.000	N-S(1):	0.224 *
	TH	2.00	259	3,200	0.081	N-S(2):	0.140
	LT	1.00	135	1,600	0.084 *	E-W(1):	0.416
Westbound	RT	1.00	92	1,600	0.015	E-W(2):	0.442 *
	TH	2.00	1,065	3,200	0.333 *		
	LT	1.00	113	1,600	0.071	V/C:	0.666
Northbound	RT	1.00	281	1,600	0.140 *	Lost Time:	0.100
	TH	2.00	315	3,200	0.098	ITS:	0.000
	LT	1.00	95	1,600	0.059		
Eastbound	RT	1.00	88	1,600	0.025	ICU:	0.766
	TH	2.00	1,103	3,200	0.345		
	LT	1.00	175	1,600	0.109 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	161	1,600	0.060	N-S(1):	0.205
	TH	2.00	346	3,200	0.108 *	N-S(2):	0.207 *
	LT	1.00	145	1,600	0.091	E-W(1):	0.383
Westbound	RT	1.00	96	1,600	0.015	E-W(2):	0.410 *
	TH	2.00	1,051	3,200	0.328 *		
	LT	1.00	196	1,600	0.123	V/C:	0.617
Northbound	RT	1.00	165	1,600	0.042	Lost Time:	0.100
	TH	2.00	364	3,200	0.114	ITS:	0.000
	LT	1.00	158	1,600	0.099 *		
Eastbound	RT	1.00	125	1,600	0.029	ICU:	0.717
	TH	2.00	831	3,200	0.260		
	LT	1.00	131	1,600	0.082 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	125	1,600	0.024	N-S(1):	0.235
	TH	2.00	450	3,200	0.141 *	N-S(2):	0.256 *
	LT	1.00	183	1,600	0.114	E-W(1):	0.463 *
Westbound	RT	1.00	119	1,600	0.017	E-W(2):	0.385
	TH	2.00	884	3,200	0.276		
	LT	1.00	179	1,600	0.112 *	V/C:	0.719
Northbound	RT	1.00	162	1,600	0.045	Lost Time:	0.100
	TH	2.00	386	3,200	0.121	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	185	1,600	0.058	ICU:	0.819
	TH	2.00	1,123	3,200	0.351 *		
	LT	1.00	174	1,600	0.109	LOS:	D

* - Denotes critical movement

CalcaDB

March 18, 2010 ,Thursday 07:27:02 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: AM Comments: 2019NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	72	519	148	55	339	431	180	997	161	545	766	110
AMBIENT												
RELATED												
PROJECT												
TOTAL	72	519	148	55	339	431	180	997	161	545	766	110
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 431
B: 55

EastBound
A: 383
B: 545

WestBound
A: 499
B: 180

NorthBound
A: 259
B: 72

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{72 + 431 + 499 + 545}{1500} = 1.031$$

LOS = F

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	261	1,600	0.058 *	N-S(1):	0.098
	TH	2.00	125	3,200	0.039	N-S(2):	0.214 *
	LT	1.00	55	1,600	0.034	E-W(1):	0.190
Westbound	RT	1.00	98	1,600	0.044	E-W(2):	0.473 *
	TH	2.00	842	3,200	0.263 *		
	LT	1.00	36	1,600	0.023	V/C:	0.687
Northbound	RT	1.00	30	1,600	0.008	Lost Time:	0.100
	TH	2.00	205	3,200	0.064	ITS:	0.000
	LT	1.00	249	1,600	0.156 *		
Eastbound	RT	1.00	105	1,600	0.000	ICU:	0.787
	TH	2.00	533	3,200	0.167		
	LT	1.00	336	1,600	0.210 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.000	N-S(1):	0.120
	TH	2.00	192	3,200	0.060 *	N-S(2):	0.176 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.274
Westbound	RT	1.00	53	1,600	0.001	E-W(2):	0.448 *
	TH	2.00	609	3,200	0.190 *		
	LT	1.00	40	1,600	0.025	V/C:	0.624
Northbound	RT	1.00	38	1,600	0.011	Lost Time:	0.100
	TH	2.00	175	3,200	0.055	ITS:	0.000
	LT	1.00	186	1,600	0.116 *		
Eastbound	RT	1.00	191	1,600	0.061	ICU:	0.724
	TH	2.00	796	3,200	0.249		
	LT	1.00	412	1,600	0.258 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	246	1,600	0.078	N-S(1):	0.230 *
	TH	2.00	281	3,200	0.088	N-S(2):	0.176
	LT	1.00	85	1,600	0.053 *	E-W(1):	0.150
Westbound	RT	1.00	47	1,600	0.003	E-W(2):	0.234 *
	TH	2.00	507	3,200	0.158 *		
	LT	1.00	63	1,600	0.039	V/C:	0.464
Northbound	RT	0.00	86	0	0.000	Lost Time:	0.100
	TH	2.00	480	3,200	0.177 *	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.564
	TH	2.00	356	3,200	0.111		
	LT	1.00	121	1,600	0.076 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	211	1,600	0.048	N-S(1):	0.243 *
	TH	2.00	499	3,200	0.156	N-S(2):	0.204
	LT	1.00	138	1,600	0.086 *	E-W(1):	0.204
Westbound	RT	1.00	49	1,600	0.000	E-W(2):	0.214 *
	TH	2.00	415	3,200	0.130 *		
	LT	1.00	98	1,600	0.061	V/C:	0.457
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	441	3,200	0.157 *	ITS:	0.000
	LT	1.00	77	1,600	0.048		
Eastbound	RT	1.00	51	1,600	0.008	ICU:	0.557
	TH	2.00	459	3,200	0.143		
	LT	1.00	135	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

March 18, 2010 ,Thursday 07:27:02 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: AM Comments: 2019NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	239	511	213	24	145	63	129	1152	521	1026	974	90
AMBIENT												
RELATED												
PROJECT												
TOTAL	239	511	213	24	145	63	129	1152	521	1026	974	90
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 145
B: 24

EastBound
A: 532
B: 564

WestBound
A: 558
B: 129

NorthBound
A: 362
B: 239

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{362 + 24 + 558 + 564}{1425} = 1.058$$

LOS = F

Developed by Chun Wong, 12/94

CalcaDB

March 18, 2010 ,Thursday 07:27:02 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: AM Comments: 2019NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	704	3004	0	1123	0	1692	0	114	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	704	3004	0	1123	0	1692	0	114	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 374
B: 0

EastBound
A: 0
B: 0

WestBound
A: 602
B: 602

NorthBound
A: 352
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 374 + 602 + 0}{1500} = 0.651$$

LOS = B

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: AM Comments: 2019NPAM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	88	1329	32	52	1037	152	67	286	65	256	343	65
AMBIENT												
RELATED												
PROJECT												
TOTAL	88	1329	32	52	1037	152	67	286	65	256	343	65
LANE	1	1	1	1	1	1	1	1	1	1	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 595
B: 52

EastBound
A: 343
B: 256

WestBound
A: 351
B: 67

NorthBound
A: 680
B: 88

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{680 + 52 + 351 + 256}{1500} = 0.893$$

LOS = D

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.146
Loss Time (sec):	0	Average Delay (sec/veh):	8.5
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0		1 0 0	1 0		1 0 2	0 1		1 0 1	0 1	
Volume Module:												
Base Vol:	7	11	4	6	18	72	86	131	5	7	96	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	7	11	4	6	18	72	86	131	5	7	96	13
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	7	11	4	6	18	72	86	131	5	7	96	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	7	11	4	6	18	72	86	131	5	7	96	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	11	4	6	18	72	86	131	5	7	96	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	11	4	6	18	72	86	131	5	7	96	13
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.73	0.27	1.00	0.20	0.80	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	578	476	173	588	143	571	630	1379	795	602	657	752
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.02	0.01	0.13	0.13	0.14	0.09	0.01	0.01	0.15	0.02
Crit Moves:			****		****		****				****	
Delay/Veh:	8.7	8.0	8.0	8.6	8.1	8.1	9.1	8.3	7.1	8.5	8.8	7.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.7	8.0	8.0	8.6	8.1	8.1	9.1	8.3	7.1	8.5	8.8	7.4
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.3			8.2			8.6			8.7		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.3			8.2			8.6			8.7		
LOS by Appr:	A			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 3.4 Worst Case Level Of Service: B[11.5]

Street Name:	Western Ave									Paseo del Mar				
Approach:	North Bound					South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1
Volume Module:																				
Base Vol:	0	0	0			79	0			70	64	178			0	0	185			80
Growth Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
Initial Bse:	0	0	0			79	0			70	64	178			0	0	185			80
Added Vol:	0	0	0			0	0			0	0	0			0	0	0			0
PasserByVol:	0	0	0			0	0			0	0	0			0	0	0			0
Initial Fut:	0	0	0			79	0			70	64	178			0	0	185			80
User Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Volume:	0	0	0			79	0			70	64	178			0	0	185			80
Reduct Vol:	0	0	0			0	0			0	0	0			0	0	0			0
FinalVolume:	0	0	0			79	0			70	64	178			0	0	185			80
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	xxxx			6.2	4.1	xxxx	xxxxx		xxxxx	xxxxx	xxxx			xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	xxxx			3.3	2.2	xxxx	xxxxx		xxxxx	xxxxx	xxxx			xxxxx
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			491	xxxx			185	265	xxxx	xxxxx		xxxx	xxxx	xxxx			xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx			540	xxxx			862	1311	xxxx	xxxxx		xxxx	xxxx	xxxx			xxxxx
Move Cap.:	xxxx	xxxx	xxxxx			520	xxxx			862	1311	xxxx	xxxxx		xxxx	xxxx	xxxx			xxxxx
Volume/Cap:	xxxx	xxxx	xxxx			0.15	xxxx			0.08	0.05	xxxx	xxxx		xxxx	xxxx	xxxx			xxxx
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			0.5	xxxx			0.3	0.2	xxxx	xxxxx		xxxx	xxxx	xxxx			xxxxx
Control Del:	xxxxx	xxxx	xxxxx			13.2	xxxx			9.5	7.9	xxxx	xxxxx		xxxxx	xxxx	xxxx			xxxxx
LOS by Move:	*	*	*			B	*			A	A	*	*		*	*	*			*
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*			*	*	*			*	*	*			*	*	*		
ApproachDel:	xxxxxx					11.5					xxxxxx					xxxxxx				
ApproachLOS:	*					B					*					*				

Note: Queue reported is the number of cars per lane.

NPAM34

March 18, 2010 ,Thursday 07:27:02 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av | W/E: 9th St | I/S No: 17

AM/PM: AM | Comments: 2019NPAM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	74	808	27	194	1137	105	20	132	146	119	184	98
AMBIENT												
RELATED												
PROJECT												
TOTAL	74	808	27	194	1137	105	20	132	146	119	184	98
LANE	1		1		1			1		1			1		1			1		1		1	0	
	Phasing		RTOR	Phasing		RTOR	Phasing		RTOR	Phasing		RTOR
SIGNAL	Prot-Fix		Auto	Prot-Fix		Auto	Perm		Auto	Perm		Auto

Critical Movements Diagram

SouthBound
A: 621
B: 194

EastBound
A: 141
B: 119

WestBound
A: 132
B: 20

NorthBound
A: 418
B: 74

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{74 + 621 + 132 + 119}{1425} = 0.664$$

LOS = B

Developed by Chun Wong, 12/94

CalcaDB

March 18, 2010 ,Thursday 11:58:59 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	104	402	565	212	589	172	376	1572	122	140	1627	53
AMBIENT												
RELATED												
PROJECT												
TOTAL	104	402	565	212	589	172	376	1572	122	140	1627	53
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 294
B: 212

EastBound
A: 560
B: 140

WestBound
A: 565
B: 376

NorthBound
A: 201
B: 104

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{201 + 212 + 376 + 560}{1375} = 0.981$$

LOS = E

NPPM34

October 24, 2011 ,Monday 06:55:28 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	43	362	47	828	2	1153	214	0	2344	54
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	43	362	47	828	2	1153	214	0	2344	54

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 455
B: 204

EastBound
A: 799
B: 0

WestBound
A: 342
B: 0

NorthBound
A: 43
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{43 + 455 + 0 + 799}{1500} = 0.865$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.303
	TH	0.00	0	0	0.000	N-S(2):	0.308 *
	LT	0.00	0	0	0.000	E-W(1):	0.153
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.338 *
	TH	3.00	1,538	4,800	0.322 *		
	LT	0.00	0	0	0.000	V/C:	0.646
Northbound	RT	1.00	266	1,600	0.166	Lost Time:	0.100
	TH	1.00	14	1,600	0.303	ITS:	0.000
	LT	0.00	471	1,600	0.294 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.746
	TH	3.00	732	4,800	0.153		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	122	1,600	0.076 *	N-S(1):	0.253
	TH	0.00	0	0	0.000	N-S(2):	0.311 *
	LT	0.00	0	0	0.000	E-W(1):	0.254
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.325 *
	TH	3.00	1,238	4,800	0.261 *		
	LT	0.00	2	1,600	0.001	V/C:	0.636
Northbound	RT	1.00	181	1,600	0.113	Lost Time:	0.100
	TH	1.00	28	1,600	0.253	ITS:	0.000
	LT	0.00	376	1,600	0.235 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.736
	TH	3.00	1,209	4,800	0.253		
	LT	1.00	102	1,600	0.064 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	239	1,600	0.000	N-S(1):	0.156
	TH	2.00	283	3,200	0.088 *	N-S(2):	0.183 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.340
Westbound	RT	1.00	128	1,600	0.055	E-W(2):	0.463 *
	TH	2.00	1,178	3,200	0.368 *		
	LT	1.00	134	1,600	0.084	V/C:	0.646
Northbound	RT	1.00	218	1,600	0.094	Lost Time:	0.100
	TH	2.00	343	3,200	0.107	ITS:	0.000
	LT	1.00	152	1,600	0.095 *		
Eastbound	RT	1.00	48	1,600	0.000	ICU:	0.746
	TH	2.00	819	3,200	0.256		
	LT	1.00	152	1,600	0.095 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	119	1,600	0.000	N-S(1):	0.224 *
	TH	2.00	259	3,200	0.081	N-S(2):	0.140
	LT	1.00	135	1,600	0.084 *	E-W(1):	0.416
Westbound	RT	1.00	92	1,600	0.015	E-W(2):	0.442 *
	TH	2.00	1,065	3,200	0.333 *		
	LT	1.00	113	1,600	0.071	V/C:	0.666
Northbound	RT	1.00	281	1,600	0.140 *	Lost Time:	0.100
	TH	2.00	315	3,200	0.098	ITS:	0.000
	LT	1.00	95	1,600	0.059		
Eastbound	RT	1.00	88	1,600	0.025	ICU:	0.766
	TH	2.00	1,103	3,200	0.345		
	LT	1.00	175	1,600	0.109 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	161	1,600	0.060	N-S(1):	0.205
	TH	2.00	346	3,200	0.108 *	N-S(2):	0.207 *
	LT	1.00	145	1,600	0.091	E-W(1):	0.383
Westbound	RT	1.00	96	1,600	0.015	E-W(2):	0.410 *
	TH	2.00	1,051	3,200	0.328 *		
	LT	1.00	196	1,600	0.123	V/C:	0.617
Northbound	RT	1.00	165	1,600	0.042	Lost Time:	0.100
	TH	2.00	364	3,200	0.114	ITS:	0.000
	LT	1.00	158	1,600	0.099 *		
Eastbound	RT	1.00	125	1,600	0.029	ICU:	0.717
	TH	2.00	831	3,200	0.260		
	LT	1.00	131	1,600	0.082 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	125	1,600	0.024	N-S(1):	0.235
	TH	2.00	450	3,200	0.141 *	N-S(2):	0.256 *
	LT	1.00	183	1,600	0.114	E-W(1):	0.463 *
Westbound	RT	1.00	119	1,600	0.017	E-W(2):	0.385
	TH	2.00	884	3,200	0.276		
	LT	1.00	179	1,600	0.112 *	V/C:	0.719
Northbound	RT	1.00	162	1,600	0.045	Lost Time:	0.100
	TH	2.00	386	3,200	0.121	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	185	1,600	0.058	ICU:	0.819
	TH	2.00	1,123	3,200	0.351 *		
	LT	1.00	174	1,600	0.109	LOS:	D

* - Denotes critical movement

CalcaDB

March 18, 2010 ,Thursday 11:58:59 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	66	405	189	123	373	375	115	749	67	471	1140	110
AMBIENT												
RELATED												
PROJECT												
TOTAL	66	405	189	123	373	375	115	749	67	471	1140	110
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 375
B: 123

EastBound
A: 570
B: 471

WestBound
A: 375
B: 115

NorthBound
A: 203
B: 66

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{66 + 375 + 375 + 471}{1500} = 0.858$$

LOS = D

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	261	1,600	0.058 *	N-S(1):	0.098
	TH	2.00	125	3,200	0.039	N-S(2):	0.214 *
	LT	1.00	55	1,600	0.034	E-W(1):	0.190
Westbound	RT	1.00	98	1,600	0.044	E-W(2):	0.473 *
	TH	2.00	842	3,200	0.263 *		
	LT	1.00	36	1,600	0.023	V/C:	0.687
Northbound	RT	1.00	30	1,600	0.008	Lost Time:	0.100
	TH	2.00	205	3,200	0.064	ITS:	0.000
	LT	1.00	249	1,600	0.156 *		
Eastbound	RT	1.00	105	1,600	0.000	ICU:	0.787
	TH	2.00	533	3,200	0.167		
	LT	1.00	336	1,600	0.210 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.000	N-S(1):	0.120
	TH	2.00	192	3,200	0.060 *	N-S(2):	0.176 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.274
Westbound	RT	1.00	53	1,600	0.001	E-W(2):	0.448 *
	TH	2.00	609	3,200	0.190 *		
	LT	1.00	40	1,600	0.025	V/C:	0.624
Northbound	RT	1.00	38	1,600	0.011	Lost Time:	0.100
	TH	2.00	175	3,200	0.055	ITS:	0.000
	LT	1.00	186	1,600	0.116 *		
Eastbound	RT	1.00	191	1,600	0.061	ICU:	0.724
	TH	2.00	796	3,200	0.249		
	LT	1.00	412	1,600	0.258 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2019 ALT 3&4 NO PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	246	1,600	0.078	N-S(1):	0.230 *
	TH	2.00	281	3,200	0.088	N-S(2):	0.176
	LT	1.00	85	1,600	0.053 *	E-W(1):	0.150
Westbound	RT	1.00	47	1,600	0.003	E-W(2):	0.234 *
	TH	2.00	507	3,200	0.158 *		
	LT	1.00	63	1,600	0.039	V/C:	0.464
Northbound	RT	0.00	86	0	0.000	Lost Time:	0.100
	TH	2.00	480	3,200	0.177 *	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.564
	TH	2.00	356	3,200	0.111		
	LT	1.00	121	1,600	0.076 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	211	1,600	0.048	N-S(1):	0.243 *
	TH	2.00	499	3,200	0.156	N-S(2):	0.204
	LT	1.00	138	1,600	0.086 *	E-W(1):	0.204
Westbound	RT	1.00	49	1,600	0.000	E-W(2):	0.214 *
	TH	2.00	415	3,200	0.130 *		
	LT	1.00	98	1,600	0.061	V/C:	0.457
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	441	3,200	0.157 *	ITS:	0.000
	LT	1.00	77	1,600	0.048		
Eastbound	RT	1.00	51	1,600	0.008	ICU:	0.557
	TH	2.00	459	3,200	0.143		
	LT	1.00	135	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	242	419	251	70	164	92	88	796	493	922	1370	79
AMBIENT												
RELATED												
PROJECT												
TOTAL	242	419	251	70	164	92	88	796	493	922	1370	79
LANE	1	1	1	1	1		1	2	1	2	1	1

	NORTHBOUND		SOUTHBOUND		WESTBOUND		EASTBOUND	
	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 164
B: 70

EastBound
A: 725
B: 507

WestBound
A: 493
B: 88

NorthBound
A: 335
B: 242

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{242 + 164 + 493 + 507}{1425} = 0.987$$

LOS = E

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	566	2192	0	1528	0	1896	0	126	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	566	2192	0	1528	0	1896	0	126	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 509
B: 0

EastBound
A: 0
B: 0

WestBound
A: 674
B: 674

NorthBound
A: 283
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 509 + 674 + 0}{1500} = 0.789$$

LOS = C

Developed by Chun Wong, 12/94

CalcaDB

March 18, 2010 ,Thursday 11:58:59 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	79	1054	40	128	1226	158	87	280	91	194	278	80
AMBIENT												
RELATED												
PROJECT												
TOTAL	79	1054	40	128	1226	158	87	280	91	194	278	80
LANE	1	1	1	1	1	1	1	1	1	1	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 692
B: 128

EastBound
A: 278
B: 194

WestBound
A: 371
B: 87

NorthBound
A: 547
B: 79

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{79 + 692 + 371 + 194}{1500} = 0.891$$

LOS = D

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.283
Loss Time (sec):	0	Average Delay (sec/veh):	9.4
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0		1 0 0	1 0		1 0 2	0 1		1 0 1	0 1	
Volume Module:												
Base Vol:	25	14	5	17	22	83	114	145	14	6	176	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	14	5	17	22	83	114	145	14	6	176	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	25	14	5	17	22	83	114	145	14	6	176	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	14	5	17	22	83	114	145	14	6	176	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	14	5	17	22	83	114	145	14	6	176	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	25	14	5	17	22	83	114	145	14	6	176	10
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.74	0.26	1.00	0.21	0.79	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	536	439	157	547	137	517	588	1278	728	569	622	702
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.03	0.03	0.16	0.16	0.19	0.11	0.02	0.01	0.28	0.01
Crit Moves:	****					****	****				****	
Delay/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.4	7.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.4	7.6
LOS by Move:	A	A	A	A	A	A	A	A	A	A	B	A
ApproachDel:	9.0			8.8			9.2			10.2		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	9.0			8.8			9.2			10.2		
LOS by Appr:	A			A			A			B		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.4	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 2.2 Worst Case Level Of Service: B[12.2]

Street Name:	Western Ave								Paseo del Mar							
Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1
Volume Module:																				
Base Vol:	0	0	0			48	0			35	59		203		0	0		271		72
Growth Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00		1.00
Initial Bse:	0	0	0			48	0			35	59		203		0	0		271		72
Added Vol:	0	0	0			0	0			0	0		0		0	0		0		0
PasserByVol:	0	0	0			0	0			0	0		0		0	0		0		0
Initial Fut:	0	0	0			48	0			35	59		203		0	0		271		72
User Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00		1.00
PHF Volume:	0	0	0			48	0			35	59		203		0	0		271		72
Reduct Vol:	0	0	0			0	0			0	0		0		0	0		0		0
FinalVolume:	0	0	0			48	0			35	59		203		0	0		271		72
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	xxxx			6.2	4.1	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	xxxx			3.3	2.2	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			592	xxxx			271	343	xxxx	xxxxx		xxxx	xxxx		xxxxx		
Potent Cap.:	xxxx	xxxx	xxxxx			472	xxxx			773	1227	xxxx	xxxxx		xxxx	xxxx		xxxxx		
Move Cap.:	xxxx	xxxx	xxxxx			455	xxxx			773	1227	xxxx	xxxxx		xxxx	xxxx		xxxxx		
Volume/Cap:	xxxx	xxxx	xxxx			0.11	xxxx			0.05	0.05	xxxx	xxxx		xxxx	xxxx		xxxx		
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			0.4	xxxx			0.1	0.2	xxxx	xxxxx		xxxx	xxxx		xxxxx		
Control Del:	xxxxx	xxxx	xxxxx			13.8	xxxx			9.9	8.1	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
LOS by Move:	*	*	*			B	*			A	A	*	*		*	*		*		
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	xxxx			xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx		xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	xxxx			xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	xxxx			xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx		xxxxx		
Shared LOS:	*	*	*			*	*			*	*	*	*		*	*		*		
ApproachDel:	xxxxxx					12.2					xxxxxx					xxxxxx				
ApproachLOS:	*					B					*					*				

Note: Queue reported is the number of cars per lane.

CalcaDB

March 18, 2010 ,Thursday 11:58:59 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: PM Comments: 2019NPPM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	89	1097	38	114	747	101	41	139	189	166	157	76
AMBIENT												
RELATED												
PROJECT												
TOTAL	89	1097	38	114	747	101	41	139	189	166	157	76
LANE	1	1	1	1	1	1	1	1	1	1	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 424
B: 114

EastBound
A: 116
B: 166

WestBound
A: 139
B: 41

NorthBound
A: 568
B: 89

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{568 + 114 + 139 + 166}{1425} = 0.693$$

LOS = B

ALTERNATIVES 1 & 2 (PROJECT)
LEVEL OF SERVICE WORKSHEETS

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	131	487	643	213	430	167	397	1793	95	119	1459	17
AMBIENT												
RELATED												
PROJECT												
TOTAL	131	487	643	213	430	167	397	1793	95	119	1459	17
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 215
B: 213

EastBound
A: 492
B: 119

WestBound
A: 629
B: 397

NorthBound
A: 246
B: 131

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{246 + 213 + 397 + 492}{1375} = 0.980$$

LOS = E

Developed by Chun Wong, 12/94

WPAM12

October 24, 2011 ,Monday 06:53:18 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	45	266	31	1011	1	1275	247	0	2189	55
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	45	266	31	1011	1	1275	247	0	2189	55

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 556
B: 149

EastBound
A: 748
B: 0

WestBound
A: 381
B: 0

NorthBound
A: 45
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{45 + 556 + 0 + 748}{1500} = 0.899$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.299
	TH	0.00	0	0	0.000	N-S(2):	0.305 *
	LT	0.00	0	0	0.000	E-W(1):	0.160
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.344 *
	TH	3.00	1,565	4,800	0.328 *		
	LT	0.00	0	0	0.000	V/C:	0.649
Northbound	RT	1.00	262	1,600	0.164	Lost Time:	0.100
	TH	1.00	14	1,600	0.299	ITS:	0.000
	LT	0.00	465	1,600	0.291 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.749
	TH	3.00	765	4,800	0.160		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	120	1,600	0.075 *	N-S(1):	0.249
	TH	0.00	0	0	0.000	N-S(2):	0.307 *
	LT	0.00	0	0	0.000	E-W(1):	0.260
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.331 *
	TH	3.00	1,269	4,800	0.268 *		
	LT	0.00	2	1,600	0.001	V/C:	0.638
Northbound	RT	1.00	179	1,600	0.111	Lost Time:	0.100
	TH	1.00	27	1,600	0.249	ITS:	0.000
	LT	0.00	371	1,600	0.232 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.738
	TH	3.00	1,236	4,800	0.259		
	LT	1.00	100	1,600	0.063 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	236	1,600	0.000	N-S(1):	0.157
	TH	2.00	285	3,200	0.089 *	N-S(2):	0.212 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.340
Westbound	RT	1.00	126	1,600	0.054	E-W(2):	0.458 *
	TH	2.00	1,164	3,200	0.364 *		
	LT	1.00	139	1,600	0.087	V/C:	0.670
Northbound	RT	1.00	221	1,600	0.095	Lost Time:	0.100
	TH	2.00	345	3,200	0.108	ITS:	0.000
	LT	1.00	197	1,600	0.123 *		
Eastbound	RT	1.00	89	1,600	0.000	ICU:	0.770
	TH	2.00	809	3,200	0.253		
	LT	1.00	151	1,600	0.094 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	118	1,600	0.000	N-S(1):	0.224 *
	TH	2.00	262	3,200	0.082	N-S(2):	0.170
	LT	1.00	134	1,600	0.084 *	E-W(1):	0.414
Westbound	RT	1.00	91	1,600	0.015	E-W(2):	0.437 *
	TH	2.00	1,052	3,200	0.329 *		
	LT	1.00	118	1,600	0.074	V/C:	0.661
Northbound	RT	1.00	283	1,600	0.140 *	Lost Time:	0.100
	TH	2.00	318	3,200	0.099	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	129	1,600	0.037	ICU:	0.761
	TH	2.00	1,089	3,200	0.340		
	LT	1.00	173	1,600	0.108 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	159	1,600	0.059	N-S(1):	0.202
	TH	2.00	342	3,200	0.107 *	N-S(2):	0.205 *
	LT	1.00	143	1,600	0.089	E-W(1):	0.379
Westbound	RT	1.00	95	1,600	0.015	E-W(2):	0.407 *
	TH	2.00	1,044	3,200	0.326 *		
	LT	1.00	193	1,600	0.121	V/C:	0.612
Northbound	RT	1.00	163	1,600	0.042	Lost Time:	0.100
	TH	2.00	360	3,200	0.113	ITS:	0.000
	LT	1.00	156	1,600	0.098 *		
Eastbound	RT	1.00	123	1,600	0.028	ICU:	0.712
	TH	2.00	827	3,200	0.258		
	LT	1.00	130	1,600	0.081 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	123	1,600	0.023	N-S(1):	0.232
	TH	2.00	445	3,200	0.139 *	N-S(2):	0.253 *
	LT	1.00	181	1,600	0.113	E-W(1):	0.459 *
Westbound	RT	1.00	117	1,600	0.017	E-W(2):	0.382
	TH	2.00	879	3,200	0.275		
	LT	1.00	177	1,600	0.111 *	V/C:	0.712
Northbound	RT	1.00	160	1,600	0.045	Lost Time:	0.100
	TH	2.00	381	3,200	0.119	ITS:	0.000
	LT	1.00	182	1,600	0.114 *		
Eastbound	RT	1.00	182	1,600	0.057	ICU:	0.812
	TH	2.00	1,115	3,200	0.348 *		
	LT	1.00	171	1,600	0.107	LOS:	D

* - Denotes critical movement

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	71	512	146	54	335	426	178	989	159	538	760	109
AMBIENT												
RELATED												
PROJECT												
TOTAL	71	512	146	54	335	426	178	989	159	538	760	109
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 426
B: 54

EastBound
A: 380
B: 538

WestBound
A: 495
B: 178

NorthBound
A: 256
B: 71

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{71 + 426 + 495 + 538}{1500} = 1.020$$

LOS = F

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	262	1,600	0.059 *	N-S(1):	0.102
	TH	2.00	135	3,200	0.042	N-S(2):	0.213 *
	LT	1.00	56	1,600	0.035	E-W(1):	0.188
Westbound	RT	1.00	99	1,600	0.044	E-W(2):	0.469 *
	TH	2.00	832	3,200	0.260 *		
	LT	1.00	36	1,600	0.023	V/C:	0.682
Northbound	RT	1.00	29	1,600	0.007	Lost Time:	0.100
	TH	2.00	215	3,200	0.067	ITS:	0.000
	LT	1.00	246	1,600	0.154 *		
Eastbound	RT	1.00	104	1,600	0.000	ICU:	0.782
	TH	2.00	527	3,200	0.165		
	LT	1.00	335	1,600	0.209 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	156	1,600	0.000	N-S(1):	0.123
	TH	2.00	201	3,200	0.063 *	N-S(2):	0.178 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.271
Westbound	RT	1.00	54	1,600	0.001	E-W(2):	0.445 *
	TH	2.00	602	3,200	0.188 *		
	LT	1.00	40	1,600	0.025	V/C:	0.623
Northbound	RT	1.00	38	1,600	0.011	Lost Time:	0.100
	TH	2.00	185	3,200	0.058	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	188	1,600	0.060	ICU:	0.723
	TH	2.00	787	3,200	0.246		
	LT	1.00	411	1,600	0.257 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	243	1,600	0.077	N-S(1):	0.228 *
	TH	2.00	278	3,200	0.087	N-S(2):	0.173
	LT	1.00	84	1,600	0.053 *	E-W(1):	0.149
Westbound	RT	1.00	46	1,600	0.003	E-W(2):	0.233 *
	TH	2.00	504	3,200	0.158 *		
	LT	1.00	63	1,600	0.039	V/C:	0.461
Northbound	RT	0.00	85	0	0.000	Lost Time:	0.100
	TH	2.00	474	3,200	0.175 *	ITS:	0.000
	LT	1.00	138	1,600	0.086		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.561
	TH	2.00	353	3,200	0.110		
	LT	1.00	120	1,600	0.075 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	208	1,600	0.046	N-S(1):	0.241 *
	TH	2.00	493	3,200	0.154	N-S(2):	0.202
	LT	1.00	137	1,600	0.086 *	E-W(1):	0.203
Westbound	RT	1.00	48	1,600	0.000	E-W(2):	0.213 *
	TH	2.00	412	3,200	0.129 *		
	LT	1.00	97	1,600	0.061	V/C:	0.454
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	435	3,200	0.155 *	ITS:	0.000
	LT	1.00	76	1,600	0.048		
Eastbound	RT	1.00	50	1,600	0.008	ICU:	0.554
	TH	2.00	455	3,200	0.142		
	LT	1.00	134	1,600	0.084 *	LOS:	A

* - Denotes critical movement

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	236	511	210	24	155	62	128	1138	515	1013	962	89
AMBIENT												
RELATED												
PROJECT												
TOTAL	236	511	210	24	155	62	128	1138	515	1013	962	89
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 155
B: 24

EastBound
A: 526
B: 557

WestBound
A: 551
B: 128

NorthBound
A: 360
B: 236

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{236 + 155 + 551 + 557}{1425} = 1.052$$

LOS = F

Developed by Chun Wong, 12/94

CalcaDB

March 31, 2010 ,Wednesday 10:31:00 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: C St I/S No: 10

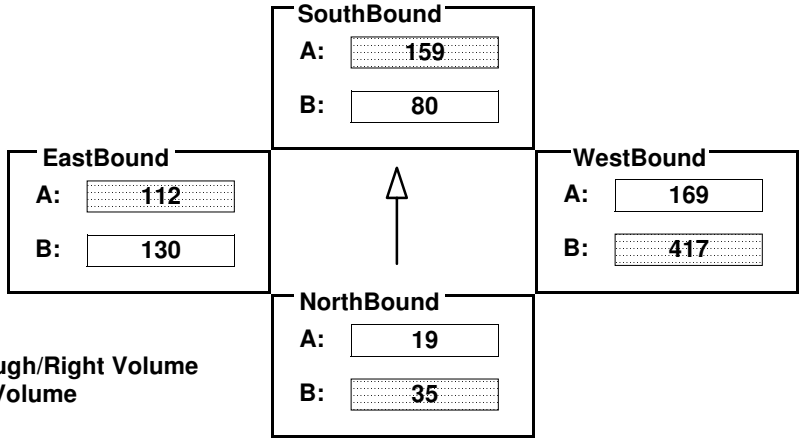
AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	63	38	574	80	74	159	759	338	92	130	223	236
AMBIENT												
RELATED												
PROJECT												
TOTAL	63	38	574	80	74	159	759	338	92	130	223	236
LANE	2	2	1	1	1	1	2	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	Free		Perm	Auto		Prot-Fix	Auto		Prot-Fix	Free	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{35 + 159 + 417 + 112}{1200} = 0.603$$

LOS = B

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Fries Av W/E: Harry Bridge Bl I/S No: 12

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	67	27	15	19	34	62	3	1002	18	94	765	51
AMBIENT												
RELATED												
PROJECT												
TOTAL	67	27	15	19	34	62	3	1002	18	94	765	51
LANE	1				1			1			1			1			1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 96
B: 19

EastBound
A: 690
B: 94

WestBound
A: 516
B: 3

NorthBound
A: 42
B: 67

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{67 + 96 + 3 + 690}{1500} = 0.571$$

LOS = A

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	697	2984	10	1120	0	1673	0	113	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	697	2984	10	1120	0	1673	0	113	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 373
B: 0

EastBound
A: 0
B: 0

WestBound
A: 595
B: 595

NorthBound
A: 349
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 373 + 595 + 0}{1500} = 0.645$$

LOS = B

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	85	1313	31	52	1025	160	66	282	64	267	339	65
AMBIENT												
RELATED												
PROJECT												
TOTAL	85	1313	31	52	1025	160	66	282	64	267	339	65
LANE	1		1		1			1			1			1			1			1			1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 593
B: 52

EastBound
A: 339
B: 267

WestBound
A: 347
B: 66

NorthBound
A: 672
B: 85

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{672 + 52 + 347 + 267}{1500} = 0.892$$

LOS = D

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.144
Loss Time (sec):	0	Average Delay (sec/veh):	8.5
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0	1 0	1 0 0	1 0	1 0	1 0 2	0 1		1 0 1	0 1	
Volume Module:												
Base Vol:	7	10	4	6	18	71	85	130	5	7	95	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	7	10	4	6	18	71	85	130	5	7	95	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	7	10	4	6	18	71	85	130	5	7	95	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	10	4	6	18	71	85	130	5	7	95	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	10	4	6	18	71	85	130	5	7	95	13
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.71	0.29	1.00	0.20	0.80	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	579	466	186	589	144	570	631	1382	796	603	660	754
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.02	0.01	0.12	0.12	0.13	0.09	0.01	0.01	0.14	0.02
Crit Moves:	****					****	****				****	
Delay/Veh:	8.7	8.0	8.0	8.6	8.1	8.1	9.1	8.3	7.1	8.5	8.8	7.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.7	8.0	8.0	8.6	8.1	8.1	9.1	8.3	7.1	8.5	8.8	7.3
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.2			8.1			8.6			8.6		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.2			8.1			8.6			8.6		
LOS by Appr:	A			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1016 Western Ave & Paseo del Mar
********************************************************************************
Average Delay (sec/veh):      3.4       Worst Case Level Of Service: B[ 11.4]
********************************************************************************
Street Name:           Western Ave                      Paseo del Mar
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    78    0    69    63  176     0     0  183    79
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    78    0    69    63  176     0     0  183    79
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    78    0    69    63  176     0     0  183    79
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    78    0    69    63  176     0     0  183    79
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   485 xxxx   183   262 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   545 xxxx   865  1314 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   525 xxxx   865  1314 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.15 xxxx  0.08  0.05 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.5 xxxx   0.3   0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  13.1 xxxx   9.5   7.9 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     A     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx             11.4           xxxxxx           xxxxxx
ApproachLOS:         *                B                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

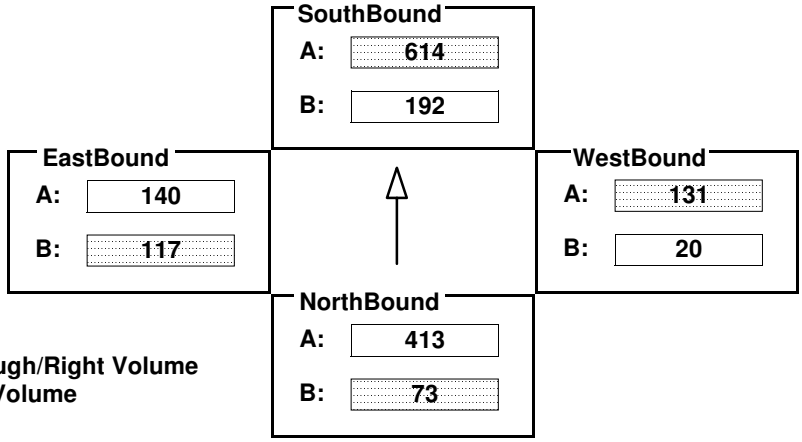
AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	73	798	27	192	1124	104	20	131	144	117	182	97
AMBIENT												
RELATED												
PROJECT												
TOTAL	73	798	27	192	1124	104	20	131	144	117	182	97
LANE	1	1	1	1	1	1	1	1	1	1	1	0
SIGNAL	Prot-Fix		Auto	Prot-Fix		Auto	Perm		Auto	Perm		Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{73 + 614 + 131 + 117}{1425} = 0.656$$

LOS = B

Developed by Chun Wong, 12/94

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: SR-47 EB On/Off Ramps I/S No: 18

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	250	348	4	654	0	614	0	2	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	250	348	4	654	0	614	0	2	0	0	0
LANE			1			1	1	2			1	
SIGNAL	Phasing: Prot-Var	RTOR: Auto		Phasing: Prot-Var	RTOR:		Phasing: Split	RTOR: OLA		Phasing:	RTOR:	

Critical Movements Diagram

SouthBound
A: 327
B: 4

EastBound
A: 0
B: 0

WestBound
A: 308
B: 308

NorthBound
A: 250
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 327 + 308 + 0}{1375} = 0.462$$

LOS = A

Developed by Chun Wong, 12/94

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Pilchard St I/S No: 19

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	2	469	0	0	1084	100	0	0	0	15	0	1
AMBIENT												
RELATED												
PROJECT												
TOTAL	2	469	0	0	1084	100	0	0	0	15	0	1

LANE	1		2					1		1		1																1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm		Perm	Auto			Split	

Critical Movements Diagram

SouthBound
A: 592
B: 0

EastBound
A: 16
B: 15

WestBound
A: 0
B: 0

NorthBound
A: 235
B: 2

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{2 + 592 + 0 + 16}{1500} = 0.407$$

LOS = A

Developed by Chun Wong, 12/94

WPAM12

October 24, 2011 ,Monday 06:53:18 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Terminal Way I/S No: 20

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	69	132	1	0	109	979				352	2	28
AMBIENT												
RELATED												
PROJECT												
TOTAL	69	132	1	0	109	979	0	0	0	352	2	28

LANE	1		2			1		1		1			1											1	1				1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm	OLA			Split	Free

Critical Movements Diagram

SouthBound
A: 802
B: 0

EastBound
A: 177
B: 177

WestBound
A: 0
B: 0

NorthBound
A: 66
B: 69

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{69 + 802 + 0 + 177}{1500} = 0.699$$

LOS = B

Developed by Chun Wong, 12/94

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Earle St W/E: Terminal Way I/S No: 21

AM/PM: AM Comments: 2017WP12AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	2	58	2	9	1	259	772	4	4	302	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	2	58	2	9	1	259	772	4	4	302	0
LANE		1			1			1			1			1			1			1			1			1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 6
B: 2

EastBound
A: 151
B: 4

WestBound
A: 388
B: 259

NorthBound
A: 58
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{58 + 2 + 259 + 151}{1500} = 0.313$$

LOS = A

Developed by Chun Wong, 12/94

WPAM12

March 31, 2010 ,Wednesday 10:31:00 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Navy Wy | W/E: Ocean Bl/Seaside Av | I/S No: 22

AM/PM: AM | Comments: 2017WP12AM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	286	0	317	0	0	0	95	2651	0	0	2506	400
AMBIENT												
RELATED												
PROJECT												
TOTAL	286	0	317	0	0	0	95	2651	0	0	2506	400
LANE	2					1							2		3							3		1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Split	Free					Prot-Fix			Prot-Fix	OLA	

Critical Movements Diagram

SouthBound
A: 0
B: 0

EastBound
A: 835
B: 0

WestBound
A: 884
B: 53

NorthBound
A: 0
B: 157

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{157 + 0 + 53 + 835}{1425} = 0.733$$

LOS = C

Developed by Chun Wong, 12/94

WPPM12

CalcaDB

March 31, 2010 ,Wednesday 10:43:20 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Sepulveda Bl I/S No: 1

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	102	397	558	209	581	170	371	1557	120	138	1611	52
AMBIENT												
RELATED												
PROJECT												
TOTAL	102	397	558	209	581	170	371	1557	120	138	1611	52
LANE	1	2	1	1	2	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	OLA		Prot-Fix	Auto		Prot-Fix	Auto		Prot-Fix	Auto	

Critical Movements Diagram

SouthBound
A: 291
B: 209

EastBound
A: 554
B: 138

WestBound
A: 559
B: 371

NorthBound
A: 199
B: 102

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{199 + 209 + 371 + 554}{1375} = 0.969$$

LOS = E

Developed by Chun Wong, 12/94

WPPM12

October 24, 2011 ,Monday 06:54:01 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

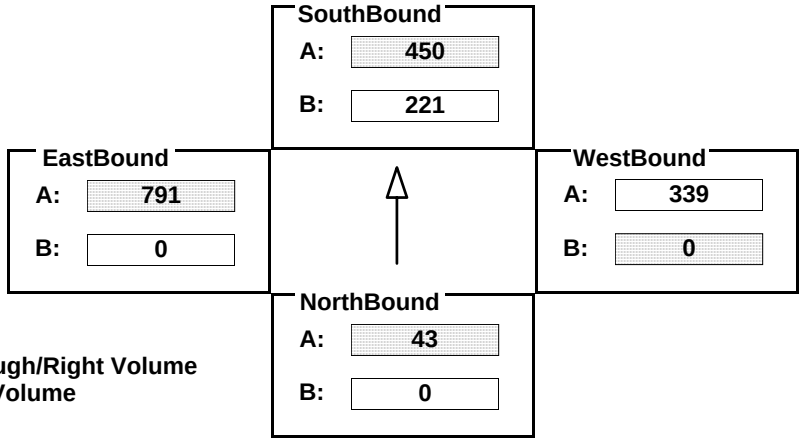
Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	43	396	46	818	2	1143	211	0	2320	53
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	43	396	46	818	2	1143	211	0	2320	53

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{43 + 450 + 0 + 791}{1500} = 0.856$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.299
	TH	0.00	0	0	0.000	N-S(2):	0.305 *
	LT	0.00	0	0	0.000	E-W(1):	0.160
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.344 *
	TH	3.00	1,565	4,800	0.328 *		
	LT	0.00	0	0	0.000	V/C:	0.649
Northbound	RT	1.00	262	1,600	0.164	Lost Time:	0.100
	TH	1.00	14	1,600	0.299	ITS:	0.000
	LT	0.00	465	1,600	0.291 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.749
	TH	3.00	765	4,800	0.160		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	120	1,600	0.075 *	N-S(1):	0.249
	TH	0.00	0	0	0.000	N-S(2):	0.307 *
	LT	0.00	0	0	0.000	E-W(1):	0.260
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.331 *
	TH	3.00	1,269	4,800	0.268 *		
	LT	0.00	2	1,600	0.001	V/C:	0.638
Northbound	RT	1.00	179	1,600	0.111	Lost Time:	0.100
	TH	1.00	27	1,600	0.249	ITS:	0.000
	LT	0.00	371	1,600	0.232 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.738
	TH	3.00	1,236	4,800	0.259		
	LT	1.00	100	1,600	0.063 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	236	1,600	0.000	N-S(1):	0.157
	TH	2.00	285	3,200	0.089 *	N-S(2):	0.212 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.340
Westbound	RT	1.00	126	1,600	0.054	E-W(2):	0.458 *
	TH	2.00	1,164	3,200	0.364 *		
	LT	1.00	139	1,600	0.087	V/C:	0.670
Northbound	RT	1.00	221	1,600	0.095	Lost Time:	0.100
	TH	2.00	345	3,200	0.108	ITS:	0.000
	LT	1.00	197	1,600	0.123 *		
Eastbound	RT	1.00	89	1,600	0.000	ICU:	0.770
	TH	2.00	809	3,200	0.253		
	LT	1.00	151	1,600	0.094 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	118	1,600	0.000	N-S(1):	0.224 *
	TH	2.00	262	3,200	0.082	N-S(2):	0.170
	LT	1.00	134	1,600	0.084 *	E-W(1):	0.414
Westbound	RT	1.00	91	1,600	0.015	E-W(2):	0.437 *
	TH	2.00	1,052	3,200	0.329 *		
	LT	1.00	118	1,600	0.074	V/C:	0.661
Northbound	RT	1.00	283	1,600	0.140 *	Lost Time:	0.100
	TH	2.00	318	3,200	0.099	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	129	1,600	0.037	ICU:	0.761
	TH	2.00	1,089	3,200	0.340		
	LT	1.00	173	1,600	0.108 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	159	1,600	0.059	N-S(1):	0.202
	TH	2.00	342	3,200	0.107 *	N-S(2):	0.205 *
	LT	1.00	143	1,600	0.089	E-W(1):	0.379
Westbound	RT	1.00	95	1,600	0.015	E-W(2):	0.407 *
	TH	2.00	1,044	3,200	0.326 *		
	LT	1.00	193	1,600	0.121	V/C:	0.612
Northbound	RT	1.00	163	1,600	0.042	Lost Time:	0.100
	TH	2.00	360	3,200	0.113	ITS:	0.000
	LT	1.00	156	1,600	0.098 *		
Eastbound	RT	1.00	123	1,600	0.028	ICU:	0.712
	TH	2.00	827	3,200	0.258		
	LT	1.00	130	1,600	0.081 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	123	1,600	0.023	N-S(1):	0.232
	TH	2.00	445	3,200	0.139 *	N-S(2):	0.253 *
	LT	1.00	181	1,600	0.113	E-W(1):	0.459 *
Westbound	RT	1.00	117	1,600	0.017	E-W(2):	0.382
	TH	2.00	879	3,200	0.275		
	LT	1.00	177	1,600	0.111 *	V/C:	0.712
Northbound	RT	1.00	160	1,600	0.045	Lost Time:	0.100
	TH	2.00	381	3,200	0.119	ITS:	0.000
	LT	1.00	182	1,600	0.114 *		
Eastbound	RT	1.00	182	1,600	0.057	ICU:	0.812
	TH	2.00	1,115	3,200	0.348 *		
	LT	1.00	171	1,600	0.107	LOS:	D

* - Denotes critical movement

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	65	400	187	121	368	370	114	745	66	465	1130	109
AMBIENT												
RELATED												
PROJECT												
TOTAL	65	400	187	121	368	370	114	745	66	465	1130	109
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 370
B: 121

EastBound
A: 565
B: 465

WestBound
A: 372
B: 114

NorthBound
A: 200
B: 65

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{65 + 370 + 372 + 465}{1500} = 0.848$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	262	1,600	0.059 *	N-S(1):	0.102
	TH	2.00	135	3,200	0.042	N-S(2):	0.213 *
	LT	1.00	56	1,600	0.035	E-W(1):	0.188
Westbound	RT	1.00	99	1,600	0.044	E-W(2):	0.469 *
	TH	2.00	832	3,200	0.260 *		
	LT	1.00	36	1,600	0.023	V/C:	0.682
Northbound	RT	1.00	29	1,600	0.007	Lost Time:	0.100
	TH	2.00	215	3,200	0.067	ITS:	0.000
	LT	1.00	246	1,600	0.154 *		
Eastbound	RT	1.00	104	1,600	0.000	ICU:	0.782
	TH	2.00	527	3,200	0.165		
	LT	1.00	335	1,600	0.209 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	156	1,600	0.000	N-S(1):	0.123
	TH	2.00	201	3,200	0.063 *	N-S(2):	0.178 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.271
Westbound	RT	1.00	54	1,600	0.001	E-W(2):	0.445 *
	TH	2.00	602	3,200	0.188 *		
	LT	1.00	40	1,600	0.025	V/C:	0.623
Northbound	RT	1.00	38	1,600	0.011	Lost Time:	0.100
	TH	2.00	185	3,200	0.058	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	188	1,600	0.060	ICU:	0.723
	TH	2.00	787	3,200	0.246		
	LT	1.00	411	1,600	0.257 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2017 ALT 1&2 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	243	1,600	0.077	N-S(1):	0.228 *
	TH	2.00	278	3,200	0.087	N-S(2):	0.173
	LT	1.00	84	1,600	0.053 *	E-W(1):	0.149
Westbound	RT	1.00	46	1,600	0.003	E-W(2):	0.233 *
	TH	2.00	504	3,200	0.158 *		
	LT	1.00	63	1,600	0.039	V/C:	0.461
Northbound	RT	0.00	85	0	0.000	Lost Time:	0.100
	TH	2.00	474	3,200	0.175 *	ITS:	0.000
	LT	1.00	138	1,600	0.086		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.561
	TH	2.00	353	3,200	0.110		
	LT	1.00	120	1,600	0.075 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	208	1,600	0.046	N-S(1):	0.241 *
	TH	2.00	493	3,200	0.154	N-S(2):	0.202
	LT	1.00	137	1,600	0.086 *	E-W(1):	0.203
Westbound	RT	1.00	48	1,600	0.000	E-W(2):	0.213 *
	TH	2.00	412	3,200	0.129 *		
	LT	1.00	97	1,600	0.061	V/C:	0.454
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	435	3,200	0.155 *	ITS:	0.000
	LT	1.00	76	1,600	0.048		
Eastbound	RT	1.00	50	1,600	0.008	ICU:	0.554
	TH	2.00	455	3,200	0.142		
	LT	1.00	134	1,600	0.084 *	LOS:	A

* - Denotes critical movement

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	239	426	248	69	168	91	87	786	487	911	1353	78
AMBIENT												
RELATED												
PROJECT												
TOTAL	239	426	248	69	168	91	87	786	487	911	1353	78
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 168
B: 69

EastBound
A: 716
B: 501

WestBound
A: 487
B: 87

NorthBound
A: 337
B: 239

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{239 + 168 + 487 + 501}{1425} = 0.979$$

LOS = E

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: C St I/S No: 10

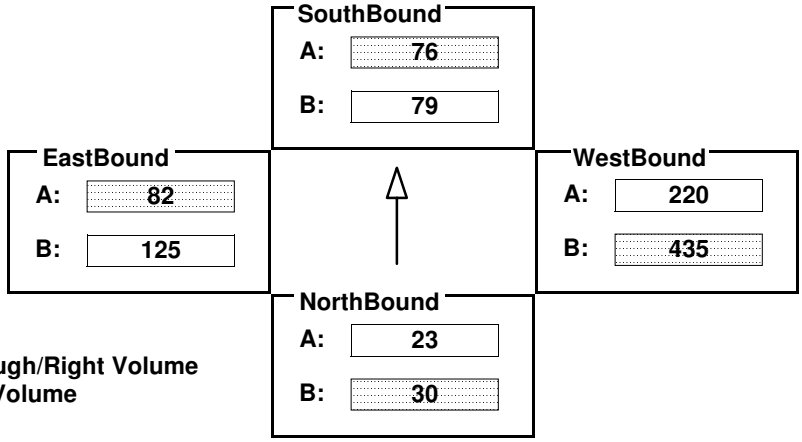
AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	54	45	747	79	62	76	791	440	120	125	163	204
AMBIENT												
RELATED												
PROJECT												
TOTAL	54	45	747	79	62	76	791	440	120	125	163	204
LANE	2	2	1	1	1	1	2	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	Free		Perm	Auto		Prot-Fix	Auto		Prot-Fix	Free	

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{30 + 76 + 435 + 82}{1200} = 0.519$$

LOS = A

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Fries Av | W/E: Harry Bridge Bl | I/S No: 12

AM/PM: PM | Comments: 2017WP12PM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	62	47	14	22	52	70	1	1093	31	76	1139	61
AMBIENT												
RELATED												
PROJECT												
TOTAL	62	47	14	22	52	70	1	1093	31	76	1139	61
LANE	1				1			1			1			1			1			1			1		
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 122
B: 22

EastBound
A: 828
B: 76

WestBound
A: 565
B: 1

NorthBound
A: 61
B: 62

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{62 + 122 + 1 + 828}{1500} = 0.675$$

LOS = B

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

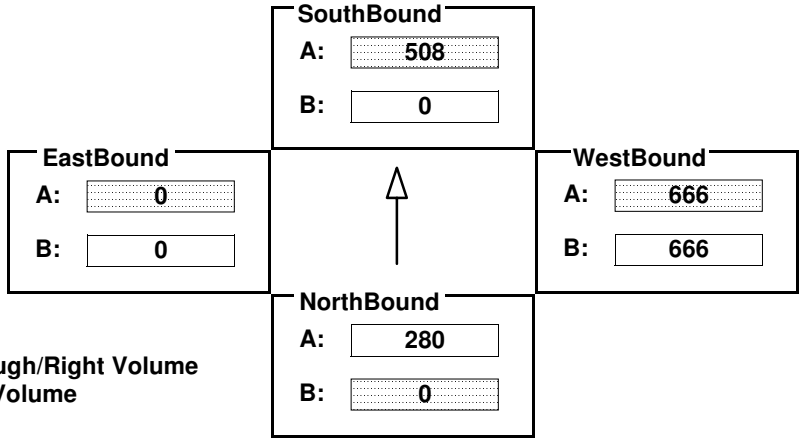
Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	560	2176	6	1525	0	1875	0	124	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	560	2176	6	1525	0	1875	0	124	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 508 + 666 + 0}{1500} = 0.783$$

LOS = C

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	78	1042	40	127	1211	171	86	277	90	202	275	79
AMBIENT												
RELATED												
PROJECT												
TOTAL	78	1042	40	127	1211	171	86	277	90	202	275	79
LANE	1		1		1			1			1			1			1			1			1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 691
B: 127

EastBound
A: 275
B: 202

WestBound
A: 367
B: 86

NorthBound
A: 541
B: 78

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{78 + 691 + 367 + 202}{1500} = 0.892$$

LOS = D

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.279
Loss Time (sec):	0	Average Delay (sec/veh):	9.4
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0	1 0	1 0 0	1 0	1 0	1 0 2	0 1	0	1 0 1	0 1	0
Volume Module:												
Base Vol:	25	14	5	17	22	82	113	143	14	6	174	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	14	5	17	22	82	113	143	14	6	174	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	14	5	17	22	82	113	143	14	6	174	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	14	5	17	22	82	113	143	14	6	174	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	25	14	5	17	22	82	113	143	14	6	174	9
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.74	0.26	1.00	0.21	0.79	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	537	441	157	549	139	517	589	1280	729	570	623	704
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.03	0.03	0.16	0.16	0.19	0.11	0.02	0.01	0.28	0.01
Crit Moves:	****					****	****				****	
Delay/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.3	7.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.3	7.6
LOS by Move:	A	A	A	A	A	A	A	A	A	A	B	A
ApproachDel:	8.9			8.8			9.2			10.1		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.9			8.8			9.2			10.1		
LOS by Appr:	A			A			A			B		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.4	0.0

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1016 Western Ave & Paseo del Mar
********************************************************************************
Average Delay (sec/veh):      2.2       Worst Case Level Of Service: B[ 12.1]
********************************************************************************
Street Name:           Western Ave                      Paseo del Mar
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    47    0    35    59  201     0     0  268    71
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    47    0    35    59  201     0     0  268    71
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    47    0    35    59  201     0     0  268    71
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    47    0    35    59  201     0     0  268    71
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   587 xxxx   268   339 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   475 xxxx   776  1231 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   458 xxxx   776  1231 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.10 xxxx  0.05  0.05 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.3 xxxx   0.1   0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  13.8 xxxx   9.9   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     A     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx             12.1           xxxxxx           xxxxxx
ApproachLOS:         *                B                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	88	1084	37	113	738	99	41	137	187	164	155	75
AMBIENT												
RELATED												
PROJECT												
TOTAL	88	1084	37	113	738	99	41	137	187	164	155	75
LANE	1	1	1	1	1	1	1	1	1	1	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 419
B: 113

EastBound
A: 115
B: 164

WestBound
A: 137
B: 41

NorthBound
A: 561
B: 88

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{561 + 113 + 137 + 164}{1425} = 0.684$$

LOS = B

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: SR-47 EB On/Off Ramps I/S No: 18

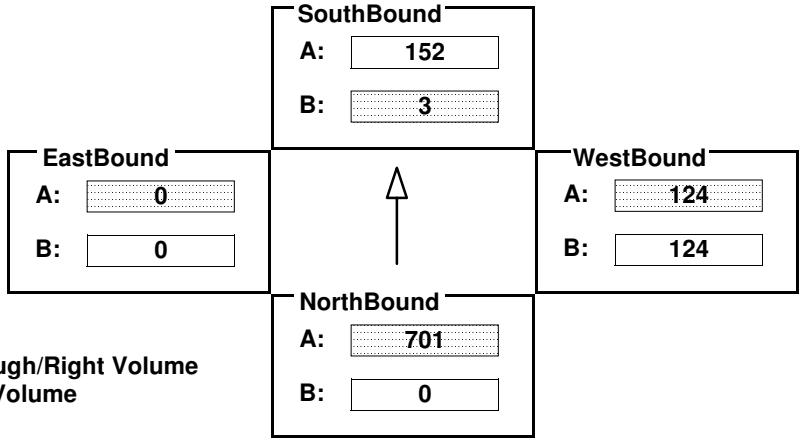
AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	631	763	3	304	0	246	0	2	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	631	763	3	304	0	246	0	2	0	0	0
LANE			1			1	1	2			1	
SIGNAL	Phasing: Prot-Var	RTOR: Auto		Phasing: Prot-Var	RTOR:		Phasing: Split	RTOR: OLA		Phasing:	RTOR:	

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{701 + 3 + 124 + 0}{1375} = 0.602$$

LOS = B

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Pilchard St I/S No: 19

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	5	1110	0	0	450	14	0	0	0	139	0	2
AMBIENT												
RELATED												
PROJECT												
TOTAL	5	1110	0	0	450	14	0	0	0	139	0	2

LANE	1		2					1		1		1																1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm		Perm	Auto			Split	

Critical Movements Diagram

SouthBound
A: 232
B: 0

EastBound
A: 141
B: 139

WestBound
A: 0
B: 0

NorthBound
A: 555
B: 5

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{555 + 0 + 0 + 141}{1500} = 0.464$$

LOS = A

Developed by Chun Wong, 12/94

WPPM12

October 24, 2011 ,Monday 06:54:01 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Ferry St W/E: Terminal Way I/S No: 20

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	71	185	0	0	96	363				913	2	104
AMBIENT												
RELATED												
PROJECT												
TOTAL	71	185	0	0	96	363	0	0	0	913	2	104

LANE	1		2			1		1		1			1											1	1				1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm	OLA			Split	Free

Critical Movements Diagram

SouthBound
A: 96
B: 0

EastBound
A: 457
B: 457

WestBound
A: 0
B: 0

NorthBound
A: 93
B: 71

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{71 + 96 + 0 + 457}{1500} = 0.416$$

LOS = A

Developed by Chun Wong, 12/94

WPPM12

CalcaDB

March 31, 2010 ,Wednesday 10:43:20 AM

INTERSECTION DATA SUMMARY SHEET

N/S: Earle St W/E: Terminal Way I/S No: 21

AM/PM: PM Comments: 2017WP12PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	2	20	180	1	13	1	124	282	3	4	824	3
AMBIENT												
RELATED												
PROJECT												
TOTAL	2	20	180	1	13	1	124	282	3	4	824	3
LANE		1			1			1			1		1		1		1		1		1		1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 8
B: 1

EastBound
A: 413
B: 4

WestBound
A: 143
B: 124

NorthBound
A: 180
B: 2

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{180 + 1 + 124 + 413}{1500} = 0.479$$

LOS = A

Developed by Chun Wong, 12/94

WPPM12

March 31, 2010 ,Wednesday 10:43:20 AM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Navy Wy | W/E: Ocean Bl/Seaside Av | I/S No: 22

AM/PM: PM | Comments: 2017WP12PM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	464	0	1067	0	0	0	21	2653	0	0	3166	257
AMBIENT												
RELATED												
PROJECT												
TOTAL	464	0	1067	0	0	0	21	2653	0	0	3166	257
LANE	2					1							2		3							3			1	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Split	Free					Prot-Fix			Prot-Fix	OLA	

Critical Movements Diagram

SouthBound
A: 0
B: 0

EastBound
A: 1055
B: 0

WestBound
A: 884
B: 12

NorthBound
A: 0
B: 255

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{255 + 0 + 12 + 1055}{1425} = 0.928$$

LOS = E

Developed by Chun Wong, 12/94

ALTERNATIVE 3 (PROJECT) LEVEL OF SERVICE WORKSHEETS

CalcaDB

March 24, 2010 ,Wednesday 02:00:55 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Sepulveda Bl | I/S No: 1

AM/PM: AM | Comments: 2019WP3AM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	132	493	651	216	435	169	402	1815	96	121	1477	17
AMBIENT												
RELATED												
PROJECT												
TOTAL	132	493	651	216	435	169	402	1815	96	121	1477	17
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 218
B: 216

EastBound
A: 498
B: 121

WestBound
A: 637
B: 402

NorthBound
A: 249
B: 132

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{249 + 216 + 402 + 498}{1375} = 0.993$$

LOS = E

Developed by Chun Wong, 12/94

WPAM3

October 24, 2011 ,Monday 06:57:24 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: AM Comments: 2019WP3AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	46	277	32	1024	1	1291	250	0	2216	56
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	46	277	32	1024	1	1291	250	0	2216	56

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 563
B: 154

EastBound
A: 757
B: 0

WestBound
A: 385
B: 0

NorthBound
A: 46
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{46 + 563 + 0 + 757}{1500} = 0.911$$

LOS = E

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.303
	TH	0.00	0	0	0.000	N-S(2):	0.308 *
	LT	0.00	0	0	0.000	E-W(1):	0.163
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.349 *
	TH	3.00	1,590	4,800	0.333 *		
	LT	0.00	0	0	0.000	V/C:	0.657
Northbound	RT	1.00	266	1,600	0.166	Lost Time:	0.100
	TH	1.00	14	1,600	0.303	ITS:	0.000
	LT	0.00	471	1,600	0.294 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.757
	TH	3.00	782	4,800	0.163		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	122	1,600	0.076 *	N-S(1):	0.253
	TH	0.00	0	0	0.000	N-S(2):	0.311 *
	LT	0.00	0	0	0.000	E-W(1):	0.265
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.336 *
	TH	3.00	1,290	4,800	0.272 *		
	LT	0.00	2	1,600	0.001	V/C:	0.647
Northbound	RT	1.00	181	1,600	0.113	Lost Time:	0.100
	TH	1.00	28	1,600	0.253	ITS:	0.000
	LT	0.00	376	1,600	0.235 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.747
	TH	3.00	1,259	4,800	0.264		
	LT	1.00	102	1,600	0.064 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	239	1,600	0.000	N-S(1):	0.156
	TH	2.00	283	3,200	0.088 *	N-S(2):	0.216 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.344
Westbound	RT	1.00	128	1,600	0.055	E-W(2):	0.463 *
	TH	2.00	1,178	3,200	0.368 *		
	LT	1.00	140	1,600	0.088	V/C:	0.679
Northbound	RT	1.00	224	1,600	0.096	Lost Time:	0.100
	TH	2.00	343	3,200	0.107	ITS:	0.000
	LT	1.00	204	1,600	0.128 *		
Eastbound	RT	1.00	98	1,600	0.000	ICU:	0.779
	TH	2.00	819	3,200	0.256		
	LT	1.00	152	1,600	0.095 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	119	1,600	0.000	N-S(1):	0.226 *
	TH	2.00	259	3,200	0.081	N-S(2):	0.173
	LT	1.00	135	1,600	0.084 *	E-W(1):	0.419
Westbound	RT	1.00	92	1,600	0.015	E-W(2):	0.442 *
	TH	2.00	1,065	3,200	0.333 *		
	LT	1.00	119	1,600	0.074	V/C:	0.668
Northbound	RT	1.00	287	1,600	0.142 *	Lost Time:	0.100
	TH	2.00	315	3,200	0.098	ITS:	0.000
	LT	1.00	147	1,600	0.092		
Eastbound	RT	1.00	138	1,600	0.040	ICU:	0.768
	TH	2.00	1,103	3,200	0.345		
	LT	1.00	175	1,600	0.109 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	161	1,600	0.060	N-S(1):	0.205
	TH	2.00	346	3,200	0.108 *	N-S(2):	0.207 *
	LT	1.00	145	1,600	0.091	E-W(1):	0.385
Westbound	RT	1.00	96	1,600	0.015	E-W(2):	0.412 *
	TH	2.00	1,057	3,200	0.330 *		
	LT	1.00	196	1,600	0.123	V/C:	0.619
Northbound	RT	1.00	165	1,600	0.042	Lost Time:	0.100
	TH	2.00	364	3,200	0.114	ITS:	0.000
	LT	1.00	158	1,600	0.099 *		
Eastbound	RT	1.00	125	1,600	0.029	ICU:	0.719
	TH	2.00	837	3,200	0.262		
	LT	1.00	131	1,600	0.082 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	125	1,600	0.024	N-S(1):	0.235
	TH	2.00	450	3,200	0.141 *	N-S(2):	0.256 *
	LT	1.00	183	1,600	0.114	E-W(1):	0.465 *
Westbound	RT	1.00	119	1,600	0.017	E-W(2):	0.387
	TH	2.00	890	3,200	0.278		
	LT	1.00	179	1,600	0.112 *	V/C:	0.721
Northbound	RT	1.00	162	1,600	0.045	Lost Time:	0.100
	TH	2.00	386	3,200	0.121	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	185	1,600	0.058	ICU:	0.821
	TH	2.00	1,129	3,200	0.353 *		
	LT	1.00	174	1,600	0.109	LOS:	D

* - Denotes critical movement

WPAM3

March 24, 2010 ,Wednesday 02:00:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Lomita Bl | I/S No: 6

AM/PM: AM | Comments: 2019WP3AM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	72	519	148	55	339	431	180	999	161	545	768	110
AMBIENT												
RELATED												
PROJECT												
TOTAL	72	519	148	55	339	431	180	999	161	545	768	110
LANE	1		2			1		1		1		1			1		2			1		1		2			1	
	Phasing		RTOR	Phasing		RTOR	Phasing		RTOR	Phasing		RTOR
SIGNAL	Perm		Auto	Perm		Auto	Perm		Auto	Perm		Auto

Critical Movements Diagram

SouthBound
A: 431
B: 55

EastBound
A: 384
B: 545

WestBound
A: 500
B: 180

NorthBound
A: 259
B: 72

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{72 + 431 + 500 + 545}{1500} = 1.032$$

LOS = F

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	261	1,600	0.058 *	N-S(1):	0.116
	TH	2.00	181	3,200	0.057	N-S(2):	0.215 *
	LT	1.00	55	1,600	0.034	E-W(1):	0.191
Westbound	RT	1.00	98	1,600	0.044	E-W(2):	0.473 *
	TH	2.00	842	3,200	0.263 *		
	LT	1.00	38	1,600	0.024	V/C:	0.688
Northbound	RT	1.00	32	1,600	0.008	Lost Time:	0.100
	TH	2.00	263	3,200	0.082	ITS:	0.000
	LT	1.00	251	1,600	0.157 *		
Eastbound	RT	1.00	107	1,600	0.000	ICU:	0.788
	TH	2.00	533	3,200	0.167		
	LT	1.00	336	1,600	0.210 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.000	N-S(1):	0.138
	TH	2.00	248	3,200	0.078 *	N-S(2):	0.196 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.275
Westbound	RT	1.00	53	1,600	0.001	E-W(2):	0.448 *
	TH	2.00	609	3,200	0.190 *		
	LT	1.00	42	1,600	0.026	V/C:	0.644
Northbound	RT	1.00	40	1,600	0.012	Lost Time:	0.100
	TH	2.00	233	3,200	0.073	ITS:	0.000
	LT	1.00	188	1,600	0.118 *		
Eastbound	RT	1.00	193	1,600	0.062	ICU:	0.744
	TH	2.00	796	3,200	0.249		
	LT	1.00	412	1,600	0.258 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	246	1,600	0.078	N-S(1):	0.230 *
	TH	2.00	281	3,200	0.088	N-S(2):	0.176
	LT	1.00	85	1,600	0.053 *	E-W(1):	0.151
Westbound	RT	1.00	47	1,600	0.003	E-W(2):	0.235 *
	TH	2.00	509	3,200	0.159 *		
	LT	1.00	63	1,600	0.039	V/C:	0.465
Northbound	RT	0.00	86	0	0.000	Lost Time:	0.100
	TH	2.00	480	3,200	0.177 *	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.565
	TH	2.00	358	3,200	0.112		
	LT	1.00	121	1,600	0.076 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	211	1,600	0.048	N-S(1):	0.243 *
	TH	2.00	499	3,200	0.156	N-S(2):	0.204
	LT	1.00	138	1,600	0.086 *	E-W(1):	0.205
Westbound	RT	1.00	49	1,600	0.000	E-W(2):	0.214 *
	TH	2.00	417	3,200	0.130 *		
	LT	1.00	98	1,600	0.061	V/C:	0.457
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	441	3,200	0.157 *	ITS:	0.000
	LT	1.00	77	1,600	0.048		
Eastbound	RT	1.00	51	1,600	0.008	ICU:	0.557
	TH	2.00	461	3,200	0.144		
	LT	1.00	135	1,600	0.084 *	LOS:	A

* - Denotes critical movement

WPAM3

March 24, 2010 ,Wednesday 02:00:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: AM Comments: 2019WP3AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	239	519	213	24	153	63	129	1152	521	1026	974	90
AMBIENT												
RELATED												
PROJECT												
TOTAL	239	519	213	24	153	63	129	1152	521	1026	974	90
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 153
B: 24

EastBound
A: 532
B: 564

WestBound
A: 558
B: 129

NorthBound
A: 366
B: 239

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{239 + 153 + 558 + 564}{1425} = 1.062$$

LOS = F

Developed by Chun Wong, 12/94

WPAM3

March 24, 2010 ,Wednesday 02:00:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: AM Comments: 2019WP3AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	704	3008	0	1145	0	1723	0	114	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	704	3008	0	1145	0	1723	0	114	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 382
B: 0

EastBound
A: 0
B: 0

WestBound
A: 612
B: 612

NorthBound
A: 352
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 382 + 612 + 0}{1500} = 0.663$$

LOS = B

Developed by Chun Wong, 12/94

WPAM3

March 24, 2010 ,Wednesday 02:00:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

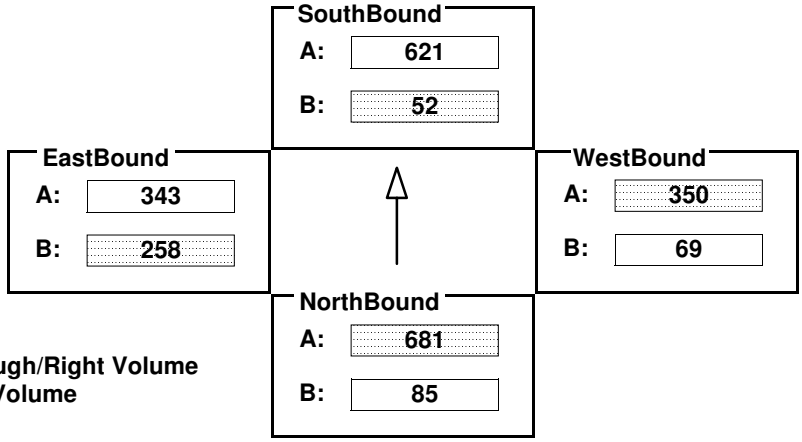
AM/PM: AM Comments: 2019WP3AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	85	1331	32	52	1072	170	69	286	65	258	343	69
AMBIENT												
RELATED												
PROJECT												
TOTAL	85	1331	32	52	1072	170	69	286	65	258	343	69
LANE	1	1	1	1	1	1	1	1	1	1	1	1
SIGNAL	Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto	

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{681 + 52 + 350 + 258}{1500} = 0.894$$

LOS = D

Developed by Chun Wong, 12/94

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.185
Loss Time (sec):	0	Average Delay (sec/veh):	8.7
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 2 0 1			1 0 1 0 1		
Volume Module:												
Base Vol:	7	11	4	6	18	115	88	131	5	7	98	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	7	11	4	6	18	115	88	131	5	7	98	13
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	7	11	4	6	18	115	88	131	5	7	98	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	7	11	4	6	18	115	88	131	5	7	98	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	11	4	6	18	115	88	131	5	7	98	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	11	4	6	18	115	88	131	5	7	98	13
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.73	0.27	1.00	0.14	0.86	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	570	469	170	587	97	620	613	1339	768	585	639	727
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.02	0.01	0.19	0.19	0.14	0.10	0.01	0.01	0.15	0.02
Crit Moves:		****			****		****				****	
Delay/Veh:	8.8	8.1	8.1	8.6	8.5	8.5	9.3	8.4	7.2	8.7	9.0	7.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.8	8.1	8.1	8.6	8.5	8.5	9.3	8.4	7.2	8.7	9.0	7.5
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:		8.3			8.5			8.8			8.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		8.3			8.5			8.8			8.8	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.2	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 3.3 Worst Case Level Of Service: B[11.7]

Street Name:	Western Ave								Paseo del Mar							
Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1
Volume Module:																				
Base Vol:	0	0	0			79	0			73	64	180			0	0	206			80
Growth Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
Initial Bse:	0	0	0			79	0			73	64	180			0	0	206			80
Added Vol:	0	0	0			0	0			0	0	0			0	0	0			0
PasserByVol:	0	0	0			0	0			0	0	0			0	0	0			0
Initial Fut:	0	0	0			79	0			73	64	180			0	0	206			80
User Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Adj:	1.00	1.00	1.00			1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00
PHF Volume:	0	0	0			79	0			73	64	180			0	0	206			80
Reduct Vol:	0	0	0			0	0			0	0	0			0	0	0			0
FinalVolume:	0	0	0			79	0			73	64	180			0	0	206			80
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx			6.4	xxxx			6.2	4.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
FollowUpTim:	xxxxx	xxxx	xxxxx			3.5	xxxx			3.3	2.2	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx			514	xxxx			206	286	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Potent Cap.:	xxxx	xxxx	xxxxx			524	xxxx			840	1288	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Move Cap.:	xxxx	xxxx	xxxxx			504	xxxx			840	1288	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Volume/Cap:	xxxx	xxxx	xxxx			0.16	xxxx			0.09	0.05	xxxx	xxxx		xxxx	xxxx	xxxx			
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx			0.6	xxxx			0.3	0.2	xxxx	xxxxx		xxxx	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx			13.5	xxxx			9.7	7.9	xxxx	xxxxx		xxxxx	xxxx	xxxxx			
LOS by Move:	*	*	*			B	*			A	A	*	*		*	*	*			
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*			*	*			*	*	*			*	*	*			
ApproachDel:	xxxxxx					11.7					xxxxxx					xxxxxx				
ApproachLOS:	*					B					*					*				

Note: Queue reported is the number of cars per lane.

WPAM3

March 24, 2010 ,Wednesday 02:00:55 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

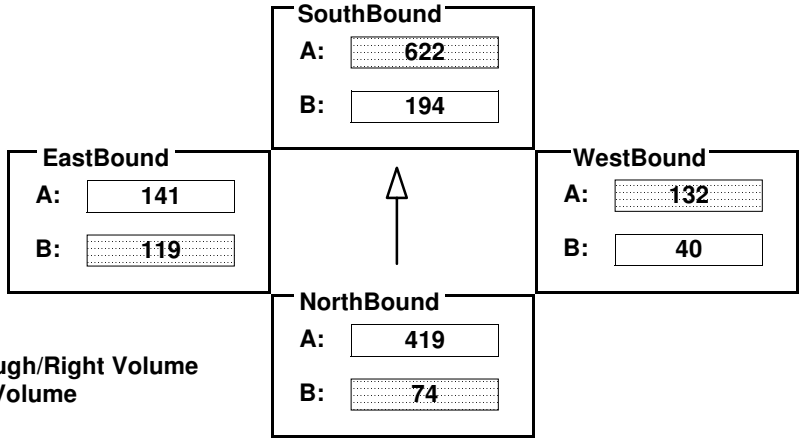
AM/PM: AM Comments: 2019WP3AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	74	808	29	194	1138	105	40	132	146	119	184	98
AMBIENT												
RELATED												
PROJECT												
TOTAL	74	808	29	194	1138	105	40	132	146	119	184	98
LANE	1		1		1			1		1			1		1			1		1		1	0	
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	Auto		Prot-Fix	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{74 + 622 + 132 + 119}{1425} = 0.665$$

LOS = B

Developed by Chun Wong, 12/94

CalcaDB

March 24, 2010 ,Wednesday 02:05:41 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Sepulveda Bl | I/S No: 1

AM/PM: PM | Comments: 2019WP3PM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	104	402	565	212	589	172	376	1576	122	140	1631	53
AMBIENT												
RELATED												
PROJECT												
TOTAL	104	402	565	212	589	172	376	1576	122	140	1631	53
LANE	1	2	1	1	2	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	OLA		Prot-Fix	Auto		Prot-Fix	Auto		Prot-Fix	Auto	

Critical Movements Diagram

SouthBound
A: 294
B: 212

EastBound
A: 561
B: 140

WestBound
A: 566
B: 376

NorthBound
A: 201
B: 104

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{201 + 212 + 376 + 561}{1375} = 0.982$$

LOS = E

Developed by Chun Wong, 12/94

WPPM3

October 24, 2011 ,Monday 06:58:14 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: PM Comments: 2019WP3PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	43	408	47	828	2	1157	214	0	2348	54
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	43	408	47	828	2	1157	214	0	2348	54

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 455
B: 227

EastBound
A: 801
B: 0

WestBound
A: 343
B: 0

NorthBound
A: 43
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{43 + 455 + 0 + 801}{1500} = 0.866$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 JWPCP Outfall System MFP**
Intersection: **Sepulveda Bl & NB I-110 Off Ramp**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.303
	TH	0.00	0	0	0.000	N-S(2):	0.308 *
	LT	0.00	0	0	0.000	E-W(1):	0.163
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.349 *
	TH	3.00	1,590	4,800	0.333 *		
	LT	0.00	0	0	0.000	V/C:	0.657
Northbound	RT	1.00	266	1,600	0.166	Lost Time:	0.100
	TH	1.00	14	1,600	0.303	ITS:	0.000
	LT	0.00	471	1,600	0.294 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.757
	TH	3.00	782	4,800	0.163		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	122	1,600	0.076 *	N-S(1):	0.253
	TH	0.00	0	0	0.000	N-S(2):	0.311 *
	LT	0.00	0	0	0.000	E-W(1):	0.265
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.336 *
	TH	3.00	1,290	4,800	0.272 *		
	LT	0.00	2	1,600	0.001	V/C:	0.647
Northbound	RT	1.00	181	1,600	0.113	Lost Time:	0.100
	TH	1.00	28	1,600	0.253	ITS:	0.000
	LT	0.00	376	1,600	0.235 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.747
	TH	3.00	1,259	4,800	0.264		
	LT	1.00	102	1,600	0.064 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	239	1,600	0.000	N-S(1):	0.156
	TH	2.00	283	3,200	0.088 *	N-S(2):	0.216 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.344
Westbound	RT	1.00	128	1,600	0.055	E-W(2):	0.463 *
	TH	2.00	1,178	3,200	0.368 *		
	LT	1.00	140	1,600	0.088	V/C:	0.679
Northbound	RT	1.00	224	1,600	0.096	Lost Time:	0.100
	TH	2.00	343	3,200	0.107	ITS:	0.000
	LT	1.00	204	1,600	0.128 *		
Eastbound	RT	1.00	98	1,600	0.000	ICU:	0.779
	TH	2.00	819	3,200	0.256		
	LT	1.00	152	1,600	0.095 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	119	1,600	0.000	N-S(1):	0.226 *
	TH	2.00	259	3,200	0.081	N-S(2):	0.173
	LT	1.00	135	1,600	0.084 *	E-W(1):	0.419
Westbound	RT	1.00	92	1,600	0.015	E-W(2):	0.442 *
	TH	2.00	1,065	3,200	0.333 *		
	LT	1.00	119	1,600	0.074	V/C:	0.668
Northbound	RT	1.00	287	1,600	0.142 *	Lost Time:	0.100
	TH	2.00	315	3,200	0.098	ITS:	0.000
	LT	1.00	147	1,600	0.092		
Eastbound	RT	1.00	138	1,600	0.040	ICU:	0.768
	TH	2.00	1,103	3,200	0.345		
	LT	1.00	175	1,600	0.109 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	161	1,600	0.060	N-S(1):	0.205
	TH	2.00	346	3,200	0.108 *	N-S(2):	0.207 *
	LT	1.00	145	1,600	0.091	E-W(1):	0.385
Westbound	RT	1.00	96	1,600	0.015	E-W(2):	0.412 *
	TH	2.00	1,057	3,200	0.330 *		
	LT	1.00	196	1,600	0.123	V/C:	0.619
Northbound	RT	1.00	165	1,600	0.042	Lost Time:	0.100
	TH	2.00	364	3,200	0.114	ITS:	0.000
	LT	1.00	158	1,600	0.099 *		
Eastbound	RT	1.00	125	1,600	0.029	ICU:	0.719
	TH	2.00	837	3,200	0.262		
	LT	1.00	131	1,600	0.082 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	125	1,600	0.024	N-S(1):	0.235
	TH	2.00	450	3,200	0.141 *	N-S(2):	0.256 *
	LT	1.00	183	1,600	0.114	E-W(1):	0.465 *
Westbound	RT	1.00	119	1,600	0.017	E-W(2):	0.387
	TH	2.00	890	3,200	0.278		
	LT	1.00	179	1,600	0.112 *	V/C:	0.721
Northbound	RT	1.00	162	1,600	0.045	Lost Time:	0.100
	TH	2.00	386	3,200	0.121	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	185	1,600	0.058	ICU:	0.821
	TH	2.00	1,129	3,200	0.353 *		
	LT	1.00	174	1,600	0.109	LOS:	D

* - Denotes critical movement

WPPM3

March 24, 2010 ,Wednesday 02:05:41 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Lomita Bl | I/S No: 6

AM/PM: PM | Comments: 2019WP3PM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	66	405	189	123	373	375	115	751	67	471	1142	110
AMBIENT												
RELATED												
PROJECT												
TOTAL	66	405	189	123	373	375	115	751	67	471	1142	110
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 375
B: 123

EastBound
A: 571
B: 471

WestBound
A: 376
B: 115

NorthBound
A: 203
B: 66

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{66 + 375 + 376 + 471}{1500} = 0.859$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	261	1,600	0.058 *	N-S(1):	0.116
	TH	2.00	181	3,200	0.057	N-S(2):	0.215 *
	LT	1.00	55	1,600	0.034	E-W(1):	0.191
Westbound	RT	1.00	98	1,600	0.044	E-W(2):	0.473 *
	TH	2.00	842	3,200	0.263 *		
	LT	1.00	38	1,600	0.024	V/C:	0.688
Northbound	RT	1.00	32	1,600	0.008	Lost Time:	0.100
	TH	2.00	263	3,200	0.082	ITS:	0.000
	LT	1.00	251	1,600	0.157 *		
Eastbound	RT	1.00	107	1,600	0.000	ICU:	0.788
	TH	2.00	533	3,200	0.167		
	LT	1.00	336	1,600	0.210 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.000	N-S(1):	0.138
	TH	2.00	248	3,200	0.078 *	N-S(2):	0.196 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.275
Westbound	RT	1.00	53	1,600	0.001	E-W(2):	0.448 *
	TH	2.00	609	3,200	0.190 *		
	LT	1.00	42	1,600	0.026	V/C:	0.644
Northbound	RT	1.00	40	1,600	0.012	Lost Time:	0.100
	TH	2.00	233	3,200	0.073	ITS:	0.000
	LT	1.00	188	1,600	0.118 *		
Eastbound	RT	1.00	193	1,600	0.062	ICU:	0.744
	TH	2.00	796	3,200	0.249		
	LT	1.00	412	1,600	0.258 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2019 ALT 3 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	246	1,600	0.078	N-S(1):	0.230 *
	TH	2.00	281	3,200	0.088	N-S(2):	0.176
	LT	1.00	85	1,600	0.053 *	E-W(1):	0.151
Westbound	RT	1.00	47	1,600	0.003	E-W(2):	0.235 *
	TH	2.00	509	3,200	0.159 *		
	LT	1.00	63	1,600	0.039	V/C:	0.465
Northbound	RT	0.00	86	0	0.000	Lost Time:	0.100
	TH	2.00	480	3,200	0.177 *	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.565
	TH	2.00	358	3,200	0.112		
	LT	1.00	121	1,600	0.076 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	211	1,600	0.048	N-S(1):	0.243 *
	TH	2.00	499	3,200	0.156	N-S(2):	0.204
	LT	1.00	138	1,600	0.086 *	E-W(1):	0.205
Westbound	RT	1.00	49	1,600	0.000	E-W(2):	0.214 *
	TH	2.00	417	3,200	0.130 *		
	LT	1.00	98	1,600	0.061	V/C:	0.457
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	441	3,200	0.157 *	ITS:	0.000
	LT	1.00	77	1,600	0.048		
Eastbound	RT	1.00	51	1,600	0.008	ICU:	0.557
	TH	2.00	461	3,200	0.144		
	LT	1.00	135	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

March 24, 2010 ,Wednesday 02:05:41 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: PM Comments: 2019WP3PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	242	427	251	70	172	92	88	796	493	922	1370	79
AMBIENT												
RELATED												
PROJECT												
TOTAL	242	427	251	70	172	92	88	796	493	922	1370	79
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 172
B: 70

EastBound
A: 725
B: 507

WestBound
A: 493
B: 88

NorthBound
A: 339
B: 242

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{242 + 172 + 493 + 507}{1425} = 0.992$$

LOS = E

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: PM Comments: 2019WP3PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	566	2245	0	1528	0	1900	0	126	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	566	2245	0	1528	0	1900	0	126	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 509
B: 0

EastBound
A: 0
B: 0

WestBound
A: 675
B: 675

NorthBound
A: 283
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 509 + 675 + 0}{1500} = 0.789$$

LOS = C

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: PM Comments: 2019WP3PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	83	1089	42	128	1228	160	87	280	91	212	278	80
AMBIENT												
RELATED												
PROJECT												
TOTAL	83	1089	42	128	1228	160	87	280	91	212	278	80
LANE	1	1	1	1	1	1	1	1	1	1	1	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Perm	Auto		Perm	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram

SouthBound
A: 694
B: 128

EastBound
A: 278
B: 212

WestBound
A: 371
B: 87

NorthBound
A: 566
B: 83

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{83 + 694 + 371 + 212}{1500} = 0.907$$

LOS = E

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.289
Loss Time (sec):	0	Average Delay (sec/veh):	9.7
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0	1 0		1 0 0	1 0		1 0 2	0 1		1 0 1	0 1	
Volume Module:												
Base Vol:	25	14	5	17	22	85	157	147	14	6	176	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	14	5	17	22	85	157	147	14	6	176	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	25	14	5	17	22	85	157	147	14	6	176	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	14	5	17	22	85	157	147	14	6	176	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	14	5	17	22	85	157	147	14	6	176	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	25	14	5	17	22	85	157	147	14	6	176	10
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.74	0.26	1.00	0.21	0.79	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	523	428	153	536	131	508	587	1274	725	558	608	685
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.03	0.03	0.17	0.17	0.27	0.12	0.02	0.01	0.29	0.01
Crit Moves:	****					****	****				****	
Delay/Veh:	9.4	8.6	8.6	9.2	9.0	9.0	10.7	8.8	7.5	9.0	10.6	7.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.4	8.6	8.6	9.2	9.0	9.0	10.7	8.8	7.5	9.0	10.6	7.8
LOS by Move:	A	A	A	A	A	A	B	A	A	A	B	A
ApproachDel:	9.1			9.0			9.7			10.4		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	9.1			9.0			9.7			10.4		
LOS by Appr:	A			A			A			B		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.1	0.0	0.0	0.4	0.0

Note: Queue reported is the number of cars per lane.

```
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #1016 Western Ave & Paseo del Mar
******************************************************************************
Average Delay (sec/veh):      2.1       Worst Case Level Of Service: B[ 12.4]
******************************************************************************
Street Name:           Western Ave                      Paseo del Mar
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    48    0    35    62  224     0     0  273    72
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    48    0    35    62  224     0     0  273    72
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    48    0    35    62  224     0     0  273    72
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    48    0    35    62  224     0     0  273    72
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    48    0    35    62  224     0     0  273    72
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   621 xxxx   273   345 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   454 xxxx   771  1225 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   437 xxxx   771  1225 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.11 xxxx  0.05  0.05 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.4 xxxx   0.1   0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  14.3 xxxx   9.9   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     A     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx             12.4           xxxxxx           xxxxxx
ApproachLOS:         *               B                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

WPPM3

March 24, 2010 ,Wednesday 02:05:41 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: PM Comments: 2019WP3PM

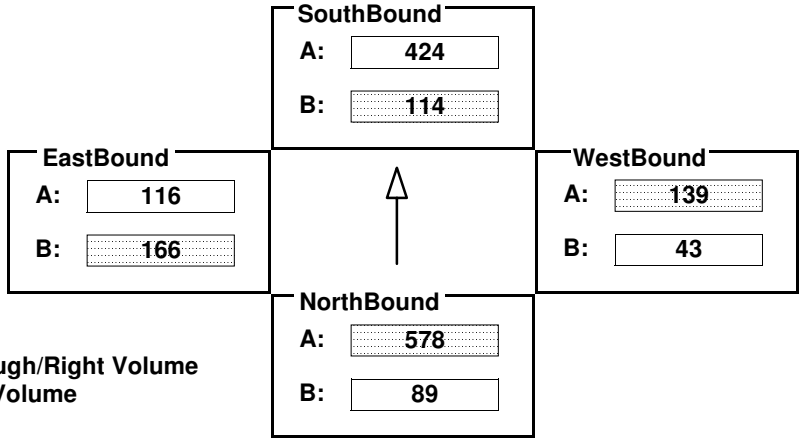
COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	89	1098	58	114	747	101	43	139	189	166	157	76
AMBIENT												
RELATED												
PROJECT												
TOTAL	89	1098	58	114	747	101	43	139	189	166	157	76
LANE	1	1	1	1	1	1	1	1	1	1	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{578 + 114 + 139 + 166}{1425} = 0.700$$

LOS = B

Developed by Chun Wong, 12/94

ALTERNATIVE 4 (PROJECT) LEVEL OF SERVICE WORKSHEETS

CalcaDB

September 21, 2011 ,Wednesday 12:55:14 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Sepulveda Bl | I/S No: 1

AM/PM: AM | Comments: 2019WP4AM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	132	493	651	216	435	169	402	1815	96	121	1477	17
AMBIENT												
RELATED												
PROJECT												
TOTAL	132	493	651	216	435	169	402	1815	96	121	1477	17
LANE	1	2	1	1	2	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	OLA	Prot-Fix	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 218
B: 216

EastBound
A: 498
B: 121

WestBound
A: 637
B: 402

NorthBound
A: 249
B: 132

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{249 + 216 + 402 + 498}{1375} = 0.993$$

LOS = E

Developed by Chun Wong, 12/94

WPAM4

October 24, 2011 ,Monday 06:59:04 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: AM Comments: 2019WP4AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	46	269	32	1024	1	1291	250	0	2216	56
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	46	269	32	1024	1	1291	250	0	2216	56

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 563
B: 150

EastBound
A: 757
B: 0

WestBound
A: 385
B: 0

NorthBound
A: 46
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{46 + 563 + 0 + 757}{1500} = 0.911$$

LOS = E

Developed by Chun Wong, 12/94

Project Title: LA07-2153 JWPCP Outfall System MFP
Intersection: Sepulveda Bl & NB I-110 Off Ramp
Description: 2019 ALT 4 WITH PROJECT CONDITIONS

Date/Time: AM PEAK HOUR (7:30-8:30)

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.303
	TH	0.00	0	0	0.000	N-S(2):	0.308 *
	LT	0.00	0	0	0.000	E-W(1):	0.161
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.347 *
	TH	3.00	1,584	4,800	0.331 *		
	LT	0.00	0	0	0.000	V/C:	0.655
Northbound	RT	1.00	266	1,600	0.166	Lost Time:	0.100
	TH	1.00	14	1,600	0.303	ITS:	0.000
	LT	0.00	471	1,600	0.294 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.755
	TH	3.00	774	4,800	0.161		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: PM PEAK HOUR (5:00-6:00)

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	122	1,600	0.076 *	N-S(1):	0.253
	TH	0.00	0	0	0.000	N-S(2):	0.311 *
	LT	0.00	0	0	0.000	E-W(1):	0.263
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.335 *
	TH	3.00	1,284	4,800	0.271 *		
	LT	0.00	2	1,600	0.001	V/C:	0.646
Northbound	RT	1.00	181	1,600	0.113	Lost Time:	0.100
	TH	1.00	28	1,600	0.253	ITS:	0.000
	LT	0.00	376	1,600	0.235 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.746
	TH	3.00	1,251	4,800	0.262		
	LT	1.00	102	1,600	0.064 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	239	1,600	0.000	N-S(1):	0.156
	TH	2.00	283	3,200	0.088 *	N-S(2):	0.212 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.344
Westbound	RT	1.00	128	1,600	0.055	E-W(2):	0.463 *
	TH	2.00	1,178	3,200	0.368 *		
	LT	1.00	140	1,600	0.088	V/C:	0.675
Northbound	RT	1.00	224	1,600	0.096	Lost Time:	0.100
	TH	2.00	343	3,200	0.107	ITS:	0.000
	LT	1.00	198	1,600	0.124 *		
Eastbound	RT	1.00	90	1,600	0.000	ICU:	0.775
	TH	2.00	819	3,200	0.256		
	LT	1.00	152	1,600	0.095 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	119	1,600	0.000	N-S(1):	0.226 *
	TH	2.00	259	3,200	0.081	N-S(2):	0.169
	LT	1.00	135	1,600	0.084 *	E-W(1):	0.419
Westbound	RT	1.00	92	1,600	0.015	E-W(2):	0.442 *
	TH	2.00	1,065	3,200	0.333 *		
	LT	1.00	119	1,600	0.074	V/C:	0.668
Northbound	RT	1.00	287	1,600	0.142 *	Lost Time:	0.100
	TH	2.00	315	3,200	0.098	ITS:	0.000
	LT	1.00	141	1,600	0.088		
Eastbound	RT	1.00	130	1,600	0.037	ICU:	0.768
	TH	2.00	1,103	3,200	0.345		
	LT	1.00	175	1,600	0.109 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	161	1,600	0.060	N-S(1):	0.205
	TH	2.00	346	3,200	0.108 *	N-S(2):	0.207 *
	LT	1.00	145	1,600	0.091	E-W(1):	0.385
Westbound	RT	1.00	96	1,600	0.015	E-W(2):	0.412 *
	TH	2.00	1,057	3,200	0.330 *		
	LT	1.00	196	1,600	0.123	V/C:	0.619
Northbound	RT	1.00	165	1,600	0.042	Lost Time:	0.100
	TH	2.00	364	3,200	0.114	ITS:	0.000
	LT	1.00	158	1,600	0.099 *		
Eastbound	RT	1.00	125	1,600	0.029	ICU:	0.719
	TH	2.00	837	3,200	0.262		
	LT	1.00	131	1,600	0.082 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	125	1,600	0.024	N-S(1):	0.235
	TH	2.00	450	3,200	0.141 *	N-S(2):	0.256 *
	LT	1.00	183	1,600	0.114	E-W(1):	0.465 *
Westbound	RT	1.00	119	1,600	0.017	E-W(2):	0.387
	TH	2.00	890	3,200	0.278		
	LT	1.00	179	1,600	0.112 *	V/C:	0.721
Northbound	RT	1.00	162	1,600	0.045	Lost Time:	0.100
	TH	2.00	386	3,200	0.121	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	185	1,600	0.058	ICU:	0.821
	TH	2.00	1,129	3,200	0.353 *		
	LT	1.00	174	1,600	0.109	LOS:	D

* - Denotes critical movement

CalcaDB

September 21, 2011 ,Wednesday 12:55:14 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: AM Comments: 2019WP4AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	72	519	148	55	339	431	180	999	161	545	768	110
AMBIENT												
RELATED												
PROJECT												
TOTAL	72	519	148	55	339	431	180	999	161	545	768	110
LANE	1		2			1		1		1		1			1		2			1		1		2			1	

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 431
B: 55

EastBound
A: 384
B: 545

WestBound
A: 500
B: 180

NorthBound
A: 259
B: 72

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{72 + 431 + 500 + 545}{1500} = 1.032$$

LOS = F

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	261	1,600	0.058 *	N-S(1):	0.114
	TH	2.00	173	3,200	0.054	N-S(2):	0.215 *
	LT	1.00	55	1,600	0.034	E-W(1):	0.191
Westbound	RT	1.00	98	1,600	0.044	E-W(2):	0.473 *
	TH	2.00	842	3,200	0.263 *		
	LT	1.00	38	1,600	0.024	V/C:	0.688
Northbound	RT	1.00	32	1,600	0.008	Lost Time:	0.100
	TH	2.00	257	3,200	0.080	ITS:	0.000
	LT	1.00	251	1,600	0.157 *		
Eastbound	RT	1.00	107	1,600	0.000	ICU:	0.788
	TH	2.00	533	3,200	0.167		
	LT	1.00	336	1,600	0.210 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.000	N-S(1):	0.136
	TH	2.00	240	3,200	0.075 *	N-S(2):	0.193 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.275
Westbound	RT	1.00	53	1,600	0.001	E-W(2):	0.448 *
	TH	2.00	609	3,200	0.190 *		
	LT	1.00	42	1,600	0.026	V/C:	0.641
Northbound	RT	1.00	40	1,600	0.012	Lost Time:	0.100
	TH	2.00	227	3,200	0.071	ITS:	0.000
	LT	1.00	188	1,600	0.118 *		
Eastbound	RT	1.00	193	1,600	0.062	ICU:	0.741
	TH	2.00	796	3,200	0.249		
	LT	1.00	412	1,600	0.258 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	246	1,600	0.078	N-S(1):	0.230 *
	TH	2.00	281	3,200	0.088	N-S(2):	0.176
	LT	1.00	85	1,600	0.053 *	E-W(1):	0.151
Westbound	RT	1.00	47	1,600	0.003	E-W(2):	0.235 *
	TH	2.00	509	3,200	0.159 *		
	LT	1.00	63	1,600	0.039	V/C:	0.465
Northbound	RT	0.00	86	0	0.000	Lost Time:	0.100
	TH	2.00	480	3,200	0.177 *	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.565
	TH	2.00	358	3,200	0.112		
	LT	1.00	121	1,600	0.076 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	211	1,600	0.048	N-S(1):	0.243 *
	TH	2.00	499	3,200	0.156	N-S(2):	0.204
	LT	1.00	138	1,600	0.086 *	E-W(1):	0.205
Westbound	RT	1.00	49	1,600	0.000	E-W(2):	0.214 *
	TH	2.00	417	3,200	0.130 *		
	LT	1.00	98	1,600	0.061	V/C:	0.457
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	441	3,200	0.157 *	ITS:	0.000
	LT	1.00	77	1,600	0.048		
Eastbound	RT	1.00	51	1,600	0.008	ICU:	0.557
	TH	2.00	461	3,200	0.144		
	LT	1.00	135	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

September 21, 2011 ,Wednesday 12:55:14 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: AM Comments: 2019WP4AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	239	519	213	24	153	63	129	1152	521	1026	974	90
AMBIENT												
RELATED												
PROJECT												
TOTAL	239	519	213	24	153	63	129	1152	521	1026	974	90
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 153
B: 24

EastBound
A: 532
B: 564

WestBound
A: 558
B: 129

NorthBound
A: 366
B: 239

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{239 + 153 + 558 + 564}{1425} = 1.062$$

LOS = F

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: AM Comments: 2019WP4AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	704	3012	0	1127	0	1704	0	114	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	704	3012	0	1127	0	1704	0	114	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 376
B: 0

EastBound
A: 0
B: 0

WestBound
A: 606
B: 606

NorthBound
A: 352
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 376 + 606 + 0}{1500} = 0.655$$

LOS = B

CalcaDB

September 21, 2011 ,Wednesday 12:55:14 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

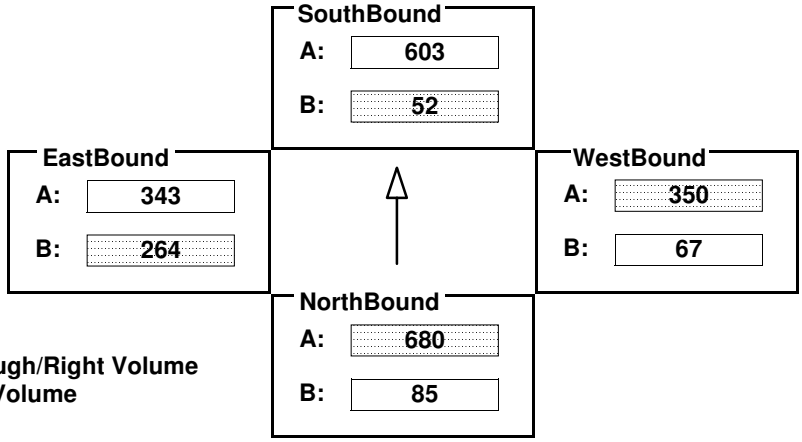
AM/PM: AM Comments: 2019WP4AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	85	1329	32	52	1038	167	67	286	65	264	343	65
AMBIENT												
RELATED												
PROJECT												
TOTAL	85	1329	32	52	1038	167	67	286	65	264	343	65
LANE	1	1	1	1	1	1	1	1	1	1	1	1
SIGNAL	Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto		Phasing: Perm	RTOR: Auto	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{680 + 52 + 350 + 264}{1500} = 0.897$$

LOS = D

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.146
Loss Time (sec):	0	Average Delay (sec/veh):	8.5
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 2 0 1			1 0 1 0 1		
Volume Module:												
Base Vol:	7	11	4	6	18	74	86	131	5	7	96	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	7	11	4	6	18	74	86	131	5	7	96	13
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	7	11	4	6	18	74	86	131	5	7	96	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	7	11	4	6	18	74	86	131	5	7	96	13
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	11	4	6	18	74	86	131	5	7	96	13
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	11	4	6	18	74	86	131	5	7	96	13
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.73	0.27	1.00	0.20	0.80	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	577	475	173	588	140	574	629	1378	794	600	656	751
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.02	0.01	0.13	0.13	0.14	0.10	0.01	0.01	0.15	0.02
Crit Moves:		****			****		****				****	
Delay/Veh:	8.7	8.1	8.1	8.6	8.2	8.2	9.1	8.3	7.1	8.5	8.8	7.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.7	8.1	8.1	8.6	8.2	8.2	9.1	8.3	7.1	8.5	8.8	7.4
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
ApproachDel:	8.3			8.2			8.6			8.7		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	8.3			8.2			8.6			8.7		
LOS by Appr:	A			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 3.3 Worst Case Level Of Service: B[11.7]

Street Name:	Western Ave						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0 0		1 0 0	0 1		1 0 1	0 0		0 0 1	0 1	
Volume Module:												
Base Vol:	0	0	0	79	0	71	64	186	0	0	201	80
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	79	0	71	64	186	0	0	201	80
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	79	0	71	64	186	0	0	201	80
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	79	0	71	64	186	0	0	201	80
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	79	0	71	64	186	0	0	201	80
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	515	xxxx	201	281	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	523	xxxx	845	1293	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	504	xxxx	845	1293	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.16	xxxx	0.08	0.05	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.6	xxxx	0.3	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	13.5	xxxx	9.7	7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	B	*	A	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			11.7			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Note: Queue reported is the number of cars per lane.

CalcaDB

September 21, 2011 ,Wednesday 12:55:14 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

AM/PM: AM Comments: 2019WP4AM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	74	808	35	194	1138	105	35	132	146	119	184	98
AMBIENT												
RELATED												
PROJECT												
TOTAL	74	808	35	194	1138	105	35	132	146	119	184	98
LANE	1	1	1	1	1	1	1	1	1	1	1	0

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Prot-Fix	Auto	Prot-Fix	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 622
B: 194

EastBound
A: 141
B: 119

WestBound
A: 132
B: 35

NorthBound
A: 422
B: 74

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{74 + 622 + 132 + 119}{1425} = 0.665$$

LOS = B

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CalcaDB

September 21, 2011 ,Wednesday 12:55:59 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av | W/E: Sepulveda Bl | I/S No: 1

AM/PM: PM | Comments: 2019WP4PM

COUNT DATE: | STUDY DATE: | GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	104	402	565	212	589	172	376	1576	122	140	1631	53
AMBIENT												
RELATED												
PROJECT												
TOTAL	104	402	565	212	589	172	376	1576	122	140	1631	53
LANE	1	2	1	1	2	1	1	2	1	1	2	1
	Phasing	RTOR		Phasing	RTOR		Phasing	RTOR		Phasing	RTOR	
SIGNAL	Prot-Fix	OLA		Prot-Fix	Auto		Prot-Fix	Auto		Prot-Fix	Auto	

Critical Movements Diagram

SouthBound
A: 294
B: 212

EastBound
A: 561
B: 140

WestBound
A: 566
B: 376

NorthBound
A: 201
B: 104

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{201 + 212 + 376 + 561}{1375} = 0.982$$

LOS = E

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WPPM4

October 24, 2011 ,Monday 06:59:47 PM

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: SB I-110 Ramp W/E: Sepulveda Bl I/S No: 2

AM/PM: PM Comments: 2019WP4PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	0	43	400	47	828	2	1157	214	0	2348	54
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	0	43	400	47	828	2	1157	214	0	2348	54

LANE						1		1	1				2				3		1				2		1		

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL			Split	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 455
B: 223

EastBound
A: 801
B: 0

WestBound
A: 343
B: 0

NorthBound
A: 43
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = A(N/B) + A(S/B)

West/East Critical Movements = B(W/B) + A(E/B)

$$V/C = \frac{43 + 455 + 0 + 801}{1500} = 0.866$$

LOS = D

Developed by Chun Wong, 12/94

Project Title: LA07-2153 JWPCP Outfall System MFP
Intersection: Sepulveda Bl & NB I-110 Off Ramp
Description: 2019 ALT 4 WITH PROJECT CONDITIONS

Date/Time: AM PEAK HOUR (7:30-8:30)

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	23	1,600	0.014 *	N-S(1):	0.303
	TH	0.00	0	0	0.000	N-S(2):	0.308 *
	LT	0.00	0	0	0.000	E-W(1):	0.161
Westbound	RT	0.00	7	0	0.000	E-W(2):	0.347 *
	TH	3.00	1,584	4,800	0.331 *		
	LT	0.00	0	0	0.000	V/C:	0.655
Northbound	RT	1.00	266	1,600	0.166	Lost Time:	0.100
	TH	1.00	14	1,600	0.303	ITS:	0.000
	LT	0.00	471	1,600	0.294 *		
Eastbound	RT	0.00	1	0	0.000	ICU:	0.755
	TH	3.00	774	4,800	0.161		
	LT	1.00	26	1,600	0.016 *	LOS:	C

Date/Time: PM PEAK HOUR (5:00-6:00)

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	122	1,600	0.076 *	N-S(1):	0.253
	TH	0.00	0	0	0.000	N-S(2):	0.311 *
	LT	0.00	0	0	0.000	E-W(1):	0.263
Westbound	RT	0.00	14	0	0.000	E-W(2):	0.335 *
	TH	3.00	1,284	4,800	0.271 *		
	LT	0.00	2	1,600	0.001	V/C:	0.646
Northbound	RT	1.00	181	1,600	0.113	Lost Time:	0.100
	TH	1.00	28	1,600	0.253	ITS:	0.000
	LT	0.00	376	1,600	0.235 *		
Eastbound	RT	0.00	7	0	0.000	ICU:	0.746
	TH	3.00	1,251	4,800	0.262		
	LT	1.00	102	1,600	0.064 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Figueroa St**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:	SBR		

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	239	1,600	0.000	N-S(1):	0.156
	TH	2.00	283	3,200	0.088 *	N-S(2):	0.212 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.344
Westbound	RT	1.00	128	1,600	0.055	E-W(2):	0.463 *
	TH	2.00	1,178	3,200	0.368 *		
	LT	1.00	140	1,600	0.088	V/C:	0.675
Northbound	RT	1.00	224	1,600	0.096	Lost Time:	0.100
	TH	2.00	343	3,200	0.107	ITS:	0.000
	LT	1.00	198	1,600	0.124 *		
Eastbound	RT	1.00	90	1,600	0.000	ICU:	0.775
	TH	2.00	819	3,200	0.256		
	LT	1.00	152	1,600	0.095 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	119	1,600	0.000	N-S(1):	0.226 *
	TH	2.00	259	3,200	0.081	N-S(2):	0.169
	LT	1.00	135	1,600	0.084 *	E-W(1):	0.419
Westbound	RT	1.00	92	1,600	0.015	E-W(2):	0.442 *
	TH	2.00	1,065	3,200	0.333 *		
	LT	1.00	119	1,600	0.074	V/C:	0.668
Northbound	RT	1.00	287	1,600	0.142 *	Lost Time:	0.100
	TH	2.00	315	3,200	0.098	ITS:	0.000
	LT	1.00	141	1,600	0.088		
Eastbound	RT	1.00	130	1,600	0.037	ICU:	0.768
	TH	2.00	1,103	3,200	0.345		
	LT	1.00	175	1,600	0.109 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Sepulveda Bl & Main St**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	161	1,600	0.060	N-S(1):	0.205
	TH	2.00	346	3,200	0.108 *	N-S(2):	0.207 *
	LT	1.00	145	1,600	0.091	E-W(1):	0.385
Westbound	RT	1.00	96	1,600	0.015	E-W(2):	0.412 *
	TH	2.00	1,057	3,200	0.330 *		
	LT	1.00	196	1,600	0.123	V/C:	0.619
Northbound	RT	1.00	165	1,600	0.042	Lost Time:	0.100
	TH	2.00	364	3,200	0.114	ITS:	0.000
	LT	1.00	158	1,600	0.099 *		
Eastbound	RT	1.00	125	1,600	0.029	ICU:	0.719
	TH	2.00	837	3,200	0.262		
	LT	1.00	131	1,600	0.082 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	125	1,600	0.024	N-S(1):	0.235
	TH	2.00	450	3,200	0.141 *	N-S(2):	0.256 *
	LT	1.00	183	1,600	0.114	E-W(1):	0.465 *
Westbound	RT	1.00	119	1,600	0.017	E-W(2):	0.387
	TH	2.00	890	3,200	0.278		
	LT	1.00	179	1,600	0.112 *	V/C:	0.721
Northbound	RT	1.00	162	1,600	0.045	Lost Time:	0.100
	TH	2.00	386	3,200	0.121	ITS:	0.000
	LT	1.00	184	1,600	0.115 *		
Eastbound	RT	1.00	185	1,600	0.058	ICU:	0.821
	TH	2.00	1,129	3,200	0.353 *		
	LT	1.00	174	1,600	0.109	LOS:	D

* - Denotes critical movement

CalcaDB

September 21, 2011 ,Wednesday 12:55:59 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Vermont Av W/E: Lomita Bl I/S No: 6

AM/PM: PM Comments: 2019WP4PM

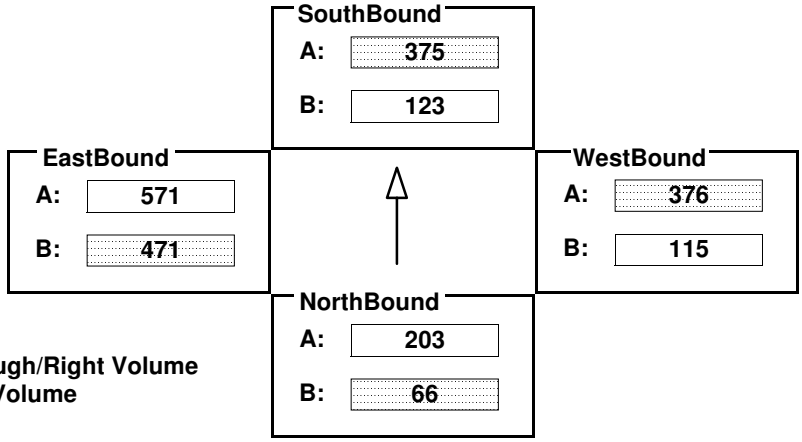
COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	66	405	189	123	373	375	115	751	67	471	1142	110
AMBIENT												
RELATED												
PROJECT												
TOTAL	66	405	189	123	373	375	115	751	67	471	1142	110
LANE	1	2	1	1	1	1	1	2	1	1	2	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram



A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{66 + 375 + 376 + 471}{1500} = 0.859$$

LOS = D

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Figueroa St**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	261	1,600	0.058 *	N-S(1):	0.114
	TH	2.00	173	3,200	0.054	N-S(2):	0.215 *
	LT	1.00	55	1,600	0.034	E-W(1):	0.191
Westbound	RT	1.00	98	1,600	0.044	E-W(2):	0.473 *
	TH	2.00	842	3,200	0.263 *		
	LT	1.00	38	1,600	0.024	V/C:	0.688
Northbound	RT	1.00	32	1,600	0.008	Lost Time:	0.100
	TH	2.00	257	3,200	0.080	ITS:	0.000
	LT	1.00	251	1,600	0.157 *		
Eastbound	RT	1.00	107	1,600	0.000	ICU:	0.788
	TH	2.00	533	3,200	0.167		
	LT	1.00	336	1,600	0.210 *	LOS:	C

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.000	N-S(1):	0.136
	TH	2.00	240	3,200	0.075 *	N-S(2):	0.193 *
	LT	1.00	104	1,600	0.065	E-W(1):	0.275
Westbound	RT	1.00	53	1,600	0.001	E-W(2):	0.448 *
	TH	2.00	609	3,200	0.190 *		
	LT	1.00	42	1,600	0.026	V/C:	0.641
Northbound	RT	1.00	40	1,600	0.012	Lost Time:	0.100
	TH	2.00	227	3,200	0.071	ITS:	0.000
	LT	1.00	188	1,600	0.118 *		
Eastbound	RT	1.00	193	1,600	0.062	ICU:	0.741
	TH	2.00	796	3,200	0.249		
	LT	1.00	412	1,600	0.258 *	LOS:	C

* - Denotes critical movement

Project Title: **LA07-2153 Joint Outfall System MFP**
Intersection: **Lomita Bl & Main St/Wilmington Bl**
Description: **2019 ALT 4 WITH PROJECT CONDITIONS**

Date/Time: **AM PEAK HOUR (7:30-8:30)**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :	SBR		
FF Movements:			

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	246	1,600	0.078	N-S(1):	0.230 *
	TH	2.00	281	3,200	0.088	N-S(2):	0.176
	LT	1.00	85	1,600	0.053 *	E-W(1):	0.151
Westbound	RT	1.00	47	1,600	0.003	E-W(2):	0.235 *
	TH	2.00	509	3,200	0.159 *		
	LT	1.00	63	1,600	0.039	V/C:	0.465
Northbound	RT	0.00	86	0	0.000	Lost Time:	0.100
	TH	2.00	480	3,200	0.177 *	ITS:	0.000
	LT	1.00	140	1,600	0.088		
Eastbound	RT	1.00	43	1,600	0.000	ICU:	0.565
	TH	2.00	358	3,200	0.112		
	LT	1.00	121	1,600	0.076 *	LOS:	A

Date/Time: **PM PEAK HOUR (5:00-6:00)**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	211	1,600	0.048	N-S(1):	0.243 *
	TH	2.00	499	3,200	0.156	N-S(2):	0.204
	LT	1.00	138	1,600	0.086 *	E-W(1):	0.205
Westbound	RT	1.00	49	1,600	0.000	E-W(2):	0.214 *
	TH	2.00	417	3,200	0.130 *		
	LT	1.00	98	1,600	0.061	V/C:	0.457
Northbound	RT	0.00	61	0	0.000	Lost Time:	0.100
	TH	2.00	441	3,200	0.157 *	ITS:	0.000
	LT	1.00	77	1,600	0.048		
Eastbound	RT	1.00	51	1,600	0.008	ICU:	0.557
	TH	2.00	461	3,200	0.144		
	LT	1.00	135	1,600	0.084 *	LOS:	A

* - Denotes critical movement

CalcaDB

September 21, 2011 ,Wednesday 12:55:59 PM

INTERSECTION DATA SUMMARY SHEET

N/S: Figueroa St W/E: PCH I/S No: 9

AM/PM: PM Comments: 2019WP4PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	242	427	251	70	172	92	88	796	493	922	1370	79
AMBIENT												
RELATED												
PROJECT												
TOTAL	242	427	251	70	172	92	88	796	493	922	1370	79
LANE	1	1	1	1	1		1	2	1	2	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Prot-Fix	Auto	Prot-Fix	Auto

Critical Movements Diagram

SouthBound
A: 172
B: 70

EastBound
A: 725
B: 507

WestBound
A: 493
B: 88

NorthBound
A: 339
B: 242

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{242 + 172 + 493 + 507}{1425} = 0.992$$

LOS = E

Developed by Chun Wong, 12/94

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: I-110 Ramps I/S No: 13

AM/PM: PM Comments: 2019WP4PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	0	566	2208	0	1528	0	1904	0	126	0	0	0
AMBIENT												
RELATED												
PROJECT												
TOTAL	0	566	2208	0	1528	0	1904	0	126	0	0	0

LANE			2			2				3					2						1						

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Free	Perm		Split	Auto		

Critical Movements Diagram

SouthBound
A: 509
B: 0

EastBound
A: 0
B: 0

WestBound
A: 677
B: 677

NorthBound
A: 283
B: 0

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + A(E/B)

$$V/C = \frac{0 + 509 + 677 + 0}{1500} = 0.791$$

LOS = C

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Gaffey St W/E: 9th St I/S No: 14

AM/PM: PM Comments: 2019WP4PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	79	1055	40	128	1226	166	87	280	91	209	278	80
AMBIENT												
RELATED												
PROJECT												
TOTAL	79	1055	40	128	1226	166	87	280	91	209	278	80
LANE	1	1	1	1	1	1	1	1	1	1	1	1

	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR	Phasing	RTOR
SIGNAL	Perm	Auto	Perm	Auto	Perm	Auto	Perm	Auto

Critical Movements Diagram

SouthBound
A: 696
B: 128

EastBound
A: 278
B: 209

WestBound
A: 371
B: 87

NorthBound
A: 548
B: 79

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

Results

North/South Critical Movements = B(N/B) + A(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{79 + 696 + 371 + 209}{1500} = 0.903$$

LOS = E

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1015 Gaffey St & Paseo del Mar

Cycle (sec):	100	Critical Vol./Cap.(X):	0.283
Loss Time (sec):	0	Average Delay (sec/veh):	9.4
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Gaffey St						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 2 0 1			1 0 1 0 1		
Volume Module:												
Base Vol:	25	14	5	17	22	83	116	145	14	6	176	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	14	5	17	22	83	116	145	14	6	176	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	25	14	5	17	22	83	116	145	14	6	176	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	14	5	17	22	83	116	145	14	6	176	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	14	5	17	22	83	116	145	14	6	176	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	25	14	5	17	22	83	116	145	14	6	176	10
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.74	0.26	1.00	0.21	0.79	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	535	438	157	547	137	517	588	1277	727	569	621	702
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.03	0.03	0.16	0.16	0.20	0.11	0.02	0.01	0.28	0.01
Crit Moves:	****					****	****				****	
Delay/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.4	7.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.3	8.5	8.5	9.1	8.8	8.8	10.0	8.8	7.5	8.8	10.4	7.6
LOS by Move:	A	A	A	A	A	A	B	A	A	A	B	A
ApproachDel:	9.0			8.8			9.2			10.2		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	9.0			8.8			9.2			10.2		
LOS by Appr:	A			A			A			B		
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.4	0.0

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1016 Western Ave & Paseo del Mar

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: B[12.4]

Street Name:	Western Ave						Paseo del Mar					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0 0		1 0 0	0 1		1 0 1	0 0		0 0 1	0 1	
Volume Module:												
Base Vol:	0	0	0	48	0	35	60	219	0	0	279	72
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	48	0	35	60	219	0	0	279	72
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	48	0	35	60	219	0	0	279	72
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	48	0	35	60	219	0	0	279	72
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	48	0	35	60	219	0	0	279	72
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	618	xxxx	279	351	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	456	xxxx	765	1219	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	439	xxxx	765	1219	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.11	xxxx	0.05	0.05	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.4	xxxx	0.1	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	14.2	xxxx	9.9	8.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	B	*	A	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			12.4			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Note: Queue reported is the number of cars per lane.

CalcaDB

INTERSECTION DATA SUMMARY SHEET

N/S: Western Av W/E: 9th St I/S No: 17

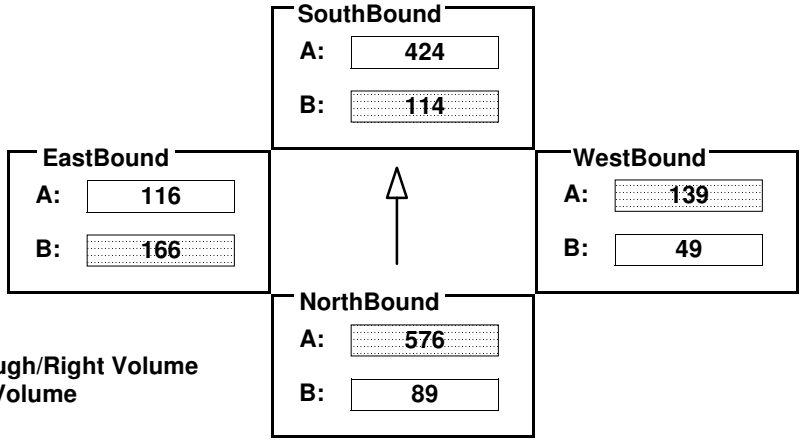
AM/PM: PM Comments: 2019WP4PM

COUNT DATE: STUDY DATE: GROWTH FACTOR:

Volume/Lane/Signal Configurations

	NORTHBOUND			SOUTHBOUND			WESTBOUND			EASTBOUND		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
EXISTING	89	1098	53	114	747	101	49	139	189	166	157	76
AMBIENT												
RELATED												
PROJECT												
TOTAL	89	1098	53	114	747	101	49	139	189	166	157	76
LANE	1	1	1	1	1	1	1	1	1	1	1	0
SIGNAL	Prot-Fix	Auto		Prot-Fix	Auto		Perm	Auto		Perm	Auto	

Critical Movements Diagram



V/C RATIO	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E

A = Adjusted Through/Right Volume
B = Adjusted Left Volume
* = ATSAC Benefit

Results

North/South Critical Movements = A(N/B) + B(S/B)

West/East Critical Movements = A(W/B) + B(E/B)

$$V/C = \frac{576 + 114 + 139 + 166}{1425} = 0.698$$

LOS = B

Appendix 18-C

EXISTING PLUS PROJECT TRAFFIC ANALYSIS

FEHR PEERS

MEMORANDUM

Date: March 12, 2012

To: Donna McCormick, ICF

From: Netai Basu and Leon Raykin

Subject: ***Existing plus Project Traffic Analysis of the Clearwater Program Master Facilities Plan*** Ref: 2153

BACKGROUND

In the draft EIR/EIS for the Clearwater Program Master Facilities Plan ("project"), the project's potential traffic impacts were analyzed according to the methodologies required by local and regional agencies governing the project when the analysis was conducted. Thus, potential construction-period impacts were assessed against the future baseline in which construction activity would occur (2017 or 2019). As discussed in Section 18.4.1.1 of the draft EIR/EIS (page 18-28), this provides a reasonable basis for assessing project impacts. These jurisdictions have since made or are considering changes to those requirements, however, in response to the court decision in the *Sunnyvale West Neighborhood Association v. City of Sunnyvale City Council* case filed in December 2010. That decision challenged the validity of traffic studies that use a future baseline to assess a project's impacts rather than using an existing baseline. The following analysis is provided as a supplemental analysis to evaluate the project's impacts against baseline existing conditions at the time when the EIR was completed.

ANALYSIS METHODOLOGY

Consistent with *Sunnyvale*, the existing year (2010) of the EIR was analyzed as the baseline to assess the potential for project impacts. No future street improvements have been included in this analysis. Intersections and freeways have been analyzed according to the lane configurations and signal controls in place at the time when the EIR was completed, and are consistent with the analysis presented in the draft EIR/EIS.

Estimated project-only construction-period traffic volumes were added to the study intersections and CMP freeway segments to develop "Existing Year (2010) plus Project" volumes, which were then analyzed. Potential impacts under this scenario were assessed using the relevant traffic impact threshold criteria.

RESULTS AND CONCLUSION

Tables 1 to 3 present the volume-to-capacity (V/C) ratios and corresponding levels of service (LOS) for the Existing Year (2010) baseline and Existing plus Project conditions, for the four project alternatives. As shown in the tables, temporary construction-period traffic associated with the project alternatives would not significantly impact any of the analyzed intersections under the "Existing Year (2010) plus Project" scenario, as the increase in traffic from the project would not exceed any thresholds of significance.

Tables 4 to 6 present the freeway volumes and levels of service for AM and PM peak periods for the four project alternatives. As shown in the tables, none of the project alternatives would significantly impact any of the analyzed freeway segments under an "Existing Year (2010) plus Project" scenario.

These findings are consistent with the analysis of potential project-related construction-period traffic impacts against the future baseline conditions presented in the draft EIR/EIS.

TABLE 1
EXISTING (2010) PLUS PROJECT INTERSECTION IMPACT ANALYSIS - ALTERNATIVES 1 AND 2

Intersection	Peak Hour	Existing (Year 2010) V/C or Delay	Existing (Year 2010) LOS	Existing plus Project ALTS 1/2 (Year 2010) V/C or Delay	Existing plus Project ALTS 1/2 (Year 2010) LOS	Project Increase in V/C	Significant Project Impact
1 Sepulveda Boulevard	**AM**	0.935	E	0.936	E	0.001	NO
Vermont Avenue	**PM**	0.925	E	0.927	E	0.002	NO
2 Sepulveda Boulevard	**AM**	0.858	D	0.859	D	0.001	NO
SB I-110 Off Ramp	**PM**	0.817	D	0.817	D	0.000	NO
3 Sepulveda Boulevard	**AM**	0.712	C	0.722	C	0.010	NO
NB I-110 Off Ramp	**PM**	0.698	B	0.708	C	0.010	NO
4 Sepulveda Boulevard	**AM**	0.710	C	0.741	C	0.031	NO
Figueroa Street	**PM**	0.725	C	0.727	C	0.002	NO
5 Sepulveda Boulevard	**AM**	0.681	B	0.683	B	0.002	NO
Main Street	**PM**	0.774	C	0.776	C	0.002	NO
6 Lomita Boulevard	**AM**	0.963	E	0.964	E	0.001	NO
Vermont Street	**PM**	0.799	C	0.801	D	0.002	NO
7 Lomita Boulevard	**AM**	0.787	C	0.792	C	0.005	NO
Figueroa Street	**PM**	0.654	B	0.659	B	0.005	NO
8 Lomita Boulevard	**AM**	0.956	E	0.959	E	0.003	NO
Main Street/Wilmington Boulevard	**PM**	0.964	E	0.966	E	0.002	NO
9 Pacific Coast Highway	**AM**	0.929	E	0.936	E	0.007	NO
Figueroa Street **	**PM**	0.862	D	0.866	D	0.004	NO
10 I-110 Ramps/C Street	**AM**	10.7	B	10.9	B	--	NO
Figueroa Street [a]	**PM**	13.6	B	14.2	B	--	NO
11 Harry Bridges Boulevard	**AM**	0.379	A	0.396	A	0.017	NO
Figueroa Street/TraPAC Gate	**PM**	0.465	A	0.483	A	0.018	NO
12 Harry Bridges Boulevard	**AM**	0.313	A	0.318	A	0.005	NO
Fries Avenue	**PM**	0.403	A	0.408	A	0.005	NO
13 Gaffey Street	**AM**	0.488	A	0.490	A	0.002	NO
I-110 Ramps **	**PM**	0.623	B	0.625	B	0.002	NO
14 Gaffey Street	**AM**	0.712	C	0.721	C	0.009	NO
9th Street **	**PM**	0.716	C	0.727	C	0.011	NO
15 Gaffey Street	**AM**	8.4	A	8.4	A	--	NO
Paseo del Mar [a]	**PM**	9.2	A	9.2	A	--	NO
16 Western Avenue	**AM**	10.9	B	10.9	B	--	NO
Paseo del Mar [b]	**PM**	11.1	B	11.1	B	--	NO
17 Western Avenue	**AM**	0.543	A	0.543	A	0.000	NO
9th Street **	**PM**	0.569	A	0.569	A	0.000	NO
18 Ferry Street	**AM**	0.285	A	0.323	A	0.038	NO
SR-47 EB On/Off Ramps	**PM**	0.343	A	0.419	A	0.076	NO
19 Ferry Street	**AM**	0.270	A	0.279	A	0.009	NO
Pilchard Street	**PM**	0.312	A	0.328	A	0.016	NO
20 Ferry Street	**AM**	0.476	A	0.503	A	0.027	NO
Terminal Way	**PM**	0.262	A	0.271	A	0.009	NO
21 Earle Street	**AM**	0.231	A	0.231	A	0.000	NO
Terminal Way	**PM**	0.357	A	0.371	A	0.014	NO
22 Ocean Boulevard/Seaside Avenue	**AM**	0.520	A	0.540	A	0.020	NO
Navy Way	**PM**	0.718	C	0.731	C	0.013	NO

Notes:
** Intersection is currently operating under ATSAC system Per LADOT guidelines a 7% capacity credit has been applied at intersections operating with ATSAC systems.
[a] Intersection is a four-way stop-controlled intersection. Level of service is based on 2000 HCM 4-way stop method. Average delay of the intersection is reported.
[b] Intersection is a one-way stop-controlled intersection. Level of service is based on 2000 HCM unsignalized method. Worst approach delay of the intersection is reported.

TABLE 2
EXISTING (2010) PLUS PROJECT INTERSECTION IMPACT ANALYSIS - ALTERNATIVE 3

Intersection	Peak Hour	Existing (Year 2010) V/C or Delay	Existing (Year 2010) LOS	Existing plus Project ALT 3 (Year 2010) V/C or Delay	Existing plus Project ALT 3 (Year 2010) LOS	Project Increase in V/C	Significant Project Impact
1 Sepulveda Boulevard	**AM**	0.935	E	0.936	E	0.001	NO
Vermont Avenue	**PM**	0.925	E	0.927	E	0.002	NO
2 Sepulveda Boulevard	**AM**	0.858	D	0.859	D	0.001	NO
SB I-110 Off Ramp	**PM**	0.817	D	0.817	D	0.000	NO
3 Sepulveda Boulevard	**AM**	0.712	C	0.723	C	0.011	NO
NB I-110 Off Ramp	**PM**	0.698	B	0.709	C	0.011	NO
4 Sepulveda Boulevard	**AM**	0.710	C	0.743	C	0.033	NO
Figueroa Street	**PM**	0.725	C	0.727	C	0.002	NO
5 Sepulveda Boulevard	**AM**	0.681	B	0.683	B	0.002	NO
Main Street	**PM**	0.774	C	0.776	C	0.002	NO
6 Lomita Boulevard	**AM**	0.963	E	0.963	E	0.000	NO
Vermont Street	**PM**	0.799	C	0.800	C	0.001	NO
7 Lomita Boulevard	**AM**	0.787	C	0.788	C	0.001	NO
Figueroa Street	**PM**	0.654	B	0.655	B	0.001	NO
8 Lomita Boulevard	**AM**	0.956	E	0.959	E	0.003	NO
Main Street/Wilmington Boulevard	**PM**	0.964	E	0.966	E	0.002	NO
9 Pacific Coast Highway	**AM**	0.929	E	0.933	E	0.004	NO
Figueroa Street **	**PM**	0.862	D	0.868	D	0.006	NO
13 Gaffey Street	**AM**	0.488	A	0.499	A	0.011	NO
I-110 Ramps **	**PM**	0.623	B	0.623	B	0.000	NO
14 Gaffey Street	**AM**	0.712	C	0.714	C	0.002	NO
9th Street **	**PM**	0.716	C	0.732	C	0.016	NO
15 Gaffey Street	**AM**	8.4	A	8.6	A	--	NO
Paseo del Mar [a]	**PM**	9.2	A	9.5	A	--	NO
16 Western Avenue	**AM**	10.9	B	11.2	B	--	NO
Paseo del Mar [b]	**PM**	11.1	B	11.1	B	--	NO
17 Western Avenue	**AM**	0.543	A	0.543	A	0.000	NO
9th Street **	**PM**	0.569	A	0.576	A	0.007	NO

Notes:

** Intersection is currently operating under ATSAC system Per LADOT guidelines a 7% capacity credit has been applied at intersections operating with ATSAC systems.

[a] Intersection is a four-way stop-controlled intersection. Level of service is based on 2000 HCM 4-way stop method. Average delay of the intersection is reported.

[b] Intersection is a one-way stop-controlled intersection. Level of service is based on 2000 HCM unsignalized method. Worst approach delay of the intersection is reported.

TABLE 3
EXISTING (2010) PLUS PROJECT INTERSECTION IMPACT ANALYSIS - ALTERNATIVE 4

Intersection	Peak Hour	Existing (Year 2010) V/C or Delay	Existing (Year 2010) LOS	Existing plus Project ALT 4 (Year 2010) V/C or Delay	Existing plus Project ALT 4 (Year 2010) LOS	Project Increase in V/C	Significant Project Impact
1 Sepulveda Boulevard	**AM**	0.935	E	0.936	E	0.001	NO
Vermont Avenue	**PM**	0.925	E	0.927	E	0.002	NO
2 Sepulveda Boulevard	**AM**	0.858	D	0.859	D	0.001	NO
SB I-110 Off Ramp	**PM**	0.817	D	0.817	D	0.000	NO
3 Sepulveda Boulevard	**AM**	0.712	C	0.722	C	0.010	NO
NB I-110 Off Ramp	**PM**	0.698	B	0.708	C	0.010	NO
4 Sepulveda Boulevard	**AM**	0.710	C	0.739	C	0.029	NO
Figueroa Street	**PM**	0.725	C	0.727	C	0.002	NO
5 Sepulveda Boulevard	**AM**	0.681	B	0.683	B	0.002	NO
Main Street	**PM**	0.774	C	0.776	C	0.002	NO
6 Lomita Boulevard	**AM**	0.963	E	0.963	E	0.000	NO
Vermont Street	**PM**	0.799	C	0.800	C	0.001	NO
7 Lomita Boulevard	**AM**	0.787	C	0.788	C	0.001	NO
Figueroa Street	**PM**	0.654	B	0.655	B	0.001	NO
8 Lomita Boulevard	**AM**	0.956	E	0.959	E	0.003	NO
Main Street/Wilmington Boulevard	**PM**	0.964	E	0.966	E	0.002	NO
9 Pacific Coast Highway	**AM**	0.929	E	0.933	E	0.004	NO
Figueroa Street **	**PM**	0.862	D	0.868	D	0.006	NO
13 Gaffey Street	**AM**	0.488	A	0.491	A	0.003	NO
I-110 Ramps **	**PM**	0.623	B	0.624	B	0.001	NO
14 Gaffey Street	**AM**	0.712	C	0.717	C	0.005	NO
9th Street **	**PM**	0.716	C	0.729	C	0.013	NO
15 Gaffey Street	**AM**	8.4	A	8.4	A	--	NO
Paseo del Mar [a]	**PM**	9.2	A	9.3	A	--	NO
16 Western Avenue	**AM**	10.9	B	11.1	B	--	NO
Paseo del Mar [b]	**PM**	11.1	B	11.2	B	--	NO
17 Western Avenue	**AM**	0.543	A	0.543	A	0.000	NO
9th Street **	**PM**	0.569	A	0.574	A	0.005	NO

Notes:

** Intersection is currently operating under ATSAC system Per LADOT guidelines a 7% capacity credit has been applied at intersections operating with ATSAC systems.

[a] Intersection is a four-way stop-controlled intersection. Level of service is based on 2000 HCM 4-way stop method. Average delay of the intersection is reported.

[b] Intersection is a one-way stop-controlled intersection. Level of service is based on 2000 HCM unsignalized method. Worst approach delay of the intersection is reported.

TABLE 4
EXISTING AND EXISTING PLUS PROJECT FREEWAY VOLUMES AND LEVELS OF SERVICE
ALTERNATIVES 1 AND 2

AM PEAK HOUR

Freeway Segments	Direction	# of Lanes	Capacity	Existing (2010) Conditions			Project-Only Peak Hour	Existing plus Project Forecast				
				Peak Hour Volume [a]	D/C Ratio	LOS		Peak Hour Volume	D/C Ratio	LOS	Project-related D/C change	Significant Impact
Harbor Freeway (I-110)												
Harbor Freeway (I-110)	NB	4	8,000	7,450	0.931	E	60	7,510	0.939	E	0.008	NO
at Wilmington, south of "C" Street	SB	4	8,000	5,491	0.686	C	73	5,564	0.696	C	0.010	NO
- Mile 2.77												
Harbor Freeway (I-110)	NB	4	8,000	9,150	1.144	F(0)	62	9,212	1.152	F(0)	0.008	NO
at Carson Street	SB	4	8,000	7,039	0.880	D	87	7,126	0.891	D	0.011	NO
- Mile 7.016												
Long Beach Freeway (I-710)												
Long Beach Freeway (I-710)	NB	3	6,000	6,128	1.021	F(0)	60	6,188	1.031	F(0)	0.010	NO
North of Junction Route 1 (PCH), Willow Street	SB	3	6,000	6,408	1.068	F(0)	73	6,481	1.080	F(0)	0.012	NO
- Mile 7.60												

PM PEAK HOUR

Freeway Segments	Direction	# of Lanes	Capacity	Existing (2010) Conditions			Project-Only Peak Hour	Existing plus Project Forecast				
				Peak Hour Volume [a]	D/C Ratio	LOS		Peak Hour Volume	D/C Ratio	LOS	Project-related D/C change	Significant Impact
Harbor Freeway (I-110)												
Harbor Freeway (I-110)	NB	4	8,000	5,014	0.627	C	76	5,090	0.636	C	0.009	NO
at Wilmington, south of "C" Street	SB	4	8,000	7,173	0.897	D	57	7,230	0.904	D	0.007	NO
- Mile 2.77												
Harbor Freeway (I-110)	NB	4	8,000	6,369	0.796	D	90	6,459	0.807	D	0.011	NO
at Carson Street	SB	4	8,000	8,687	1.086	F(0)	59	8,746	1.093	F(0)	0.007	NO
- Mile 7.016												
Long Beach Freeway (I-710)												
Long Beach Freeway (I-710)	NB	3	6,000	5,807	0.968	E	76	5,883	0.981	E	0.013	NO
North of Junction Route 1 (PCH), Willow Street	SB	3	6,000	4,372	0.729	C	57	4,429	0.738	C	0.009	NO
- Mile 7.60												

Notes:
[a] Caltrans Data - factored from 2008 to 2010 conditions.
[b] The post miles of the count data are in close proximity to the two identified CMP locations, including: I-110 s/o C St (exit at postmile 2.77) and I-710 s/o Willow St (at post mile 7.887)

TABLE 5
EXISTING AND EXISTING PLUS PROJECT FREEWAY VOLUMES AND LEVELS OF SERVICE
ALTERNATIVE 3

AM PEAK HOUR

Freeway Segments	Direction	# of Lanes	Capacity	Existing (2010) Conditions			Project-Only Peak Hour	Existing plus Project Forecast				
				Peak Hour Volume [a]	D/C Ratio	LOS		Peak Hour Volume	D/C Ratio	LOS	Project-related D/C change	Significant Impact
Harbor Freeway (I-110)												
Harbor Freeway (I-110)	NB	4	8,000	7,450	0.931	E	4	7,454	0.932	E	0.001	NO
at Wilmington, south of "C" Street	SB	4	8,000	5,491	0.686	C	31	5,522	0.690	C	0.004	NO
- Mile 2.77												
Harbor Freeway (I-110)	NB	4	8,000	9,150	1.144	F(0)	52	9,202	1.150	F(0)	0.006	NO
at Carson Street	SB	4	8,000	7,039	0.880	D	77	7,116	0.890	D	0.010	NO
- Mile 7.016												
Long Beach Freeway (I-710)												
Long Beach Freeway (I-710)	NB	3	6,000	6,128	1.021	F(0)	0	6,128	1.021	F(0)	0.000	NO
North of Junction Route 1 (PCH), Willow Street	SB	3	6,000	6,408	1.068	F(0)	22	6,430	1.072	F(0)	0.004	NO
- Mile 7.60												

PM PEAK HOUR

Freeway Segments	Direction	# of Lanes	Capacity	Existing (2010) Conditions			Project-Only Peak Hour	Existing plus Project Forecast				
				Peak Hour Volume [a]	D/C Ratio	LOS		Peak Hour Volume	D/C Ratio	LOS	Project-related D/C change	Significant Impact
Harbor Freeway (I-110)												
Harbor Freeway (I-110)	NB	4	8,000	5,014	0.627	C	31	5,045	0.631	C	0.004	NO
at Wilmington, south of "C" Street	SB	4	8,000	7,173	0.897	D	4	7,177	0.897	D	0.000	NO
- Mile 2.77												
Harbor Freeway (I-110)	NB	4	8,000	6,369	0.796	D	79	6,448	0.806	D	0.010	NO
at Carson Street	SB	4	8,000	8,687	1.086	F(0)	50	8,737	1.092	F(0)	0.006	NO
- Mile 7.016												
Long Beach Freeway (I-710)												
Long Beach Freeway (I-710)	NB	3	6,000	5,807	0.968	E	22	5,829	0.972	E	0.004	NO
North of Junction Route 1 (PCH), Willow Street	SB	3	6,000	4,372	0.729	C	0	4,372	0.729	C	0.000	NO
- Mile 7.60												

Notes:
[a] Caltrans Data - factored from 2008 to 2010 conditions.
[b] The post miles of the count data are in close proximity to the two identified CMP locations, including: I-110 s/o C St (exit at postmile 2.77) and I-710 s/o Willow St (at post mile 7.887)

TABLE 6
EXISTING AND EXISTING PLUS PROJECT FREEWAY VOLUMES AND LEVELS OF SERVICE
ALTERNATIVE 4

AM PEAK HOUR

Freeway Segments	Direction	# of Lanes	Capacity	Existing (2010) Conditions			Project-Only Peak Hour	Existing plus Project Forecast				
				Peak Hour Volume [a]	D/C Ratio	LOS		Peak Hour Volume	D/C Ratio	LOS	Project-related D/C change	Significant Impact
Harbor Freeway (I-110)												
Harbor Freeway (I-110)	NB	4	8,000	7,450	0.931	E	8	7,458	0.932	E	0.001	NO
at Wilmington, south of "C" Street	SB	4	8,000	5,491	0.686	C	12	5,503	0.688	C	0.002	NO
- Mile 2.77												
Harbor Freeway (I-110)	NB	4	8,000	9,150	1.144	F(0)	50	9,200	1.150	F(0)	0.006	NO
at Carson Street	SB	4	8,000	7,039	0.880	D	50	7,089	0.886	D	0.006	NO
- Mile 7.016												
Long Beach Freeway (I-710)												
Long Beach Freeway (I-710)	NB	3	6,000	6,128	1.021	F(0)	0	6,128	1.021	F(0)	0.000	NO
North of Junction Route 1 (PCH), Willow Street	SB	3	6,000	6,408	1.068	F(0)	4	6,412	1.069	F(0)	0.001	NO
- Mile 7.60												

PM PEAK HOUR

Freeway Segments	Direction	# of Lanes	Capacity	Existing (2010) Conditions			Project-Only Peak Hour	Existing plus Project Forecast				
				Peak Hour Volume [a]	D/C Ratio	LOS		Peak Hour Volume	D/C Ratio	LOS	Project-related D/C change	Significant Impact
Harbor Freeway (I-110)												
Harbor Freeway (I-110)	NB	4	8,000	5,014	0.627	C	12	5,026	0.628	C	0.001	NO
at Wilmington, south of "C" Street	SB	4	8,000	7,173	0.897	D	8	7,181	0.898	D	0.001	NO
- Mile 2.77												
Harbor Freeway (I-110)	NB	4	8,000	6,369	0.796	D	54	6,423	0.803	D	0.007	NO
at Carson Street	SB	4	8,000	8,687	1.086	F(0)	46	8,733	1.092	F(0)	0.006	NO
- Mile 7.016												
Long Beach Freeway (I-710)												
Long Beach Freeway (I-710)	NB	3	6,000	5,807	0.968	E	4	5,811	0.969	E	0.001	NO
North of Junction Route 1 (PCH), Willow Street	SB	3	6,000	4,372	0.729	C	0	4,372	0.729	C	0.000	NO
- Mile 7.60												

Notes:
[a] Caltrans Data - factored from 2008 to 2010 conditions.
[b] The post miles of the count data are in close proximity to the two identified CMP locations, including: I-110 s/o C St (exit at postmile 2.77) and I-710 s/o Willow St (at post mile 7.887)

Appendix 18-D

ADDITIONAL TRAFFIC ANALYSIS OF ALTERNATIVE 4 (PROJECT)

FEHR PEERS

MEMORANDUM

Date: June 18, 2012

To: Donna McCormick, ICF

From: Netai Basu

Subject: ***Additional Traffic Analysis of (Project) Alternative 4 of the Clearwater Program*** Ref: 2153

BACKGROUND

The project-level traffic impact analysis of Alternative 4 (Project) included in the draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Clearwater Program ("project") used baseline traffic data collected in 2010, at that the time the technical analysis was begun. Since that time, there has been a landslide east of the Royal Palms Shaft Site, which has led the City of Los Angeles to close a portion of Paseo del Mar to through traffic for an indeterminate period. The closure of the roadway link between Western Avenue and Weymouth Avenue to motorized traffic has resulted in localized traffic patterns that differ from those that prevailed when the baseline traffic counts used in the draft EIR/EIS were collected. In addition, one public comment raised the question of whether the project has the potential to significantly impact the intersection of Western Avenue & 25th Street. The purpose of this memorandum is to document additional traffic impact analysis of Alternative 4 (Project) in the vicinity of the proposed Royal Palms Shaft Site. Because the area affected by the landslide does not include streets in the vicinity of the Joint Water Pollution Control Plant (JWPCP), nor conditions on the regional freeway system, this analysis is limited to intersections in the vicinity of the proposed Royal Palms Shaft Site.

ANALYSIS METHODOLOGY

In May 2012, new baseline traffic counts were collected at the five study intersections along key access routes to and from the Royal Palms Shaft Site, as well as at the intersection of Western Avenue & 25th Street. These five intersections, which are analyzed in this memorandum, are listed below. The intersection numbers follow the numbering system used in the draft EIR/EIS. The new traffic count data sheets are included as an attachment to this memorandum.

13. Gaffey Street & I-110 Ramps
14. Gaffey Street & 9th Street
16. Western Avenue & Paseo Del Mar
17. Western Avenue & 9th Street
23. Western Avenue & 25th Street (not analyzed in the draft EIR/EIS)

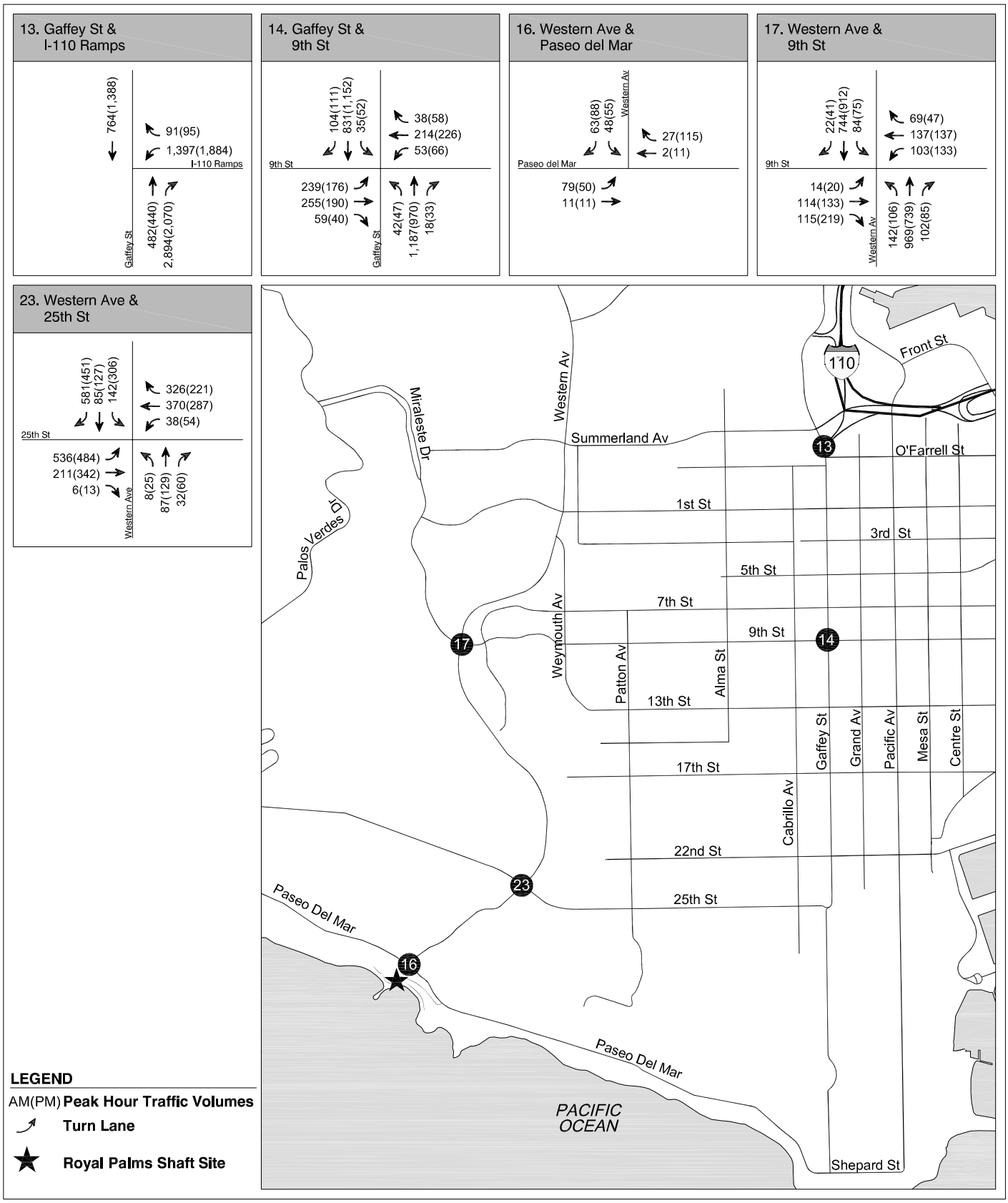
The existing (2012) traffic volumes illustrated in Figure 1 were analyzed using the Critical Movement Analysis (CMA) (Transportation Research Board, 1985) and Highway Capacity Manual (HCM) (Transportation Research Board, 2000) methodologies, as described on page 18-13 of the draft EIR/EIS, to determine existing (2012) traffic conditions. Table 1 shows the existing (2012) volume-to-capacity (V/C) ratios and levels of service, which are generally similar to the existing (2010) levels of service documented in Table 18-6 of the draft EIR/EIS.

The estimates of peak project-generated construction-period traffic for Alternative 4 (Project) used in this analysis are the same as what is documented in the draft EIR/EIS. The distribution of project-generated construction traffic used in this analysis is slightly different from what was assumed in the draft EIR/EIS in that a few worker trips which had been assumed to use Paseo del Mar east of the Royal Palms Shaft Site have now been assigned instead to Western Avenue and 25th Street. Figure 2 presents the revised assignment of estimated project-generated construction-period trips. These trips were added to the existing volumes and used to develop the Existing plus Project traffic volumes shown in Figure 3. The resulting levels of service and the incremental V/C change from Existing conditions are presented in Table 1.

Based on the anticipated construction schedule for Alternative 4 (Project), the peak of construction is expected to occur in 2020. Estimates of increases in traffic due to ambient growth (0.65% per year for eight years, or 5.2% overall) and related projects in the area, as identified in the draft EIR/EIS, were applied to the new baseline traffic counts used in this analysis, taking into account the closure of a portion of Paseo del Mar. The estimated cumulative (2020) traffic volumes are presented in Figure 4. Project-generated trips were added to develop the Cumulative plus Project volumes shown in Figure 5. The resulting levels of service and the incremental V/C change from cumulative conditions are presented in Table 2.

RESULTS AND CONCLUSION

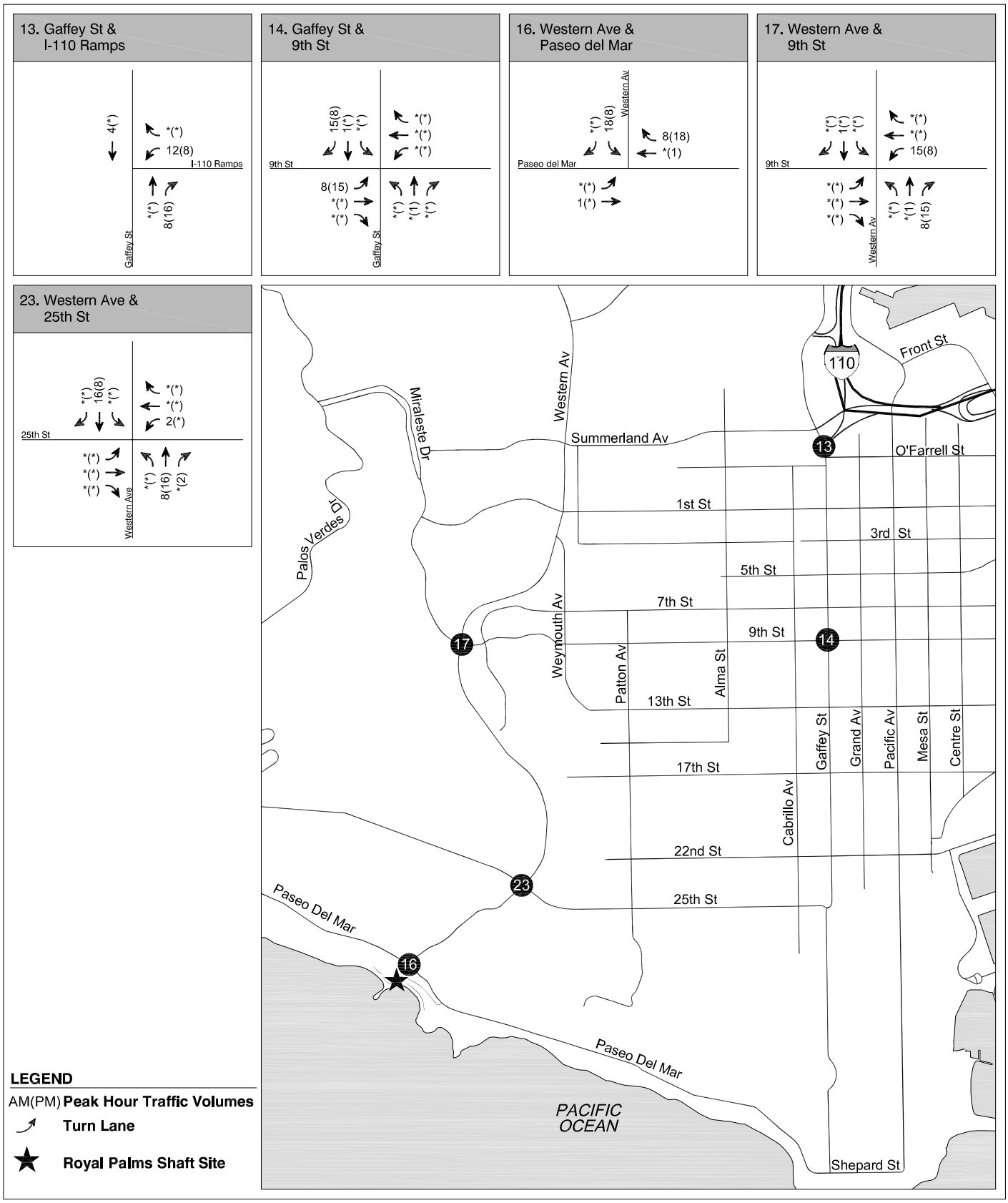
Tables 1 and 2 present the updated traffic impact analysis for Alternative 4 (Project) under Existing (2012) plus Project conditions and under Cumulative (2020) plus Project conditions. As shown in the tables, temporary construction-period traffic associated with the project alternatives would not significantly impact any of the analyzed intersections under either scenario, as the increase in traffic from the project would not exceed the City of Los Angeles' established thresholds of significance, as defined in the draft EIR/EIS. These findings are consistent with the analysis of potential project-related construction-period traffic impacts against the future baseline conditions presented in the draft EIR/EIS.



FEHR & PEERS

Jun 18, 2012 JS
\\fpla1\data\Jobs\Active\2100s\2153 – Joint Outfall System MFP\Graphics\ACAD\Alt4\2153_BaseMap.dwg

EXISTING (2012)
PEAK HOUR TRAFFIC VOLUMES
FIGURE 1

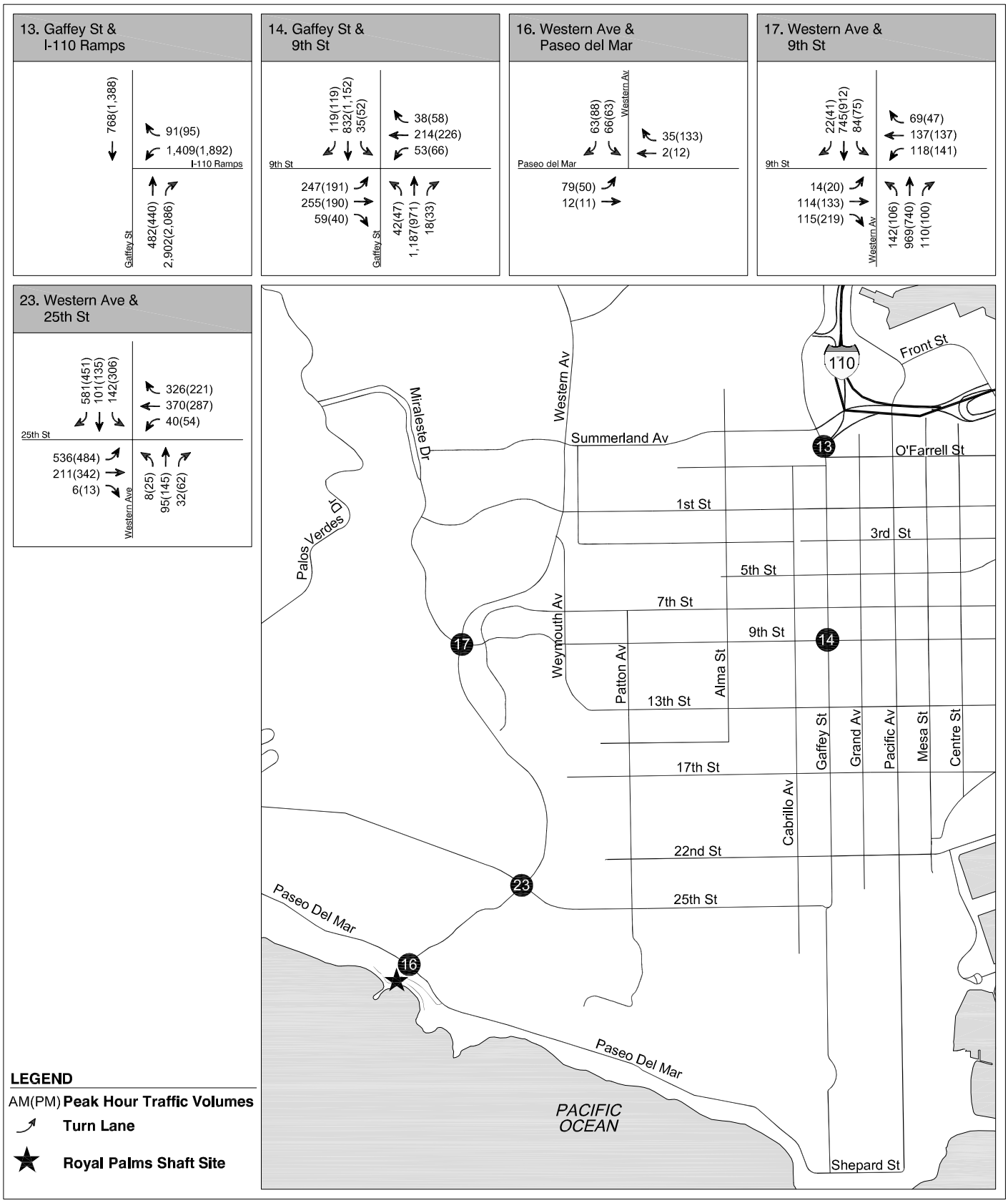


FEHR & PEERS

ALTERNATIVE 4 (PROJECT) ONLY
PEAK HOUR TRAFFIC VOLUMES

FIGURE 2

Jun 18, 2012 JS
\\fpla1\data\Jobs\Active\2100s\2153 – Joint Outfall System MFP\Graphics\ACAD\Alt4\2153_BaseMap.dwg



EXISTING BASE PLUS ALTERNATIVE 4 (PROJECT) ONLY (2012) PEAK HOUR TRAFFIC VOLUMES

FIGURE 3

FEHR & PEERS

Jun 18, 2012 JS
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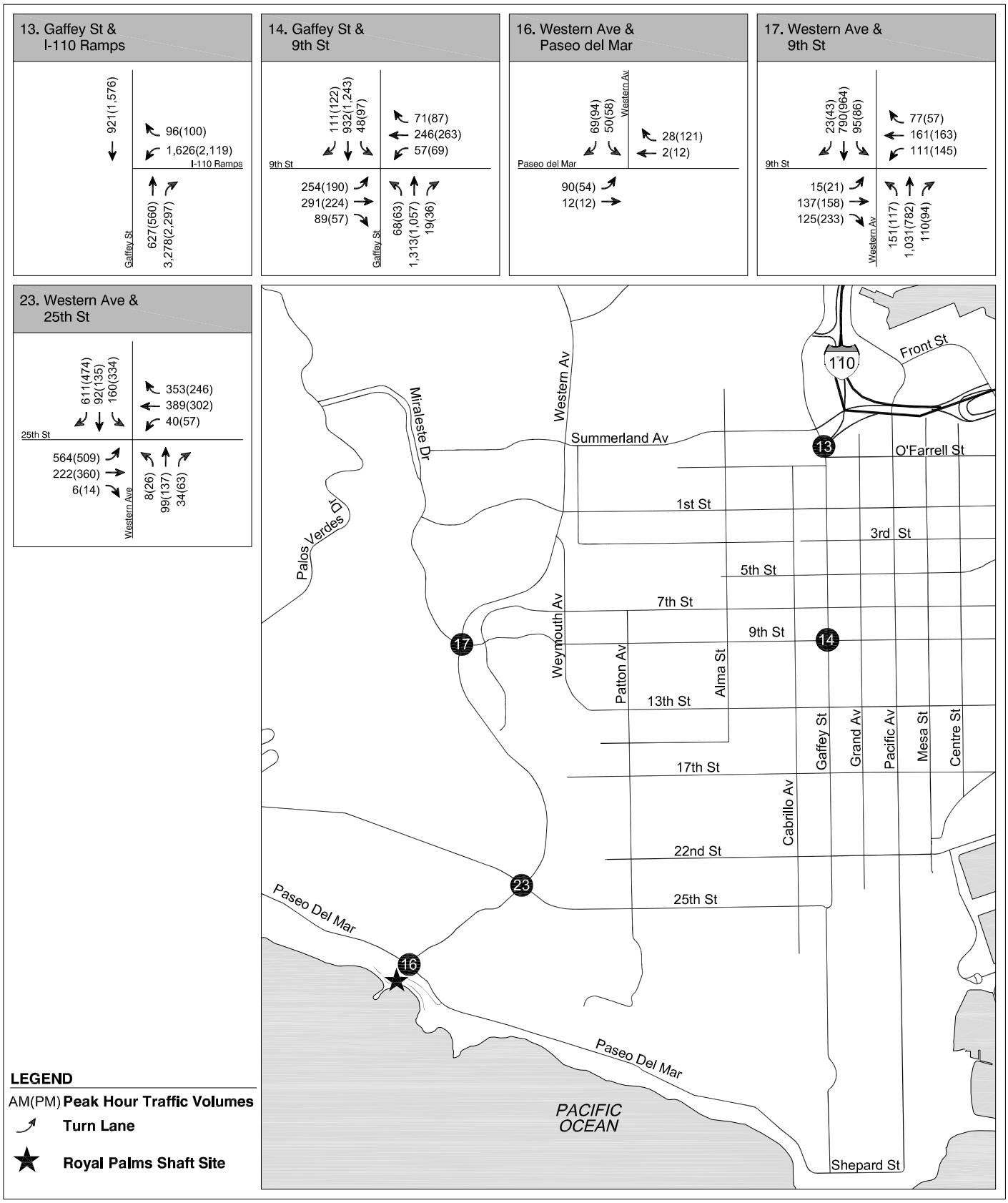
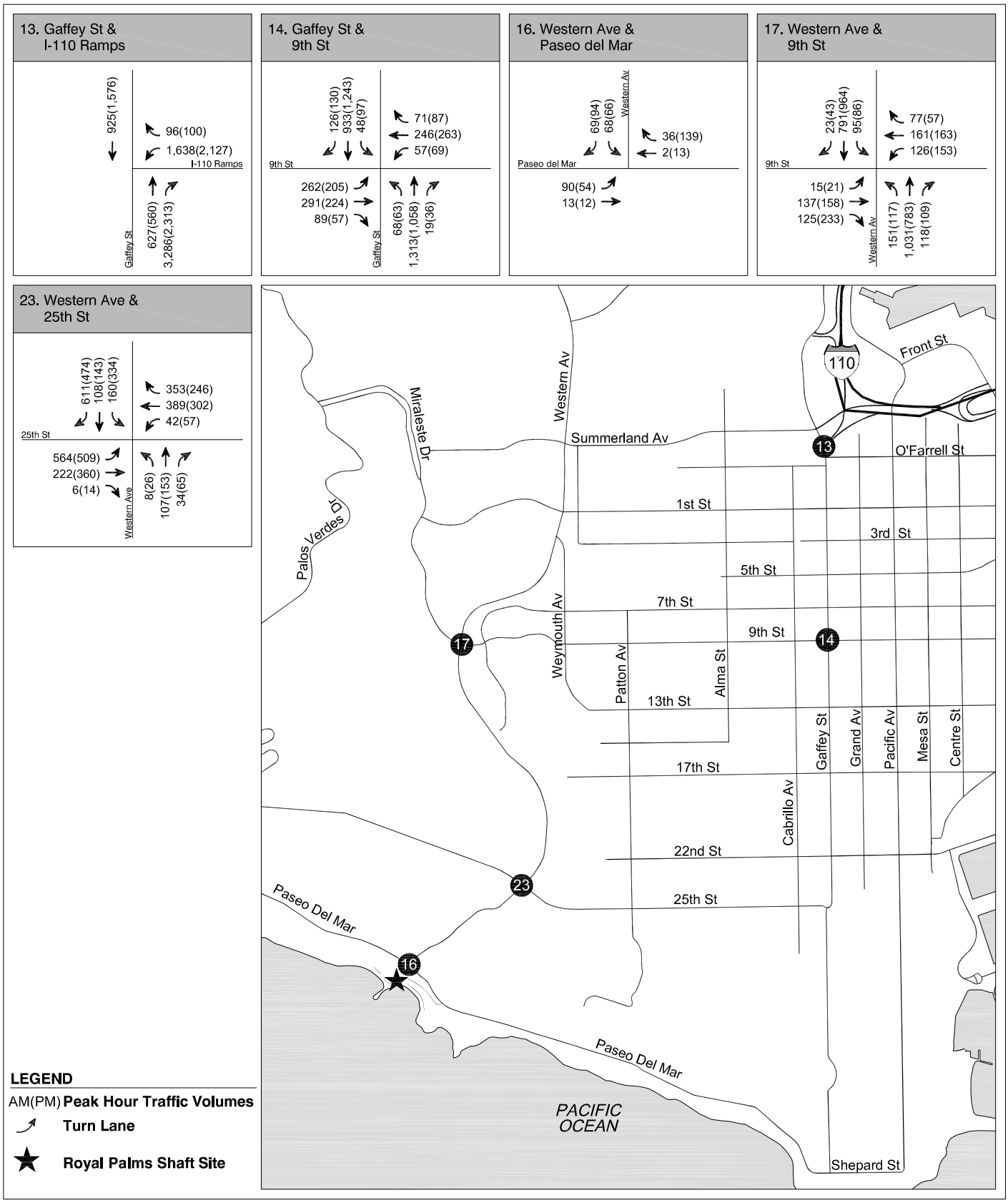


FEHR & PEERS

CUMULATIVE BASE (2020)
PEAK HOUR TRAFFIC VOLUMES

FIGURE 4

Jun 18, 2012 JS
\\fpla1\data\Jobs\Active\2100s\2153 – Joint Outfall System MFP\Graphics\ACAD\Alt4\2153_BaseMap.dwg



CUMULATIVE BASE (2020) PLUS ALTERNATIVE 4 (PROJECT) ONLY PEAK HOUR TRAFFIC VOLUMES

FIGURE 5

FEHR & PEERS

Jun 18, 2012 JS
\\fpla1\data\Jobs\Active\2100s\2153 – Joint Outfall System MFP\Graphics\ACAD\Alt4\2153_BaseMap.dwg

TABLE 1
EXISTING (2012) INTERSECTION LEVEL OF SERVICE AND IMPACT ANALYSIS
ALTERNATIVE 4 (PROJECT)

Intersection	Peak Hour	Existing (Year 2012) V/C or Delay	Existing (Year 2012) LOS	Existing plus Project ALT 4 (Year 2012) V/C or Delay	Existing plus Project ALT 4 (Year 2012) LOS	Project Increase V/C or Delay	Significant Project Impact
13 Gaffey Street	**AM**	0.431	A	0.434	A	0.003	NO
I-110 Ramps **	**PM**	0.679	B	0.680	B	0.001	NO
14 Gaffey Street	**AM**	0.683	B	0.688	B	0.005	NO
9th Street **	**PM**	0.689	B	0.702	C	0.013	NO
16 Western Avenue	**AM**	9.1	A	9.3	A	0.200	NO
Paseo del Mar [a]	**PM**	9.0	A	9.0	A	0.000	NO
17 Western Avenue	**AM**	0.518	A	0.531	A	0.013	NO
9th Street **	**PM**	0.586	A	0.592	A	0.006	NO
23 Western Avenue	**AM**	0.654	B	0.657	B	0.003	NO
25th Street **	**PM**	0.602	B	0.608	B	0.006	NO

Notes:

** Intersection is currently operating under ATSAC system Per LADOT guidelines a 7% capacity credit has been applied at intersections operating with ATSAC systems.

[a] Intersection is a side-street stop-controlled intersection. Level of service is based on 2000 HCM unsignalized method. Worst approach delay of the intersection is reported.

TABLE 2
FUTURE (2020) INTERSECTION LEVEL OF SERVICE AND IMPACT ANALYSIS
ALTERNATIVE 4 (PROJECT)

Intersection	Peak Hour	Cumulative Base 2020		Cumulative Plus Alt 4 (Project) 2020		Project Increase	Adverse Project Impact
		V/C or Delay	LOS	V/C or Delay	LOS	V/C or Delay	
Study Intersections in the Vicinity of the Royal Palms Shaft Site							
13 Gaffey Street	**AM**	0.492	A	0.495	A	0.003	NO
I-110 Ramps **	**PM**	0.743	C	0.745	C	0.002	NO
14 Gaffey Street	**AM**	0.757	C	0.762	C	0.005	NO
9th Street **	**PM**	0.757	C	0.770	C	0.013	NO
16 Western Avenue	**AM**	9.2	A	9.3	A	0.100	NO
Paseo del Mar [a]	**PM**	9.0	A	9.1	A	0.100	NO
17 Western Avenue	**AM**	0.537	A	0.551	A	0.014	NO
9th Street **	**PM**	0.601	B	0.607	B	0.006	NO
23 Western Avenue	**AM**	0.664	B	0.667	B	0.003	NO
25th Street **	**PM**	0.616	B	0.622	B	0.006	NO

Notes:

** Intersection is assumed to be operating under ATSAC and ATCS system in the future. Per LADOT guidelines a 10% capacity credit has been taken at intersections operating with ATSAC/ATCS systems.

[a] Intersection is a side-street stop-controlled intersection. Level of service is based on 2000 HCM unsignalized method. Worst approach delay of the intersection is reported.

ATTACHMENT
TRAFFIC COUNTS

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Gaffey St and I-110 Freeway Terminus , City of San Pedro

Date: 5/22/2012

Day: Tuesday

Project #: CA12_5208_002

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach (Gaffey St)

	Left	Thru	Right	
Lanes	0	3	0	
AM	0	764	0	573 AM
NOON	0	0	0	0 NOON
PM	0	1388	0	535 PM

Eastbound Approach (I-110 Freeway Terminus)

Lanes	AM	NOON	PM
	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
	91	0	95	0.5
	0	0	0	0
	1397	0	1884	2.5
	2894	0	2070	

Northbound Approach

	Left	Thru	Right	
AM	2161	0	482	2894 AM
NOON	0	0	0	0 NOON
PM	3272	0	440	2070 PM
Lanes		0	2	2 Lanes

CONTROL: Signalized

Count Periods	Start	End
AM	7:00 AM	10:00 AM
NOON		
PM	3:00 PM	6:00 PM

Total Ins & Outs

	North Leg	South Leg	East Leg	West Leg
AM	764	2161	1488	0
NOON	0	0	0	0
PM	1388	3272	2894	0
	573	3376	0	1979
	0	0	0	2070
	535	2510		

Total Volume Per Leg

	North Leg	South Leg	East Leg	West Leg
AM	1337	5537	4382	0
NOON	0	0	0	0
PM	1923	5782	4049	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_002 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

AM

NS/EW Streets:	Gaffey St			Gaffey St			I-110 Freeway Terminus			I-110 Freeway Terminus			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	2	0	3	0	0	0	0	2.5	0	0.5	
7:00 AM		75	648		127					250		7	1107
7:15 AM		86	744		163					324		20	1337
7:30 AM		118	726		171					373		22	1410
7:45 AM		136	733		241					384		20	1514
8:00 AM		142	691		189					316		29	1367
8:15 AM		124	641		231					264		11	1271
8:30 AM		92	541		168					239		12	1052
8:45 AM		112	542		175					297		17	1143
9:00 AM		95	463		170					211		12	951
9:15 AM		84	502		152					258		11	1007
9:30 AM		98	453		174					255		20	1000
9:45 AM		95	426		167					259		15	962
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1257	7110	0	2128	0	0	0	0	3430	0	196	14121
APPROACH %'s :	0.00%	15.02%	84.98%	0.00%	100.00%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	94.59%	0.00%	5.41%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	482	2894	0	764	0	0	0	0	1397	0	91	5628
PEAK HR FACTOR :		0.971			0.793			0.000			0.921		0.929

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_002 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

PM

NS/EW Streets:	Gaffey St			Gaffey St			I-110 Freeway Terminus			I-110 Freeway Terminus			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	2	0	3	0	0	0	0	2.5	0	0.5	
3:00 PM		130	462		316					382		27	1317
3:15 PM		161	508		317					334		21	1341
3:30 PM		106	506		310					354		20	1296
3:45 PM		157	461		373					413		18	1422
4:00 PM		105	516		309					405		22	1357
4:15 PM		120	499		321					377		17	1334
4:30 PM		94	532		323					429		25	1403
4:45 PM		107	551		384					480		20	1542
5:00 PM		114	506		364					446		17	1447
5:15 PM		105	488		355					462		24	1434
5:30 PM		114	525		285					496		34	1454
5:45 PM		119	477		298					495		19	1408
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1432	6031	0	3955	0	0	0	0	5073	0	264	16755
APPROACH %'s :	0.00%	19.19%	80.81%	0.00%	100.00%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	95.05%	0.00%	4.95%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	440	2070	0	1388	0	0	0	0	1884	0	95	5877
PEAK HR FACTOR :		0.954			0.904			0.000			0.933		0.953

CONTROL : Signalized

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 12-5208-002
N/S Street: Gaffey St
E/W Street: I-110 Freeway Terminus
DATE: 5/22/2012 DAY: Tuesday
CITY: San Pedro

	Start	End
AM	7:00	10:00
PM	15:00	18:00

A M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	1	0
9:45 AM	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	1	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

P M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
3:00 PM	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Gaffey St and 9th St , City of San Pedro

Date: 5/22/2012

Day: Tuesday

Project #: CA12_5208_001

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Peak Hour Summary

Southbound Approach (Gaffey St)

Lanes	0	2	1		
AM	104	831	35	1464	AM
NOON	0	0	0	0	NOON
PM	111	1152	52	1204	PM

Eastbound Approach (9th St)

Lanes	AM	NOON	PM
	360	0	384
1	239	0	176
1	255	0	190
1	59	0	40

Westbound Approach

Lanes	AM	NOON	PM
0	38	0	58
1	214	0	226
1	53	0	66
	308	0	275

Northbound Approach

AM	943	42	1187	18	AM
NOON	0	0	0	0	NOON
PM	1258	47	970	33	PM
		1	2	0	Lanes

CONTROL

Signalized

Count Periods	Start	End
AM	7:00 AM	10:00 AM
NOON		
PM	3:00 PM	6:00 PM

Total Ins & Outs

	North Leg		
	970	1464	AM
	0	0	NOON
	1315	1204	PM

West Leg	AM	NOON	PM
	360	0	384
	553	0	406

East Leg	AM	NOON	PM
	305	0	350
	308	0	275

	South Leg	
AM	943	1247
NOON	0	0
PM	1258	1050

Total Volume Per Leg

	North Leg
AM	2434
NOON	0
PM	2519

West Leg	AM	NOON	PM
	913	0	790

East Leg	AM	NOON	PM
	613	0	625

	South Leg
AM	2190
NOON	0
PM	2308

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_001 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

AM

NS/EW Streets:	Gaffey St			Gaffey St			9th St			9th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	1	1	1	1	0	
7:00 AM	10	253	4	7	144	12	71	18	3	2	23	8	555
7:15 AM	6	279	5	6	195	15	61	34	10	8	30	7	656
7:30 AM	13	307	1	8	212	36	62	69	12	21	75	8	824
7:45 AM	16	302	6	11	233	27	61	86	28	13	58	11	852
8:00 AM	7	299	6	10	191	26	55	66	9	11	51	12	743
8:15 AM	13	257	4	11	161	30	52	45	14	2	41	20	650
8:30 AM	14	237	4	20	149	24	56	42	8	5	21	14	594
8:45 AM	11	223	8	16	167	25	52	36	11	8	27	20	604
9:00 AM	11	205	6	10	147	22	41	37	9	14	31	12	545
9:15 AM	13	209	8	13	166	21	46	37	5	6	21	17	562
9:30 AM	6	218	8	11	176	16	39	45	2	9	22	12	564
9:45 AM	11	194	11	21	147	22	48	30	8	11	23	17	543
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	131	2983	71	144	2088	276	644	545	119	110	423	158	7692
APPROACH %'s :	4.11%	93.66%	2.23%	5.74%	83.25%	11.00%	49.24%	41.67%	9.10%	15.92%	61.22%	22.87%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	42	1187	18	35	831	104	239	255	59	53	214	38	3075
PEAK HR FACTOR :		0.962			0.895			0.790			0.733		0.902

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_001 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

PM

NS/EW Streets:	Gaffey St			Gaffey St			9th St			9th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	1	1	1	1	0	
3:00 PM	20	268	10	16	286	29	54	51	20	15	44	15	828
3:15 PM	13	234	9	22	260	23	46	71	17	10	41	22	768
3:30 PM	10	238	5	15	255	31	30	49	13	14	50	18	728
3:45 PM	9	241	7	23	257	44	43	45	9	11	34	28	751
4:00 PM	9	241	9	19	292	27	42	36	21	17	43	10	766
4:15 PM	8	220	15	13	277	37	32	50	16	13	57	19	757
4:30 PM	11	243	10	21	247	37	51	36	12	12	49	17	746
4:45 PM	13	213	6	17	298	27	44	34	12	16	39	19	738
5:00 PM	10	240	7	14	297	32	38	49	17	14	59	18	795
5:15 PM	18	242	7	11	282	20	40	58	8	18	68	13	785
5:30 PM	8	257	10	14	297	30	52	37	6	20	51	15	797
5:45 PM	11	231	9	13	276	29	46	46	9	14	48	12	744
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	140	2868	104	198	3324	366	518	562	160	174	583	206	9203
APPROACH %'s :	4.50%	92.16%	3.34%	5.09%	85.49%	9.41%	41.77%	45.32%	12.90%	18.07%	60.54%	21.39%	

PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	47	970	33	52	1152	111	176	190	40	66	226	58	3121
PEAK HR FACTOR :		0.955			0.958			0.958			0.884		0.979

CONTROL : Signalized

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 12-5208-001
N/S Street: Gaffey St
E/W Street: 9th St
DATE: 5/22/2012 DAY: Tuesday
CITY: San Pedro

	Start	End
AM	7:00	10:00
PM	15:00	18:00

A M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	1	1	5	1	5	2	3	1
7:15 AM	8	0	4	2	7	1	14	0
7:30 AM	9	4	18	1	7	6	4	18
7:45 AM	8	1	13	7	5	10	6	12
8:00 AM	1	12	12	5	13	12	5	12
8:15 AM	2	1	3	0	1	2	2	3
8:30 AM	2	1	3	1	4	1	4	10
8:45 AM	2	0	2	1	4	2	6	3
9:00 AM	0	1	5	0	3	1	4	4
9:15 AM	0	1	0	2	1	2	5	5
9:30 AM	3	1	1	0	4	4	3	2
9:45 AM	4	8	3	1	7	12	6	5
TOTALS	**40**	**31**	**69**	**21**	**61**	**55**	**62**	**75**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	1	0	0	0
7:15 AM	0	1	0	0	1	0	0	1	0	0	0	0
7:30 AM	0	2	0	0	1	0	0	0	0	0	0	0
7:45 AM	0	2	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	1	0	0	2	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	1	0	0	1	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	1	1	0	0	0
TOTALS	**0**	**6**	**0**	**0**	**3**	**0**	**0**	**4**	**2**	**0**	**2**	**0**

P M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
3:00 PM	1	25	5	4	19	40	4	18
3:15 PM	5	20	6	10	24	31	8	11
3:30 PM	4	11	2	9	9	33	6	6
3:45 PM	2	13	1	3	10	3	5	8
4:00 PM	4	8	6	6	17	7	8	6
4:15 PM	7	10	10	3	7	3	7	9
4:30 PM	8	6	2	3	8	4	4	8
4:45 PM	1	6	4	5	8	5	7	4
5:00 PM	3	6	6	0	7	12	3	12
5:15 PM	4	6	4	11	5	12	12	6
5:30 PM	9	8	3	5	13	14	3	2
5:45 PM	0	4	4	4	2	1	6	3
TOTALS	**48**	**123**	**53**	**63**	**129**	**165**	**73**	**93**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
3:00 PM	0	0	0	1	3	0	2	1	0	0	2	0
3:15 PM	0	1	0	0	1	0	0	0	2	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	1	0	0	0	1	1	0	0	1	1	0	0
4:00 PM	0	3	0	0	0	1	0	0	0	0	0	0
4:15 PM	0	2	0	0	5	0	0	0	1	0	1	0
4:30 PM	0	1	0	1	0	0	0	0	0	0	0	0
4:45 PM	0	1	0	1	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	2	0	0	0
5:15 PM	0	1	0	0	2	1	0	0	0	1	0	0
5:30 PM	0	4	0	0	2	0	0	0	0	0	2	0
5:45 PM	0	3	0	0	0	0	0	0	0	0	0	0
TOTALS	**1**	**17**	**0**	**3**	**14**	**3**	**2**	**1**	**6**	**2**	**5**	**0**

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Western Ave and Paseo Del Mar , City of San Pedro

Date: 5/22/2012

Day: Tuesday

Project #: CA12_5208_003

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach (Western Ave)

Lanes	1	0	1		
AM	63	0	48	106	AM
NOON	0	0	0	0	NOON
PM	88	0	55	165	PM

Eastbound Approach (Paseo Del Mar)

	AM	NOON	PM
	65	0	99
1	79	0	50
1	11	0	11
0	0	0	0
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
27	0	115	1
2	0	11	1
0	0	0	0
59	0	66	
AM	NOON	PM	

CONTROL

1-Way Stop (EB)

Northbound Approach

AM	0	0	0	0	AM
NOON	0	0	0	0	NOON
PM	0	0	0	0	PM
		0	0	0	Lanes

Count Periods	Start	End
AM	7:00 AM	10:00 AM
NOON		
PM	3:00 PM	6:00 PM

Total Ins & Outs

	North Leg		
	111	106	AM
	0	0	NOON
	143	165	PM

West Leg			East Leg		
AM	NOON	PM			
65	0	99	29	0	126
90	0	61	59	0	66
			AM	NOON	PM

	South Leg	
AM	0	0
NOON	0	0
PM	0	0

Total Volume Per Leg

	North Leg
	217 AM
	0 NOON
	308 PM

West Leg			East Leg		
AM	NOON	PM			
155	0	160	88	0	192
			AM	NOON	PM

	South Leg
AM	0
NOON	0
PM	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_003 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

AM

NS/EW Streets:	Western Ave			Western Ave			Paseo Del Mar			Paseo Del Mar			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	1	0	1	1	1	0	0	1	1	
7:00 AM				6		6	13	1			0	5	31
7:15 AM				8		6	20	1			0	3	38
7:30 AM				5		4	21	1			0	3	34
7:45 AM				11		15	28	1			1	7	63
8:00 AM				15		18	21	2			0	4	60
8:15 AM				14		18	16	5			1	10	64
8:30 AM				8		12	14	3			0	6	43
8:45 AM				8		10	13	0			2	13	46
9:00 AM				11		9	18	2			0	10	50
9:15 AM				10		17	9	0			0	10	46
9:30 AM				9		12	13	1			2	13	50
9:45 AM				10		13	22	1			0	9	55
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	115	0	140	208	18	0	0	6	93	580
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	45.10%	0.00%	54.90%	92.04%	7.96%	0.00%	0.00%	6.06%	93.94%	
PEAK HR START TIME :	745 AM												TOTAL
PEAK HR VOL :	0	0	0	48	0	63	79	11	0	0	2	27	230
PEAK HR FACTOR :	0.000			0.841			0.776			0.659			0.898

CONTROL : 1-Way Stop (EB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_003 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

PM

NS/EW Streets:	Western Ave			Western Ave			Paseo Del Mar			Paseo Del Mar			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	1	0	1	1	1	0	0	1	1	
3:00 PM				29		12	13	0			1	16	71
3:15 PM				27		17	9	2			3	12	70
3:30 PM				27		15	8	0			1	13	64
3:45 PM				25		17	12	1			0	14	69
4:00 PM				21		14	16	4			1	12	68
4:15 PM				10		16	12	1			0	16	55
4:30 PM				12		18	18	6			4	17	75
4:45 PM				20		25	12	2			0	15	74
5:00 PM				14		31	12	6			2	11	76
5:15 PM				12		15	14	0			6	37	84
5:30 PM				9		17	12	3			3	52	96
5:45 PM				14		13	10	0			0	29	66
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	220	0	210	148	25	0	0	21	244	868
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	51.16%	0.00%	48.84%	85.55%	14.45%	0.00%	0.00%	7.92%	92.08%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	0	0	55	0	88	50	11	0	0	11	115	330
PEAK HR FACTOR :		0.000			0.794			0.847			0.573		0.859

CONTROL : 1-Way Stop (EB)

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 12-5208-003
N/S Street: Western Ave
E/W Street: Paseo Del Mar
DATE: 5/22/2012 DAY: Tuesday
CITY: San Pedro

	Start	End
AM	7:00	10:00
PM	15:00	18:00

A M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	1	0	0
8:00 AM	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	2
8:45 AM	0	0	0	0	1	0	0	0
9:00 AM	0	0	0	0	0	1	1	0
9:15 AM	0	0	0	0	1	0	0	0
9:30 AM	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	1	0	0
TOTALS	**0**	**0**	**0**	**0**	**2**	**4**	**1**	**2**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	1	0	0	0	0	0	0	0	1
9:00 AM	0	0	0	1	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	1	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

P M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
3:00 PM	0	0	0	0	0	2	0	0
3:15 PM	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	1	0	0	0
4:00 PM	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	1	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	1	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	2
TOTALS	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Western Ave and 9th St , City of San Pedro

Date: 5/22/2012

Day: Tuesday

Project #: CA12_5208_004

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach (Western Ave)

Lanes	0	2	1		
AM	22	744	84	1052	AM
NOON	0	0	0	0	NOON
PM	41	912	75	806	PM

Eastbound Approach (9th St)

Lanes	AM	NOON	PM
	301	0	284
1	14	0	20
2	114	0	133
0	115	0	219

Westbound Approach

Lanes	AM	NOON	PM
1	69	0	47
1	137	0	137
1	103	0	133
	300	0	293

Northbound Approach

AM	962	142	969	102	AM
NOON	0	0	0	0	NOON
PM	1264	106	739	85	PM
		1	2	0	Lanes

CONTROL

Signalized

Count Periods	Start	End
AM	7:00 AM	10:00 AM
NOON		
PM	3:00 PM	6:00 PM

Total Ins & Outs

	North Leg		
	850	1052	AM
	0	0	NOON
	1028	806	PM

West Leg	AM	NOON	PM
	301	0	284
	243	0	372

East Leg	AM	NOON	PM
	309	0	317
	300	0	293

	South Leg	
AM	962	1213
NOON	0	0
PM	1264	930

Total Volume Per Leg

	North Leg
AM	1902
NOON	0
PM	1834

West Leg	AM	NOON	PM
	544	0	656

East Leg	AM	NOON	PM
	609	0	610

	South Leg
AM	2175
NOON	0
PM	2194

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_004 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

AM

NS/EW Streets:	Western Ave			Western Ave			9th St			9th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1	
7:00 AM	14	200	10	1	102	3	2	9	14	13	13	11	392
7:15 AM	21	221	18	2	125	4	5	15	15	14	11	27	478
7:30 AM	37	288	24	22	182	5	2	35	25	21	33	25	699
7:45 AM	38	278	23	22	197	8	1	29	34	32	40	17	719
8:00 AM	38	210	29	16	201	6	3	26	31	25	45	18	648
8:15 AM	29	193	26	24	164	3	8	24	25	25	19	9	549
8:30 AM	25	193	24	22	137	7	3	15	16	13	25	18	498
8:45 AM	30	147	16	29	135	11	13	33	24	20	37	10	505
9:00 AM	16	183	26	28	110	6	12	20	23	23	17	11	475
9:15 AM	20	168	15	28	126	8	9	15	15	21	15	13	453
9:30 AM	21	190	15	26	129	10	7	16	20	17	18	10	479
9:45 AM	16	161	16	37	118	9	7	21	21	20	9	11	446
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	305	2432	242	257	1726	80	72	258	263	244	282	180	6341
APPROACH %'s :	10.24%	81.64%	8.12%	12.46%	83.66%	3.88%	12.14%	43.51%	44.35%	34.56%	39.94%	25.50%	

PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	142	969	102	84	744	22	14	114	115	103	137	69	2615
PEAK HR FACTOR :		0.869			0.936			0.949			0.868		0.909

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_004 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

PM

NS/EW Streets:	Western Ave			Western Ave			9th St			9th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	2	0	1	1	1	
3:00 PM	35	215	27	54	165	6	7	41	40	27	29	14	660
3:15 PM	32	143	22	41	161	7	7	50	64	49	35	20	631
3:30 PM	30	143	13	38	173	9	2	34	67	41	35	9	594
3:45 PM	24	170	22	44	172	4	7	41	58	42	31	11	626
4:00 PM	26	180	31	32	197	10	5	46	49	38	29	14	657
4:15 PM	26	200	20	24	132	9	11	42	40	29	30	11	574
4:30 PM	25	157	21	23	184	4	7	42	59	45	30	12	609
4:45 PM	33	190	17	17	198	11	7	45	70	38	37	10	673
5:00 PM	25	173	29	21	223	13	7	32	43	33	42	9	650
5:15 PM	21	181	13	13	261	8	2	30	64	29	32	12	666
5:30 PM	27	195	26	24	230	9	4	26	42	33	26	16	658
5:45 PM	27	146	21	16	226	7	5	34	46	28	24	15	595
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	331	2093	262	347	2322	97	71	463	642	432	380	153	7593
APPROACH %'s :	12.32%	77.92%	9.75%	12.55%	83.95%	3.51%	6.04%	39.37%	54.59%	44.77%	39.38%	15.85%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	106	739	85	75	912	41	20	133	219	133	137	47	2647
PEAK HR FACTOR :		0.938			0.911			0.762			0.932		0.983

CONTROL : Signalized

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 12-5208-004
N/S Street: Western Ave
E/W Street: 9th St
DATE: 5/22/2012 DAY: Tuesday
CITY: San Pedro

	Start	End
AM	7:00	10:00
PM	15:00	18:00

A M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	1	0	0	0	0	1	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	1	0	0	0
8:00 AM	0	0	0	1	0	0	1	0
8:15 AM	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	1	0	0	0
9:00 AM	0	0	0	1	0	1	0	1
9:15 AM	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	1	0	1	0	0
9:45 AM	0	0	0	0	1	0	0	0
TOTALS	**1**	**0**	**0**	**3**	**3**	**3**	**1**	**2**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	1	0	0	0	0	0	1	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	1	0	0	1	1	1	0	0
8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	2	0	0	0	0
9:15 AM	0	1	0	0	1	0	0	0	0	1	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**0**	**2**	**1**	**0**	**2**	**0**	**0**	**5**	**1**	**2**	**0**	**0**

P M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
3:00 PM	0	0	0	1	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	1	0
3:45 PM	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	1	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	3	0	2	0	0
5:15 PM	0	0	0	0	0	2	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
TOTALS	**0**	**0**	**1**	**4**	**1**	**4**	**1**	**0**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
3:00 PM	0	1	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
TOTALS	**0**	**1**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Western Ave and 25th St , City of San Pedro

Date: 5/22/2012

Day: Tuesday

Project #: CA12_5208_005

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach (Western Ave)

Lanes	1	2	1		
AM	581	85	142	949	AM
NOON	0	0	0	0	NOON
PM	451	127	306	834	PM

Eastbound Approach (25th St)

Lanes	AM	NOON	PM
	959	0	763
2	536	0	484
2	211	0	342
1	6	0	13

Westbound Approach

Lanes	AM	NOON	PM
1	326	0	221
1	370	0	287
1	38	0	54
	385	0	708

Northbound Approach

	1	2	0	Lanes
AM	129	8	87	32	AM
NOON	0	0	0	0	NOON
PM	194	25	129	60	PM

CONTROL

Signalized

Count Periods	Start	End
AM	7:00 AM	10:00 AM
NOON		
PM	3:00 PM	6:00 PM

Total Ins & Outs

	North Leg		
AM	808	949	AM
NOON	0	0	NOON
PM	884	834	PM

West Leg	AM	NOON	PM
	959	0	763
	753	0	839

East Leg	AM	NOON	PM
	734	0	562
	385	0	708

South Leg		
AM	129	127
NOON	0	0
PM	194	214

Total Volume Per Leg

North Leg	
1757	AM
0	NOON
1718	PM

West Leg	AM	NOON	PM
	1712	0	1602

East Leg	AM	NOON	PM
	1119	0	1270

South Leg	
AM	256
NOON	0
PM	408

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_005 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

AM

NS/EW Streets:	Western Ave			Western Ave			25th St			25th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	1	2	2	1	1	1	1	
7:00 AM	4	11	3	18	7	82	82	28	4	5	52	58	354
7:15 AM	0	19	6	24	5	104	91	35	4	7	73	66	434
7:30 AM	1	16	6	25	10	150	130	37	1	0	67	106	549
7:45 AM	3	26	8	34	27	155	149	58	1	9	82	86	638
8:00 AM	3	21	7	45	26	154	136	59	1	16	125	72	665
8:15 AM	1	24	11	38	22	122	121	57	3	13	96	62	570
8:30 AM	0	18	8	36	16	78	119	54	2	8	70	58	467
8:45 AM	3	17	8	28	16	88	98	53	2	14	62	45	434
9:00 AM	5	27	6	32	22	74	88	46	2	9	67	50	428
9:15 AM	2	19	5	20	18	67	95	45	3	12	48	61	395
9:30 AM	7	23	8	27	14	75	104	37	5	7	46	55	408
9:45 AM	4	27	9	29	24	69	92	37	4	10	61	44	410
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	33	248	85	356	207	1218	1305	546	32	110	849	763	5752
APPROACH %'s :	9.02%	67.76%	23.22%	19.99%	11.62%	68.39%	69.30%	29.00%	1.70%	6.39%	49.30%	44.31%	
PEAK HR START TIME :	730 AM												TOTAL
PEAK HR VOL :	8	87	32	142	85	581	536	211	6	38	370	326	2422
PEAK HR FACTOR :		0.858			0.898			0.905			0.862		0.911

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA12_5208_005 **Day:** TUESDAY

City: City of San Pedro **Date:** 05/22/2012

PM

NS/EW Streets:	Western Ave			Western Ave			25th St			25th St			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	1	2	2	1	1	1	1	
3:00 PM	4	32	18	60	37	84	141	71	8	24	75	47	601
3:15 PM	6	17	13	65	32	101	101	89	6	25	85	43	583
3:30 PM	2	22	14	47	35	112	120	90	1	17	69	34	563
3:45 PM	7	19	16	55	38	102	124	101	5	17	65	50	599
4:00 PM	5	24	12	57	23	89	123	69	4	28	86	49	569
4:15 PM	5	25	17	40	19	87	123	79	6	10	93	44	548
4:30 PM	8	25	17	59	28	98	118	79	5	14	72	55	578
4:45 PM	8	31	17	64	36	107	128	83	2	16	69	51	612
5:00 PM	5	16	10	62	29	98	134	89	5	20	75	52	595
5:15 PM	6	35	14	105	36	128	96	75	3	6	73	57	634
5:30 PM	6	47	19	75	26	118	126	95	3	12	70	61	658
5:45 PM	3	29	17	67	25	104	87	71	3	19	78	59	562
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	65	322	184	756	364	1228	1421	991	51	208	910	602	7102
APPROACH %'s :	11.38%	56.39%	32.22%	32.20%	15.50%	52.30%	57.69%	40.24%	2.07%	12.09%	52.91%	35.00%	

PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	25	129	60	306	127	451	484	342	13	54	287	221	2499
PEAK HR FACTOR :		0.743			0.822			0.920			0.956		0.949

CONTROL : Signalized

PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 12-5208-005
N/S Street: Western Ave
E/W Street: 25th St
DATE: 5/22/2012 DAY: Tuesday
CITY: San Pedro

	Start	End
AM	7:00	10:00
PM	15:00	18:00

A M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	1	1	1	0	1
7:15 AM	0	0	1	0	0	3	1	1
7:30 AM	0	2	0	0	4	1	0	0
7:45 AM	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	1	0	0	2	0
8:15 AM	0	0	1	1	3	0	1	2
8:30 AM	1	0	2	0	0	1	0	3
8:45 AM	0	1	1	4	0	1	4	0
9:00 AM	2	1	0	0	3	1	0	0
9:15 AM	1	1	0	0	0	3	0	0
9:30 AM	0	0	0	1	0	0	0	1
9:45 AM	2	0	0	0	2	1	0	0
TOTALS	**6**	**5**	**5**	**8**	**13**	**12**	**8**	**8**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	1	1	0	0	0	0	0	0	0	0	0	1
9:00 AM	0	1	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	1	0	1	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**1**	**2**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**3**

P M

PEDESTRIANS

TIME	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
3:00 PM	1	0	0	0	1	1	0	0
3:15 PM	0	0	0	1	2	1	1	0
3:30 PM	0	0	3	3	10	0	0	3
3:45 PM	0	3	1	1	1	2	1	1
4:00 PM	1	2	0	0	2	3	0	0
4:15 PM	4	0	0	1	1	3	1	0
4:30 PM	0	0	0	0	1	2	0	0
4:45 PM	0	0	1	1	2	3	0	1
5:00 PM	2	0	1	0	0	0	0	0
5:15 PM	0	3	0	1	2	0	1	1
5:30 PM	0	0	0	0	5	1	1	0
5:45 PM	0	1	1	0	0	1	1	1
TOTALS	**8**	**9**	**7**	**8**	**27**	**17**	**6**	**7**

BIKES

TIME	TURNING MOVEMENTS											
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	1	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	2	0	0	0	0	0	0	1	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	1	0	0	0	0
5:45 PM	1	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**2**	**3**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**

Appendix 24-A

SECTION 404(B)(1) COMPLIANCE EVALUATION

APPENDIX 24-A
SECTION 404(B)(1) COMPLIANCE EVALUATION

1 Section 404(b)(1) Regulatory Background

Section 404 of the Clean Water Act (CWA) authorizes the U.S. Army Corps of Engineers (Corps) to issue permits for the discharge of dredged or fill materials into waters of the United States (waters of the U.S.), including wetlands (33 United States Code [USC.] 1344). Waters of the U.S., defined in 33 Code of Federal Regulations (CFR) Part 328, consist of coastal and inland waters, lakes, rivers, and streams, including adjacent wetlands and tributaries. The U.S. Environmental Protection Agency (EPA) Section 404(b)(1) Guidelines (40 CFR 230 et seq.) are the substantive environmental criteria used by the Corps to evaluate permit applications. Under these guidelines, an analysis of practicable alternatives is the primary tool used to determine whether a proposed discharge can be authorized. The Section 404(b)(1) Guidelines prohibit discharges of dredged or fill material into waters of the U.S. if a practicable alternative to the proposed discharge exists that would have less adverse impacts on the aquatic ecosystem, including wetlands, as long as the alternative does not have other significant adverse environmental impacts (40 CFR Part 230[a]). An alternative is considered practicable if it is available and capable of being implemented after considering cost, existing technology, and logistics in light of overall project purpose (40 CFR Part 230[a][2]). The Section 404(b)(1) Guidelines suggest a sequential approach to project planning that considers mitigation measures only after the project proponent shows no practicable alternatives are available to achieve the overall project purpose with less environmental impacts. Once it is determined that no practicable alternatives are available, the guidelines then require that appropriate and practicable steps be taken to minimize potential adverse effects on the aquatic ecosystem (40 CFR Part 230.10[d]). Such steps may include actions controlling discharge location, material to be discharged, the fate of material after discharge or method of dispersion, and actions related to technology, plant and animal populations, or human use (40 CFR Parts 230.70-230.77).

Beyond the requirement for demonstrating that no practicable alternatives to the proposed discharge exist, the Section 404(b)(1) Guidelines also require the Corps to compile findings related to the environmental impacts of discharge of dredged or fill material. The Corps must make findings concerning the anticipated changes caused by the discharge to the physical and chemical substrate and to the biological and human use characteristics of the discharge site.

These guidelines also indicate that the level of effort associated with the preparation of the alternatives analysis should be commensurate with the significance of the impact and/or discharge activity (40 CFR Part 230.6(b)). The following draft Section 404(b)(1) alternatives analysis shows that discharges into waters of the U.S. associated with all of the alternatives, including the recommended alternative (Alternative 4), are relatively minor and, with the

exception of the No-Federal-Action Alternative, all of the alternatives would result in similar and insignificant discharges of fill material in waters of the U.S. Based on the detailed analysis in the draft EIR/EIS, neither the recommended alternative (Alternative 4) nor any of the alternatives that involve in-water discharges would result in significant adverse effects on the aquatic ecosystem.

2 Purpose and Need

2.1 NEPA Statement of Purpose and Need

Currently, the Sanitation Districts of Los Angeles County (Sanitation Districts) rely on two onshore tunnels and four offshore ocean outfall structures to convey treated effluent from the Joint Water Pollution Control Plant (JWPCP), in the city of Carson, to the Pacific Ocean. The two tunnels were constructed in 1937 and 1958 and have not been inspected for over 50 years. Inspection of the tunnels is not possible due to their overall length, limited access, interconnections between the tunnels, and continuous flow through the tunnels. Furthermore, in January 1995, the Joint Outfall System (JOS) service area was inundated by two major back-to-back storm events. The resulting peak wastewater flows in the sewerage system from these storm events nearly exceeded the capacity of the JWPCP ocean discharge system. If the tunnels were to be damaged or the capacity of the ocean discharge system exceeded, treated JWPCP effluent would need to be bypassed into the Wilmington Drain, a stormwater channel that flows through Harbor Regional Park. If sufficient capacity were not available in the Wilmington Drain, the sewers tributary to the JWPCP could overflow and untreated wastewater could enter various water courses, such as the Dominguez Channel and the Los Angeles River. Based on the above, there is a need to inspect and upgrade the aging ocean discharge system, to provide sufficient capacity in the JOS to accommodate the estimated 2050 peak wastewater flows, and to comply with all applicable water quality standards, including regulations prohibiting sewer overflows. The purpose of the Clearwater Program is to evaluate structural alternatives including modification of the existing ocean discharge system and the construction of a new ocean discharge system. Activities associated with a new/modified ocean discharge system occurring in the marine environment would require authorization from the Corps pursuant to Section 404 of the CWA, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.

2.2 Basic Project Purpose

The basic project purpose comprises the fundamental, essential, or irreducible purpose of the project, and is used by the Corps to determine whether the applicant's project is water-dependent. The Section 404(b)(1) Guidelines state that if an activity associated with the discharge proposed for a water body does not require access or proximity to, or siting within, water to fulfill its basic purpose, the activity is not water-dependent. However, the project is water-dependent because it requires an upgrade to the existing ocean discharge system.

The basic project purpose is construction/operation of marine utility lines (i.e., ocean outfalls). Thus, the applicant's project is water-dependent.

2.3 Overall Project Purpose

The overall project purpose serves as the basis for the Corps' Section 404(b)(1) alternatives analysis and is determined by further defining the basic project purpose in a manner that more specifically describes the applicant's goals and accounts for logistical considerations for the project, and which allows a reasonable range of alternatives to be analyzed. It is critical that the overall project purpose be defined to provide for a meaningful evaluation of alternatives. It should not be so narrowly defined as to give undue deference to the applicant's wishes, thereby unreasonably limiting the consideration of alternatives.

Conversely, it should not be so broadly defined as to render the evaluation unreasonable and meaningless.

The overall project purpose is to construct a new ocean discharge system or to modify the existing ocean discharge system in a manner that will reliably accommodate the peak wet weather flow of 927 million gallons per day (MGD) projected for year 2050 and allow for inspection/repair of the existing JWPCP effluent tunnels.

3 Alternatives Considered

The Clearwater Program is a comprehensive planning effort to develop a long-range Master Facilities Plan (MFP) and an associated joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Sanitation Districts' JOS, a regional wastewater management system serving approximately 4.8 million people in 73 cities and unincorporated areas of Los Angeles County. The Clearwater Program encompasses both program-wide and project-specific elements. In order to ensure sufficient JWPCP effluent management capacity through the year 2050, the Clearwater Program MFP and EIR/EIS evaluated, at a project-specific level, four alternatives (see attached figure) for the construction of underground effluent tunnels and ocean outfalls as well as rehabilitation of the existing ocean outfalls. The Clearwater Program also evaluated a No-Project Alternative and a No-Federal-Action Alternative in accordance with state and federal law, respectively. The No-Project Alternative (Alternative 5) is not discussed in this evaluation.

Only elements within the marine environment that are relevant to compliance with Section 404(b)(1) are evaluated in this alternatives analysis. Alternatives 1 through 3 are composed of two basic elements: construction of a new ocean discharge system and rehabilitation of the existing ocean outfalls. Alternative 4 is limited to the rehabilitation of the existing outfalls.

3.1 New and Existing Ocean Outfalls

3.1.1 Construction of New Ocean Outfalls

Alternatives 1 through 3 would include the construction of an offshore tunnel that terminates and the placement of an ocean outfall structure on the ocean floor. The ocean outfall structure would consist of a riser that would be constructed of steel with a concrete lining and a diffuser that would be constructed of either steel, reinforced concrete pipe (RCP), or high density

polyethylene (HDPE). The riser would physically connect the offshore tunnel to the seafloor diffuser. Both the riser and diffuser assembly would be pre-fabricated onshore prior to ocean construction.

If the diffuser were constructed of steel or RCP, it would consist of two 4,000-foot-long legs oriented out of the riser head. The diameter (internal) of the steel or RCP diffuser would incrementally decrease in size from approximately 132 inches to 48 inches. Diffuser installation would require seafloor grading and possibly trenching for site preparation. It may be necessary to construct a roadbed base of ballast rock up to 54 feet wide and 5 feet thick. The roadbed would be placed either in the trench or on the graded seafloor. The diffuser would be placed on this base with additional ballast rock added around the pipe for stability. The riser and diffuser would cover a seafloor area of approximately 5 to 10 acres, depending on depth. Estimated quantities of ballast rock are 30,000 to 95,000 cubic yards.

If the diffuser were constructed of HDPE, no trenching would be required. The HDPE would be placed directly on the seafloor, which may require some minor grading and would require a limited amount of ballast rock to protect the piping and riser. The HDPE design would consist of a manifold with eight diffuser legs configured in a sequentially staggered array from shortest to longest. The pipe diameter (external) would range in size from approximately 63 inches to 42 inches. The riser, manifold, and diffuser would cover a seafloor area of approximately 8 acres. Approximately 1,500 pre-installed concrete anchor blocks would be attached to HDPE piping to provide ballast during the sinking and installation process as well as to provide stability against ocean currents and wave-induced hydrodynamic loading. Estimated quantities of ballast rock are 7,000 to 20,000 cubic yards.

To prepare the site for riser installation, unconsolidated seafloor material would either be sidecast or removed and disposed. Hydro-jetting or pile-driving would be used to install the riser casing. The majority of the riser and diffuser construction work would be based on one 10-hour shift per day, 5-day-per-week schedule. However, when the pre-fabricated riser assembly is transported to the installation site, construction work would take place on a continuous 24-hour-per-day basis for approximately 1 week. All work, including mobilization, pre-assembly, site preparation, construction, and demobilization, would take approximately 24 months for the riser and approximately 6 to 12 months for the diffuser.

There are two proposed riser and diffuser locations. The San Pedro Shelf (SP Shelf) riser and diffuser assembly site would be located approximately 7.5 miles from the Port of Los Angeles (POLA) breakwater. The riser assembly would be located at a depth of approximately 200 feet of water and would extend approximately 110 feet below the seafloor to meet the tunnel. The SP Shelf riser and diffuser area is located on a relatively flat area of the upper slope along the southwest edge of the SP Shelf. It is not located within the boundaries of the EPA-designated dichlorodiphenyltrichloroethane/polychlorinated biphenyl (DDT/PCB) contaminated sediment study area. Construction activities for diffuser placement on the SP Shelf would include grading and possibly trenching the seafloor and placing ballast rocks.

The Palos Verdes Shelf (PV Shelf) riser and diffuser assembly site would be located approximately 2 miles from Point Fermin. The riser assembly would be located at a depth of

approximately 175 feet of water and would extend approximately 145 feet below the seafloor to meet the tunnel. The PV Shelf riser and diffuser area is within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. An estimated 1,800 metric tons of DDT was discharged onto the PV Shelf between 1953 and 1971. Much of the original DDT that was historically discharged has now dispersed throughout the greater PV Shelf, but a reservoir of approximately 100 metric tons remains buried in the seafloor concentrated near the diffusers of the existing outfalls. Construction activities would avoid contaminated sediments and would not interfere with the EPA's proposed remedy, which is a cap of clean sand/silt to be placed over approximately 300 acres of the PV Shelf where the highest surficial contaminant concentrations appear to be eroding. The Sanitation Districts will coordinate with the EPA during design and construction of the cap.

For construction of the proposed shaft sites, offshore tunnel, and riser/diffuser, dredged material determined to be suitable for ocean disposal could be potentially disposed at an Ocean Dredged Material Disposal Site (ODMDS). LA-2 and LA-3 are the two ODMDSs in the vicinity of the project. LA-2 is located approximately 4 miles from the PV Shelf site, 3 miles from the SP Shelf site, and 9 miles from POLA. LA-3 is located approximately 26 miles from the PV Shelf site, 21 miles from the SP Shelf site, and 26 miles from POLA. Any contaminated sediments would be disposed at inland facilities in accordance with all applicable regulations. Estimated quantities of dredged material are 5,000,000 to 30,000,000 cubic yards for the offshore tunnel, 40,000 to 45,000 cubic yards for the riser, and 10,000 to 50,000 cubic yards for the diffuser.

3.1.2 Rehabilitation of Existing Ocean Outfalls

Alternatives 1 through 4 would include rehabilitation of the existing ocean outfalls. The rehabilitation activities, such as joint repairs, re-ballasting, and cathodic protection, would occur on the existing 72-, 90-, and 120-inch outfalls in water depths of approximately 20 to 50 feet. Mechanical dredging or removal/disposal of large quantities of sediment would not be required. Joint repairs would only require a localized and temporary removal of small amounts of sediment and ballast rock. A small derrick barge would be used to place the ballast rock (estimated total of 15,000 to 18,000 cubic yards) around the outfalls and support the joint repair work. A tube extending from the barge deck to the ocean floor would ensure that placement of ballast rock would not extend beyond the existing footprint. Joint repairs (an estimated 10 to 40 total) would involve temporarily removing some of the existing ballast rock from around the outfall to fully expose the joint being repaired. A team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards of sediment, which are *de minimis* quantities relative to typical dredging projects. A coupling would be installed and the annular space filled with concrete. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed. Cathodic protection would also be restored or added to the existing outfalls where necessary. The majority of the construction work would be based on one 10-hour shift per day, 5 days per week. Approximately eight to ten construction workers would be needed for the rehabilitation work. Joint repairs and transport of construction workers would require a work vessel and crew deploying from POLA and operating one daily round-trip for approximately 1 month. All work (including mobilization, construction, and demobilization) would take approximately 9 months.

These outfall rehabilitation activities could potentially impact both contaminated sediments and kelp beds in the project area. Regarding sediments, the highest contaminant concentrations are near the terminus of the existing ocean outfalls in depths of 150 to 200 feet, while the primary sediment-disturbing activity would be placement of additional ballast rock along the existing outfalls at ocean depths ranging from approximately 20 to 50 feet. Given the distance between the proposed re-ballasting work and the EPA's proposed cap, potential impacts would be avoided and mitigation is not required. However, if during final design it is determined that ballast rock is needed at depths greater than 50 feet, the Sanitation Districts would coordinate with the EPA to ensure that the work would not interfere with the proposed remedy. In addition, the Sanitation Districts have proposed entering into a memorandum of understanding that preserves the EPA's need to implement the proposed remedy and the Sanitation Districts' need to operate, maintain, and repair the existing ocean outfalls.

Regarding kelp beds, the project area includes 150 acres of kelp along approximately 5 miles of coastline (that includes the White Point area) in water depths of approximately 40 to 70 feet. Areas shoreward of 40-foot depths do not support kelp because of wave action, sea urchin grazing, and the absence of hard substrate. Because proposed re-ballasting work would occur at water depths of approximately 20 and 50 feet, there would be some overlap between the general work area and the kelp habitat between about 40 and 50 feet. As a result, re-ballasting activities could impact kelp growing on the outfall pipes and the adjacent rock ballast. To reduce impacts, the proposed method of placing the new ballast rock would ensure that the work would be limited to the existing footprint of the outfalls (i.e., pipeline and adjacent rock ballast). The impact would also be temporary because kelp would be able to recolonize the rock ballast upon completion of construction. Furthermore, replacement and addition of rock ballast would increase hard substrate surface area and thus benefit benthic habitat.

3.2 Description of Alternatives

3.2.1 Alternative 1

Alternative 1 (Wilmington to SP Shelf alignment) would include a 2-mile-long onshore tunnel and a 12.4-mile-long offshore tunnel. The 18-foot diameter (internal) underground tunnel would begin at the JWPCP and run beneath Wilmington Boulevard to POLA. From POLA, the tunnel would be extended offshore beneath the ocean floor at a depth of approximately 200 feet, terminating at a new riser structure and ocean outfall consisting of a diffuser on the SP Shelf. The alignment would include one working shaft at the JWPCP as well as one working shaft and two access shafts at POLA. Alternative 1 would include dredging in the vicinity of the new ocean outfall structure, transportation of dredged material for disposal, and rehabilitation of the existing ocean outfalls.

3.2.2 Alternative 2

Alternative 2 (Wilmington to PV Shelf alignment) would include a 2-mile-long onshore tunnel (which is identical to Alternative 1) and a 7.2-mile-long offshore tunnel. The 18-foot-diameter (internal) underground tunnel would begin at the JWPCP and run beneath Wilmington Boulevard to POLA, from which the tunnel would be extended offshore beneath the ocean floor at a depth

of approximately 175 feet, terminating at a new riser structure and ocean outfall consisting of a diffuser on the PV Shelf. The alignment would include one working shaft at the JWPCP as well as one working shaft and two access shafts at POLA. Alternative 2 would include dredging in the vicinity of the new ocean outfall structure, transportation of dredged material for disposal, and rehabilitation of the existing ocean outfalls.

3.2.3 Alternative 3

Alternative 3 (Figueroa/Gaffey to PV Shelf alignment) would include a 6.4-mile-long onshore tunnel and a 2.2-mile-long offshore tunnel. The 18-foot diameter (internal) underground tunnel would begin at the JWPCP and run beneath Figueroa Street and South Gaffey Street to Angels Gate Park. From Angels Gate Park, the tunnel would be extended offshore beneath the ocean floor at a depth of approximately 175 feet, terminating at a new riser structure and ocean outfall consisting of a diffuser on the PV Shelf. The alignment would include one working shaft at the JWPCP and one access shaft at Angels Gate Park. Alternative 3 would include dredging in the vicinity of the new ocean outfall structure, transportation of dredged material for disposal, and rehabilitation of the existing ocean outfalls.

3.2.4 Alternative 4 (Recommended Alternative)

Alternative 4 is the recommended alternative. Alternative 4 (Figueroa/Western to Royal Palms alignment) would include a 6.9-mile-long onshore tunnel; however, no new offshore tunnel, riser structure, or ocean outfall would be required. The 18-foot diameter (internal) underground tunnel would begin at the JWPCP and run beneath Figueroa Street, Harbor Regional Park, North Gaffey Street, Capitol Drive, and Western Avenue (through Dodson Avenue) to Royal Palms Beach where the tunnel would connect to the existing ocean outfalls at the existing manifold structure. The alignment would include one working shaft at the JWPCP and one exit shaft at Royal Palms Beach. Alternative 4 would include rehabilitation of the existing ocean outfalls.

3.2.5 Alternative 6 (No-Federal-Action Alternative)

Pursuant to the National Environmental Policy Act (NEPA), an environmental impact statement (EIS) must evaluate a no-federal-action alternative. The No-Federal-Action Alternative for the Clearwater Program consists of activities that the Sanitation Districts would perform without issuance of Corps permits, which are required for construction of both the offshore tunnel and the riser/diffuser, rehabilitation of the existing ocean outfalls, and ocean disposal of dredged material. Without a Corps permit to work on the aforementioned facilities, the Sanitation Districts would not construct the onshore tunnel and shaft sites and would not rehabilitate the existing ocean outfalls. Therefore, the Corps would not make any significance determinations under NEPA and would not issue any permits or discretionary approvals for dredge or fill actions, or for transport or ocean disposal of dredged material. None of the project elements previously described would be constructed under the No-Federal-Action Alternative. The Sanitation Districts would continue to use the existing ocean discharge system, which could result in emergency discharges and/or sewer overflows to various water courses.

4 Alternatives Analysis

4.1 Restrictions on Discharge

The Section 404(b)(1) Guidelines require implementation of the least environmentally damaging practicable alternative (LEDPA), which by law must:

- Avoid and minimize discharge of dredged or fill material into waters of the U.S.[1]
- Not entail significant impacts on other non-aquatic environmental resources[2]
- Be practicable with respect to cost, technology, and logistics[3]
- Meet the overall project purpose[4]

4.2 Overall Project Purpose

Alternatives 1 through 4 meet the overall project purpose. All four alternatives would reliably accommodate the peak wet weather flow of 927 MGD projected for year 2050 and allow for inspection/repair of the existing JWPCP effluent tunnels. Alternative 6 (No-Federal-Action Alternative) does not meet the overall project purpose because accommodating peak wet weather flow would require construction of new outfalls and/or rehabilitation of the existing ocean outfalls. Both activities would be located within waters of the U.S. and be subject to Section 404 of the CWA.

4.3 Impacts on Waters of the U.S.

Alternatives 1 through 3 would entail discharge of fill into 5 to 10 acres of waters of the U.S. Approximately 30,000 to 95,000 cubic yards of rock ballast would be required for a steel or RCP diffuser structure. Approximately 7,000 to 20,000 cubic yards of rock ballast would be required for a HDPE diffuser structure. A HDPE diffuser structure would also require the discharge of approximately 1,500 concrete anchor blocks. Estimated quantities of dredged material are 5,000,000 to 30,000,000 cubic yards for the offshore tunnel, 40,000 to 45,000 cubic yards for the riser, and 10,000 to 50,000 cubic yards for the diffuser. Approximately 15,000 to 18,000 cubic yards of rock ballast would be discharged for the rehabilitation of the existing ocean outfalls, which would be restricted to the footprint of the existing ocean outfalls. Alternative 4 (the recommended alternative) would only entail rehabilitation of the existing ocean outfalls.

4.4 Practicability (Technology)

Alternatives 1 through 4 could be constructed with existing technology, although Alternative 4 would be more constructible than Alternatives 1 through 3 because it would include a technically

[1] 40 CFR Part 230.10(a); The text states "…less adverse impacts on the aquatic ecosystem..." In practice this is often quantified as volume or acres of discharge into waters of the U.S.
[2] Ibid.
[3] 40 CFR Part 230.10(a)(2)
[4] Ibid.

less challenging onshore tunnel, and no new offshore tunnel or new riser/diffuser ocean outfall structure. All four alternatives are considered practicable with respect to technology for the purposes of this evaluation.

4.5 Practicability (Logistics)

Final design for each of the four alternatives is estimated to take approximately 2.5 years, with anticipated construction durations of approximately 6.5 years for Alternatives 2, 3, and 4 and approximately 8 years for Alternative 1. Key construction tasks for all four alternatives include tunnel boring machine (TBM) fabrication and assembly, shaft construction, onshore tunneling, and existing ocean outfall rehabilitation. Additional tasks for Alternatives 1 through 3 include offshore tunneling and construction of a riser/diffuser ocean outfall structure. All four alternatives are considered practicable with respect to logistics for the purposes of this evaluation.

4.6 Practicability (Costs)

Alternative 1 (Wilmington to SP Shelf tunnel with new riser/diffuser ocean outfall structure and rehabilitation of the existing ocean outfalls) would cost approximately $1,360 million.
Alternative 2 (Wilmington to PV Shelf tunnel with new riser/diffuser ocean outfall structure and rehabilitation of the existing ocean outfalls) would cost approximately $980 million.
Alternative 3 (Figueroa/Gaffey to PV Shelf tunnel with new riser/diffuser ocean outfall structure and rehabilitation of the existing ocean outfalls) would cost approximately $910 million.
Alternative 4 (Figueroa/Western to Royal Palms tunnel with rehabilitation of the existing ocean outfall) would cost approximately $550 million. Because the costs for Alternatives 1 through 3 are approximately two to three times as much as Alternative 4 (the recommended alternative), these alternatives are less practicable with respect to costs.

4.7 Significant Environmental Impacts on Non-Aquatic Resources

Alternatives 1 through 3 would require construction of onshore tunnels ranging from 2 to 6.4 miles, and offshore tunnels ranging from 2.2 to 12.4 miles. Alternative 4 would require construction of an approximately 6.9 mile onshore tunnel. Tunneling activities associated with Alternatives 1 through 4 would entail significant impacts on air quality, paleontological resources, and greenhouse gas emissions. Construction of temporary shafts for Alternatives 3 and 4 and rehabilitation of the existing ocean outfalls for Alternatives 1 through 4 would entail significant impacts on aesthetics. The increased potential for emergency discharges and/or sewer overflows to various water courses associated with Alternative 6 would entail significant impacts on geology, soils, and mineral resources; hydrology, water quality and public health; recreation; and utilities, services systems, and energy.

Table 1 summarizes the evaluation criteria.

Table 1. Comparison of 404(b)(1) Evaluation Criteria

Alternatives	Practicability Test			Significant Environmental Impacts on Non-Aquatic Resources?	Impact on Waters of the U.S. (acres)	Meets Overall Project Purpose?
	Cost	Logistics	Technology			
Alternative 1	$1,360M	Yes	Yes	Yes	5-10	Yes
Alternative 2	$910M	Yes	Yes	Yes	5-10	Yes
Alternative 3	$980M	Yes	Yes	Yes	5-10	Yes
Alternative 4	$550M	Yes	Yes	Yes	<1	Yes
Alternative 6	$0M	N/A	N/A	Yes	Zero	No

5 Environmental Effects of Alternatives on Aquatic Resources

The potential impacts of the construction and operation of Alternatives 1 through 6 on the overall environment have been analyzed in the EIR/EIS for the Clearwater Program.

The purpose of the Section 404(b)(1) Guidelines is to restore and maintain the chemical, physical, and biological integrity of the waters of the U.S. through the control of discharges of dredged or fill material. Except as provided under CWA Section 404(b)(2), no discharge of dredged or fill material will be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impacts on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. In accordance with the Section 404(b)(1) Guidelines, the potential short-term or long-term effects of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment must be determined.

Alternatives 1 through 4 would entail the discharge of fill in waters of the U.S. Alternative 6, the No-Federal-Action Alternative, would not entail the discharge of fill, and as indicated in Section 4.2, it does not meet the overall project purpose. Therefore, the following discussion evaluates impacts of Alternatives 1 through 4 on the aquatic resources identified in Subpart C through Subpart H of the Section 404(b)(1) Guidelines.

5.1 Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

5.1.1 Substrate

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. A steel or RCP diffuser structure may require the discharge of a ballast rock base up to 54 feet wide and 5 feet deep. The diffuser

would be placed on this base with additional ballast rock added around the pipe for stability. The riser and diffuser would cover a seafloor area of approximately 5 to 10 acres, depending on depth. Estimated quantities of ballast rock are 30,000 to 95,000 cubic yards. A HDPE diffuser structure would be placed directly on the seafloor, which may require some minor grading and would require a limited amount of ballast rock to protect the piping and riser. The riser, manifold, and diffuser would cover a seafloor area of approximately 8 acres. Approximately 1,500 pre-installed concrete anchor blocks would be attached to the HDPE piping to provide ballast during the sinking and installation process as well as to provide stability against ocean currents and wave-induced hydrodynamic loading. Estimated quantities of ballast rock are 7,000 to 20,000 cubic yards.

To prepare the site for riser installation, unconsolidated seafloor material would either be sidecast or removed and disposed. Hydro-jetting or pile-driving would be used to install the riser casing. The majority of the riser and diffuser construction work would be based on a one 10-hour shift per day, 5-day-per-week schedule. However, when the pre-fabricated riser assembly is transported to the installation site, construction work would take place on a continuous 24-hour-per-day basis for approximately 1 week. All work, including mobilization, pre-assembly, site preparation, construction, and demobilization, would take approximately 24 months for the riser and approximately 6 to 12 months for the diffuser.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would entail rehabilitation of the existing ocean outfalls. The rehabilitation work would entail a like-for-like replacement of existing substrate. A small derrick barge would be used to place the ballast rock (estimated total of 15,000 to 18,000 cubic yards) around the outfalls and support the joint repair work. A team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards of sediment, which are *de minimis* quantities relative to typical dredging projects. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed.

Alternative 4 would entail *de minimis* discharge of fill material, and the fill would entail a like-for-like replacement of existing substrate. Furthermore, Alternative 4 would be limited to the footprint of the existing outfall structures. Thus, there would not be increased impacts on waters of the U.S. Based on the detailed analysis in Section 13.4.3.2 of the draft EIR/EIS, Alternative 4 would have substantially less direct and indirect impact on substrate when compared to Alternatives 1 through 3, and the impacts on substrate would be less than significant.

5.1.2 Suspended Particulates and Turbidity

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. A steel or RCP diffuser structure may require the discharge of a ballast rock base up to 54 feet wide and 5 feet deep. Diffuser

installation would require seafloor grading and possibly trenching for site preparation. If the diffuser were constructed of HDPE, no trenching would be required. The HDPE may require some minor grading and would require a limited amount of ballast rock to protect the piping and riser. To prepare the site for riser installation, unconsolidated seafloor material would either be sidecast or removed and disposed. Hydro-jetting or pile-driving would be used to install the riser casing. Construction of the offshore tunnel could generate approximately 5,000,000 to 30,000,000 cubic yards of material requiring ocean disposal at either LA-2 or LA-3. Beneficial reuse would be maximized to the extent practicable.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would entail rehabilitation of the existing ocean outfalls. The rehabilitation work would entail a like-for-like replacement of existing substrate. A small derrick barge would be used to place the ballast rock (estimated total of 15,000 to 18,000 cubic yards) around the outfalls and support the joint repair work. A team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards of sediment, which are *de minimis* quantities relative to typical dredging projects. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed.

Alternatives 1 through 3 would entail sediment-disturbing activities such as dredging, pile driving, and hydro-jetting. Construction activities could alter water quality by generating a turbid environment at the surface of the ocean and near the bottom by increasing suspended sediment levels. Surface turbidity could result from overflow or spill when sediments within the riser casings and riser structure are brought to the surface and transferred from the top of the casing to the transport barge. Near-bottom turbidity could occur during sidecasting, grading, and placement of ballast for construction of the diffuser structure. The size and persistence of a sediment plume would depend on several factors, including sediment characteristics, water depth, and current direction and velocity. Settling rates are largely determined by the grain size of the suspended material.

If dredged material is sidecasted, sediment generally would not be released more than 20 feet from the bottom, thereby limiting the spread of sediment. Localized areas of elevated turbidity conditions would occur in the vicinity of the near-bottom construction activities for the duration of construction. However, near-bottom turbidity generated by construction activities is expected to settle and rapidly mix with ambient water, with normal conditions likely to be found in the area within hours to days of cessation of construction activities.

Dredging would require sediment to be brought to the surface via a clamshell dredge and loaded onto a barge. As sediment is brought up through the water column, some amount of sediment would wash out of the dredge, typical of all dredging operations. Therefore, water column turbidity would occur using this dredging and removal method. The process of raising these sediments from the seafloor to the dredge barge would create turbidity throughout the entire water column instead of just near bottom and more sediment would be removed from the marine

environment when compared to sidecasting. The rate of sediment settling would remain the same. However, sediments would take longer to mix and diffuse through the water column.

Alternative 4 would not entail dredging, pile driving, or hydro-jetting. For the rehabilitation of the existing ocean outfalls, a team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards of sediment, a *de minimis* amount compared to the riser/diffuser construction under Alternatives 1 through 3. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed. Therefore, Alternative 4 would substantially reduce turbidity and suspended particulates in the water column compared to Alternatives 1 through 3. Furthermore, based on the detailed analysis in Section 13.4.3.2 of the draft EIR/EIS, Alternative 4 would entail less than significant impacts on turbidity.

5.1.3 Contaminants

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. All three types of materials are chemically inert and would not introduce contaminants into the water column via leaching. Alternatives 1 through 3 would entail sediment-disturbing activities such as dredging, pile driving, and hydro-jetting. However, suspension of sediments is not expected to introduce contaminants into the water column because the SP Shelf riser and diffuser assembly site (Alternative 1) would be located approximately 7.5 miles from the POLA breakwater. As such, the sediment is expected to be clean relative to sediment within POLA, which receives contaminants from urban runoff and historical industrial practices within the port. Furthermore, Alternative 1 would not be located within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. Likewise, the PV Shelf riser and diffuser assembly site (Alternatives 2 and 3) would be located approximately 2 miles from Point Fermin. The PV Shelf riser and diffuser area is within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. An estimated 1,800 metric tons of DDT was discharged onto the PV Shelf between 1953 and 1971. Much of the original DDT that was historically discharged has now dispersed throughout the greater PV Shelf, but a reservoir of approximately 100 metric tons remains buried in the seafloor concentrated near the diffusers of the existing ocean outfalls. Construction activities would avoid contaminated sediments and would not interfere with the EPA's proposed remedy, which is a cap of clean sand/silt to be placed over approximately 300 acres of the PV Shelf where the highest surficial contaminant concentrations appear to be eroding. The Sanitation Districts will coordinate with the EPA during design and construction of the cap.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would not entail sediment-disturbing activities such as dredging, pile driving, or hydro-jetting. Therefore, Alternative 4 would substantially reduce turbidity and suspended particulates in the water column compared to the riser/diffuser construction under Alternatives 1 through 3. Likewise, the potential for introducing contaminants into the water column from

sediment-disturbing activities would be substantially less. For the rehabilitation work, Alternative 4 would discharge ballast rock (estimated total of 15,000 to 18,000 cubic yards) around the existing ocean outfalls and in support of the joint repair work. Ballast rock is chemically inert and would not introduce contaminants into the water column via leaching. The existing ocean outfalls are located within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. However, the highest contaminant concentrations are near the terminus of the existing ocean outfalls in depths of 150 to 200 feet, while the primary sediment-disturbing activity would be placement of additional ballast rock along the existing ocean outfalls at ocean depths ranging from approximately 20 to 50 feet. Given the distance between the proposed re-ballasting work and the EPA's proposed cap, potential impacts would be avoided. In addition, the Sanitation Districts have proposed entering into a memorandum of understanding that preserves the EPA's need to implement the proposed capping remedy and the Sanitation Districts' need to operate, maintain, and repair the existing ocean outfalls. Therefore, Alternative 4 would substantially reduce contaminants in the water column compared to Alternatives 1 through 3. Furthermore, based on the detailed analysis in Section 13.4.3.2 of the draft EIR/EIS, Alternative 4 would entail less than significant impacts on contaminants.

5.1.4 Water

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. All three types of materials are chemically inert and would not introduce contaminants into the water column via leaching. Construction would entail sediment-disturbing activities such as dredging, pile driving, and hydro-jetting. These activities could alter water quality by generating a turbid environment at the surface of the ocean and near the bottom by increasing suspended sediment levels. Surface turbidity could result from overflow or spill when sediments within the riser casings and riser structure are brought to the surface and transferred from the top of the casing to the transport barge. Near-bottom turbidity could occur during sidecasting, grading, and placement of ballast for construction of the diffuser structure. The size and persistence of a sediment plume would depend on several factors, including sediment characteristics, water depth, and current direction and velocity. Settling rates are largely determined by the grain size of the suspended material. Because the construction activities are located within an open marine environment, and factors such as temperature, salinity, density, hydrogen ion concentration (pH), and because levels of dissolved oxygen (DO), transparency, and nutrients in deeper offshore waters are generally influenced by large-scale oceanographic and meteorological conditions, there would be minimal and short-term impacts on water quality parameters.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would entail rehabilitation of the existing ocean outfalls. The rehabilitation work would entail a like-for-like replacement of existing substrate. Alternative 4 would not entail dredging, pile driving, dredging, or hydro-jetting. For the rehabilitation of the existing ocean outfalls, a team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards

of sediment, a *de minimis* amount compared to the riser/diffuser construction under Alternatives 1 through 3. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed. Therefore, Alternative 4 would substantially reduce turbidity and suspended particulates in the water column compared to Alternatives 1 through 3. Other water quality parameters such as DO, salinity, pH, and nutrients would remain unaffected. Based on the detailed analysis in Section 13.4.6.2 of the draft EIR/EIS, Alternative 4 would entail less than significant impacts on water quality.

5.1.5 Current Patterns and Water Circulation

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. The alternatives would result in the permanent placement of large pipes on the ocean floor. If the diffuser were constructed of steel or RCP, it would consist of two 4,000-foot-long legs oriented out of the riser head. The diameter (internal) of the steel or RCP diffuser would incrementally decrease in size from approximately 132 inches to 48 inches. It may be necessary to construct a ballast rock base up to 54 feet wide and 5 feet thick. The diffuser would be placed on this base with additional ballast rock added around the pipe for stability. The riser and diffuser would cover a seafloor area of approximately 5 to 10 acres, depending on depth. Estimated quantities of ballast rock are 30,000 to 95,000 cubic yards. If the diffuser were constructed of HDPE, it would be placed directly on the seafloor. The HDPE design would consist of a manifold with eight diffuser legs configured in a sequentially staggered array from shortest to longest. The pipe diameter (external) would range in size from approximately 63 inches to 42 inches. The riser, manifold, and diffuser would cover a seafloor area of approximately 8 acres. Approximately 1,500 pre-installed concrete anchor blocks would be attached to HDPE piping to provide ballast during the sinking and installation process as well as to provide stability against ocean currents and wave-induced hydrodynamic loading. Estimated quantities of ballast rock are 7,000 to 20,000 cubic yards. Placement of such structures on the ocean floor would permanently alter the current patterns and water circulation in the immediate vicinity of the structures. However, because the structures would be placed within a deep and open marine environment, there would be no impacts on current patterns within the Southern California Bight (SCB).

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would entail rehabilitation of the existing ocean outfalls. The rehabilitation work would entail a like-for-like replacement of existing substrate. Therefore, based on the detailed analysis in Section 13.4.6.2 of the draft EIR/EIS, there would be no permanent alteration of current patterns and water circulation within the immediate vicinity of the structure. There would also be no impacts on current patterns within the SCB.

5.1.6 Normal Water Fluctuations

Alternatives 1 through 4 include construction and/or rehabilitation of a relatively small outfall system within an open ocean environment. Furthermore, water fluctuation associated with the

marine environment such as tides and waves are influenced by large-scale oceanographic processes as well as the combined gravitational influences of the moon, sun, and rotation of the earth. Therefore, Alternatives 1 through 4 would not impact water fluctuations including the tidal regime and wave action within the SCB.

5.1.7 Indirect and Cumulative Impacts

Past and present projects constructed and operating within the open marine environment on the PV Shelf and SP Shelf include oil platforms, fiber optic cables, and wastewater outfalls. Future projects would include construction and maintenance of similar structures and infrastructure. Construction activities that could affect water quality include dredging, pile driving, demolition, dredged material placement, and discharge of fill material. Impacts from construction on water quality would be short term and would return to baseline levels upon completion of construction. Furthermore, most constructions activities in the SCB would occur in an open marine environment where water quality is influenced by large-scale oceanographic processes. Therefore, past, present, and reasonably foreseeable future projects would not result in cumulatively significant impacts on water quality. Additional analysis of indirect and cumulative impacts on the marine environment is provided in Section 21.2.10 of the draft EIR/EIS.

5.2 Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)

5.2.1 Threatened and Endangered Species

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. Threatened and endangered species that occur throughout the SCB are listed in Table 13-4 of the draft EIR/EIS. In general, construction activities within an open marine environment could affect marine mammals, sea turtles, or marine birds through vessel collisions, entanglements, and underwater sounds.

Construction of Alternatives 1 through 3 would entail approximately 1,930 to 2,240 vessel round trips during construction of the riser and diffuser for approximately 3 years. Furthermore, ocean disposal of dredged sediment would require 135 one-way barge trips per year to carry excavated material to LA-2 and/or LA-3. The potential for vessel interactions with marine mammals would be increased by these additional trips. Marine mammals in the area may come in proximity to construction vessels, primarily tugboats and barges. Because construction at the riser and diffuser sites would increase the number of vessel trips in an area that is already susceptible to collisions with marine mammals, there is the potential for a significant impact without mitigation.

Construction of Alternatives 1 through 3 would also entail the use of anchors, buoy lines, and rope. Therefore, there is potential for protected species to become entangled in lines associated with project construction. Impacts could be significant without mitigation.

Construction of Alternatives 1 through 3 would also increase underwater sound during construction associated with pile-driving activities. Furthermore, pile driving may also be utilized for the placement of riser casings, which are large diameter steel casings. The pressure levels associated with construction activities could exceed the entry threshold for cetaceans, pinnipeds, and marine birds (during diving activities). Furthermore, construction is expected to last 10 hours per day on each of the 5 working days. Therefore, there is potential for significant impacts without mitigation.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would entail rehabilitation of the existing ocean outfalls. The rehabilitation work would entail a like-for-like replacement of existing substrate. A small derrick barge would be used to place the ballast rock (estimated total of 15,000 to 18,000 cubic yards) around the outfalls and support the joint repair work. A team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards of sediment, which are *de minimis* quantities relative to dredging projects. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed. There would be a substantial decrease in potential for vessel collisions, entanglements, and underwater sounds in association with the rehabilitation of the existing ocean outfalls.

The rehabilitation work would be located adjacent to the designated critical habitat for black abalone (*Haliotis cracherodii*), which extends from the shoreline demarcated by the mean higher high water mark to -9.8 feet mean lower low water (MLLW). The proposed rehabilitation work would be located between -20 feet MLLW to -50 feet MLLW, outside of the seaward boundary of the designated critical habitat. Annual abalone surveys conducted by the Sanitation Districts since 1976 have not indicated presence of the black abalone within the proposed work area.

Overall, Alternative 4 would entail little or no impacts on threatened and endangered species compared to Alternatives 1 through 3.

5.2.2 Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web

Alternatives 1 through 3 would entail sediment-disturbing activities such as dredging, pile driving, and hydro-jetting. Construction activities could alter water quality by generating a turbid environment at the surface of the ocean and near the bottom by increasing suspended sediment levels. The size and persistence of a sediment plume would depend on several factors, including sediment characteristics, water depth, and current direction and velocity. Settling rates are largely determined by the grain size of the suspended material.

If dredged material is sidecasted, sediment generally would not be released more than 20 feet from the bottom, thereby limiting the spread of sediment. Localized areas of elevated turbidity conditions would occur in the vicinity of the near-bottom construction activities for the duration of construction. However, near-bottom turbidity generated by construction activities is expected

to settle and rapidly mix with ambient water, with normal conditions likely to be found in the area within hours to days of cessation of construction activities.

Dredging would require sediment to be brought to the surface via a clamshell dredge and loaded onto a barge. As sediment is brought up through the water column, some amount of sediment would wash out of the dredge, which is typical of all dredging operations. Therefore, water column turbidity would occur using this dredging and removal method. The process of raising these sediments from the seafloor to the dredge barge would create turbidity throughout the entire water column instead of just near bottom, and more sediment would be removed from the marine environment when compared to sidecasting. Dredging, trenching, grading, and placement of ballast on the seafloor would directly impact aquatic organisms with limited mobility, such as crustaceans and mollusks through removal and burial. These activities would have limited impact on mobile organisms such as fishes that can easily move away from the construction through startle response triggered by underwater sound. However, turbidity impacts would be temporary. Furthermore, because crustaceans and mollusks are relatively abundant, it is likely that such organisms would quickly recolonize affected areas. Therefore, impacts would be limited to the duration of construction and baseline conditions would return thereafter.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would not entail dredging, pile driving, dredging, or hydro-jetting. For the rehabilitation of the existing ocean outfalls, a team of divers would remove the ballast rock and hand-shovel approximately 2 cubic yards of sediment from each joint, resulting in the removal of approximately 20 to 80 cubic yards of sediment, a *de minimis* amount compared to the riser/diffuser construction under Alternatives 1 through 3. Sediment and existing ballast rock would be replaced around the pipe, and additional ballast rock would be placed as needed.

Construction activities would be limited to the existing footprint of the existing outfall structures. Therefore, based on the detailed analysis in Section13.4.6.2 of the draft EIR/EIS, Alternative 4 would entail little or no impacts on aquatic organisms compared to Alternatives 1 through 3.

5.2.3 Other Wildlife

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. The riser, manifold, and diffuser would cover a seafloor area of approximately 8 acres. Construction would take approximately 3 years and entail sediment-disturbing activities such as dredging, pile driving, and hydro-jetting. During the 3-year construction period, elevated noise levels could disturb other wildlife in the vicinity of the project area. Furthermore, Alternatives 1 through 3 would result in permanent impacts on 8 acres of substrate and associated habitat on the ocean floor.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would entail rehabilitation of the existing ocean outfalls. The rehabilitation work would entail a like-for-like replacement of existing rock ballast. Construction activities would not entail dredging, pile driving, dredging, or hydro-jetting and would be limited to the existing footprint of the existing outfall structures. Due to the differences in the type, scope, and duration of work, Alternative 4 would entail substantially less impacts on other wildlife compared to the riser/diffuser construction under Alternatives 1 through 3.

5.2.4 Indirect and Cumulative Impacts

Past and present projects constructed and operating within the open marine environment on the PV Shelf and SP Shelf include oil platforms, fiber optic cables, and wastewater outfalls. Future projects would include construction and maintenance of similar structures and infrastructure. Construction activities that could affect marine organisms include dredging, pile driving, demolition, dredged material placement, and discharge of fill material. These activities could affect marine organisms through underwater sounds, entanglement, vessel strikes, direct removal, and burial. With the exception of crustaceans, benthic invertebrates, and similar organisms, most marine organisms such as birds, fish, and marine mammals are mobile. The ability of mobile marine organisms to avoid or move away from construction areas would attenuate construction-related impacts. Immobile benthic organisms in general can quickly recolonize previously occupied areas. Furthermore, impacts from construction to water quality would be short term and would return to baseline levels upon completion of construction. Therefore, construction associated with past, present, and reasonably foreseeable future projects would not result in cumulatively significant impacts on marine organisms. Additional analysis of indirect and cumulative impacts on the marine environment is provided in Section 21.2.10 of the draft EIR/EIS.

5.3 Potential Impacts on Special Aquatic Sites (Subpart E)

5.3.1 Sanctuaries and Refuges

Alternatives 1 through 4 are not located within sanctuaries or refuges designated under state or federal laws. Therefore, all alternatives would not impact sanctuaries or refuges.

5.3.2 Wetlands

Alternatives 1 through 4 are not located within or adjacent to wetlands. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline within an open marine environment. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline within an open marine environment. Alternatives 1 through 4 would rehabilitate the existing ocean outfalls located approximately 2 miles offshore from the coastline within an open marine environment. Therefore, all alternatives would not impact wetlands.

5.3.3 Mudflats

Alternatives 1 through 4 are not located within or adjacent to mudflats. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline within an open marine environment. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline within an open marine environment. Alternatives 1 through 4 would rehabilitate the existing ocean outfalls located approximately 2 miles offshore from the coastline within an open marine environment. Therefore, all alternatives would not impact mudflats.

5.3.4 Vegetated Shallows

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline within an open marine environment, at a depth of approximately 200 feet. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline at approximately the same depth. Marine vegetation is not expected to be present due to the reduced availability of sunlight at this depth.

Alternatives 1through 4 would entail rehabilitation of the existing ocean outfalls located near kelp beds. There are approximately 150 acres of kelp along an approximately 5-mile length of coastline that includes the White Point area in water depths of approximately 40 to 70 feet. Areas shoreward of 40-foot depths do not support kelp because of wave action, sea urchin grazing, and the absence of hard substrate. Because proposed re-ballasting work would occur at water depths of approximately 20 and 50 feet, there would be some overlap between the general work area and the kelp habitat between about 40 and 50 feet. As a result, re-ballasting activities could impact kelp growing on the outfall pipes and the adjacent rock ballast. However, the impact would be minimized because the proposed method of placing the new ballast rock ensures that the work would be limited to the existing footprint of the outfalls (i.e., pipeline and adjacent rock ballast). The impact would also be temporary because kelp would be able to recolonize the rock ballast upon completion of construction. Furthermore, replacement and addition of rock ballast would increase hard substrate surface area and thus benefit benthic habitat. Based on the detailed analysis in Section 13.4.6.2 of the draft EIR/EIS, impacts on kelp forests associated with the rehabilitation work would be minimal and temporary.

5.3.5 Coral Reefs

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline within an open marine environment, at a depth of approximately 200 feet. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline at approximately the same

depth. Coral reefs are not expected to be present due to the reduced availability of sunlight at this depth.

Alternatives 1 through 4 would entail rehabilitation of the existing ocean outfalls located near a rocky intertidal shoreline. Ballast on the existing ocean outfall structures provides additional hard substrate to support benthic habitat. It is possible that there are coral reefs within the vicinity of the existing ocean outfalls. However, the rehabilitation work would be limited to the existing footprint of the existing ocean outfalls. Therefore, Alternatives 1 through 4 would not result in impacts on coral reefs.

5.3.6 Riffle and Pool Complexes

Alternatives 1 through 4 are not located within or adjacent to a riverine environment where riffle and pool complexes are expected to be present. Alternative 1 would locate the riser and diffuser site approximately 7.5 from the coastline miles offshore within an open marine environment. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline within an open marine environment. Alternatives 1 through 4 would rehabilitate the existing ocean outfalls located approximately 2 miles offshore from the coastline within an open marine environment. Therefore, all alternatives would not impact riffle and pool complexes.

5.3.7 Indirect and Cumulative Impacts

Past and present projects constructed and operating within the open marine environment on the PV Shelf and SP Shelf include oil platforms, fiber optic cables, and wastewater outfalls. Future projects would include construction and maintenance of similar structures and infrastructure. Due to construction within an open marine environment, mudflats, wetlands, and riffle pools and complexes would be unaffected. Construction activities that could affect sanctuaries and refuges, vegetated shallows, and coral reefs include dredging, pile driving, demolition, dredged material placement, and discharge of fill material. In general, oil platforms, fiber optic cables, and wastewater outfalls occupy small footprints. In the context of the large expanse of the PV Shelf and SP Shelf, and the low frequency of the construction and maintenance of these structures, construction associated with past, present, and reasonably foreseeable future projects would not result in cumulatively significant impacts on special aquatic sites.

5.4 Potential Effects on Human Use Characteristics (Subpart F)

5.4.1 Municipal and Private Water Supplies

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. All three types of materials are chemically inert and would not introduce contaminants into the water column via leaching.

Construction of the riser/diffuser ocean outfall structure would require discharge of ballast. Ballast rock is chemically inert and would not introduce contaminants into the water column via

leaching. If the diffuser were constructed of steel or RCP, it may be necessary to construct a ballast rock base up to 54 feet wide and 5 feet thick. The diffuser would be placed on this base with additional ballast rock added around the pipe for stability. Estimated quantities of ballast rock are 30,000 to 95,000 cubic yards. If the diffuser were constructed of HDPE, no trenching would be required, and it would be placed directly on the seafloor. Approximately 1,500 pre-installed concrete anchor blocks would be attached to HDPE piping to provide ballast during the sinking and installation process as well as to provide stability against ocean currents and wave-induced hydrodynamic loading. Estimated quantities of ballast rock are 7,000 to 20,000 cubic yards.

Construction of the offshore reach of the tunnel and riser/diffuser ocean outfall structure would require ocean disposal of the suitable dredged material at an ODMDS. Any contaminated sediments would be disposed at inland facilities in accordance with all applicable regulations. Estimated quantities of dredged material are 5,000,000 to 30,000,000 cubic yards for the offshore tunnel, 40,000 to 45,000 cubic yards for the riser, and 10,000 to 50,000 cubic yards for the diffuser.

Discharge of suitable dredged material within the marine environment may leach contaminants into the water column. However, most of the material is native substrate with little or no exposure to sources of contamination. Therefore, any leaching of contaminants would be minimal.

Alternatives 1 through 4 would discharge ballast rock around the existing ocean outfalls and support the joint repair work. Ballast rock is chemically inert and would not introduce contaminants into the water column via leaching.

All alternatives would be located offshore within an open marine environment away from municipal and private water supplies, which are mostly located in the uplands. There is no intake infrastructure for desalination plants within the vicinity of the proposed location for the riser/diffuser structures or the existing ocean outfalls. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline at a depth of approximately 200 feet. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline at approximately the same depth. Alternatives 1 through 4 would rehabilitate the existing ocean outfalls located approximately 2 miles offshore from the coastline. Therefore, all alternatives would not impact municipal and private water supplies.

5.4.2 Recreational and Commercial Fisheries

Construction of the riser/diffuser ocean outfall structure under Alternatives 1 through 3 would be located within areas where commercial and recreational fishing occur. Furthermore, the areas are located within two fishery management plans (FMP): the Coastal Pelagics FMP (6 species), and the Pacific Groundfish FMP (89 species). During construction, the footprint at the ocean surface and ocean floor where construction is occurring would be off-limits to recreational and commercial fishing boats. However, given the large areas of the ocean available for commercial and recreational fishing, the off-limits area at the construction site would entail *de minimis* impacts. Upon completion of construction, construction areas would again be available for

recreational and commercial fishing. There would be no long-term impacts on recreational and commercial fisheries due to the discharges of fill. Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. All three types of materials are chemically inert and would not introduce contaminants into the water column via leaching.

Construction of the riser/diffuser ocean outfall structure would require discharge of ballast. Ballast rock is chemically inert and would not introduce contaminants into the water column via leaching. Furthermore, the discharges of fill would not impede fish migration because the riser/diffuser ocean outfall structure would be located within an open marine environment. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline at a depth of approximately 200 feet. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline at approximately the same depth.

Rehabilitation of the existing ocean outfalls, under Alternatives 1 through 4, would be located within an area where recreational fishing occurs. This area is located within two FMPs: the Coastal Pelagics FMP (6 species), and the Pacific Groundfish FMP (89 species). During construction, the footprint at the ocean surface and ocean floor where construction is occurring would be off-limits to recreational and commercial fishing boats. However, given the large areas of the ocean available for recreational fishing, the off-limits area at the construction site would entail *de minimis* impacts. Upon completion of construction, construction areas would again be available for recreational fishing. There would be no long-term impacts on recreational fisheries due to the discharges of fill because the rehabilitation work would entail like-for-like replacement of rock ballast on an existing ocean outfall. Ballast rock is chemically inert and would not introduce contaminants into the water column via leaching.

5.4.3 Water-Related Recreation

Construction of the riser/diffuser ocean outfall structure under Alternatives 1 through 3 would be located in an open marine environment. Alternative 1 would locate the riser and diffuser site approximately 7.5 miles offshore from the coastline. Alternatives 2 and 3 would locate the riser and diffuser site approximately 2 miles offshore from the coastline. At this distance, the only form of water-related recreation would be recreational boating. During construction, the footprint at the ocean surface where construction is occurring would be off-limits to recreational boating. However, given the large areas of the ocean available for recreational boating, the impacts would be *de minimis*. Upon completion of construction, off-limit areas would again be available for recreational and commercial fishing.

Rehabilitation of the existing ocean outfalls under Alternatives 1 through 4 would be located in an open marine environment in the nearshore, out to approximately 2 miles off Palos Verdes. Water-related recreation activities associated with the nearshore environment such as diving, motorized recreational boating, kayaking, surfing, and swimming are expected to be present within the general area. During construction, the footprint at the ocean surface and ocean floor where construction is occurring would be off-limits to recreational activities. However, given the large areas of the ocean available for recreational activities, the impacts would be *de minimis*.

Upon completion of construction, off-limit areas would again be available for recreational activities.

5.4.4 Aesthetics

Alternatives 1 through 3 are located in an open marine environment and would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE. Alternatives 1 through 3 would result in new structures on the ocean floor covering approximately 5 to 10 acres. However, the structures would not impact coral reefs. Furthermore, the structures would not be visible due to their depths. Therefore, impacts on aesthetics would be *de minimis*.

Alternatives 1 through 4 would entail rehabilitation of the existing ocean outfalls in an open marine environment in the nearshore, approximately 2 miles off the Palos Verdes coastline. The rehabilitation work would entail a like-for-like replacement of existing rock ballast. However, the structures would not impact coral reefs. Furthermore, the rehabilitated structures would not be visible due to their depths. Therefore, there would be no impacts on aesthetics.

5.4.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, and Research Sites

Alternatives 1 through 4 are not located within parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar sites designated under state or federal laws. Therefore, all alternatives would not impact these resources.

5.4.6 Indirect and Cumulative Impacts

Past and present projects constructed and operating within the open marine environment on the PV Shelf and SP Shelf include oil platforms, fiber optic cables, and wastewater outfalls. Future projects would include construction and maintenance of similar structures and infrastructure. It is unlikely that construction and maintenance would cumulatively impact municipal and private water supplies. The primary sources of water supplies for the southern California area are the State Water Project and ground water. Construction and maintenance could temporarily affect recreational and commercial fishing and other recreation during construction. However, any designated off-limit construction area would be available for fishing and recreational activities upon termination of construction. In general, oil platforms, fiber optic cables, and wastewater outfalls occupy small footprints. In the context of the large expanse of the PV Shelf and SP Shelf, and the low frequency of the construction and maintenance of these structures, construction associated with past, present, and reasonably foreseeable future projects would not result in cumulatively significant impacts on fish spawning areas or other areas that support recreational and commercial fisheries. With the exception of oil platforms, the impacts on aesthetics would be limited because most structures and infrastructure within the open marine environment would be submerged. Based on the above, construction associated with past, present, and reasonably foreseeable future projects would not result in cumulatively significant impacts on human use characteristics.

5.5 Evaluation and Testing (Subpart G)

5.5.1 Chemical, Biological, and Physical Evaluation and Testing

Alternatives 1 through 3 would entail the discharge of a riser/diffuser ocean outfall structure on the ocean floor. The riser would be constructed of steel with a concrete lining and the diffuser would be constructed of either steel, RCP, or HDPE on the ocean floor. All three types of materials are chemically inert and would not introduce contaminants into the water column via leaching. Alternatives 1 through 3 would entail sediment-disturbing activities such as dredging, pile driving, and hydro-jetting. Sediment-disturbing activities from Alternative 1 are not expected to introduce contaminants into the water column because the SP Shelf riser and diffuser assembly site would be located approximately 7.5 miles from the POLA breakwater. As such, the sediment is expected to be clean relative to sediment within POLA, which receives contaminants from urban runoff and historical industrial practices within the port. Furthermore, Alternative 1 is not located within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. Alternatives 2 and 3 would locate the riser/diffuser ocean outfall structure on the PV Shelf, approximately 2 miles from Point Fermin. The PV Shelf riser and diffuser area is within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. An estimated 1,800 metric tons of DDT was discharged onto the PV Shelf between 1953 and 1971. Much of the original DDT that was historically discharged has now dispersed throughout the greater PV Shelf, but a reservoir of approximately 100 metric tons remains buried in the seafloor concentrated near the diffusers of the existing outfalls. Sediment testing would be implemented to ensure that construction activities avoid contaminated sediments and would not interfere with the EPA's proposed remedy, which is a cap of clean sand/silt to be placed over approximately 300 acres of the PV Shelf where the highest surficial contaminant concentrations appear to be eroding. Discharge of dredged or fill material would be subject to the Southern California Dredge Material Management Team's suitability determinations for discharge into the aquatic environment.

Alternatives 1 through 3 would also include the rehabilitation of the existing ocean outfalls as discussed under Alternative 4 below.

Alternative 4 would not entail sediment-disturbing activities such as dredging, pile driving, or hydro-jetting. Therefore, Alternative 4 would substantially reduce turbidity and suspended particulates in the water column compared to Alternatives 1 through 3. Likewise, the potential for introducing contaminants into the water column from sediment-disturbing activities would be substantially less. Furthermore, Alternative 4 would discharge ballast rock (estimated total of 15,000 to 18,000 cubic yards) around the existing ocean outfalls and support the joint repair work. Ballast rock is chemically inert and would not introduce contaminants into the water column via leaching. The existing ocean outfalls are located within the boundaries of the EPA-designated DDT/PCB contaminated sediment study area. However, the highest contaminant concentrations are near the terminus of the existing ocean outfalls in depths of 150 to 200 feet, while the primary sediment-disturbing activity would be placement of additional ballast rock along the existing ocean outfalls at ocean depths ranging from approximately 20 to 50 feet. Given the distance between the proposed re-ballasting work and the EPA's proposed cap, potential impacts would be avoided. Therefore, based on the detailed analysis in Section

13.4.6.2 of the draft EIR/EIS, Alternative 4 would substantially reduce contaminants in the water column compared to Alternatives 1 through 3. Furthermore, Alternative 4 would entail less than significant impacts on contaminants.

5.6 Actions Taken to Minimize Adverse Effects (Subpart H)

During construction activities in waters of the U.S., actions to minimize adverse effects to the aquatic environment are provided below. These measures are also found in Chapter 13 of the EIR/EIS.

MM MAR-1a. During riser and diffuser construction, analyses of contaminant concentrations (i.e., metals, dichlorodiphenyltrichloroethane [DDT], polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons [PAHs]) in waters near the dredging operations will be required if the contaminant levels in the dredged sediments are known to be elevated and represent a potential risk to beneficial uses. Monitoring data will be used to demonstrate that water quality limits specified in applicable state and federal permits are not exceeded. Corrective or adaptive actions would be implemented if the monitoring data indicate that water quality conditions outside the mixing zone are above the permit-specified limits.

MM MAR-1b. Prepare and implement a contaminated sediment management plan that is consistent with practices outlined in the Los Angeles Regional Contaminated Sediment Task Force long-term management strategy if contaminant levels in the dredged sediments are known to be elevated and represent a potential risk. At a minimum, the plan will include site-specific best management practices at the immediate work site to reduce the potential area of exposure to contaminated sediments.

MM MAR-3a. Prepare and implement a collision protection plan to address sensitive and protected species. All construction personnel and boat operators will receive protected species training. The training will include review of the plan as well as identification of animals, species, and habitats potentially present in the project area.

MM MAR-3b. Restrict tugs, tugs with barges under tow, and large work vessels to speeds of 12 knots (14 miles per hour [mph]) or less at all times. Maneuverable single hull vessels such as crew or supply boats may proceed at speeds of 20 knots (23 mph) or less under most conditions, but will reduce speed to 12 knots or less when whales or sea turtles are reported in the project area.

MM MAR-3c. Immediately report all vessel collisions with marine mammals or sea turtles to the National Marine Fisheries Service.

MM MAR-3d. Limit the deployment of any material that has the potential to entangle marine mammals or sea turtles (e.g., anchor lines, cables, rope, other construction debris) to only as long as necessary.

MM MAR-3e. Remove as much slack as possible from any potentially entangling material to the point of not jeopardizing construction operations.

MM MAR-3f. Position temporary mooring buoys with heavy steel cables or chains to minimize potential entanglements.

MM MAR-3g. In the event that a marine mammal or sea turtle becomes entangled, immediately seek guidance from the National Marine Fisheries Service for safe disentanglement options.

MM MAR-3h. Implement a "soft start" method for all pile driving by operating the hammer at less than full capacity (i.e., approximately 40 to 60 percent energy levels) with no less than a 1-minute interval between each strike for a 5-minute period on initial driving for the day, or after a delay of 15 minutes between strikes.

MM MAR-3i. Prepare and implement a pile driving management plan. The plan will require that a National Marine Fisheries Service-approved observer be stationed on the work platform or work vessel to monitor the presence of sensitive marine species in the construction area on all days when pile driving is taking place. The observer will survey the project vicinity before pile driving is started and give approval before such work begins. The observer will continue to advise the construction crew throughout the day to modify or stop pile driving if a sensitive or protected species travels within injury distances.

MM MAR-3j. Within 90 days prior to initiation of the rehabilitation work, survey the existing ocean outfall pipelines for black abalone at depths between the 15- and 55-foot isobaths in areas potentially affected by the work. The survey team will include divers/biologists experienced in locating abalone. If black abalone are determined to be present, consult with the National Marine Fisheries Service to develop a black abalone transplantation plan that includes the identification of a suitable nearby transplant location, temporary holding and transport methods, and reporting requirements. Implementation of the plan will occur no more than 30 days preceding the in-water rehabilitation activities and will be conducted by qualified divers/biologists.

MM MAR-4c. Prepare and implement an anchoring plan prior to in-water construction activities in accordance with the U.S. Army Corps of Engineers' permitting requirements. The plan will identify deployment methods for anchors, lines, cables, and moorings to minimize damage to hard-bottom substrate.

MM MAR-7l. Apply minimum lighting standards. Lights will be installed at the lowest practicable height and with the lowest practicable wattage. Lights will be screened and directed downward to the greatest degree possible. The number of nighttime lights will be minimized.

The measures apply to Alternatives 1 through 4 as indicated:

- MM MAR-1a: Alternatives 1, 2, and 3
- MM MAR-1b: Alternatives 1, 2, and 3
- MM MAR-3a: Alternatives 1, 2, and 3
- MM MAR-3b: Alternatives 1, 2, and 3
- MM MAR-3c: Alternatives 1, 2, and 3
- MM MAR-3d: Alternatives 1, 2, and 3
- MM MAR-3e: Alternatives 1, 2, and 3
- MM MAR-3f: Alternatives 1, 2, and 3
- MM MAR-3g: Alternatives 1, 2, and 3
- MM MAR-3h: Alternatives 1, 2, and 3
- MM MAR-3i: Alternatives 1, 2, and 3
- MM MAR-3j: Alternatives 1, 2, 3, and 4
- MM MAR-4c: Alternatives 1, 2, and 3
- MM MAR-7l: Alternative 4

5.7 Summary of Effects on the Aquatic Environment

Results from the evaluation of Subparts C through H are summarized in Table 2. In general, Alternatives 1 through 3 would have greater impact on substrate, water quality, contaminant, and benthic organisms when compared to Alternative 4 due to the larger scope of the discharge of fill and the longer duration of construction. Alternatives 1 through 3 would have similar impacts on other parameters when compared to Alternative 4.

Table 2. Comparison of Effects on the Aquatic Environment

	Alt.4 (Recommended Alt.)	Alt. 1	Alt. 2	Alt. 3
Substrate	E	G	G	G
Suspended particulates and turbidity	E	G	G	G
Contaminants	E	E	E	E
Water	E	G	G	G
Current patterns and water circulation	E	E	E	E
Normal water fluctuations	E	E	E	E
Threatened and endangered species	E	E	E	E
Fish, crustaceans, and other aquatic life	E	G	G	G
Other wildlife	E	E	E	E
Sanctuaries and refuges	N	N	N	N
Wetlands	N	N	N	N
Mudflats	N	N	N	N

Table 2 (Continued)

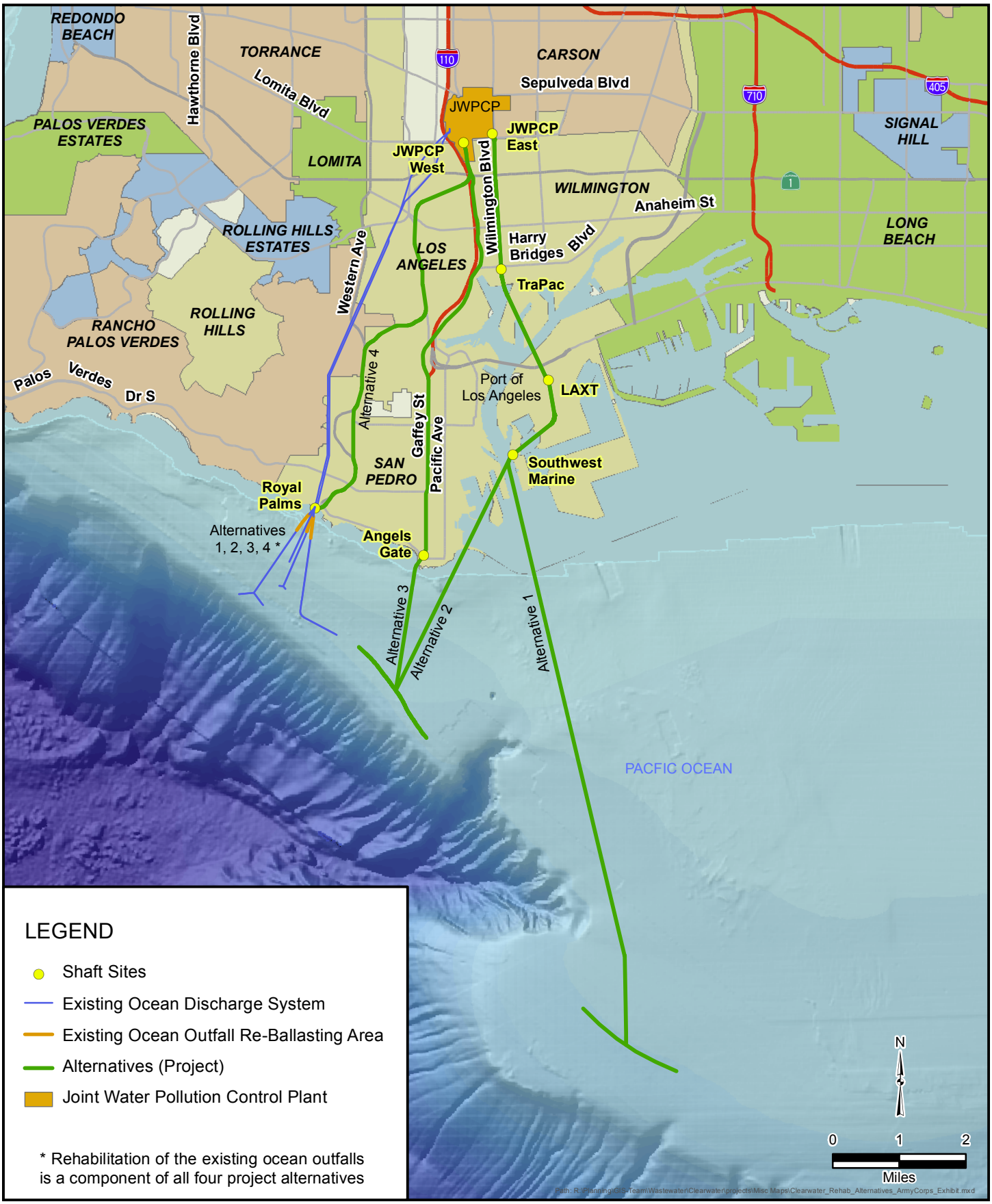
	Alt.4 (Recommended Alt.)	Alt. 1	Alt. 2	Alt. 3
Vegetated shallows	N	N	N	N
Coral reefs	N	N	N	N
Riffle and pool complexes	N	N	N	N
Municipal and private water supplies	N	N	N	N
Recreational and commercial fisheries	E	E	E	E
Water-related recreation	E	E	E	E
Aesthetics	N	N	N	N
Parks, national and historical monuments, etc.	N	N	N	N
Chemical, biological, and physical evaluation	E	G	G	G

Notes:
E = Equivalent to recommended alternative
L = Less than recommended alternative
G = Greater than recommended alternative
N = No impact

6 Conclusion

Alternatives 1 through 4 meet the overall project purpose and are practicable with respect to cost, technology, and logistics. Furthermore, due to the onshore and offshore tunneling activities, all alternatives would entail significant impacts on aesthetics, air quality, paleontological resources, and greenhouse gas emissions.

Alternatives 1 through 3 would entail permanent discharge of fill into 5 to 10 acres of waters of the U.S. Approximately 30,000 to 95,000 cubic yards of rock ballast would be required for a steel or RCP diffuser structure. Approximately 7,000 to 20,000 cubic yards of rock ballast would be required for a HDPE diffuser structure. A HDPE diffuser structure would also require the discharge of approximately 1,500 concrete anchor blocks. Estimated quantities of dredged material are 5,000,000 to 30,000,000 cubic yards for the offshore tunnel, 40,000 to 45,000 cubic yards for the riser, and 10,000 to 50,000 cubic yards for the diffuser. Approximately 15,000 to 18,000 cubic yards of rock ballast would be discharged for the rehabilitation of the existing ocean outfalls, which would be restricted to the footprint of the existing ocean outfalls. Alternative 4 (the recommended alternative) would only entail rehabilitation of the existing ocean outfalls. Alternative 4 would not entail large-scale, mechanized sediment-disturbing activities such as dredging, hydro-jetting, grading, or pile driving. Results from the evaluation of Subparts C through H indicate that Alternatives 1 through 3 would entail greater impacts on substrate, water quality, contaminants, and benthic organisms when compared to Alternative 4. Alternatives 1 through 3 would have similar impacts on other parameters when compared to Alternative 4. With the inclusion of the above mitigation measures, direct and indirect impacts associated with Alternative 4 would be minimized. Based on the above, the Corps preliminarily determines that Alternative 4 is the least environmentally damaging practicable alternative.



Clearwater Program Project Alternatives

Appendix 28-A

COMMENTS ON THE DRAFT EIR/EIS

WRITTEN COMMENTS – AGENCIES

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

February 14, 2012

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

Dear Mr. Highter:

This is in response to your request for comments on Public Notice of Availability regarding the Clearwater Program Draft Environmental Impact Report.

Please review the current effective countywide Flood Insurance Rate Maps (FIRMs) for the County of Los Angeles, Maps revised September 26, 2008. Please note that the County of Los Angeles, California is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

REC'D LACSD
FEB 21 '12 AM9:39

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- All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The Los Angeles County floodplain manager can be reached by calling George De La O, Senior Civil Engineer, at (626) 458-7155.

If you have any questions or concerns, please do not hesitate to call Cynthia McKenzie of the Mitigation staff at (510) 627-7190.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
George De La O, Senior Civil Engineer, Los Angeles County
Garret Tam Sing/Salomon Miranda, State of California, Department of Water Resources, Southern Region Office
Cynthia McKenzie, Senior NFIP Planner, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

February 15, 2012

Steven W. Highter
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

RE: SCH# 2008101074 Clearwater Program Master Facilities Plan; Los Angeles County.

Dear Mr. Highter:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Completion (NOC) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5 minute quadrangle name, township, range and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Program Analyst
(916) 653-4040

REC'D LACSD
FEB 21 '12 AM 9:31

cc: State Clearinghouse

DOC #
Highter S (Fac)

Native American Contact List
Los Angeles County
February 15, 2012

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3098 Mace Avenue, Aapt. D Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
(619) 294-6660-work
(310) 428-5690 - cell
(310) 587-0170 - FAX

bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 483--3564 cell
(626) 286-1262 -FAX

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Park East, Suite 1500
Los Angeles , CA 90067 Gabrielino
lcandelaria1@gabrielinoTribe.org
626-676-1184- cell
(310) 587-0170 - FAX
760-904-6533-home

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net

(909) 262-9351 - cell

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2008101074 Clearwater Program Master Facilities Plan; Los Angeles County.

Highter, Steve

From: Alex Hamilton <AlexH@ci.commerce.ca.us>
Sent: Thursday, February 23, 2012 8:50 AM
To: Highter, Steve
Subject: FW: SAVE THE DATE - Meeting with US EPA - Integrated Planning Framework
Attachments: integrated_planning_framework%20_draft.pdf; EPA_Memo_on_Integrated_Municipal_Planning_10.27.11.pdf

Importance: High

Mr. Highter,

It was nice speaking with you today. Again, my compliments to your staff for putting together the Executive Summary for the EIR/EIS for the Clearwater Program. It is an excellent document that uses graphics very effectively to describe a project/program.

Here is the EPA effort I was speaking to you about.

Alex Hamilton
City of Commerce
Assistant Director of Community Development
2535 Commerce Way
Commerce, CA 90040
323 722-4805 ext 2330

From: Jorge Rifa
Sent: Wednesday, February 22, 2012 3:33 PM
To: Gina Nila
Cc: ROBERT ZARRILLI; Alex Hamilton; FERNANDO MENDOZA
Subject: FW: SAVE THE DATE - Meeting with US EPA - Integrated Planning Framework
Importance: High

Gina you are it

From: Kimberly Boles [mailto:KBoles@cityofsignalhill.org]
Sent: Wednesday, February 22, 2012 8:38 AM
To: City of Arcadia (Don Penman); City of Arcadia (Vanessa Hevener); City of Artesia (Maria Dadian); City of Baldwin Park (David Lopez) ; City of Bell; City of Bell (Arne Croce); City of Bell (Terry Rodrigue); City of Bell Gardens; City of

Bell Gardens (Steve Simonian); City of Bellflower; City of Bellflower (Jeffrey Stewart); City of Bellflower (Lee Mingle); City of Bradbury (Michelle Keith); City of Carson (David Biggs); City of Carson (Patricia Elkins); City of Cerritos (Mike O'Grady); Rebecca Kuhn; Jorge Rifa; City of Covina; City of Covina; City of Covina (Vivian Castro); City of Cudahy (Saul Bolivar) ; City of Diamond Bar (James DeStefano) ; City of Downey (Gilbert Livas); City of Downey (John Oskoui); City of Gardena (Mitchell Lansdell); City of Hawaiian Gardens (Ernesto Marquez); City of Industry (Kevin Radecki); City of Irwindale; City of Irwindale ; City of Irwindale (Anna Lee); City of Irwindale (Martin Lomeli); City of La Canada Flintridge (Mark Alexander); City of La Mirada (Tom Robinson); City of Lakewood (Howard Chamber); City of Lawndale (Steve Mandoki); City of Lynwood (Roger Haley); City of Maywood ; City of Maywood (Lillian Myers); City of Montebello (Larry Kosmont); City of Montebello (Richard Torres); City of Monterey Park; City of Monterey Park (Paul Talbot); City of Norwalk (Mike Egan); City of Palos Verdes Estates (Judy Smith); City of Paramount (Linda Benedetti-Leal); City of Pico Rivera (Debbie Lopez); City of Pico Rivera (Jeffrey Prang); City of Pico Rivera (Ron Bates); City of Pomona; City of Rosemead; City of Rosemead; City of Rosemead (Chris Marcarello); City of Rosemead (Margaret Clark); City of Rosemead (Polly Low); City of San Fernando (Al Hernandez); City of San Gabriel; City of Santa Fe Springs (Thaddeus McCormack); City of Sierra Madre (Elaine Aguilar); City of South El Monte (Anthony Ybarra) ; City of South Gate (George Troxcil); City of South Pasadena; City of Vernon; City of Vernon (Kristen Enomoto); City of Vernon (Mark Whitworth); City of Walnut (Rob Wishner) ; City of West Covina (Andrew Pasmant); City of West Covina (Dave Nichols); City of West Covina (Shannon Yauchzee); City of Whittier (Dan Wall); City of Whittier (David Pelser); City of Whittier (Jeffrey Collier); West Covina (Sam Gutierrez)
Subject: SAVE THE DATE - Meeting with US EPA - Integrated Planning Framework
Importance: High

URGENT COMMUNICATION

Meeting with EPA Officials – February 27th

To: **CPR City Managers**

From: **Ken Farfsing, Signal Hill City Manager**

Subject: **EPA Meeting – Integrated Planning Framework**

We received the following invitation from the City of Monrovia regarding a special meeting with U.S. EPA officials next week to take input on their draft "Integrated Planning Framework." Mayor Mary Ann Lutz has been working through the U.S. Conference of Mayors to have EPA Headquarters officials take testimony on their proposed Integrated Planning Framework. This is the only local meeting that has been arranged in the nationwide rollout of the draft framework. The meeting will be held at the Monrovia Community Center on Monday, February 27th from 1:30 p.m. to 3:30 p.m. Please see Heather Maloney's e-mail below for the meeting details. Heather has also included copies of the draft framework and the EPA explanation memo.

Mayor Lutz attended a recent briefing in Washington D.C. on the framework with the Conference of Mayors. The framework is aimed at outlining "cost effective and protective solutions" to urban runoff and stormwater issues facing the nation's communities. A closer review of the framework demonstrates an East Coast orientation found in many U.S. EPA approaches. The framework is geared towards assisting cities with combined sanitary sewer and storm sewer systems, (which are more common on the East Coast) in prioritizing and finding cost-effective solutions to their stormwater and sewer requirements. In conversations with Mayor Lutz, she believes that this is a good opportunity for the cities in Southern California to raise the significant issues that our communities are facing in complying with the many competing priorities in the TMDL and NPDES Permit programs.

We are urging that you send a representative to attend and speak to the issues confronting your City. Here are some suggestions for testimony:

- The framework needs to recognize the unique arid climate of the Southwest U.S. in that the majority of rain occurs during a short period in the winter. In addition, the amount of rain varies based on La Nina/El Nino conditions. Combined sewer and storm-drain systems do not exist in Southern California, where your City are located. In our region, many streams serve as flood control channels, which are designed to transport large volumes of water rapidly to the ocean in order to prevent flooding.

- The volume of storm water in the flood channels is extraordinarily large – flow rates in the Los Angeles River at Wardlow ranged up to 924 million gallons per day in the 2004-2005 water year. This is enough water to fill 11 Rose Bowls per day. Very few POTWs have capacity to store and treat this volume of water. The framework needs to recognize the physical limitations of our sanitary sewer systems.

- The framework should encourage a "deemed compliant, iterative BMP approach" that is consistent with the MEP standard, as a means of complying with the waste load allocations that will be placed into our upcoming NPDES permits. This deemed compliant approach, with iterative BMPs, should also be the means of complying with the Receiving Water Limitation and Discharge Prohibition terms within the NPDES Permits. The practical application of this is the deemed compliant BMP approach found in the Los Angeles River Trash TMDL. This deemed compliant approach needs to be extended to the metals, bacteria and other TMDLs.

- EPA needs to provide "Safe Harbor" language in the NPDES Permits for the cities. This would be a safe harbor from Regional Board fines and third-party litigation provided to cities so long as they are acting in good faith and implementing iterative BMPs to comply with the permit terms.

- The framework should provide assistance on the meaning of the MEP standard, and particularly whether the standard would include complying with numeric limits even if it is not practicable or economic or otherwise reasonably feasible to do so.

- The framework needs to call for the development of TMDLs holistically, rather than serially, and thus the development of an integrated set of implementation measures to address all TMDLs for a particular water body.

Please don't hesitate to contact me if you have any questions on this or need additional information. I can be reached at 562-989-7302 or at kfarfsing@cityofsignalhill.org.

Thanks.

From: Heather Maloney [mailto:hmaloney@ci.monrovia.ca.us]
Sent: Tuesday, February 21, 2012 3:16 PM
Subject: FW: SAVE THE DATE - Meeting with US EPA
Importance: High

LA Permit Group,

Monrovia's Mayor Mary Ann Lutz has requested that the notice below be distributed to the LA Permit Group (see Mayor Lutz's email below for additional information and background).

The City of Monrovia will be hosting a meeting with the US EPA, on behalf of the Municipalities of Los Angeles and various other stakeholders, to discuss US EPA's Draft Integrated Planning Approach Framework (attached) and other related storm water and NPDES issues on ***Monday, February 27, 2012, 1:30 p.m. – 3:30 p.m****., at the Monrovia Community Center, 119 West Palm Ave, Monrovia, California 91016.*

Please pass along to any others you feel may be interested in the meeting.

Heather M. Maloney
Senior Management Analyst, Administration & Environmental Services
City of Monrovia - Department of Public Works
600 S. Mountain Ave, Monrovia, CA 91016
☎ 626.932.5577 | 626.932.5559 | hmaloney@ci.monrovia.ca.us

Consider the environment. Please don't print this e-mail unless really needed.

From: Mary Ann Lutz [mailto:maryann@lutz-co.com]
Sent: Saturday, February 18, 2012 5:03 PM
To: awilson@lcf.ca.gov; frankg1@denram.com; 'Jacki Bacharach - South Bay Cities COG'; 'John Takhtalian - Arroyo Verdugo Cities'; jquan@cacities.org; Mark Alvarado; mrychlicki.wsccog@gmail.com; 'Nick Conway'; Ron Bow; 'Richard Powers - Gateway COG'; robb@grassrootslab.com; snwdale@earthlink.net; sochoa@ci.glendale.ca.us; Susan.Reyes@sen.ca.gov; 'Terry Dipple - Las Virgenes-Malibu COG'
Cc: M Lutz; Heather Maloney
Subject: SAVE THE DATE - Meeting with US EPA

Save the Date:

The City of Monrovia will be hosting a meeting with the US EPA, on behalf of the Municipalities of Los Angeles and various other stakeholders, to discuss US EPA's Draft Integrated Planning Approach Framework and other related storm water and NPDES issues on **Monday, February 27, 2012, 1:30 p.m. – 3:30 p.m**., at the Monrovia Community Center, 119 West Palm Ave, Monrovia, California 91016.

The following are encouraged to attend:

- Mayors and Council Members from cities within Los Angeles County

- City Managers, Public Works Directors and various city staff members
- Representatives from Water Agencies
- Elected State Senators and Assembly Members and/or their staff representatives
- Elected Congressional members and their staff representatives

Further details, including the meeting agenda will be sent out next week.

THE BACKGROUND:

In mid-January while attending the US Conference of Mayors while sitting in my capacity of a member of the Mayors Water Council, I became aware that US EPA had developed an integrated planning framework document for NPDES/MS4 permits. This is very a timely because we in Los Angeles County are in the mist of negotiating the permit for our area. During the discussion it was explained that workshops would be held to hear comments regarding this draft and other items related to NPDES permits. I was quite dismayed to find that there were no workshops scheduled in EPA Region 9, and more specifically Southern California. The comment period ends March 30, 2012.

After my return I requested that EPA hold such a workshop in our area. They are not able to hold an official workshop, but indicated to me that if we were to schedule a study session/meeting, they would attend and hear our comments and input.

Please feel free to invite anyone you think might benefit.

Please review these documents and come to the meeting with your comments and questions. If you are unable to attend but would still like to have your opinions heard by EPA please put them in writing and send them to Heather Maloney (see below) and we will hand deliver them on the February 27.

Thank you,

If you have any questions about the meeting or to RSVP, please contact Heather Maloney (contact information below).

Heather M. Maloney

Senior Management Analyst, Administration & Environmental Services

City of Monrovia - Department of Public Works

600 S. Mountain Ave, Monrovia, CA 91016

(626.932.5577 | 7 626.932.5559 | * hmaloney@ci.monrovia.ca.us

Thank you very much and see you on February 27th!

My Best,

Mayor Lutz

Mary Ann Lutz, Mayor
City of Monrovia
415 S. Ivy
Monrovia, CA 91016
Direct: (626) 303-1113
Cell: (626) 695-6222
Fax: (626) 303-7883
MaryAnn@Lutz-Co.com

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COMMISSIONER

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BUREAU OF SANITATION

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ASSISTANT DIRECTORS

WASTEWATER ENGINEERING SERVICES DIV.
2714 MEDIA CENTER DRIVE
LOS ANGELES, CA 90065
FAX: (323) 342-6210 OR 342-6211

March 1, 2012

Steven W. Highter, Supervising Engineer, Planning Section
SANITATION DISTRICTS OF LOS ANGELES COUNTY
1955 Workman Mill Road
Whittier, CA 90601

File: SC.CE.

Dear Mr. Highter:

Clearwater Program Master Facilities Plan – Draft EIR

This is in response to your January 26, 2012 letter requesting wastewater service information for the proposed project to develop a long-range Master Facilities Plan for the Joint Outfall System serving unincorporated areas in Los Angeles County. The Bureau of Sanitation, Wastewater Engineering Services Division (WESD) has reviewed the request and found the project to be related to outfall systems and treatment plants of the Los Angeles County Sanitation Districts only.

Based on the project description, we have determined the project is unrelated to our sewers and therefore do not have sufficient detail to offer an analysis at this time. Should the project description change, please continue to send us information so that we may determine if a sewer assessment is required in the future.

If you have any questions, please call Kwasi Berko of my staff at (323) 342-1562.

Sincerely,

Ali Poosti, Acting Division Manager
Wastewater Engineering Services Division
Bureau of Sanitation

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c: Kosta Kaporis, BOS
Daniel Hackney, BOS
Rowena Lau, BOS

Div Files\SCAR\CEQA Review\Final Response Ltrs\Clearwater Program Master Facilities Plan – Draft EIR

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
(ER 12/101)

Filed Electronically

16 March 2012

U.S. Army Corps of Engineers, Los Angeles District
Regulatory Branch
915 Wilshire Boulevard
Los Angeles, CA 90017
Contact: Aaron O. Allen, Ph.D.
Chief, North Coast Branch
(213) 452-3290
Aaron.O.Allen@usace.army.mil

Subject: Review of the Draft Environmental Impact Statement (DEIS) for the Proposed Clearwater Program, Los Angeles County, CA

Dear Mr. Allen:

The Department of the Interior has received and reviewed the review of the Draft Environmental Impact Statement (DEIS) for the Proposed Clearwater Program, Los Angeles County, CA and has no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

CURTIS L. FOSSUM, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
California Relay Service From TDD Phone **1-800-735-2929**
from Voice Phone **1-800-735-2922**

Contact Phone: **(916) 574-1900**
Contact FAX: **(916) 574-1885**

March 23, 2012

File Ref: SCH #2008101074

Mr. Steven W. Highter
Sanitation Districts of Los Angeles County
Facilities Planning Department
1955 Workman Mill Road
Whittier, CA 90601

Subject: Draft Environmental Impact Report/Draft Environmental Impact Statement (DEIR/DEIS) for the Clearwater Program, Los Angeles County

Dear Mr. Highter:

The California State Lands Commission (CSLC) staff has reviewed the subject DEIR/DEIS for the Clearwater Program (Program), which is being prepared by the Sanitation Districts of Los Angeles County (Districts) and the U.S. Army Corps of Engineers (ACOE). The Districts, as the public agencies proposing to carry out a Program, is the Lead Agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The ACOE is the Lead Agency under the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.). The CSLC will act as a trustee agency because of its trust responsibility for projects that could directly or indirectly affect sovereign lands, their accompanying Public Trust resources or uses, and the public easement in navigable waters. Additionally, if the Program involves work on sovereign lands, the CSLC will act as a responsible agency.

CSLC Jurisdiction and Public Trust Lands

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership

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extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. On navigable non-tidal waterways, including lakes, the State holds fee ownership of the bed of the waterway landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark, except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections.

The Districts, as part of developing the Joint Outfall System (JOS) Master Facilities Plan, have identified the need for new facilities and upgrades that are required to accommodate projected future conditions within the JOS service area, inclusive of a new tunnel and ocean outfall to convey effluent from the Districts' upland treatment plant to the ocean. At the Program level, CSLC staff does not have enough detail to determine whether the Program components or potential alternatives would involve sovereign lands. However, the Districts have evaluated, at the project level in the DEIR/DEIS, four feasible project-specific ocean discharge system alignment alternatives. All of the alternatives would require rehabilitation of the existing ocean outfalls located in Alternative 4. Based on the information provided in the DEIR/DEIS and a review of CSLC records, Alternatives 1, 2, and 3 involve granted lands, while Alternative 4 involves ungranted sovereign lands under the jurisdiction of the CSLC, as follows:

- Alternative 1 would be located partially within lands the State patented as Tideland Locations 57 and 152 and partially located within lands the State legislatively granted to the city of Los Angeles pursuant to Chapters 656, Statutes of 1911, and as amended, no minerals reserved.
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- Alternative 3 would be located within lands the State legislatively granted to the City pursuant to Chapters 656, Statutes of 1911 and Chapters 651, Statutes of 1929 and as amended, no minerals reserved.
- Alternative 4 would be covered under CSLC Lease No. PRC 251.9 to the Los Angeles Sanitation District for the life of the structure and also extends into lands the State legislatively granted to the City pursuant to Chapters 443, Statutes of 1951, and as amended, no mineral reserved.

Proposed Alternatives 1, 2, and 3 occupy lands managed by the City of Los Angeles and, as such, no new authorization would be required from the CSLC for those alignments. However, because each of the alternatives would include rehabilitation of the existing ocean outfalls located in Alternative 4, which occupies land covered under CSLC Lease No. PRC 251.9, an amendment to the existing lease would be required regardless of the alternative selected by the Districts for implementation. The Los Angeles Sanitation District should contact the CSLC's Land Management Division through the contact listed at the end of this letter, for additional information regarding

the application requirements for a lease amendment. Additionally, other regulatory agencies will need to provide authorization for use.

Program/Project Description

The Program is a comprehensive planning effort undertaken by the Districts. Its purpose is to develop a long-range Master Facilities Plan (MFP) for the JOS, a regional wastewater management system serving over five million people in 73 cities and unincorporated areas of Los Angeles County. The Program's MFP includes an evaluation of infrastructure needs and will serve to guide the management and development of the JOS through the year 2050.

The Program has the following objectives:

- Provide adequate system capacity to meet the needs of the growing population
- Provide for overall system reliability by allowing for the inspection, maintenance, repair, and replacement of aging infrastructure
- Provide support for emerging recycled water reuse and biosolids beneficial use opportunities
- Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies

CSLC staff understands that the components considered in the Program DEIR/DEIS include five areas for which conceptual options were developed. These include:

- Wastewater Conveyance and Treatment
- WRP Effluent Management
- Solids Processing
- Biosolids Management
- Joint Water Pollution Control Plant (JWPCP) Effluent Management

Screening at the Program level identified one feasible option for each of four of the five Program component areas. Analysis of the fifth Program component area (JWPCP Effluent Management) resulted in four ranked feasible project alternatives for the ocean discharge system. The four feasible Program alternatives were paired with each of the four ranked feasible project alternatives to produce four ranked feasible alternatives for the Program. The highest ranked of these alternatives (Alternative 4) was selected as the recommended plan in the MFP and identified as the recommended alternative in the DEIR/DEIS.

The JWPCP Ocean Discharge System project (Project) alternatives evaluated were based on the fifth Program component, JWPCP Effluent Management, which includes rehabilitation of the existing ocean outfalls. The Project is composed of three functional categories: (1) tunnel alignment (onshore and offshore), (2) shaft site (JWPCP and intermediate), and (3) riser and diffuser area.

Currently, the Districts rely on two onshore tunnels and four offshore ocean outfall structures to convey effluent from the JWPCP, in the city of Carson, to the Pacific Ocean. The Project purpose and needs are to inspect and upgrade the aging ocean discharge system, to provide sufficient capacity in the JOS to accommodate the estimated 2050 peak wastewater flows, and to comply with all applicable water quality standards, including regulations prohibiting sewer overflows. To meet these needs, the Project evaluates alternatives to both modifying the existing ocean discharge system and constructing a new ocean discharge system. All four of the Project alternatives include rehabilitation to the existing offshore discharge area, which is under the jurisdiction of the CSLC. Alternative 4, which would modify the existing ocean discharge system, was the highest-ranked feasible alternative and is the recommended Project in the DEIR/DEIS.

Environmental Review

CSLC staff requests that the Districts consider the following comments on the DEIR/DEIS.

Alternatives

1. The Alternatives listed under the Water Reclamation Plant (WRP) Effluent Management component (Figure 3-1) included the "All Reuse – No Surface Discharge" Alternative, which was subsequently eliminated from consideration during the screening process as described in the Draft Master Facilities Plan. Recent progress has been made in regards to water reuse technology. The DEIR/DEIS should analyze treating wastewater to drinking water standards as a water supply alternative. For example, Groundwater Replenishment Systems (GWRSs) significantly lower the energy currently required to import water and desalinate seawater, supply a reliable water source, and also decrease the amount of wastewater discharged in the Pacific Ocean. This technology is currently being used by the Orange County Water District, which currently produces 70 million gallons per day of potable water, and is being considered by the Padre Dam Water District in San Diego County. As the impacts of coastal wastewater discharges into tidelands are of concern to the CSLC, staff recommends that any water reuse technology that could decrease discharges into the ocean be seriously considered during the CEQA process.

Climate Change

2. Sea Level Rise: The DEIR/DEIS should also consider the effects of sea level rise on all resource categories potentially affected by the proposed Project. At its meeting on December 17, 2009, the CSLC approved the recommendations made in a previously requested staff report, "A Report on Sea Level Rise Preparedness" (Report), which assessed the degree to which the CSLC's grantees and lessees have considered the eventual effects of sea level rise on facilities located within the CSLC's jurisdiction. (The Report can be found on the

CSLC's website, http://www.slc.ca.gov). One of the Report's recommendations directs CSLC staff to consider the effects of sea level rise on hydrology, soils, geology, transportation, recreation, and other resource categories in all environmental determinations associated with CSLC leases. Because it is reasonably foreseeable that long-term coastal facilities will eventually have to operate under higher sea level conditions, the eventual effects of the facilities' operations under those conditions are of interest to the CSLC; staff therefore recommends these effects be considered in the Program and Project's CEQA analysis.

Cultural Resources

3. CSLC staff is concerned that the DEIR/DEIS does not present sufficient evidence in regards to the potential for archaeological resources within some of the Program and Project areas due to the lack of a complete and comprehensive pedestrian surveys of the areas. Several areas have only been "partially" surveyed. Complete surveys of all areas within granted and sovereign land where construction may occur should be conducted prior to proposing mitigation relating to unanticipated discovery.

   Furthermore, the DEIR/DEIS should mention that the title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC. The recovery of objects from any submerged archaeological site or shipwreck may require a salvage permit under Public Resources Code section 6309. On statutorily granted tide and submerged lands, a permit may be issued only after consultation with the local grantee and a determination by the CSLC that the proposed salvage operation is not inconsistent with the purposes of the legislative grant.

Marine Environment

4. Table 13-11 should note the CSLC under "Rehabilitation of the Existing Ocean Outfalls," as the existing structure is currently under lease with CSLC and any rehabilitation activity may require an amendment to that lease.

5. Mitigation Measure MAR-1a states that "During riser and diffuser construction, analyses of contaminant concentrations... in waters near the dredging operations will be required if the contaminant levels in the dredged sediments are known to be elevated and represent a potential risk to beneficial uses." The measure does not specify when or how often the analyses would occur. In addition, a lead agency may not defer the formulation of a mitigation measure to other agencies; lead agencies must do all that is feasible on their part to address significant impacts even where a subsequent permit from another agency is necessary. While the requirements contained in permits issued by the various regulatory agencies mentioned may ultimately provide a basis to conclude that the

particular agency's permitting requirements were met, such a conclusion is not, by itself, a basis to conclude that all project-related impacts on those resources are mitigated to below a level of significance under CEQA. Rather, the lead agency has the responsibility to comply with CEQA's substantive mandate to mitigate all project-related impacts to the extent feasible, not simply pass the responsibility to a responsible agency with more limited regulatory and statutory requirements. The DEIR/DEIS has stated that the Project components have been designed to meet the receiving water standards of the California Ocean Plan as well as the requirements of the JWPCP's existing Regional Water Quality Control Board Waste Discharge Request order and National Pollutant Discharge Elimination System permit. CSLC suggests that these documents could be used to improve the Districts' ability to monitor and enforce this mitigation measure.

Thank you for the opportunity to comment on the DEIR/DEIS for the Program and Project. As a responsible and trustee Agency, the CSLC will need to rely on the Final DEIR/DEIS for the issuance of any amended lease as specified above and, therefore, we request that you consider our comments prior to adoption of the DEIR/DEIS. Please send additional information on the Program/Project to the CSLC staff listed below as plans become finalized.

In addition, please send copies of future Program and Project-related documents, including an electronic copy of the Final EIR/EIS, CEQA Findings, and if applicable, Statement of Overriding Considerations, when they become available, and refer questions concerning environmental review to Cynthia Herzog, Environmental Scientist, at (916) 574-1310 or via e-mail at Cynthia.Herzog@slc.ca.gov. For questions concerning archaeological or historic resources under CSLC jurisdiction, please contact Senior Staff Counsel Pam Griggs at (916) 574-1854 or via email at Pamela.Griggs@slc.ca.gov. For questions concerning CSLC leasing jurisdiction, please contact Michelle Andersen, Public Land Management Specialist at (916) 574-0200, or via email at Michelle.Andersen@slc.ca.gov.

Sincerely,

Cy R. Oggins, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
Michelle Andersen, LMD, CSLC
Cynthia Herzog, DEPM, CSLC

The following letter from the California State Lands Commission was submitted as a follow-up to their March 23, 2012, comment letter.

STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

CURTIS L. FOSSUM, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
California Relay Service from TDD Phone **1-800-735-2929**
from Voice Phone **1-800-735-2922**

Contact Phone: **(916) 574-1227**
Contact FAX: **(916) 574-1835**

July 27, 2012

File Ref: PRC 251.9
SCH 2008101074

Glenn Acosta
Sanitation District of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

Subject: Clearwater Program Repairs

Dear Mr. Acosta:

This letter is a follow-up to our March 23, 2012 letter commenting on the Draft Environmental Impact Report for the Clearwater Program, specifically, our comments regarding the California State Lands Commission's (CSLC) jurisdiction in the four existing outfall sewers authorized under CSLC Lease No. PRC 251.9. As you are aware, on December 17, 1953, the CSLC authorized a Right-of-Way Easement, PRC 251.9, to the County Sanitation Districts of Los Angeles for the construction, maintenance, and operation of multiple outfall sewers within the Pacific Ocean. As proposed by the Clearwater Program, the existing four outfall sewers would require rehabilitation under alternatives 1-4, including joint repairs and re-ballasting.

After a second review of PRC 251.9 and our jurisdiction in the proposed project, staff has determined that the joint repair and re-ballasting of the existing four outfall sewers is consistent with repair and maintenance as authorized by the lease. Consequently, no additional authorization from the Commission is required at this time.

If you have any additional questions regarding this determination, please contact Michelle Andersen at (916) 574-0200 or at Michelle.Andersen@slc.ca.gov. Thank you.

Sincerely,

Grace Kato

Grace Kato
Public Land Manager

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STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

March 27, 2012

Steven W. Highter
Los Angeles County
Sanitation Districts
1955 Workman Mill Road
Whittier, CA 90601

Subject: Clearwater Program Master Facilities Plan
SCH#: 2008101074

Dear Steven W. Highter:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on March 26, 2012, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

REC'D LACSD

DOC # Highter S

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

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Document Details Report
State Clearinghouse Data Base

STATE OF CALIFORNIA

GOVERNOR'S OFFICE of PLANNING AND RESEARCH

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

SCH# 2008101074
Project Title Clearwater Program Master Facilities Plan
Lead Agency Los Angeles County

Type EIR Draft EIR

Description The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts of Los Angeles County (Sanitation Districts) with the purpose of developing a long-range master facilities plan (MFP) for the Joint Outfall System (JOS), a regional wastewater management system serving over 5 million people in 73 cities and unincorporated areas of Los Angeles County. The Clearwater Program MFP includes an evaluation of infrastructure needs and will serve to guide the management and development of the JOS through the year 2050.

Lead Agency Contact

Name Steven W. Highter
Agency Los Angeles County
Phone 562-699-7411 ext 2711 **Fax**
email
Address Sanitation Districts
1955 Workman Mill Road
City Whittier **State** CA **Zip** 90601

Project Location

County Los Angeles
City
Region
Lat / Long
Cross Streets Countywide
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use Countywide

Project Issues Agricultural Land; Air Quality; Archaeologic-Historic; Coastal Zone; Biological Resources; Drainage/Absorption; Cumulative Effects; Landuse; Growth Inducing; Economics/Jobs; Fiscal Impacts; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Aesthetic/Visual; Other Issues

Reviewing Agencies Resources Agency; Department of Boating and Waterways; California Coastal Commission; Department of Conservation; Department of Fish and Game, Region 5; Office of Historic Preservation; Department of Parks and Recreation; Resources, Recycling and Recovery; California Highway Patrol; Caltrans, District 7; Regional Water Quality Control Board, Region 4; Department of Toxic Substances Control; Native American Heritage Commission; State Lands Commission

Date Received 02/09/2012 **Start of Review** 02/09/2012 **End of Review** 03/26/2012

STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
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Contact Phone: **(916) 574-1900**
Contact FAX: **(916) 574-1885**

March 23, 2012

3/26/12 clear

File Ref: SCH #2008101074

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MAR 23 2012
STATE CLEARING HOUSE

Mr. Steven W. Highter
Sanitation Districts of Los Angeles County
Facilities Planning Department
1955 Workman Mill Road
Whittier, CA 90601

Subject: Draft Environmental Impact Report/Draft Environmental Impact Statement (DEIR/DEIS) for the Clearwater Program, Los Angeles County

Dear Mr. Highter:

The California State Lands Commission (CSLC) staff has reviewed the subject DEIR/DEIS for the Clearwater Program (Program), which is being prepared by the Sanitation Districts of Los Angeles County (Districts) and the U.S. Army Corps of Engineers (ACOE). The Districts, as the public agencies proposing to carry out a Program, is the Lead Agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The ACOE is the Lead Agency under the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.). The CSLC will act as a trustee agency because of its trust responsibility for projects that could directly or indirectly affect sovereign lands, their accompanying Public Trust resources or uses, and the public easement in navigable waters. Additionally, if the Program involves work on sovereign lands, the CSLC will act as a responsible agency.

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The JWPCP Ocean Discharge System project (Project) alternatives evaluated were based on the fifth Program component, JWPCP Effluent Management, which includes rehabilitation of the existing ocean outfalls. The Project is composed of three functional categories: (1) tunnel alignment (onshore and offshore), (2) shaft site (JWPCP and intermediate), and (3) riser and diffuser area.

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Environmental Review

CSLC staff requests that the Districts consider the following comments on the DEIR/DEIS.

Alternatives

1. The Alternatives listed under the Water Reclamation Plant (WRP) Effluent Management component (Figure 3-1) included the "All Reuse – No Surface Discharge" Alternative, which was subsequently eliminated from consideration during the screening process as described in the Draft Master Facilities Plan. Recent progress has been made in regards to water reuse technology. The DEIR/DEIS should analyze treating wastewater to drinking water standards as a water supply alternative. For example, Groundwater Replenishment Systems (GWRSs) significantly lower the energy currently required to import water and desalinate seawater, supply a reliable water source, and also decrease the amount of wastewater discharged in the Pacific Ocean. This technology is currently being used by the Orange County Water District, which currently produces 70 million gallons per day of potable water, and is being considered by the Padre Dam Water District in San Diego County. As the impacts of coastal wastewater discharges into tidelands are of concern to the CSLC, staff recommends that any water reuse technology that could decrease discharges into the ocean be seriously considered during the CEQA process.

Climate Change

2. Sea Level Rise: The DEIR/DEIS should also consider the effects of sea level rise on all resource categories potentially affected by the proposed Project. At its meeting on December 17, 2009, the CSLC approved the recommendations made in a previously requested staff report, "A Report on Sea Level Rise Preparedness" (Report), which assessed the degree to which the CSLC's grantees and lessees have considered the eventual effects of sea level rise on facilities located within the CSLC's jurisdiction. (The Report can be found on the

CSLC's website, http://www.slc.ca.gov). One of the Report's recommendations directs CSLC staff to consider the effects of sea level rise on hydrology, soils, geology, transportation, recreation, and other resource categories in all environmental determinations associated with CSLC leases. Because it is reasonably foreseeable that long-term coastal facilities will eventually have to operate under higher sea level conditions, the eventual effects of the facilities' operations under those conditions are of interest to the CSLC; staff therefore recommends these effects be considered in the Program and Project's CEQA analysis.

Cultural Resources

3. CSLC staff is concerned that the DEIR/DEIS does not present sufficient evidence in regards to the potential for archaeological resources within some of the Program and Project areas due to the lack of a complete and comprehensive pedestrian surveys of the areas. Several areas have only been "partially" surveyed. Complete surveys of all areas within granted and sovereign land where construction may occur should be conducted prior to proposing mitigation relating to unanticipated discovery.

   Furthermore, the DEIR/DEIS should mention that the title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC. The recovery of objects from any submerged archaeological site or shipwreck may require a salvage permit under Public Resources Code section 6309. On statutorily granted tide and submerged lands, a permit may be issued only after consultation with the local grantee and a determination by the CSLC that the proposed salvage operation is not inconsistent with the purposes of the legislative grant.

Marine Environment

4. Table 13-11 should note the CSLC under "Rehabilitation of the Existing Ocean Outfalls," as the existing structure is currently under lease with CSLC and any rehabilitation activity may require an amendment to that lease.

5. Mitigation Measure MAR-1a states that "During riser and diffuser construction, analyses of contaminant concentrations... in waters near the dredging operations will be required if the contaminant levels in the dredged sediments are known to be elevated and represent a potential risk to beneficial uses." The measure does not specify when or how often the analyses would occur. In addition, a lead agency may not defer the formulation of a mitigation measure to other agencies; lead agencies must do all that is feasible on their part to address significant impacts even where a subsequent permit from another agency is necessary. While the requirements contained in permits issued by the various regulatory agencies mentioned may ultimately provide a basis to conclude that the

particular agency's permitting requirements were met, such a conclusion is not, by itself, a basis to conclude that all project-related impacts on those resources are mitigated to below a level of significance under CEQA. Rather, the lead agency has the responsibility to comply with CEQA's substantive mandate to mitigate all project-related impacts to the extent feasible, not simply pass the responsibility to a responsible agency with more limited regulatory and statutory requirements. The DEIR/DEIS has stated that the Project components have been designed to meet the receiving water standards of the California Ocean Plan as well as the requirements of the JWPCP's existing Regional Water Quality Control Board Waste Discharge Request order and National Pollutant Discharge Elimination System permit. CSLC suggests that these documents could be used to improve the Districts' ability to monitor and enforce this mitigation measure.

Thank you for the opportunity to comment on the DEIR/DEIS for the Program and Project. As a responsible and trustee Agency, the CSLC will need to rely on the Final DEIR/DEIS for the issuance of any amended lease as specified above and, therefore, we request that you consider our comments prior to adoption of the DEIR/DEIS. Please send additional information on the Program/Project to the CSLC staff listed below as plans become finalized.

In addition, please send copies of future Program and Project-related documents, including an electronic copy of the Final EIR/EIS, CEQA Findings, and if applicable, Statement of Overriding Considerations, when they become available, and refer questions concerning environmental review to Cynthia Herzog, Environmental Scientist, at (916) 574-1310 or via e-mail at Cynthia.Herzog@slc.ca.gov. For questions concerning archaeological or historic resources under CSLC jurisdiction, please contact Senior Staff Counsel Pam Griggs at (916) 574-1854 or via email at Pamela.Griggs@slc.ca.gov. For questions concerning CSLC leasing jurisdiction, please contact Michelle Andersen, Public Land Management Specialist at (916) 574-0200, or via email at Michelle.Andersen@slc.ca.gov.

Sincerely,

Cy R. Oggins, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
Michelle Andersen, LMD, CSLC
Cynthia Herzog, DEPM, CSLC

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

3/26/12 clear

February 15, 2012

RECEIVED
FEB 17 2012
STATE CLEARING HOUSE

Steven W. Highter
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

RE: SCH# 2008101074 Clearwater Program Master Facilities Plan; Los Angeles County.

Dear Mr. Highter:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Completion (NOC) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5 minute quadrangle name, township, range and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

KS

Katy Sanchez
Program Analyst
(916) 653-4040

cc: State Clearinghouse

Central San Pedro Neighborhood Council

Linda Alexander
President

Frank Anderson
Vice President

Scott Gray
Secretary

Kali Merideth
Treasurer

March 28, 2012

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

Aaron O. Allen, Ph.D.
Chief, North Coast Branch
U.S. Army Corps of Engineers, Los Angeles District
Regulatory Branch
915 Wilshire Boulevard
Los Angeles, CA90017

Gentlemen,

The Central San Pedro Neighborhood requests that the public comment period for the Clearwater Program be extended by one month to May 10, 2012. The issues involved are complex and require more extensive review by our Council. Our meeting schedule precludes a vote of our Governing Board to take a position before May.

Thank you for your consideration.

Sincerely,

Linda Alexander

Linda Alexander
President

cc: Ken Melendez, Co-Chair, Port Community Advisory Committee
Annette McDonald, Board Member Central San Pedro Neighborhood Council

REC'D LACSD
APR 2 '12 AM 11:47

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1840 S. Gaffey Street, Box 212, San Pedro, CA 90731 • 310-832-0363 • www.centralsanpedro.org

CITY OF RANCHO PALOS VERDES
CITY MANAGER'S OFFICE
ADMINISTRATION

9 April 2012

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Rd.
Whittier, CA 90601

Dr. Aaron O. Allen
U.S. Army Corps of Engineers, Los Angeles District
Regulatory Division, Ventura Field Office
2151 Alessandro Dr., Ste. 110
Ventura, CA 93001

SUBJECT: Comments on the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the Clearwater Program

Dear Mr. Highter and Dr. Allen:

The City of Rancho Palos Verdes appreciates the opportunity to comment upon the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the above-mentioned project. The City respectfully offers the following comments on the content and analysis of the DEIS/EIR for the proposed project:

1. A small portion of the proposed tunnel alignment for Alternative 4 would appear to traverse the public right-of-way of Western Avenue within the jurisdiction of the City of Rancho Palos Verdes (i.e., roughly between Crestwood Street and Summerland Street). As such, Table 1-3 in Section 1.6 "Relationship to Existing Plans" should include a reference to the Rancho Palos Verdes General Plan, which may be reviewed on the City's website at the following link:

   http://www.palosverdes.com/rpv/planning/General_Plan_EIR/index.cfm

2. The City has the following concerns regarding the construction of the proposed tunnel exit shaft at Royal Palms County Beach for Alternative 4:

   a. The proposed shaft site is located quite close to a recent landslide at White Point in San Pedro (i.e., the City of Los Angeles). In addition, the

soils of the Palos Verdes Peninsula may be generally characterized as being susceptible to large-scale land movement, such as the on-going Portuguese Bend Landslide and the failure of a portion of the golf course at the Trump National Golf Club in 1999. Chapter 8 "Geology, Soils and Mineral Resources" should address not only the suitability and stability of the proposed shaft site at Royal Palms, but also the potential for the excavation of this shaft site to de-stabilize the White Point Landslide and/or other nearby coastal bluffs.

b. As a result of the White Point Landslide, West Paseo del Mar is currently closed to traffic just east of the proposed shaft site. With this closure, east-west neighborhood traffic in the *South Shores* area of San Pedro has been diverted inland to West 25th Street, which is a major arterial that provides access to the southerly portion of the City of Rancho Palos Verdes. Has the analysis in Chapter 18 "Transportation and Traffic (Terrestrial)" taken into account the impacts of c ınd other construction-related traffic on West 25th Street as a result of the closure of West Paseo del Mar?

3. The City has the following concerns regarding the proposed tunneling activities related to Alternative 4:

a. The proposed tunnel alignment would follow Western Avenue from Trudie Drive/Capitol Drive to the proposed exit shaft site at Royal Palms County Beach. Although most of this segment of the proposed tunnel would be located in San Pedro, a small portion would fall within the City of Rancho Palos Verdes. In recent years, the City of Rancho Palos Verdes has experienced failures of storm drains under Western Avenue, most dramatically in the case of a sinkhole that occurred near Delasonde Drive/Westmont Drive in 2005. Does Chapter 8 "Geology, Soils and Mineral Resources" address the potential impact of tunneling activities upon storm drains and similar, underground public infrastructure within the alignment of the proposed tunnel?

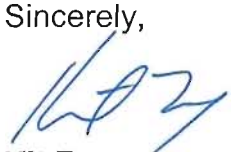
b. We note that Chapter 10 "Hazards and Hazardous Materials" discusses the close proximity of the tunneling activities for Alternative 4 to contaminated soils at the Defense Fuel Support Point (DFSP) on North Gaffey Street in San Pedro. The analysis of "risk of upset" from tunneling activities under Alternative 4 appears to be limited to the exposure of hazardous materials in the soil related to the operation of the tunnel boring machine. However, the City respectfully suggests that the DEIS/EIR should also analyze the "risk of upset" that tunneling activities might pose upon nearby industrial facilities, particularly the Rancho LPG butane storage facility at North Gaffey Street and Westmont Drive.

c. Chapter 14 "Noise and Vibration (Terrestrial)" states that there are currently no Federal regulations or State environmental guidelines regarding vibration from tunneling operations. The analysis in the DEIS/EIR is based upon studies conducted for the construction of the Red Line subway in the City of Los Angeles, and concludes that there will be no significant groundborne vibration impacts in areas where the depth of the tunnel base is more than one hundred ten feet (110') below the ground surface. Within the City of Rancho Palos Verdes, most of the properties abutting the Western Avenue right-of-way in the vicinity of the proposed tunnel alignment are zoned and developed for non-residential use. However, there is a motel (America's Best Value Inn) located at 29601 Western Avenue, a 70-unit residential condominium (*Eastview Townhouse*) located at 29641 Western Avenue and a 116-bed residential care facility for the elderly (Palos Verdes Villa) located at 29661 Western Avenue. What is the depth of the proposed tunnel base in the vicinity of these properties (relative to ground surface), and how significant is the impact of groundborne vibration expected to be upon them?

4. Among the major goals of the Clearwater Program are the achievement of system redundancy and the ability to inspect (and possibly repair) the existing 8- and 12-foot-diameter tunnels connecting the Joint Water Pollution Control Plant (JWPCP) to the existing ocean outfalls. As you are aware, these existing tunnels traverse the *Eastview* area of the City of Rancho Palos Verdes. Do the Sanitation Districts have any sense yet of what will be involved in the future inspection and possible repair of these existing tunnels? Should the City expect that the staging of these future activities might occur in our Eastview Park, which is located on land leased from the Sanitation Districts? Can the expected impacts of these future activities somehow be included in the current DEIS/EIR?

Again, thank you for the opportunity to provide comments on this important project. If you have any questions or need additional information, please feel free to contact me at (310) 544-5226 or via e-mail at *kitf@rpv.com*.

Sincerely,



Kit Fox, AICP
Senior Administrative Analyst

cc: Mayor Anthony Misetich and City Council
Carolyn Lehr, City Manager
Carolynn Petru, Deputy City Manager

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THE PORT OF LOS ANGELES
425 S. Palos Verdes Street Post Office Box 151 San Pedro, CA 90733-0151 TEL/TDD 310 SEA-PORT www.portoflosangeles.org

Antonio R. Villaraigosa | Mayor, City of Los Angeles
Board of Harbor Commissioners | Cindy Miscikowski, President | David Arian, Vice President | Robin M. Kramer | Douglas P. Krause | Sung Won Sohn, Ph.D.
Geraldine Knatz, Ph.D. | Executive Director

April 9, 2012

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601
shighter@lacsd.org

Dear Mr. Highter:

SUBJECT: CLEARWATER PROGRAM DRAFT EIR

The City of Los Angeles Harbor Department (LAHD) supports the Los Angeles County Sanitation Districts (LACSD) Clearwater Program as it would improve the regional wastewater infrastructure. More specifically, LAHD supports improvements to the Joint Wastewater Pollution Control Plant (JWPCP) and its ocean discharge system since they would reduce the likelihood of untreated effluent entering various watercourses such as the Dominguez Channel, Wilmington Drain, and Machado Lake. These watercourses influence water quality within the Port of Los Angeles (Port).

LAHD has reviewed the Clearwater Program Draft Environmental Impact Report/Draft Environmental Impact Statement (DEIR/DEIS) (State Clearinghouse No. 2008101074) and submits the following comments for your consideration.

Offshore Tunnels

As indicated in the DEIR/DEIS, Alternatives 1 and 2 include the construction and operation of offshore tunnels through the Port that terminate at the Palos Verdes Shelf or San Pedro Shelf. The offshore tunnel alignments are depicted in Figures 3-12 and 3-13 of the DEIR/DEIS and would be approximately 100 to 250 feet below the ground surface or seafloor. Given the general alignment and depth of these tunnels, close coordination with the Port would be required if either of these alternatives is selected. The Port and other utility companies have a number of deep utility crossings (100 feet and deeper) within the Main and East Channels that could be affected.

Shaft Sites

Alternatives 1 and 2 include shaft sites within the Port, referred to as the TraPac and the LAXT Shaft Sites.

TraPac Shaft Site

Figure 3-19 of the DEIR/DEIS depicts the approximate location, configuration and size of the TraPac Shaft Site. Construction and operation of the access shaft site would disrupt ongoing operations of the TraPac Container Terminal at Berths 136-147. According to the DEIR/DEIS,

construction of the shaft would take between 10 and 11 months. During construction, approximately 30 to 65 trucks per day would be required for delivering supplies and removing excavated material. According to Table 3-13 of the DEIR/DEIS, tunnel construction and shaft operation would occur for several years. Once construction of the onshore and offshore tunnels is completed, a permanent easement of approximately 0.3 acre would be needed for future operation and maintenance (O&M) activities.

The following facts should be considered by LACSD. Redevelopment of the TraPac Container Terminal is expected to begin within 2012 and continue through 2016. Construction and operation of the shaft site could potentially conflict with the TraPac redevelopment. Additionally, construction workers would need to be eligible for the Transportation Worker Identification Credential through the Maritime Transportation Safety Act in order to access the TraPac Container Terminal.

The noise analysis in Chapter 14 of the DEIR/DEIS did not account for potential noise impacts to the Wilmington Waterfront Park, which is considered a sensitive receptor. The property is owned and operated by LAHD. The park is located between Harry Bridges Boulevard and C Street to the north, from Figueroa Street to Lagoon Avenue to the east. The analysis should account for short-term construction and long-term operational noise impacts to this sensitive receiver.

LAHD recommends that the TraPac Shaft Site be substituted with a shaft site located between I-110 and Figueroa Street, just north of Harry Bridges Boulevard, where vacant Port property is or will become available.

LAXT Shaft Site
Figure 3-20 depicts the approximate location, configuration and size of the LAXT Shaft Site. It is generally northwest of the intersection at Ferry Street and Terminal Way, and immediately east of the City of Los Angeles Terminal Island Water Reclamation Plant. LAHD does not object to this shaft site, however is obligated to inform LACSD of conditions that could affect the Clearwater Program. The Port has proposed the Pacific L.A. Marine Terminal (PLAMT) project in the vicinity and PLAMT construction would coincide with construction and/or operation of the shaft site. The availability of property and access to the shaft site would be confined by the PLAMT project. Furthermore, railroad tracks intersecting the shaft site are active and operated by Pacific Harbor Line (PHL) for railcar storage and locomotive fueling and could further interfere with the construction and operation of the shaft site.

Thank you for the opportunity to comment on this project. We look forward to your response to our comments and notification when the Final EIR/EIS becomes available. Should you have any questions, please contact me at 310-732-3675.

Sincerely,

CHRISTOPHER CANNON
Director of Environmental Management

CC:LO:JB:mx

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

APR 0 9 2012

Dr. Aaron O. Allen
Regulatory Division, Ventura Field Office
U.S. Army Corps of Engineers
2151 Alessandro Drive, Suite 110
Ventura, CA 93001

Subject: Draft Environmental Impact Statement for the Sanitation Districts of Los Angeles County Clearwater Program, Los Angeles County, CA (CEQ # 20120028)

The U.S. Environmental Protection Agency is providing comments on the Draft Environmental Impact Statement for the Clearwater Program, Los Angeles County, California. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. These comments were also prepared under the authority of, and in accordance with, the provisions of the Federal Guidelines promulgated at 40 CPR 230 under Section 404(b)(1) of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research and Sanctuaries Act.

EPA appreciated the opportunity to coordinate early and discuss our concerns with the Districts on December 10, 2007, and with the Army Corps of Engineers and the Districts on February 9, 2010 and August 24, 2011. We provided detailed comments on the January 2, 2008 Draft Notice of Intent in our letter dated March 5, 2008. EPA also submitted a letter to the Districts, dated July 30, 2008, clarifying our Superfund Program comments with respect to the effluent-affected sediment deposit on the Palos Verdes Shelf. In a November 4, 2008 letter, we confirmed that our comments on the Draft NOI still applied, based on our review of the NOI released on October 6, 2008.

We commend the Corps and the Districts for selecting their preferred alternative (Alternative 4) which would not necessitate construction of new outfalls that would have the potential to disturb contaminated sediment and generate additional air emissions. We are also pleased that the preferred alternative should avoid impacts to the Palos Verdes DDT Superfund Site and the LA-2 Ocean Disposal site.

While we acknowledge these positive developments and the need to update the county's sanitation infrastructure, we have rated the preferred alternative in the DEIS as Environmental Concerns – Insufficient Information (EC-2) (please see enclosed "*Summary of Rating Definitions*") due to concerns regarding impacts to air quality, aquatic resources, children's health and environmental justice communities.

We remain concerned with the localized and cumulative impacts to the already health burdened communities in the vicinity of the project, and recommend the Districts and the Corps commit, in the Final Environmental Impact Statement and Record of Decision, to implementing measures, beyond those identified in the DEIS, that would further reduce air emissions and associated health risks. For example, in anticipation of the availability of cleaner engines prior to commencement of project construction in 2015, we recommend the Districts and the Corps fully integrate the cleanest engines and the best available emission control technologies for equipment to be used during the project's construction phases,

as well as for the operational elements of the Clearwater Program (e.g. truck hauling of biosolids from Joint Water Pollution Control Plant to various locations for beneficial use or disposal).

We were pleased to note that rehabilitation work of the existing outfalls will be limited to depths between 20 and 50 ft below the water's surface. While we believe this should minimize impacts to potentially contaminated sediments, we recommend the FEIS and ROD include Best Management Practices to ensure minimum disturbance to sediments and marine habitats. To better identify potential impacts to aquatic resources, we recommend the FEIS provide additional information describing the potential frequency of bottom sediment disturbance and the volume of bottom sediments disturbed during outfall joint rehabilitation, as well as any direct or indirect impacts to kelp forests and/or kelp bed habitat. This information may be useful in identifying additional avoidance measures.

Please see the enclosed detailed comments for a more thorough discussion of the comments provided above, as well as additional comments on air and aquatic resources, the Palos Verdes Shelf Superfund Site, greenhouse gas emissions, physical safety, and noise.

We appreciate the opportunity to review this DEIS. When the FEIS is released for public review, please send one hard copy and one electronic copy to the address above (mail code: CED-2). If you have questions, please contact me at (415) 972-3521 or Tom Plenys of my staff at plenys.thomas@epa.gov.

Sincerely,

Cornell Dimming

For Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosures:
(1) Summary of EPA Rating Definitions
(2) EPA's Detailed Comments

cc: David Castanon, Chief, Regulatory Branch, Los Angeles District, Corps of Engineers
Thomas J. LeBrun, Department Head, County Sanitation Districts of Los Angeles County
Steven Highter, Supervising Engineer, County Sanitation Districts of Los Angeles County

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE SANITATION DISTRICTS OF LOS ANGELES COUNTY CLEARWATER PROGRAM, LOS ANGELES COUNTY, CALIFORNIA, APRIL 9, 2012

Air Quality

EPA is concerned about the direct, indirect and cumulative impacts of construction emissions associated with the project, even after mitigation measures have been taken into account. The DEIS includes estimated emissions for criteria pollutants and description of the mitigation measures that will be implemented to reduce the adverse air impacts identified in the DEIS; however, even with implementation of these mitigation measures, combined peak daily emissions from outfall rehabilitation, coupled with the construction of the on-shore tunnel and shaft sites, would exceed South Coast Air Quality Management District daily emissions significance thresholds for nitrogen oxides under the preferred alternative (p. 5-114). Table 5-56 indicates the construction of the on-shore tunnel, alone, from 2016 to 2020 would exceed the 100 pounds per day NO_x threshold.

Given the severe air quality problems within the project area, all feasible measures should be implemented to reduce and mitigate air quality impacts to the greatest extent possible. This is especially important for the South Coast Air Basin nonattainment criteria pollutants including volatile organic compounds, NO_x, and particulate matter, both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$).

> *Recommendation:*
> The Districts and Corps should ensure that mitigation measures in the DEIS, and additional mitigation measures that go beyond those in the DEIS (see recommendations, below), are implemented on a schedule that will reduce construction emissions to the maximum extent feasible. All mitigation measures proposed in the DEIS and any additional measures should be included in the Final Environmental Impact Statement and the Record of Decision. The FEIS should describe how these mitigation measures will be made an enforceable part of the project's implementation schedule. We recommend implementation of applicable mitigation measures prior to or, at a minimum, concurrent with the commencement of construction of the project.

Additional mitigation for non-road engines

EPA appreciates the efforts of Corps and the Districts to identify the suite of seven air quality mitigation measures to reduce emissions from project construction (p. 5-127). In particular we were pleased to note the use of the all-electric tunnel boring machine.

In light of the air quality in and around the Ports of Los Angeles and Long Beach, and the SCAB in general, we recommend that the Corps and the Districts commit to implementing best available emission control technologies for construction, ahead of the California Air Resources Board's in-use off-road diesel vehicle regulations, regardless of fleet size.[1] EPA began phasing-in Tier 4 standards for non-road engines in 2008,[2] and the DEIS notes the availability of Tier 4 non-road engines, effective January 1st, 2015. The use of such engines would result in an approximately 90% reduction in NO_x and PM emissions as compared to Tier 3 (p. 5-13); yet, although construction is expected to begin after January 1, 2015, MM AQ-2b and 3b state that all off-road diesel powered equipment used during construction will be equipped with an EPA Tier 3 engine, except for

[1] See CARB's Factsheet at: http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf
[2] See EPA website: http://www.epa.gov/nonroad-diesel/2004fr/420f04032.htm#standards

specialized equipment that is not available (p. 5-121). The DEIS leaves open the possibility of using Tier 4 engines, if available, but does not commit to their use (p. 5-42).

> *Recommendations:*
> The FEIS and ROD should commit to using non-road construction equipment that meets Tier 4 emission standards, when available, and best available emission control technology, for construction that occurs prior to Tier 4 standards availability.
>
> The FEIS should indicate the expected availability of Tier 3 and Tier 4 engines for the construction equipment list provided in Appendix 3-A.
>
> The FEIS should update the tables in the Chapter 5 impact analysis to reflect the additional criteria pollutant emissions reductions that would result from using Tier 4 engines for each component of project construction.

Mitigation Measure AQ-2f for harbor craft recommends the use of the cleanest marine diesel engines available at the Port of Los Angeles. The mitigation measure does not specifically discuss new Tier 4 standards applicable to harbor craft in 2015.

> *Recommendation:*
> Mitigation Measure AQ-2f should be revised to require Tier 4 equivalent harbor craft as of January 2015. It should also be revised so that the contractor is required to provide proof that the cleanest Tier is unavailable in California, Oregon or Washington, before allowing the use of a lower Tier harbor craft.

Mitigation Measure AQ-2g for tunnel locomotives recommends the use of US EPA Tier 4 engines. The mitigation measure does not discuss the availability of battery-electric locomotives.

> *Recommendations:*
> The FEIS should include a discussion of available battery-electric locomotives suitable for tunnel construction.
>
> Mitigation Measure AQ-2g should be revised to require battery-electric locomotives during tunnel construction pending availability and applicability.

Additional mitigation for on-road engines

The DEIS estimates 30 to 65 truck trips per day during construction of the West Shaft Site, 10 to 40 truck trips per day during construction of the Royal Palms Shaft Site, and 48 to 95 truck trips per day during on-shore tunnel alignment construction (p. 3-15 and 3-17). As a result of the expansion of the Joint Outfall System and the increased biosolids processing at the Joint Water Pollution Control Plant, it is anticipated that there would be an additional 20 truckloads per day above 2008 baseline levels to haul biosolids to various locations for beneficial use or disposal (p. 5-25). By 2050, approximately 27,500 trucks per year would transport biosolids from the JWPCP to the beneficial use and landfill locations (p. 3-8).

MM AQ-2a and 3a state that all on-road heavy-duty diesel trucks used during construction (greater than 26,000 pounds) will include a particulate matter trap or have a 2007 model engine or newer (p. 5-121). MM AQ-2d and 3d indicate alternative fuels will be evaluated for their use during construction.

In view of the heavily impacted air basin and nearby residents, exceedances of the SCAQMD thresholds for NO_x, and the potential adverse impacts to environmental justice communities, the cleanest achievable NO_x emission controls are justified for trucks and equipment used on this project during the construction phase as well as the program operational elements.

Recommendations:

The FEIS should address PM_{10}, $PM_{2.5}$ and NO_x emission levels as part of the on-road diesel engine discussion in Chapter 5 (p. 5-13), and include a table, similar to Table 5-8 for off-road engines, highlighting emission levels for on-road engines. Discuss and compare these levels to those that would be achieved with alternative fuel use.

The FEIS should discuss the availability of on-road engines that meet the NO_x emission standard of 0.2 g/bhp-hr for each on-road vehicle application required as part of the project construction and program operational elements. It should note that EPA on-road standards allowed manufacturers to phase-in compliance with this standard, and that 100 percent of vehicle sales met the standards as of 2010.

Mitigation Measures AQ-2a and 3a, as well as MM AQ-2d and 3d, should commit to meeting the cleanest available on-road emission standards for trucks to be used during project construction, as well as program operational elements (e.g. hauling of biosolids from JWPCP).

MM AQ-2a and 3a should be updated to apply to all on-road heavy-duty diesel trucks greater than 14,000 pounds versus the current 26,000 pounds mentioned in the DEIS.

The FEIS should update the tables in the Chapter 5 impact analysis to reflect the additional criteria pollutant emissions reductions that would result from using the cleanest available on-road engines for each component of project construction and program operational elements.

The FEIS should describe the location of expected final disposal locations for excavated materials and include criteria that would minimize overhaul hauling distances.

Provide a quantification of (1) the additional air quality impacts associated specifically with the trucking of the excavated material and (2) the air quality benefits expected to be achieved by specific mitigation measures. If prior analysis of emissions and mitigation strategies has been conducted, update the FEIS to reflect this.

The Ports' Clean Trucks Programs, key elements of the neighboring Ports' Clean Air Action Plan, have substantially reduced port-related air emissions, especially diesel emissions, in the vicinity of the project. Last August, the Ports released the technical document, "Roadmap for Moving Forward with Zero Emissions Technologies at the Ports of Long Beach and Los Angeles – Technical Report." The report is their mechanism for evaluating various methods of transport that produce no air pollution at the tailpipe. Through the CAAP, the ports created the Technology Advancement Program, which places a priority on the development and demonstration of zero emission technologies for port-operations, consistent with this report.[3]

[3] Website for the report at: http://www.cleanairactionplan.org/civica/filebank/blobdload.asp?BlobID=2527

Recommendations:
The FEIS should discuss the Ports' Clean Trucks Programs and how their success could be transferred to truck applications proposed for construction of the Clearwater project, as well as the fleet of trucks used to transport biosolids from the JWPCP. The FEIS should also discuss incentives and require continuous improvement for trucks servicing the construction sites and the JWPCP.

The FEIS should describe zero and near zero emission tailpipe demonstration and deployment projects, and include a mitigation measure providing a schedule for phase-in of zero emission heavy duty trucks, as practicable, for construction related heavy duty trucks, as well as biosolids transport trucks, following successful demonstrations by the ports through their Clean Trucks Programs.

The FEIS should commit to reviewing periodically (e.g., every three years from the date of the ROD), new technologies and regulations specific to heavy-duty trucks to further reduce NO_x and other criteria pollutant and air toxics emissions. Additionally, technology reviews and any recommendations that result should be made available to the public.

Analysis of Localized Emissions Impacts

Potential local effects can include emissions of volatile organic compounds, carbon monoxide, nitrogen oxides, PM_{10}, and $PM_{2.5}$. Because some communities impacted by this project are predominantly minority and low income communities, these impacts could constitute a disproportionately adverse impact on minority and low income populations. We note the DEIS evaluates the localized impact of construction emissions using the SCAQMD's Localized Significance Thresholds and that the "NOx LST" was scaled to reflect the federal NO_2 standard (p. 5-32).

Recommendation:
The FEIS should clarify the calculations used to adjust the LST threshold based on the federal NO_2 standard and demonstrate compliance with both EPA and SCAQMD localized thresholds.

Impact AQ-6 considers whether the public is exposed to significant levels of toxic air contaminants. The DEIS concludes, for each alternative, that, because exposure to diesel exhaust would be well below the 70-year exposure period at any given location, construction of the preferred alternative is not anticipated to result in an elevated cancer risk to exposed persons, due to the short term nature of construction. While we recognize that Table 5-23 includes a hazard index of greater than or equal to 1.0 as presumably a non-cancer significance threshold, Impact AQ-6 does not discuss or analyze the non-cancer risks associated with short term exposures. Numerous scientific studies have linked particulate pollution exposure to a range of health problems, including premature death, increased hospital and emergency room visits for cardiovascular and respiratory effects, and development of chronic respiratory disease.

Recommendations:
Discuss, in the FEIS, the range of potential non-cancer health problems linked to particulate pollution, including diesel PM.

Discuss and analyze, for each alternative, as appropriate, the relative contribution (or project increment) to the acute hazard index from toxic air contaminants during construction as well as a total hazard index (background plus project exposure).

Consider incorporating, into the FEIS, additional mitigation, as appropriate, such as altering the construction schedule or using high emitting equipment only when emissions would otherwise be low, which may sufficiently change the timing of emissions to avoid an acute residential or non-residential hazard.

Greenhouse Gas Emissions - Construction and Operation Bid Specifications

In soliciting future contracts for project construction and program operations, consider including in the FEIS, and adopting in the ROD, the following additional requirements:

a) Soliciting bids that include use of energy- and fuel-efficient fleets;
b) Giving preference to construction bids that use Best Available Control Technology, particularly those seeking to deploy zero emission technologies;
c) Requiring that contractors ensure to the extent possible that construction activities utilize grid-based electricity and/or onsite renewable electricity generation rather than diesel and/or gasoline powered generators.
d) Employing the use of alternative fueled vehicles;
e) Using lighting systems that are energy efficient, such as LED technology;
f) Using the minimum feasible amount of GHG-emitting construction materials that is feasible;
g) Use of cement blended with the maximum feasible amount of flash or other materials that reduce GHG emissions from cement production;
h) Use of lighter-colored pavement where feasible;
i) Recycling construction debris to maximum extent feasible; and,
j) Planting shade trees in or near construction projects where feasible.

Environmental Justice

The Department of Defense is signatory to the August 4, 2011 Memorandum of Understanding on Environmental Justice and Executive Order 12898. In addition to reinforcing the federal government's commitment to environmental justice, the MOU is relevant to actions such as the Clearwater Program through its focus on NEPA and Title VI of the Civil Rights Act. In light of this renewed commitment and focus, we recommend that the Corps consider changes to mitigation measures, as proposed in this letter and by other stakeholders, to avoid or further mitigate the project's adverse impacts. Further efforts to reduce environmental justice impacts could assist local entities that receive Federal funds to meet their potential obligations under Title VI of the Civil Rights Act.

The Environmental Justice analysis in the DEIS only analyzes impacts that were determined to be significant and unavoidable (p. 15-27). The EJ analysis concludes that, because the significant and unavoidable air quality impacts that would occur as a result of NOx emissions during construction of the Clearwater Program are regional emissions, the emissions would not result in adverse effects on minority and low-income populations, as the impacts on the reference community (Los Angeles County) and the affected community would be the same (p. 15-28). Because of the limitations of the EJ analysis, neither localized emissions from the project nor cumulative impacts are discussed in the EJ analysis.

The DEIS does note that the JWPCP West Shaft Site (proposed under Alternative 4) study area has a greater presence of minority and low-income populations in comparison to the reference community (p. 15-46). Additionally, sensitive receptors are located only 105 ft from the West Shaft

site (Figure 5-11), and numerous homes are located within a few hundred feet. The communities in the study area, and the local communities nearby, are already heavily impacted by air emissions[4], a condition likely to be exacerbated by the many projects currently planned at and around the Ports of Los Angeles and Long Beach, such as the Corps' Pier S and American President Lines' container terminal projects, the Southern California International Gateway, and perhaps the expansion of Interstate 710. Therefore, all impacts, even seemingly small ones, are important to consider and mitigate in order to fully offset the adverse project-related impacts to the local community.

There is a growing body of evidence that environmental justice communities are more vulnerable to pollution impacts than other communities[5]. As discussed in EPA's *Framework for Cumulative Risk*[6] and *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria*[7] *(July 2008),* disadvantaged, underserved, and overburdened communities are likely to come to the table with pre-existing deficits of both a physical and social nature that make the effects of environmental pollution more, and in some cases, unacceptably, burdensome. Thus, certain subpopulations may be more likely to be adversely affected by a given stressor than is the general population.

As stated by the Council on Environmental Quality[8], the identification of disproportionately high and adverse human health or environmental effects on a low-income or minority population does not preclude a proposed agency action from going forward nor compel a finding that a proposed project is environmentally unacceptable. Instead, the identification of such effects is expected to encourage agency consideration of alternatives, mitigation measures, monitoring needs, and preferences expressed by the affected community or population.

Recommendations:
Given the magnitude of potential cumulative health impacts, the FEIS should consider all feasible mitigation strategies, monitoring measures, and the preferences expressed by the local community. Examples of mitigation measures that should be considered to reduce the community's exposure and reduce community vulnerability are:

- Fund proactive measures to improve air quality and general health in neighboring homes, schools, and other sensitive receptors;
- Provide public education programs about environmental health impacts to better enable residents to make informed decisions about their health and community;
- Engage in proactive measures to train and hire local residents for construction or operation of the project to improve their economic status and access to health care; and,
- Expand and improve the local community parks and recreation system in areas where air quality is highest, in order to provide increased access to open space and exercise opportunities.

As an element of the Corps' Pier S project, the proponent, the Port of Long Beach, offered grant funds for impacts that could not be fully mitigated. We recommend that the Corps and

[4] Final Report, Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES-III, September 2008, South Coast Air Quality Management District.
[5] Symposium on the Science of Disproportionate Environmental Health Impacts, March 17 - 19, 2010, see the fourteen scientific reviews commissioned by EPA and published in the American Journal of Public Health at: http://www.epa.gov/compliance/ej/multimedia/albums/epa/disproportionate-impacts-symposium.html.
[6] Available at: http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=54944.
[7] Available at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=194645#Download.
[8] Environmental Justice Guidance Under the National Environmental Policy Act, Council on Environmental Quality, 10 December 1997.

Districts consider establishing a similar program to facilitate implementation of the above and/or other mitigation measures, and discuss this in the FEIS.

Children's Environmental Health and Safety

Executive Order 13045 on Children's Health and Safety directs that each Federal agency shall make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, and shall ensure that its policies, programs, activities, and standards address these risks. Analysis and disclosure of these potential effects under NEPA is necessary because some physiological and behavioral traits of children render them more susceptible and vulnerable than adults to health and safety risks. Children may be more highly exposed to contaminants than are adults because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Also, children's normal activities, such as putting their hands in their mouths or playing on the ground, can result in higher exposures to contaminants as compared with adults. Children may be more vulnerable to the toxic effects of contaminants because their bodies and systems are not fully developed and their growing organs are more easily harmed.

Based on current EPA policy and guidance, an analysis of impacts to children should be included in a NEPA analysis if there is a possibility of disproportionate impact on children related to the proposed action.[9] EPA views childhood as a sequence of life stages, from conception through fetal development, infancy, and adolescence. Therefore, exposures to children at each life stage, as well as to pregnant and nursing women, are relevant and should be considered when addressing health and safety risks for children.

Chapter 5 of the DEIS discusses air quality impacts and uses the SCAQMD Localized Significance Threshold Methodology to assess localized air quality impacts from construction activities. Table 5-21 provides approximate distances of proposed construction sites to nearest non-resident sensitive receptors.

Recommendations:
In addition to considering schools and convalescent homes as non-resident sensitive receptors, the FEIS should discuss and update analyses to include child care facilities as non-resident sensitive receptors when assessing localized air quality impacts from construction activities.

The FEIS should describe the specific location for all staging areas to be used during construction at each shaft site, and confirm that these locations would result in the least environmental impacts and disruption to sensitive receptors, including schools and child care centers. The FEIS should also consider smaller footprints for the proposed shaft sites and construction schedules that would minimize impacts to such sensitive receptors.

Please also identify measures to reduce identified impacts, including measures identified in the recently released Draft Schools Environmental Health Guidelines for reducing exposure of environmental hazards near schools.
http://www.epa.gov/schools/ehguidelines/index.html.

[9] U.S. EPA. April 4, 1996. Memorandum: Interim OFA Program Guidance on Implementing the EPA Policy on Evaluating Health Risks to Children. Available at: http://www.epa.gov/compliance/resources/policies/nepa/children-health-risks-pg.pdf.

Chapter 5 states that construction-related air pollution emissions would be reduced with the implementation of mitigation measures; however, construction-related emissions of NO_x would continue to exceed the SCAQMD significance threshold and have an incremental regional air quality effect. Research has linked short-term NO_2 exposures with adverse respiratory effects, including airway inflammation in healthy people and increased respiratory symptoms in people with asthma.[10] Children may be more susceptible to air pollution and experience higher exposures than adults. According to the 2007 Los Angeles County Health Survey, 9.5% of children less than 18 years old who live in the Los Angeles County South Bay Service Planning Area (also known as SPA 8) currently have asthma or had an asthma attack in the preceding 12 months.[11]

> *Recommendation:*
> The FEIS should discuss current rates of asthma in the study area and how construction-related air emissions may impact children's health.

Chapter 10 states that aerially deposited lead and asbestos may be present in surface soils at the JWPCP East, JWPCP West, and TraPac shaft sites. Residences have been identified near these shaft sites and a school was identified as being located near the JWPCP East shaft site. It is unclear whether soil screening has been completed or will be conducted prior to construction to assess the levels of lead and asbestos in surface soil.

> *Recommendation:*
> The FEIS should discuss whether activities have or will be completed to characterize potential surface soil contamination at these sites prior to excavation.

Palos Verdes Shelf Superfund Site

The preferred alternative would not require new outfalls and, as a result, should avoid impacts to the Palos Verdes DDT Superfund Site. While we are pleased this alternative would address many of the concerns we previously raised through our scoping comments and during our in person meetings pertaining to the Superfund site, the current alternatives analysis does not sufficiently characterize the impacts to the Palos Verdes DDT Superfund Site under each alternative, nor how such information was used to support selection of the preferred alternative.

> *Recommendations:*
> The "Description of Alternatives" (p. 3-4), in the FEIS, should include avoidance and impact minimization of the Palos Verdes Shelf Superfund Site as one of the screening criteria.
>
> The FEIS should include a discussion on how the construction, operation, rehabilitation and maintenance activities under each alternative would impact the Palos Verdes Shelf Superfund Site and identify any potentially necessary remedial actions.
>
> The FEIS should discuss potential environmental effects due to disturbance of DDT contaminated sediments that could result from effluent discharge and changes in currents as a result of the JWPCP outfall. A discussion of modeling and monitoring results used to determine environmental effects should also be included.

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[10] U.S. Environmental Protection Agency. Nitrogen Dioxide: Health, last updated on July 6, 2011, http://www.epa.gov/airquality/nitrogenoxides/health.html.

[11] 2007 Los Angeles County Health Survey. Office of Health Assessment and Epidemiology, Los Angeles County Department of Public Health.

The FEIS should evaluate the alternatives with recognition that two of the offshore tunnel alignments have the potential to cause unavoidable, but mitigable, impacts to the Palos Verdes Superfund Site.

The FEIS should amend Chapter 10 - Hazardous Material – to discuss contaminated sediment at the Palos Verdes Shelf Superfund Site and disclose that two of the proposed offshore tunnel alignments terminate on Palos Verdes Shelf Superfund Site.

Please include the extent of DDT and PCB contamination as recorded in 2007[12] on Figure 13-4, and indicate the location of the proposed existing outfall rehabilitation activities.

The FEIS should acknowledge in Chapter 2 that the Districts entered into a Consent Decree in 1997 with EPA to address the DDT and PCB contaminations on the Palos Verdes Shelf.

We were pleased to note that rehabilitation work on the existing outfalls will be limited to depths between 20 and 50 ft below the water's surface. While we believe this should avoid potentially contaminated sediments and not interfere with the proposed CERLCA remedy[13], we recommend the FEIS and ROD include Best Management Practices to ensure minimum disturbance to sediments and marine habitats.

Recommendations:
EPA expects the proposed CERCLA remedy (sediment cap for the Palos Verdes Superfund site) will be implemented by 2018, prior to the proposed construction start date for offshore diffusers and risers and existing outfall rehabilitation. The FEIS and ROD should include commitments from the Corps and the Districts to coordinate with EPA during design and construction to ensure the selected alternative will not interfere with Superfund remediation activities.

In the FEIS, for each alternative, as part of the discussion on the existing outfall rehabilitation, off-shore tunneling and riser/diffuser construction:

- Include potential impacts from the construction and rehabilitation activities (e.g. ballasting work) to the proposed CERLCA remedy.
- Propose avoidance measures to minimize impacts from the construction and rehabilitation activities to the proposed CERCLA remedy.
- Propose mitigation measures to mitigate unavoidable impacts to the CERCLA remedy.
- Include a commitment to notify and coordinate with EPA if the proposed outfall rehabilitation activities occur beyond the 50 feet isobath.

Clean Water Act Section 404

The preferred alternative identified in the Corps' DEIS and February 13, 2012 Public Notice would avoid and minimize the impacts to aquatic resources described for Alternatives 1-3, including impacts associated with dredging and sediment disposal and fill from new outfall construction.

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[12] In October, 2007 EPA issued the Final Palos Verdes Superfund Site Remedial Investigation Report. The Remedial Investigation Report contains EPA's last published characterization of the PV Shelf PCB and DDT contamination.

[13] Interim Record of Decision, Palos Verdes Shelf Operable Unit 5 of Montrose Chemical Corporation Superfund Site, Los Angeles County, California, September 2009.

Because of the degree to which project impacts would be avoided and minimized, EPA supports the identification of Alternative 4 as the preferred alternative. We will provide our comments on the Public Notice in a separate letter; but, preliminarily, EPA considers Alternative 4 to be the least environmentally damaging practicable alternative (LEDPA) that will achieve the overall project purpose.

The DEIS states that, in 2008, 150 acres of kelp were reported in the White Point area, but it is not clear whether the project would result in any impacts to this specific habitat. Kelp forest and kelp bed are highly productive aquatic habitats providing areas for spawning, foraging and refuge for several marine species. These habitats can also provide physical buffers that can attenuate wave energy, reducing damage to coastal environments.

> *Recommendation:*
> The FEIS should more accurately describe locations of kelp forest and/or kelp bed in proximity to the proposed project activities, clearly state whether the proposed project is expected to have any direct or indirect impacts to kelp, and, if so, how impacts will be avoided, minimized, and/or mitigated consistent with the CWA 404(b)(1) Guidelines.

It is unclear to what extent sediment disturbance, during construction of the preferred alternative, could result in increased turbidity and exposure of contaminated sediments. Based on the project description for Alternative 4, some ballast rock would be temporarily removed from the outfall pipes to expose the joints so that couplings and concrete or epoxy can be installed. EPA assumes that the entire circumference of the pipe would need to be exposed around each joint to complete this operation. If so, there is potential to disturb bottom sediments at several locations along the three outfalls.

> *Recommendation:*
> While it is expected that turbidity will be localized and temporary, it would be helpful to include additional language in the FEIS better describing the approximate number of locations where outfall joint rehabilitation will occur, and an estimate of the volume of bottom sediments that could be disturbed. This additional information would better inform whether additional sediment sampling and BMPs would be appropriate to prevent the redistribution of contaminated sediments, control turbidity, and protect aquatic organisms in proximity to the project.

Cumulative Impacts

The Council on Environmental Quality's regulations for implementing NEPA define cumulative effects as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR Part 1508.7).

The cumulative impact analysis provided in the DEIS does not fully assess and quantify cumulative impacts associated with the project. The DEIS includes a map of 'cumulative projects' in the vicinity of the project (Figure 21-1). It appears that the list of 'cumulative projects' was provided without being incorporated into an analysis of what additional impact to resources those projects may have when also considered with the Clearwater project.

For air quality, the cumulative impacts analysis indicates that, after mitigation, the incremental effect on cumulative air quality impacts for NO_x during construction for Alternatives 1 through 4 would be significant and unavoidable. The cumulative impacts analysis does not discuss other key

pollutants of concern, such as VOCs, PM_{10} and $PM_{2.5}$. As stated earlier, the cumulative air quality impacts of the proposed project are of concern to EPA; however, the degree of impact cannot be determined without a quantification of emissions of specific pollutants as was done for air quality impacts assessed in Chapter 5. This lack of quantified cumulative emissions leaves the reader uncertain as to how significant these cumulative impacts could be.

Recommendations:
The FEIS should update the list of cumulative impact projects and, in tabular format, summarize each project's current status, proximity to, and anticipated schedule overlap with the proposed project. It is critical to understand the full scope of the construction and timing of operation for the multiple ongoing projects in order to assess potential cumulative impacts.

The FEIS should include a quantification of cumulative emissions from the project and, at a minimum, other nearby goods movement projects, including terminal expansion projects at the Ports of Los Angeles and Long Beach, nearby proposed intermodal facilities and freeway expansion projects (e.g. the I-710), where emissions have already been quantified. Results should be provided in tabular format.

Discuss, in the FEIS, whether there are projects that, if all constructed at the same time, would heavily burden specific communities (with regard to construction impacts). Discuss whether there are measures that could be adopted, such as staging construction, so as not to overly-impact one community.

Noise Impacts

Chapter 14 discusses noise and vibration impacts from program and project construction. Noise sensitive receptors were identified near the shaft sites and the DEIS includes noise mitigation measures that will be implemented. Mitigation measure MM NOI-4b states that a complaint/response tracking program will be initiated prior to constriction, and a construction schedule will be made available to residents living near construction areas.

Recommendation:
The FEIS and ROD should include a commitment to provide the construction schedule and contact information of the noise disturbance coordinator to affected sensitive receptors, including schools and child care facilities, that are in the vicinity of construction areas.

Physical Safety

The DEIS states that access to the shaft sites will be controlled through the use of fencing and controlled access locations (p. 10-29). The 40 to 60 ft diameter JWPCP West Shaft Site and the 25 to 35 ft diameter Royal Palms Shaft Site could pose a risk of physical injury to anyone who enters the area unsupervised and without permission. Truck traffic, due to construction activities, is also expected to increase in the vicinity of the shaft sites.

Recommendations:
The FEIS and ROD should include a commitment to ensure signs are posted along the fence line that clearly communicate the danger of entering this area, especially at shaft sites that have nearby residences, schools, child care facilities, and parks.

The FEIS and ROD should include a commitment to ensure schools, child care facilities, and/or residences are notified of increased truck traffic, once truck routes are established for program and project elements.

Highter, Steve

From: Allen, Aaron O SPL <Aaron.O.Allen@usace.army.mil>
Sent: Tuesday, April 10, 2012 8:00 AM
To: Wong, Kenneth SPL; Highter, Steve
Subject: FW: SDLAC Clearwater PN, SPL-2008-0087-AOA (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

See USEPA comments below:

-----Original Message-----
From: Paul Amato [mailto:Amato.Paul@epamail.epa.gov]
Sent: Tuesday, April 10, 2012 7:35 AM
To: Allen, Aaron O SPL
Cc: Jason Brush; Allan Ota; Thomas Plenys
Subject: SDLAC Clearwater PN, SPL-2008-0087-AOA

Hi Aaron,

The following comments are provided for your consideration and are essentially a repeat of our comments on the DEIS for the subject project.

Alternative 4, identified as the preferred alternative in the Corps' February 13, 2012 Public Notice, would avoid and minimize the impacts to aquatic resources described for Alternatives 1-3, including impacts associated with dredging and sediment disposal and fill from new outfall construction. Because of the degree to which project impacts would be avoided and minimized, EPA supports the identification of Alternative 4 as the preferred alternative and preliminarily EPA considers Alternative 4 to be the least environmentally damaging practicable alternative (LEDPA) that will achieve the overall project purpose.

Though not mentioned in the PN, the DEIS states that in 2008, 150 acres of kelp were reported in the White Point area; however it is not clear whether the project would result in any direct or indirect impacts to this specific habitat. Kelp forest and kelp bed are highly productive aquatic habitats providing areas for spawning, foraging and refuge for several marine species. These habitats can also provide physical buffers that can attenuate wave energy, reducing damage to coastal environments. Potential project impacts to kelp beds and forest should be assessed and avoided if they have the potential to occur.

It is unclear to what extent sediment disturbance, during construction of the preferred alternative, could result in increased turbidity and exposure of contaminated sediments. Based on the project description for Alternative 4, some ballast rock would be temporarily removed from the outfall pipes to expose the joints so that couplings and concrete or epoxy can be installed. EPA assumes that the entire circumference of the pipe would need to be exposed around each joint to complete this operation. If so, there is potential to disturb bottom sediments at several locations along the three outfalls. While it is expected that turbidity will be localized and temporary, it would be helpful to provide an estimate of the volume of bottom sediments that could be disturbed, This additional information would better inform whether additional sediment sampling and BMPs are appropriate to prevent the redistribution of contaminated sediments, control turbidity, and protect aquatic organisms in proximity to the project.

Please feel free to contact me directly to discuss any of the above comments.

Paul

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Classification: UNCLASSIFIED
Caveats: NONE

Highter, Steve

From: Pompa, Syndi <Syndi.Pompa@conservation.ca.gov>
Sent: Tuesday, April 10, 2012 3:59 PM
To: Highter, Steve
Subject: Clearwater Program SCH 2008101074

Mr. Highter,

I did some research on what we may have done in the past with this issue, and it looks like we commented during the NOP/NOI phase in October of 2008. I found our comment letter in Appendix 1-B.

What was said then, would be the same thing I would say now, so I'm not going to comment on this Draft EIR.

You are aware of our concerns.

Thank you for making available your draft EIR, for the Clearwater Program, to review.

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October 17, 2008

Mr. Steven W. Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601

Subject: Notice of Preparation of an Environmental Impact Report for the Clearwater Program Master Facilities Plan

Dear Mr. Highter:

The Department of Conservation's (Department) Division of Oil, Gas, and Geothermal Resources (Division) has reviewed the above referenced project. The Division supervises the drilling, maintenance, and plugging and abandonment of oil, gas, and geothermal wells in California.

The proposed project is located within the administrative boundaries of the Torrance and Wilmington oil field. There are numerous active, idle, plugged and abandoned wells within or in proximity to the project boundaries. The wells are identified on Division maps 126, 128, W1-6 and in Division records. The Division recommends that all wells within or in close proximity to project boundaries be accurately plotted on future project maps.

Building over or in the proximity of idle or plugged and abandoned wells should be avoided if at all possible. If this is not possible, it may be necessary to plug or re-plug wells to current Division specifications. Also, the State Oil and Gas Supervisor is authorized to order the reabandonment of previously plugged and abandoned wells when construction over or in the proximity of wells could result in a hazard (Section 3208.1 of the Public Resources Code). If abandonment or reabandonment is necessary, the cost of operations is the responsibility of the owner of the property upon which the structure will be located. Finally, if construction over an abandoned well is unavoidable an adequate gas venting system should be placed over the well.

Furthermore, if any plugged and abandoned or unrecorded wells are damaged or uncovered during excavation or grading, remedial plugging operations may be required. If such damage or discovery occurs, the Division's district office must be contacted to obtain information on the requirements for and approval to perform remedial operations.

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To ensure proper review of building projects, the Division has published an informational packet entitled, "Construction Project Site Review and Well Abandonment Procedure" that outlines the information a project developer must submit to the Division for review. Developers should contact the Division's Cypress district office for a copy of the site-review packet. The local planning department should verify that final building plans have undergone Division review prior to the start of construction.

Thank you for the opportunity to comment on the Notice of Preparation. If you have questions on our comments, or require technical assistance or information, please call me at the Cypress district office: 5816 Corporate Avenue, Suite 200, Cypress, CA 90630-4731; phone (714) 816-6847.

Sincerely,

Paul Frost

Paul Frost

Associate Oil & Gas Engineer

Division of Oil, Gas and Geothermal Resources
District 1

cc: State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

Linda Campion – Headquarters
Sacramento

Northwest San Pedro Neighborhood Council

"Your Community Voice"

Diana Nave
President

John Mavar
Vice President

Craig Goldfarb
Treasurer

Cynthia Gonyea
Secretary

April 10, 2012

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601
shighter@lacsd.org

RE: DEIR for Proposed Clearwater Project

Please accept the attached comments from the Northwest San Pedro Neighborhood Council with regard to the DEIR for the proposed Clearwater Project. At our governing board meeting on April 9, the Northwest San Pedro Neighborhood Council unanimously passed the attached resolution opposing Alternative 4 and supporting Alternative 1. The primary concerns of the council members and the community with regard to Alternative 4 are the proximity to the White Point Landslide and to the earthquake fault, which in 1933 caused the closure of the White Point/Royal Palms thermal pools. The resolution goes on to enumerate steps that should be taken in the event that the Districts decide to move forward with Alternative 4.

Thank you for your consideration of these comments.

Diana Nave, President
Northwest San Pedro Neighborhood Council

Cc: Councilmember Joe Buscaino
Aaron Allen, USACE

638 S. Beacon Street Box 688 ● San Pedro, CA 90731 ● (310)-732-4522
www.nwsanpedro.org

638 S. Beacon Street Box 688 ● San Pedro, CA 90731 ● (310)-732-4522
www.nwsanpedro.org

Northwest San Pedro Neighborhood Council
Sanitation Districts of Los Angeles County
Clearwater Program

Whereas, The Sanitation Districts of Los Angeles County's (the District's) have prepared a Draft Environmental Impact Report (DEIR) for the Clearwater Program which includes a third effluent treated water line from its Carson Plant to discharge off the coast of San Pedro; and

Whereas, four tunnel alignment alternatives were studied as part of the DEIR with Alternative 4 being chosen as the preferred option primarily based on cost. Alternative 4 is the only alternative that utilizes the existing ocean outfall infrastructure instead of additional tunneling and construction beneath the sea floor through the use of vertical shaft at Royal Palms Beach.

Whereas, the Alternative 4 of the Clearwater project will be tunneled under streets in Northwest San Pedro primarily Gaffey Street, Capital Drive, Western Avenue, and Dodson Avenue.

Whereas, the Clearwater project's Alternative 4 shaft site at Royal Palms will be used to tie in the existing ocean outfall infrastructure with the new treated effluent pipeline and remove the tunnel boring machine. Soil from the tunneling will be removed at the Carson shaft site. Shaft construction at the Royal Palms site will last between 6–9 months with approximately 10 to 40 trucks (maximum) per day leaving the site with soil. The onsite interconnection work will take approximately 18 months and the shaft will become a permanent structure at Royal Palms following completion of the tunneling project.

Whereas, Alternative 4, as proposed, has the following potentially harmful impacts on the environment and Northwest San Pedro;

- Potential for the Royal Palms Shaft site to initiate a landslide or ground failure in the surrounding cliffs due to the shaft construction.

- Construction truck traffic and noise impacts to the residents of Northwest San Pedro related to the construction of the Royal Palms Shaft site.

- The potential for a catastrophic failure of all treated effluent tunnels, existing and the proposed tunnel from Alignment 4, due to the proximity of all tunnels to the seismic zones along the Western Avenue route.

- Degradation of the aesthetics of Royal Palm Beach due to the construction of the shaft site and continued use of the site after construction has been completed.

Whereas Alternative 1 would not have many of these negative impacts,

Therefore, the Northwest San Pedro Neighborhood Council opposes the recommendation for Alternative 4 and recommends Alternative 1;

However, should the District decide to proceed with Alternative 4, we provide the following mitigations and studies to be performed prior to, and during construction:

- The District's should perform a detailed geotechnical study of the Royal Palms shaft site to provide a detailed understanding of the slope stability in the area. Details from this geotechnical study should be used to make specific recommendations to mitigate potential slope instability that may be caused by the shaft construction.

- Should the Royal Palms Site be used the surrounding slopes should be instrumented and monitored in prior to, during, and after construction of the shaft site.

- Modify MM AQ-3a (on-road heavy-duty diesel trucks), MM AQ-3b (off-road diesel-powered equipment), to require use of best available control technology/latest emissions-reduction technology, as soon as Air Resources Board (ARB) certified if applicable, regardless of Year or Tier stated.

- Modify MM AQ-3d to require use of construction equipment and heavy-duty trucks that use alternative fuels as soon as the equipment/fuels are ARB Certified.

- Modify MM AQ-3e to define periods when routing equipment away from congested streets and/or sensitive receptors is not feasible or remove the qualification "as feasible."

- Modify MM NOI-1a (Noise) to require that all equipment used within 500 feet of residential areas be equipped with best available control technology specifically designed for noise reduction.

- Provide specific Truck Trips projections and daily truck trip quantities from the Royal Palm Shaft site.

- Develop an alternative that includes car pooling to reduce the Passenger Car Equivalent trips per day during shaft-site construction and manifold construction.

Adopted April 9, 2012

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

E-MAILED: April 19, 2012

Mr. Steven W. Highter, Supervising Engineer, shighter@lacsd.org
Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) for the Proposed Clearwater Program Project

The South Coast Air Quality Management District (AQMD) appreciates the opportunity to comment on the above-mentioned document, including with an extended review period. The following comments are meant as guidance for the Lead Agency and should be incorporated into the Final CEQA/NEPA document.

In the project description, the lead agency proposes the Clearwater Program, a comprehensive plan to develop the Master Facilities Plan (MFP) for the Joint Outfall System (JOS). The JOS is a regional wastewater management system that meets the needs of communities and business in 73 cities and unincorporated areas of Los Angeles County. The proposed project would include excavation and soil export from the construction of a new approximately 7–mile tunnel that would convey treated wastewater from the Joint Water Pollution Control Plant (JWPCP) to the ocean outfalls. Construction would also include repair work on two existing effluent tunnels that are about six miles long and an expansion to the existing San Jose Water Reclamation Plant in Whittier to increase production of recycled water. The proposed project would also include planning to increase the number of anaerobic digesters at the JWPCP to process residual solids that can be converted into biosolids for future uses. Construction is estimated to begin in 2015 and last up to six years. Operations are expected to begin in 2021.

Based on the project description, the lead agency should contact AQMD engineering and compliance staff for input concerning activities that may require AQMD permits. Permit applications to construct/operate will be required for the modifications at five Water Reclamation Plants and the Joint Water Pollution Control Plant. In addition, the San Jose Creek Water Reclamation Plant expansion would require compliance with New Source Review and Rule 1401 - New Source Review of Toxic Air Contaminants requirements due to emission increases from the additional wastewater treatment capacity. Questions concerning permit requirements can be directed to engineering and compliance staff at (909) 396-2684.

Please provide the AQMD with a written response to the comments contained herein prior to the adoption of the final environmental document. The AQMD staff is available to work with the Lead Agency to address these issues and any other air quality questions that may arise. Please contact Gordon Mize, Air Quality Specialist – CEQA Section, at (909) 396-3302, if you have any questions regarding these comments.

Sincerely,

Ian MacMillan
Program Supervisor, Inter-Governmental Review
Planning, Rule Development & Area Sources

IM:CT:GM

SBC120230-01
Control Number

Highter, Steve

From: Emilio M. Murga <emmurga@sogate.org>
Sent: Tuesday, April 24, 2012 12:04 PM
To: Highter, Steve
Cc: Mohammad Mostahkami
Subject: City of South Gate Comments, Clearwater Program Draft Environmental Report

Mr. Steven W. Highter,
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County

This email is is response to the Public Notice of Availability, Clearwater Program Draft Environmental Impact Report.

We regret to have missed the deadline of April 10, 2012, but nevertheless we reviewed the Draft Environmental Impact Report.

We request that recycle water lines be extended through the City of South Gate arterial and collector streets, to serve the various parks, shopping centers with substantial landscaped areas and industrial areas throughout the City.

Thank you for your consideration.

Please call me if you have any questions.

Sincerely,

Emilio M. Murga
Assistant City Engineer
City of South Gate
Office: 323 563-9582
Cell: 323 595-9129

_____ Information from ESET NOD32 Antivirus, version of virus signature database 7083 (20120424)
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The message was checked by ESET NOD32 Antivirus.

http://www.eset.com

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

May 25, 2012

Steven W. Highter
Los Angeles County
Sanitation Districts
1955 Workman Mill Road
Whittier, CA 90601

Subject: Clearwater Program Master Facilities Plan
SCH#: 2008101074

Dear Steven W. Highter:

The enclosed comment (s) on your Draft EIR was (were) received by the State Clearinghouse after the end of the state review period, which closed on March 26, 2012. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (2008101074) when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

REC'D LACSD
MAY 31 '12 AM 9:59

DOC #

Highter S

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

MAY 23 2012

Mr. John Kilgore
Los Angeles County Sanitation District
1955 Workman Mill Road
P.O. Box 4998
Whittier, CA 90607

Dear Mr. Kilgore:

CLEARWATER PROGRAM DRAFT ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL IMPACT STATEMENT (EIR/EIS) FOR THE LOS ANGELES COUNTY SANITATION DISTRICT (DISTRICT) AND THE UNITED STATES ARMY CORPS OF ENGINEERS (USACE); JOINT OUTFALL SYSTEM IMPROVEMENTS (PROJECT); LOS ANGELES COUNTY (COUNTY); STATE CLEARINGHOUSE NO. 2008101074

We understand the District is pursuing Clean Water State Revolving Fund (CWSRF) financing for this Project. As a funding agency and a State agency with jurisdiction by law to preserve, enhance, and restore the quality of California's water resources, the State Water Resources Control Board (State Water Board) is providing the following information on the EIR/EIS for the Project. The District is the lead agency under the California Environmental Quality Act (CEQA) and the USACE is the lead National Environmental Policy Act (NEPA) and jointly prepared an EIR/EIS.

Please provide us with the following documents applicable to the proposed Project following the District and the USACE CEQA and NEPA processes: (1) one copy of the draft and final EIR/EIS, (2) the District's resolution certifying the EIR/EIS and making CEQA findings, (3) all comments received during the review period and the District's and USACE's response to those comments, (4) the adopted Mitigation Monitoring and Reporting Program (MMRP), (5) the Notice of Determination filed with the Los Angeles County Clerk and the Governor's Office of Planning and Research, State Clearinghouse, and (6) the USACE Record of Decision. In addition, we would appreciate notices of any hearings or meetings held regarding environmental review of any projects to be funded by the State Water Board.

The State Water Board, Division of Financial Assistance, is responsible for administering the CWSRF Program. The primary purpose for the CWSRF Program is to implement the Clean Water Act and various state laws by providing financial assistance for wastewater treatment facilities necessary to prevent water pollution, recycle water, correct nonpoint source and storm drainage pollution problems, and provide for estuary enhancement, and thereby protect and promote health, safety and welfare of the inhabitants of the state. The CWSRF Program provides low-interest funding equal to one-half the most recent State General Obligation Bond Rates with a 20-year term. Applications are accepted and processed continuously. Please refer to the State Water Board's CWSRF website at www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/index.shtml.

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The CWSRF Program is partially funded by the United States Environmental Protection Agency and requires additional "CEQA-Plus" environmental documentation and review. Four enclosures are included that further explain the CWSRF Program environmental review process and the additional federal requirements. The State Water Board is required to consult directly with agencies responsible for implementing federal environmental laws and regulations. Any environmental issues raised by federal agencies or their representatives will need to be resolved prior to State Water Board approval of a CWSRF financing commitment for the proposed Project. For further information on the CWSRF Program, please contact Mr. Ahmad Kashkoli, at (916) 341-5855.

It is important to note that prior to a CWSRF financing commitment, projects are subject to provisions of the Federal Endangered Species Act (ESA), and must obtain Section 7 clearance from the United States Department of the Interior, Fish and Wildlife Service (USFWS), and/or the United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) for any potential effects to special status species. Please be advised that the State Water Board will consult with USFWS, and/or NMFS regarding all federal special status species the Project has the potential to impact if the Project is to be funded under the CWSRF Program. The District will need to identify whether the Project will involve any direct effects from construction activities or indirect effects, such as growth inducement, that may affect federally listed threatened, endangered, or candidate species that are known, or have a potential to occur on-site, in the surrounding areas, or in the service area, and to identify applicable conservation measures to reduce such effects.

In addition, CWSRF projects must comply with federal laws pertaining to cultural resources, specifically Section 106 of the National Historic Preservation Act. The State Water Board has responsibility for ensuring compliance with Section 106 and the State Water Board's Cultural Resources Officer (CRO) must consult directly with the California State Historic Preservation Officer (SHPO). SHPO consultation is initiated when sufficient information is provided by the CWSRF applicant. If the City decides to pursue CWSRF financing, please retain a consultant that meets the Secretary of the Interior's Professional Qualifications Standards (www.cr.nps.gov/local-law/arch_stnds_9.htm) to prepare a Section 106 compliance report.

Note that the District will need to identify the Area of potential Effects (APE), including construction and staging areas and the depth of any excavation. The APE is three-dimensional and includes all areas that may be affected by the Project. The APE includes the surface area and extends below ground to the depth of any Project excavations. The records search request should be made for an area larger than the APE. The appropriate area varies for different projects but should be drawn large enough to provide information on what types of sites may exist in the vicinity.

Please contact the CRO, Ms. Cookie Hirn, at (916) 341-5690, to find out more about the requirements, and to initiate the Section 106 process.

Other federal requirements pertinent to the Project under the CWSRF Program include the following:

A. Compliance with the federal Clean Air Act: (a) Provide air quality studies that may have been done for the Project; and (b) if the Project is in a nonattainment area or attainment area subject to a maintenance plan; (i) provide a summary of the estimated emissions (in tons per year) that are expected from both the construction and operation of the Project for each federal criteria pollutant in a nonattainment or maintenance area, and indicate if the nonattainment designation is moderate, serious, or severe (if applicable); (ii) if emissions are above the federal de minimis levels, but the Project is sized to meet only the needs of current population projections that are used in the approved State Implementation Plan for air quality, quantitatively indicate how the proposed capacity increase was calculated using population projections.

B. Compliance with the Coastal Zone Management Act: Identify whether the Project is within a coastal zone and the status of any coordination with the California Coastal Commission.

C. Protection of Wetlands: Identify any portion of the proposed Project area that should be evaluated for wetlands or United States waters delineation by the USACE, or require a permit from the USACE, and identify the status of coordination with the USACE.

D. Compliance with the Farmland Protection Policy Act: Identify whether the Project will result in the conversion of farmland. State the status of farmland (Prime, Unique, or Local and Statewide Importance) in the Project area and determine if this area is under a Williamson Act Contract.

E. Compliance with the Migratory Bird Treaty Act: List any birds protected under this act that may be impacted by the Project and identify conservation measures to minimize impacts.

F. Compliance with the Flood Plain Management Act: Identify whether or not the Project is in a Flood Management Zone and include a copy of the Federal Emergency Management Agency flood zone maps for the area.

G. Compliance with the Wild and Scenic Rivers Act: Identify whether or not any Wild and Scenic Rivers would be potentially impacted by the Project and include conservation measures to minimize such impacts.

Following are specific comments on the District's and USACE's Draft EIR/EIS:

1. Please include copies of consultation correspondences and approval documents (Clean Water Act [CWA] Section 401 Water Quality Certification and CWA Section 404 USACE Permit, California Department of Fish and Game 1600 Lake and Streambed Alteration Agreement, Coastal Development Permit, Biological Opinion's, Section 106 with the SHPO), and any associated Biological Assessments and supporting documents, along with your CWSRF Application.

2. For environmental impacts that will result in a significant and unavoidable impact after mitigation, please prepare a Statement of Overriding Consideration (SOC) with substantial evidence that explains why the District is willing to accept each significant effect. In addition, please include the SOC in the record of Project approval and identify it in the Notice of Determination to be filed upon Project approval [CEQA Guidelines Section 15093 (b) and (c)].

Thank you for the opportunity to review the District's and USACE's Draft EIR/EIS. If you have any questions or concerns, please feel free to contact me at (916) 341-5642, or by email at mdownham@waterboards.ca.gov, or contact Ahmad Kashkoli by email at akashkoli@waterboards.ca.gov.

Sincerely,

Melessia Downham
Environmental Scientist

cc: State Clearing House
(Re: SCH# 2008101074)
P.O. Box 3044
Sacramento, CA 95812-3044

Enclosures (4)

1. SRF & CEQA-Plus
2. Quick Reference Guide to CEQA Requirements for State Revolving Fund Loans
3. Instructions and Guidance for "Environmental Compliance Information"
4. Basic Criteria for Cultural Resources Reports

CLEAN WATER STATE REVOVLING FUND PROGRAM
INSTRUCTIONS AND GUIDANCE FOR
"ENVIRONMENTAL COMPLIANCE INFORMATION"

Introduction:

The State Water Resources Control Board (State Water Board) uses the California Environmental Quality Act (CEQA) review process and compliance with federal environmental laws and regulations to satisfy the environmental requirements of the Clean Water State Revolving Fund (CWSRF) Program Operating Agreement between the United States Environmental Protection Agency (USEPA) and the State Water Board. The CWSRF Program is partially funded by a capitalization grant from the USEPA. The issuance of funds from the CWSRF Program is equivalent to a federal action, and thus, compliance with federal environmental laws and regulations is required for projects being funded under the CWSRF Program.

All CWSRF Program applicants must submit adequate and complete environmental documentation to the State Water Board. Following submittal of an applicant's environmental documents, the State Water Board will review the documents to determine if the information is sufficient to document compliance with the CWSRF Program environmental requirements, including making a determination if consultation with federal authorities is required, and may request additional environmental information, when needed. The State Water Board encourages all applicants to initiate early consultation, so that the State Water Board can better streamline the environmental review process.

CEQA Information:

All projects coming to the State Water Board for funding are considered "projects" under CEQA because of the State Water Board's discretionary decision to approve funding.

Detailed information, including CEQA statutes and guidelines can be found online at the California Natural Resources Agency website at http://ceres.ca.gov/ceqa. A CEQA Process Flowchart that shows interaction points between lead and responsible agencies can be found at http://ceres.ca.gov/topic/env_law/ceqa/flowchart/index.html. In addition, State Water Board environmental staff is available to answer questions about the CEQA process, as well as the CWSRF Program environmental requirements. Please contact your assigned Project Manager at the State Water Board, regarding contact information for the appropriate environmental staff.

CEQA requires full disclosure of all aspects of the project, including impacts and mitigation measures that are not only regulated by state agencies, but also by federal agencies. Early consultation with state and federal agencies in the CEQA process will assist in minimizing changes to the project when funding is being requested from the State Water Board.

The types of CEQA documents that may apply to an applicant's project include one or a combination of the following: 1) Notice of Exemption (NOE); 2) Initial Study and Negative Declaration (ND); 3) Initial Study and Mitigated Negative Declaration (MND) with a Mitigation Monitoring and Reporting Program (MMRP); 4) Environmental Impact Report (EIR) with an MMRP; and/or 5) Addendum, Supplemental and Subsequent ND, MND or EIR. The applicant must determine the appropriate document for its project and submit the supporting information listed under the applicable section of the Environmental Package Checklist for Applicant (Attachment 1), along with a completed copy of the Evaluation Form for Environmental Review and Federal Coordination (Attachment 2). Please submit two copies of all CEQA documents.

The applicant must ensure the CEQA document is specific to the project for which funding is being requested. Program or Master Plan EIRs may not be suitable for satisfying the State Water Board' environmental requirements if these documents are not project-specific. When an applicant uses an Addendum, Supplemental or Subsequent CEQA document for a project, the associated Program or Master Plan EIR must also be submitted, especially if the Addendum, Supplemental or Subsequent CEQA document includes references to pertinent environmental and mitigation information contained in the Program or Master Plan EIR.

If the applicant is using a CEQA document that is older than five years, the applicant must re-evaluate environmental and project conditions, and develop and submit an updated environmental document (such as an Addendum, Supplemental or Subsequent CEQA document) based on the results of that re-evaluation. The updated environmental document must be circulated through the State Clearinghouse for public review. The applicant must adopt the final updated environmental document, including any new identified measures, make CEQA findings, and file a Notice of Determination (NOD) with the local county clerk(s) and the Governor's Office of Planning and Research, State Clearinghouse (State Clearinghouse).

Each applicant, if it is a public agency, is responsible for approving the CEQA documents it uses regardless of whether or not it is a lead agency under CEQA. Non-profit organizations shall only be responsible for approving and ensuring implementation of the applicable project mitigation measures identified in the MMRP. All public agencies applying for CWSRF Program funding shall file either an NOE or an NOD with the State Clearinghouse and the local county clerk(s). Date stamped copies of those notices must be submitted with all the applicable environmental documents.

If the CEQA document was jointly prepared by a federal public governmental agency to satisfy the National Environmental Policy Act (NEPA) requirements, then the applicant must submit the corresponding NEPA documents, including a Finding of No Significant Impact, or a Record of Decision completed by the federal NEPA lead agency.

Federal Information:

In addition to CEQA compliance, the State Water Board is required to document environmental compliance with federal environmental laws and regulations, including:

1. Federal Endangered Species Act (ESA), Section 7:

The United States Department of the Interior, Fish and Wildlife Service (USFWS) and the United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) must be consulted for any project that will have the potential to adversely impact a federal special-status species. The USEPA delegated the State Water Board to act as the non-federal lead for initiating informal Section 7 ESA consultation with the USFWS. The State Water Board will coordinate with the USEPA for projects requiring formal Section 7 ESA consultation with the USFWS and projects that will impact federal special-status fish species under the NMFS jurisdiction. The USFWS and NMFS must provide written concurrence prior to a CWSRF financing agreement. USFWS and NMFS comments may include conservation measures, for which the applicant's CWSRF financing agreement will be conditioned to ensure compliance.

For further information on the federal ESA law, regulation, policy, and notices, go to http://www.fws.gov/endangered/policy/index.html and http://www.nmfs.noaa.gov/pr/laws/esa/. Note that compliance with both the state and federal ESAs is required of projects having the potential to impact state and federal special-status species. Although overlap exists between the state and federal ESAs, there might be additional or more restrictive state requirements. For further information on the state ESA, refer to the California Department of Fish and Game website at http://www.dfg.ca.gov/habcon/cesa/.

2. Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat (EFH):

The Magnuson-Stevens Fishery Conservation and Management Act, as amended, is designed to manage and conserve national fishery resources. EFH consultations are only required for actions that may adversely effect EFH. The applicant needs to determine whether the proposed project may adversely affect EFH. NMFS is responsible for publishing maps and other information on the locations of designated EFH, and can provide information on ways to promote conservation of EFHs to facilitate this assessment. If a project may adversely affect a designated EFH, the applicant must complete an EFH consultation.

The State Water Board will coordinate with the USEPA to request an EFH consultation from the NMFS. NMFS is required to respond informally or in writing. NMFS comments may include conservation measures, for which the applicant's CWSRF financing agreement will be conditioned to ensure compliance. For more information, see the brochure at http://www.nmfs.noaa.gov/sfa/reg_svcs/Council%20stuff/council%20orientation/2007/2007TrainingCD/TabT-EFH/EFH_CH_Handout_Final_3107.pdf.

3. National Historic Preservation Act (NHPA), Section 106:

The NHPA focuses on federal compliance. Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. The Section 106 compliance efforts and reports must be prepared by a qualified researcher that meets the Secretary of the Interior's Professional Qualifications Standards (www.cr.nps.gov/local-law/arch_stnds_9.htm).

In addition, CEQA requires that impacts to cultural and historic resources be analyzed. The "CEQA and Archeological Resources" section from the Governor's Office of Planning and Research CEQA Technical Advice Series states that the lead agency obtains a current records search from the appropriate California Historical Resources Information System Center. Also, to contact the Native American tribes that are culturally affiliated with a project area from the list obtained from the Native American Heritage Commission (NAHC).

The NAHC can be contacted at:

915 Capitol Mall, Room 364
Sacramento, CA 95814
Tele: (916) 653-4082

4. Clean Air Act:

For CWSRF financed projects, we recommend including a general conformity section in the CEQA documents so that another public review process will not be needed, should a conformity determination be required. The applicant should check with its local air quality management district and review the Air Resources Board California air emissions map for information on the State Implementation Plan. For information on the analysis steps involved in evaluating conformity, please contact the State Water Board environmental staff through the assigned Project Manager.

5. Coastal Zone Management Act:

Projects proposing construction in the Coastal Zone will require consultation with either the California Coastal Commission (or the designated local agency with a Local Coastal Program), or the San Francisco Bay Conservation and Development Commission (for projects located in the San Francisco Bay area). The applicant must submit a copy of the approved Coastal Development permit to the State Water Board to satisfy this requirement.

For more information on Coastal Zone Management Act requirements refer to the following agencies websites:

- United States Coastal Zone Boundaries through the NMFS website at http://coastalmanagement.noaa.gov/mystate/docs/StateCZBoundaries.pdf;
- California Coastal Commission website at http://www.coastal.ca.gov/ccatc.html; and/or
- San Francisco Bay Conservation and Development Commission website at http://www.bcdc.ca.gov/.

6. Coastal Barriers Resources Act:

The Coastal Barriers Resources Act is intended to discourage development in the Coastal Barrier Resources System and adjacent wetlands, marshes, estuaries, inlets, and near-shore waters. Since there is no designated Coastal Barrier Resources System in California, no impacts from California projects are expected. However, should the applicant believe there may be impacts to the Coastal Barrier Resources System due to special circumstances, please use the following information as a guide.

During the planning process, the applicant should consult with the appropriate Coastal Zone management agency (e.g., City or County with an approved Local Coastal Program, the California Coastal Commission, or the San Francisco Bay Conservation and Development Commission) to determine if the project will have an effect on the Coastal Barrier Resources System. If the project will have an effect on the Coastal Barrier Resources System, the State Water Board must consult with the appropriate Coastal Zone management agency and the USFWS. Any recommendations from the Coastal Zone management agency and USFWS will be incorporated into the project's design prior to approval of CWSRF financing.

For more information and to ensure that no modifications to Coastal Barrier Resources System have occurred, please visit: http://www.fws.gov/habitatconservation/coastal_barrier.html.

7. Farmland Protection Policy Act:

Projects involving impacts to farmland designated as prime and unique, local and statewide importance, or under a Williamson Act Contract, will require consultation with the United States Department of Agriculture, Natural Resources Conservation Service and/or California Department of Conservation. For more information on the Farmland Protection Policy Act go to http://www.nrcs.usda.gov/programs/fppa, and regarding the Williamson Act Contact go to http://www.consrv.ca.gov/dlrp/lca.

8. Floodplain Management – Executive Order 11988:

Each agency shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities. Before taking an action, each agency shall determine whether the proposed action will occur in a designated floodplain. The generally established standard for risk is the flooding level that is expected to occur every 100 years. If an agency determines or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains.

For further information regarding Floodplain Management requirements, please consult the United States Department of Homeland Security, Federal Emergency Management Agency website at http://www.fema.gov, as well as the USEPA floodplain management Executive Order 11988 at http://www.epa.gov/owow/wetlands/regs/eo11988.html.

9. Migratory Bird Treaty Act (MBTA):

The MBTA restricts the killing, taking, collecting and selling or purchasing of native bird species or their parts, nests, or eggs. The MBTA, along with subsequent amendments to this act, provides legal protection for almost all breeding bird species occurring in the United States and must be addressed under CEQA. In the CEQA document, each agency must make a finding that a project will comply with the MBTA. For further information, please consult the Migratory Bird Program through the USFWS website at http://www.fws.gov/laws/lawsdigest/migtrea.html.

10. Protection of Wetlands – Executive Order 11990:

Projects, regardless of funding, must get approval for any temporary or permanent disturbance to federal and state waters, wetlands, and vernal pools. The permitting process through the United States Army Corps of Engineers (USACE) can be lengthy, and may ultimately require project alterations to avoid wetlands and waters of the United States. Applicants must consult with the USACE early in the planning process if any portion of the project site contains wetlands, or other federal waters. The USACE Wetland Delineation Manual is available at http://www.wetlands.com/regs/tlpge02e.htm. Also note that the California State Water Boards are involved in providing approvals through the Clean Water Act Section 401 Water Quality Certification Program and/or Waste Discharge Requirements. For more information, please go to http://www.waterboards.ca.gov/water_issues/programs/cwa401/index.shtml.

11. Wild and Scenic Rivers Act:

There are construction restrictions or prohibitions for projects near or in a designated "wild and scenic river." A listing of designated "wild and scenic rivers" can be obtained at http://www.rivers.gov/wildriverslist.html. Watershed information can be obtained through the "Watershed Browser" at http://cwp.resources.ca.gov/map_tools.php.

12. Safe Drinking Water Act, Source Water Protection:

Projects must comply with the Safe Drinking Water Act and document whether or not a project has the potential to contaminate a sole source aquifer. For projects impacting a listed sole source aquifer, the applicant must identify an alternative project location, or develop adequate mitigating measures in consultation with the USEPA. For more information, please go to the Sole Source Aquifer Program website at http://epa.gov/region09/water/groundwater/ssa.html.

13. Environmental Justice – Executive Order No. 12898:

Identify and address any disproportionately high and adverse human health or environmental effects of the project's activities on minority and low-income populations. USEPA has defined environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

Fair Treatment means that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative consequences of industrial, governmental, and commercial operations or programs and policies.

Meaningful Involvement means that: 1) potentially affected community members have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; 2) the public's contribution can influence the agency's decision; 3) the concerns of all participants involved will be considered in the decision-making process; and 4) the decision-makers seek out and facilitate the involvement of those potentially affected.

The term "environmental justice concern" is used to indicate the actual or potential lack of fair treatment or meaningful involvement of minority, low-income, or indigenous populations, or tribes in the development, implementation, and enforcement of environmental laws, regulations, and policies.

Your project may involve an "environmental justice concern" if the project could:

a) Create new disproportionate impacts on minority, low-income, or indigenous populations;
b) Exacerbate existing disproportionate impacts on minority, low-income, or indigenous populations; or
c) Present opportunities to address existing disproportionate impacts on minority, low-income, or indigenous populations that are addressable through the project.

Attachment 1

ENVIRONMENTAL[1] PACKAGE CHECKLIST FOR APPLICANT (What to Submit to Project Manager)

Required for all CWSRF Projects:

- ❑ **Evaluation Form for Environmental Review and Federal Coordination with the substantiating information** (i.e. USFWS species list/biological assessment, cultural resources documentation, air quality data, flood map etc.)
- ❑ **Project Report, Scope of Work and Map(s)**

Based on the type of CEQA documents prepared for the project, provide additional information as identified in the following boxes.

If project is covered under a **CEQA Categorical or Statutory Exemption**, submit a copy of the following:

- ❑ **Notice of Exemption** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If project is covered under a **Negative Declaration**, submit a copy of the following:

- ❑ **Draft and Final Initial Study/Negative Declaration (IS/ND)**
  - ❑ Comments and Responses to the Draft IS/ND
- ❑ **Resolution approving the CEQA documents**
  - ❑ Adopting the Negative Declaration
  - ❑ Making CEQA Findings
- ❑ **Notice of Determination** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If project is covered under a **Mitigated Negative Declaration**, submit a copy of the following:

- ❑ **Draft and Final Initial Study/Mitigated Negative Declaration (IS/MND)**
  - ❑ Comments and Responses to the Draft IS/MND
  - ❑ Mitigation Monitoring and Reporting Plan/Program (MMRP)
- ❑ **Resolution approving the CEQA documents**
  - ❑ Adopting the Mitigated Negative Declaration and the MMRP
  - ❑ Making CEQA Findings
- ❑ **Notice of Determination** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If project is covered under an **Environmental Impact Report (EIR)**, submit a copy of the following:

- ❑ **Draft and Final EIR**
  - ❑ Comments and Responses to the Draft EIR
  - ❑ Mitigation Monitoring and Reporting Plan/Program (MMRP)
- ❑ **Resolution approving the CEQA documents**
  - ❑ Certifying the EIR and adopting the MMRP
  - ❑ Making CEQA Findings
  - ❑ Adopting a Statement of Overriding Considerations for any adverse environmental impact(s), if applicable
- ❑ **Notice of Determination** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If EIR is a joint CEQA/National Environmental Policy Act document (EIR/Environmental Impact Statement or EIR/Environmental Assessment), submit the applicable Record of Decision and/or the Finding of No Significant Impact.

---

[1] If the CEQA document is more than five years old applicant shall provide an updated CEQA document (eg. subsequent, supplemental, or addendum CEQA documents) or a letter that describes the current status of the environmental condition for the project's location.

State Water Resources Control Board (State Water Board)
Clean Water State Revolving Fund Program

Evaluation Form for Environmental Review and Federal Coordination

CWSRF No.: _____
Applicant Name: _____
Date: _____
Project Title: _____

1. **Federal Endangered Species Act (ESA), Section 7:**
Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may affect federally listed threatened or endangered species or their critical habitat that are known, or have a potential, to occur on-site, in the surrounding area, or in the service area?

   a. **Required documents: Attach project-level biological surveys, evaluations analyzing the project's direct and indirect effects on special-status species, and an up-to-date species list (from the United States Fish and Wildlife Service and the California Natural Diversity Database) for the project area.**

☐ No. Discuss why the project will not impact any federally listed special status species:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

☐ Yes. Provide information on federally listed species that could potentially be affected by this project and any proposed avoidance and compensation measures so that the State Water Board can initiate informal/formal consultation with the applicable federally designated agency. Document any previous ESA consultations that may have occurred for the project. Include any comments below:

_____
_____
_____
_____
_____
_____
_____
_____
_____

2. **<u>Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat</u>: Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may adversely affect essential fish habitat?**

☐ No. Discuss why the project will not impact essential fish habitat:

☐ Yes. Provide information on essential fish habitat that could potentially be affected by this project and any proposed avoidance and compensation measures. Document any consultations with the National Marine Fisheries Service that may have occurred for the project. Include any comments below:

3. **<u>National Historic Preservation Act, Section 106</u>: Identify the area of potential effects (APE), including construction, staging areas, and depth of any excavation. (Note: the APE is three dimensional and includes all areas that may be affected by the project, including the surface area and extending below ground to the depth of any project excavations).**

- **Required documents: Cultural Resources Assessment** prepared by a prepared by a qualified researcher that meets the Secretary of the Interior's Professional Qualifications Standards (www.cr.nps.gov/local-law/arch_stnds_9.htm). **Current records search** with maps showing all sites and surveys drawn in relation to the project area, and records of **Native American consultation.** Include any comments below:

4. **Federal Clean Air Act:**
Identify Air Basin Name _____
Name of the Local Air District for Project Area: _____

Is the project subject to a State Implementation Plan (SIP) conformity determination?

☐ No. The project is in an attainment or unclassified area for all federal criteria pollutants.

☐ Yes. The project is in a nonattainment area or attainment area subject to maintenance plans for a federal criteria pollutant. Include information to indicate the nonattainment designation (e.g. moderate, serious, severe, or extreme), if applicable. If estimated emissions (below) are above the federal de minimis levels, but the project is sized to meet only the needs of current population projections that are used in the approved SIP for air quality, then quantitatively indicate how the proposed capacity increase was calculated using population projections.

- **If you checked "Yes" above, provide the estimated project construction and operational air emissions (in tons per year) in the chart below, and attach supporting calculations.**
- **Also, attach any air quality studies that may have been done for the project.**

Pollutant	Federal Status (Attainment, Nonattainment, Maintenance, or Unclassified)	Nonattainment Rates (i.e., moderate, serious, severe, or extreme)	Threshold of Significance for Project Air Basin (if applicable)	Construction Emissions (Tons/Year)	Operation Emissions (Tons/Year)
Ozone (O_3)					
Carbon Monoxide (CO)					
Oxides of Nitrogen (NO_x)					
Reactive Organic Gases (ROG)					
Volatile Organic Compounds (VOC)					
Lead (Pb)					
Particulate Matter less than 2.5 microns in diameter ($PM_{2.5}$)					
Particulate Matter less than 10 microns in diameter (PM_{10})					
Sulfur Dioxide (SO_2)					

5. **Coastal Zone Management Act:**
Is any portion of the project site located within the coastal zone?

☐ No. The project is not within the coastal zone.

☐ Yes. Describe the project location with respect to coastal areas and the status of the coastal zone permit, and provide a copy of the coastal zone permit or coastal exemption:

_____
_____
_____
_____
_____
_____

6. **Coastal Barriers Resources Act:**
Will the project impact or be located within or near the Coastal Barrier Resources System or its adjacent wetlands, marshes, estuaries, inlets, and near-shore waters? Note that since there is currently no Coastal Barrier Resources System in California, projects located in California are not expected to impact the Coastal Barrier Resources System in other states. If there is a special circumstance in which the project may impact a Coastal Barrier Resource System, indicate your reasoning below.

☐ No. The project will not impact or be located within or near the Coastal Barrier Resources System or its adjacent wetlands, marshes, estuaries, inlets, and near-shore waters.

☐ Yes. Describe the project location with respect to the Coastal Barrier Resources System, and the status of any consultation with the appropriate Coastal Zone management agency and the United States Fish and Wildlife Service:

_____
_____
_____
_____

7. **Farmland Protection Policy Act:**
Is any portion of the project located on important farmland?

☐ No. The project will not impact farmland.

☐ Yes. Include information on the acreage that would be converted from important farmland to other uses. Indicate if any portion of the project boundaries is under a Williamson Act Contract and specify the amount of acreage affected:

_____
_____
_____
_____
_____

8. **Flood Plain Management:**
Is any portion of the project located within a 100-year floodplain as depicted on a floodplain map or otherwise designated by the Federal Emergency Management Agency?

- **Required documents: Attach a floodplain map.**

☐ No. Provide a description of the project location with respect to streams and potential floodplains:

_____

☐ Yes. Describe the floodplain, and include a floodplains/wetlands assessment. Describe any measures and/or project design modifications that would be implemented to minimize or avoid project impacts:

_____
_____
_____
_____

9. **Migratory Bird Treaty Act:**
Will the project affect protected migratory birds that are known, or have a potential, to occur on-site, in the surrounding area, or in the service area?

☐No. Provide an explanation below.

_____
_____
_____
_____

☐Yes. Discuss the impacts (such as noise and vibration impacts, modification of habitat) to migratory birds that may be directly or indirectly affected by the project and mitigation measures to reduce or eliminate these impacts. Include a list of all migratory birds that could occur where the project is located:

_____
_____
_____
_____

10. **Protection of Wetlands:**
Does any portion of the project boundaries contain areas that should be evaluated for wetland delineation or require a permit from the United States Army Corps of Engineers?

☐ No. Provide the basis for such a determination:

_____
_____
_____
_____

☐ Yes. Describe the impacts to wetlands, potential wetland areas, and other surface waters, and the avoidance, minimization, and mitigation measures to reduce such impacts. Provide the status of the permit and information on permit requirements:

_____
_____
_____
_____

11. **Wild and Scenic Rivers Act:**
Identify watershed where the project is located: _____

Is any portion of the project located within a wild and scenic river?

☐ No. The project is not located near a wild and scenic river.

☐ Yes. Identify the wild and scenic river watershed and project location relative to the affected wild and scenic river:

_____
_____
_____
_____

12. **Safe Drinking Water Act, Sole Source Aquifer Protection:**
Is the project located in an area designated by the United States Environmental Protection Agency, Region 9, as a Sole Source Aquifer?

☐ No. The project is not within the boundaries of a sole source aquifer.

☐ Yes. Contact USEPA, Region 9 staff to consult, and identify the sole source aquifer (e.g., Santa Margarita Aquifer, Scott's Valley, the Fresno County Aquifer, the Campo/Cottonwood Creek Aquifer or the Ocotillo-Coyote Wells Aquifer) that will be impacted:

_____

_____

13. **Environmental Justice:**
Does the project involve an activity that is likely to be of particular interest to or have particular impact upon minority, low-income, or indigenous populations, or tribes?

☐No. Selecting "No" means that this action is not likely to be of any particular interest to or have an impact on these populations or tribes. Explain.

_____

_____

_____

_____

_____

☐Yes. If you answer yes, please check at least one of the boxes and provide a brief explanation below:

☐ The project is likely to impact the health of these populations.

☐ The project is likely to impact the environmental conditions of these populations.

☐ The project is likely to present an opportunity to address an existing disproportionate impact of these populations.

☐ The project is likely to result in the collection of information or data that could be used to assess potential impacts on the health or environmental conditions of these populations.

☐ The project is likely to affect the availability of information to these populations.

☐ Other reasons, describe: _____

_____

_____

_____

_____

_____

_____

BASIC CRITERIA FOR CULTURAL RESOURCES REPORTS

FOR SECTION 106 CONSULTATION WITH THE STATE HISTORIC PRESERVATION OFFICER (SHPO) UNDER THE NATIONAL HISTORIC PRESERVATION ACT (NHPA)

CULTURAL RESOURCES REPORTS

The Section 106 compliance efforts and reports must be prepared by a qualified researcher that meets the Secretary of the Interior's Professional Qualifications Standards (www.cr.nps.gov/local-law/arch_stnds_9.htm).

REPORT TERMINOLOGY

- A cultural resources report used for Section 106 consultation should use terminology consistent with the NHPA.

- This doesn't mean that the report needs to "filled" with passages and interpretations of the regulations, the SHPO reviewer already knows the law.

- If "findings" are made they must be one of the four "findings" listed in Section 106. These include:

  "No historic properties affected" (no properties are within the APE, including the below ground APE).

  "No effect to historic properties" (properties may be near the APE but the project will not impact them).

  "No adverse effect to historic properties" (the project may affect historic properties but the impacts will not be adverse)

  "Adverse effect to historic properties". *Note: the SHPO must be consulted at this point. If your consultant proceeds on his own, his efforts may be wasted.*

CURRENT RECORDS SEARCH INFORMATION

- A current (less than a year old) records search from the appropriate Information Center is necessary. The records search should include maps that show all recorded sites and surveys in relation to the area of potential effects (APE) for the project.

- The APE is three-dimensional and includes all areas that may be affected by the project. It includes the surface area and extends below ground to the depth of any project excavations.

- The records search request should be made for an area larger than the APE. The appropriate area varies for different projects but should be drawn large enough to provide information on what types of sites may exist in the vicinity.

NATIVE AMERICAN AND INTERESTED PARTY CONSULTATION

- Native American and interested party consultation should be initiated at the beginning of any cultural resource investigations. The purpose is to gather information from people with local knowledge that may be used to guide research.

- A project description and map should be sent to the Native American Heritage Commission (NAHC) requesting a check of their Sacred Lands Files. The Sacred Lands Files include religious and cultural places that are not recorded at the information centers.

- The NAHC will include a list of Native American groups and individuals with their response. A project description and maps should be sent to everyone on the list asking for information on the project area.

- Similar letters should be sent to local historical organizations.

- Follow-up contact should be made by phone if possible and a phone log should be included in the report.

WARNING PHRASES IN ALREADY PREPARED CEQA REPORTS

- A finding of **"no known resources"**, this doesn't mean anything. The consultant's job is to find out if there are resources within the APE or to explain why they are not present.

- **"The area is sensitive for buried archaeological resources",** followed by a statement that **"monitoring is recommended as mitigation".** Monitoring is not an acceptable mitigation. A reasonable effort should be made to find out if buried resources are present in the APE.

- **"The area is already disturbed by previous construction",** this may be true, but documentation is still needed to show that the new project will not affect cultural resources. As an example, an existing road can be protecting a buried archaeological site. Or, previous construction may have impacted an archaeological site that was never documented.

- No mention of **"Section 106"**, a report that gives adequate information for CEQA may not be sufficient to comply with Section 106.

STATE WATER BOARD CULTURAL RESOURCES OFFICER CONACT INFORAMTION

Please contact Ms. Cookie Hirn, 916-341-5690 or Mhirn@waterboards.ca.gov if you have any questions related to CWSRF Program cultural resources compliance.

WRITTEN COMMENTS – PUBLIC

ConocoPhillips
Pipe Line Company

ConocoPhillips Pipe Line Company
Leo Martinez
Utility Coordinator
Corporate Real Estate-PTRRC*
*Property Tax, Real Estate,
Right of Way and Claims
1232 Park Street, Suite 300
Paso Robles, CA 93446
805-226-2656 - Office
805-239-4410 – Fax

February 27, 2012

Charles E. Boehmke
Sanitation District of Los Angeles
1955 Workman Mill Road
Whittier, CA 90601-1400

RE: Clearwater Program Master Facilities Plan

Mr. Boehmke

This letter is to inform the County of Los Angeles Sanitation District that ConocoPhillips has numerous active pipelines along the proposed route which can be impacted. Please send me more detailed drawings, including elevation data of the tunnels when the information is available so that we can evaluate their potential impact on or near our facilities.

Sincerely,

Leo Martinez
Property Tax, Real Estate, Right of Way and Claims

Steve Highter SNH

REC'D LACSD

FEB 29 '12 AM 9:56

DOC # 274498

Boehmke C (Fac Plan)

Highter, Steve

From: Janet Gunter <arriane5@aol.com>
Sent: Wednesday, March 07, 2012 10:05 PM
To: Haug, David; Highter, Steve
Subject: Fwd: LA County Clean Water/LA County Sewer Plan attached LA City Rupture Zone Doc....SAFTYELT from Janet Gunter
Attachments: saftyelt.pdf; rupturezonecityla-1.jpg

Sorry...screwed up your addresses initially!!! Typical!

-----Original Message-----
From: Janet Gunter <arriane5@aol.com>
To: dhaug <dhaug@lasd.org>; shighter <shighter@lasd.org>; connie <connie@rutter.us>; MrEnvirlaw <MrEnvirlaw@sbcglobal.net>
Cc: rkim <rkim@lacbos.org>; chateau4us <chateau4us@att.net>
Sent: Wed, Mar 7, 2012 10:00 pm
Subject: LA County Clean Water/LA County Sewer Plan attached LA City Rupture Zone Doc....SAFTYELT from Janet Gunter

Hi David and Steven-

Here is the LA City Doc that I spoke of. I got the date wrong...but, it is still relevant. Also, of particular note for you...would be the Alquist Priolo Act of 1970 and its references to building on an earthquake fault. Although, it references in specific a "home"....the issue is the ***act of building or constructing*** in an area as vulnerable as this one on No. Gaffey St.. The Rancho LPG facility should have never been allowed to be located at the Gaffey St. site. We are actually 40 years into the 50-100 year predictability of a significant seismic event upon the Palos Verdes fault that was proclaimed in the EIR for the LPG facility in 1973.

My experience with consultants is that they often miss important details and prove to be deficient. Our lawsuit on the China Shipping EIR proved this point. The added complication of this hazardous gas facility should also be considered when thinking about the future of your identified major sewer line plan. Our homeowners grave concern on the Rancho LPG facility is the fact that the 25 million gallons of butane gas (the largest stored volume in a populated area in the nation) burns at around 1800 degrees centigrade....and will cause radiant heat strong enough to ignite any other combustibles for miles. The "domino effect" of all of the multiple fuel resources in the region would cause an inferno never before witnessed. The infrastructure of just about everything will be decimated. While, the option of moving this sewer line through the port might be more costly...and "cutting edge" as far as distance.... personally, it appears to be the most sensible approach. And, the long term concept makes more sense as well. If the County is going to spend this kind of money on this system....don't you believe that it would behoove the County to consider this kind of potential loss in its analysis? However drastic the cost may appear at this point in pursuing the Port option instead of option #4 (Gaffey St)....it is critical to think about the longevity of the pipeline and the protection of the investment. In 25 years...this cost will not be considered dramatic.. particularly if you have a system that is still viable, intact and healthy. That is why further consideration of this issue is so important.

I know that this issue is a difficult one...but, one that has to be addressed. Although there are no easy answers....there is a crucial need to employ the "best" decision that will yield the most logical and responsible decision. There also remains the potential to condemn the Rancho facility for safety reasons and continue on with your project as planned without the fear of this explosive opportunity looming on the horizon. Makes sense, no? I hope that your team and the County will investigate this concern vigorously.

Best,
Janet G

SAFETY ELEMENT

DEPARTMENT OF CITY PLANNING LOS ANGELES, CALIFORNIA

City Plan Case No. 95-0371
Council File No. 86-0662

SAFETY ELEMENT
OF THE LOS ANGELES CITY GENERAL PLAN

Relates to Natural Hazards, Not Police Matters

Replaces the 1975 Safety, 1974 Seismic Safety and 1979 Fire Protection & Prevention Elements

Approved by
the City Planning Commission
August 8, 1996

Adopted by
the City Council
November 26, 1996

CITY OF LOS ANGELES
Richard Riordan, Mayor

CITY COUNCIL
1st District - Mike Hernandez
2nd District - Joel Wachs
3rd District - Laura N. Chick
4th District - John Ferraro
5th District - Michael Feuer
6th District - Ruth Galanter
7th District - Richard Alarcón
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9th District - Rita Walters
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13th District - Jackie Goldberg
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Gordon B. Hamilton, Deputy Director, Administration
Robert H. Sutton, Deputy Director, Community Planning

CITYWIDE PLANNING DIVISION
R. Ann Siracusa, AICP, Principal City Planner

SAFETY ELEMENT REVISION STAFF
Anne V. Howell, City Planner

GRAPHICS SERVICES SECTION
Rey Hernandez, Graphic Designer III
Michael Uhlenkott, Graphic Designer II

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INTRODUCTION

State law since 1975 has required city general plans to include a safety element which addresses the issue of protection of its people from unreasonable risks associated with natural disasters, *e.g.*, fires, floods, earthquakes. It did not intend that a safety element address police matters, except in the context of natural disasters. In 1984, the State deleted the seismic safety element from its list of mandated general plan elements and incorporated the seismic provisions under the safety element provisions. The subject Safety Element provides a contextual framework for understanding the relationship between hazard mitigation, response to a natural disaster and initial recovery from a natural disaster. It replaces three previously adopted elements of the City's General Plan: the Safety Element, Fire Protection and Prevention Element, and Seismic Safety Element.[1] All three have been revised and combined into the subject Element. Drainage, water and fire facilities will be addressed in greater detail by facilities or infrastructure elements of the General Plan.

An important premise of the Safety Element is that Los Angeles is a built city that is integrally connected to its neighbors geographically and by natural disasters which recognize no boundaries. Therefore, the Element outlines the historic evolution in Los Angeles of local, state and federal roles, particularly relative to mitigation of and response to natural disasters. The last section of the Element contains goals, objectives, policies and broadly stated programs. The programs outlined are programs of the City Emergency Operations Organization (EOO). The EOO is the City agency (program) which implements the Safety Element.

Following the 1994 Northridge and 1995 Kobe, Japan earthquakes a variety of studies and cooperative information exchange ventures were initiated to expand knowledge concerning earthquakes so that people could be better protected in the event of future significant seismic events. Kobe, Northridge and other seismic event information is being used in formulating methodologies for strengthening buildings and structures to more successfully withstand severe damage and to better protect occupants and equipment during various types and degrees of seismic events.

The California State Geologist's Seismic Hazards Mapping Program is preparing the State's official seismic hazard maps. The maps will identify amplified shaking, liquefaction and landslide hazard zones. Once the maps become available they will be used in revising the City's building, zoning and other codes, plans, standards, procedures and/or development permit requirements.

Chapters I and III of this Safety Element outline the scope of the EOO's on-going efforts to use experiences and new information to improve the City's hazard program. Chapter II outlines the City's historic commitment to improving its prevention of controllable disasters, mitigation of impacts associated with disasters and response to disaster events.

[1] *Adopted by the City Council on September 19, 1975, January 16, 1979 and September 10, 1974, respectively.*

CHAPTER I - BACKGROUND

PLANNING AREA

The Safety Element relates to the entire City of Los Angeles. Within the City's boundaries are approximately 465 square miles of land area, including approximately 214 square miles of hills and mountains. The San Gabriel and Santa Susana Mountains bound the City on the north, the Santa Monica Mountains extend across the middle of the City. The Palos Verdes Hills and Pacific Ocean are on the south and west. Because flood, fire and seismic events, geologic features and potential hazards relate to each other and transcend the City's boundaries, this Element takes into account other jurisdictions and governmental entities.

DEMOGRAPHICS

The 1990 Federal census estimated that the City's population was 3,485,399 individuals. The 1995 General Plan "Framework" element estimated that the population of Los Angeles City would be increased by approximately 820,000 people to 4,306,564[2] and that employment would be increased by an estimated 390,000 jobs by the year 2010.

EMERGENCY OPERATIONS ORGANIZATION AND OTHER INTERAGENCY COORDINATION

Emergency Operations Organization (EOO). The EOO is the City agency that implements the Safety Element. Therefore, it is the only "program" identified by the Element. The EOO is a unique City department, as indicated in the following.

EOO background and history. After every significant emergency, City personnel evaluate the effectiveness of response, ways to improve response and how to reduce potential loss of life, injury and property damage in future similar events. Natural disasters within the City, as well as disasters in other parts of the world, have added to existing knowledge about disaster preparedness. Historically most jurisdictions rely on emergency personnel (police, fire, gas and water) to respond to and handle emergencies. In many jurisdictions, emergency agencies work independently of one another; situation which can lead to command and effectuation conflicts and inefficiencies.

In the late 1970s it was recognized that Los Angeles enjoyed a significant number of public and private resources which could be mobilized to respond to emergencies and provide assistance to victims. However, most of the services operated independently of each other. To evaluate how to make better use of government and private resources, Mayor Tom Bradley convened a task force to study the situation and recommend a plan of action. The task force recommended establishment of a unified, streamlined chain of command to maximize the limited City resources which were available for response to emergency situations. To accomplish this goal the City, in 1980, adopted the Emergency Operations Ordinance (Ordinance No. 153,772) which established a multi-agency Emergency Operations Organization (EOO) under the direction of the Mayor and administration of an Emergency Operations Board (EOB). At the time, it was the only city organization of its kind in the United States.

EOO description. The EOO is an operational department of the City pursuant to City Administrative Code Division 8, Chapter 3. It is a "department without walls" which is comprised of all agencies of the City's government. However, unlike traditional departments, the EOO is not located physically in any one place. It is a chain of command and protocols which integrate the City's emergency operations into a single operation. It centralizes command and information coordination so as to enable the chain of command to operate efficiently and effectively in deploying resources.

The Emergency Operations Board (EOB) supervises the EOO (*i.e.*, City) emergency preparedness, response and recovery. It is comprised of the heads of the City's critical emergency operations agencies, *e.g.*, Board Public Works, Fire and Police departments, *etc.* The Chief of Police is chair of the EOB, the City Administrative Officer is the vice chair responsible for coordinating non-emergency EOO activities and the City Attorney is the legal advisor

[2] *The figure is consistant with the estimate used by the Southern California Association of Governments.*

to the EOB. The Mayor, in time of emergency, directs the 13 operational divisions of the EOO. Each division is responsible for carrying out specific tasks for coordinating emergency actions which are essential in abating the impacts and limiting the scope of a catastrophe; responding to life threatening situations and safety needs of the population; maintaining and reestablishing essential services, transportation and communication networks; aiding dislocated people; and planning for recovery. Various City agencies are responsible for coordinating the activities of their assigned divisions. For example, the EOO ordinance specifies that the Transportation Division is under the responsibility of the general manager of the City Department of Transportation and is responsible for developing plans

> "for the maintenance of traffic control devices, emergency travel routes to be used in the event of an emergency, placement of barricades as necessary or as directed by the chiefs of the Police and Fire Suppression and Rescue Divisions, direction and control of traffic and coordination with all other agencies supplying common carrier services."

An Emergency Management Committee (EMC) provides staff to support the EOB. Over two dozen City agencies, other governmental agencies and private organizations participate in activities of the EMC. The EMC develops plans and programs and conducts training exercises to promote integrated disaster planning, response and mitigation efforts.

An Emergency Operations Center (EOC) of the EOO provides a centralized coordination facility for emergency response activities. The EOC is located four floors underground and is equipped with vital communications and backup power, food and other supplies necessary to provide for the needs of the EOO emergency response coordinating team for approximately two weeks. A mobile EOC unit is available in the event the primary center is inaccessible or to provide additional disaster response coordination capability. It is comprised of a fleet of vehicles which contain portable offices, communications, self-sustaining power, rest rooms and other resources to enable the mobile EOC unit to operate at any location to which it is sent.

To enhance communications and provide additional communications back-up, the City, as a member of the Operational Area Satellite Information System (OASIS), through the EOO is linked to the Governor's Office of Emergency Services (OES) by satellite. At the time this Element was prepared, Los Angeles was the only city participating in OASIS. OASIS interconnects all of the counties within the State to the OES which in turn is linked to national communications systems.

In the event of a disaster or emergency, the Mayor assumes emergency powers, as defined by law. City agencies follow procedures contained in their emergency plans, under the direction of the Mayor and Chief of Police, pursuant to EOO protocols set forth in the EOO ordinance and plans.

The EOO Master Plan and individual agency "Emergency Response Plans" set forth procedures for City personnel to follow in the event of an emergency. "Annexes" to the Master Plan include hazard-specific plans (*e.g.*, flood), situational contingency plans for known or anticipated events (*e.g.*, annual L.A. Marathon) and pre- and post-event plans (*e.g.*, "Recovery and Reconstruction Plan").

Other interagency coordination. Individual jurisdictions long have cooperated with one another in responding to emergency incidents. At one time emergency response personnel had to remain at their own boundaries, unable to respond to fires or other emergencies across their borders due to territorial requirements. Such territorial limitations were recognized as unacceptable for maintaining public health and safety and resulted in informal and formal aid arrangements between agencies and jurisdictions. These typically enabled the closest available unit to respond to an emergency incident. The agreements usually provided for compensation of the responding jurisdiction for services rendered. Interjurisdictional assistance to assure public safety, protection and other assistance services today generally are in the form of "mutual aid" agreements.

Mutual aid and other agreements provide for voluntary cooperative efforts and for provision or receipt of services and aid to or from other agencies or jurisdictions when local capabilities are exceeded by an emergency event. Through mutual aid agreements, the EOO and individual City agencies coordinate emergency response planning with adjacent cities, the County of Los Angeles, the State, federal agencies and other public and private

organizations, such as the Los Angeles Unified School District and the American Red Cross. In addition they share information so as to improve hazard mitigation efforts and coordinate resources for disaster response and recovery. For example, in the event of a disaster, Los Angeles County is required by State law to provide the City with coroner, health, mental health, prosecutorial, court and children's services. The OES is designated by law to provide coordination and State resources to regions or local areas which are declared disaster areas by the Governor. The Federal Emergency Management Agency (FEMA) is designated by federal law to coordinate and provide Federal resources to state and local government relative to disasters declared by the President. To facilitate rapid response to wild fires in brush and forest areas, the U.S. Forest Service has agreements with the County and City fire services for simultaneous dispatch of personnel and equipment to fight fires in designated geographic areas ("Initial Action Zone"). The Public Works Mutual Aid Agreement, conceived by Los Angeles County in the late 1980s, provides for sharing of personnel and public works equipment between signatory cities and counties within the State during times of emergency. In addition, sometimes the City provides a specific service by contract to another jurisdiction. For example, for a set fee, the City provides fire and emergency medical services to the City of San Fernando which is geographically surrounded by Los Angeles.

Following the disastrous Oakland-East Bay Hills fire of 1991 the State legislature directed the OES, in coordination with other State agencies and interested local emergency management agencies, to establish by regulation the Standardized Emergency Management System (SEMS). The SEMS became effective September 1994 (Government Code Section 8607). It is a command management system which is based upon the Incident Command System (ICS).[3] Like ICS, the SEMS is not a physical agency, it is a procedure for integrating emergency response functions. It sets forth a system and framework within which response agencies which utilize the SEMS can function in an integrated fashion, in effect becoming a single response entity. The SEMS outlines a chain of authority (command) for organization of all public emergency response functions within the State. As its name implies, the SEMS provides guidelines for standardization of procedures and approaches to emergency response; facilitation of the flow of information and resources between organizational levels (field, local government, operation area, regional and state); coordination between responding agencies; and rapid mobilization, deployment, use and tracking of resources. Cities and counties are encouraged to utilize the SEMS in order to qualify for State funds for emergency response activities. At the time this Safety Element was under preparation the EOO was reorganizing so as to implement the SEMS for the City of Los Angeles.

In addition to agreements between government entities, private organizations play a key role in disaster planning and response. In particular, the American Red Cross, Salvation Army, churches and other non-profit organizations provide food, shelter, clothing, health care, volunteer labor and other emergency services to disaster victims, in coordination with the governmental agencies. A variety of private sector organizations have been formed to coordinate community emergency preparedness efforts, to heighten public awareness and understanding of the need for disaster preparedness and to encourage private disaster preparedness activities. Los Angeles Unified School District and City park facilities are the designated assembly and coordination locations for emergency sheltering and assistance efforts coordinated by the Red Cross, the State and/or FEMA. In addition, the Red Cross provides interagency emergency response planning and training support.

CALIFORNIA STATE SAFETY ELEMENT REQUIREMENTS

General mandates and guidelines. City and county general plans are required to contain a safety element which addresses natural disaster hazards. This Safety Element fulfills this State requirement. It should be noted that the term "safety" does not mean "police." Safety, in the context of the General Plan law and the subject Safety Element, addresses natural hazards associated with fire, flood, earthquake, landslides and other hazards generally asso-

[3] *For more about the Incident Command System, see Chapter II: Fire and Rescue.*

ciated with or compounded by natural events. State law also indicates that hazardous materials should be addressed by a safety element. In this Element, hazardous materials are addressed primarily in relation to natural disaster hazards, *e.g.*, release of stored chemicals as a result of fire or earthquake. Other elements of the General Plan address other hazardous materials issues.

Local officials have the authority to declare a local emergency and to invoke emergency regulations to facilitate response to the emergency. Planning and preparedness are critical in mitigating the extent of the impacts of a disaster, through pre-disaster abatement, pre-disaster response preparation and post-disaster recovery plans. The State identifies local safety elements as key tools for assisting local jurisdictions in organizing their hazard mitigation, disaster response and recovery efforts.

In 1975, the State mandated that general plans contain safety elements. The general plan law was amended in 1984 to remove seismic elements from the list of required elements and to incorporate seismic provisions within the safety element provisions. The amended law (California Government Code Section 65302.g) requires that a city's general plan contain a

> "safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mud slides and landslides; subsidence and other geologic hazards known to the legislative body; flooding; and wild land and urban fires."

These components need not be contained within the same general plan document. Other components may be added, as deemed appropriate by a local jurisdiction. A city within a county may adopt by reference all or part of the county's safety element, providing that the county element is sufficiently detailed to apply to the City.

The intent of the State in requiring mandatory planning was to reduce deaths, injuries, property damage and economic and social dislocation resulting from "natural hazards." A safety element is intended to be the primary vehicle for relating local safety planning to land use planning and decisions.

Jurisdictional infrastructures, such as roads and emergency services, have become increasingly interrelated. Therefore, local jurisdictions are encouraged by the State to coordinate their general plans with neighboring jurisdictions. The Los Angeles County Safety Element includes all of the cities and unincorporated areas within the County and interrelates the critical service systems, evacuation routes, *etc.* for the entire county. The subject Element and its associated graphic exhibits utilize and are consistent with the County Safety Element.

State required mapping and content. Relative to fire and geologic hazards, a safety element is to take into account maps of known seismic and other geologic hazards and to address peak load water supply requirements, minimum road widths (for evacuation purposes) and clearances around structures (for emergency access). For information about seismic and landslide hazards mapping, see Chapter II, "Seismic Events."

Dam failure inundation diagrams are encouraged by the Governor's Office of Planning and Research to be incorporated into a safety element. The diagrams are to show the areas of potential flooding in the event of dam failure. In addition, pursuant to the State Emergency Services Act (Government Code Section 8550), the City Department of Water and Power provides dam failure inundation maps to the State Office of Emergency Services via the County of Los Angeles. These maps are the basis of the County inundation maps which were a resource for preparation of the inundation exhibit which is a part of this Element (Exhibit G).

Landslide hazard identification maps are encouraged by the State Office of Planning and Research to be considered in a safety element. A landslide exhibit is included in the attached exhibits (Exhibit C).

State required consultation. Pursuant to Government Code Section 65302g, staff on January 6, 1994, prior to proceeding with the preparation of the subject element, contacted the State Division of Mines and Geology and the State Office of Emergency Services to advise them that preparation of the City Safety Element was about to commence and to solicit advice concerning plan preparation. Staff was advised by these offices that the County of Los Angeles Safety Element provided research data

in its technical appendices, including geologic, seismic, wildfire, critical facilities (*e.g.*, evacuation route) and other exhibits, which adequately covered the City of Los Angeles. They advised that the County reports provided an adequate technical basis and could be utilized by reference for the City's element.

Technical references. The City Planning Department reviewed the County Safety Element and decided that it did not contain sufficient City-oriented information to be adopted as the City's safety element. The background data and information concerning the character of natural hazards and history of natural disasters and events relative to the County and its immediate environs provided excellent technical information. However, it did not provide adequate specific information about the history of disaster mitigation in the City. Further, the goals, objectives, policies and programs contained in the County element generally did not apply to the City. Therefore, the City decided to prepare its own safety element and to use the "Technical Appendix to the Safety Element of the Los Angeles County General Plan: Hazard Reduction in Los Angeles County" as a technical resource and its exhibits as a basis for some of the exhibits contained in the City's element. The County Technical Appendix was prepared by Leighton and Associates, Incorporated in cooperation with Sedway Cooke Associates and William Spangle and Associates, December 1990.

The principal data source for the City Safety Element was the Los Angeles City General Plan Framework 1994 Draft Environmental Impact Report (DEIR). In addition to the County Technical Appendix and Framework DEIR, additional information was secured from City historic records, a variety of informational sources and oral interviews with technical staff of various City and other agencies. The exhibits which accompany the Element were based primarily on the County Technical Appendix exhibits and Framework DEIR exhibits, for which the County Technical Appendix was a resource. The City's Safety Element exhibits include information required by the State. They are comparable to and consistent with the County Safety Element exhibits which were deemed by the State to be in compliance with its requirements.

State required format, implementation and monitoring. In addition to State law, the Governor's Office of Planning and Research issues "General Plan Guidelines." The document provides guidance for preparation of local general plans. The 1990 Guide, under which this Safety Element was prepared, advises that a general plan contain goals, objectives, policies, programs and implementation monitoring. The goals are to be general and abstract, suggesting specific actions for achievement. Objectives are to express intermediate steps for achieving goals. Policies are to guide decision making. Each policy is to have at least one corresponding implementation measure.

Los Angeles was the first city in the State to establish an "Emergency Operations Organization" (EOO). The City, through its EOO has developed integrated operational, contingency and long range plans to address all aspects of potential emergency and disaster situations. Therefore, Los Angeles already goes far beyond the intent of the State general plan law and Governor's guidelines relative to a comprehensive City safety element. In keeping with the national, State and City efforts to streamline emergency operations, including planning, the Safety Element complies with the State's general plan laws without creating a new bureaucratic layer or causing duplication of government work. To this end it identifies only one implementation program, the EOO.

The three Safety Element goals parallel three of the primary phases of disaster planning: hazard mitigation (pre-disaster), emergency response (disaster event) and recovery (post-disaster). For the purposes of this Element, planning and training are incorporated under each of these phases. The three categories identify the three steps needed for urban safety relative to potential natural disasters: (1) pre-disaster mitigation of potential hazards which could cause loss of life and property damage during a disaster, procedures for mitigating disruption, provisions for back-up systems necessary for keeping essential City services and systems operational in the event of a disaster; (2) protection of life and property and provision of temporary assistance to disaster victims during and immediately following a disaster; and (3) post-disaster elimination of disaster-created hazards, re-establishment of private and public services and systems and general recovery.

The policies to achieve Element objectives are administrative. They generally provide broad guidelines for program formulation. Given the complexity of Los Angeles City government, often more than one EOO program emanates from a policy or more than one policy guides program formulation. Every policy contained herein is implemented by at least one EOO program or protocol, *i.e.*, a program which is administered by the EOO or one or more of its member City agencies. The broadly stated programs of this element describe the type of EOO programs which implement each policy of the Safety Element.

The Element complies with State law by providing a contextual framework and overview of the City's natural hazards, hazard mitigation and emergency response operations. It is not as comprehensive as the EOO establishing ordinance, Master Plan, Master Plan Annexes and associated plans insofar as the Element is informational rather than operational document and generally does not address social and police issues (*e.g.*, crowd control and riots). The EOO Master Plan and its related documents provide comprehensive (including police) operational protocols and plans. They are reviewed and approved not only by the EOO Board but by the Mayor and City Council and, therefore, are City policy. More importantly, they are operational documents, not just planning documents, and they are updated continuously.

The Safety Element is listed as a program of the EOO "Recovery and Reconstruction Plan" (aka "annex"). Therefore, the EOO's periodic monitoring of that annex will include a review of the Safety Element for purposes of recommending revisions. The Safety Element format, programs and monitoring are in compliance with State law and state general plan guidelines.

ELEMENT SCOPE

Prior General Plan elements. The Safety Element is less complex than the former safety, seismic and fire elements of the General Plan which were prepared in the 1970s. It simplifies goals and policies and identifies program categories. It generally does not contain standards and technical guidelines because these already are contained in City codes and administrative procedures which implement the EOO plans.

Jurisdiction. Element implementation involves only those programs which are within the authority and responsibility of the City of Los Angeles.

Police. The Element addresses only natural hazard issues. Therefore it does not address police matters, except in relation to natural disasters, *e.g.*, traffic safety during or following a disaster.

Wind. No wind hazard section is contained in the Element. Generally the most severe wind conditions come in the autumn when the dry Santa Ana or "devil" winds contribute to wild land (brush fire) conditions or cause localized minor damage. These winds rarely reach a velocity of more than 75 miles per hour. Wind hazards, such as tornadoes, are rare and in recent history have resulted in relatively minor, localized impact. The most damaging tornado recorded in Los Angeles occurred in 1983. It traveled several miles, moving north from South Central Los Angeles and the vicinity of the Convention Center in the Central City. Vehicles were turned over and many homes and other structures, including the Convention Center, were damaged. There is no record of a hurricane having struck the City in modern times. The City does not have large areas of flat agricultural or vacant lands which necessitate wind barrier protection. The anchoring of structures pursuant to seismic safety requirements assumes anchoring needed for wind considerations.

Assumptions. The City's EOO programs, including the subject Element, emphasize mitigation of potential hazard impacts, rather than avoidance through land use prohibitions, except as required by State flood and seismic regulations. This is because, by and large, the City is a built city and damage due to disasters such as fire, seismic event or hazardous materials release could occur anywhere in the city regardless of distance from identified major earthquake fault rupture zones, forested areas or concentrations of hazardous materials. The assumption is that hazard mitigation strategies, such as building design, and pre-event training and planning can reduce damage, disruption, injury and costs resulting from natural disasters and will facilitate more rapid short and long term recovery following a disaster.

CHAPTER II - EXISTING CONDITIONS, HAZARD ISSUES AND MITIGATION HISTORY

Much of the City of Los Angeles is built within old flood plains and mountains or adjacent to the Pacific Ocean. The population is concentrated within urban centers which are interspersed by low density residential neighborhoods. Most of the flat lands of the City have been developed with some land use. Remaining open space tends to be concentrated within flood plains or along steep hillside and drainage water courses which typically have been designated as public park land, recreational, flood control or low intensity uses, consistent with State law. Vulnerability to fire and flood has increased as development has encroached into remaining open space areas. Concentration of development and infrastructure has increased the vulnerability of greater numbers of people, businesses and facilities to seismic, fire and flood events while at the same time providing greater resources for responding to such events.

When a catastrophic natural disaster strikes, it may trigger secondary events. An earthquake may trigger a landslide or cause rupture of gas mains or hazardous materials enclosures. Disruption of gas mains could contribute to or cause fires. If winds are present, fires could become wild fires. Fires can denude hillsides and, thereby, exacerbate potential flood hazard and inundation conditions. For purposes of evaluating natural hazards addressed by this Safety Element, the following sections provide a brief history of the measures taken to mitigate individual natural hazards in Los Angeles.

FIRE AND RESCUE[4]

Fire was the first "natural" hazard to be addressed by El Pueblo de Los Angeles which was founded in 1781. The hot, arid climate, especially during the summer and fall, dried out vegetation. Dry brush was prone to fires caused by lightning strikes and spontaneous combustion. Nature adjusted to this phenomenon by making some of the native chaparral (vegetation) dependent on fires for regeneration. Their seed cases opening only when heated by fire. New sources of fire came with the advent of human habitation. By the early 1800s Los Angeles was an agricultural community with a small population. Buildings generally were constructed of adobe and tile. Individual properties experienced fires such as hay mounds igniting spontaneously, roofs being set afire by sparks from cooking stoves or fires due to carelessness. The primary fire hazard was storage of large quantities of hay. No fire bells or alarms existed. Instead someone would shoot a gun in the air repeatedly to attract assistance and volunteers formed leather bucket brigades to douse fires. As the City grew and buildings were established in close proximity to each other, entire blocks could burn in a matter of hours due to the lack of adequate water storage and delivery systems. Given these potentially catastrophic hazards it is not surprising that some of the earliest City building regulations addressed fire hazards.

Fire Department established. In 1869, officials and interested men met at Billy Buffum's Saloon and formed the City's first informal volunteer fire department. They convinced the City Council to levy fines on alleged arsonists so as to raise money for equipment. Because the levies also were used to drive unwanted elements, such as prostitutes and immigrants, from the City, not much money was raised. After the disastrous Chicago fire of 1871, the Volunteer Fire Department was recognized formally and the City Council allocated money for construction of a fire house. Water delivery was a major problem in the early years due to feuds with the local water company, lack of water supplies and lack of an integrated water system. The volunteers pleaded for pumping and other equipment but the City Council was reluctant to expend money because fires were deemed an inconsequential problem. To secure equipment, the volunteers solicited donations. In 1872 they purchased the City's first piece of modern fire fighting equipment, an Amoskeag steam pump. The City's first paid fire fighting employee was an engineer hired by the City Council at $100 a month to operate the pump and

[4] *A primary source used in in the preparation of this Element relative to Fire Department history, especially early history, was Paul C. Ditzel's* L.A.F.D. Centennial Edition*, Jostens Printing and Publishing Co., Visalia, California, 1986.*

help manage the firehouse. The heavy pump had to be pulled by the volunteers to fires because the Council refused to allocate funds to purchase horses. Sometimes the pump became bogged down in sand and never made it to a fire site. In 1874 the volunteers became so upset over the Council's failure to buy horses that they threatened to quit. This prompted another meeting at Buffum's. After the meeting, town leaders convinced the City Council to turn over the new fire station to the volunteers and to provide horses for the pumper. But it was not until 1875 that funds were appropriated for two horses. In that year, the volunteers began using chemicals (carbon dioxide) to help extinguish fires. By 1881 demand for fire fighting still was small. Of the 33 fire calls, 15 were false alarms and only $950 was sustained in fire damage. Sometimes months went by when no fire calls were received. Major fires were rare but the potential for major disaster soon became apparent.

In September 1883 the Los Angeles area experienced the worst brush fire it had known to that date. It was centered in the Coldwater Canyon area, eight miles west of the city limits. It burned for three days, destroying acres of watershed as well as cottages, barns, farmhouses, entire ranches, a bee farm, haystacks and crops. Although County personnel fought the fire, the City Council realized the City was vulnerable to a similar catastrophe. Subsequently, it took steps to improve the fire protection system, including a review of ways to improve the fire alarm system which still was comprised of people shooting guns in the air and ringing church and other bells. The old firehouse was replaced in 1884 by a new Plaza Firehouse, which still stands in the El Pueblo de Los Angeles State Historic Park near the civic center. In 1885, instead of constructing an alarm bell system, the Council voted to establish a City Fire Department with paid fire fighters.

The Department was established on February 1, 1886. Walter S. Moore, who had served three nonconsecutive terms as volunteer fire chief and as president of the City Council for a term, was hired at $125 per month as the first salaried Chief Engineer. Thirty fire fighters, most of them former volunteers, were hired to man four leased firehouses. In addition, volunteer units were retained in the less populated areas outside the central city, including the San Fernando Valley. In 1898 a $150,000 bond issue was approved for purchase of the first city-owned fire station sites, construction of 12 stations and establishment of a more efficient alarm system using new telephone and telegraph technology. Engine Company No. 1, the first City-owned station, became operational in 1887 at the site of what today is the Fire Department's supply and maintenance facility. A unique feature of the station was a hanging harness developed by one of the firemen. Horses were trained to walk under the harness upon hearing the fire bell so the harness could be quickly lowered and strapped onto them. This time saving innovation was adopted by stations across the nation.

From the beginning the Department was an innovative, progressive agency which sought to secure the latest equipment, utilize the latest techniques and to develop better methods for fire fighting and prevention. The 1920s was a period in which the Fire Department grew and developed into a premier fire fighting force. It explored and experimented with new techniques and received considerable public support for purchase of modern equipment and expansion of its stations and personnel. By 1921 the Department had become fully motorized. Recognizing that costly property loses were occurring due to smoke, falling debris and water damage, the Department experimented with salvage techniques. In 1923 it became the first major fire department in the nation to operate its own fleet of salvage rigs. Salvage teams were assigned throughout the City. At fire sites they covered furniture and valuables with tarpaulins while the fire fighters fought the fires. This tactic significantly reduced property damage and improved insurance ratings for the City. A Demolition Corps of personnel who were trained in handling explosives was established for such duties as dynamiting fire or flood damaged structures, preparing fire breaks and combating gas fires. Around 1924 the Department became the first major fire agency in the nation to equip all of its vehicles with two-way radios.

Fire Department expansion almost halted during the period of the Great Depression due to a lack of monetary resources. During the early 1940s, training and procedural changes reflected war concerns, including response to possible air raid attacks. A special Mountain Patrol was established to monitor potential targets of anticipated incendiary bombs.

After World War II the Department expanded dramatically in response to a commercial, industrial and population boom. Passage of a $4.5 million bond issue in 1947 enabled the construction or upgrading of 35 stations and purchase of new, modern apparatus. Upgrading of its services earned the Department its first national Board of Fire Underwriters "Class I" rating (1947).

Fire prevention. Fire prevention long has been recognized as the best method for reducing fire incidence and devastation. As the Fire Department became more organized and better accepted, the City adopted fire regulations and authorized fire fighters, police and other officials to enforce them. Increasingly comprehensive ordinances were passed to regulate building design, materials and occupancies so as to better contain fires and reduce fire hazards.

The first regulations applied to Fire Districts which were established in 1869 in the most densely developed sections of the City. By 1874 the amount of hay, gun powder and kerosene which could be stored in buildings was regulated, outside walls and roofs were required to be made of noncombustible material and stoves to be surrounded by masonry. In the 1880s concern regarding spread of fire and loss of life resulted in requirements for separate exits for large assembly halls, fire walls between adjoining buildings, exit aisles and swinging doors. In some districts, such as what is now the Central City, wooden structures were prohibited and masonry structures were required. Wood remained the most common construction material for buildings outside of the downtown fire districts. In 1907 water connections were mandated for new and existing homes. With the advent of electrical wiring, fire hazards increased, leading to the establishment of electrical safety codes.

Around the turn of the century, insurance companies played a significant role in the improvement of fire standards throughout the nation. Facing high costs from poorly managed fire systems, the fire underwriters joined together in an association which established fire rating systems to assess efficiency and effectiveness of local fire hazard mitigation and fire fighting agencies. Insurance rates were established accordingly. Cities could lower their fire insurance rates if they improved their hazard mitigation and fire fighting systems. This economic incentive spurred nationwide interest in fire prevention and suppression and continues to do so to this day.

In 1916 a Fire Prevention Bureau was established to carry the message of prevention to the general public, encourage voluntary hazard prevention measures, enforce hazard mitigation ordinances and improve prevention regulations and methods. The Bureau quickly inaugurated its first public information program. It was aimed at the general public and especially at children because fires set by children playing with matches was one of the major causes of fires. Public education was recognized as an important fire prevention tool. Programs, like firemen's musters (skills demonstrations) were designed to interest the public in fire prevention and to recruit young men into the volunteer fire service. Firemen visited schools to demonstrate their equipment and techniques and to present a fire prevention message. By 1929 Los Angeles boasted an average $1.05 per capita loss due to fire incidents, compared to the $2.10 national average. This was due in large part to the Department's aggressive efforts to improve its own resources, techniques, equipment and response as well to the upgrading of fire prevention and suppression regulations, strengthening of enforcement and improving the public's fire prevention awareness.

In 1942 a Junior Fire Department was established in conjunction with the city schools. Not only did it inculcate good fire prevention awareness but it provided a sort of Little League for fire service by providing a career development program. School and community fire prevention programs to this day are an important means of encouraging the public to exercise fire prevention in their daily lives.

Fire prevention measures often were adopted following fires which resulted in loss of life or significant property loss so as to prevent similar occurrences in the future. Sometimes it took more than one tragic event to trigger public support for changes. This was due to conflicts between life safety issues and costs to property owners who would be required to implement safety features. For example, as early as 1912, a fire in the St. George Hotel in the downtown raised the issue of the danger of open stairwells in spreading fires. However, no action was taken. In 1928 open stairwells contributed to a fire in the Ponet Square Hotel in the Central City area.

In 1952 seven people were killed in a second St. George Hotel fire. Following this fire, *The Los Angeles Daily News* ran an exposé which revealed that 248 hotels and apartment buildings (10,000 units) had fire violations and open stairwells which made them firetraps. Nevertheless, a proposed stair enclosure ordinance was not adopted. It took the tragic second Ponet Square Hotel fire of 1970, in which 19 residents lost their lives, to provide the impetus for passage of an ordinance. The Ponet Square Ordinance included requirements for stair shaft enclosures, self-closing doors and one-hour fire doors. It applied retroactively to pre-1943 structures of three or more stories in height. A four-year grace period was allowed for compliance. Over 1,200 of the 1,487 buildings affected by the retrofitting provisions were located in the older Central City area.

A major multi-casualty fire occurred in the Stratford Apartments (Westlake community) in 1973. It took the lives of 25 of the 120 tenants, including nine children. The Stratford was a pre-1943 building which had not been retrofitted. Following the fire, the Ponet Square Ordinance compliance grace period was rescinded. The 1983 Dorothy Mae Apartments fire resulted in the loss of 25 civilian lives in a building which had been retrofitted to comply with the Ponet Square ordinance. Most victims lost their lives in the hallways at stairwell exits due to flash over situations. To prevent similar tragedies, a retroactive ordinance was adopted for pre-1943 apartment and hotel buildings of three or more stories. It required automatic sprinklers in common areas and inside entry doors to each residential unit and mandated installation of fire alarm systems.

The Department has not waited for fires to happen. It has been aggressive in researching and evaluating fires. Operation School Burning was instituted by the Department in 1958 following the Chicago Our Lady of the Angeles parochial school fire which killed 95 children and teachers. The program utilized a vacated school facility to monitor scientifically the propagation and spread of fires and methodologies for preventing, suppressing and containing fires and saving people. From this program came supervised school fire drills to train students and teachers to respond appropriately and without panic to a fire situation. In addition, new regulations were developed to make schools safer.

A similar program was utilized in 1977-78 to evaluate house fires and to develop and field test prevention and suppression measures. It demonstrated the effectiveness of early warning, sprinkler systems and smoke detectors in homes and dramatically changed available information about the time/temperature curve for fire development. Findings were utilized by private industry in product development.

Fire prevention and enforcement measures account for a continuing reduction in deaths and injuries associated with fires related to structures. For example in 1983-4 the Fire Department responded to 5,620 structural fires. In 1992-3 it responded to 4,010 structural fires even though the City's population had increased by 17% (500,000 people), new construction had increased substantially and a greater intensity of development had taken place, *e.g.*, multi-story and high rise buildings had replaced low density structures.

Training. Unlike fire agencies in many other jurisdictions, all Fire Department emergency personnel, including fire fighters, inspectors and an increasing number of emergency medical personnel, are trained fire fighters and all are given emergency medical training. This enables an efficient mobilization in event of major emergencies and has resulted in a department in which fire fighters are multi-skilled. Fire fighters receive on-going skills training to familiarize them with new techniques and equipment and to refresh their skills.

The Department long has been known for its innovative leadership in the field of fire fighting techniques and strategies. In the early days, firemen responded in an ad hoc fashion to fire incidents. They used their muscle, agility and quick wits to assess and respond to a situation, often operating independently of each other. The ad hoc approach to fire fighting was inefficient and sometimes resulted in injury to firemen. To improve efficiency, safety and effectiveness the Department established a unique Fire College. The program included classroom training as well as exercises under simulated emergency and fire conditions. It was the first such educational program in the nation. Instructors were required to have at least seven years of fire fighting experience and a teaching credential from the University of California at Los Angeles. The first class graduated in 1925. The Fire College transformed

the Department into one of the most professional in the nation and was credited with a significant reduction in property losses and loss of life due to fire. It was so successful that in 1931 the Federal Board of Vocational Education incorporated the College's curriculum into a standard curriculum for fire personnel. Fire College instructors were hired by the International Association of Fire Chiefs and National Board of Fire Underwriters to help other departments establish similar training programs.

In 1957 the Emergency Operational Procedures Manual was developed to provide coordinated ground and air procedures for fighting brush fires. The manual was the precursor of the Incident Command System which provides coordinated procedures for multi-unit response to emergency events. Exercises were conducted to assure that personnel were familiar with the procedures, thereby increasing efficiency and effectiveness.

Coordination/mutual assistance. Because the City surrounds other cities, *e.g.*, Beverly Hills and West Hollywood, and adjoins other cities as well as county, state and federally controlled lands, it has joined in a variety of agreements with other jurisdictions for cooperative response and management of fires and other emergency incidents. Containment and suppression of a fire within an adjoining jurisdiction protects the City from encroachment and damage from the fire, thereby protecting the population as a whole. Most of the agreements are voluntary. Services are accepted and rendered at the discretion of the respective jurisdictions, depending upon factors such as availability of personnel and equipment. Under such agreements, usually the nearest fire units, regardless of jurisdictional boundaries, respond to fire or emergency medical calls. For example, since 1952 the Department has participated in a memorandum of understanding with the U.S. Forestry Service to render "all reasonable assistance" in suppressing fires along or near the National Forest boundary. It participates in automatic response agreements with the County and adjoining cities of Beverly Hills, Burbank, El Segundo and Santa Monica for fires within specific geographic areas of each jurisdiction and in contract agreements to provide services to the City of San Fernando and the community of Bell Canyon (in Ventura County). Under mutual aid agreements, personnel and equipment sometimes are loaned to jurisdictions experiencing major incidents which exceed their resources. For example, when an area experiences major brush fires, crews and equipment sometimes are sent from not only other California jurisdictions but other states as well, through agreements coordinated by the Governor's Office of Emergency Services or the Federal Emergency Management Agency. In recent years, City fire fighters have assisted in suppression of brush fires in the immediate region and as far away as Mammoth Lakes in the High Sierras and Mt. Palomar in San Diego County.

When a major disaster strikes, local, state, federal and private agencies respond under mutual aid agreements and federal, state and local disaster response procedures. The City's Emergency Operations Organization is the primary City organization under which City agencies join together in emergency preparation, response and recovery planning. In addition, the fire and police departments and other emergency response personnel participate with like agencies in other jurisdictions in training exercises and network coordination. Following the Watts civil disturbance in 1965 the Fire Department developed a task force procedure for more efficient deployment of personnel and equipment in response to emergencies. Civil disturbances and increased violence have resulted in cooperative procedures between state and local law enforcement agencies and the Fire Department to protect fire fighting and rescue personnel.

Coordination sometimes has been hampered by a lack of compatible communications systems, utilization of different terms for agency functions and a confusing variety of local agency organizational structures. These factors hampered communications and sharing of resources to fight a series of devastating fires in the Southern California region during 1970. The experience resulted in establishment by the U.S. Forestry Service of a partnership of local, state and federal fire agencies to develop improved coordination for fire suppression management and emergency response. The partnership evolved into the Fire Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) program. FIRESCOPE[5] developed the Incident Command

[5] *When FIRESCOPE became state wide, the word 'Southern' subsequently was dropped but the acronym 'FIRESCOPE' was retained.*

System (ICS) and Multi-Agency Coordination System (MACS) which were designed to improve multi-agency response to multi-hazard events, including earthquakes, floods and fires. The Los Angeles City Fire Department was a leader in developing these programs and one of the first to make them operational. The programs established plans and procedures for improved interagency coordination, including common terminology, organizational structures (chain of command) and response procedures and for compatible communications (*e.g.*, radio frequencies) and equipment systems (*e.g.*, hose connections). The goal was to make agency personnel and equipment readily interchangeable within and between jurisdictions and command levels so as to facilitate effective deployment and efficient utilization of limited resources between federal, state, regional, district and local agencies and operational levels. When incidents exceed or are anticipated to exceed the resources at a particular response level, assistance is requested from the next level which in turn evaluates the needs and assembles and allocates personnel and other resources. The ICS and MACS procedures were incorporated into the City's fire fighting program where they were tested in mock and real situations. The State's Standardized Emergency Management System (SEMS) regulations of 1994 was patterned in part after the ICS and MACS programs in response to the Oakland-Eastbay fire in northern California. The SEMS encourages compatibility between all emergency agencies operating within the State. The agreements described above are but a few of the cooperative agreements in which the Fire Department is a party.

Brush fires. Brush fires continue to be a major threat to life and property throughout the region due to unique fuel, terrain and climatic conditions. The hazard is especially great when the dry "Santa Ana" winds arrive, usually in the fall and winter seasons. The desert blown Santa Anas turn vegetation to tinder and spread localized fires quickly. A brush clearance program was instituted in 1920 using paid civilians to clear vacant lots of debris and rubbish. The program significantly reduced brush fires. In 1924 a civilian Mountain Fire Patrol was established to improve fire safety in hillside areas. The Patrol counseled private property owners in fire prevention and encouraged them to maintain burlap bags and other fire fighting material to protect their homes which often were distant from fire stations or were not served by adequate roads. Boxes of fire fighting tools were placed at strategic locations along Mulholland Drive and fire breaks, fire trails and fire roads were maintained to slow movement of fires and provide access for fire fighters. However, the fire breaks proved ineffective with major fires. Wind conditions, including those generated by a fire, could carry burning embers and materials far beyond fire breaks. In 1958 the City banned incinerator and open burning to reduce fire hazards and improve air quality. The ban resulted in the lowest incidence of fires in 14 years.

To date, the 1961 Bel Air fire storm in the Santa Monica Mountains is ranked as the City's most costly brush fire. The 50 mile an hour Santa Ana winds, combined with fire-generated winds, carried burning debris and set new fires far from the main front. Within the first six hours, before defensive procedures became effective, 484 homes and other structures were destroyed. The fire lasted two days, destroyed over 500 structures and burned 6,090 acres of watershed within a 19-mile perimeter. Even with this loss, 78% of all the homes within the perimeter were saved. A direct result of the fire was the phasing out of the Mountain Fire Patrol, rebuilding the two existing fire stations and constructing two new stations along Mulholland Drive, the road which runs along the ridge of the Santa Monica Mountains. In addition, the Mountain Fire District and Buffer Zone boundaries were expanded to include a greater area and a Department Brush Clearance Unit was established to enforce brush clearance regulations in the Districts and Zones. The Public Works Department's Bureau of Street Maintenance took over the responsibility of enforcing brush clearance on vacant lots within other areas of the City.

Devastating brush fires have resulted in establishment of more fire stations and facilities in hillside areas and in more stringent requirements for fire hydrant installation, hillside brush clearance, fire access road systems, home sprinklers, fire resistant construction and landscaping materials, and development of improved fire fighting strategies and equipment. In 1962 the Department acquired its first helicopter with water dropping capability. Subsequently, air craft became important equipment for fighting brush fires. They were used for dropping

water and chemicals on targeted fire areas. Flammable roofs long had been identified by fire agencies as major contributors to property damage and the spreading of fire storms in developed areas near brush lands. In 1970, following the Chatsworth fire in which 113 homes were damaged or destroyed, the City required that new homes in Mountain Fire Districts treat combustible roof materials so as to make them more resistant to fire. Following the devastating December 1989 Sesnon (Granada Hills) fire which destroyed or damaged 30 dwellings, combustible roofing material was banned from use in construction of new homes in Mountain Fire Districts.

Between October 25 and November 10, 1993 an unprecedented series of 22 devastating wild fires occurred in the six county Southern California region (from Ventura to San Diego County). The fires were caused by arson (12 fires), arcing power lines (6), campfires (2) and undetermined sources and were fanned by Santa Ana winds and fueled by a combination of dead undergrowth resulting from a seven-year drought and heavy new growth caused by recent rains. The fires burned 197,277 acres, destroyed over 1,170 structures and killed three people. They were battled by a force of 9,476 fire fighting personnel from 458 agencies from around the nation. The last and largest of the fires was in the Topanga-Malibu area (November 2-7). The fire burned 18,000 acres, destroyed 384 structures and killed three civilians. Fire fighters were shifted by the FIRESCOPE center in Riverside County from other fire sites to Malibu-Topanga and placed under the command of the Los Angeles County Fire Department. The largest commitment of fire personnel in fire fighting history, 7,136 fire fighters, were involved in battling the Topanga portion of the fire and a total of over 9,000 personnel battled both segments. The fire was an extremely dangerous, rapidly changing, fast moving fire. Fire fighting was hampered by steep hillside terrain, narrow mountain roads, falling debris dislodged by the fire and shifting winds which sent flames up to 200 feet in the air and carried burning embers which ignited new fires. Resources were deployed to protect structures and to contain and eventually suppress the fire. Fixed wing and helicopter aircraft were used to battle fires.

The 22 fires, especially the Topanga-Malibu fire, successfully tested FIRESCOPE. Different agencies interacted and combined into a single force under a unified command system as planned by the FIRESCOPE protocols. The fires also tested the processes and procedures of individual agencies to combat and manage major fires and proved the effectiveness of the City's hillside brush clearance law. Clearance of brush within 100 feet of structures in Mountain Fire Districts not only protected the structures but enabled fire fighters to battle fires without having to stand in fuel (brush). Following the fires, the Governor's Office of Emergency Services convened a survey team to review all of the fires and recommend additional procedures and measures to improve response and coordination. A direct result of the Topanga-Malibu fire was the signing of a cooperative agreement for use of planes ("Super Scoopers") which could scoop water from the ocean and drop it on brush fires. The Super Scooper agreement marked the first time that federal, state, county and a city had joined in a cooperative agreement with another nation (Canada) and a private manufacturer to test new equipment in the field as a means of exploring new fire fighting tools. Another direct result of the fire was the Department's decision to secure syphon ejectors, pumps and other equipment to enable utilization of water from private swimming pools for fire fighting.

High rise and complex structural fires. Improved building construction engineering, materials and mechanisms made possible construction of increasingly taller buildings. Lighter materials, such as asbestos was used instead of brick for fire proofing. The first four-story wood frame building was constructed in Los Angeles in 1882. By 1888 seven story buildings with brick bearing walls were permitted and fire escapes were required for buildings four stories or more in height. With the advent of elevators and minimal masonry reinforcement, the City in 1903 allowed the construction of its first 13-story office building. In 1905 the fire escape ordinance was made retroactive and enforcement was delegated to the Building Department. Subsequently, water connections were required in new multi-story buildings to facilitate fire fighting. In 1910 the height limit was set at 150 feet (13 stories) for steel frame office buildings, the maximum possible under then available engineering techniques, and five stories for residential buildings, including hotels. After building technological advances enabled construction of

taller buildings, the height limit was retained to assure that the proposed City Hall would be the City's tallest building. City Hall was dedicated in 1928 and at 452 feet in height (over 28 stories) it remained the tallest building until the 1957 floor area ratio ordinance replaced the height ordinance. The 1957 ordinance allowed unlimited height with a maximum floor area in order to encourage provision of open space and more imaginative building design. In 1962 the 32-story Occidental Tower (later TransAmerica Building) was constructed in the Central City community. It became the first building to exceed the height of City Hall. Hundreds of high rise buildings have since been constructed in the City. This has necessitated entirely new techniques for fire mitigation, suppression and rescue.

In 1964 Operation High Rise was instituted. It used empty buildings to study the propagation, effects and spread of fires and to develop systematic response and suppression procedures for high rise fires. Procedures developed by this unique program and subsequent programs have been used by emergency response agencies throughout the world. The first significant local test of Operation High Rise was in 1968 for a fire in the 9-story U.S. Borax and Chemical Corporation building in the Westlake area. Heat activated elevator buttons caused elevators to be called to and to remain at the fire involved floor, resulting in the death of one fire fighter. Emergency alarm systems failed to work and hand held walkie talkies proved ineffective inside the building. Out of this tragedy came new building construction requirements and fire fighting procedures, including banning of heat activated elevator buttons by Los Angeles and establishment of a new Department procedure requiring fire fighters to use stairs instead of elevators to gain access to a fire involved floor. The first major high rise fire in the nation, the One New York Plaza fire of 1970, triggered a national review of hazards associated with high rise buildings. The California State Legislature in 1974 adopted high rise fire safety regulations which included requirements for automatic sprinkler systems in any new buildings which were 75 or more feet in height.

Revised procedures were successfully used in the 1971 Westwood Center Building (Glendon Avenue, Westwood community) fire. The Department quickly contained the fire and suppressed it within half an hour. In 1976 the new Incident Command System (ICS) was instituted. It was designed to improve operations and coordinate fire suppression resources. Its first major test was the 1976 fire on the 20th floor of the Occidental Tower building. The success of ICS resulted in adoption of the ICS methodology by other emergency response agencies around the world.

The 1979 fire on the 11th floor of the Bunker Hill West Tower (Hope and Third Streets, Central City) was the City's first major fire in a residential high rise building. Residents were phoned and urged to remain in their rooms so that opening of doors would not spread the fire and so that residents would not become victims of smoke inhalation. One couple died when they were literally blown off a balcony ledge when the fire burned from the open room across the hall, through the door to their unit, causing a blast of heated air. Following this tragedy, rescue procedures were improved and, in 1980, smoke detectors were required in all new residential high rise buildings and any high rise buildings which were issued remodeling permits.

In 1984 the Department's improved ICS procedures were successfully used in responding to the 12-story Fickett Towers (Van Nuys community) senior citizen building fire. The fire was knocked down in 71 minutes and all 230 of the elderly and infirm tenants were successfully evacuated.

The most materially damaging high rise fire in City history occurred in 1988 in the 62-story First Interstate Bank Building fire (Wilshire Boulevard at Hope Street, Central City) which claimed the life of one civilian. The fire began on the 12th floor and moved upwards to the 16th floor before it was contained and suppressed. Following the Interstate fire, the City Council required fire sprinklers in the 363 existing commercial and office buildings constructed before the State sprinkler regulations became effective. The fire also underscored to private industry the need for private back-up systems and facilities to enable continuance of business operations following a fire.

One of the most complex and difficult fires ever fought by the Department was the 1986 Central Library fire (5th Street at Grand Avenue, Central City). The open book stacks, narrow corridors, circuitous stairways, interference of the thick walls with

the walkie-talkies, lack of windows and ventilation, dense smoke, intense heat (estimated as high as 2500 degrees in some areas), limited access and fire fighter exhaustion due to heat and exertion made the fire difficult to attack. Extensive pre-planning for a potential fire in the historic structure resulted in an orderly evacuation of library staff and patrons and invaluable familiarity of the fire commanders with the building and its unique fire suppression demands. Salvage units quickly instituted procedures to protect the 1.2 million books and documents from smoke and water damage. Ingenious methods were devised to direct smoke from the building and relay fire fighters in and out of the fire areas. After seven hours and thirty-eight minutes the fire was brought under control. It took another five days to mop up the hot spots and for the building to cool down. The 350 fire fighters saved over a million books. Only 350,000 books were fire or water damaged and only 4% of the $500 million value of the structure was lost.

Harbor and airport emergencies. With the annexation of San Pedro and Wilmington in 1909, including property which would become the future Port of Los Angeles, the Department began to develop capabilities for fighting dock and other harbor fires. Two private tugs for ocean vessel and pier fire fighting were replaced in 1916 by a motor launch fire boat and two steam pumpers on a barge. In 1919 the City's first fire fighting vessel was commissioned. A subsequent 1924 bond issue enabled the construction of one of the world's most powerful fireboats. Its "guns" could deliver 10,200 gallons of water per minute to douse waterfront and harbor fires and it had a unique stationary tower which could be extended to 44 feet above the water line. Three more fire boats were added in 1928. In the 1960s, self-contained underwater breathing apparatus equipment enabled more effective response to underwater fires, spills and other emergency incidents in the Port. To facilitate response, the Department has entered into cooperative arrangements with federal, state, county and the adjoining Port of Long Beach for response to fires, hazardous materials spills and other emergencies in the harbor area.

Airport expansion resulted in the establishment of fire stations at the Los Angeles International (LAX) and Van Nuys airports in 1956. As with the harbor operations, special equipment, tactics and training were instituted to prevent, suppress and contain fires and to rescue potential victims. The first major air crash took place in 1978 when a Continental Airlines DC-10 crashed on take-off at LAX. LAX Fire personnel quickly suppressed the blaze and saved the lives of all but three of the 198 passengers and crew. Due to the quick response, the emergency was over in less than six minutes. Today both the port and airports have on-site fire fighting operations and special equipment designed for the unique needs of those facilities.

Arson fires. Arson is a major cause of fire, averaging 10 incidents per day in 1994-95 with an estimated $23 million property loss (18% of the total loss due to all fires). Arson first was recognized as a major issue in 1887 when a spate of arson fires associated with anti-Chinese civil unrest in Los Angeles caused San Francisco insurance companies to cancel policies for properties in the old Chinatown area (roughly from what is now Union Station to the El Pueblo de Los Angeles Plaza). In 1918 the Arson Bureau was established to investigate suspicious fires. The squad was so effective in identifying and bringing arsonists to conviction during the Prohibition era (1920-35) that during the Depression (1927-37) Los Angeles was not plagued by the rash of set fires which was experienced by many other jurisdictions. Arson investigations also led to a better understanding of the causes and propagation of fires and, thereby, assisted and continues to assist in the development of better prevention measures. By 1978 arson had become the fastest growing crime in the United States. To combat the crime, federal agencies joined with local agencies to establish task forces. In Los Angeles the Arson Suppression Task Force consists of representatives from federal agencies, the Fire Department and the Police Department. Arson Section investigations have resulted in a high rate of arrests and convictions, including convictions of the Dorothy Mae and Ponet Square arsonists. Of 148 arson related cases involving adults which were sent to the County District Attorney in 1991-92, 109 cases resulted in commitment of arsonists to imprisonment or mental health facilities or placement under supervised probation.

Hazardous materials mitigation and response. See Hazardous Materials section.

Rescue/medical. Rescue and provision of medical care to victims of fires always has been an impor-

tant function of the Department. A Rescue Squad began operating in 1922 to provide breathing apparatus and to attend to fire fighters at fire scenes. In 1930 a fleet of six ambulances was purchased to transport injured firemen to hospitals. The service soon was expanded to serve civilian fire victims. By 1957 the fleet included Department ambulances and ambulances operated by private companies. The first paramedic ambulance service was established in 1970. In that year, other City operated ambulances and their crews were transferred to the Fire Department by executive order of Mayor Sam Yorty. The Department reorganized the service and reassigned ambulances and crews to all areas of the City so as to facilitate efficient response. By 1973 all contract services with private ambulance companies had been phased out and the Department had assumed authority over all first care (response) medical service within the City. The operation was upgraded and became the Bureau of Emergency Medical Services. All of the Department's fire fighting personnel are trained in emergency medical skills so as to enable any fire fighting team to respond to an emergency medical call. By the 1990s more calls were received for medical services than for fire fighting services, *e.g.*, approximately 77 percent of the all calls received in 1993-94 were for medical services.

Following the collapse in 1963 of the Baldwin Hills Dam, the Department's new helicopter was used to rescue stranded and endangered victims. The success of the helicopter operation resulted in purchase of a fleet of helicopters. Following the 1992 drowning of a teenage boy in the Los Angeles River channel, the Los Angeles River Rescue Task Force program was established in cooperation with the Army Corps of Engineers and the County of Los Angeles to develop strategies for rescuing people who might become trapped in the over 400 miles of the flood control channels which exist within the City.

The Department has been called upon to respond to several major earthquake related emergencies beginning with the 1933 Long Beach quake. Following the 1971 San Fernando (aka Sylmar) earthquake the Department developed an Earthquake Response Plan which was utilized during the 1994 Northridge quake. The Department and other emergency professionals also evaluate response of other jurisdictions to major emergencies in other cities, states and nations so as to assess how to better prepare for local emergencies. Following the 1985 Mexico City and 1987 Whittier earthquakes, the City recognized that its personnel alone were insufficient to provide all assistance needed during and following a major disaster. To address this issue a Disaster Preparedness Division was established within the Fire Department to train City and private sector personnel in disaster response techniques and procedures. One of the programs is the Community Emergency Response Program (CERT) which trains volunteer community, business and City employee representatives in earthquake awareness, disaster fire suppression techniques, light search and rescue operations and team organization and management. The goal of CERT is to create a well-trained civilian emergency work force as an adjunct to professional forces. CERT trains people to establish neighborhood self-sufficiency during extended emergencies (such as earthquakes) and in situations where the numbers and scope of events overwhelms government emergency forces. The volunteers are trained to perform independently, to train other neighborhood or work area volunteers, to operate teams within their work areas or communities and to work with professional forces in other disaster areas to which they might be assigned. As of 1994 the CERT Program had trained over 12,000 people and its techniques had been adopted by other agencies, including FEMA, to train volunteers throughout the nation.

Following the 8.1 magnitude 1985 Mexico City earthquake, the Department recognized the need for equipment to facilitate rescue of victims trapped in structures and to stabilize hazardous structures. With the support of the City's Emergency Operations Organization, the Department purchased better equipment, including diamond blade power saws and air lifting bags. The equipment proved invaluable in rescuing victims following the 1993 Northridge earthquake.

In 1990, FEMA sponsored a conference in Seattle, Washington for the purpose of developing a national Urban Search and Rescue (US&R) response plan. This led to the formation of 25 Federal Emergency Management Agency (FEMA) US&R Task Forces which are located throughout the nation. Each of the 25 fully equipped, 62-person US&R teams can operate self-sufficiently for 72 hours. They are trained to a high level of expertise in rescue, medi-

cal and technical skills and are equipped with specialized equipment capable of dealing with difficult types of building and structural collapses in which people are trapped. The teams rotate the initial on-call responsibility. However, more than one team may be called to assist in a disaster situation. In a major disaster all might be called. The Los Angeles Fire Department is one of the 25 participants in this program. Its FEMA US&R team is maintained in addition to the US&R operations which are part of the Department's on-going US&R program.

Urban development in proximity to brush and hillside terrain makes containment of wild fires difficult. The density and variety of urban development from low rise to high rise structures, traditional commercial and industrial to harbor and airport facilities poses unique fire response and suppression challenges for the City's emergency forces. The broad scope of potential hazards is depicted on Exhibit D, "Selected Wildfire Fire Hazard Areas." The City's fire safety program addresses the broad scope of fire prevention and suppression and emergency response operations.

STORM WATER, INUNDATION AND OTHER WATER ACTION

The water-related hazard programs associated with the Safety Element relate only to those matters which are within the authority and responsibility of the City. However, it is important to understand the context within which the City operates. Water action hazards include major and localized flooding, erosion and landslides as well as potential inundation from water storage facility failure, seiches, mud and debris flows, tsunamis and other ocean wave related hazards. These hazards generally are depicted on Exhibits C (landslide), F (flood plains) and G (inundation and tsunami). Mitigation of water action hazards is a cooperative, multi-jurisdictional effort. It also is related to geologic conditions, seismic, fire and hazardous materials mitigation. To merely set forth the City's specific mitigation responsibilities would leave gaps and raise questions about how related hazards are addressed. Therefore, to provide a comprehensive overview, this section provides a summary of the historic evolution of the roles of various levels of government and how Los Angeles City fits into the overall hazard mitigation efforts.

In general, flood control authority can be summarized as follows: (1) the United States Army Corps of Engineers oversees construction of projects associated with navigable bodies of water, including the Los Angeles River-related flood control systems and ocean harbors; (2) the Los Angeles County Department of Public Works oversees construction of ancillary Los Angeles County Flood Control District facilities and designs and/or maintains the flood control drainage facilities, including the Los Angeles River system (under the guidance of the Army Corps) to mitigate 100- and 500-year storms; and (3) the City Bureau of Engineering oversees construction and maintenance of the City's storm drainage system which is designed to mitigate 50-year magnitude storms. Various City agencies implement development permit, slope stability and watershed protection regulations.

The flood control and storm drainage systems are comprised of the following principal features: (1) debris basins at the mouths of canyons to slow the flow of water and trap boulders, rocks and debris and to prevent clogging of the flow channels; (2) flood control basins (dams) at the upstream portions of the rivers to contain water and regulate downstream flow; (3) containment of over 400 miles of river and tributary systems within mostly open concrete flood control channels; (4) streets, gutters and catch basins to collect and route surface flows to storm drains which carry urban run-off to larger tributary systems and, ultimately, to the flood control channels and ocean; (5) spreading grounds in the San Fernando Valley to impound storm water and allow it to percolate into the ground where it replenishes the underground water system; and (6) associated bridges, reservoirs and water storage facilities. The purpose of the flood control system is to carry storm waters as quickly as possible to the Santa Monica and San Pedro (harbor area) bays to prevent flooding.

Before the flood control system was built, the Los Angeles River and its tributaries flowed freely from the Santa Susana, Santa Monica and San Gabriel Mountains to the sea, flooding large portions of the basins south of the mountains. The Los Angeles basin between the Santa Monica Mountains and Wilmington-San Pedro (future site of the harbor) was dotted with swamp lands and marshes fed by the rivers and streams. Local Spanish names derive

from this marshy landscape including "arroyo" (water course), "cienega" (marsh), "zanja" (ditch) and "redondo" (willow). A swamp existed in what is now the Central City. Figueroa Street was called Grasshopper Street and the area became known as "Grasshopper Gulch" due to the insects which lived in the swamp and plagued that part of the community. Today ground water still is very close to the surface in the Wilshire District, feeding the La Brea tar pits, which once entrapped pre-historic animals, and requiring special building design considerations to protect against flooding of subsurface structures. "Brea" is Spanish for "tar."

Capital floods. Major storms which cause a high magnitude of water flow can be devastating to a wide geographic area. They are the most dramatic and potentially the most hazardous water activity confronting the City. The Los Angeles region is a semi-arid region with rainfall which averages 15 inches per year but can vary from 8 to 30 inches per year. Rains tend to occur in heavy, short duration storms between November and April. In a 100-year storm (Exhibit F), 10 to 24 inches of rain may fall within 24-hours or as much as one inch of rain a minute for a brief duration. Severe storms are periodic and may not occur for several years. Paving of the City with structures and impermeable surfaces has eliminated natural ponding areas which allowed water to percolate into the soil. This has facilitated water runoff and velocity of runoff thereby increasing the potential for flooding. Water rushes from streets and other impermeable surfaces along the path of least resistance to the ocean.

Between 1815 and 1938 seventeen major floods were recorded. The 1815 flood cut across what is now the Central City, diverting the Los Angeles River to the Pacific Ocean via Ballona Creek. The flood of 1825 diverted the river from Ballona Creek to its present course. After the 1825 flood, the City was reestablished in the 1815 flood plain without thought of potential future flooding. The floods of 1867-8 destroyed the City's new water system, including a reservoir and a dam intended to divert water for domestic and irrigation needs, changed the course of the San Gabriel River and convinced the City Council to hire the first City Engineer. The 1865-71 droughts devastated farms and the cattle ranches which had characterized the region for a century. To recover losses, ranches, orchards and farms were subdivided and sold. The smaller plots began to be developed with homes, businesses and urban infrastructure. Railroads were extended into the region in 1865, spurring a development boom and accelerating in-migration from the eastern United States. Prior to 1914 there was little interest in providing protection from flooding because the City was rural in character, development was dispersed and major permanent infrastructures had not been constructed. Flooding tended to be localized or occurred in areas not yet inhabited or utilized. As Los Angeles became more urbanized, permanent structures were installed, the population became more concentrated, impermeable surfaces caused more and swifter runoff and flooding increased the threat to life and property.

The first public program in the area to address flooding was the Los Angeles harbor construction project of 1898 which included flood water and silt diversion to protect the harbor. On December 31, 1898 the Army Corps of Engineers, which was charged with the responsibility of improving navigable waterways of the United States, established a 19 man team to plan and build a deep water harbor for the City.

Flood control initially was not within the authority of the Corps, except as it pertained to harbor improvement. The harbor project was completed in 1914. In 1914 over 19 inches of rain fell in four days causing streams and rivers to overflow, turning sections of the Los Angeles basin into islands, severing communications and causing $10 million in property damage, including damage to the harbor. In response, the State, in 1915, created the Los Angeles County Flood Control District to prepare and carry out a flood control plan. Major flooding in 1916 resulted in passage of a County bond issue for the Army Corps to construct the first phase of the flood control system. The project, the Dominguez Narrows by-pass, was completed in 1921. It diverted Los Angeles River flood waters and eliminated harbor silting by emptying flood waters into what is now the Long Beach harbor. Between 1917 and 1939, dams, reservoirs and debris basins were constructed in local mountains, along with some river channel enclosures, but the construction did not keep pace with the explosion in urban growth and was not sufficient to protect the populace. A series of devastating floods between 1921 and 1938 dem-

onstrated the need to establish and carry out a comprehensive flood control plan and resulted in a series of federal acts which gradually expanded the role of the Army Corps and provided funds to construct local drainage systems. The most devastating flood ever experienced by Los Angeles occurred on March 2, 1938. Two days of flooding caused over $40 million in damage and the deaths of 113 people, disrupted the City and again severed communications systems. The disaster resulted in establishment of the first local emergency plan (to aid victims and control looters and sightseers) and adoption of the Drainage Act of 1938 which mandated the Army Corps to prepare a flood control plan for the entire Los Angeles County Drainage Area. The plan was adopted by Congress in 1941 and construction of the system was authorized.

Between 1935 and 1970 the Army Corps oversaw the construction of a system of drainage projects designed to contain the Los Angeles, San Gabriel, Rio Hondo and Santa Ana Rivers as well as Ballona Creek, the Dominguez Channel and other waterways so as to prevent future flooding in the Los Angeles basin from 100-year and 500-year magnitude storms. Two three-day storms in 1943 led to enactment of the National Flood Control Act of 1948 which permitted construction of small flood control projects and performance of emergency work without authorization of Congress. As each phase of the flood control system was completed, except for the dams and dam basins, it was placed under the authority of the Los Angeles County Flood Control District which was charged with maintaining the system (including 58 miles of the Los Angeles River which runs through 13 cities from Calabasas to Long Beach). The principal function of this massive system was to prevent flooding by channeling storm waters so they would be carried as quickly as possible to the sea.

Fire-flood cycles in recent years have increased flood hazards. Rains regenerate growth of vegetation on hillside slopes. The hot summer climate dries out vegetation, creating fuel for fires which destroy the vegetation. Lacking vegetation to slow water flow and enhance water absorption, rain water rushes unimpeded down the fire denuded slopes causing erosion and flooding. Such cycles in 1968-69, 1977-78, 1979-80, 1982-83 and 1994-95 resulted in flooded and washed out streets, destruction of bridges, loss of life, landslides which destroyed hillside and coastal properties, localized but destructive flooding and mud and debris flow inundation of properties below denuded areas.

Since 1940, the City and County have become increasingly urbanized, adding more impermeable surfaces which have increased storm water runoff which in turn has taxed the capacity of the current system during major storms. In 1980 a levee of the Los Angeles River flood control channel near the City of Long Beach was threatened with overtopping by flood waters. This raised concerns about the adequacy of the capacity of the southern sections of the channel to protect adjacent cities. Destructiveness of recent floods and the issue of system capacity have contributed to a re-evaluation of the flood control system by the Army Corps and County Department of Public Works (which in 1985 took over the Flood Control District). They currently are preparing plans to increase the capacity of the Los Angeles River channel in order to meet Federal Emergency Management Agency (FEMA) guidelines for protecting downstream cities from flooding.

Drainage. Within the broad context of regional flood control the City's role is relatively small but critical. It is responsible for construction and maintenance of a storm drainage system within the City's boundaries. The first drainage system was constructed by settlers after the City was established in 1784. Zanjas (ditches) were dug to trap and guide water for drinking, irrigation and drainage. During the 19th Century, wooden (typically redwood) and pottery pipes were added. The first large publicly constructed drainage system may have been the system installed by the Army Corps during the Civil War to drain ponds and wet lands and supply water to the Army's Drum Barracks at Wilmington.

Los Angeles City committed itself to construction of a drainage system after the devastating floods of 1867-68. Contrary to common practice of the time, the storm drainage system was separated from the sewer (i.e., waste water) system and remains separate today, except for treated waste water which is discharged into the flood control system or directly into the ocean. The separation was established following an 1870 report by Frank Lecouvreur, the City's first Engineer, that separation would prevent

overwhelming of the sewer system by flood waters associated with periodic major storms. By 1879 a sewer system to take waste water from what is now the civic center to the ocean was under construction. In addition, Lecouvreur designed an east-west street system to assist the flow of rain waters via a street gutter system. The gutters carried storm and daily run off water via the zanjas to ponds and other natural collection areas or to rivers.

The City Bureau of Engineering is charged with overseeing construction of the City's storm drainage system. In addition, the Bureau, under contract to the County, sometimes designs and constructs sections of the County Flood Control system. The City's storm drainage system is integrated with the County Flood Control system and drainage systems of neighboring jurisdictions. The City system consists of streets (including gutters), approximately 1,500 miles of storm drains beneath the streets, approximately 50,000 catch basins which collect runoff from the streets, several large spreading grounds and several pumping facilities. It is designed to accommodate 50-year magnitude storms. During dry weather the combined County and City storm drainage systems carry tens of millions of gallons of runoff (*e.g.*, treated waste water, lawn irrigation, *etc.*) daily. During storms it carries billions of gallons of storm runoff per day. Runoff is carried via open flood control channels directly to the ocean or to collection systems, as envisioned by Lecouvreur in 1870.

Until recent times, the drainage system primarily was financed with public funds or by bond programs. The State Subdivision Map Act of 1907 provided for dedication of land for public purposes. In 1911 the State Improvement Act empowered local governments to use easements, eminent domain, assessment districts and subdivision procedures to secure streets, sewers, drainage and other infrastructure systems. The Subdivision Map Act was amended in 1921 to allow cities to require easements for drainage purposes but legal challenges prevented them from exacting land from property owners. Therefore, dedication of land for public purposes generally continued to be voluntary or was secured through purchase following costly and often lengthy condemnation proceedings. With limited funding available for purchase of easements and construction, development of the system was slow until the Great Depression when federal and state public works programs for the unemployed provided millions of dollars for system construction.

A City's right to withhold building permits for noncompliance with public dedication requirements was upheld by the California Supreme Court in 1966 *(Southern Pacific Railroad versus the City of Los Angeles).* This decision strengthened the City's ability to secure drainage facilities in conjunction with new development. Local authority was further strengthened by the California Environmental Quality Act of 1971 which required development projects to mitigate potential environmental impacts of proposed projects. Under the State Subdivision Map Act (California Government Code Sections 66410ff), environmental mitigation and City regulations, the City in recent times has required owners of proposed development projects to construct drainage systems to accommodate runoff associated with a project and/or to protect a project and adjacent properties from storm water related hazards associated with the project. This has resulted in a systematic construction of drainage facilities in association with new development projects.

Drainage facilities are built to design specifications determined by the City's Bureau of Engineering. The Bureau in the 1920s established a hydrologic testing laboratory, later called the Hydraulic Research Laboratory. Using mathematical models and dynamic physical models, the lab developed and refined drainage system design and design standards. For specific projects its models were designed to take into account particular site specific factors such as degree of slope, susceptibility to flooding, anticipated velocity of water. The lab also designed associated equipment, including an efficient grate configuration for catch basin grates so grates would not be hazardous to bicyclists, and developed engineering aids such as hydraulic tables, charts and graphs. In the 1980s and 1990s the lab focused on designing wastewater related hydraulic structures. The laboratory incorporated computer technology to assist in hydraulic analysis. However, despite tremendous advances, computer modeling technology is not yet able to achieve the detail and accuracy provided by the lab's physical models. The lab's design innovations and standards have been used not only in development of the Los Angeles storm water and waste water systems and by the City's engineers

but have been used by other jurisdictions and private engineers.

Land use planning. Land use planning is important in protecting the public from storm water related hazards. The State Subdivision Map Act allows local jurisdictions to disapprove permits for construction of structures in flood hazard or inundation areas if the hazards cannot be mitigated adequately. The Flood Control Act of 1960 authorized the Army Corps to provide flood maps and information to local jurisdictions to assist them in land use planning. Subsequent federal and state (Cobey-Alquist Flood Plain Management Act, Water Code Section 8401c) legislation encouraged local land use planning, regulations and enforcement in flood prone areas by linking insurance rates and flood management funding to the adequacy of local regulations.

Flood hazard areas, or flood plains which are subject to 100-year floods (Exhibit F), comprise approximately 30 square miles of the City. These areas were mapped by the Federal Emergency Management Agency (FEMA), which deemed that approximately 15 square miles of the hazard areas were buildable. FEMA estimated that over 48,000 structures were located in the hazard areas. To comply with the Flood Disaster Protection Act of 1973, which increased the insurance rates set forth in the National Flood Insurance Act of 1968 and required local floodplain regulations to have enforcement provisions, the City of Los Angeles adopted the 1980 Flood Hazard Management Specific Plan (amended in 1988 by Ordinance 163,913). The ordinance establishes annexation procedures and permit review and mitigation procedures for issuance of development permits in areas prone to flooding, mud flow or coastal inundation. It also specifies the responsibilities of City agencies which process the permits. Mitigation measures include relocation of structures within a property, increased base elevation, additional structural reinforcement, anchoring, and installation of protective barriers. A permit can be denied if mitigation is deemed insufficient to protect human life. Compliance with the National Flood Insurance Act makes the City eligible for FEMA funds and reduced federal flood insurance rates. In addition, the General Plan community plan elements establish land use designations (zoning categories) for all properties within the City, in compliance with State land use requirements. Flood inundation areas generally are classified in the lowest density zoning categories.

Mud and debris slides and localized flooding. Watershed protection is a primary concern of the City, especially in hillside areas (Exhibit C). Permeable soil soaks up rain and irrigation water, proper grading and drainage systems channel and collect water to protect slopes from saturation and slippage, catch basins divert surface water to street gutters which divert the water to storm drains and flood control channels so as to reduce erosion and flooding. The Bureau of Engineering, Building and Safety Department, Planning Department and Fire Department coordinate development permit review and issuance to assure proper grading, drainage, irrigation and landscaping so as to preserve slope stability, provide erosion control and reduce potential for flooding and fire hazard.

Following major brush fires, federal or state agencies typically seed denuded areas with wild plant seeds which rapidly germinate thereby encouraging regeneration of vegetation which will hold the soil and protect the watershed from erosion. Remedial measures, such as sandbagging and erection of temporary erosion control measures, are instituted in anticipation of storms so as to protect road systems and property from potential landslides, flooding and mud and debris flows. To reduce fire hazards and protect slopes, the City requires vegetation clearance and encourages hillside property owners to plant appropriate vegetation and to implement proper irrigation and slope maintenance measures.

Beach erosion. Beach erosion mitigation is under the auspices of the Army Corps. Taming of flood waters of the Los Angeles River and draining of marshes, dredging, construction of breakwaters and creation of new land masses for development of the harbors changed ocean wave action and reduced the flow of natural sediments (sand) to the sea. Change in wave action and lack of sand to replenish beaches resulted in erosion of the coastline, undermining of cliffs and reducing or eliminating beaches. Undermining of cliffs sometimes resulted in landslides and loss of homes and property. Initially local jurisdictions were responsible for beach protection. In the 1930s the Bureau of Engineering Hydraulic Research Laboratory evaluated sand migration to

identify causes of erosion and means of mitigating erosion and protecting roadways and properties. It became clear the that primary cause of beach erosion was due to the breakwaters and other Army Corps constructed modifications of wave action along the coast. Mitigation generally was beyond the expertise and resources of local jurisdictions. In 1956 damage had become so serious that Congress expanded the role of the Corps to include responsibility for beach erosion management, *e.g.*, beach protection and replenishment.

Tsunamis and large ocean waves. Tsunamis are large ocean waves which are generated by major seismic events. Storms at sea also can generate heavy waves. Both have the potential of causing flooding of low lying coastal areas. Exhibit G depicts potential tsunami hazard areas. Hazardous tsunamis are rare along the Los Angeles coast. However, storm generated waves have caused considerable damage to property and beaches along the ocean perimeter. The City Flood Hazard Specific Plan sets forth design criteria for development in coastal zones, including increased base building elevations. The Army Corps is responsible for constructing and maintaining the breakwaters which are designed to mitigate damaging wave action, particularly in the harbor area. The Harbor Department works cooperatively with the Army Corps relative to maintenance and protection of the breakwater facilities. Along with the fire and police departments, it participates in the federal tsunami alert program to warn potentially affected properties and harbor tenants of tsunami threats and to advise them concerning protective response actions.

Seiches and inundation (water storage facilities). A seiche is a surface wave created when a body of water is shaken. Seiches are of concern relative to water storage facilities because inundation from a seiche can occur if the wave overflows a containment wall, such as the wall of a reservoir, water storage tank, dam or other artificial body of water. Mitigation of potential seiche action has been implemented by the Department of Water and Power through regulation of the level of water in its storage facilities and providing walls of extra height to contain seiches and prevent overflow. Dams and reservoirs are monitored during storms and measures are instituted in the event of potential overflow. These measures apply to facilities within the City's borders and facilities owned and operated by the City within other jurisdictions.

Inundation due to water storage facility failure also is a potential hazard. The Baldwin Hills dam failure of December 14, 1963 and near collapse of the Van Norman Dam during the 1971 San Fernando earthquake resulted in strengthening of the federal, state and local design standards and retrofitting of existing facilities. Thirteen dams in the greater Los Angeles area moved or cracked during the 1994 Northridge earthquake. The most seriously damaged was the Pacoima Dam which was located approximately eight miles from the epicenter. However, none were severely damaged. This low damage level was due in part to completion of the retrofitting of dams and reservoirs pursuant to the 1972 State Dam Safety Act following the San Fernando quake. The Act also required the preparation of inundation maps. Significant potential inundation hazard areas are depicted on Exhibit G.

Ecological systems. Environmental considerations are an important part of flood control systems. As the Los Angeles flood control system neared completion and public demand for water supplies, recreation and beautification increased, Congress provided for multiple use of facilities. By the 1960s watershed protection, electrical power, recreation, agriculture and water storage were integral secondary uses of flood control systems and considerations in flood control systems planning. Paving of the Los Angeles River bottom, and City in general, reduced ground water recharge. To compensate for the loss, water spreading grounds were established to replenish underground aquifers. Three sections of the Los Angeles River have unpaved bottoms partially due to the existence of natural springs. These sections and dam basins provide natural habitats for wild animals and birds. The dam basins also provide land for recreation and agricultural uses. Sand bars, trees and heavy marsh growth provide protected habitats for water birds. Fish live in the river channel. Until 1984, the Los Angeles River channel, except for the unpaved sections, virtually was dry except during the rainy season. Upon completion of the San Fernando Valley Donald C. Tillman Wastewater Reclamation Plant (1984) a continuous flow of reclaimed water was sent down the channel creating a year round stream which has regenerated plant and animal life along the entire channel. Some

hiking, equine and bicycle trails exist and are planned for expansion along the edges of some flood control channels.

Water quality. Water quality relative to drainage was an early consideration of the City. Public funds began to be expended in the late 1880s for construction of public works, including streets with gutters and associated drains. The sewage and water drainage systems were separated so as to keep storm and drainage water from entering the sewage system and to enable large quantities of rain water to be carried rapidly to the ocean without necessity of treatment. In the 1920s sewer maintenance hole covers near gutters were sealed to keep out storm water and an inspection unit was established to identify and cite property owners for illegal connections from roofs, yards, wash racks and the like into the sewer system. In recent years pollution of drainage water has become an increasing concern.

Prior to 1958 the primary concern relative to water pollution related to pollution of ocean and beaches due to oil tanker spills. Such spills were regulated by federal agencies. Beginning with the Water Pollution Control Act of 1956, the federal government began to address the problem of pollution discharge into navigable waters, such as the Pacific Ocean. Initially, this resulted in regulations of discharge of waste water (sewage). More recently, federal regulations have focused on storm water, urban runoff and dumping of pollutants into storm drainage systems. Daily runoff in dry or wet periods washes residues from the land, including deposits from vehicles, pet waste, pesticides and street litter. Illegal dumping of waste into the storm drainage system adds to the run-off stream. The first rains of the season wash accumulated pollutants from streets, vegetation and roof tops into the drainage system. Even natural seepage, such as from the La Brea tar pit area or other oil and gas deposits which underlay large sections of the City, or from microorganisms in the soil, contribute pollutants. Pollutants also are washed from the air onto the land and into the run-off stream. Air quality aspects of pollution are addressed in the General Plan Air Quality Element.

Storms result in inflow and infiltration into sewage systems and have caused release into the ocean of partially treated sewage. Sometimes discharge washed into the ocean during storms has resulted in temporary beach closure due to potential health hazards associated with harmful bacteria from human and animal waste and decomposed plant material which is washed from land surfaces into the ocean by storms or which results from leak incidents. There also is concern that storm related residues may contribute damage to the ecology of the local bays, estuaries and natural water supported habitats.

To address potential hazards of discharge and run-off, the Federal Clean Water Act (*i.e.*, Water Pollution Control Act) was amended in 1972 making it unlawful to discharge water borne pollutants into navigable waters of the United States from any point source, except as allowed by a National Pollutant Discharge Elimination System (NPDES) permit. A "point source" being an identifiable source of discharge such as from a ship, pipe, fissure, or container, as opposed to non-point sources, such as water borne run-off containing pollutants from sources which are not readily identifiable. In 1973 the Federal Environmental Protection Agency (EPA) issued regulations to implement the Act and specifically exempted urban runoff that was not contaminated by industrial or commercial sources. The State Water Resources Control Board and its regional boards were charged with enforcing the regulations and issuing the permits. In Los Angeles, the regulations were interpreted to apply to City sewage and industrial waste water discharges into the Pacific Ocean and not to storm water or urban runoff.

To more clearly address the issue of storm water and urban runoff, the Clean Water Act was amended in 1987 to require NPDES permits for any discharge into navigable waters of the United States. The intent of the amendment was to address non-point sources and general urban and storm water runoff, especially residues from routine industrial and commercial activity. Such residues are washed by storm water from surfaces and the land and are carried via the drainage systems to the ocean. There was recognition in broadening the regulations that it was difficult to assess non-point source pollution and that further data and evaluation of run-off was needed.

In 1988-90 the EPA issued storm water discharge regulations to implement the 1987 amendments. The City joined with Los Angeles County and other

municipalities within the County in ubmitting a joint NPDES permit which was approved by the Los Angeles Regional Water Quality Control Board in June 1990. The permit was applicable for five years. The involved jurisdictions were in the process of renewing the permit at the time this Safety Element was being prepared. Water pollution issues and programs are addressed more comprehensively by other elements of the General Plan.

SLOPE FAILURE AND SUBSIDENCE

Los Angeles is a part of the Pacific Coastal Region, a huge geologic region which stretches from Alaska to the tip of South America. The region consists of young geologic areas in which the mountains still are in the process of growing and shaping the California land form. Los Angeles is one of the few major cities in the world with a mountain range (the Santa Monica Mountains) bisecting its land area. In addition, it is bounded by the Santa Susana and Verdugo Mountains and the Palos Verdes Hills. The Beverly Hills and Baldwin Hills bound or cross other sections of the City. The Pacific Ocean interacts with the coastal boundaries of these ranges to create seaside cliffs and beaches. Under natural conditions, slopes often give way, resulting in landslides. Exhibit C generally depicts some of the significant potential landslide hazard areas. As City development spread from the flat lands of what is now the Central City and the San Fernando Valley into the hillsides and along the bases of slopes, unstable soil and erosion sometimes contributed to landslides and mud and debris flows which impacted development, especially following rain storms. Landslides can be triggered by natural causes such as earthquakes, ocean wave action or saturation by storm, or can be induced by the undercutting of slopes during construction, improper artificial compaction or saturation from sprinkler systems or broken pipes.

The principal tool for mitigation of geologic hazards is the City Grading Code. In 1929 the Building and Safety Department began to compile and correlate data on soil conditions for distribution to realtors, builders and prospective property buyers. In 1952 hillside grading provisions were added to the Building Code. Los Angeles was the first city in the nation to have such provisions. Storms of 1957-58 caused extensive damage in hillside areas and led to adoption of the 1963 Grading Code. It was the first such legislation in the nation and served as a model for other jurisdictions. A unique feature of the Code was a requirement that professional geologists supervise hillside grading. Under the Code the Department of Building and Safety has the authority to withhold building permit issuance if a project cannot mitigate potential hazards to the project or which are associated with the project. A property owner may be required to install pilings to anchor a structure to bedrock, to construct retaining walls, build drainage systems or implement other mitigation measures. If, after a project is constructed, potential slope stability hazards are identified, the City can require implementation of stabilization measures. The Grading Code periodically is revised to reflect new technology and improve standards and requirements. Pursuant to the State Hazard Mapping Act, the State Geologist is preparing maps which identify potential landslide hazard areas. A description of this program is contained in the "Seismic Events" section of this Element.

To regulate subsurface extraction activities, the City established Oil Drilling District procedures in 1948 and Rock and Gravel District procedures in 1951. The latter was superseded in 1976 by the Surface Mining District ordinance which brought the City into compliance with the California Surface Mining and Reclamation Act of 1975. The former has been amended several times to improve protective and procedural measures and, in 1971, to include offshore oil drilling. Both contain provisions for monitoring and imposing mitigation measures to prevent significant subsidence relative to oil and gas extraction and mining activities. The districts (Exhibit E) are established as overlay zones and are administered by the City Planning Department with the assistance of other City agencies. The City Oil Administrator of the Office of the City Administrative Officer is responsible for monitoring oil extraction activities and has the authority to recommend additional mitigation measures to the Planning Commission after an Oil Drilling District is established. The Planning Department Office of Zoning Administration issues and administers oil drilling permits and may impose additional mitigation measures, as deemed necessary, after a permit has been granted, such as measures to address subsidence.

SEISMIC EVENTS

The programs associated with this Safety Element emphasize seismic safety issues because seismic events present the most widespread threat of devastation to life and property. With an earthquake, there is no containment of potential damage, as is possible with a fire or flood. Unlike a fire or flood whose path often can be generally measured and predicted, quake damage and related hazard events may be widespread and, at present, are unpredictable. Related hazard events could occur anywhere in the quake area including inundations from damaged reservoirs or release of hazardous materials, such as gas, which in turn could lead to fires or form toxic clouds.

Since 1800 there have been approximately 60 damaging seismic events, or "earthquakes," in the Los Angeles region. After a brief hiatus between major events (circa 1940-1972), the greater Los Angeles area has experienced a number of moderate events which have resulted in considerable disruption of the infrastructure, impact on social and economic life, loss of lives and extensive property damage within the City, the greater metropolitan area and the adjacent region. The most recent of these was the 6.7 magnitude 1994 Northridge earthquake which was centered in the northwest part of the City, in the general vicinity of the 1971 San Fernando (aka Sylmar) quake.

The U.S. Geological Survey has estimated the probability of a ten to thirty percent potential for a 7.5 or more magnitude quake along the southern portion of the San Andreas fault within the next five to thirty years. The Alquist-Priolo Act requires the State Geologist to map active earthquake fault zones. Those faults in the Los Angeles area typically are visible, above ground faults, *e.g.*, the San Andreas fault. The fault zones located within the City are depicted on Exhibit A. However, it is the quakes along the unmapped faults, such as the blind thrust fault associated with the Northridge earthquake, that increasingly are becoming the focus of study and concern. The concept of blind thrust faults has been recognized only recently by seismologists. The effect of such faults may dominate the geology of the Los Angeles basin in a way not previously known.

Seismic mitigation is relatively new, compared to flood and fire mitigation. Every major seismic event in the United States and abroad has provided valuable data for evaluating existing standards and techniques and improving hazard mitigation. The 6.3 magnitude Long Beach earthquake of 1933 killed 115 people and caused approximately $48 million in property damage. It demonstrated the vulnerability of unreinforced masonry structures and the hazards of parapets and unanchored facade decorations. In response, the State legislature adopted the Field Act of 1934 which set seismic building standards. Locally the reinforcement and parapet standards were adopted for new construction. The nature of damage to Seattle, Washington, due to the 1949 earthquake, persuaded Los Angeles to require removal of parapets and decorative appendages so as to prevent unreinforced masonry and concrete from falling onto streets and sidewalks during a quake. The ordinance was applicable to some 30,000 pre-1933 buildings which were located predominantly in the Central City area. The 1985 Mexico City earthquake prompted the City to upgrade and expand its urban search and rescue program (see Fire Section).Following the 1971 San Fernando quake, the City required improved anchoring of new tilt-up (concrete walls poured and tilted-up on the site) structures and retroactive reinforcement of unreinforced masonry structures. A seismic retrofit tilt-up ordinance was developed and made retroactive two weeks after the 1994 Northridge earthquake. Subsequently, the City adopted a series of ordinances which required retrofitting of certain existing structures (*e.g.*, foundation anchoring of hillside dwellings) and for new construction, as well as an ordinance which required evaluation of structures by a structural engineer during the construction process. The Northridge quake underscored the need for thorough, on-going building inspections to assure construction of buildings according to Code.

Although the Northridge earthquake was listed by seismologists as a moderate quake, it was the most costly seismic event in the United States since the 1906 San Francisco earthquake. Within the City and surrounding region, approximately 72 people died as a result of the quake (including by heart attack associated with the quake experience), thousands were physically injured, and the direct and indirect psychological toll was incalculable. Property damage was in the billions of dollars. An estimated

93,000 (as of June 1996) buildings were damaged in the City, some requiring demolition. Approximately 5,800 buildings had to be partially or totally vacated, including approximately 25,640 mostly multiple-residential dwelling units. By the autumn following the quake, some 27,000 units were deemed in danger of being lost because owners had difficulty financing repair costs.

In addition, the infrastructure (Exhibit H) of the metropolitan area was severely disrupted. Freeways collapsed, the power systems for the City and linked communities as far away as Oregon were temporarily "blacked out" and communications were disrupted. Due to abatement measures, planning, training and inter-agency and inter-jurisdictional coordination, response was much more efficient than in 1971 following the San Fernando quake. Stronger building codes and required retrofitting following the San Fernando quake contributed to a reduction in damage to structures and buildings and resulted in better containment of hazardous materials. Coordinated response resulted in more rapid identification of damage sites, extinguishing of fires, addressing of fire hazards, administering, often from battle-field like temporary facilities, to the injured and displaced and initiation of work to restore the disrupted cities and region. Closure of businesses, disruption of services and dislocation of people had a significant domino effect on the economy of the region, state and nation. The economic impact would have been greater had the quake been more severe or had disruption of the infrastructure continued for a longer period of time.

The fact that the Northridge event occurred at 4:31 a.m. January 17, 1994 on the Martin Luther King Jr. national holiday may have been the primary reason for so little loss of life and human injury. A low number of commuters were traveling on the freeways and streets and few people were in offices, industrial, commercial buildings, public garages and shopping centers, many of which suffered severe structural and non-structural damage. Many emergency and seismic experts believe that had the quake occurred at midday, instead of during the predawn, the loss of life and injury figures would have been substantially higher. Nevertheless, emergency forces were severely challenged by the event.

The Northridge quake was one of the most measured earthquakes in history due to extensive seismic instrumentation in buildings and on the ground throughout the region. Information from seismological instruments, damage reports and other data provided a wealth of information for experts to analyze. Traditional theories about land use siting and existing building code provisions were called into question. It is known that the complex Los Angeles fault system interacts with the alluvial soils and other geologic conditions in the hills and basins. This interaction appears to pose a potential seismic threat for every part of the City, regardless of the underlying geologic and soils conditions. Structural damage does not occur due to any one factor. The duration and intensity of the shaking, distance from the epicenter, composition of the soil and type of construction, all are factors in determining the extent of damage which may occur. Alluvial and artificially uncompacted soils tend to amplify the shaking. Shallow ground water, combined with uncompacted soils can result in liquefaction (quicksand effect) during a strong quake. Therefore, it is difficult to escape the impacts of a quake. During the Northridge quake, damage appeared to have a more direct relationship to building construction than did proximity to the epicenter. Largely as a result of the Northridge earthquake, the national Uniform Building Code was amended in 1994 to require that new development projects provide geotechnical reports which assess potential consequences of liquefaction and soil strength loss and propose appropriate mitigation measures, *e.g.*, walls supported by continuous footings, steel reinforcement of floor slabs, *etc.* These provisions were incorporated into the Los Angeles City Building Code, effective January 1996. Exhibit B identifies, in a general manner, areas susceptible to liquefaction. It was prepared for the General Plan Framework Element environmental impact report and is based on the County of Los Angeles 1990 Safety Element liquefaction exhibit. It identifies areas deemed to be liquefaction or potential liquefaction areas, based on occurrences of shallow ground water together with recent alluvial deposits.

One of the surprising findings following the Northridge quake was that many steel frame buildings, believed before the quake to be the safest structures, suffered unexpected welding joint damage. Such damage resulted in the evacuation of an 11-story building in West Los Angeles several months

after the quake when it was determined that the damage to building joints had dangerously weakened the building structure. The building was located miles from Northridge, in the basin on the other side (south) of the Santa Monica Mountains. At the time this Safety Element was under preparation experts had not determined an acceptable method for retrofitting such buildings.

These are important findings for Los Angeles because Los Angeles is a built city. Few large tracts of land remain which have not already been developed with some use. Many key facilities, such as freeways, already follow fault lines through mountain passes. Buildings already are built on uncompacted and alluvial soils. Part of the downtown center, including its many high rise buildings, is built near the Elysian Park blind thrust fault which many seismologists believe could be the source of a major seismic event in the not so distant future. Physical expansion and change in the City will occur primarily through rehabilitation of existing structures and redevelopment of existing neighborhoods. The City's biggest challenge is how to protect an existing city and its inhabitants from future damage. Many believe this should be accomplished through improved building design instead of prohibition of construction. At the time this Element was under preparation, the City was retrofitting City Hall and some Port of Los Angeles facilities with base isolators to make the structures less prone to failure during strong ground shaking. This type of retrofitting is a step in addressing the strengthening of built structures.

Pre-seismic event land use planning with a view to reconfiguring the devastated areas though post-event changes in land use, intensity of development, *etc.* generally are not included as programs of this Safety Element. It has been the City's experience that the unpredictability of seismic events, both as to location and damage, renders such planning impractical. Devastation, while widespread, generally does not completely destroy entire blocks, neighborhoods or large geographic areas. Therefore, rebuilding tends to be more of an infill activity than an urban clearance and reconstruction enterprise. However, traditional redevelopment programs are included in the optional tools available for reconstruction of severely damaged areas and are being used to rebuild neighborhoods devastated by the Northridge quake.

Hazard assessment. The State Public Resources Code Section 2699 requires that a safety element "take into account" available seismic hazard maps prepared by the State Geologist pursuant to the Alquist-Priolo Earthquake Fault Zoning Act of 1972, subsequently amended (Public Resources Code Sections 2621-2630, originally known as the Alquist-Priolo Special Studies Zones Act) and the Seismic Hazard Mapping Act of 1990, subsequently amended (Public Resources Code Sections 2690-2699.6 and 3720-3725). The Alquist-Priolo Act was established as a direct result of the 1971 San Fernando earthquake. It requires that the State Geologist map active faults throughout the State. Those maps which are applicable to the City of Los Angeles are incorporated into Exhibit A of this Safety Element.

The Hazard Mapping Act requires the State Geologist to map areas subject to amplified ground shaking (or conditions which have potential for amplified ground shaking), liquefaction and landslide hazard areas. Following the 1994 Northridge earthquake, the hazard mapping program was revised and accelerated. The maps were under preparation concurrently with the preparation of this Safety Element. The first liquefaction and landslide hazard maps are scheduled to be released in 1996. Ground shaking maps are scheduled for release beginning in 1997. The entire mapping program is expected to be completed around 1999. Local jurisdictions are required by the Mapping Act to require additional studies and appropriate mitigation measures for development projects in areas identified as potential hazard areas by the maps. As maps are released for Los Angeles they will be utilized by the Building and Safety Department in helping to identify areas where additional soils and geology studies are needed for evaluation of hazards and imposition of appropriate mitigation measures prior to issuance of building permits. Once the entire set of maps for Los Angeles is complete it will be used to revise the soils and geology exhibits of this Safety Element. The maps, along with information being developed by private technical organizations, such as the Southern California Earthquake Center and California Institute of Technology, will assist the City in evaluating how to strengthen its land use and development codes and development permit procedures so as to better protect life and property from seismic

hazards. The Building Code already has been revised utilizing data secured relative to the Northridge and other recent significant seismic events. The subject Safety Element fulfills current requirements, based upon available official maps and reliable data, relative to fault zones (Exhibit A), liquefaction areas (Exhibit B) and slope failure (Exhibit C). These exhibits will be revised following receipt of the reliable new information. In addition to the hazard mapping provisions, the State requires that property sellers or agents disclose to potential property buyers geotechnical reports and their contents.

HAZARDOUS MATERIALS

Hazardous materials have been a concern since 1900 when the City experienced its first major oil industry fire. Extraction of oil and gas deposits began in 1896 when Edward Doheny discovered oil at Second Street and Glendale Boulevard (Westlake community). By 1900 he had erected over 600 wooden oil rigs and installed hundreds of storage tanks and related facilities. In that year a family bonfire ignited the oil field at Bixel Street. An estimated 10,000 gallons of blazing oil spilled down the hills but was diverted and suppressed before it reached the densely built Central City. The saving of the downtown from a potential disaster prompted the City to purchase more fire suppression equipment and to expand the number of fire stations and personnel. Subsequent oil field fires in the Doheny and other fields throughout the City resulted in regulations to assure containment of oil fires in oil fields, refineries and oil and gas storage facilities.

Much of the area south of the Santa Monica Mountains is underlain by gas and oil deposits. Such deposits exist under other areas of the City as well (Exhibit E). Natural gas, crude oil and hydrogen sulfide can work their way to the surface or infiltrate structures, causing potential fire and health hazards. In addition, landfills are sources of methane gas. The existence of underground gas and hazardous materials deposits requires monitoring of excavations and known seepage areas. A major incident occurred in 1971 during the tunneling for the Feather River Project when a methane explosion killed 18 workers. Incidents relating to the gas seepage caused temporary safety shutdowns of the Metro Rail subway tunneling in 1993-95.

In the 1920s the use of chemicals and hazardous materials in the City's expanding manufacturing and commercial sectors increased the hazards for both workers and the general populace. A series of movie studio back lot fires and film processing laboratory fires occurred in the late 1920s. These incidents led to the enactment of City regulations to protect workers and the public from fires and fumes associated with highly flammable film and chemicals used in film processing as well as from hazards associated with flammable movie sets.

Today hazardous materials are used in commercial, industrial, institutional and agricultural enterprises as well as households throughout the City. Los Angeles operates both a major international airport and a major harbor within its boundaries and operates other airport facilities within and outside its boundaries. Hazardous and highly flammable materials are shipped through, stored and used (especially fuels) at these facilities. They also are transported along freeways and highways and are stored in facilities throughout the City. Many hazardous materials, if released by accident or catastrophic event, could cause severe damage to human life and health and to the facilities and could disrupt activities within a radius of several miles around the release site.

During the 1994 Northridge earthquake, over 100 incidents of quake related release of hazardous materials were reported. Of these, 23 involved release of natural gas, 10 involved release of gases and liquid chemicals at educational institutions and 8 involved release of hazardous materials at medical facilities. Gas leaks or chemical reactions triggered fires which destroyed or damaged nine university science laboratories. Rupture of a high pressure natural gas line under Balboa Boulevard in Granada Hills resulted in a fire which damaged utility lines and adjacent homes. Petroleum pipeline leaks released 4,000 barrels of crude oil into the Santa Clara River north of Los Angeles and caused fires in the Mission Hills section of the City.

Fires can damage labeling and warning signs which are posted on chemical and fuel containers and on structures to identify presence of hazardous materials. Identification of hazardous materials, storage and handling sites and information about containment facilities and/or procedures are important to protect emergency personnel as well as employees and

the adjacent community during a spill incident and incident clean-up.

Hazardous materials management is regulated by federal and state codes. Within the City, the Fire Department is designated as the enforcement agency for the City, state and federal hazardous materials regulations. City regulations include spill mitigation and containment and securing of hazardous materials containers to prevent spills. In addition, the State Fire Marshall enforces oil and gas pipeline safety regulations and the federal government enforces hazardous materials transport pursuant to its interstate commerce regulation authority. At the time this Safety Element was under preparation cooperative interjurisdictional efforts were underway to evaluate the Northridge, Kobe and other seismic experiences and to develop methods for reducing potential hazardous materials spills and related damage associated with seismic events.

In 1976 the bulk oil tanker S.S. Sansinena exploded in the Port of Los Angeles killing nine people, injuring 46 and causing an estimated $21.6 million in damage. The tanker was empty. Poor maintenance and operating procedures on board the ship were identified as the cause of the explosion. In response to this incident, the City Council adopted a unique ordinance which required the Fire Department to inspect all tanker ships in the Port prior to loading and unloading so as to assure compliance with City fire prevention and safety measures and regulations. Los Angeles is the only City in the nation which has established such a program.

The Fire Department works cooperatively with the United States Coast Guard, the State and Los Angeles County in responding to off-shore emergency incidents including responding to, containing and cleaning-up off-shore oil spills. The City's authority is to protect the shoreline (on-shore). In accordance with a mutual aid agreement with the U.S. Coast Guard, the Fire Department provides the initial response to any spill in the harbor or off-shore. Its responsibility is to contain the initial spill and keep the situation from getting worse. The County is responsible for coordinating clean-up efforts. At the time this Safety Element was being prepared, the State was preparing a statewide Coastal Oil Spill Contingency Plan to establish administrative procedures (*e.g.*,chain of command) for responding to spills and providing clean-up, including training and utilization of volunteers in clean-up operations. The Fire Department's spill contingency plan will be incorporated into the State plan.

As noted above, this Safety Element primarily addresses hazardous materials relative to other potential natural hazards. Landfill monitoring is addressed by another element of the General Plan and by the City's Integrated Solid Waste Management Plan.

CHAPTER III - GOALS, OBJECTIVES AND POLICIES

The Safety Element goals, objectives, policies and programs are broadly stated to reflect the comprehensive scope of the Emergency Operations Organization (EOO). The EOO is the only program that implements the Element. The Element's policies outline administrative considerations which are addressed by EOO procedures, including its Master Plan, or which are observed in the carrying out of the Plan. All City agencies are part of the EOO. All City emergency preparedness, response and recovery programs are integrated into EOO operations and are reviewed and revised continuously.

Because City codes and regulations contain standards for water, streets, *etc.*, the Safety Element programs generally do not contain specific standards. An exception is the Fire Code policy which contains standards which, at the time this Element was under preparation, were contained only in the 1979 Fire Protection and Prevention Element of the General Plan. Until the standards are incorporated into the Fire Code or other regulations or plans, this is the only place where they are located. They are needed to guide City development actions. Other standards which were listed in the 1979 Fire Protection and Prevention Element have been incorporated into City Codes or superseded by other regulations or procedures.

HAZARD MITIGATION

GOAL 1

A city where potential injury, loss of life, property damage and disruption of the social and economic life of the City due to fire, water related hazard, seismic event, geologic conditions or release of hazardous materials disasters is minimized.

Objective 1.1

Implement comprehensive hazard mitigation plans and programs that are integrated with each other and with the City's comprehensive emergency response and recovery plans and programs.

Policies

1.1.1 Coordination. Coordinate information gathering, program formulation and program implemen tation between City agencies, other jurisdictions and appropriate public and private entities to achieve the maximum mutual benefit with the greatest efficiency of funds and staff. [All EOO hazard mitigation programs involving cooperative efforts between entities implement this policy.]

1.1.2 Disruption reduction. Reduce, to the greatest extent feasible and within the resources available, potential critical facility, governmental functions, infrastructure and information resource disruption due to natural disaster. [All EOO programs involving mitigation of disruption of essential infrastructure, services and governmental operations systems and prepare personnel for quickly reestablishing damaged systems implement this policy.]

1.1.3 Facility/systems maintenance. Provide redundancy (back-up) systems and strategies for continuation of adequate critical infrastructure systems and services so as to assure adequate circulation, communications, power, transportation, water and other services for emergency response in the event of disaster related systems disruptions. [All EOO programs that involve provision of back up systems and procedures for reestablishment of essential infrastructure, services and governmental operations which are disrupted implement this policy.]

1.1.4 Health/environmental protection. Protect the public and workers from the release of hazardous materials and protect City water supplies and resources from contamination resulting from accidental release or intrusion resulting from a disaster event, including protection of the environment and public from potential health and safety hazards associated with program implementation. [All EOO hazardous materials hazard and water pollution mitigation programs implement this policy.]

1.1.5 Risk reduction. Reduce potential risk hazards due to natural disaster to the greatest extent feasible within the resources available, including provision of information and training. [All programs that incorporate current data, knowledge and technology in revising and implementing plans (including this Safety Element), codes, standards and procedures that are designed to reduce potential hazards and risk from hazards potentially associated with natural disasters implement this policy.]

1.1.6 State and federal regulations. Assure compliance with applicable state and federal planning and development regulations, *e.g.*, Alquist-Priolo Earthquake Fault Zoning Act, State Mapping Act and Cobey-Alquist Flood Plain Management Act. [All EOO natural hazard enforcement and implementation programs relative to non-City regulations implement this policy.]

EMERGENCY RESPONSE (Multi-Hazard)

GOAL 2

A city that responds with the maximum feasible speed and efficiency to disaster events so as to minimize injury, loss of life, property damage and disruption of the social and economic life of the City and its immediate environs.

Objective 2.1

Develop and implement comprehensive emergency response plans and programs that are integrated with each other and with the City's comprehensive hazard mitigation and recovery plans and programs.

Policies

2.1.1 Coordination. Coordinate program formulation and implementation between City agencies, adjacent jurisdictions and appropriate private and public entities so as to achieve, to the greatest extent feasible and within the resources available, the maximum mutual benefit with the greatest efficiency of funds and staff. [All EOO response programs involving cooperative efforts between entities implement this policy.]

2.1.2 Health and environmental protection. Develop and implement procedures to protect the environment and public, including animal control and care, to the greatest extent feasible within the resources available, from potential health and safety hazards associated with hazard mitigation and disaster recovery efforts. [All EOO emergency response and recovery programs that mitigate environmental impacts or provide care and control of animals injured or released by an emergency situation implement this policy.]

2.1.3 Information. develop and implement, within the resources available, training programs and informational materials designed to assist the general public in handling disaster situations in lieu of or until emergency personnel can provide assistance. [All EOO response programs involving training, collection and dissemination of warning, guidance and assistance information to the public implement this policy.]

2.1.4 Interim procedures. Develop and implement pre-disaster plans for interim evacuation, sheltering and public aid for disaster victims displaced from homes and for disrupted businesses, within the resources available. Plans should include provisions to assist businesses which provide significant services to the public and plans for reestablishment of the financial viability of the City. [All EOO response and recovery programs involving evacuation and provision of temporary services to victims of an emergency event and any planning and training related thereto implement this policy.]

2.1.5 Response. Develop, implement and continue to improve the City's ability to respond to emergency events. [All EOO emergency response programs and all hazard mitigation and disaster recovery programs related to protecting and reestablishing communications and other infrastructure, service and governmental operations systems implement this policy.]

2.1.6 Standards/fire. Continue to maintain, enforce and upgrade requirements, procedures and standards to facilitate more effective fire suppression. [All peak load water and other standards, code requirements (including minimum road widths, access, clearances around structures) and other requirements or procedures related to fire suppression implement this policy.]

The Fire Department and/or appropriate City agencies shall revise regulations or procedures to include the establishment of minimum standards for location and expansion of fire facilities, based upon fire flow requirements, intensity and type of land use, life hazard, occupancy and degree of hazard so as to provide adequate fire and emergency medical event response. At a minimum, site selection criteria should include the following standards which were contained in the 1979 General Plan Fire Protection and Prevention Plan:[6]

• Fire stations should be located along improved major or secondary highways. If, in a given service areas, the only available site is on a local street, the site must be on a street which leads directly to an improved major or secondary highway.

• Fire station properties should be situated so as to provide drive-thru capability for heavy fire apparatus.

• If a fire station site is on the side of a street or highway where the flow of traffic is toward a signalized intersection, the site should be at least 200 feet from that intersection in order to avoid blockage during ingress and egress.

• The total number of companies which would be available for dispatch to first alarms would vary with the required fire flow and distance as follows: (a) less than 2,000 g.p.m. would require not less than 2 engine companies and 1 truck company; (b) 2,000 but less than 4,500 g.p.m., not less than 2 or 3 engine companies and 1 or 2 truck companies; and (c) 4,500 or more g.p.m., not less than 3 engine companies and 2 truck companies.

[These provisions, in full or in part, shall be deemed deleted from the Safety Element upon incorporation of these or substitute provisions into the Fire Code, Fire Chief Regulations, other appropriate regulations or procedures or another General Plan element.]

2.1.7 Volunteers. Develop and implement, within the resources available, strategies for involving volunteers and civic organizations in emergency response activities. [All EOO response programs involving volunteers implement this policy.]

[6] *These provisions of the 1979 Plan were modified by the Fire Department for purposes of clarification .*

DISASTER RECOVERY (Multi-Hazard)

GOAL 3

A city where private and public systems, services, activities, physical condition and environment are reestablished as quickly as feasible to a level equal to or better than that which existed prior to the disaster.

Objective 3.1

Develop and implement comprehensive disaster recovery plans which are integrated with each other and with the City's comprehensive hazard mitigation and emergency response plans and programs.

Policies

3.1.1 Coordination. Coordinate with each other, with other jurisdictions and with appropriate private and public entities prior to a disaster and to the greatest extent feasible within the resources available, to plan and establish disaster recovery programs and procedures which will enable cooperative ventures, reduce potential conflicts, minimize duplication and maximize the available funds and resources to the greatest mutual benefit following a disaster. [All EOO recovery programs involving cooperative efforts between entities implement this policy.]

3.1.2 Health/safety/environment. Develop and establish procedures for identification and abatement of physical and health hazards which may result from a disaster. Provisions shall include measures for protecting workers, the public and the environment from contamination or other health and safety hazards associated with abatement, repair and reconstruction programs. [All EOO hazard mitigation, response, recovery programs involving identification and mitigation of release of hazardous materials and protection of the public and emergency personnel from hazardous materials implement this policy.]

3.1.3 Historic/cultural. Develop procedures which will encourage the protection and preservation of City-designated historic and cultural resources to the greatest extent feasible within the resources available during disaster recovery. [All EOO recovery programs that encourage protection and preservation of historic and cultural resources implement this policy.]

3.1.4 Interim services/systems. Develop and establish procedures prior to a disaster for immediate reestablishment and maintenance of damaged or interrupted essential infrastructure systems and services so as to provide communications, circulation, power, transportation, water and other necessities for movement of goods, provision of services and restoration of the economic and social life of the City and its environs pending permanent restoration of the damaged systems. [All EOO response, recovery programs involving restoration of the City's infrastructure and essential services and service systems implement this policy.]

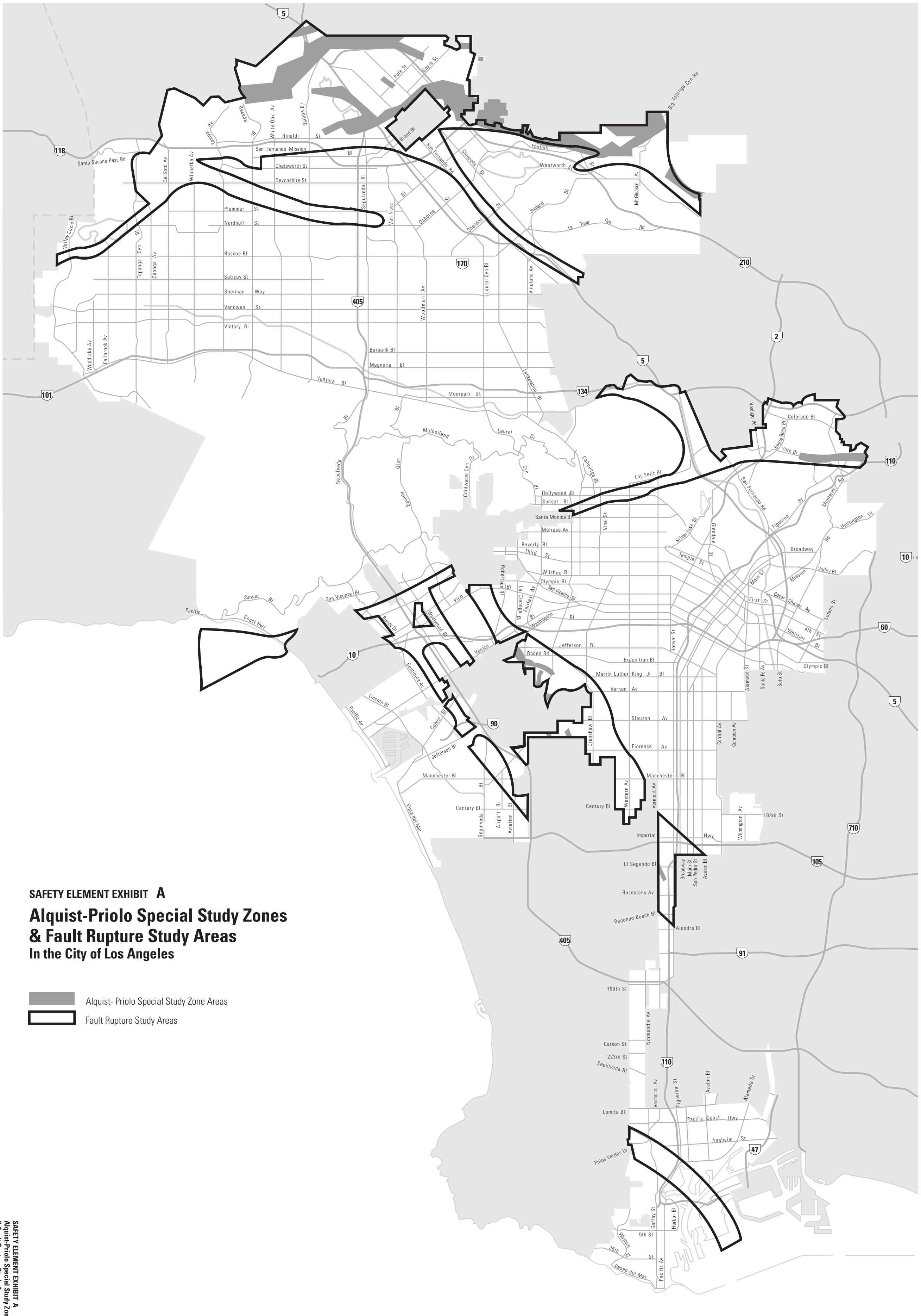
3.1.5 Restoration. Develop and establish prior to a disaster short- and long-term procedures for securing financial and other assistance, expediting assistance and permit processing and coordinating inspection and permitting activities so as to facilitate the rapid demolition of hazards and the repair, restoration and rebuilding, to a comparable or a better condition, those parts of the private and public sectors which were damaged or disrupted as a result of the disaster. [All EOO recovery programs involving financial planning, permit expediting and legislative and administrative actions to facilitate post-disaster recovery implement this policy.]

CHAPTER IV - IMPLEMENTATION

An Implementation program is an action, procedure, program or technique that carries out general plan policy. The Emergency Operations Organization (EOO) is the program that implements the Safety Element. The EOO is a City department comprised of all City agencies, pursuant to City Administrative Code, Division 8, Chapter 3. The Administrative Code, EOO Master Plan and associated EOO plans establish the chain of command, protocols and programs for integrating all of the City's emergency operations into one unified operation. Each City agency in turn has operational protocols, as well as plans and programs, to implement EOO protocols and programs. A particular emergency or mitigation triggers a particular set of protocols which are addressed by implementing plans and programs. The City's emergency operations program encompasses all of these protocols, plans and programs. Therefore, its programs are not contained in one comprehensive document. The Safety Element goals, objectives and policies are broadly stated to reflect the comprehensive scope of the EOO.

As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability, and upon request, will provide reasonable accomodation to ensure equal access to its programs, services and activities.

EXHIBITS



SAFETY ELEMENT EXHIBIT A

Alquist-Priolo Special Study Zones & Fault Rupture Study Areas

In the City of Los Angeles

Alquist- Priolo Special Study Zone Areas

Fault Rupture Study Areas

0 1/2 1 2 3 4 5 KILOMETERS

N 0 1/4 1/2 1 2 3 4 MILES

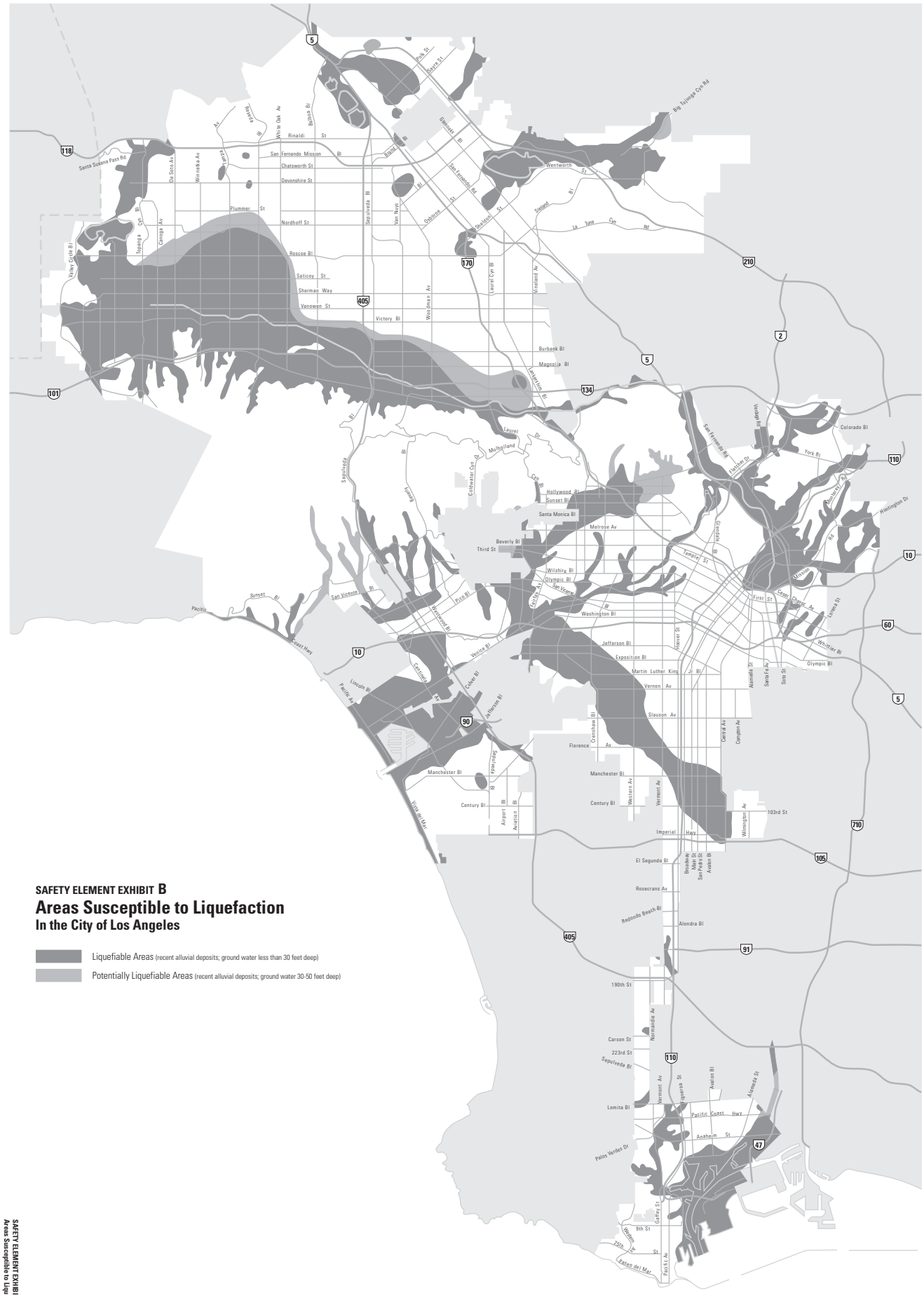
SAFETY ELEMENT EXHIBIT A
Alquist-Priolo Special Study Zones
& Fault Rupture Study Areas

NOTES

The Safety Element seismic and landslide exhibits, along with any official geologic or seismic hazard maps prepared by the State Geologist and any other potential hazard areas identified by the City Building Safety Department are used in determining if additional soils and geology reports should be prepared to help assess potential hazards and mitigations, as a part of the development permit process.

Sources: California Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; California Environmental Quality Act of 1970 (CEQA), Public Resources Code 21000 *et. seq.* as amended 1992, Alquist-Priolo Special Study Zone Act, Public Resources Code 2621-2630 and 2690-2699.6 as amended 1993, State of California Special Studies Zone maps for the following USGS quadrangles: Oat Mountain (1-1-76) San Fernando (1-1-79), Sunland (1-1-79), Burbank (1-1-79), Beverly Hills (6-1-86), Hollywood (6-1-86), Los Angeles (1-1-77), Inglewood (6-1-86), Torrance (6-1-86), Long Beach (6-1-86), as prepared by the State Geologist pursuant to the Alquist-Priolo Special Study Zones Act, City of Los Angeles Seismic Safety Plan Element of the General Plan Council file 74-3401, September 10, 1975.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • March 1994 • Council File No. 89-2104



SAFETY ELEMENT EXHIBIT B

Areas Susceptible to Liquefaction

In the City of Los Angeles

Liquefiable Areas (recent alluvial deposits; ground water less than 30 feet deep)

Potentially Liquefiable Areas (recent alluvial deposits; ground water 30-50 feet deep)

NOTES

The Safety Element seismic and landslide exhibits, along with any official geologic or seismic hazard maps prepared by the State Geologist and any other potential hazard areas identified by the City Building Safety Department are used in determining if additional soils and geology reports should be prepared to help assess potential hazards and mitigations, as a part of the development permit process.

Sources: Environmental Impact report, Framework Element, Los Angeles City General Plan, May 1995; County of Los Angeles, General Plan Safety Element Technical Appendix Vol. 2 plate 4 "Liquefaction Susceptibility", January 1990.

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N

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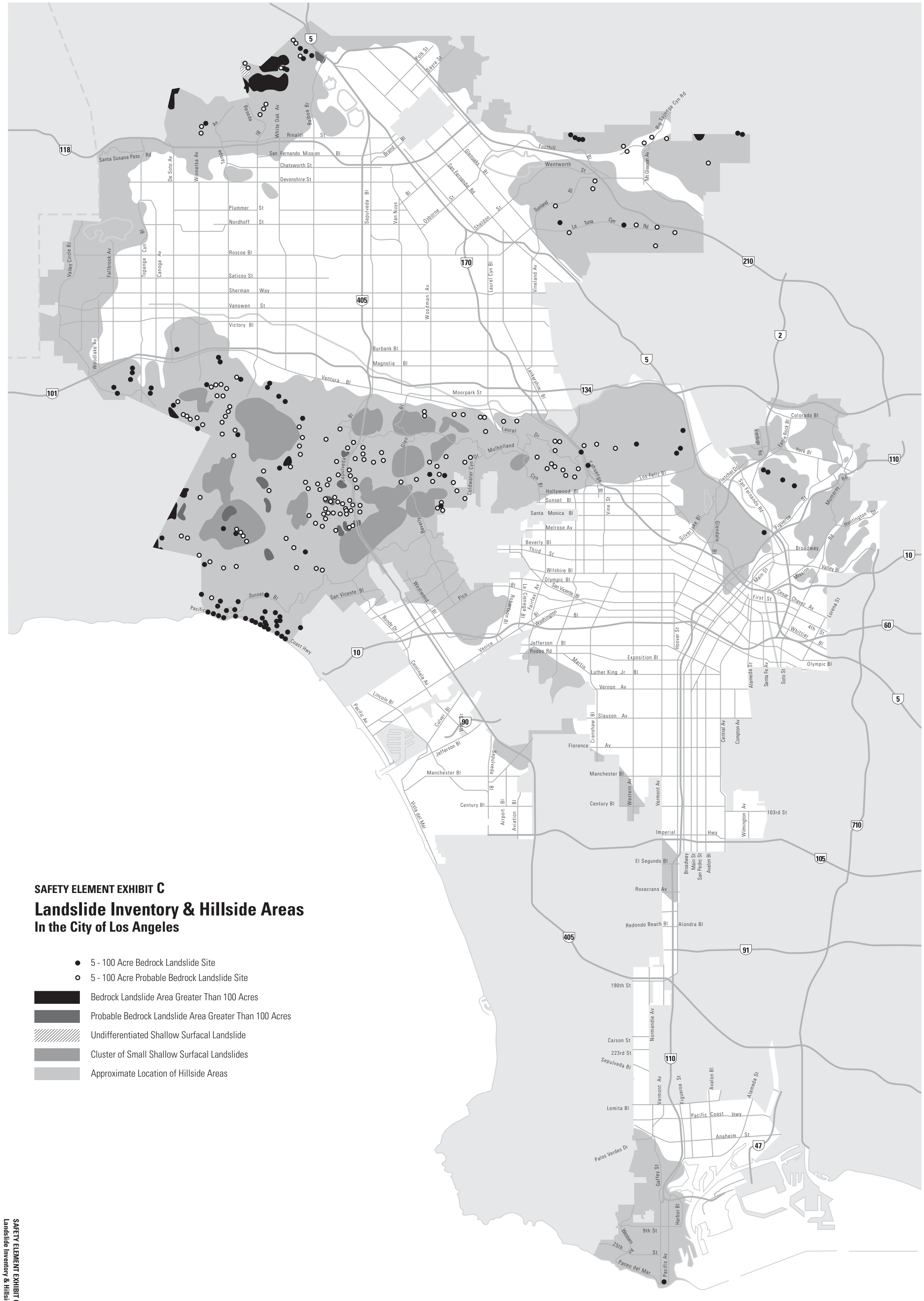
SAFETY ELEMENT EXHIBIT B
Areas Susceptible to Liquefaction



SAFETY ELEMENT EXHIBIT C

Landslide Inventory & Hillside Areas
In the City of Los Angeles

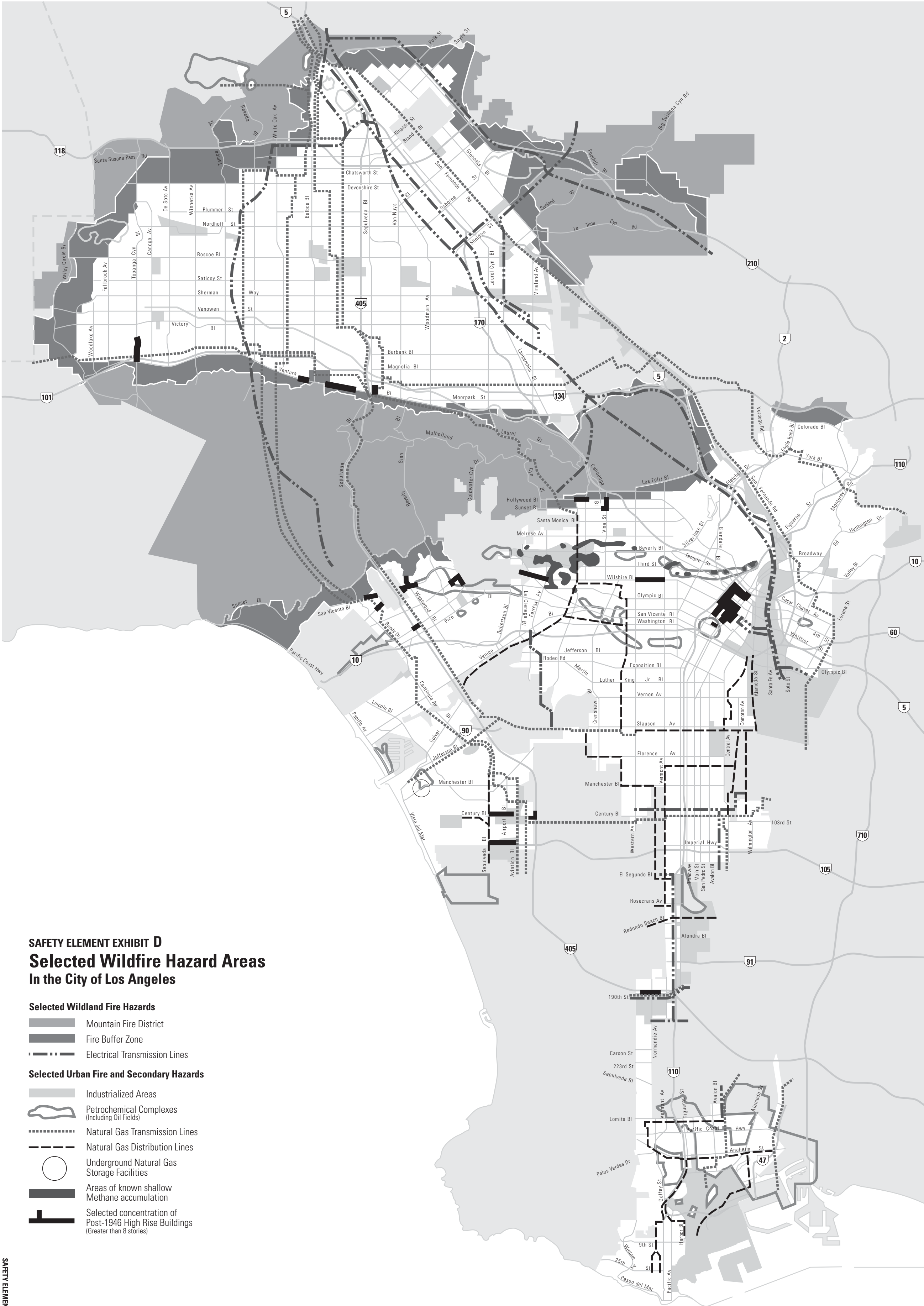
- ● 5 - 100 Acre Bedrock Landslide Site
- ○ 5 - 100 Acre Probable Bedrock Landslide Site
- Bedrock Landslide Area Greater Than 100 Acres
- Probable Bedrock Landslide Area Greater Than 100 Acres
- Undifferentiated Shallow Surfacal Landslide
- Cluster of Small Shallow Surfacal Landslides
- Approximate Location of Hillside Areas

NOTES

The Safety Element seismic and landslide exhibits, along with any official geologic or seismic hazard maps prepared by the State Geologist and any other potential hazard areas identified by the City Building Safety Department are used in determining if additional soils and geology reports should be prepared to help assess potential hazards and mitigations, as a part of the development permit process.

Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; County of Los Angeles, General Plan *Safety Element Technical Appendix Vol. 2 Plate 5* "Landslide inventory", January 1990; County of Los Angeles, *General Plan Safety Element Technical Appendix (Vol.1)*, "Hazard Reduction in Los Angeles County," December 1990 California Environmental Quality Act of 1970 (CEQA) with guideline, Public Resources Code Section 21000 *et. seq.*, as amended 1992; California Government Code Section 6530(g), as amended; City of Los Angeles, Planning and Zoning Code Section 17.05(c), as revised 10-13-93.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • June, 1994 • Council File No. 89-2104



NOTES

1. Mountain Fire Districts and Buffer Zones (Los Angeles City Fire Code Section 57.25) have been substituted for the "Fire Zone 4" and "Additional Areas of High Fire Hazard" designations shown on the County Safety Element Appendix exhibit.
2. Industrial zones are used to represent industrialized areas. Industrialized areas can be correlated with greater risk of public exposure to atmospheric releases of hazardous materials and flammable or explosive materials.
3. This plate does not show all fire hazards, nor does it intend to designate their relative risk. It should be used for general planning purpose only.

Source: LA County Safety Element Technical Appendix, Plate 7, December 1990. , City of Los Angeles Fire Department (See note No. 1) and Exhibit H

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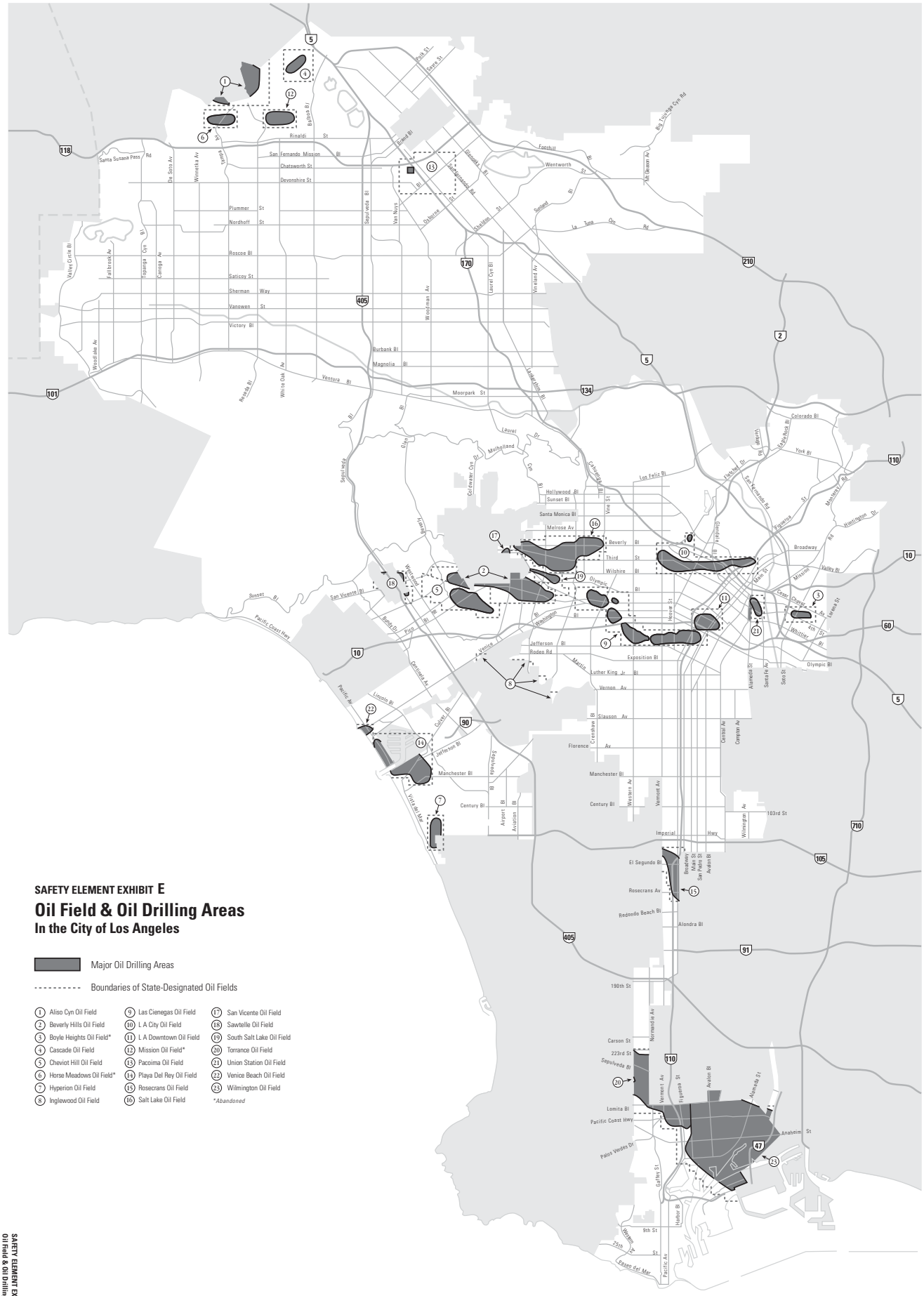

SAFETY ELEMENT EXHIBIT E

Oil Field & Oil Drilling Areas

In the City of Los Angeles

Major Oil Drilling Areas

Boundaries of State-Designated Oil Fields

1. Aliso Cyn Oil Field
2. Beverly Hills Oil Field
3. Boyle Heights Oil Field*
4. Cascade Oil Field
5. Cheviot Hill Oil Field
6. Horse Meadows Oil Field*
7. Hyperion Oil Field
8. Inglewood Oil Field
9. Las Cienegas Oil Field
10. L A City Oil Field
11. L A Downtown Oil Field
12. Mission Oil Field*
13. Pacoima Oil Field
14. Playa Del Rey Oil Field
15. Rosecrans Oil Field
16. Salt Lake Oil Field
17. San Vicente Oil Field
18. Sawtelle Oil Field
19. South Salt Lake Oil Field
20. Torrance Oil Field
21. Union Station Oil Field
22. Venice Beach Oil Field
23. Wilmington Oil Field

*Abandoned

NOTES

This map shows all oil fields know by the state geologist to have shown at least 6 months of economically viable production of oil. State wildcat maps show that exploratory wells have been drilled throughout the city.

Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; California Department of Conservation Division of Oil and Gas (DOG), Publication No. TR31, Land Use Planning in Urban Oil Producing Areas, 1988: DOG, Publication No. PRC 04, California Code of Regulations, Title 14 "Natural Resources" Section 1681 *et. seq.*, as amended February 1993; DOG, Publication No. PRC01, California Public Resources Code, Division 3"Oil and Gas", Sec. 3000 *et. seq.*, as amended July 1993; Division of Oil and Gas and Geothermal Resources, Construction project site review and well abandonment procedure (Brochure), as amended February 1994; City of Los Angeles Planning Department, interviews with DOG Long Beach office staff Engineers, 1994; California Environmental Quality Act of 1970 (CEQA) including guidelines, PRC SEC. 21000 *et. seq.*, as amended 1992.

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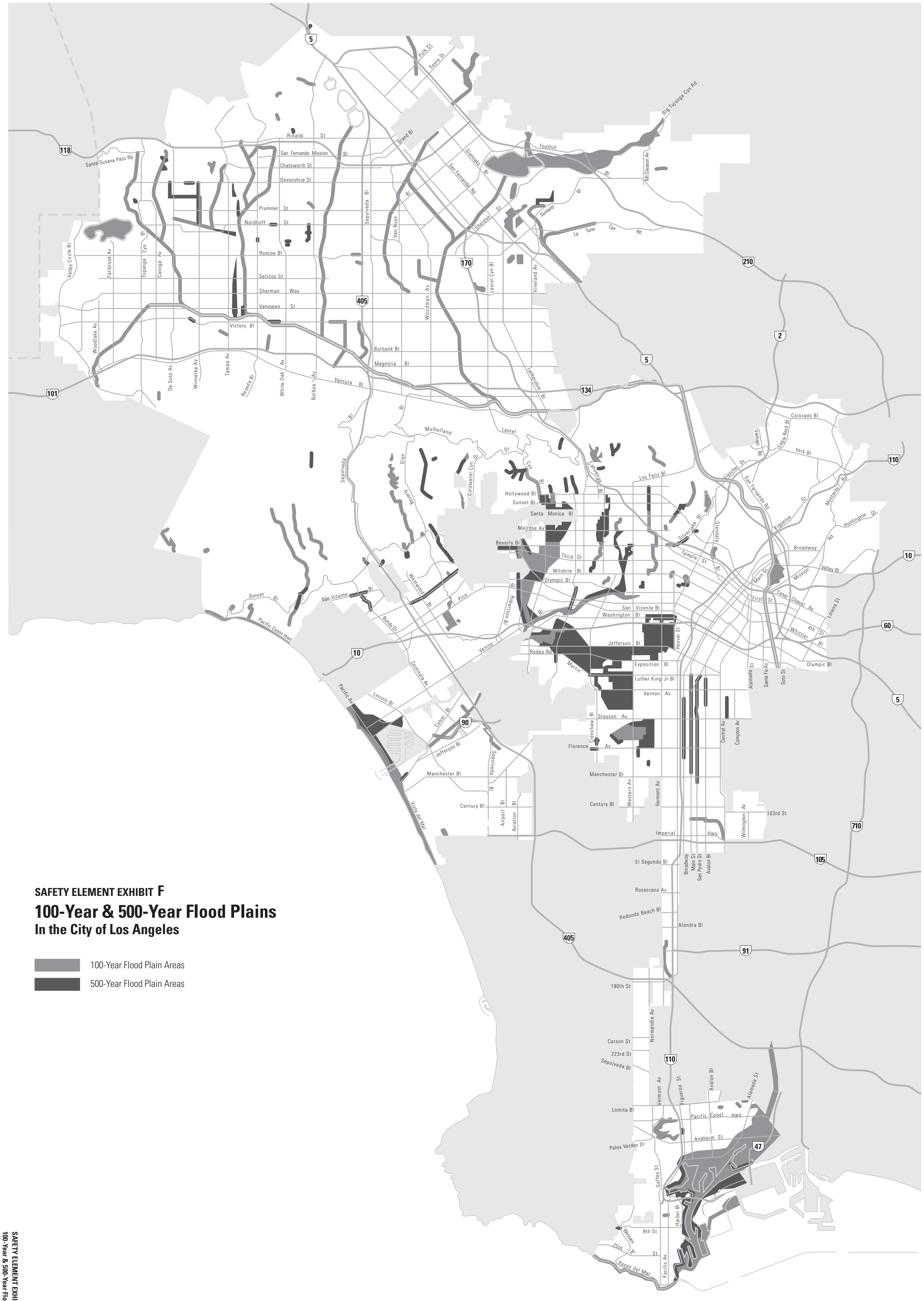
Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • May, 1994 • Council File No. 89-2104

SAFETY ELEMENT EXHIBIT E
Oil Field & Oil Drilling Areas



SAFETY ELEMENT EXHIBIT F

100-Year & 500-Year Flood Plains

In the City of Los Angeles

100-Year Flood Plain Areas

500-Year Flood Plain Areas

NOTES

1. A 500-Year flood will also flood 100-Year flood plains.
2. A 100-Year flood is a flood which results from a severe rainstorm with a probability of occuring approximately once every 100 years.
3. A 500-Year flood is a flood which results from a severe rainstorm with a probability of occuring once every 500 years.
4. Flood plains shown on the map reflect Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) currently in effect and Preliminary FIRM maps showing increases in expected flooding along the Los Angeles River and Dominguez Channel. Flood plains are now larger due to increased urbanization of the Los Angeles River Basin.

Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps; FEMA Preliminary Flood Insurance Rate Maps; California Evironmental Quality Act of 1970 (CEQA), Public Resources Code Section 21000 et. seq., as amended 1992; California Government Code Section 65302 as amended 1993.

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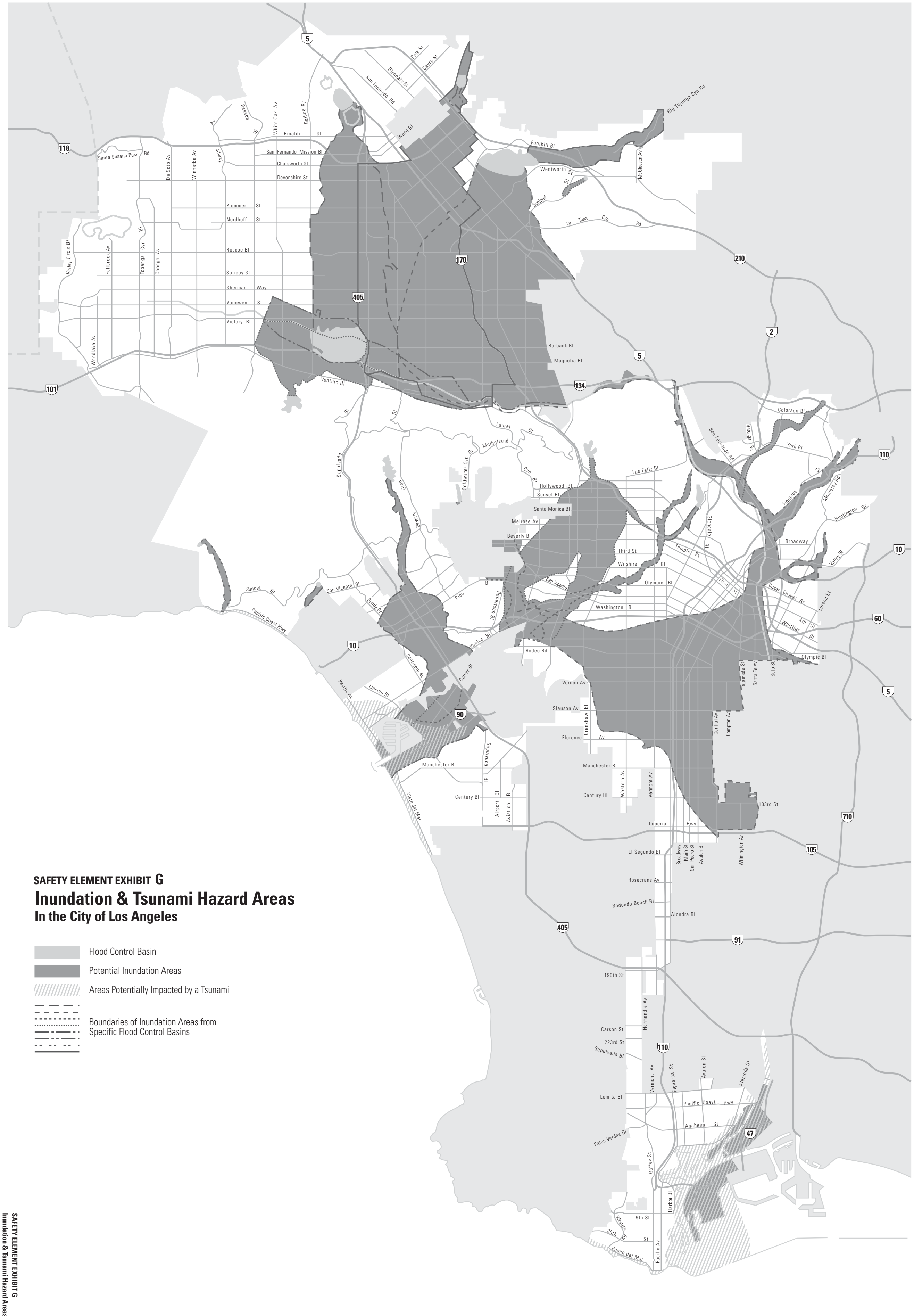


SAFETY ELEMENT EXHIBIT G

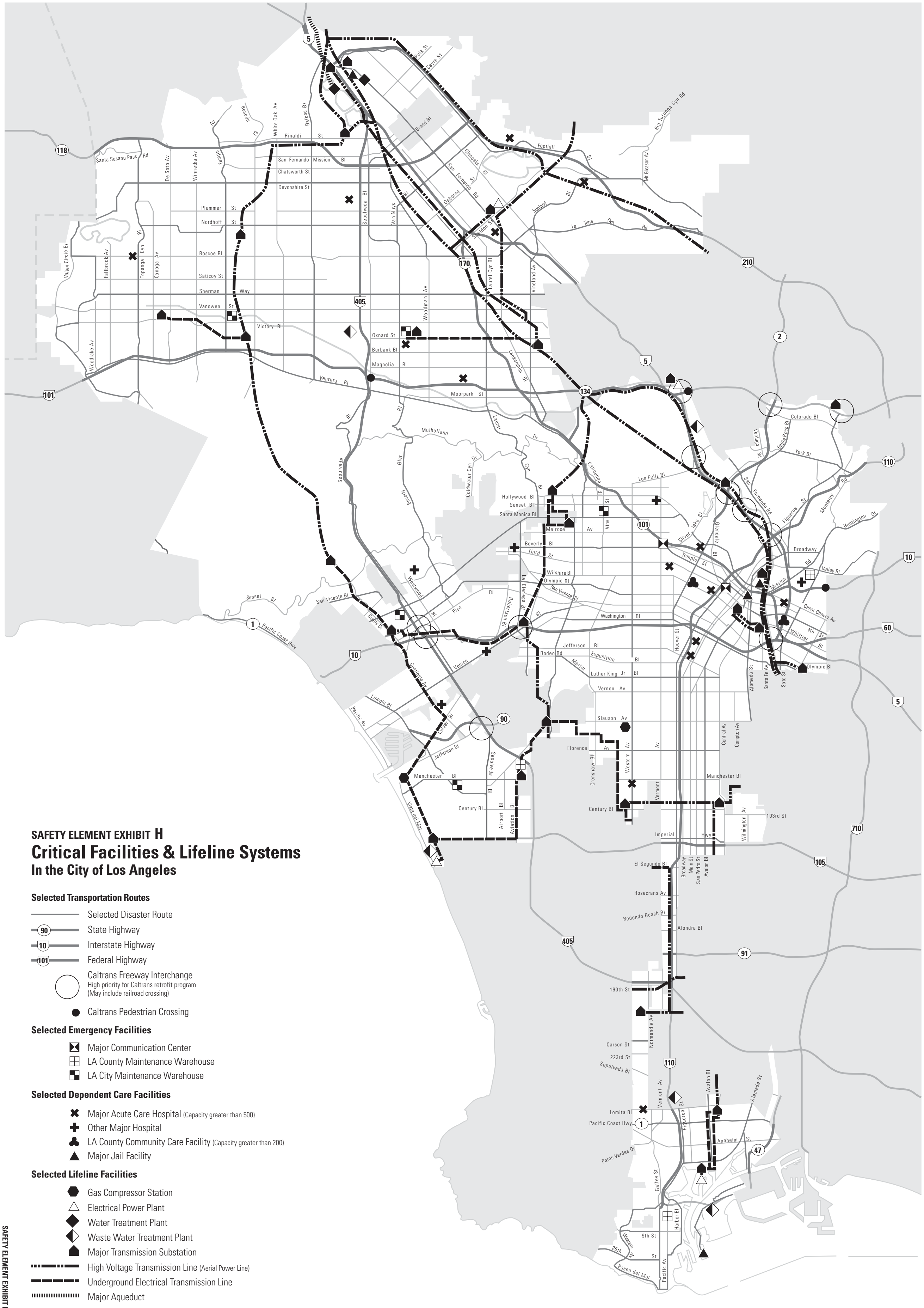
Inundation & Tsunami Hazard Areas

In the City of Los Angeles

- Flood Control Basin
- Potential Inundation Areas
- Areas Potentially Impacted by a Tsunami
- Boundaries of Inundation Areas from Specific Flood Control Basins

Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; Technical Appendix to the Safety Element of the Los Angeles County General Plan Hazard Reducation in Los Angeles County, Volume 2, Plate 6, "Flood and Inundation Hazards" January 1990; California Environmental Quality Act of 1970 (CEQA), Public Resources Code Section 21000 *et. seq.* with guidelines as amended, 1992; California Government Code Title 7 chapter 3, article 5 section 65302(g), as amended 1993.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • March, 1994 • Council File No. 89-2104



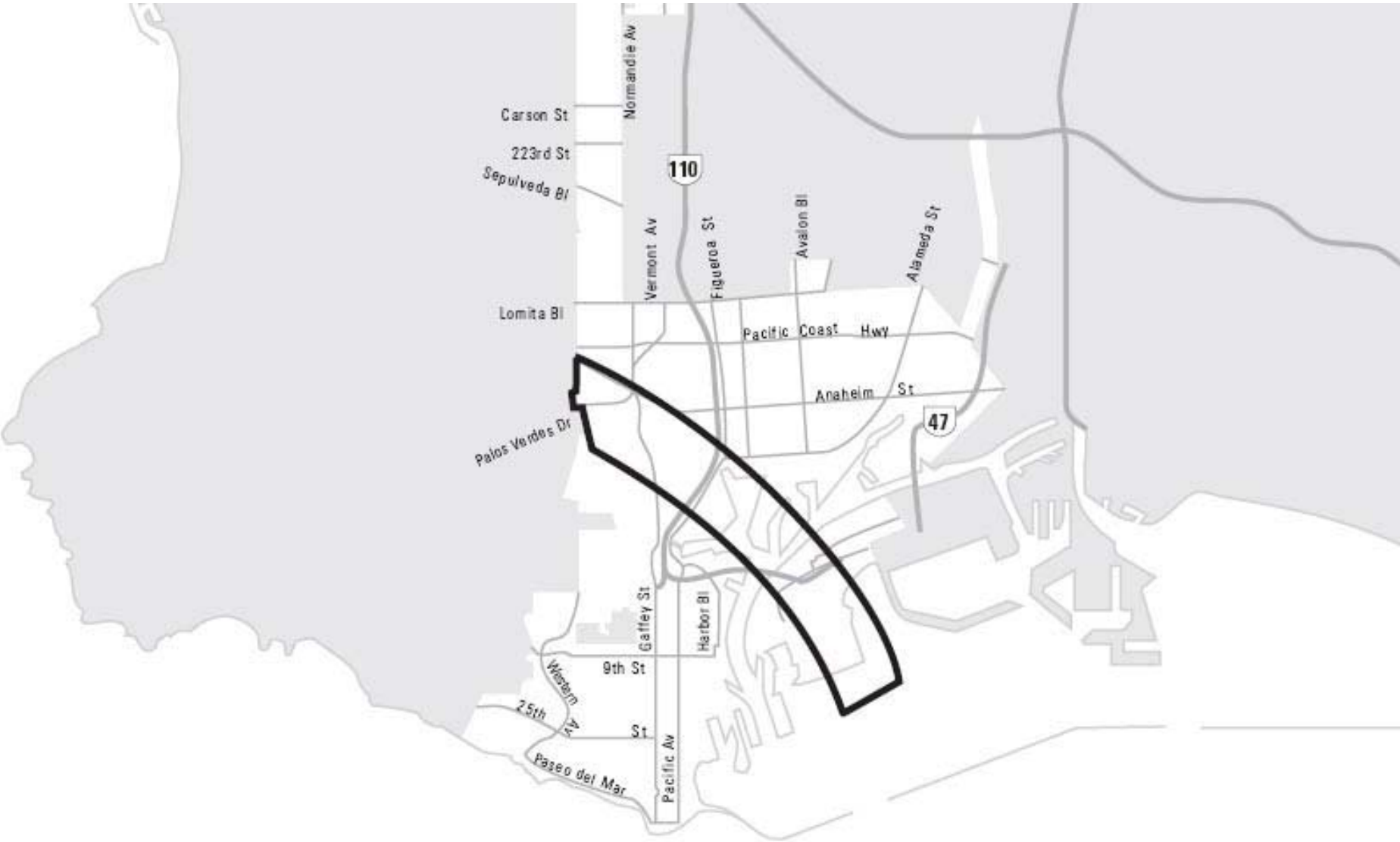
SAFETY ELEMENT EXHIBIT H
Critical Facilities and Lifeline System

NOTES

1. This map is intended to present the general distribution of community elements vulnerable to damages from a variety of hazards. In order to preserve map clarity, all important critical facilities and lifelines are not shown.
2. Disaster routes function as primary thoroughfares for movement of emergency response traffic and access to critical facilities. Immediate emergency debris clearance and road/bridge repairs for short-term emergency operations will be emphasized along these routes.
3. The selected disaster routes also provide a plan for interjurisdictional road reconstruction and rebuilding following a major disaster.
4. The compilation of selected lifeline facilities relied heavily upon California Division of Mines and Geology, Earthquake Scenario Reports, Special Publications 60 and 99.
5. This map is intended for general land use and disaster planning purposes only.

Source: LA County Safety Element Technical Appendix, Plate 8, December 1990 & General Plan Framework EIR.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • April, 1995 • Council File No. 89-2104


Carson St
223rd St
Sepulveda Bl
Lomita Bl
Palos Verdes Dr
Normandie Av
Vermont Av
Figueroa St
Avalon Bl
Alameda St
110
Pacific Coast Hwy
Anaheim St
47
Gaffey St
Harbor Bl
9th St
Western Av
25th St
Paseo del Mar
Pacific Av

CLEARWATER
Program

Public Hearing for Draft EIR/EIS
COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: Jody James

Organization: (Private Citizen)

Mailing Address: 1068 Via Cordova

City: San Pedro State: CA Zip: 90732

E-mail: Jody.James@sbcglobal.net

Regardless of which route this project takes our community is bearing an unfair and unmitigated burden. Give us reasonable mitigation - REMOVE the Rancho Butane/Propane Ultra Hazardous facility. - Eminent Domain for a public purpose - should be used to take this hazard away from our vulnerable Port and community. Use the site for a shaft, (it's half-way.) or base of operation, later for public parking - Special events, Soccer field, parking or "park and ride."

I would like to receive future public notices regarding the project via: ☒ E-mail ☐ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to:

Steven Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601
shighter@lacsd.org

Aaron O. Allen, Ph.D.
Chief, North Coast Branch
U.S. Army Corps of Engineers,
Los Angeles District Regulatory Branch
915 Wilshire Boulevard
Los Angeles, CA 90017
Aaron.O.Allen@usace.army.mil

REC'D LACSD
MAR 13 '12 AM 9:47

DOC # 485576

Highter S

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Public Hearing for Draft EIR/EIS

COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: Rosellen Trunnell

Organization:

Mailing Address: 1206 North Brett Place, Unit 212

City: San Pedro State: CA Zip: 90732-5003

E-mail:

This meeting was valuable, and I hope there will be more of this kind.

I would like to receive future public notices regarding the project via: ☐ E-mail ☐ Regular Mail

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Aaron O. Allen, Ph.D.
Chief, North Coast Branch
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Los Angeles District Regulatory Branch
915 Wilshire Boulevard
Los Angeles, CA 90017
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COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: ROBERT BORDEN

Organization: Resident

Mailing Address:

City: S.P. State: CA Zip: 90732

E-mail: RBorden959@Cox.net

Geologic instability in 1300 feet in prime residential. This proposal is outrageous! Infrastructure Yes, but please don't jeopardize our community

I would like to receive future public notices regarding the project via: ☑ E-mail ☐ Regular Mail

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CLEARWATER
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Public Hearing for Draft EIR/EIS
COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: PAT ROME -

Organization: HARBOR PINE CREEK H.O.A.

Mailing Address: 25327 PINE CREEK LANE

City: WILMINGTON State: CA Zip: 90744

E-mail: PJWrome@YAHOO.COM

ARE YOU COORDINATING WITH THE PROP "O" PEOPLE? THAT IS A MULTI MILLION DOLLAR PROJECT TO CLEAN UP MACHADO LAKE - WHAT ABOUT THE GAS STORAGE TANKS ON GAFFEY? IF THERE ARE ALREADY LPG TANKS THAT ARE A DISASTER WAITING TO HAPPEN - HOW CAN YOU PROMISE THERE WILL BE NO PROBLEMS?? OUR PRIORITIES MUST BE SAFETY - HOW CLOSE IS THIS PLAN TO FRACKING -

I would like to receive future public notices regarding the project via: ☑ E-mail ☒ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to:

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shighter@lacsd.org

Aaron O. Allen, Ph.D.
Chief, North Coast Branch
U.S. Army Corps of Engineers,
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Los Angeles, CA 90017
Aaron.O.Allen@usace.army.mil

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Public Hearing for Draft EIR/EIS
COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: KATY WATKINS

Organization: CITIZEN / RESIDENT

Mailing Address: 26101 S. VERMONT AVE #201

City: HARBOR CITY State: CA Zip: 90710

E-mail: KATYW@PACBELL.NET

ARE YOU AWARE OF THE PROP O PROJECT AT LAKE MACHADA? WHAT ARE YOU DOING TO COORDINATE WITH THAT PROJECT? WHAT IMPACT WILL YOUR PROJECT HAVE ON THE PROP O PROJECT. WHAT ABOUT THE PURPORTED UNSTABLE LPG TANKS AT GAFFEY AND PALOS VERDES DRIVE NORTH? ANAHEIM

I would like to receive future public notices regarding the project via: ☒ E-mail ☐ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to:

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Aaron O. Allen, Ph.D.
Chief, North Coast Branch
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Los Angeles District Regulatory Branch
915 Wilshire Boulevard
Los Angeles, CA 90017
Aaron.O.Allen@usace.army.mil

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Public Hearing for Draft EIR/EIS
COMMENT FORM I

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: JoAnn Wysocki

Organization: Resident

Mailing Address: 1006 King Avenue

City: Wilmington State: CA Zip: 90744-3204

~~E-mail~~: F18-B Levels of Service Intersection Turning Movement
City of Wilmington
Gaffey St - 110 Ramp
Gaffey St - 9th Street
Gaffey St - Paseo del Mar
Western - Paseo del Mar
Western - 9th Street
① Should be corrected to community of San Pedro.
② Wilmington is a community not a city.
II no response from Los Angeles Police Department on primary response time (2175 John S. Gibson Blvd) to Angel Gate or Royal Palms. Page 16-9
① L.A.P.D. should respond in final EIR.

I would like to receive future public notices regarding the project via: ☐ E-mail ☒ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to:

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Supervising Engineer, Planning Section
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Aaron O. Allen, Ph.D.
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CLEARWATER
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Public Hearing for Draft EIR/EIS

COMMENT FORM II

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: JoANN WYSOCKI

Organization: RESIDENT

Mailing Address: 1006 KING AVENUE

City: WILMINGTON State: CA Zip: 90744-3204

E-mail: none

III This E.I.R. should be any opportunity for anyone who has new ~~uses~~ suggestions for new new uses of reclaimed water.

IV Need additional information in final E.I.R. Project put out to bid process: cost overruns; street sweeping; telephone contacts; removal of grafitti in a timely matter PAGE 15-38.

V Will the final E.I.R. be sent to the San Pedro Regional, Carson Regional and Wilmington Branch Libraries?

I would like to receive future public notices regarding the project via: ☐ E-mail ☒ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to:

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shighter@lacsd.org

Aaron O. Allen, Ph.D.
Chief, North Coast Branch
U.S. Army Corps of Engineers,
Los Angeles District Regulatory Branch
915 Wilshire Boulevard
Los Angeles, CA 90017
Aaron.O.Allen@usace.army.mil

Highter, Steve

From: Kim Stevens <stevens@his.com>
Sent: Friday, March 09, 2012 4:54 PM
To: Highter, Steve
Subject: Clearwater Program

Dear Sirs,

As a nearby resident in the Palisades, I would like to make a comment on the Clearwater Program.

This is a NIMBY issue par excellence, but we all know it has to be done and that the White Point site is the logical place from which to do it.

My concern is that, as you know, there was a recent landslide on the Paseo del Mar between the Palisades and White Point, which has cut the Paseo del Mar.

As your described access site is down the hill at White Point, all of the detritus removed will have to be moved uphill. The existing road up the hill was not designed for heavy traffic, and I fear that its use by hundreds of heavy trucks will destabilize the cliff at White Point also. Would it be possible to move the dirt and stone up the hill on a conveyor belt, and have the trucks load at the top of the hill rather than at the excavation site itself?

Regards,

Robert K. Stevens
3612 S Walker Ave.
San Pedro 90731
310-514-8369

Highter, Steve

From: Laureen Claire Vivian <lvivian@earthlink.net>
Sent: Saturday, March 10, 2012 2:57 PM
To: Highter, Steve
Cc: joebuscaino@cox.net; diananave@earthlink.net; johnmmavar@gmail.com
Subject: Clearwater

March 10, 2012

Dear Steven Highter,

I am very concerned about the impact of the Clearwater Program on our community of San Pedro. I have served on the NW Neighborhood Council Board for 4 years and on the CAC/CRA Board for 3 1/2 and have spear-headed and shepherded the $682,000 Averill Park Stream renovation project. My concern for the community and our quality of life runs deep.

Over the short course of our awarness of your proposed project, the process of alternative studies and their presentation has been minimal to us. And now, the "preferred alternative", so deemed by your department and without the people of San Pedro having any say in the matter, is the one that rams through the upper spine of our town. We would like to have a meeting with you and ask you to present to our three (3) neighborhood councils as a matter of due diligence and transperancey. We believe that the citizens of our town should be made fully aware of the alternatives and their respective impact.

Moreover, the preferred alternative you have seemed to have chosen is not our preferred alternative. The negative impacts of traffic, noise, ,pollution, disruption of existing natural features at Royal Palms (even "just" temporarily) are extensive.

With the Port's waterfront projects the alternative that parallels this disruption and improvement is the more logical and least damaging to our town. The outfall is a bit further yet the benefits to us as a town and people far outweighs this added effort.

Please let me know if you would be willing to present to our local Neighborhood Councils, write in our local papers and/or hold special "town hall" meetings to allow for the best plan to be decided communally and transparently.

Thank you for your consideration and I look forward to hearing from you.

Laureen Vivian, MA

Laureen Vivian & Associates

445 West 6th Street

San Pedro, CA 90731

www.LaureenVivian.com

Highter, Steve

From: Jody James <jody.james@sbcglobal.net>
Sent: Sunday, March 11, 2012 10:49 PM
To: Highter, Steve
Cc: mrenvirlaw@sbcglobal.net; Janet Gunter
Subject: Clearwater/mitigation

Greetings Mr. Highter,

I am writing my short comments on the Clearwater Program. Regardless whichever tunneling route is taken - hopefully the geologic information is as accurate as possible - our Harbor Communities are bearing a disproportionate burden for the benefit of wider areas of LA County.

I am asking for "mitigation" that would be a benefit in a substantial way. The "preferred" route of your tunneling travels under Gaffey Street and takes a westward turn almost directly under the large Rancho LPG - Butane and Propane storage facility. This facility meets all the legal definitions of an Ultra Hazardous Activity. The site is in LA City Planning documents (you have seen these) clearly identified as in the Rupture Zone of the Palos Verdes Fault. I also see that this location on the "preferred" route is approximately half way along the route. This might be a useful site for a shaft or base of operations for this project.

More importantly, for **PUBLIC SAFETY** and justifiable **MITIGATION** it would be admirable to remove this "hazard". Perhaps Eminent Domain action for public use of this land should be utilized. When the Clearwater Project is complete it could be used as a park-and-ride, parking lot for the Field of Dreams Soccer Field, and/or special events at the Port of LA. A railroad spur exists that could be useful without much imagination. Thank you, Jody James

Highter, Steve

From: Kiran Magiawala <kiran_magiawala@yahoo.com>
Sent: Thursday, April 05, 2012 12:35 PM
To: Highter, Steve; Giljum, Mark
Subject: Urban Wastewater: One Man's Waste Is Another Man's Treasure

Greetings Gentlemen. Does this make sense? Thanks and regards. Kiran.

http://blogs.ei.columbia.edu/2012/03/21/wastewater-in-urban-ecosystems-one-mans-waste-is-another-mans-treasure/

Kiran R. Magiawala PhD
Retired Engineer, Citizen Scientist and Volunteer
Tele: 310-978-1434
Email: kiran_magiawala@yahoo.com

Highter, Steve

From: Kiran Magiawala <kiran_magiawala@yahoo.com>
Sent: Tuesday, April 03, 2012 12:47 PM
To: Highter, Steve; Giljum, Mark
Subject: Storms and Rising Seas Present New Threats to Unstable SoCal Peninsula

Greetings Gentlemen. Pray you saw this news report. Regards. Kiran.

http://blogs.kqed.org/climatewatch/2012/04/01/storms-and-rising-seas-present-new-threats-to-unstable-socal-peninsula/

Kiran R. Magiawala PhD
Retired Engineer, Citizen Scientist and Volunteer
Tele: 310-978-1434
Email: kiran_magiawala@yahoo.com

Highter, Steve

From: Kiran Magiawala <kiran_magiawala@yahoo.com>
Sent: Tuesday, March 27, 2012 11:52 AM
To: Ted Johnson; Robb Whitaker
Cc: Highter, Steve; Giljum, Mark; Acosta, Glenn; Stephen Arakawa; James Stahl; Simon Bluestone
Subject: First-ever Use of Airborne Resistivity System in Antarctica Allows Researchers to Look Beneath Surface in Untapped Territories

27 March, 2012

Greetings Ted and Robb.

Pray this news item is of interest at

http://www.nsf.gov/news/news_summ.jsp?cntn_id=123620&org=NSF&from=news

As appropriate, this Danish technology can also be used for measuring salinity ingress in open coastal area, in aquifer mapping and perhaps...in pre-tunneling geological surveys.

http://skytem.com/technology/

Impressive at first look! Might be worth investigating.

Regards,

Kiran.

Kiran R. Magiawala PhD
Retired Engineer, Citizen Scientist and Volunteer
Tele: 310-978-1434
Email: kiran_magiawala@yahoo.com

Highter, Steve

From: Kiran Magiawala <kiran_magiawala@yahoo.com>
Sent: Thursday, March 22, 2012 12:55 PM
To: Highter, Steve; Giljum, Mark; Acosta, Glenn; Haug, David; Avila, Don
Cc: James Stahl
Subject: Climate Change Alters the Calculus for Water Infrastructure Planning

Greetings.

FYI. Will the sea level rise due to climate change be integrated into discharge duct elevation planning/pumping requirements for our ClearWater program? Just curious.

Thanks and regards.

Kiran.

http://www.circleofblue.org/waternews/2012/world/climate-change-alters-the-calculus-for-water-infrastructure-planning/

Kiran R. Magiawala PhD
Retired Engineer, Citizen Scientist and Volunteer
Tele: 310-978-1434
Email: kiran_magiawala@yahoo.com

Highter, Steve

From: Kiran Magiawala <kiran_magiawala@yahoo.com>
Sent: Tuesday, March 13, 2012 4:45 PM
To: Kiran Magiawala
Subject: A UN analysis sets out global water-management concerns ahead of Earth Summit

Greetings.

FYI at http://www.nature.com/news/water-under-pressure-1.10216

Around the world, water use distribution pattern (a 40,000 ft view) is worth noting. Please share.

Do we here in USA/California have some benchmark approaches/constructs on monitoring/data compilation/sharing to offer to the world water community?

Thanks and regards.

Kiran.

Kiran R. Magiawala PhD
Retired Engineer, Citizen Scientist and Volunteer
Tele: 310-978-1434
Email: kiran_magiawala@yahoo.com

Highter, Steve

From: Bruce Logan <bel3@engr.psu.edu>
Sent: Thursday, March 01, 2012 12:19 PM
To: Kiran Magiawala; Ackman, Phil; Steele, Alex; Tremblay, Ray; Nygaard, Jodie; John Bednarski; Hampik Dekermenjian; Phil Luri; Shivaji Deshmukh; Rich Nagel; Highter, Steve; Boehmke, Chuck; Bill Dunivin; Tom Knoell; Jeff Mosher; Robert Renner
Cc: Ron Wildermuth; Gus Meza
Subject: RE: Giving waste water the power to clean itself
Attachments: 2012-Cusick-etal-Science(Express).1219330.full.pdf

Here is a copy of the paper.

Prof. Bruce Logan, Ph.D.
Director, Hydrogen Energy (H2E) Center &
Engineering Energy & Environmental Institute (E3I)
231Q Sackett Bldg
Penn State University
University Park, PA 16802 USA
Voice: 814-863-7908, Cell:814-777-4124, blogan@psu.edu

---

www.engr.psu.edu/ce/enve/logan/ (my own home page)
www.engr.psu.edu/h2e/ (H2E Center)
www.engr.psu.edu/e3i (E3I)
see an MFC powering a fan in real time: www.engr.psu.edu/mfccam
Follow MFCs on Twitter: www.twitter.com/MFCtechnology
Follow MFCs on You Tube: www.youtube.com/user/MFCTechnology
See also: www.microbialfuelcell.org

From: Kiran Magiawala [mailto:kiran_magiawala@yahoo.com]
Sent: Thursday, March 01, 2012 3:00 PM
To: Phil Ackman; Alex Steele; Ray Tremblay; Jodie Nygaard; John Bednarski; Hampik Dekermenjian; Phil Luri; Shivaji Deshmukh; Rich Nagel; Steve Highter; Chuck Boehmke; Bill Dunivin; Tom Knoell; Jeff Mosher; Robert Renner
Cc: Ron Wildermuth; Gus Meza
Subject: Giving waste water the power to clean itself

Greetings.

FYI. Do we follow-up on this technology in determining its technology readiness for scaling, and in determining its associated costs? Just curious.

Unfortunately, I do not have access to the reference paper.

Regards.

Kiran.

http://www.nature.com/news/giving-waste-water-the-power-to-clean-itself-1.10153

Kiran R. Magiawala PhD
Retired Engineer, Citizen Scientist and Volunteer
Tele: 310-978-1434
Email: kiran_magiawala@yahoo.com

Climate Change Alters the Calculus for Water Infrastructure Planning

WEDNESDAY, 21 MARCH 2012 10:23

Adapting to climate change in the U.S., according to one estimate, will cost at least a half trillion dollars over the next four decades.

Photo courtesy Alex McLean/Massachusetts Water Resources Authority

The holding tanks at the Deer Island's wastewater treatment plant in Boston Harbor were raised by half a meter (nearly two feet) during construction in the 1990s in response to potential sea-level rise. The facility was one of the first to have a design that was informed by climate science.

By Brett Walton
Circle of Blue

When the water and sewer agency for metropolitan Boston decided to raise parts of the Deer Island sewage treatment plant in the city's harbor by half a meter (two feet) as a hedge against climate change and rising sea levels, it was not a policy decision.

"It was the engineers who pushed it," said Steve Estes-Smargiassi, the director of planning for the Massachusetts Water Resources Authority (MWRA).

The major urban utility's decision to protect an expensive coastal facility should not arch eyebrows in an age when the Atlantic Ocean, off the eastern coast of the United States, is rising at its fastest rate in the last two millennia, according to a 2010 study. Except that the adaptation planning for Deer Island happened in 1989, three years before the Kyoto Protocol and one year after NASA scientist James Hansen's Congressional testimony brought public attention to global warming.

Deer Island was one of the first instances of climate change projections being incorporated into a sewage plant's design, Estes-Smargiassi told Circle of Blue. Now, more than 20 years later, as the detrimental effects of climate change have become better understood at global, national, and regional scales, more people are asking how a warmer, wetter world will alter the function and effectiveness of vital infrastructure in the U.S. However, when it comes to planning for the effects

Effects on Drinking Water, Sewer, and Stormwater Infrastructure

- Rising sea levels will push salt water into coastal sewage and stormwater pipes, reducing flows and disrupting the treatment process.
- Rising sea levels will also infiltrate coastal aquifers and spoil wells.
- Earlier snowmelt will change reservoir management.
- Longer droughts and scarcer water will prompt utilities to use water more efficiently, to conserve, and to increase supplies by investing in desalination

More Water Pricing Stories

Climate Change Alters the Calculus for Water Infrastructure Planning

America's Water Infrastructure Shows Its Age — The National Debate About How to Pay for Repairs

Water Law: Racing an Arizona Senator's Retirement, Dry Navajo Nation Draws Closer to Securing More Water

Peter Gleick: Why Spend Public Money for Private Bottled Water?

Mixing Art and Technology: North America's Largest Membrane-filtration Sewage Plant Opens Near Seattle

The Federal Water Tap

Federal Water Tap, April 23: Clean Water Act

Federal Water Tap, April 16: The Mississippi River and the Rio Grande

Federal Water Tap, April 9: Colorado River Study

Federal Water Tap, April 3: Knocking Down Regulations

Federal Water Tap, April 2: Great Lakes Water and Wind

Recent Posts

The Stream, April 27: Water Cycle is Intensifying Faster Than Predicted

The Stream, April 26: Fracking Should Occur At Least 600 Meters From Aquifers, Study Says

The Stream, April 25: Beijing Will Face a Water Shortage

Emerald City Water

Ned Breslin: Navigating Public Toilets in the City, Begging for Change in the WASH Sector

DONATE TO CIRCLE OF BLUE GLOBAL REPORTING

on drinking water and sewer systems, many cities, for a variety of reasons, still are lagging.

plants, pipelines, or wastewater recycling.
- More intense storms could overwhelm the sewer system's collection capacity, with more flooding and more untreated sewage spilled into waterways.

Most municipalities are more concerned with stanching the immediate leaks from an aging distribution system, as Circle of Blue reported on Monday. Without sufficient funds to fix today's problems or access to sophisticated climate simulations, these utilities are more worried about today's problems than the incremental changes that will develop over the next decades. Some utilities are a step ahead and have begun the assessment phase, developing models to understand new rainfall patterns and river flows. And a few of the most pro-active are already making their water systems more resilient by changing policies, building new structures or revamping old ones.

Though the environmental circumstances for each region of the U.S. are unique, the cost of adaptations nationwide — backflow prevention in sewer pipes, expanded stormwater retention, green infrastructure investments, desalination plants, wastewater recycling — could amount to hundreds of billions of dollars in the coming decades. These investments will come at a time when water infrastructure, in general, is deteriorating and in need of replacement.

In some places, the inadequacy of the old system is already showing.

Surrounded on three sides by water, San Francisco has begun to see the effects of higher seas and higher tides on its stormwater collection pipes. The city's water utility anticipates spending $US 20 million to $US 40 million over the next five years to prevent backflow into the system, where the salt water can compromise the biological treatment process.

"There are 29 stormwater sites that will go from a nuisance to a problem," said David Behar, the climate program director for San Francisco Public Utilities Commission. "We know that these types of impacts will only increase in the future because of climate change."

Done well, like the Deer Island facility, the nation's pipes and plants can concurrently be remodeled and made climate resilient. But with poor planning or no planning at all, these assets will need to be re-fitted — at great cost — well before their useful life has expired.

A Model Exercise

A report released last August by the Natural Resources Defense Council considered the effects that climate change might have on water resources for 12 American cities. Though New York, Chicago, Seattle, and San Francisco had decent assessments, according to Michelle Mehta, one of the report's principal authors, the goal of canvassing 15 cities was not met because of a lack of good information.

Even the U.S. Environmental Protection Agency (EPA), when it collects data from states on capital needs for water and sewer infrastructure, does not ask how climate change might influence the numbers. The most recent figures, collected during 2007 and 2008, estimated that utilities would need to spend $US 298 billion on wastewater and $US 335 billion on drinking water over the next two decades.

Federal Legislation for Climate Change Funding

Members of both the House and the Senate have introduced versions of a bill that would help communities adapt water infrastructure to a climate-altered world.

The Water Infrastructure Resiliency and Sustainability Act would establish a grant program within the Environmental Protection Agency to provide money for things like water storage, sewer outfalls, and stormwater capacity.

In October, a group of 16 water organizations sent a letter of support to the act's Senate sponsors, following an August letter to the House sponsor. Neither bill has been acted on.

The EPA told Circle of Blue that the 2011 drinking water survey, which is underway and will be reported to Congress in 2013, will for the first time ask what infrastructure needs are attributed to climate change preparations.

The first attempt at a national figure for the cost of climate change adaptation to water utilities came in 2008 from a study by the National Association of Clean Water Agencies (NACWA) and the Association of Metropolitan Water Agencies, two lobby groups for public utilities. They estimated that U.S. water and sewer agencies would have to spend between $US 448 billion and $US 944 billion from 2010 through 2050 on infrastructure, operations, and maintenance. The Southwest — defined as Arizona, California, Colorado, Nevada, New Mexico, and Utah — would have to spend the most to adapt.

One of the reasons some cities have not taken up the issue is expediency. They are more concerned about finding money to fix today's broken sewer line or to meet the latest water quality standard, according to Adam Krantz, the managing director for government and public affairs for NACWA.

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"How do you determine your priorities when there are other issues at hand?" Krantz told Circle of Blue. "Utilities do not necessarily consider that long-range planning when they don't have the funds to meet the immediate problems."

A second factor is technical. Most climate models do not provide the "granularity," or minute-by-minute, neighborhood-by-neighborhood details that are required for an accurate evaluation of stormwater flows. Furthermore, regional climate models may not provide a clear enough picture of what could happen in a particular watershed.

Sea-level rise, however, has been easier to run through the computers. Most adaptation investment, such as Boston's Deer Island sewage plant, has been directed to that area.

Interactive Map: U.S. Cities and Climate Change

Click on the points below to learn more about the potential threats and solutions for each city.

View U.S. Cities and Climate Change in a larger map. Map © Brett Walton / Circle of Blue

Source: Mayors Climate Protection Center, National Resources Defense Council

Design for the Future

Like most coastal facilities, treated wastewater flows away from Deer Island with the force of gravity. The Massachusetts Water Resources Authority (MWRA) feared that, if the seas rose, the sewer outfall would have a lower flow rate, especially during high tide, because of pressure differences. Gravity would become ineffective, and pumping would then be necessary. Instead, the utility built the holding tanks 0.58 meters (1.9 feet) higher at the outset, to compensate for the expected change.

"In designing the sewer outfall, which has a life of up to 100 years, folks had to think about the capacity during tides," Estes-Smargiassi told Circle of Blue. "Someone on the engineering team asked about sea-level rise."

Those are questions that more utilities are beginning to think about. Though most are not taking bold actions yet, they are assessing the situation, gathering information, and refining their computer simulations, said David Behar, the climate program director for San Francisco Public Utilities Commission. Behar is also the staff chair for the Water Utility Climate Alliance, a group of 10 large U.S. water utilities collaborating on climate change issues.

"Utilities can ask, 'What will the effects be?'" Behar told Circle of Blue. "And they can ask, 'How do we make ourselves resilient?' The second question can only be answered after the first. Right now, we're not asking 'How?' We're asking 'What?' And that has not been satisfactorily answered by anyone."

Paul Fleming, the manager of the climate and sustainability group at Seattle Public Utilities, told Circle of Blue that he used to feel apologetic when he told people that the city was in an assessment period. "But now, I think it's the place to be," he said. "I think there's been buyer's remorse in Australia, for example, because of all the investment in desalination plants. We have to ask ourselves, 'When do we make those large purchases?'"

Two decades ago, in the middle of a severe drought, the city of Santa Barbara, California, asked the same question and decided to build a desalination plant for emergency supplies. The $US 34 million facility was used for less than a year before the drought broke. The plant

was mothballed (or put, as the city says, in “long-term storage mode”), and parts of it were sold off.

The uncertainty in the rainfall models is one argument for green infrastructure, says Fleming, who says that the “cellular” essence of these natural water-absorbing systems — such as streetside wetlands, grassy roofs and permeable pavement — allows for greater flexibility when both average and peak environmental conditions are in flux.

New York is one of several cities to use green infrastructure to address the variability that climate change is expected to bring.

“If you put a pipe in the ground,” Fleming reasoned, “you can’t increase it if you guessed wrong on the size.”

Seattle’s climate assessment program has allowed the city to feel confident that it does not need to make those big capital investments yet, but the city is experimenting with several green infrastructure projects for stormwater. Now is the time for such experiments, argues Richard Luthy, a Stanford engineering professor and the director of the nation’s only federally funded center for urban water infrastructure research.

“This is a special moment for water,” Luthy said in an interview with Circle of Blue, “because of all the pressures — scarcity, increasing demands, and the need to provide water for ecosystem services — all on top of failing infrastructure.”

This article is part of a series on water infrastructure in the U.S. Part one reported the national debate on how to pay for repairing and upgrading an aging system.

Print PDF

Brett Walton *is a Seattle-based reporter for Circle of Blue. He writes our Federal Water Tap, a weekly breakdown of U.S. policy. Interests: Southwest, Pacific Northwest, Pricing, Infrastructure.*

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This entry was posted on Wednesday, March 21st, 2012 at 10:23 am and is filed under Business, Feature Stories, North America, Policy + Politics, U.S. Water, Water + Climate, Water News, Water Policy, Water Pricing. You can follow any responses to this entry through the RSS 2.0 feed. You can leave a response, or trackback from your own site.

3 Comments

Wash Bay March 21, 2012 at 9:37 pm

Interesting that this issue isn’t taken more serious.

Water Infrastructure Planning in an Era of Climate Change : ACT April 3, 2012 at 12:23 pm

[...] Walton from Circle of Blue writes a compelling story about the importance of infrastructure planning in an era of climate change. His article gets at [...]

Climate Change Alters the Calculus for Water Infrastructure Planning on Ecocentric Blog |

Food, Water and Energy Issues

April 4, 2012 at 10:02 am

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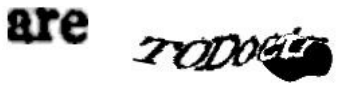

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Highter, Steve

From: Lacombe <chateau4us@att.net>
Sent: Friday, March 23, 2012 3:35 PM
To: Highter, Steve
Subject: Clearwater project

Hi Mr. Highter,

I met you last year when you spoke to our HOA regarding the Clearwater project. I recently received the latest packet of information and noticed that the new proposed line will run under the Rancho LPG facility at 2110 N. Gaffey in San Pedro.

This concerns me because there is 25 million gallons of butane and propane stored at this facility. The local residents have been opposed to this facility since it was built in 1973 without permits. Our homes, schools and businesses were there prior to 1973 but the tanks were built anyway. In 1978 legislation was passed due to this facility to prevent any future facility from being built like this one was. I'm part of the group that is trying to relocate these tanks to a safer location. I found out according to LACity planning that the parcel is on an earthquake fault, landslide, liquefaction and methane zone.

Since the local residents oppose the tanks and local politicians also oppose it (but can't do anything because it's grandfathered in) I'm sure you can get lots of support to push for eminent domain on this facility because it would be for the public good and benefit. The public needs to be able to flush our toilets but we don't need 25 million gallons of propane there.

Rancho purchased the property in 2010 for $19 million dollars. There shouldn't be the added expense of the business side of the transaction since they would get to keep and take the product and equipment. Then the Sanitation District can use that parcel as a shaft side, equipment storage or whatever.

I have a great relationship with RPV city council, planning dept and city staff. If I can be of any assistance to help provide documentation or contact information, please let me know.

Thanks for your time,
Jeanne Lacombe
(310) 833-0444

Highter, Steve

From: Susie Santilena <ssantilena@healthebay.org>
Sent: Wednesday, April 04, 2012 2:47 PM
To: Highter, Steve
Subject: Questions Regarding Clearwater Program DEIR

Hi, Steven.

I am reviewing the Clearwater Program DEIR on Heal the Bay's behalf and have a few questions.

Section 3.3.2.4- Will the preferred alternative also result in the dredging of ocean sediments?

Section 3.3.1.2- says JOS is expected to have a treatment capacity shortfall of around 20 MGD needed to accommodate future flows. It looks like by optimizing treatment plant operations in all of its plants, LACSD will be able to increase water reuse by anywhere from 16-47 MGD. Has there been any analysis to determine if LACSD could recycle its way out of needing to build a new tunnel altogether? If so, what were the results? Also, have you looked at upgrading treatment to level where JWPCPs effluent could be discharged to Wilmington Drain to allow for maintenance of the existing infrastructure?

Any input or documents you have that might help answer these questions would be greatly appreciated!

Thank you!

W. Susie Santilena | Environmental Engineer | Water Quality
Heal the Bay | 1444 9th Street | Santa Monica CA 90401
Tel: 310 451 1500 X189 | FAX: 310 496 1902 | ssantilena@healthebay.org
Protect what you love. Get involved, take action or join as a Heal the Bay member!

CLEAR WATER PROJECT

Public Hearing for Draft EIR/EIS Comment Form

This is a proposal for the Sanitation Districts to give back to the community that will be impacted by the Clearwater program.

In the 1920's up to about 1933 there was a Hot Spring Resort at Royal Palms State Beach. This resort was located a short distance from where the current connecting outfall extends offshore. Since the Long Beach earthquake of 1933 cut off the flow of the natural sulfur hot springs, it is felt that this spring can be found again with new technology. The Royal Palms Resort would benefit the residents of the 73 cities and unincorporated Los Angeles County as an outdoor swimming pool.

In the past, the Sanitation Districts have been good neighbors in providing benefits in the immediate vicinity of the JWPCP. Since the Sanitation Districts have recently restored a 17-acre Bixby Marshland at the corner of Sepulveda and Figueroa as well as other neighborhood improvements, it is felt that the Sanitation Districts could also restore the White Point Hot Spring pool as a way of giving back to the community.

Over time, the ratepayers in the Sanitation District's JOS (Joint Outfall System) would pay off the loans and bonds of $550 million to 1.4 billion dollars through connection fees and annual service charges. It is the population growth that will drive up the cost of Sanitation fees and the current homeowners will have to pay more because of this factor.

A failure of any of the existing tunnels could affect Wilmington Drain, Machado Lake and the Los Angeles Harbor. With this in mind, the San Pedro community takes the risk without any compensation.

The Sanitation Districts will be putting the aliment on public right of way (streets) although there will most likely be subsurface easements for portions of the tunnel project. If easements are needed, the property owner would have to sell at market value. The Sanitation Districts would also need land for temporary occupational right of way. Property owners again would be in a situation of temporary occupation in which the projects construction would last for 7 years (2015 to 2022).

Senior Engineer David Haug says, "he wants to leave the community as good or better than when we arrived". It is hoped that this proposal is acted on so that White Point Hot Springs can once again be a destination and attraction like it once was.

John Winkler/ Jhwinkler@me.com

Miraflores Home Owner Association

925 Cara Place, San Pedro, CA 90731

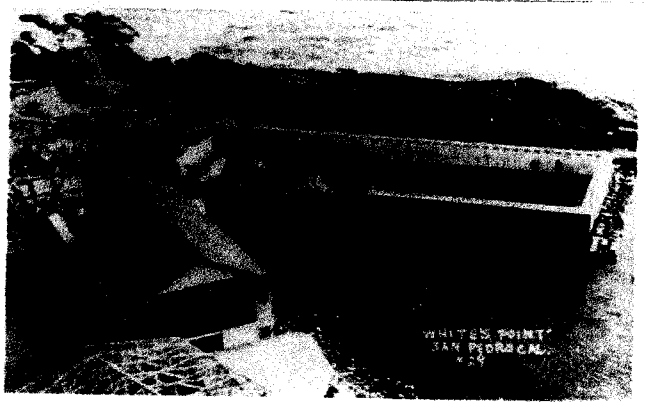
REC'D LACSD
APR 9 '12 AM10:29

DOC #

Flighter S

John Winkler

White Point Hot Spring Hotel



Aerial view of the White Point Hot Spring Hotel and resort from August 1922 shows the hotel, saltwater swimming pool and outdoor dance floor. Photo courtesy Palos Verdes Library District.

Only a few remnants remain today of the White Point Hot Spring Hotel resort and spa located at what is now Royal Palms County Beach in San Pedro.

During its heyday in the 1920s, it was one of the most popular beach resorts in Southern California, especially among Japanese-Americans.

Before Tojuro Tagami and his brother Tamiji built the resort in 1917, the area had been part of the Rancho de los Palos Verdes, which owner Jose Sepulveda had used as a cattle ranch.

In 1898, then-owner Ramon Sepulveda built housing and leased land to 12 Japanese-American fishermen from Los Angeles who had discovered an abundance of abalone and other readily harvestable sea life in the area. The fishing village thrived until 1906, when the abalone supply diminished and the operation closed.

The discovery of a sulfur hot spring in the area led to the Tagami brothers developing the bathhouse, together with Ramon Sepulveda. They built roads and dug out the hot spring, and by 1925 the resort included a hotel, restaurant, salt water swimming pools and an enclosed boating area.

This July 1925 aerial view shows the outdoor concrete swimming area and an enclosed saltwater pool just north of it at the resort. Photo courtesy LACFD Station 48.

Sepulveda also had built a terrazo dance floor surrounded by stone fireplaces and carved stone benches, some of which still survive today.

View looking north show the White's Point Hot Spring Hotel, with land owner Rámon Sepúlveda (b. 1854), son of José Diego Sepúlveda, on horseback next to fountain in foreground. Photo courtesy Palos Verdes Library District.

Enterprising fisherman Mitsuo Endo placed a fishing barge about a mile offshore among the kelp beds, then built a pier at the resort from which fishermen were transported to the barge by small powerboats.

The resort thrived during the 1920s. Physicians would send patients to the resort for the curative powers of the hot springs, and newlyweds would stay there for the beauty of the weather and location.

A variety of factors led to the resort's demise. A huge storm battered the coast in 1928, damaging the concrete pool. A bigger blow came when the Long Beach earthquake of 1933 cut off the flow of the natural sulfur hot springs, and the Depression also hurt the resort economically.

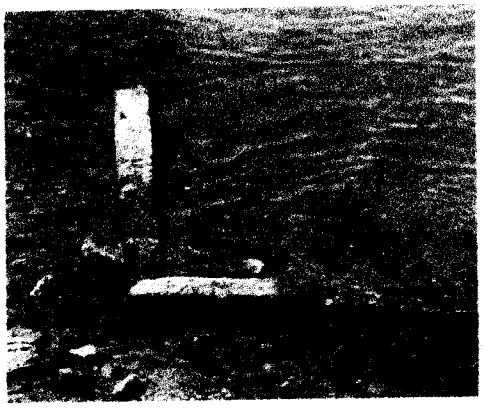
The Tagamis continued to run the resort, but they never were granted ownership of the land. Ramon Sepulveda legally could not sell to them under a California law which prohibited ownership of land by those not eligible to become citizens, a category that at that time included Asian immigrants.

The resort finally closed in the late 1930s. In February 1942, federal agents raided the surrounding community for security reasons and by April 1942, its residents had been moved to internment camps.

The federal government took over the area, incorporating it into the nearby Fort MacArthur military defense complex. The resort's buildings were demolished, and fortifications were added to the shoreline and nearby hillside.

The state of California bought the beach area in 1960, and it became Royal Palms State Beach. In 1995, the land was deeded to the county and became Royal Palms County Beach.

The site underwent a $2 million renovation in 1997. Additions included a children's play area, picnic tables and new restrooms. Descendants of the original Tagami family that built the resort were in attendance at the dedication.



Remains of concrete walls from the resort can be seen in this July 2006 Daily Breeze file photo.

What Are the Benefits of Sulfur Water?

By Heidi Brooks, eHow Contributor

Essential to humans as a vital component of three amino acids, sulfur is a mineral commonly found in naturally occurring springs and near volcanic formations. Sulfur water, either obtained directly from a natural spring or created by dissolving potassium sulfate in water, is an alternative treatment option for ailments ranging from arthritis to acne and offers a number of benefits for improving your health.

Skin Conditions

Sulfur water is a possible treatment for acne, dry scalp and diaper rash. Those suffering from eczema report relief from itching following the use of sulfur. The mineral is a common addition to creams, ointments, soaps or powders designed to treat these conditions. Furthermore, astringents or rinsing agents add sulfur water for use after cleansing with a gentle soap. This mineral affects the skin as a peeling and drying agent, helping the skin to fight and break down the bacteria or fungus causing the skin condition. Though reports document the successful use of sulfur for skin problems, side effects often occur. The most common side effects reported with sulfur water use include redness, skin discoloration and exacerbation of the skin condition in question.

Pain Relief

Another beneficial use of sulfur water is as a pain reliever for those suffering from arthritis. Studies show that arthritis sufferers have traditionally low levels of sulfur, offering a possible explanation for sulfur's pain-relieving effect. Although soaking in hot sulfur springs is one way for people to take advantage of this mineral, this involves visiting a place that has a naturally occurring sulfur spring, which may be inconvenient and not possible. However, arthritis sufferers can create their own sulfur water in which to soak by adding potassium sulfate to their bath water at a ratio of 2 ounces of the mineral to 30 gallons of water. Soaks should last 15 to 20 minutes. Bath soaks with sulfur can also be purchased from health supply stores.

Other Benefits

Sulfur water has other beneficial properties as well. Sulfur plays a vital role in collagen production, so sulfur water helps with skin elasticity and may serve as a tool for wrinkle prevention. In addition, soaking in sulfur water baths is an effective way to relieve the burning, pain and itching caused by hemorrhoids. Other ailments that sulfur water holds promise for alleviating are digestive disorders such as acid reflux, premenstrual issues, menopausal symptoms, heightened cholesterol levels and high blood pressure. Sulfur is also highly concentrated in the protein keratin, which is responsible for strengthening nails and hair. Sulfur water may aid keratin in this process.

Sulphur spring spas have pain- and inflammation-reducing benefits

Submitted by Eva Neumann on Mon, 10/20/2008 - 03:27 Health Update Germany

Hamburg - Bursa in western Turkey, Monticelli outside the gates of Parma, Italy, and Digne-les-Bains in southern France have something in common.

They are the locations of sulphur springs, which promise vacationers a particularly healthy experience. Sulphur usually is employed today in the form of thermal baths. The beneficial, pain-killing and anti-inflammatory effects on the body are due to many factors.

"As with all thermal baths, the warmth of the water has an initial effect," said Wolfgang Brueckle, chief physician of a German rheumatism clinic. The warming effect of the water is increased through the hydrogen sulphide. This is clearly visible in the reddening of the skin."

The muscles throughout the entire body relax and the body's connective tissue is more flexible. The blood vessels widen, the pulse and metabolism increase. Blood flow to the skin increases, which leads to an improvement in the absorption of oxygen and minerals. Sulphide enters the blood through the skin, and where needed, it contributes to the healing process, inhibits some joint inflammation or helps in the reconstruction of articular cartilage.

Thermal sulphur baths are well-suited for the treatment of illnesses of the musculoskeletal system, Brueckle said.

"We see very good success in patients with degenerative joint and spine illnesses, including spinal disc problems, Bekhterev's disease, inflammatory rheumatic diseases and muscle pain," he said. In addition, thermal sulphur baths are successfully used in the treatment of eczema and neurodermatitis.

Sulphur baths are generally prescribed as part of a visit to a spa. Of the 154 health resorts in Germany that are recognized as official spas, there are 31 with sulphur springs. Each sulphur spring is unique in its composition - sulphur content differs from spring to spring. But the water must contain a minimum of one gram of sulphur per litre. Otherwise, it cannot be designated as a mineral spring.

"But these factors should not be overestimated when weighed against other effectiveness factors," said professor Juergen Kleinschmidt of a German institute for health and rehabilitation science at Munich University. "Knowledge of how to employ sulphur springs and other factors at a spa are more important than the quantity of sulphur."

Spa specialists also are skeptical of the medicinal benefits of a single visit to a thermal spa while on vacation or at home in the bathtub. Kleinschmidt said these are at best brief wellness experiences that provide only an introduction.

Wherever a sulphur bath takes place, it should last 10 to 20 minutes in water warmed to 37 to 39 degrees centigrade, said Guenter Till, a member of the expert advisory committee on spas and thermal springs of the German wellness association in Duesseldorf. A hot shower follows the bath so that the pores open widely and the unpleasant sulphur smell dissipates.

The body feels heavy, and because bathing in a thermal sulphur spring puts quite a strain on the heart and on circulation, the usual practice is to take a long rest afterward. (dpa)

Mark Wells

1858 Trudie Drive, Rancho Palos Verdes, CA. 90275
E-Mail: mtwells@pacbell.net

Date: April 9, 2012

Mr. Stephen Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
Facilities Planning Department
1955 Workman Mill Road
Whittier, CA 90601

RE: SCH# 2008101074, Clearwater Program, EIR/EIS

DearMr. Highter:

This is my set of comments for The Clearwater Program and more importantly, the Joint Water Pollution Control Plant's, (JWPCP) proposed new Outfall Tunnel System.

I am in great support of The Cleatwater Program and I have stated as much in interviews by staff members of The Clearwater Program, at various times and in various ways and in talking with representatives of my city and local residents of Rancho Palos Verdes and San Pedro. I believe it is necessary to upgrade the Los Angeles County Sanitations Districts' Joint Outfall System (JOS) and I have been interested in learning more about The Program since I first learned of it, over five years ago.

My biography includes growing up very close to the two existing Joint Outfall Tunnel Systems under Western Avenue in the San Pedro and Rancho Palos Verdes areas. I continue to be a concerned resident of the area in which my wife and I reside.

I believe a new Joint Outfall Tunnel System is now necessary and should be welcomed by all those who would benefit from its construction and usage. My concerns lie not with the need or desire for this new construction, but rather the location of the new Tunnel System and a few of the aspects of the consideration of the Proposed Project's alignment and construction of the new Joint Outfall Tunnel System.

I have studied the Environmental Impact Report and even though I find myself not as objectionable to the Proposed Project's planned alignment of Alternative Number 4, as I was initially, both new and existing issues still plague me, with this Alternative and Alternative Number 3.

One of the most important issues I have with further work towards the construction of a new Joint Outfall Tunnel System with both Alternatives 3 and 4 is the fact that damage done to Paseo Del Mar, as a result of landslide activity, will create many new problems not previously considered, even in the EIR/EIS.

I am in agreement that the potential for new construction for any new Joint Outfall Tunnel System and Exit Shaft will not cause further damage to any area with landslide activity and I have confidence in the studies performed on the Geology of the areas, in the Report.

My major concern in this particular issue are the facts surrounding the possibilities that a major transit route for residents, visitors, construction teams and others has been eliminated from the areas near the sites for Alternative Nos. 3 and 4 and that there is no reconciliation of the landslide/road closure and there does not appear to be study or further analysis discussed between the Sanitation Districts and the City of Los Angeles, Department of Transportation, regarding these matters.

I feel very strongly that before much further study and work on the Proposed Project continues, everyone needs to feel confident that Paseo Del Mar will be restored to a viable thoroughfare long before any physical activity on a new Outfall Tunnel begins.

Another issue I found to be of concern is the routing of dirt haulers and other construction traffic related to the Proposed Project, Alternative Number 4 as it relates to routes not very well suggested in the EIR though the streets of San Pedro and/or the city of Rancho Palos Verdes.

I noted with the intersections where traffic counts were taken, they included intersections where construction vehicles might turn, but not necessarily through intersections that might see that particular traffic continue through, without turning.

One such intersection I found to be very lacking in study is the intersection of 25th Street and Western Avenue, in San Pedro.

Since it appears to me in the EIR/EIS, that construction vehicles MIGHT not utilize this particular intersection for turning, it was left out of much of the traffic counts provided for other intersections.

This alarms me because that intersection would be used exclusively for most, if not all vehicle traffic related to the Proposed Project, Alternative Number 4, in relation to the Exit Shaft and other construction planned for the Royal Palms area of San Pedro.

It appears that no truck route is truly suggested for ingress and egress of traffic related to The Clearwater Program in the area of Royal Palms in San Pedro. The Report does not state whether large construction vehicles will proceed along Western Avenue, turn east onto 9th Street, then north onto Gaffey Street, to access the (110) Harbor Freeway, as some have stated.

I feel this is a major issue at it relates to placing the Exit Shaft and other construction as proposed in Alternative Number 4.

Since there doesn't seem to have been any 'real' documented study as to the routes through San Pedro, to be taken by massive dirt haulers and other construction vehicles, I find this particular portion of the EIR sorely lacking and in need of much further study long before any construction begins.

With the exception of residences and businesses in the 'South Shores' areas of San Pedro, most residents and businesses would not have any use for any new Tunnel System by the JWPCP, because the vast majority of those impacted during the construction period for Alternatives 3 and 4 use the city of Los Angeles' Sewage Treatment Plant on Terminal Island.

While it is my strong opinion that a new Outfall Tunnel is necessary, I must conclude that there has not been sufficient study with potential traffic issues related to both the Proposed Project and Alternative Number 3. This is made much stronger since I learned via a person within The Clearwater Program's representation, that little has been done between the Sanitation Districts and the city of Los Angeles concerning the entire scope of having lost Paseo Del Mar, in San Pedro, as a viable route and that this situation has the potential of becoming a permanent problem that was never studied, to this point.

I also feel it is unfair to task so many residents and businesses with the issues of having a major construction project for something they will not use. Those who would utilize the new Outfall Tunnel will benefit at the expense, for a period of time, of so many who would not only not have use of any new Outfall Tunnel, but would be encumbered with many negatives during construction periods and environmental issues that could linger even after a new Outfall Tunnel is finished.

While Alternative Number 1 is the most expensive and could take the longest construction period, I feel it remains the best Alternative for all and the aspects including close freeway access and potential rail transportation of diggings could be accomplished with Alternatives Numbers 1 and 2.

It was and remains my hope that the comment period of the EIR/EIS be extended or paused to allow for further study of the potential impacts caused by the unfortunate collapse of Paseo Del Mar and the now very necessary complete study and implementation of a positive resolution because of the unplanned loss of such a major roadbed.

I would also urge a much more thorough set of studies and information provision to all the residents and business owners near the areas of the Proposed Project's route and Exit Shaft, so they are much more well informed about what representatives of The Los Angeles County Sanitation Districts intend to do or participate in the resolution of the Paseo Del Mar situation and all the potential routes dealing with construction traffic related

to the Proposed Project, Alternative 4 and the entire scope of possibilities should that Alternative be ultimately selected as the final route for a new Joint Outfall Tunnel.

I do understand that this EIR/EIS had many of its studies done several years ago. But things change and there has been at least one very big change since the Traffic Studies were done, several years ago.

Also troubling to many I have talked to is the fact that the EIR/EIS does not include enough information and study to indicate the possible routes of large dirt haulers and other construction traffic though San Pedro. I feel this should be a major concern to all those who live along any possible route where they will be impacted by construction traffic for an extended period of time.

Thank you for your considerations.

Regards,

Mark Wells
Rancho Palos Verdes Resident

Public Comment related to the Clearwater Sanitation Project:

Lonna Calhoun, CEM
1570 W. 9th Street
San Pedro, CA
310-569-5438

Concerns over Landslide Risk:

As a San Pedro resident and a Certified Emergency Manager I am concerned about the landslide risk in Alternative # 4. My concern is based on my experience in hazard analysis and risk mitigation specifically through 2010-2011 as a consultant for the City of Rancho Palos Verdes where I became interested in landslide activity on the Peninsula.

According to the Clearwater EIR:

Alternative # 4 *"could expose people, structures, or property to major geologic hazards such as landslides, mudslides, or ground failure."*

Alternative # 1 *"would not cross ancient landslides and would not result in renewed landslide movement during construction. Deep-seated ground failure is considered a low geologic hazard during construction. Impacts would be less than significant."*

Knowing that landslides can be caused by manmade activities the question becomes *landslide risk vs. no landslide risk.* I considered previous landslide history: 1929 - Sunken City, 1956 - Portuguese Bend, 1974 - Abalone Cove, 1981 - Klondike Canyon, 1983 - Flying Triangle, 1999 - Ocean Trails Golf Course, 2001 - The Peninsula Center, 2009 - 1800 block of West Paseo del Mar, 2010 – Sunken City Cliff Area, 2011 – Paseo Del Mar. Most notable is the Portuguese Bend Landslide that was triggered by manmade activities. It cost $14.6 Mil in the first year, millions since and the land continues to move at about 3 feet per year.

I'm concerned because the full scope/cause of the Paseo Del Mar Landslide is still undetermined and the majority of the EIR was completed prior to that event. It was mentioned by a Clearwater representative that there was a 2000 foot buffer between the Paseo Del Mar Landslide and Royal Palms. When you consider the distances between the Peninsula landslides I've listed, 2000 is an insignificant distance.

Furthermore, The EIR states that the Royal Palms site "consists of Altimira Shale". Our landslide vulnerability is due in part because the majority of the Peninsula is underlain by shale and siltstone units of the Monterey Formation. San Pedro News Pilot reported that Mark Pestrella, Assistant Director of Public Works told visiting officials evaluating the Paseo Del Mar slide, "The whole area is unstable"; "This is what we call coastal bluff landslide"; "The material here, because it does not have high cohesion, wants to slip into the ocean."

Our community has suffered a devastating loss with the Paseo Del Mar Landslide. We need better answers to these concerns.

<u>Request to extend April 10th Public Comment Time:</u>

Only one poorly attended public comment presentation was made in San Pedro on March 8th and no questions were allowed at that forum. Many residents are still unaware of the potential impact of this project. More marketing of the public comment meetings need to happen and we should have the public comment period extended. The community needs more time for public education

and public comment that is due to end on April 10th. We should also be able to ask and have questions answered at the public comment meetings.

Mitigation for San Pedro in compensation for landslide risk:

If Alternative # 4 of the Clearwater Project is chosen then there should be some compensation made to San Pedro for the landslide risk to our community. While we all benefit from infrastructure improvements this project will not be used by San Pedro residents but will used by LA County residents. San Pedro should not be asked to take the risk without any direct benefit.

Conclusion:

I do support the Clearwater Project but am concerned with Alternative # 4. I understand the vital importance of improving aging infrastructure and that risk is part of progress. However, the landslide risks to San Pedro should be fully considered, investigated further and the public should be better informed that landslide risk does exist.

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April 10, 2012

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Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601
Sent Via email to [shighter@lacsd.org]

Re: Comments on Clearwater Program Draft Environmental Impact Report

Dear Mr. Highter:

On behalf of Heal the Bay, we submit the following comments on Clearwater Program ("Program") Draft Environmental Impact Report ("DEIR") issued by the Sanitation Districts of Los Angeles County ("Districts"). We appreciate the opportunity to provide these comments.

Heal the Bay is a nonprofit environmental organization with over 13,000 members dedicated to making the waters of Southern California clean and healthy for marine life and people. Heal the Bay has actively worked to improve water quality in the Santa Monica Bay for over 26 years. In the context of this project, Heal the Bay has long followed water quality regulatory issues associated with the Districts and was a party to the consent decree negotiated in response to the suit USEPA and the California Regional Water Quality Control Board filed against the Districts under Section 309 of the Clean Water Act to comply with full secondary treatment at the JWPCP by December 31, 2002.[1]

There are aspects of the Clearwater Program we support, such as its goals to create a plan to increase water reuse, to optimize water treatment plants within the Joint Outfall System ("JOS"), and to improve system reliability and accommodate future flows, while protecting public health. However, we have a number of questions and concerns regarding the DEIR that are outlined below. We also offer suggestions for additional options to explore that could ultimately reduce the need for a second outfall. Minimizing discharge is beneficial to overall water quality and avoiding outfall construction is favorable for marine habitat protection. If an outfall project does move forward, it is critical that mitigation take place for marine mammal and marine habitat disturbance.

The EIR should evaluate water recycling, treatment system upgrades, and discharge to Wilmington Drain as alternatives to the pipeline.

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[1] *Joint Water Pollution Control Plant, Upgrade to Full Secondary Treatment; Intent To Prepare a Draft Environmental Impact Statement* Federal Register Vol. 60, No. 18 / Friday, January 27, 1995 / Notices P. 5389

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Water Recycling

The EIR should evaluate increased recycling of water at the Districts' seven treatment plants connected to the JOS and expansion of recycled water use throughout its service area as an alternative to the proposed Project. Section 3.3.1.2 of DEIR mentions that JOS is expected to have a treatment capacity shortfall of around 20 million gallons per day (MGD) needed to accommodate future flows, yet it appears that by optimizing treatment plant operations in all of its plants, the Districts will be able to increase water reuse by anywhere from 16-47 MGD. Has there been any analysis to determine if the Districts could increase water recycling instead of building a new tunnel altogether? If so, what were the results? We believe the option of treatment upgrades and increased water recycling either at upstream plants and/or JWPCP is worth investigating and could be included as an additional alternative evaluated in the EIR. Water recycling is an important component of the development of sustainable water resources in both the short- and long-term. In order to further increase water recycling, the Districts should also investigate ways to expand demand and uses for recycled water in its service area. Having "satellite" water recycling plants is also helpful in finding economically viable uses for the water. Have the Districts tried working with CDHP to expand allowable uses of recycled water, such as use for toilet flushing and other indoor non-potable uses?

Advanced Treatment and Discharge to Wilmington Drain and Machado Lake

Proposition O authorized the City of Los Angeles to issue a series of general obligation bonds for up to $500 million for projects to protect public health by cleaning up pollution, including bacteria and trash, in the City's watercourses, beaches and the ocean, in order to meet Federal Clean Water Act requirements. In addition, the measure funds improvements to protect water quality, provide flood protection, and increase water conservation, habitat protection, and open space.[2] Heal the Bay played a key role in securing this funding for projects by strongly supporting Proposition O on the ballot. Heal the Bay also sat on the Proposition O Citizens Oversight Advisory Committee (COAC) that is responsible for monitoring the bond program, projects, budgets and schedules and to advise and report to the Mayor and the Los Angeles City Council on its status. Thus, we are extremely supportive of Prop O projects such as the Wilmington Drain Multi-Use Project and Machado Lake Rehabilitation Project sited at Harbor Park. The City has earmarked Proposition O funding to implement the project by mid-2014. This $117 million project will be the key to meeting the wasteload allocations ("WLAs") in multiple TMDLs aimed at addressing water quality issues in the Lake.

Unfortunately, the Machado Lake system is starved for water inputs, partly because the Districts' Bixby Marshland demands most of the dry-weather flows from the Wilmington Drain, which would otherwise feed the lake. In order to meet water quality standards and replenish the lake, the City of Los Angeles is considering replenishing the lake with potable water, a precious resource that must be conserved for other uses. The Notice of Availability that accompanied the

[2] Proposition O Background http://www.lapropo.org/index.htm Accessed 4 Apr. 2012

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DEIR and Section 3.4.1.5 of the DEIR states that if the tunnels were to be damaged or the capacity of the ocean discharge system exceeded, treated JWPCP effluent would need to be bypassed into the Wilmington Drain, a stormwater channel that flows through the Harbor Regional Park (Notice of Availability Page 2, DEIR Page 3-28). This leads us to believe the infrastructure is in place for JWPCP to discharge into the Drain. Is this a correct assumption? Unfortunately, JWPCP's effluent quality currently does not consistently meet all water quality standards for the Lake. Have project proponents investigated the feasibility of upgrading JWPCP treatment to a level where JWPCPs effluent could be regularly discharged to Wilmington Drain to allow for maintenance of the existing JOS tunnel infrastructure? Text within the Draft Clearwater Program Facilities Master Plan ("Draft FMP") insinuates this option was not examined for JWPCP when it states, "Taking into account the facility's current operational effectiveness and efficiency of treatment, consideration of either a new process or significant changes for process optimization are not warranted nor included in this option. As such, any future expansion at the JWPCP would be consistent with current processes and configurations" (Draft FMP Page 6-11).

Our research suggests that Wilmington Drain and Machado Lake have the capacity to handle dry-weather effluent flows from JWPCP. Wilmington Drain had a design capacity varying from 5,400 cfs (approximately 3,500 MGD) at its northern portion near the 110 Freeway to 7,000 cfs (approximately 4,500 MGD) at its southern portion near Machado Lake. This is enough capacity for the 593 MGD discharge from the seven wastewater treatment plants connected to the JOS, along with storm runoff in excess of the 2-year, 24-hour design storm (1500 cfs) through the described stretch of Wilmington Drain.[3] Our understanding is that the lake itself is also equipped to handle large inputs from the Wilmington Drain. Machado Lake is comprised of upper and lower basins separated by a low earthen dam. The upper basin contains the 40-acre recreational lake created by impoundment of stormwater runoff; the lower basin is a seasonal freshwater marsh of roughly 63 acres. The dam was designed to maintain the level of the lake at a maximum of approximately 10 feet above mean sea level. During major storms, water flows over the dam into the lower basin and ultimately to the Harbor Outfall at the southeastern corner of the park, where it is discharged to the West Channel of the Los Angeles Harbor[4] (see Attachment 1).

Given the potential capacity of Wilmington Drain and the need for water inputs to Machado Lake, the Districts should look at the alternative to treat water from JWPCP or upstream plants to a higher level and discharge to Wilmington as an alternative way of relieving pressure on the existing JOS and to allow for its maintenance, as well as to offset potable water usage in Machado Lake and provide other water quality and supply benefits. As a part of the analysis of this alternative, the Districts should confirm maximum capacity of the lake needed to maintain

[3] Source: email correspondence with Los Angeles County Water Resources Department staff 4/3/2012
[4] City of Los Angeles Department of Public Works, Bureau of Engineering. Machado Lake Ecosystem Rehabilitation Project Wilmington Drain Multi-Use Project Pre-Design Report Executive Summary Page 3. July 2009.

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habitat value. The proposed Project is estimated to cost $550 million. How would this compare to the cost of advanced treatment at JWPCP and/or upstream plants? Project proponents should investigate this option to eliminate the need for an additional tunnel. As an added benefit, a portion of the advanced treated water could be sold to industrial users, used for indirect potable use and groundwater replenishment, or sold to other entities to recoup a portion of the costs of advanced treatment. Investing in advanced treatment would also help the Project meet its goal of providing "a long-term solution for meeting water quality requirements set forth by regulatory agencies" (Public Notice Page 2). Advanced treatment may provide high enough quality water so that flows intermingled with secondary treated water could still meet waste load allocations when discharged to Wilmington Drain, allowing for even more relief to the overtaxed system. As a side question, what are the maximum flows that can exist in the current outfall tunnel that would allow for repairs? This information can also be factored into this alternative.

Other treatment plants have opted to install advanced treatment as an alternative to building a second ocean outfall. For example, when faced with the possibility of having to build a second ocean outfall that would have cost approximately $200 million, the Orange County Sanitation District instead partnered with the Orange County Water District to create the Groundwater Replenishment System – the world's largest wastewater purification system for indirect potable reuse. This system treats and reuses 70 MGD of treated wastewater for a saltwater intrusion barrier and to replenish groundwater basins.

Project proponents should work towards 100% beneficial reuse of any dredged material resulting from the proposed Project.

Over the past fifteen years, Heal the Bay has worked with the Los Angeles Contaminated Sediments Task Force and others to develop solutions the management of contaminated sediment and other dredged material in the Los Angeles Region. The *Los Angeles Regional Contaminated Sediments Task Force: Long-Term Management Strategy* contains a goal for projects to beneficially reuse 100 percent of dredged contaminated sediment. We are disappointed to learn that over 30 million cubic yards of material from dredging activities associated with the project could potentially end up at USEPA's open-ocean dredged disposal sites LA-2 and LA-3. Section 13.4.1 states "Suitable dredge and tunnel spoils as a result of construction activities would be disposed of at LA-2 or LA-3, or sidecast, if practicable, for graded seafloor sediments." (DEIR Page 13-44). This is an enormous amount of material and would be a huge waste. While this material might not be considered "contaminated," it is important that it is beneficially reused instead of being disposed of in the ocean. Clean material does not require the same level of containment and caution in its handling as contaminated material; hence, there should be more potential uses for this material in coastal and inland projects. For instance, if physically compatible with beach sands, clean sandy dredged material may be used for beach nourishment. In addition, a large amount of clean material is needed for capping the USEPA's Superfund Site off of Palos Verdes Shelf. Barging material six miles offshore and dumping in the ocean disposal

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sites is not logical when the material is clean enough to be beneficially reused in local projects. Project proponents should exhaust all other beneficial reuse options prior to choosing offshore disposal at LA-2 and LA-3. Also, the Districts should work with other dredging project proponents, the Los Angeles Regional Water Quality Control Board, the Army Corps of Engineers, and the other regulatory entities involved in the Dredged Materials Management Team to develop a specific plan for beneficial reuse as soon as possible that includes interim goals with a timeline to reach the 100 percent reuse goal.

Project Proponents should promote water use efficiency and conservation measures to further reduce future capacity shortfalls of the JOS.

We encourage project proponents to look for additional ways to encourage ratepayers to conserve water and take pressure off of the Joint Outfall System, including promoting the use of waterless urinals (which each save an average of 20,000-45,000[5] gallons of potable water annually) instead of conventional urinals within commercial properties. The current precarious state of our water supply in California necessitates that our region reduces potable water usage and conserves water to the greatest extent possible. As you know, water rates are increasing throughout our region, mainly due to water shortages and the need to repair our aging water infrastructure. Water shortages are expected to worsen due to climate change and population growth. Project Proponents should: a) make sure these factors are considered in its projections for increased water demand, and b) utilize public outreach, financial incentives, and other resources to further encourage water conservation among its user base.

It is crucial that project proponents address these issues discussed above. If you have any questions or would like to discuss any of these comments, please feel free to contact us at (310) 451-1500.

Sincerely,

W. Susie Santilena
Environmental Engineer/Water Quality

Kirsten James
Director of Water Quality

[5] Waterless.com Homepage: Water Conservation.
http://www.waterless.com/index.php?option=com_content&task=view&id=17&Itemid=44

Ken Malloy Harbor Regional Park (KMHRP) and the Wilmington Drain are located in the Wilmington and Harbor City communities of the City of Los Angeles, approximately 15 miles south of downtown Los Angeles and just west of the Harbor Freeway.

OVERALL PROJECT SITE PLAN

1" = 250'

LEGEND

- PROJECT BOUNDARY
- CHANNEL ALIGNMENT
- WALKWAY
- EXISTING STORM DRAIN D-XXXXX & P-XXXXX: PLAN
- RECYCLED WATER LINE
- OXYGENATION SYSTEM
- PUMP STATION
- OXYGEN GENERATOR BUILDING
- PHOSPHORUS REMOVAL SYSTEM
- SPEECE CONE AND OXYGEN GENERATOR
- HYDRODYNAMIC SEPARATOR
- OFF-LINE TREATMENT WETLAND
- EMERGENT WETLAND
- FISHING PIER

NOTES

1. INCLUDES INVASIVE PLANT REMOVAL IN THE RIPARIAN WOODLAND AND FRESHWATER MARSH AND AQUATIC VEGETATION IN MACHADO LAKE
2. INCLUDES AQUATIC VEGETATION/ LITTORAL ZONE BOUNDARY (VOLUME 3), AQUATIC HABITAT STRUCTURES, AND FLOATING ISLANDS
3. INCLUDES MACHADO LAKE DREDGING
4. INCLUDES WHOLE-LAKE ALUM TREATMENT POST-DREDGING
5. SEE DWG. R-007 FOR CHANNEL ALIGNMENT PROFILE

0 125' 250' 500' 750'
SCALE: 1" = 250'

CDM PARSONS

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING

VERTICAL CONTROL: NGVD29, 1988 ADJ.
HORIZONTAL CONTROL: NAD83, EPOCH 2007.00

SHEET TITLE: OVERALL PROJECT SITE PLAN
PROJECT: MACHADO LAKE ECOSYSTEM REHABILITATION
ADDRESS: KEN MALLOY HARBOR REGIONAL PARK 25820 VERMONT AVE., LOS ANGELES, CA

GARY LEE MOORE P.E. CITY ENGINEER
ENGINEER: STEPHANIE BACHE, P.E. LIC. NO. C056907 DATE:
DESIGN GROUP
DESIGNED BY: LINDA LUU
DRAWN BY: LINDA LUU
CHECKED BY: STEPHEN GRATWICK, P.E.
APPROVED BY: RICHARD CORNELLE, P.E.

THIS PLAN HAS BEEN ELECTRONICALLY SIGNED AND STAMPED

NO. REVISIONS: DATE: BY:

INDEX NO.

WORK ORDER NO. EW40022F
DRAWING NO. R-005
VOLUME 1 OF 8
SHEET 5 OF 55 SHEETS

100% SUBMITTAL-NOT FOR CONSTRUCTION

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REVISION DATES (DESIGN STAGE ONLY)

Sheet Version 3.0

DRA/RLE:W:\Pasadena Sector\Projects\260459 - Machado Lake Design\18.0 CADD - Working Drawings\01-sheets\01-Gen\R-005 - Overall Project Site Plan.dwg
DATE&TIME: Dec 06, 2011 - 7:00am

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April 10, 2012

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RE: Comments on Clearwater Program Draft Environmental Impact Report/ Environmental Impact Statement

The following comments are submitted on behalf of the Sierra Club Angeles Chapter in response to the Draft Environmental Impact Report (DEIR)/Draft Environmental Impact Statement (DEIS) prepared for the Clearwater Program.

We recognize the need for an additional tunnel from the Sanitation Districts' Joint Water Pollution Control Plant (JWPCP) in Carson to the ocean, (1) in order to inspect, and if necessary, repair the existing tunnels and (2) to provide additional capacity for possible future high-flow storm events such as happened in January 1995. Such storm events are likely to become more frequent with global warming. Also, sea level will continue to rise because of global warming, so that there will be decreased hydraulic head between the JWPCP and the ocean outfall.

Clearwater construction would *yield of 165 million gallons per day of high quality recycled water*. That Clearwater elevates recycled water to major player status in our local water resources inventory is only hinted at in this report.

After review of the DEIR/DEIS, we believe that this document is inadequate to meet CEQA requirements.

Chapters-Number/Titles p.Chap.N-pg # Text-Quotation ***Comments***

ES-1 Executive Summary (DEIR and MFP) is based on inadequate and incomplete assessment of Program and a single Project impacts, their significance, and appropriate mitigations (see comments below) and therefore must be considered as incomplete and inadequate and must be reviewed and revised in accordance with revisions of the DEIR for adequacy and completeness.

p.ES-3 The wastewater from homes and businesses flows...to seven wastewater treatment plants with a combined permitted capacity of 593 MGD.
p.ES-4 Approximately one-third of the wastewater...is treated at six WRPs...produce high-quality recycled water that is beneficially reused (e.g., landscape irrigation and groundwater recharge)...remaining two-thirds, which includes saltier industrial wastewater...is treated at...JWPCP in Carson...solids removed at the WRPs...returned to the trunk sewers to be **cost-effectively** processed at the JWPCP.
ES-2 This part of the project description clearly indicates that the six upper WRPs do not provide complete sewage treatment (e.g., sludge digester, dewatering, and storage/transport) or cause the same environmental effects as those of the JWPCP in Carson. Thereby the upper WRPs and their service areas (above +300ft elevation) avoid impacts from sludge processing and disposition but receive benefits (e.g., abundant cheap treated recycled irrigation water) which are not available to lower service areas' residents and in Carson (those below +300ft elevation). As these areas represent different communities with different economic, ethnic, and other relationships, these difference become the basis for comments on environmental justice elsewhere. The current and proposed Programmatic effects are significant and continuing and avoided throughout the DEIR. The current and proposed projects and Program must address adequately and completely the differences between benefits and effects in the upper and lower service areas and facilities before any new facilities are proposed.

p.ES-7 CLEARWATER PROGRAM GOALS ***[vs]*** **OBJECTIVES** The Clearwater **Program...objectives**:
Provide adequate system capacity to meet the needs of the growing population.
Provide for overall system reliability by allowing for the inspection, maintenance, repair, and replacement of aging infrastructure.
Provide support for emerging recycled water reuse and biosolids beneficial use opportunities.
Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies.
ES-3a The Executive Summary and DEIR fails to provide the "Goals" of the Program or Project and the preparers appear to have confuse objectives and goals without definitions of the terms. All sections fail to provide shorter term, dated and quantitative expected/planned achievement (=objectives). Therefore the provided "objectives" are incomplete and inadequate or they are goals and no objectives are provided.

Appendix 1-A PRELIMINARY SCREENING ANALYSIS, Chap.2 p.1-A 2.2 2.1.3 Clearwater Program Objectives The Clearwater Program is necessary to ensure adequate JOS wastewater system capacity and reliability through the year 2050...following objectives were

identified in the Master Facilities Plan (MFP) and are the **California Environmental Quality Act (CEQA) objectives**: ***List is identical with those of p.ES-7***
ES-3b The Executive Summary provides similar Program "objectives" while the Screening further emphasizes capacity and reliability, and both do not provide the 2050 Goals on which the objectives would be based. Therefore the fundamental basis for alternatives and proposed Program components and the Project itself are inadequately developed and not based on scheduled and quantitative parameters and criteria.

p.ES-7 ...**philosophy** is to design, construct, and maintain **reliable** systems that have **sufficient capacity and redundancy** to provide the **highest level of public safety and environmental protection**. These systems are maintained with routine inspection, repair, and/or replacement as required....critical component...onshore tunnels for the existing ocean discharge system, has not been inspected for over 50 years. Both tunnels cross the active Palos Verdes Fault, which is an additional **area of concern**...Districts have **no reason** to believe **serious** problems exist...imperative that they be **properly** inspected. Addressing aging infrastructure is an **important objective** of the Clearwater Program.
ES-4a Engineering is not philosophy although the remainder of the paragraph contains many undefined, arbitrary, and unquantitative words and phrases. If aging is an important objective why wasn't it place specifically in the list of objectives. Aging and redundancy are not defined but would be estimated, say 100-yr life of project (along a depreciation or capital replacement provision) or 25% capacity, in order to quantify the aging and related redundancy/reliability. Lack of timely proper inspection and maintenance (=deferred maintenance) are reasons for existence of serious problems, if not in the physical facilities, in the management of those facilities. Similarly deferred maintenance relates to O&M costs of facilities and rates , and managements' apparent avoidance of costs with increased risks/costs of failures for those in the lower portions of the sewerage network.

Before committing to an additional tunnel ending at White Point, geotechnical field studies must be done to determine whether this route can be built without impact.

p.ES-8.a PURPOSE AND NEEDS ...rely on two onshore tunnels...have not been inspected...due to their overall length, limited access, interconnections between the tunnels, and continuous flow through the tunnels...flows...from these storm events nearly exceeded the capacity of the JWPCP ocean discharge system. If...damaged or the capacity of the ocean discharge system exceeded, treated JWPCP effluent would need to be bypassed into the Wilmington Drain...through Harbor Regional Park. If sufficient capacity were not available in the Wilmington Drain, the sewers tributary to the JWPCP could overflow and untreated wastewater could enter various water courses, such as the Dominguez Channel and the Los Angeles River.
ES-5a The DEIR and ES do not provide the relationship of Goal(s), Objectives, Purpose(s) and Needs nor their definitions.
ES-5b All risks of adverse effects from expected overflow problems are focused in the Carson-San Pedro area and not in the upper service areas (north of I-5) which have been in place for decades. This again demonstrates assignment of risks and adverse effects toward the lower and benefits in the upper services areas. The proposed Project is, in part only, aimed at reducing the risks to the communities from Carson southward which in

itself would benefit, reduce risks of overflows and malfunctions of the onshore outfall, while increasing the concentration of sludge processing and impacts for residents of the lower service areas. Assessment of benefits and impacts for the lower service areas' compared to upper service areas' is not provided in the DEIR. As indicated herein, the benefits and impacts must be quantified and balanced else wise "net-impact(s)" should be considered as significant.

p.ES-8.b The **project purpose and needs** are to inspect and upgrade the aging ocean discharge system, to provide sufficient capacity in the JOS to accommodate the estimated 2050 peak wastewater flows, and to comply with all applicable water quality standards...prohibiting sewer overflows...Program evaluates both modifying the existing ocean discharge system and constructing a new ocean discharge system.

ES-6 These Project purpose(s) and needs (inspect/upgrade discharge-on/offshore) are not related to the Program and Project goals and objectives and the Program purpose(s) and needs.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-9 PROGRAM-WIDE ALTERNATIVES ANALYSIS AND RECOMMENDATIONS JOINT OUTFALL SYSTEM COMPONENT AREAS For the purposes of developing and evaluating **program-wide alternatives**, the JOS was divided into...: Wastewater Conveyance and Treatment WRP Effluent Management Solids Processing Biosolids Management JWPCP Effluent Management

ES-7a The proposed Program continues and emphasizes distinctions between the five-six WRPs (upper system) and the JWPCP area and again demonstrates assignment of benefits in the upper services areas and continues and increases effects of sludge management in the lower service areas. The five proposed Program elements predominately involve how to get increased sludge generation in the upper service areas down to JWPCP and disposal of treated effluent without recycling. As indicated above, the Program assigns treated WRP effluent for recycled irrigation, recharge, and streamflows to benefit the upper service areas, while sludge and other "non-compliant stream discharge" flows to the regional "sewers" also continues and increases upper sludge discharged for treatment in the JWPCP.

ES-7b The DEIR does not clearly provide adequate nor complete assessment of the sludge processing and differential focus of benefits/impacts for upper and lower service areas. Lower service areas do not receive benefits of recycling

ES-7c No alternatives are developed nor screened to increase in-door water conservation/sewage reduction in upper service areas and to reduce their liquids/sludge flows to and their impacts on the lower service areas and needs for new ocean outflows and risks of overflows.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-13 PROJECT-SPECIFIC ALTERNATIVES ANALYSIS AND RECOMMENDATIONS OCEAN DISCHARGE SYSTEM PROJECT ELEMENTS
...purposes of developing and evaluating project-specific alternatives, the...project was divided into...five elements based on primary functionality: JWPCP Shaft Site Onshore Tunnel Alignment Intermediate Shaft Site Offshore Alignment Diffuser Area.

ES-8a Project purposes, needs, goals, and objectives are not clearly defined. The Project alternatives have been developed without the simplest onshore outfall element alternatives: Straight Alignment from either the west JWPCP Shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.

ES-8b No study in the DEIR provides an overall sewerage liquid/sludge conservation/management alterative for both upper and lower services' areas with an objective of say 10% reduction in WRP flows to JWPCP and 15% reduction in discharge to the Onshore Tunnel by 2030.

ES-8c No study in the DEIR provides an overall hydrological modeling, conducted to locate "best" marine water quality locations for 50-100% increased discharge by 2050.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-19 PROJECT-SPECIFIC RECOMMENDATIONS Alternative 4...highest-ranked **feasible** alternative and thus is the recommended project...maximum hydraulic capacity...accommodate the peak wastewater flows...for the year 2050.

ES-9 The Recommendations of the DEIR are based on the undefined "feasible"(technically, financially, administratively, etc.), and the ranking is based on undefined and unquantified goal(s), objectives, purpose(s), and needs without quantified criteria levels to assess feasible vs infeasible.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-22 Project Implementation Schedule The estimated implementation schedule for the **recommended project** is shown below. The actual schedule could vary depending on...considerations.

ES-10 No Program Schedule has been presented other than 2050 for all Program's projects in order to understand the relationship of the ocean discharge vs water conservation, improved recycling in the upper service areas, and eventual upgrading to advanced secondary or tertiary for recycling and reuse.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-24 ENVIRONMENTAL REVIEW In conformance...joint EIR/EIS...assess the environmental impacts of the **recommended plan**...identified in...MFP. Both program-wide and project-specific recommendations comprise each alternative.

ES-11 The only "recommended plan" (presumably the proposed Project or Recommended Alternative, Alternative 4) does not incorporate even a tentative program-wide projects'

recommendations in order to understand and assess impacts of both the specific Project and others of the Program.

Without clear and consistent definition of the proposed Project, the recommended plan and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-24 CEQA Scope of Analysis The EIR...**Program** provides a **program**-level environmental assessment of the following **program** elements:

conveyance improvements, plant expansion, process optimization,
WRP effluent management, solids processing, and biosolids management.

[p.ES-9 states program items - Wastewater Conveyance and Treatment, *WRP Effluent Management,* *Solids Processing,* *Biosolids Management,* ***JWPCP Effluent Management]***

Because these elements would not be implemented in the **near future and/or the actual construction locations are unknown (e.g., sewer relief projects), the project specifics are too speculative for a detailed analysis**.

ES-12a The CEQA Program analysis can easily propose a "conceptual base-case" for one set of feasible "projects" which would serve the population of the service areas in 2050 and be integrated with the proposed Project from the JWPCP and seaward.

ES-12b Even within the Executive Summary differences in Program elements differ as they do in the DEIR text - adding JWCP effluents, while lumping plant expansion and process optimization within joint Wastewater Treatment.

ES-12c No Program Schedule has been presented other than 2050 for all other projects in the Program, although a 2050 timeframe does not equal useful life of the Program or the Project projects. A "conceptual base-case" overall program and optimal feasible schedule can and should be provided.

Without clear and consistently applied definitions and a base-case program plan and schedules, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-24 The EIR for the Clearwater Program provides a **project-level environmental assessment of the JWPCP effluent management project alternatives.** The alternatives are divided...for analysis: onshore tunnel alignment, offshore tunnel alignment, JWPCP shaft site, intermediate shaft site, and diffuser area.

ES-13a Please not that even on the same page (ES-11 - perhaps as WRP Effluent Management) and in the related sections of the DEIR, the classification of the proposed Project is not included as JWPCP Effluent Management (ES-9) in the initial portion of the ES section.

ES-13b The Project alternatives have been developed without the simplest onshore outfall element alternatives: Straight Onshore Tunnel Alignment from either the west JWPCP shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.

ES-13c The Project alternatives have been developed without delineation of the best offshore diffuser areas with existing and future discharges and the marine and maritime environments offshore of Royal Palms or Angels Gate. Other sections and appendices of the DEIR do not start from the basic premise of locating the best-case area for treated

sewage diffusion and then working back to onshore facilities all of which maybe within 10-15% of the total length of the recommended Alternative 4.

ES-13d The Project also includes elements upstream of the effluent system but related to the current and future flows through the JWPCP effluent system alternatives.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-24 Prior to approval of any future projects related to the **program elements**, the environmental impacts would be **reassessed, and appropriate environmental documentation** would be prepared at that time.

ES-14 Given the lack of definitive future Program projects, their schedules, and integration with the recommended Project, no other project should be considered to be included in this Programmatic EIR and future project must be separately assessed within Supplemental EIRs at the least.

Without clear and consistently applied definitions, the recommended project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-27 SIGNIFICANT UNAVOIDABLE IMPACTS *[Project]*

ES-15 Most if not all of the identified significant adverse effects of the Program and recommended alternative (No.4) can be further mitigated or compensated by existing technologies and changes in designs and may be reduced sufficiently so as to eliminate significant unavoidable impacts. As an example, an alternative onshore tunnel alignment would avoid the more circuitous alignment of Alternative 4 and reduce anticipated alignment impacts by 10-20%. Other alternative mitigation and/or compensatory measures will be provided as appropriately below.

Without consideration of a direct onshore alignment, screening and recommendation of an effluent project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-28 Air Quality Significant and unavoidable peak day air quality impacts would occur at a regional level...would exceed the Southern California Air Quality Management District daily significance thresholds for construction-related emissions **before mitigation**.

ES-16 Construction emissions for tunneling can be greatly reduced by alternative electrical or LPG/CNG powered and slurry-line systems compared to the diesel fuelled "locomotives". The JWPCP facilities currently do dewatering and have staff experience and facilities and thereby can deal with dewatering in a more efficienct manner.

Without consideration of alternative conveyance systems for tunnel debris, the recommendation of an effluent project (Alt.4) and assessments of unavoidable and significant impacts thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-28 Specifically, Alternatives 1, 3, and 4 would exceed thresholds for volatile organic compounds (VOC) and nitrogen oxides (NOX)...Although mitigation would reduce emissions, impacts would remain significant for NOX for all alternatives...significance is **directly related**

<u>to the length of the alignment</u>, the **<u>duration of construction</u>**, and the **<u>overlap of elements during construction</u>**...Alternative 4 has the smallest emissions contribution of the four alternatives and would be the preferred alternative based on air emissions.

ES-17 Construction emissions for tunneling can be greatly reduced by alternative direct tunnels rather than those proposed and recommended. Additional alternative onshore and offshore tunnel alignments can further reduce emissions below those of considered alternatives and changes in conveyance system can greatly reduce the emissions.

Without consideration of alternative alignments and conveyance systems, assessments of unavoidable and significant impacts thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-28 Cultural Resources **<u>Significant and unavoidable impacts on paleontological resources would occur during construction</u>**...rock face being removed during onshore and offshore tunnel construction **<u>could not be observed</u>** for the presence of paleontological resources; thus, if present, paleontological resources would be destroyed by the TBM. Likewise, at a certain depth, paleontological resources may be encountered during construction at the shaft sites; these resources could not be observed and, if present, would also be destroyed...relatively equal across the alternatives...more paleontological resources would be encountered in the longer alignments...based on alignment length. Alternative 4 would be the preferred alternative with regard to paleontological resources based on alignment length.

ES-18a Construction impacts on fossils can be greatly reduced by:

- ***Early geotechnical sampling, analyses, and reporting for shafts and tunnel alignments,***
- ***Geological investigations to establish most-likely locations to encounter fossils prior to construction***
- ***Site/Locations identification as to probable fossiliferous locations based on stratigraphy and drilling information***
- ***Sampling, analyses, and reporting fossiliferous deposits encountered during excavations***
- ***Develop/operate sampling systems for shaft and slurry/debris from tunneling excavations***

ES-18b DEIR preparer does not recognize what fossils are. Fossils include foraminifera, diatoms, shells, and bones but the assessment appears to be focused on "bones".

Without consideration of all fossils and of many opportunities that paleontologists have implemented, the assessment appears to be totally inadequate and incomplete which in turn assigns unavoidable and significant impacts when in fact such impacts can be mitigated to below significance levels and the DEIR must be revised and recirculated.

p.ES-29 Employment, Housing, Socioeconomics, and Environmental Justice Under NEPA, **<u>significant and unavoidable environmental justice impacts</u>** would occur during construction of...JWPCP East shaft site would result in environmental impacts that are disproportionately high and adverse on minority and low-income populations.

ES-19 Further mitigation and compensation can be implemented to reduce the significant effects of construction and should be combined with current and ongoing environmental justice impacts from existing and proposed facilities and the overall program bias toward protecting the upper service areas and impacting the lower service areas and Carson

Without clear and consistently applied definitions, the recommended Program and Project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-30 SIGNIFICANT IMPACTS AND MITIGATION MEASURES (PROGRAM-WIDE) ***[Tables]***

p.ES- AQ

p.ES- CR

p.ES-33 **EMPLOYMENT, HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE2**
Impact SOC-3. Would Program result in environmental impacts that are disproportionately high and adverse on minority and low-income communities
p.ES-46 EMPLOYMENT, HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE
Impact SOC-3. Would Alternatives...result in environmental impacts that are disproportionately high and adverse on minority and low-income populations?

Carson vs other treatment facilities - Solids/Sludge treatment
ES- The Project alternatives have been developed without the simplest onshore outfall element alternatives: Straight Alignment from either the west JWPCP shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.
Without clear and consistently applied definitions, the recommended Program and Project and assessments therefrom cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.ES-34 **SIGNIFICANT IMPACTS AND MITIGATION MEASURES (PROJECT-SPECIFIC)** ***[Tables]***

MM AES-3a. Implement **visual measures** to improve the aesthetic quality of the noise barrier to ensure the design blends with the surrounding environment...During the final design process, the input of residents and/or recreationists that will be affected by the placement of the noise barriers **will be accepted**. Their comments will be **evaluated for inclusion** in the design to ensure the final treatment **meets expectations to the greatest extent feasible.**
ES- The Project alternatives have been developed without the simplest onshore outfall element alternatives: Straight Alignment from either the west JWPCP shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.

p.MFP6.1/189 **Chapter 6 ALTERNATIVES ANALYSIS 6.1 Introduction**
...overall **goal**...is to ***identify a recommended plan*** *that*
is ***protective of public health*** *and*
will best ***meet the needs of the Joint Outfall System (JOS) through the year 2050***
in a ***cost-effective*** *and* ***environmentally sound manner****.*

Recommendations consist of
system improvements, upgrades, and expansions
to accommodate projected future conditions within the service area.
The future conditions...include
anticipated growth within the system,
an aging infrastructure,
emerging demands for recycled water, and
potential new regulatory requirements.

MFP definition of a single overall Project goal of "identify a recommend plan" is totally inadequate and incomplete for the proposed Project and its relationship to the Program.

Without clear and consistently applied Goals, objectives, and quantification for the recommended Program and Project and assessments thereof the DEIR and MFP cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

6.1.2 Planning Objectives The MFP...ensure adequate JOS wastewater system capacity, reliability, sustainability, and compliance...2050...recommended plan in the MFP...following objectives:

Provide adequate system capacity to meet the needs of the growing population
Provide for overall system reliability by allowing for the inspection, maintenance, repair, and replacement of aging infrastructure
Provide support for emerging recycled water reuse and biosolids beneficial use opportunities
Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies

MFP use of identical objectives for a recommend plan is totally inadequate and incomplete for a specific proposed Project.

Without clear and consistently applied quantification objectives, the Project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.MFP6-2 6.1.5.1 Program Versus Project...*program...*options or alternatives that are broad in nature and do not have a high level of detail...implemented in the long term.
*project...*a specific component of the comprehensive plan....in the short term, and a greater level of detail is required for its analysis in the MFP and the associated EIR/EIS.
...program...continuation of...current biosolids management practices...2050 planning horizon...project...a new or modified ocean discharge system...next 10 years...address the effluent management needs of the JWPCP.

MFP use of identical objectives for a recommend plan would require that the Program and Project have identical systems and facilities but the proposed Project represents a totally inadequate and incomplete for a specific proposed Project.

Without clear and consistently applied quantification objectives, the Project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.MFP6-58 6.4.3 Identification of Recommended Plan ...alternatives consist of program and project aspects....identical in all aspects except for...JWPCP effluent management...Alternative

4...is the **<u>recommended plan</u> alternative**...program and project elements of the **<u>recommended plan</u>** are:

Wastewater Conveyance and Treatment – CT 2A: Expansion at the SJCWRP; Process Optimization at the SJCWRP, POWRP, LCWRP, and LBWRP; and Additional Conveyance Capacity ***(same in all 4)***

Solids Processing – SP 1A: Centralized Processing at the JWPCP ***No changes***

Biosolids Management – BM 1: Current Practices: Beneficial Use/Landfill ***No changes***

WRP Effluent Management – WE 1: Use of Current Effluent Management Systems ***No changes***

JWPCP Effluent Management – JE 3: Figueroa...– Royal Palms (JWPCP West [working shaft];..to Royal Palms Beach [exit shaft]); and Rehabilitation of the Existing Ocean Outfalls...

MFP use of identical objectives for a recommend plan would require that the Program and Project have identical systems and facilities but the proposed Project represents a totally inadequate and incomplete for a specific proposed Project.

Without clear and consistently applied quantification objectives, the Project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

p.MFP7-1/263 The five major program component areas are:

Wastewater conveyance and treatment
Solids processing
Biosolids management
Water reclamation plant (WRP) effluent management
JWPCP effluent management

...recommended program-level improvements are wastewater conveyance and treatment, solids processing, biosolids management, and WRP effluent management...area with recommended project-specific improvements is JWPCP effluent management.

MFP use of identical objectives for a recommend plan would require that the Program and Project have identical systems and facilities but the proposed Project represents a totally inadequate and incomplete for a specific proposed Project.

Without clear and consistently applied quantification objectives, the Project and assessments thereof cannot be considered as complete and adequate and the DEIR must be revised and recirculated.

1 Introduction

<u>2 Existing Facilities</u>

<u>3 Alternatives Description</u>

Program Alternatives do not include major building water conservation measures and recycling of effluent in the lower service areas. Apparently higher salts levels in lower

service areas could reflect high inflow and leakage which should be a major conservation/process-reduction measures.

Alternative 4 (Project) doesn't appear to be the best/shortest distance alternative, straight line alternative reduces length and associated impacts by 15+%. "Preferred" alternative should be dead straight line and deeper to the existing header perhaps with additional overflows between the existing onshore outfalls and the new one.

5 Air Quality p.5-26 **Locomotives Used During Tunneling Activities** Small, mining-type locomotives would be used to convey excavated material and personnel in rail cars through the tunnel alignments. Emissions from these diesel-powered locomotives were quantified using 5-27 EPA Tier 2 off-road diesel emission standards...were calculated based on the sulfur content of California diesel fuel of 15 ppm...assumed that up to 5 locomotives could operate simultaneously.

T*raffic, odors, and air emissions impacts can be mitigated by a pressure-balancing rotating TBM-shield can use electric powered slurry line systems and a muck-dewatering at the JWPCP with odor control and dewatering systems. Similarly all tracked conveyance could use LPG or electric drive locomotives.*

p.5-108 **5.4.6 Alternative 4 (Recommended Alternative)** Alternative 4 (Program) is the same as Alternative 1 (Program). The impacts for the JWPCP West shaft site for Alternative 4 (Project) would be the same as for Alternative 3 (Project). Alternative 4 (Project) includes a shaft site at Royal Palms Beach. The impacts for the existing ocean outfalls would be the same as for Alternative 1 (Project).

Alternatives do not include major building water conservation measures and recycling of effluent in the lower service areas. Apparently higher salts levels in lower service areas could reflect high inflow and leakage which should be a major conservation/process-reduction measures.

Alternative 4 doesn't appear to be the best/shortest distance alternative, straight line alternative reduces length and associated impacts by 15+%. "Preferred" alternative should be dead straight line and deeper to the existing header perhaps with additional overflows between the existing onshore outfalls and the new one.

7 Cultural Resources (Terrestrial and Marine)

22.4.1.3 Cultural Resources Significant and unavoidable impacts on paleontological resources...The rock face...could not be observed for the presence of paleontological resources...paleontological resources would be destroyed by the tunnel boring machine. Likewise, at a certain depth, paleontological resources may be encountered during construction at the shaft sites; these resources could not be observed and, if present, would also be destroyed. Impacts are relatively equal across the alternatives...in the longer alignments; thus, Alternatives 3 and 4 are preferred over Alternatives 1 and 2 based on alignment length.

7- The Project alternatives have been developed without the simplest onshore outfall element alternative: Straight Alignment from either the west JWPCP shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.

Alternative 4...preferred alternative with regard to paleontological resources based on alignment length.

7- The Project alternatives have been developed without the simplest onshore outfall element alternatives: Straight Alignment from either the west JWPCP shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.

8 Geology, Soils, and Mineral Resources

The Program facilities and proposed improvements of sewerage systems depend on a basic functional concept and related facilities - sludge is separated but not treated in the upper WRPs and is conveyed through onshore transmission sewers to the JWPCP facilities for treatment. Such concentration of sludge treatment and disposition places the entire sewerage system at risk from seismic and fault rupture due to the transit of sewers and sludge conveyance crossing numerous fault zones. This risk of significant environmental effects is not discussed in this Chapter 8.

Similarly risk of sludge handling disruption by seismic events and perhaps fault ruptures and damages to facilities is not assessed for the concentration of most if not all sludge processing in the JWPCP within an active fault zone.

Assessment of impacts for damage to sewerage facilities does not reflect effects of differential movement of large facilities (e.g., manholes, access-shafts, pump stations) and their interconnecting pipelines for both Program and Project level, and the differential movement of buried shafts and tunnels and connections with exposed or ballasted surface structures.

8.2.1.5 Non-Seismic Geologic Hazards - Subsidence

Measured ground subsidence occurs in areas where groundwater extraction, oil production, or other mining activities have lowered the ground surface...**Artificial recharge has managed the problem.**

The Project alternatives have been developed without the simplest onshore outfall element alternatives: Straight Alignment from either the west JWPCP shaft-to-Intermediate Royal Palms shaft or central JWPCP shaft-to-Royal Palms-to-Angels Gate shafts.

No locations/areas of subsidence are shown to relate to the proposed Project Alternatives nor the Program Alternatives.

No documentation for this statement is provided or referenced regarding artificial recharge successes and return of ground surface to original levels.

No consideration is given to significant changes in the Wilmington and Long Beach Oil Fields.

Boundary maps of oil fields and areas of >1ft historic subsidence and current residual subsidence of >1ft are not provided as part of Setting nor Assessment. No well-head, casing path, and well toes within 6000ft of the proposed Alternative 4 route.

8.2.3 Project Setting 8.2.3.1 Tunnel Alignment

Figure 8-2 **Tunnel Depths** ***[In-Plan -colored-segments rather than In-Section]***

Figure 8-3a **Map of Stratigraphic Relationships for Proposed Tunnel Alignments** ***[Surface geology]***

Figure 8-4 **Generalized Geological Cross Section** ***[Scale >2000ft, while maximum depth is 200ft]***

Alternatives are not shown in reasonable scaled-sections; the plan alignments with colored segments do not relate the alignments with the geological settings through which Project tunnel alternatives would pass.

As tunnels, the surface geology does not provide adequate setting of the actual vertical tunnel alignment with respect to surface geological conditions.

Without such comparative depiction, no adequate assessment and meaningful comments can be made with regard to the risks of each alternative with the geological conditions of the ground responses to seismic tremors (e.g., depths of materials and length of tunnel susceptible to liquefaction.

8.2.3.1 Tunnel Alignment Table 8-7. Geologic Inventory of Hazards Along Tunnel Alignments Sources: a Parsons 2011; b CDMG 1998e; c CDMG 1998f;

8.2.3.2 Shaft Sites Table 8-8. Geologic Inventory of Shaft Sites CDMG 1998f; d Parsons 2011;

Several liquefaction zones for shafts referencing CDMG rather than Parsons, while in alignments reference is only given for Parsons and no liquefaction zones are identified.

Discussions of shafts and their geological character can not be related to the colored geological sections provided.

Alternatives 1-3 includes outfall segments, while Alternative 4 uses existing diffuser sections, and no geological sections and settings are provided.

The above referenced sections are contradictory, totally inadequate and incomplete, and cannot provide the basis for an objective description of the project setting and potential impacts that may arise.

13 Marine Environment

p.13-42 13.4 Environmental Impacts and Mitigation Measures 13.4.1 Methodology and Assumptions

This section evaluates environmental impacts resulting from both the construction and operation of the project for each alternative. The primary project activities that could potentially affect the marine environment are:

Construction of a riser
Construction of a diffuser
Improvements to existing ocean outfalls
Operation of the new ocean discharge system

All of the program elements are located outside the marine environment; **some of the project elements** are located within the marine environment. Only...within the marine environment are discussed in the analysis.

p.13-132 13.4.6 Alternative 4 (Recommended Alternative) 13.4.6.1 Program Alternative 4 (Program) does not include marine elements and, therefore, has **no potential to have an impact on the marine environment**.

As all Program Alternatives have two central elements: sludge disposition and effluent disposition via JWPCP and all use ocean discharge for a near doubling of discharge of secondary-treated effluent, operations all Program alternatives. Program alternatives do not include intensive recycling of effluent and on-land disposition of effluent, and therefore all program alternatives impact the marine environment.

The Marine Environment Setting and Assessment does not identify the optimum location within San Pedro Bay for discharge and diffusion of a near-doubling of secondary treated effluent although it is widely restricted from any irrigation or recharge within the service areas of the JOS.

The Marine Environment Setting and Assessment are totally inadequate and incomplete and cannot provide the basis for an objective description of the project setting, program and project alternatives, and potential impacts that may arise within the marine environment.

p.13-46 13.4.1.2 Furthermore, the impact analysis for operation assumes the following:...The physical characteristics of the effluent released on the SP Shelf and PV Shelf would be the same as the existing effluent characteristics despite any change in location or change in depth of release...

p.13-133 13.4.6.2 Project The construction impacts for the rehabilitation of the existing ocean outfalls for Alternative 4 (Project) would be the same as for Alternative 1 (Project). Operational impacts would be the same as baseline conditions; therefore, there would be no operational impacts for the existing ocean outfalls under Alternative 4 (Project)..

As the DEIR-Project does not locate within the Marine study area the optimal location for discharge and diffusion of a doubling of the treated effluent load, the assessment appears to be bias to justifying the existing discharge area for a doubling of existing nutrient and freshwater daily loads. The discharge characteristics are simply assumed to be identical to those at present although with the current and future anticipated water recycling and conservation characteristics can be assumed to change perhaps in those elements which may not be regulated through the current secondary treatment requirements for discharge, e.g., salts, boron, chemicals of concern, TPH, etc.). The Marine Environment Setting and Assessment does not identify the optimum location within San Pedro Bay for discharge and diffusion of a near-doubling of secondary treated effluent although it is widely restricted from any irrigation or recharge within the service areas of the JOS.

The Marine Environment Setting and Assessment are totally inadequate and incomplete and cannot provide the basis for an objective description of the project setting, program and project alternatives, and potential impacts that may arise within the marine environment.

15 Employment, Housing, Socioeconomics, and Environmental Justice

p.15-18 Environmental Justice. The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. (EPA 2004:Section 2.2.)

p.15-22 15.3.3.2 South Coast Air Quality Management District In 1997, the South Coast Air Quality Management District (SCAQMD) adopted a set of guiding principles on environmental justice...initiatives led to the SCAQMD Board's approval of the 2003–2004 Environmental Justice Workplan. SCAQMD intends to update this as needed to reflect ongoing and new initiatives..."right to equal protection from air pollution and fair access to the decision making process that works to improve the quality of air within their communities."..."...equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."

p.15-23 15.3.4.1 General Plan of the City of Los Angeles Environmental Justice...adopted environmental justice policies as outlined in its framework and transportation elements; these policies are summarized in this section. The framework element is a "strategy for long-term growth which sets a citywide context to guide the update of the community plan and citywide elements."...policy to "assure the fair treatment of people of all races, cultures, incomes and education levels with respect to the development, implementation and enforcement of environmental laws, regulations and policies, including affirmative efforts to inform and involve environmental groups, especially environmental justice groups, in early planning stages through notification and two-way communication."
...Compact for Environmental Justice, which was adopted by the City's Environmental Affairs Department as the City's foundation for a sustainable urban environment. Statements relevant to the proposed project include the following:

> All people in Los Angeles are entitled to equal access to public open space and recreation, clean water, and uncontaminated neighborhoods.
> All planning and regulatory processes must involve residents and community representatives in decision making from start to finish.

p.15-46 Environmental justice impacts would be considered indirect impacts with respect to the Corps' NEPA scope of analysis described in **Section 3.5.**

As indicated elsewhere, the JOS service areas of are clearly not treated identically and the upper service areas are not subject to the same potential risks of sludge treatment and treated effluent malfunctions as those south of I-5, the lower service areas. Similarly the upper service areas receive the benefits of higher level treated recycled irrigation water that are not provided to residents and ratepayers in the lower service areas.

Therefore, the DEIR contains contradictory, totally inadequate and incomplete, assessment of environmental justice issues and without specific mitigation the effects must be considered as significant.

22 Comparison of Alternatives 22.2.1 CEQA Requirements

The CEQA requirements for the evaluation of alternatives...an EIR present a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the **basic project objectives** but would avoid or substantially lessen any significant effects of the project...requires an evaluation of the comparative merits of the alternatives. An EIR is not required to consider alternatives that are infeasible.

Elsewhere in the comments, alternatives and mitigation have been proposed which have not been considered and which cannot be considered infeasible without incorporating more environmental justice issues:

a. Full recycling of advanced treated effluent from and local sludge disposition systems for all service areas
b. Onshore outfall along a straight line from JWPCP to the Royal Palms Header;
c. Slurry pipeline from EPB-TBM to JWPCP;
d. Marine disposal site based on the most favorable (optimal) location for discharge and diffusion of a doubling of current loads;
e. Screening and sampling of paleontological materials from slurry or cart conveyed-systems

Without fuller review of alternatives, the program and project DEIR cannot be considered adequate and/or complete.

<u>23 Significant Irreversible Impacts</u> - 23.2 Analysis of Irreversible Changes

p.23-1 - 2 The tunnel boring...could damage or destroy unknown, unique paleontological resources...as discussed in Chapter 7...would be significant and irreversible...other significant impacts...would not be irreversible.

...Alternative 4 **<u>would result</u>** in significant irreversible changes...**<u>could result</u>** in significant irreversible damages to paleontological resources during construction...commitments and damages would occur in accordance with the Clearwater Program...significant irreversible changes...**<u>deemed acceptable in light of the Clearwater Program's overall benefits</u>**.

As indicated elsewhere, mitigation of paleontological impacts exists but the assessment has centered entirely on those remains which would be >1in in diameter, while significant paleontological resources and information are gathered and used for every drilling operation for gas and oil in Los Angeles County and even within the onshore and marine environment of the Project.

Without fuller review of available mitigation, the program and project DEIR's assessment of irreversible impacts cannot be considered adequate and/or complete.

We respectfully submit these comments.

Charming Evelyn
Chair, Water Committee
Sierra Club Angeles Chapter

SOUTHERN CALIFORNIA
EDISON®
An EDISON INTERNATIONAL® Company

Ben Wong
Director
Local Public Affairs

April 10, 2012

Steven W. Highter
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90601

Re: Clearwater Program Draft Environmental Impact Report (DEIR)

Dear Mr. Highter:

Southern California Edison (SCE) appreciates the opportunity to provide comment on the above referenced DEIR.

SCE Company rights-of- ways and fee-owned properties are purchased for the exclusive use of SCE to operate and maintain its present and future facilities. Any proposed use will be reviewed on a case-by-case basis by SCE's Operating Department. Approvals or denials will be in writing based upon review of the maps provided by the developer and compatibility with SCE right-of-way constraints and rights. In the event the project proposes to impact SCE facilities or its land related rights, please forward five (5) sets of project plans, and a PDF copy of the same, depicting SCE's facilities and its associated land rights to the following location for review:

Real Properties Department
Southern California Edison Company
2131 Walnut Grove Avenue
G.O.3 – Second Floor
Rosemead, CA 91770

Please be advised if development plans result in the need to build new or relocate existing SCE electrical facilities that operate at or above 50 kV, the SCE construction may have environmental consequences subject to CEQA review as required by the California Public Utilities Commission (CPUC). If those environmental consequences are identified and addressed by the local agency in the CEQA process for the larger project, SCE may not be required to pursue a later, separate, mandatory CEQA review through the CPUC's General Order 131-D (GO 131-D) process. If the SCE facilities are not adequately addressed in the CEQA review for the larger project, and the new facilities could result in significant environmental impacts, the required additional CEQA review at the CPUC could delay approval of the SCE power line portion of the project for two years or longer.

Once again, we appreciate the opportunity to comment on the project. If you have any questions regarding this letter, do not hesitate to contact me at (323) 720-5292.

Sincerely,

Ben Wong

1000 Potrero Grande
Monterey Park, CA 91754
(323) 720-5292 PAX 45292
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DOC # Highter S
RECD LACSD
APR 18 '12 AM9:54

April 10, 2012

CLEARWATER Program

Public Hearing for Draft EIR

COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: JoAnn Wysocki

Organization: Resident

Mailing Address: 1006 KING AVE.

City: WILMINGTON State: CA Zip: 90744-3204

E-mail: None

OUTLINE OF TOPICS ON ESPECIAL NOTE

1 and copy

1. Cost of E.I.R.
2. Sepulveda - Surge Tower - East Shaft Site
3. Traffic Statistics
4. West Shaft Site
5. Hours of Construction
6. Traffic due to Construction
7. 100 Ft. Crane
8. Location of JWPCP
9. San Pedro not Wilmington

I would like to receive future public notices regarding the project via: ☐ E-mail ☐ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to:

Steven Highter, P.E.
Supervising Engineer, Planning Section
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, California 90601
shighter@lacsd.org

CLEARWATER
Program

Public Hearing for Draft EIR II
COMMENT FORM

This form is provided as a convenience and is not required. Your comments may be submitted at any time during the public comment period, which ends on April 10, 2012.

Name: JoAnn Wysocki

Organization: Resident

Mailing Address: 1006 King Avenue

City: Wilmington State: CA Zip: 90744-3020

E-mail: none

10. Define Ruderal
11. Small Print Volume I appendices
12. Figueroa St. at Harry Bridges
13 Fees to Harry Bridges - "C" to John S. Gibson
14 Pasha Terminal
15. L.A.P.D. Failure to respond
16. Water Uses
17. Put out to bid: Cost over runs - street sweeping and street cleaning; grafitti removal; telephone contacts

I would like to receive future public notices regarding the project via: ☐ E-mail ☐ Regular Mail

You may hand in this form during the public hearing or mail/e-mail it to: 18. Final EIR

Steven Highter, P.E.
Supervising Engineer, Planning Section
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Whittier, California 90601
shighter@lacsd.org

TRANSCRIPT – PUBLIC HEARING
MARCH 6, 2012

SANITATION DISTRICTS OF LOS ANGELES COUNTY

PUBLIC HEARING

ON

THE CLEARWATER PROGRAM

TUESDAY, MARCH 6, 2012

SANITATION DISTRICTS OF LOS ANGELES COUNTY

ADMINISTRATIVE OFFICES

WHITTIER, CALIFORNIA

APPEARANCES

Basil Hewitt, Public Information

Angela Chang, Facilities Planning Department

ALSO PRESENT:

Steven Highter, Clearwater Project Manager

Glenn Acosta, Planning Section

MR. HEWITT: Welcome. Good evening. My name is Basil Hewitt. I'm a senior engineer in the Sanitation District Public Information Office. Before we get started, I'd like to point out that tonight's public hearing will be documented by a court reporter, and if anyone needs Spanish translation, we have a translator here -- Margott Hinostroza. She's also a civil engineer at the Sanitation District.

And last but not least, if anyone needs the restrooms, they are located in the lobby outside. So as you go out to the lobby to the right, the men's room; to the left, the ladies' room.

Welcome to the first of three public hearings for the Clearwater Program's Draft Environmental Impact Report. Public input is an essential part of the Clearwater Program planning process. Since 2006 we've met with more than 500 elected officials, county -- community and business leaders and organizations to discuss the Clearwater Program. We've also held four public workshops where we presented the needs for the Clearwater Program and gathered input prioritizing the objectives, developing screening criteria for alternatives, and evaluating potential locations for shaft sites and tunnel alignments. All of this input was used to develop and analyze the final alternatives

presented in the draft documents for the Clearwater Program.

The District also worked jointly with the U.S. Army Corps of Engineers to develop the Draft Environmental Report and the Draft Environmental Impact Statement because certain elements of the recommended project will require federal permits. This work was done in accordance with CEQA, the California Environmental Quality Act, and NEPA, the National Environmental Policy Act. The District and Army Corps of Engineers will be holding a joint public hearing on March 8th to receive input on both these draft environmental documents.

Tonight's public hearing, which deals solely with the Environmental Impact Report, is not a decision-making meeting. We're here to get your input which will be used to help finalize the EIR. Your comments and our response to your comments will be part of the final document.

Tonight's public hearing will consist of a 20-minute presentation by District staff followed by a public comment period. Your comments will not be part of the final document and, thus, part of the public record for the Clearwater Program unless you provide your oral comments during the comment -- public comment

portion of tonight's hearing or you provide your comments in writing either by filling out a comment form which are located in the back or submitting a comment letter or an e-mail to the Sanitation District.

Now, I'd like to introduce District staff involved with tonight's public hearing. Steve Highter. Steve is the supervisor engineer in the Sanitation District Facilities Planning Department, and he's also the project manager for the Clearwater Program. We also have Glenn Acosta. Glenn is a senior engineer in the Sanitation District Facilities Planning Department, and he's been an integral part of our outreach effort for the Clearwater Program. And there's Angela Chang. Angela is a senior engineer in the District Facilities Planning Department.

And with that, I'd like to turn this hearing over to Angela, who will give you a brief presentation on the Clearwater Program and outline the schedule as we move forward on this very important wastewater facility project.

MS. CHANG: Thank you very much, Basil. Good evening.

I will begin this Clearwater Public Hearing with a brief overview of the Sanitation District. The Sanitation Districts provide wastewater and solid waste

management services to more than 5.7 million people in Los Angeles County. We actually consist of 23 independent special districts serving 78 of the 88 cities in the county as well as unincorporated county areas. The Clearwater Program focuses on the Joint Outfall System or JOS which is outlined in red. The JOS includes 17 districts serving 73 cities that share a regional sewer system.

The elected officials that represent the cities and unincorporated in the JOS comprise the Sanitation District's Board of Directors which will consider approval and certification of the master facilities plan and Environmental Impact Report for the Clearwater Program.

The JOS serves approximately 4.8 million people, covers 660 square miles, and manages about 400 million gallons of wastewater per day. It consists of approximately 1300 miles of large trunk sewers, shown here in green, that interconnect six upstream water reclamation plants, which is shown here in orange, and the Joint Water Pollution Control Plant, which is shown here and is located in the city of Carson. Wastewater is treated at the Joint Water Pollution Control Plant, is discharged to the Pacific Ocean through a tunnel and outfall system, which is shown here in black.

From time to time we prepare facilities plans to identify and address future needs of our sewerage systems and treatment facilities. The most recent plan was prepared in the mid-1990s with a planning horizon through the year 2010. Our new JOS facilities planning effort is called the Clearwater Program which will be our road map over the next several decades.

The Districts are the California Environmental Quality Act, or CEQA, lead agency, and the United States Army Corps of Engineers is the National Environmental Policy Act, or NEPA, lead agency for this program. Together we have conducted scoping meetings and consulted with federal, state, and local agencies. The Districts have additionally held public workshops and met with over 500 community leaders, environmental groups, and civic organizations since 2006 to obtain input for development and evaluation of the alternatives for the Clearwater Program.

The Clearwater Program addresses long-term system needs that will be constructed as necessary and a more current project that will be constructed in the near future. I will first present the long-term planning efforts and then discuss in more detail the specific project now being considered.

The Clearwater Program has four main

objectives. First, we must provide adequate system capacity to meet the needs of the growing population. As shown here, a shortfall is expected before 2050 based on regional population growth projections. We also must provide for overall system reliability through inspection, maintenance, repair, and replacement of aging infrastructure to ensure the highest level of public safety and environmental protection. We must provide support for emerging recycled water use and biosolids beneficial use opportunities. Finally, we must provide a long-term solution for meeting water quality requirements set forth by regulatory agencies. The Sanitation Districts have a strong record of compliance and strive to continue to meet evolving regulations and permit requirements in a cost-effective and environmentally sound manner.

Based on future flow projections, the Joint Outfall conveyance system will require approximately 33 miles of new trunk sewers through the year 2050. This is shown here in red. Because the wastewater treatment facilities shown here in orange are interconnected, their collective treatment capacity was evaluated for the Clearwater Program. Based on the previous evaluation, it was also determined that there will be a capacity shortfall of 20 million gallons per day by the

year 2050. To take advantage of reuse opportunities, the Master Facilities Plan recommends expanding the San Jose Creek Water Reclamation Plant by 25 million gallons per day. Those proposed facilities are shown here in yellow.

The Master Facilities Plan also recommends implementing process optimization at the San Jose Creek, Long Beach, Pomona, and Los Coyotes Water Reclamation Plants, which are shown here in blue. Process optimization would consist of modifications within the existing plant to ensure that the Sanitation Districts continue to consistently meet permit requirements. Construction activities would include flow equalization through the addition of below-ground storage capacity.

The Districts have been producing recycled water for nearly 50 years and are currently supplying over 600 reuse sites throughout the county. Applications include groundwater recharge, landscape and agricultural irrigation, recreational impoundments, habitat enhancement, and industrial reuse. About half of the recycled water produced is not reused and is instead discharged to the rivers and flows to the ocean. Our ongoing challenge is to use all available recycled water. By law we are not allowed to distribute recycled water directly to customers. Instead we must work with

local water agencies to supply reuse sites.

The solids generated at each of the six upstream water reclamation plants during the wastewater treatment process are returned to the trunk sewers and conveyed to the Joint Water Pollution Control Plant for centralized solids processing. The Master Facilities Plan recommends continuation of this existing practice. Additionally, based on current per capita generation rates and projected population for 2050, six new anaerobic digesters are needed. The timing of construction depends on future sludge production at the Joint Water Pollution Control Plant. The location of the new digesters, which is shown here in blue, would be within the existing site.

After solids processing, the residual material is converted into biosolids that can be beneficially used for composting, generation of renewable fuels, and land application for crop production. Both future and existing biosolids management locations are shown here.

The wastewater treated at the Joint Water Pollution Control Plant is conveyed by two existing tunnels as shown here from the plant to the Royal Palms Beach. The two tunnels are interconnected by manifold structures to four existing ocean outfalls. The eight-foot tunnel was completed in 1937, and the

twelve-foot tunnel was completed in 1958. The tunnels have not been inspected for over 50 years due to the constant flow of treated wastewater, while the existing ocean outfalls which were constructed between 1937 and 1966 sit on the ocean floor and are visually inspected on a regular basis.

The alternatives analysis in the Master Facilities Plan demonstrated an immediate need to address this aging infrastructure resulting in a project that considered both a new ocean discharge system that is hydraulically separate from the existing system and a modified ocean discharge system that is hydraulically connected to the existing system.

To determine the recommended project, a screening process was conducted in the Master Facilities Plan to reduce a range of more than 50 options down to four feasible alternatives. These alternatives were further evaluated and ranked based on environmental impacts, public input, operational considerations, constructability, long-term uncertainty, and cost effectiveness. These final four alternatives were then carried forward for detailed environmental analysis in the EIR/EIS.

All four alternatives are shown here in green, and for reference and perspective, the existing tunnels

and ocean outfall are shown in blue. Each tunnel alignment would require a working shaft site at the Joint Water Pollution Control Plant and would traverse the Palos Verdes -- the active Palos Verdes fault. An engineered system would be installed along the Palos Verdes fault to meet current seismic standards and minimize the potential for damage due to fault rupture. It should also be noted that our geotechnical consultants have indicated that our project areas will not be impacted by the recent slope failure near White Point State Beach along Paseo Del Mar as shown here.

Alternatives 1, 2, 3 would require a new ocean discharge system that is hydraulically separate from the existing system, while Alternative 4 would connect to the existing ocean discharge system.

Alternative 1 would go through the Port of Los Angeles to the San Pedro shelf and include three additional shaft sites. The total project length of 14.4 miles would be constructed at an estimated cost of $1.36 billion.

Alternative 2 is the same as Alternative 1 up to the Southwest Marine shaft site, from which a shorter offshore tunnel would be built out to the Palos Verdes shelf. The total project length of 9.2 miles would be constructed at an estimated cost of $980 million.

Alternative 3 would traverse under streets including Figueroa and Gaffey to the Angels Gate shaft site. The offshore tunnel would extend out to the Palos Verdes shelf, and the total project length of 8.6 miles would be constructed at an estimated cost of $910 million.

Alternative 4 is the only tunnel alignment that is completely onshore. It is constructed from JWPCP to the Royal Palms shaft site. Its total project length of 6.9 miles would be constructed at an estimated cost of $550 million.

Additionally, all four alternatives include rehabilitation of the existing ocean outfalls to ensure long-term reliability of the system. For Alternatives 1, 2, and 3, the existing system would serve as backup for the new system.

Through the Master Facilities Plan and EIR/EIS review process, it was determined that Alternative 4 was the highest ranked alternative, and Alternative 2 was the lowest ranked alternative.

As shown in green, Alternative 4 originates at the Joint Water Pollution Control Plant, goes beneath Figueroa Street, Harbor Regional Park, North Gaffey Street, Capitol Drive, and Western Avenue through Dodson Avenue to Royal Palms Beach. As the highest ranked

alternative, Alternative 4 is the recommended project because it is the environmentally preferred and superior alternative. Alternative 4 has only two shaft sites, the shortest overall tunneling distance, the least amount of construction air emissions, the fewest number of truck trips, the least amount of excavated materials, and the shortest construction duration.

Alternative 4 uses the existing ocean outfalls and, thus, would not require offshore tunneling or construction of a new ocean riser and diffuser, which eliminates many of the constructability challenges and risks posed by tunneling under the ocean. The in-water construction activities which would require an Army Corps permit, would also be greatly reduced. The minimization of ocean work would result in less impact to the marine environment.

Construction for the Alternative 4 tunnel would originate at the JWPCP west shaft site, which would be on plant property near the corner of Lomita Boulevard and Figueroa Street. This working shaft site would serve as the entry point for construction and the exit point for excavated materials. The shaft would be a diameter of 40 to 60 feet and a depth of 140 feet. Shaft construction would take approximately ten to twelve months, and tunnel construction would be

approximately four years.

Upon completion of tunneling activities, the shaft would be converted into a drop structure and connected to the existing JWPCP effluent management infrastructure. Permanent facilities at this site would include a surge tower and potentially a pumping plant.

Instead of open trenching, which is highly disruptive to traffic and businesses, a tunnel-boring machine, also known as a TBM, would be utilized. Beginning at the JWPCP west shaft site, which is shown on the far left, the tunnel would run underground for approximately seven miles to the Royal Palms Beach, which is shown on the far right. The TBM would operate at subsurface depths ranging from 70 to 450 feet, therefore minimizing surface impacts.

The tunnel would be constructed of prefabricated steel reinforced concrete segments with watertight gaskets. The tunnel would have an external diameter of 20 to 22 feet and a finished internal diameter of 18 feet. This would provide hydraulic capacity to accommodate peak flows from severe storm events projected through the year 2050.

The new tunnel would come in at the Royal Palms Beach shaft site, which would serve as an exit shaft to remove the TBM. This shaft would be primarily located

on property we already own at Royal Palms Beach, which is surrounded by chain-link fence as shown here in this photo. The shaft site would be used to connect the new tunnel to the existing ocean outfalls at a manifold structure as depicted here.

The shaft would be a diameter of 25 to 35 feet and approximately 50 feet deep. Shaft construction would take six to nine months, and the interconnection work would take approximately one and a half years. Only subsurface facilities are being proposed, and the site would be returned to its original condition after the construction.

Once the new tunnel has been interconnected to the existing system, the existing tunnels can be taken out of service, inspected, and rehabilitated as necessary.

As previously discussed as part of the recommended project, the existing ocean outfalls would be rehabilitated, which requires obtaining a permit from the U.S. Army Corps of Engineers. The smallest and oldest outfall has basically reached the end of its useful life and will not be relied upon to manage future flows. Core samples of the other three outfalls, as depicted in green and shown in this photo, were collected from nine locations. After laboratory

analysis it was determined that these outfalls are in excellent condition. Additional evaluations recommended joint repair, cathodic protection, and re-ballasting for wave action protection on the 72-, 90-inch, and 120-inch outfalls in depths ranging from 20 to 50 feet as shown in orange. The rehabilitation work will take approximately nine months. Once rehabilitated, it is anticipated that the three existing ocean outfalls would have a remaining service life that extends well beyond the 2050 planning horizon.

The Environmental Impact Report and Environmental Impact Statement evaluated a plethora of resources as shown here and determined that Alternative 4 will result in the least environmental impacts.

A total of 58 mitigations at the various project sites are proposed from these resource areas to address impacts resulting from the recommended project. For example, a variety of geotechnical investigations will be performed at each construction site, and those recommendations will be incorporated into the final design. A number of measures will be taken to reduce noise and vibration during construction at each of the shaft sites, as well as for the tunnel, such as implementation of a rail maintenance plan and a

vibration control plan resulting from rail hauling activities. For the rehabilitation work, mitigations will include a black abalone survey, as well as development of a transplantation plan if necessary.

However, even with mitigation, it was determined that Alternative 4 would result in aesthetic, air quality, cultural, and greenhouse gas emission impacts that are significant and unavoidable. But a number of measures would still be taken to reduce air and greenhouse gas emissions, such as the use of a newer and cleaner diesel locomotive engine, as well as particulate matter traps for heavy-duty diesel trucks and equipment, as shown here. Additionally, a construction barrier, as simulated in this photograph, will be constructed at Royal Palms Beach to reduce aesthetic and noise impacts.

Overall, Alternative 4 would still have the fewest environmental impacts, and it should be noted that the unavoidable aesthetic, air quality, and greenhouse gas emission impacts would be temporary and occur only during construction.

The Draft Master Facilities Plan and Draft EIR/EIS have been released for an extended review period during which public comments will be received until April 10th. After review and response to comments, the

Final Master Facilities Plan and Final EIR/EIS will be considered for certification later this year. Final engineering design will take about three years, and construction will require approximately six and a half years after award of contract, with an anticipated completion date of 2021.

We invite you to submit your formal comments tonight at the table over there. Otherwise you can submit them to Steven Highter or Aaron Allen at the addresses shown above. To review the executive summary, master facilities plan, or EIR/EIS, please visit our Web site at www.clearwaterprogram.org. Thank you very much for your time and interest.

MR. HEWITT: At this point we'll begin the public comment portion of tonight's hearing. If you wish to comment, please fill out a presenter form if you haven't already done so. In addition to your oral comments, we encourage you to submit your comments in writing to ensure that your comments are reflected accurately in the record. Except for providing minor clarification, we will not be responding to comments tonight or answering questions at this time. We will respond to comments and questions in writing in the final document.

I will call your name in the order you signed

up to comment. When I call your name, please step to the microphone and begin with your name and affiliation.

We don't have any comment forms. Would anyone else like to comment?

Well, thank you for coming tonight. I'd like to just reiterate the schedule that Angela went through. As Angela mentioned, the comment period for the draft document ends April 10th, so there is additional opportunity to comment after tonight's meeting. The second of three public hearings for the Clearwater Program will be tomorrow night in Carson. In addition, comments can be submitted in writing either by filling out a comment form, sending an e-mail to Steve or Aaron Allen, or sending us a letter. The Final EIR, Environmental Impact Report, and Final Environmental Impact Statement should be completed this fall at which point a public hearing will be held to consider certification of the Final EIR by the Sanitation Districts Board of Directors. The Army Corps of Engineers will separately issue the EIS, an Environmental Impact Statement. Then you will be notified when the final documents are available.

Thank you, and have a good night.

TRANSCRIPT – PUBLIC HEARING
MARCH 7, 2012

SANITATION DISTRICTS OF LOS ANGELES COUNTY

PUBLIC HEARING

ON

THE CLEARWATER PROGRAM

WEDNESDAY, MARCH 7, 2012

CARSON COMMUNITY CENTER

CARSON, CALIFORNIA

APPEARANCES

Basil Hewitt, Public Information

Angela Chang, Facilities Planning Department

ALSO PRESENT:

Tom LeBrun, Department Head of Facilities Planning

Steve Highter, Clearwater Project Manager

PUBLIC SPEAKERS:

JoAnn Wysocki

Dr. Kiran R. Magiawala

Janet Gunter, San Pedro Peninsula Homeowners United

MR. HEWITT: Good evening. My name is Basil Hewitt. I'm a senior engineer in the Sanitation Districts Public Information Office. Before we get started, I'd like to point out that a court reporter will be documenting tonight's public hearing, and if any one of you need Spanish translation, please see our translator that's here in the front row.

And last but not least, if anybody needs the restrooms, they are outside in the lobby. The men's room to the left, and to the right is the ladies' room.

Welcome to the second of three public hearings for the Clearwater Program Draft Environmental Impact Report. Public input is an essential part of this Clearwater Program planning process. Since 2006 the Sanitation Districts have met with more than 500 elected officials, community and business leaders, and organizations to discuss the Clearwater Program. We've also had four public workshops where we presented the need for the Clearwater Program and gathered input on prioritizing the objectives, developing screening criteria for the alternatives, and evaluating potential locations for shaft sites and tunnel alignments. All this input was used to develop and analyze the final alternatives that are presented in the draft documents for the Clearwater Program.

In addition, the Sanitation Districts worked jointly with the Army Corps of Engineers to prepare the Draft Environmental Impact Report and the Draft Environmental Impact Statement because certain elements of the recommended project will require federal permits. This work was done in accordance with CEQA, the California Environmental Quality Act, and NEPA, the National Environmental Policy Act.

The Districts and the Corps of Engineers is holding a joint public hearing tomorrow night to get input and take comments on both draft documents. Tonight's public hearing deals solely with the Draft EIR and is not a decision-making meeting. We're here to get your input, which will be used to help finalize the EIR. Your comments and our response to your comments will be part of the final environmental document.

Tonight's meeting will consist of a 20-minute presentation by District's staff, followed by a public comment period. Your comments will not be part of the final document and part of the public record for the Clearwater Program unless you provide oral comments during the public comment portion of tonight's meeting or submit your comments in writing.

With that, I'd like to introduce Districts' staff involved with tonight's public hearing. We have

Tom LeBrun. He's a department head for the Sanitation Districts Facilities Planning Department. There's Steve Highter, and he's supervising engineer in the Sanitation Districts Facilities Planning Department and the project manager for the Clearwater Program. And we have Angela Chang, a senior engineer for the Districts Facilities Planning Department.

With that, I'm going to turn the meeting over to Angela, who will give a 15-minute presentation on the Clearwater Program.

MS. CHANG: Thank you, Basil. Good evening. I'll begin the Clearwater Program Public Hearing with a brief overview of the Sanitation Districts. The Sanitation Districts provide wastewater and solid waste management services to more than 5.7 million people in Los Angeles County. We actually consist of 23 independent special districts serving 78 of the 88 cities in the county as well as unincorporated county areas.

The Clearwater Program focuses on the Joint Outfall System, or JOS, which is outlined in red. The JOS includes 17 districts, serving 73 cities that share a regional sewerage system.

The elected officials that represent the cities and unincorporated areas in the JOS comprise the

Sanitation District's Board of Directors, which will consider approval and certification of the Master Facilities Plan and Environmental Impact Report for the Clearwater Program.

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From time to time, we prepare facilities plans to identify and address future needs of our sewerage systems and treatment facilities. The most recent plan was prepared in the mid-1990s with a planning horizon through 2010. Our new JOS facilities planning effort is called the Clearwater Program, which will be a road map over the next several decades.

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Policy Act, or NEPA, lead agency for this program. Together we have conducted the scoping meetings and consulted with federal, state, and local agencies. The Districts have additionally held public workshops and met with over 500 community leaders, environmental groups, and civic organizations since 2006 to obtain input for development and evaluation of the alternatives for the Clearwater Program.

The Clearwater Program addresses long-term system needs that will be constructed as necessary and a more current project that will be constructed in the near future. I will first present the long-time planning efforts and then discuss in more detail the specific project now being considered.

The Clearwater Program has four main objectives. First, we must provide adequate system capacity to meet the needs of the growing population. As shown here, a shortfall is expected before 2050 based on regional population growth projections. We also must provide for overall system reliability through inspection, maintenance, repair, and the replacement of aging infrastructure to ensure the highest level of public safety and environmental protection. We must provide support for emerging recycled water reuse and biosolids beneficial use opportunities. And finally, we

must provide a long-term solution for meeting water quality requirements set forth by regulatory agencies. The Sanitation Districts have a strong record of compliance and strive to continue to meet evolving regulations and permit requirements in a cost-effective and environmentally sound manner.

Based on future flow projections, the Joint Outfall conveyance system will require approximately 33 miles of new trunk sewers. This is shown here in red. Because the wastewater treatment facilities, shown here in orange, are interconnected, their collective treatment capacity was evaluated for the Clearwater Program. Based on the previous evaluation, it was also determined that there will be a capacity shortfall of 20 million gallons per day by the year 2050.

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Process optimization would consist of modifications within the existing plant to ensure that

the Sanitation Districts continue to consistently meet permit conditions. Construction activities would include flow equalization through the addition of below-ground storage capacity.

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construction depends on the future sludge production at the Joint Water Pollution Control Plant. The location of the new digesters, shown here in blue, would be located within the existing site.

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The wastewater treated at the Joint Water Pollution Control Plant is conveyed by two existing tunnels from the plant to Royal Palms Beach. The two tunnels are interconnected by a manifold structure to four existing ocean outfalls. The eight-foot tunnel was completed in 1937, and the twelve-foot tunnel was completed in 1958. The tunnels have not been inspected for over 50 years due to the constant flow of treated wastewater, while the existing ocean outfalls, which were constructed between 1937 and 1966, sit on the ocean floor and are visually inspected on a regular basis.

The alternatives analysis in the Master Facilities Plan demonstrated an immediate need to address this aging infrastructure, resulting in a project that considered both a new ocean discharge system that is hydraulically separate from the existing

system and a modified ocean discharge system that is hydraulically connected to the existing system.

To determine the recommended project, a screening process was conducted in the Master Facilities Plan to reduce a range of more than 50 options down to four feasible alternatives. These alternatives were further evaluated and ranked based on the environmental impacts, public input, operational considerations, constructability, long-term uncertainty, and cost effectiveness. These final four alternatives were then carried forward for detailed environmental analysis in the EIR/EIS.

All four alternatives are shown here in green, and for reference and perspective, the existing tunnels and ocean outfalls are shown in blue. Each tunnel alignment would require a working shaft site at the Joint Water Pollution Control Plant and would traverse the active Palos Verdes fault. An engineered system would be installed along the Palos Verdes fault to meet current seismic standards and minimize the potential for damage due to fault rupture. It should also be noted that our geotechnical consultants have indicated that our project areas will not be impacted by the recent slope failure near White Point State Beach along Paseo Del Mar, as shown here.

Alternatives 1, 2, 3 would require a new ocean discharge system that is hydraulically separate from the existing system, while Alternative 4 would connect to the existing ocean discharge system.

Alternative 1 would go through the Port of Los Angeles to the San Pedro Shelf and include three additional shaft sites. The total project length of 14.4 miles would be constructed at an estimated cost of $1.36 billion.

Alternative 2 is the same as Alternative 1 up to the Southwest Marine shaft site, from which a shorter offshore tunnel would be built out to the Palos Verdes Shelf. The total project length of 9.2 miles would be constructed at an estimated cost of $980 million.

Alternative 3 would traverse under streets including Figueroa and Gaffey to the Angeles Gate shaft site. The offshore tunnel would then extend out to the Palos Verdes Shelf. The total project length of 8.6 miles would be constructed at an estimated cost of $910 million.

Alternative 4 is the only tunnel alignment that is completely onshore. It is constructed from JWPCP to the Royal Palms shaft site. The total project length of 6.9 miles would be constructed at an estimated cost of $550 million.

Additionally, all four alternatives include rehabilitation of the existing ocean outfalls to ensure long-term reliability of the system. For Alternatives 1, 2, and 3, the existing system would serve as backup for the new system.

Through the Master Facilities Plan and EIR/EIS review process, it was determined that Alternative 4 was the highest ranked alternative, and Alternative 2 was the lowest ranked alternative.

As shown in green, Alternative 4 originates at the Joint Water Pollution Control Plant, goes beneath Figueroa Street, Harbor Regional Park, North Gaffey Street, Capitol Drive, and Western Avenue, through Dodson Avenue, to Royal Palms Beach. As the highest ranked alternative, Alternative 4 is the recommended project because it is the environmentally preferred and superior alternative. Alternative 4 has only two shaft sites, the shortest overall distance, the least amount of construction air emissions, the fewest number of truck trips, the least amount of excavated materials, and the shortest construction duration.

Alternative 4 uses the existing ocean outfalls and thus would not require offshore tunneling or construction of a new ocean riser and diffuser, which eliminates many of the constructability challenges and

risks posed by tunneling under the ocean. The in-water construction activities, which require an Army Corps permit, would also be greatly reduced. The minimization of ocean work would result in less impacts to the marine environment.

Construction for the Alternative 4 tunnel would originate at the JWPCP west shaft site, which would be on plant property near the corner of Lomita Boulevard and Figueroa Street. This working shaft site would serve as the entry point for construction and the exit point for excavated materials. The shaft would be a diameter of 40 to 60 feet and a depth of approximately 140 feet. Shaft construction would take ten to twelve months, and tunnel construction would take approximately four years.

Upon completion of tunneling activities, the shaft would be converted into a drop structure and connected to the existing infrastructure. Permanent facilities at this site would include a surge tower and potentially a pumping plant.

Instead of open trenching, which is highly disruptive to traffic and businesses, a tunnel boring machine, a TBM, would be utilized. Beginning at the JWPCP west shaft site on the far left, the tunnel would go underground for approximately seven miles to Royal

Palms Beach on the far right. The TBM would operate at subsurface depths ranging from 70 to 450 feet, therefore minimizing surface impacts. The tunnel would be constructed of prefabricated steel reinforced concrete segments with watertight gaskets. The tunnel would have an external diameter of 20 to 22 feet and a finished internal diameter of 18 feet. This would provide hydraulic capacity to accommodate peak flows from severe storm events projected through the year 2050.

The new tunnel would terminate at the Royal Palms Beach shaft site, which would serve as an exit shaft to remove the TBM. This shaft site would be primarily located on property we already own at Royal Palms Beach, which is surrounded by chain-link fence as seen here in this photo. The shaft site would be used to connect the new tunnel to the existing ocean outfalls at a manifold structure as depicted here.

The shaft would be a diameter of 25 to 35 feet and approximately 50 feet deep. Shaft construction would take six to nine months, and the interconnection work would take approximately one and a half years. Only subsurface facilities are being proposed, and the site would be returned to its original condition after construction.

Once the new tunnel has been interconnected to

the existing system, the existing tunnels can be taken out of service, inspected, and rehabilitated as necessary.

As previously discussed as part of the recommended project, the existing ocean outfalls would be rehabilitated, which requires obtaining a permit from the United States Army Corps of Engineers.

The smallest and oldest outfall has basically reached the end of its useful life and will not be relied upon to manage future flows. Core samples of the other three outfalls, as depicted here in green, were collected from nine locations. After laboratory analysis, it was determined that these outfalls are in excellent condition.

Additional evaluations recommended joint repair, cathodic protection and re-ballasting for wave protection on the 72-, 90-inch, and 120-inch outfalls in depths ranging from 25 to 50 feet, as shown in orange. The rehabilitation work would take approximately nine months.

Once rehabilitated, it is anticipated that the three existing ocean outfalls would have a remaining service life that extends well beyond the 2050 planning horizon.

The Environmental Impact Report and

Environmental Impact Statement evaluated a plethora of resources, as shown here, and determined that Alternative 4 will result in the least environmental impacts.

A total of 58 mitigations at the various project sites are proposed from these resources -- resource areas to address impacts resulting from the recommended project. For example, a variety of geotechnical investigations will be performed at each construction site, and those recommendations will be incorporated into the final design. A number of measures will be taken to reduce noise and vibration during construction at each of the shaft sites as well as for the tunnel, such as implementation of a rail maintenance plan and a vibration control plan resulting from rail-hauling activities. For the rehabilitation work, mitigations will include a black abalone survey, as well as development of a transplantation plan if necessary.

However, even with mitigation, it was determined that Alternative 4 would result in aesthetic, air quality, cultural, and greenhouse gas emission impacts that are significant and unavoidable. But a number of measures would still be taken to reduce air and greenhouse gas emissions, such as the use of a newer

and cleaner diesel locomotive engine, as well as particulate matter traps for heavy-duty diesel trucks and equipment.

Additionally, a construction barrier, as simulated in the photograph, will be constructed at Royal Palms Beach to reduce aesthetic and noise impacts.

Overall, Alternative 4 would still have the fewest environmental impacts, and it should be noted that the unavoidable aesthetic, air quality, and greenhouse gas emission impacts would be temporary and occur only during construction.

The Draft Master Facilities Plan and Draft EIR/EIS have been released for an extended review period during which public comments will be received until April 10th. After review and response to comments, the Final Master Facilities Plan and Final EIR/EIS will be considered for certification later this year. Final engineering design will take approximately three years, and construction will require six and a half years after award of contracts with an anticipated completion date of 2021.

We invite you to submit your formal comments tonight at the table over there. Otherwise, you can submit them to Steven Highter or Aaron Allen at the addresses shown above. To review the executive summary,

Master Facilities Plan, or EIR/EIS, please visit our Web site at www.clearwaterprogram.org. Thank you for your time.

MR. HEWITT: Thank you, Angela.

Now, we'll begin the public comment portion of tonight's presentation. If you'd like to provide public comment, please fill out a presenter form if you haven't already done so. We will be limiting public comments to five minutes, and except for providing minor clarifications, we will not be responding to comments or answering questions at this time. We will respond to comments and answer questions in writing in the final Environmental Impact Report, the final environmental document. I want to reiterate that your comments will not be part of the final document and the public record on the Clearwater Program unless you provide your oral comments at this point, or you can submit your comments in writing.

And with that, I will call the names in the order that you signed up to comment. When I call your name, please step to the microphone to speak your comment and begin with your name and affiliation.

JoAnn Wysocki.

MS. WYSOCKI: How much time do I have?

MR. HEWITT: We're limiting comments to five

minutes.

MS. WYSOCKI: JoAnn Wysocki, 1006 King Avenue in Wilmington in the Rancho Palos Verde area. As they spent $82,000 on the Environmental Impact Report for the dog park, I'm kind of curious as to how much this cost to put together all these very nice Environmental Impact Report on good quality paper.

I was curious in all of the draft reports why Sepulveda Boulevard was mentioned so much because it is so far south -- or so far north of this project, and it just kind of -- I just wondered if it was because of the truck traffic.

The statistics in Figure 18-3 and Appendix B of the EIR used 2009 for the vehicular traffic, and I suppose that it is probably the latest stat that they can use typically, though it says 2010. But I do point out the area particularly at Anaheim and Figueroa at the on ramp to the 110 freeway, there is a great deal of traffic that comes down from the hill, and that traffic causes the backup to the hill through a small residential area. So there were no traffic statistics for that area, and I'd like to see there should be some.

The west shaft site is what we call the Margate property which is in Figure 6-7, and there is mention of a possible pumping plant 7.2.5.1, pages 7, 5. I need a

little bit more information on the proposal for the pumping plant.

The shaft construction -- how many shifts? For instance, is it 10-hour shifts, five days a week? But 24 hours in a day, you should have two shifts. And how many workers do you have and where will the workers' cars go? If it's the west shaft, there is quite a bit of property. There are 18 acres for parking.

It's the age old problem with environmental staff reports on traffic. Does a truck taking dirt away from a construction site go once and come back; is that two trips? Or is that one truck going around twice? It needs a little bit of clarification.

As to the hundred-foot crane, how are we going to get it to the shaft site? Do they drive it down the street, or are you going to dismantle it?

And Volume II of the Appendices to the Joint Water Pollution Control Plant. They don't know where it is. They've got it placed way south of Pacific Coast Highway and even Anaheim, but that's after page 8-A-9, Attachment B and Attachment C-1.

They mention Gaffey Street at the 110 freeway, Gaffey Street and Ninth Street, Gaffey Street and Paseo Del Mar, Western at Paseo Del Mar, and Western and Ninth Street. They put them in the city of Wilmington.

They're all in San Pedro the last time I looked. And Wilmington is not a city; it is a community in a city. This is the intersection.

Turning movements on Figure 6-10 and 6-11, pages 6-9 should be defined r-u-d-e-r-a-l vegetation, just for the record.

In Volume I Appendices for all the projects. The print is entirely too small, and the pages are not numbered.

In 18-5, Volume II, of the second draft, it said Figueroa Street and Harris Bridge is no longer in existence. Yes, it is. I just took it to San Pedro today, so that needs to be corrected.

Streets to Harris Bridges, Figures 8-2, is still open. And C Street to John S. Gibson -- those two streets run parallel to each other. So I think they should take a look at Tables 18-3 and 18-8.

They keep talking about the Pasha Terminal, but they never put it on the map. 19.4.3.1, Figure 21-1, page 19-33 and page 20-28. Please put it on the map, so people know where it is.

And shame on the Los Angeles Police Department -- I'm going to say this tomorrow at San Pedro -- 16-9. They did not respond to the primary response time for Angels Gate and Royal Palms. Perhaps

they will respond again.

I presume this project will be put out to bid. You know the question of local hiring is going to come up. This is not going to be a great job maker, but the secondary jobs will be increased.

Are we taking into account cost overruns? How about street sweeping and street watering? That's 5-27, and telephone contact so that people can complain if something goes wrong, or they have questions.

And of course, removing graffiti in a timely manner, page 15-38.

People always make criticisms about the continued use of reclaimed water. This is a good opportunity for them to give some examples that no one has thought of.

When will the Final Environmental Impact Report be released? It said 2012, but 2012 -- is that Christmastime or September? When will it be released? Thank you.

MR. HEWITT: Thank you.

Dr. Kiran Magiawala, please.

DR. MAGIAWALA: Thank you. My name is Kiran Magiawala. And I will spell it out for the benefit of everyone. My first name is K-i-r-a-n, and the last name, Magiawala, M-a-g-i-a-w-a-l-a.

And I am a resident of Hawthorne, California, and I wanted to share with the Clearwater Program some information which I have come to know on the general subject of what to do with the soil that is removed from tunneling and where to put it and what might be the beneficial uses of those soils that are removed.

I came to Los Angeles Department of Power and Water [sic] -- is conducting long-term study on this subject of sedimentation removal for their dams, and they have been studying various ways of collecting those particular soils, transporting them, and disposing them at various locations on various pits as well as the landfills as well as, if possible, replenishing the beaches, and some processes for them to make. And I had requested the Clearwater Program to look over what they have been doing and understand that it would be better if they could use some portion of that information for the future use as to what to do with the soil removed from the tunneling which we are going to be conducting.

I do not know the exact number on the cubic feet of the soil, but just for the sake of an approximate number, the number which they are talking about for the removal of the sediment or soil is approximately 16 million cubic feet. And for us it could be alternating between maybe 8 or 10 million cubic

feet or less of soil. Thank you.

MR. HEWITT: Thank you.

Now, I'd like to call Janet Gunter.

MS. GUNTER: Good evening. My name is Janet Gunter, and I'm with the San Pedro Peninsula Homeowners United. I'm a member of that group, and I think you'll probably hear more from them tomorrow evening.

Our biggest concern in the community of San Pedro as of late has to do with the liquid petroleum gas facility that is right at the juncture extremely close to this project on site four. That represents the single largest storage facility of its type in the nation in a populated area which happens to be sitting on top of Palos Verdes fault, very much like this project that is being planned. The area is also USGS identified liquefaction landslide area. It is also a methane zone.

Our concern has to do with any effects this project may have on the operation and the vulnerabilities that already exist at that site. Also, you know, obviously the geological conditions in the area are suspect, to say the least. The area they said is fine, and I read in the newspaper lately that the geotechnical analysis says that the area which is a hundred feet away is fine, but if you look at -- it

doesn't take a genius to look at that coastline there to see that you have a sunken city area which fell in the ocean back, I believe, in the late '30s. You have -- that's on the east of it. And on the west of it on the same coastline and within two and a half miles probably, which is Portuguese Bend which is also landslide, and in the area in between, which is right near this outfall, was the area that just fell. It's in the national news.

So you know, as a homeowner, as a person in the community, I understand that we need to do something with this project. I always thought, even though it was going to cost more money, that the less offensive route or least offensive route would be to take it through the facility -- through the harbor, underground, not disturbing -- yeah, you've got marine life there, and you've also got soil disruption there as well. But it seems to me that then the most sensible route to take -- I'm sure the port doesn't like that idea. And again, I am sort of a cynic because I've been fighting the Port of L.A. on many of these issues which are the same issues that we're facing now -- the vulnerability with our reaction to the port's introduction of a facility at marine terminal back in the '70s.

So you know, they've built some things in the community over time that are offensive, and we feel

like, at least speaking for myself and not the group, it appears that here is a straightforward route that might cost more money and might interrupt to some degree some of the potential operations there but would serve the best of -- the rest of us in a better fashion.

I am sure that the organization will have a presence tomorrow night at the meeting, and they'll probably submit written responses, and I may write and submit my written responses to you later. Thank you.

MR. HEWITT: Thank you.

Would anyone else like to present -- provide public comments tonight?

Thank you all for participating in tonight's public hearing. Your input is a very important part of the Clearwater Program, and I'd just like to close this meeting by reiterating some key dates on the Clearwater Program for information.

The public comment for the draft documents will remain open until April 10th, so there's additional opportunities to provide comment after tonight's meeting. For example, the third of the three public hearings will be tomorrow night in San Pedro. That will be a joint public hearing with the Army Corps of Engineers and the Districts.

In addition, you may submit additional comments

in writing either by filling out a comment form or submitting a comment letter or sending an e-mail to Steve or Aaron Allen.

The Final EIR should be completed this fall, at which point there will be a public hearing to consider certification of the Final EIR. Certification is by the Board of Directors of the Final EIR. The Army Corps of Engineers will issue a separate Record of Decision for the Final Environmental Impact Statement. You will be notified when the final documents are available.

And thank you, and your participation is much appreciated. Have a good night.

TRANSCRIPT – PUBLIC HEARING
MARCH 8, 2012

SANITATION DISTRICTS OF LOS ANGELES COUNTY

AND

U.S. ARMY CORPS OF ENGINEERS

JOINT PUBLIC HEARING

ON

THE CLEARWATER PROGRAM

THURSDAY, MARCH 8, 2012

CROWNE PLAZA LOS ANGELES HARBOR HOTEL

SAN PEDRO, CALIFORNIA

APPEARANCES

Don Avila, Sanitation Districts Public Information

Dan Swenson, Section Chief, U.S. Army Corps of Engineers

Steve Highter, Sanitation Districts Project Manager

Mark Giljum, Sanitation Districts Civil Engineer

ALSO PRESENT:

Ken Wong, U.S. Army Corps of Engineers Project Manager

Tom LeBrun, Sanitation Districts Facilities Planning

PUBLIC SPEAKERS:

Lonna Calhoun, COPE Preparedness

Augie Bezmalinovich, Port of Los Angeles

John Winkler, Peck Park Committee

JoAnn Wysocki

George Radovcich

Cathy Beauregard

Pat Rome, Pine Creek Homeowners Assn.

David McCulloch

Jody James, San Pedro Peninsula Homeowners United

Katy Watkins

MR. AVILA: Good evening. My name is Don Avila. I am the Division engineer in charge of public information of the Sanitation Districts of Los Angeles County, and I'd like to welcome you to the public hearing for the Clearwater Program Draft Environmental Impact Report and Draft Environmental Impact Statement.

Before we get started, if anyone needs to use the restroom, out the door and to the right. Water is on the table in the back. If anyone needs Spanish translation, we've got Gloria, our translator, who's in the back. Feel free to go see her.

Public input has been an essential part of the Clearwater Program planning process. Since 2006 we have held over 500 meetings with elected officials, community and business leaders, and groups and organizations to discuss the Clearwater Program. We've also held four public workshops where we presented the need for the Clearwater Program, and we gathered public input to prioritize the objectives, develop screening criteria for the alternatives, and evaluate potential locations for shaft sites and tunnel alignments. We also used the this input to develop and analyze the final alternatives presented in the draft document.

We worked jointly with the Army Corps of Engineers to prepare the Draft EIR and EIS because

certain elements of the recommended project will require federal permits. This was all done in accordance with the California Environmental Quality Act and the National Environmental Policy Act.

This public hearing tonight is not a decision-making process. We are here to gather your input to get the Districts and Army Corps to finalize the EIR and EIS. We will not be answering questions this evening, but we will address all questions and all input in writing in the final documents.

I'd like to introduce the staff who is taking part in the public hearing this evening. For the Army Corps, we have Dan Swenson. We have Ken Wong, project manager. From the Sanitation Districts, we have Tom LeBrun, department head of our planning department. We have Steve Highter, who is the Clearwater Project manager, and we've got Mark Giljum, who is the civil engineer in our planning department.

Tonight's public hearing will consist of brief introductory remarks by the Army Corps, followed by introductory remarks and presentation of the Clearwater Program by Sanitation Districts' staff, and then we will have the public hearing.

So with that, I'd like to bring up the Army Corps to make introductory remarks.

MR. SWENSON: Hello, my name is Dan Swenson. I'm the U.S. Army Corps of Engineers section chief for the L.A. and San Bernardino County Section. And I apologize. I don't have my lines as well rehearsed. So I'll do a little bit more reading from them, but bear with me.

The Corps is considering a permit application for the project submitted by the Sanitation Districts of Los Angeles County to serve to rehabilitate the Sanitation Districts' existing ocean outfalls off White's Point on the Palos Verdes Peninsula. And ocean outfalls rehabilitation activities comprise one component of the project element of the Clearwater Program, which is one piece of that. That's the focus of our summary.

On February 16th, a Notice of Availability of the Draft EIS/EIR was published in the Federal Register. The Corps will accept any written comments concerning the project components of the Clearwater Program. This will be evaluated in the Draft EIS/EIR until April 10th, 2012.

Our federal permit program -- under our federal permit program, the Corps of Engineers is responsible for regulating the discharge of dredged or fill materials into waters of the United States and work in

navigable waters of the United States. The offshore activities proposed in the permit application are regulated under both Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Because federal permits qualify as major federal actions, the Corps also has to comply with the National Environmental Policy Act, or NEPA.

The project elements of the Clearwater Program encompasses both onshore and offshore construction activities. Though the Corps' geographic jurisdiction under the Clean Water Act and the Rivers and Harbors Act is restricted to the offshore portions of the project, the associated onshore work was determined to be within the Corps' scope of analysis. So in other words, in our jurisdiction the offshore areas in the EIR affecting the onshore portions of the project as well are part of our NEPA analysis. And the Corps has determined the environmental onshore and offshore activities proposed by the Sanitation Districts had potential significant environmental impacts which is why an EIS is being prepared as part of the project.

For purposes of this discussion, I will concentrate on the decision-making process associated with our permit program. The three main components of the Corps' permit decision, as I mentioned, the NEPA

process, also the 404(b)(1) guidelines, and a public interest review. In order for the Corps to issue a 404 permit, the dredge project must comply with the 404(b)(1) guidelines and cannot be contrary to the public interest. The 404(b)(1) guidelines provide criteria for evaluating the effect of discharge of dredged or fill material into waters of the United States, includes an in-depth examination of the effects of the proposed project on the physical, chemical, biological, and human-use components of the marine environment.

So this evening based on the 404(b)(1) alternative analysis, comments provided by the public, and the public interest review, the Corps will make a final permit decision for the proposed project. The Corps is prohibited by regulations from issuing the permit unless we are convinced that the permitted activity is the least environmentally damaging alternative that meets the overall project purpose, and that it is not contrary to the public interest.

At this public hearing the Corps is requesting comments from the public concerning the physical, chemical, biological, and human use in terms of the project. We'd like to emphasize that we will carefully consider all the comments that we receive for the

proposed project, and we will give them full consideration prior to making our permit decision.

Thank you.

MR. AVILA: Thank you very much, Dan.

I'd now like to bring up Steve Highter to give introductory remarks for the Sanitation Districts, and that will be followed by Mark Giljum, who will give a presentation of the Clearwater Program.

MR. HIGHTER: Good evening, everyone. Thank you very much for being here and taking an interest in the project. As Don said, my name is Steve Highter. I'm the supervising engineer in the Sanitation Districts, and for the past six years, I've been the project manager for the Clearwater Program.

The Sanitation Districts provide wastewater and solid waste management services for over 5 million people in Los Angeles County. The Clearwater Program is a comprehensive planning effort that focuses on the wastewater side of our business. Under the Clearwater Program, we prepared a Master Facilities Plan, and there's a number of long-range, system-wide recommendations. It also addresses a more immediate project-specific concern: The adequacy of the aging tunnels and ocean outfalls that convey all the treated wastewater effluent from our Joint Water Pollution

Control Plant in Carson to the Pacific Ocean.

The Sanitation Districts are the lead agency under the California Environmental Quality Act. On October 8th, 2008, we completed a Notice of Preparation of an Environmental Impact Report, or EIR. In October and November 2008, we held a series of five public hearings and scoping meetings. We subsequently conducted 70 coordination meetings with federal, state, and local agencies. This scoping effort was in addition to the hundreds of outreach meetings that took place in the community with the general public.

The Sanitation Districts' EIR is broader in scope than the Corps' EIS. In addition to the proposed project-specific tunnel and ocean outfall work, the EIR evaluates environmental impacts of all the system-wide recommendations of the Master Facilities Plan.

In conclusion, I'd like to reiterate the statement, an important statement, that Don made during his opening remarks. We're not here this evening to make decisions. Instead, the purpose of tonight's hearing is to formally receive public comments on the Draft EIR and EIS so that they can be addressed in the final documents.

At this time, I'll turn it over to Mark Giljum to give you a brief overview of the Clearwater Program,

the alternatives considered, and the recommend plan.

Thank you.

MR. GILJUM: Thank you, Steve. I will begin this Clearwater Program public hearing with a very brief overview of the Sanitation Districts. As Steve mentioned, we provide wastewater and solid waste management service for more 5.7 million people in L.A. County. We actually consist of 23 special independent districts serving 78 of the 88 cities in the county as well as the county unincorporated areas.

Our Clearwater Program focuses on the Joint Outfall System, or JOS, as outlined here in red. It includes 17 districts, serving 73 cities, and they all share a regional sewerage system. The elected officials that represent the cities and unincorporated areas in the JOS comprise our Board of Directors, which will consider approval and certification of the Master Facilities Plan and our Environmental Impact Report for the Clearwater Program.

The JOS serves approximately 4.8 million people, covers 660 square miles, and manages about 400 million gallons of wastewater per day. It consists of 1300 miles of trunk sewers, shown here in green, that interconnects six upstream reclamation plants, shown in orange, and our Joint Water Pollution Control Plant, or

JWPCP, also shown in orange. Wastewater is treated by the Joint Water Pollution Control Plant in Carson. It is discharged to the Pacific Ocean through a tunnel and outfall system that's shown here in black.

From time to time we prepare facilities plans to identify and address future needs of our sewerage systems and treatment facilities. The most recent plan was prepared in the mid-1990s with a planning horizon through the year 2010. Our new JOS facilities planning effort is called the Clearwater Program. This will be our road map for the next several decades.

The Districts are the California Environmental Quality Act, CEQA, lead agency as Steve mentioned, and the U.S. Army Corps is the federal lead agency under NEPA. We have conducted scoping meetings and consulted with federal, state, and local agencies throughout this process. Additionally, we've held 500 public workshops and meetings with various community leaders, environmental groups, and civic organizations since the inception of this program in 2006 to obtain input for development and evaluation of the alternatives in our Clearwater Program.

The Clearwater Program addresses long-term system needs that will be constructed as necessary, and a more current project that will be constructed in the

near future. I will first discuss our long-term planning efforts and then discuss the project in more detail that we're considering at this time.

Our Clearwater Program has four major objectives. First, we must provide adequate system capacity to meet the needs of the growing population. As shown here, a shortfall in the system capacity is expected before the year 2050 based on regional population growth projections.

We must also provide for system reliability through inspection, maintenance, repair, and rehabilitation of our aging infrastructure to ensure the highest level of public safety and environmental protection. We must provide support for emerging recycled water reuse and biosolids beneficial use opportunities.

And finally, we must provide a long-term solution for meeting water quality requirements set forth by various regulatory agencies. The Sanitation Districts have a strong record of compliance and strive to continue to meet evolving regulations and permit requirements in both a cost-effective and environmentally sound manner.

Based on the future flow projections, the joint outfall conveyance system will require approximately

33 miles of new trunk sewers through the year 2050. These are shown at various locations in our systems, shown in red here.

Because our wastewater treatment facilities, shown here in orange, are interconnected, their collective capacity was evaluated for the Clearwater Program.

Based on the previous evaluation, it was also determined there will be a capacity shortfall of 20 million gallons per day by the year 2050. To take advantage of reuse opportunities, the Master Facilities Plan recommends expanding the San Jose Creek Water Reclamation Plant by 25 million gallons per day. The proposed facilities are shown here in yellow.

Our Master Facilities Plan also recommends implementing process optimization at the San Jose Creek, Long Beach, Los Coyotes, and Pomona Water Reclamation Plants, shown here in blue. Optimization would consist of modifications within the existing plant to ensure that the Sanitation Districts continue to consistently meet permit conditions. Construction activities would include flow equalization through the addition of below-ground storage capacity.

The Districts have been producing recycled water for nearly 50 years and are currently suppling

over 600 reuse sites throughout the county. Applications include groundwater recharge, landscape and agricultural irrigation, recreational impoundments, habitat enhancement, and industrial reuse.

About half the recycled water that is produced is not actually reused and, instead, is discharged to the rivers and flows to the ocean. Our ongoing challenge is to reuse all of this available recycled water. By law we cannot distribute it directly to customers. We must work instead with local agencies to supply the various reuse sites.

The solids generated at each of the six upstream water reclamation plants during the wastewater treatment process are returned to the trunk sewers and conveyed to the Joint Water Pollution Control Plant for centralized solids processing. The Master Facilities Plan recommends that we continue this practice.

Additionally, based on current per capita generation rates and projected population for 2050, six new anaerobic digesters will be needed. The timing of construction depends on actual future sludge production at our Joint Water Pollution Control Plant. The location of these new digesters, shown here in blue, would be within the existing site.

After solids processing, the residual material

is converted to biosolids that can be beneficially used for composting, generation of renewable fuels, and land application for crop production. Both future and existing biosolids management locations are shown here.

The wastewater treated at the Joint Water Pollution Control Plant is conveyed by two existing tunnels, as shown here, from our plant to Royal Palms Beach. The two tunnels are interconnected by a manifold structure at the shoreline to the existing ocean outfall. An eight-foot tunnel was constructed in 1937, and the twelve-foot tunnel was constructed in 1958. They have not been inspected for over 50 years due to the constant flow of treated wastewater. The existing ocean outfalls, on the other hand, were constructed between 1937 and 1966, sit on the ocean floor, and can be inspected -- and are inspected on a regular basis.

The alternatives analysis in the Master Facilities Plan demonstrated immediate need to address this aging infrastructure, resulting in a project that considered both a new ocean discharge system that is hydraulically separate from our existing system and a modified ocean discharge system that would actually be connected to the existing ocean discharge system.

To determine the recommended project, a screening process was conducted in the Master Facilities

Plan to reduce a range of more than 50 options down to four feasible alternatives. These alternatives were further evaluated and ranked based on environmental impacts, public input, operational considerations, constructability, long-term uncertainty, and cost effectiveness. These final four alternatives were then carried forward for detailed environmental analysis in the EIR/EIS.

All four alternatives are shown here in green, and for reference and perspective, the existing tunnels and outfall systems are shown in blue. Each tunnel alignment would require a working shaft site at the Joint Water Pollution Control Plant and would traverse the active Palos Verdes fault. An engineered system would be installed along the Palos Verdes fault to meet current seismic standards and minimize potential for damage due to fault rupture. It should be noted that our geotechnical consultants indicated that our project areas will not be impacted by the recent slope failure near White Point State Beach along Paseo Del Mar, as shown here.

Alternatives 1, 2, 3 would require a new ocean discharge system that is hydraulically separate from the existing system, while Alternative 4 would connect to the existing ocean discharge system.

Alternative 1 would go through the Port of Los Angeles to the San Pedro Shelf and include three additional shaft sites. The total project length of 14.4 miles is to be constructed at an estimated cost of $1.36 billion.

Alternative 2 is the same as Alternative 1 up to the Southwest Marine shaft site, from which a shorter offshore tunnel would be constructed. The total project length of 9.2 miles would be constructed at an estimated cost of $980 million.

Alternative 3 would traverse under streets including Figueroa and Gaffey to the Angels Gate shaft site. The offshore tunnel would then extend out to the Palos Verdes shelf. The total project length of 8.6 miles would be constructed at an estimated cost of $910 million.

Alternative 4 is the only one that's completely onshore. This is the one that is constructed from the JWPCP to the Royal Palms shaft site. The total project length of 6.9 miles would be constructed at an estimated cost of $550 million.

Additionally, all four alternatives include rehabilitation of the existing ocean outfalls to ensure their long-term reliability. For Alternatives 1, 2, and 3 the existing system would serve as backup for the

system.

Through the Master Facilities Plan and EIR/EIS review process, it was determined that Alternative 4 is the highest ranked alternative, and Alternative 2 is the lowest ranked alternative.

As shown in green, Alternative 4 originates at the Joint Water Pollution Control Plant, goes beneath Figueroa Street, Harbor Regional Park, North Gaffey Street, Capitol Drive, and Western Avenue through Dodson Avenue to Royal Palms Beach. As the highest ranked alternative, Alternative 4 is the recommended project because it is the environmentally preferred and superior alternative.

Alternative 4 has only two shaft sites, the shortest overall tunnel distance, the least amount of construction air emissions, the fewest number of truck trips, the least amount of excavated material, and the shortest construction duration.

Alternative 4 uses the existing ocean outfalls and thus would not require offshore tunneling or construction of a new ocean riser and diffuser, which eliminates many of the constructability challenges and risks posed by tunneling under the ocean. The in-water construction activities, which require an Army Corps permit, would also be greatly reduced. The minimization

of ocean work would result in less impact to the marine environment.

Construction for the Alternative 4 tunnel would originate at the JWPCP shaft site on our plant property near the corner of Lomita Boulevard and Figueroa Street. This working shaft site would serve as the entry point for construction and the exit point for excavated material. The shaft would be a diameter of 40 to 60 feet at an approximate depth of 140 feet. Shaft construction would take ten to twelve months, and construction of the tunnel would take about four years.

Upon completion of tunneling activities, the shaft would be converted into a drop structure and connected to the existing facilities JWPCP effluent management infrastructure. Permanent facilities at this site would include a surge tower and potentially a pumping plant.

Instead of open trenching, which is highly disruptive to traffic and businesses, a tunnel boring machine, or TBM, would be utilized. Beginning at the JWPCP West shaft site, shown here on the left, the tunnel would run underground for about seven miles to the Royal Palms Beach shaft site, shown on the far right. The TBM would operate at subsurface depths ranging between 70 and 450 feet, therefore minimizing

surface impacts.

The tunnel would be constructed of prefabricated steel reinforced concrete segments with watertight gaskets. It would have an external diameter of 20 to 22 feet and an internal diameter of 18 feet. This would provide hydraulic capacity to accommodate peak flows from severe storm events projected through the year 2050.

The new tunnel would terminate at the Royal Palms Beach shaft site, which would serve as an exit shaft for the TBM. The shaft site would be primarily located on property we already own at Royal Palms Beach, which is surrounded by a chain-link fence as seen here in this photo. The shaft site would be used to connect the new tunnel to the existing ocean outfalls at a manifold structure as depicted here. The shaft would be a diameter of 25 to 35 feet and approximately 50 feet deep. Shaft construction would take six to nine months, and the interconnection work would take about one and a half years. Only subsurface facilities are being proposed, and the site would be returned to its original condition after construction.

Once the new tunnel has been interconnected to the existing system, the existing tunnels can be taken out of service, inspected, repaired, and rehabilitated

if necessary.

As previously discussed as part of the recommended project, the existing ocean outfalls would be rehabilitated, which requires obtaining a permit from the U.S. Army Corps of Engineers. The smallest and oldest outfall has basically reached the end of its useful life and will not be relied upon in the future.

Core samples of the other three outfalls, as depicted in green and shown in the photograph, were collected from nine locations. After laboratory analysis, it was determined that these outfalls are in excellent condition. Additional evaluations recommended joint repair, cathodic protection, and re-ballasting for wave protection on the 72-inch, 90-inch, and 120-inch outfalls in depths ranging from 20 to 50 feet, as shown here in orange. That rehabilitation work will take about nine months. Once rehabilitated, it is anticipated that the three existing ocean outfalls would have a remaining service life that extends well beyond the 2050 planning horizon.

The Environmental Impact Report and Environmental Impact Statement evaluated a plethora of resources, as shown here, and determined that Alternative 4 will result in the least environmental impacts.

A total of 58 mitigations at the various project sites are proposed from these resource areas to address impacts resulting from the recommended project. For example, a variety of geotechnical investigations will be performed at each construction site, and those recommendations will be incorporated into the final design.

A number of measures will be taken to reduce noise and vibration during construction at each of the shaft sites as well as the tunnel, such as implementation of a rail maintenance plan and a vibration control plan resulting from rail-hauling activities. For the rehabilitation work, mitigations will include a black abalone survey, as well as development of a transplantation plan, if necessary.

However, even with mitigation, it was determined that Alternative 4 would result in aesthetic, air quality, cultural, and greenhouse gas emission impacts that are significant and unavoidable. But a number of measures would still be taken to reduce air and greenhouse gas emissions, such as the use of a newer and cleaner diesel locomotive engine, as well as particulate matter traps for heavy-duty diesel trucks and equipment, as shown here.

Additionally, a construction barrier, as

simulated in the photograph, will be constructed at Royal Palms Beach to reduce aesthetic and noise impacts.

Overall, Alternative 4 would still have the fewest environmental impacts. It should be noted that the unavoidable aesthetic, air quality, and greenhouse gas emission impacts would be temporary and occur only during construction.

The Draft Master Facilities Plan and Draft EIR/EIS have been released for an extended review period during which public comments will be received until April 10th. After review and response to comments, the Final Master Facilities Plan and Final EIR/EIS will be considered for certification later this year. Final engineering design will take about three years, and construction will take about six and a half years after award of the construction contracts. The project is estimated to be completed sometime around 2021.

We invite you to submit your formal comments tonight at the table over there. Otherwise, you can submit them to Steven Highter or Aaron Allen at the addresses shown right there. To review the executive summary, master facilities plan, or the EIR/EIS, please visit our Web site, www.clearwaterprogram.org. Thank you for your time and input this evening.

MR. AVILA: Thank you very much, Mark.

Okay. We would like to start receiving public comments tonight. If you'd like to comment, please fill out a presenter card if you haven't already done so. We will be limiting comments to five minutes per person to ensure that everybody has a chance to present their comments. Your comments will not be included in the public record unless you fill out a presenter card and give a public comment now, or give us written comments, or as Mark has indicated, give us comments through e-mail or written comments up until the end of the comment period.

A court reporter is recording everything that is being mentioned this evening, so we will have that on the record. I will call the names in the order that you signed up, and please begin with your name and affiliation.

The first person would be Lonna Calhoun.

MS. CALHOUN: Good evening. I'd like to start by saying that I'm representing myself as a resident but also as a emergency management consultant most recently for the last couple years for the city of Rancho Palos Verdes where I studied their hazardous analysis, assessed their risks, trained their staff, and the emergency operation centers and conducting emergency drills.

So in that capacity I'm very familiar with the landslide activity along our coastline, and that's my primary concern. I do want to emphasize that also as an emergency manager, I believe that the importance of infrastructure improvement is really vital to the survival of our community in the event that we do have major impacts. So I'm a hundred percent supportive of the project.

My concern is with the Alternative 4, and the impact that it may have on our coastline here in San Pedro, especially when we consider the recent landslide on Paseo Del Mar. Now, I have studied extensively -- I kind of grunt at that a little bit -- Chapter 8 of your EIR that deals with each alternative and the risks and how you would mitigate those risks.

And just quickly because I only have five minutes, I want to point out a couple things that I circled, and that one would be on page -- I believe that's 8, Chapter 8-36, where we talk about the tunnel alignment, Alternative Number 1, which is really not along any identified landslide area.

Okay. As we move further into your Chapter 8 plan, on page 149, when you start talking about Alternative 4, the Royal Palms shaft site is -- says it's not in any mapped landslide area. However,

construction of the shaft would be in the Altamira Shale that could contain weak layers below the water table. And excavation at this instability of the construction risk that could result in ground failure in the vicinity near the shaft -- at the shaft.

Moving forward to page 156, we are talking about Alternative 4 could expose people or structures to potential substantially adverse effect including risk of life and involving the substrata consisting of material that is subject to liquefaction or other secondary seismic hazards. Okay. That's a concern.

Moving forward into page 158, it says construction of the shaft at Royal Palms could result in unstable earth conditions in the vicinity of the shaft. For example, weak layers in the Altamira Shale could be exposed in construction cuts, slope instability could create slope movement if the nearby natural slopes were affected, and unstable earth conditions could occur over the broader area than the shaft. Once the shaft is constructed and during tunnel drilling, there would be minimum risk of instability.

I wanted to point out a couple other documents that I'm going to leave with you. One of them is the Natural Hazard Mitigation Plan for the City of Rancho Palos Verdes that deals a lot with the prehistoric

landslide area in Portuguese Bend. And one of the things that you'll notice here is that when that landslide began was in 1956, and it says the Portuguese Bend landslide began its moderate movement in August 1956 when displacement was noted at northeast margin during construction of the Crenshaw Boulevard extension from Crest Road to the Palos Verdes Drive, moving gradually extending downslope so that the entire eastern edge of the slide mass was moving within six weeks. By summer of 1957, the entire slide mass was sliding towards the sea. Cost, $14.6 million and $2,000.

I also wanted to point out that according to their plan, the majority of the peninsula is underlaid by shale and siltstone units of the Monterey formation. These innovative units have planes of weakness that are conducive to landsliding and slope instability. This is all along our coastline. And I think that this is our big concern.

I also want to leave you with a document that I worked on with the City of L.A. Emergency Management Department, and we produced it for the community in 2009, and in this document we researched the sunken city, just on the other side of the proposed construction and the coastal erosion, and we identified

as one of the risks to start a landslide is dredging. And this is based on historical documentation.

So my concern is really based on the fact that I believe this community has suffered a true loss, a loss that they're still grieving, and that is the loss of the landslide that we just had in Paseo Del Mar. And I believe that our coastline is unstable, and any type of project like this that could even possibly increase our risk is not acceptable to us, especially when there are other alternatives. Maybe they would cost a little bit more, but if you consider the fact of what the cost would be if a landslide is generated because of this activity, it would be substantially far more.

I can leave these documents with you for your review. Thank you.

MR. AVILA: Thank you very much, Ms. Calhoun.

Next presenter would be Augie Bezmalinovich. I hope I didn't butcher your name too badly.

MR. BEZMALINOVICH: No, that was pretty good. That's a good San Pedro name. Thank you.

Good evening, everyone. I'm Augie Bezmalinovich, and I'm representing the Port of Los Angeles on this matter. And the Port of Los Angeles would like to go on record that if a tunnel and ocean alignment selected by the Sanitation Districts'

construction of a new ocean discharge system runs under the Port of Los Angeles, that, one, the construction access portal cannot be situated on the Trapac Terminal due to the disruptions and expense it would cause, and that any construction by this project would be coordinated with the Port of Los Angeles, such that port operations would not be disturbed.

And two, if the Sanitation Districts' construction of new ocean discharge system runs under the Port of Los Angeles, the Sanitation Districts would coordinate with the Terminal Island Treatment Plant and the Port of Los Angeles to explore the possibility of having the Terminal Island Treatment Plant discharge system tied into the Sanitation Districts' system, if needed.

Thank you very much. Have a nice day.

MR. AVILA: Thank you.

Our next presenter would be John Winkler.

MR. WINKLER: Good evening. My name is John Winkler. I wanted to -- I'm a resident and past steering committee volunteer for Peck Park.

And one of the things I wanted to bring to your attention is the backfill that would be available for projects here in San Pedro, and there are two projects currently right now would be the recent landslide at

Paseo Del Mar and down near the palms, and that dirt could be used for backfill. And the other project is the Dunn Canyon off of Summerland in San Pedro, and it's a project that would enhance the lower part of Peck Park if they filled in the canyon that partially. And this would help provide a need for recreation that is not being addressed at the present time, and this is referring to Hernandez Ranch. Thank you very much.

MR. AVILA: Thank you very much, Mr. Winkler.

Our next presenter would be JoAnn Wysocki.

MS. WYSOCKI: JoAnn Wysocki, 1006 King Avenue in Wilmington.

Volume II of the draft, Chapter 18B, the level of services at the intersection turning movement, it says Gaffey Street to the 110 ramp, Gaffey Street to the Ninth Street, Gaffey Street to Paseo Del Mar, Western to Paseo Del Mar, and Western to Ninth Street. It says they're all in the city of Wilmington. The last time I looked, they were in San Pedro. Also Wilmington is not a city; it's a community just as San Pedro is.

In the Volume II, Chapter 16-9, there was no response from the Los Angeles Police Department, and they gave the John S. Gibson Boulevard address on primary response time to Angel Gate or Royal Palms. Shame on the L.A.P.D., especially if it's down here.

L.A.P.D. should respond in the Final EIR.

This Environmental Impact Report should be an opportunity for anyone who has new suggestions for new uses of reclaimed water, and we need additional information in the Final Environmental Impact Report on the project being put out to bid -- cost overruns, street sweeping, and removal of graffiti in a timely manner. This is from Volume II, Chapter 15-38.

And I have a question that I would like to have answered tonight: Would the Final Environmental Impact Report be sent to the San Pedro Regional, the Carson Regional, and the Wilmington Branch libraries? Thank you.

MR. AVILA: Thank you, Ms. Wysocki.

The next presenter would be George Radovcich.

MR. RADOVCICH: Hi, my name is George Radovcich. I'm a resident in San Pedro.

I'm completely against Alternative 4. We live in a peninsula, and Western Avenue and Gaffey Street are all the way out. Western Avenue is honeycombed with sewers and all these things, and we've had -- we've had sink holes in the past. We've had block -- if you would block -- if one of these things fails on Western Avenue, we're doomed here essentially.

And another thing, this is a county project.

Why is this -- why is San Pedro burdened with a county project and going through residential neighborhoods? Why isn't this going through county land? What happened to Palos Verdes? The original pipeline is in Palos Verdes. My uncle was here when the original pipeline was built. He said it was very noisy. In fact, you could feel the vibrations of their equipment.

I live off of Dodson Avenue. The neighbors there don't even know about this yet. You really haven't been vetted out. We have a few of -- I think only one that I know of other than this one where you actually had community involvement. But they're going to hear about it now. In fact, I told a few neighbors today, and they are outraged. They couldn't believe it.

And your maps -- I called your office to find out if I could get real maps where I could see exactly where that pipe is going to go through down Dodson next to Seventh Street School, beautiful school, and beautiful Dodson Avenue has some of the best and nicest homes in San Pedro.

My brother is an engineer, and he wanted me to ask tonight. He said, what happens when the settling occurs? What is the settling you are expecting to occur, and who is going to draw -- who is going to pay for that damage to homes along Dodson Avenue when that

settling occurs? I mean, cracks are going to appear, and you're going to say, oh, it's not because of our pipeline, but it just happens after the pipeline is built. And what happens if we have a major failure along that pipeline on Dodson Avenue and Dodson sinks? Who is going to pay those homeowners for that? What's going to happen to property values? And are people going to have to disclose that they're selling a home where 10 feet away and 110 feet down is a 24- -- a 22-inch pipeline? I mean . . .

And it just disturbs me that this is all going out to Royal Palms again. In the past we had the DDT problems. In 2007 there was a study that showed that the DDT levels still at Royal Palms in 2007 are five times greater than anywhere on earth. I mean, are we -- are we just going to have another pipe so that we can put more stuff out there?

I think Alternative 1, if you're going to go with anything, is your best alternative because at least it's going to extend that pipeline further out to the shelf, and it won't go through residential neighborhoods where, frankly, if there is settling or if there is any damage to those homes, who is going to be responsible?

I don't understand why the City of Los Angeles is allowing you to do this when back in 19- -- the

earlier time when you built the pipeline, it was greatly discouraged by the City, and that's why you had to go out to Palos Verdes. Of course, there was no homes there at the time. You didn't have to worry about the noise factor. I noticed that your noise level -- you are going to be 10 dB over the Los Angeles limit for -- for nighttime ambient noise, which is 55 dB. According to your environmental report, it's going to be 65.

Now, people living a long touch from the cavity, they don't realize the vibration and the noise level that's going to go on 24/7 in ten-hour shifts. I mean once this starts, it's going to be too late. And then the people are just going to be saddled with it. What's going to happen to our property values when all this is going on for years?

The real sad part is that all this is going out to Royal Palms again. That's a big, big mistake, and you're saving a couple of bucks and in the big scheme of things, with California completely underwater, you know, they go for the good -- let's go for Number 1.

Let's go for the more extensive one which completely alleviates going under any neighborhood, alleviates messing up Western Avenue, alleviates messing up Gaffey Avenue, and let's go for the good stuff. And that's going to solve another outfall which will be

further out on the shelf, and it won't add to the stuff that we already have at Royal Palms, which is pretty bad. It's pretty bad already.

That's all I have.

MR. AVILA: Thank you very much.

Do I have another one, Mary?

Okay. Cathy Beauregard.

MS. BEAUREGARD: Good evening. I'm sorry I missed your presentation, but I've been involved with the department of sanitation and water policy issues for about 12 years now. I'm here to be in favor of this project. I think it's a great idea. We've been having a lot of problems with our infrastructure, and I'm thinking it's a great idea. It's about time we started improving our infrastructure so that we can meet the capacity for the population we have.

So I just wanted to say that I'm in support of this project, and that's all. Thank you.

MR. AVILA: Thank you very much.

That takes care of the people that have signed up. Is there anybody else who would like to make comments this evening? Please.

MS. ROME: My name is Pat Rome, and I'm a resident. I just live on the north side of Harbor Park right on the Pacific Coast Highway.

And for the last two years I've been going to meetings about Prop O, a multimillion-dollar project to try to clean up the Machado Lake and the Wilmington Drain. And when I got the information about this hearing, I see that you've got this pipeline going right through Harbor Park, and I wanted to find out where you are in conjunction with this multimillion-dollar project that's happening on this end, if your agency knows anything about it, or you're working in conjunction with it. Because from what I've heard, the whole Prop O is stopped now because they found a least sparrow vireo, which is a tiny little bird.

So I'm concerned that you're going to either come in after or before, and then you're going to turn around and dredge, and it's going to be upsetting to everything. And I think at this point we can't be penny-wise and pound-foolish. You can't save a couple -- I know it's a million dollars, but to save that, I think you have to look at the big picture and what can be impacted, and I don't think San Pedro or Wilmington needs any more of this.

MR. AVILA: Thank you, Ms. Rome.

Was there anybody else who wished to comment this evening? Yes, sir. Since they don't have a form, could you spell your name for us?

MR. McCULLOCH: M-c-C-u-l-l-o-c-h.

THE REPORTER: Could you speak into the microphone? I'm having trouble hearing you.

MR. McCULLOCH: Dave McCulloch, and I'm a resident. The first thing that pops out on the handout, you have the recommended route, but there is no finalization of the proposed route for the pipeline. You don't have to, and I guess this is on the EIR. Yeah, right, it is on the EIR, but I hope this doesn't mean that it's a foregone conclusion that this is the route. There is a concern -- or it raises the question when I see the crooked route that the tunnel is proposed on the recommended route down Gaffey, up Capitol, down Western, and across. This route is really proposed for underneath streets rather than a straight line that would knock miles off the pipeline. A straight line -- why isn't that an option is my question?

And I'm mostly concerned about traffic, certainly for the residential residents' point of view. One year significant environmental effects or air quality impacts when construction takes place, equipment and vehicles' exhaust. Where does that take place? All of this is underground from 70 to 400-some-odd feet underground. Why are we worried about the construction equipment other than the portals, three portal sites?

Why would that be a concern to residents? Is it a concern to residents?

I know years ago when this first came out, we went to the first meeting regarding this Clearwater project, and there was a proposed portal right here in Peck Park, 20 feet in diameter where construction material entered and exited the tunnel site and where construction debris was lodged. The debris would be removed from that site as well. And they're talking about hundreds of trucks moving up and down in the community throughout the area to transport that debris away from the tunneled sites.

Now, I do believe from this presentation that there's not going to be a portal between the plant and the coastline. Is that the case? Why? And if there is an air quality impact due to construction and equipment or vehicles, is that impact between those two points? That is the main concern that I have.

I hope this is somehow answered. From what I can read online, I have not seen it so far. And it will be a question that is continually raised by me and perhaps others as we go forward with the project.

One other question that my wife mentioned to me just now, there are some LPG plants down on Gaffey Street area and the proposed route -- the recommended

route -- I've got to use those words -- I don't want to accept recommended as to mean this is the route that it's going to be because there are three other proposed routes. So I am concerned about the LPG and air quality and the waste, and the route as it goes under the major streets rather than in a straight line, and the impact from emptying.

It seems like a tunnel this long is going to have to have some way to vent so that this can be an even and consistent flow of materials through that tunnel, that long tunnel, where those vents will be, and what impact those vents will have? Okay.

MR. AVILA: Thank you very much.

Okay. So I have a presenter. That would be Jody James.

MS. JAMES: Hi, I'm a member on the board of the San Pedro Peninsula Homeowners United on the San Pedro Peninsula Owners Coalition, and it includes the past presentation and using what we know from following the path of the city project. They have been referred by us and often by us and one of the things pointed out by a number of --

(Pause in the proceedings to replace microphone.)

-- this project is to benefit. Sorry -- many

other communities all around, but we are bearing the brunt. You're also putting all your eggs in one basket going through this way. I am sure I'm not the first one that's pointed this out. This is kind of a redundancy.

And don't you want something to rely on? Going through the port would be the less disruptive to our people, and if you spread the cost, the extra cost out over all these years and all the people that will be paying for this, that's really not a very big extra cost to bear.

And I'm sure, as I know another has pointed out and sent you documents, this project has taken a green line on this preferred path. It goes right into the zone that's called the Palos Verdes rupture zone, and this has been identified. We didn't always know about this. We've just known it about six months. In 1996 city and planning documents with maps show that this is a rupture zone, and what this means is it's the convergence of several faults that come all together here. That's why they're calling it the rupture zone. And as I heard the last person point out, these huge butane and propane tanks sit right on top of this area on Gaffey before it takes a turn to go to Capitol.

I'd just like you to do some things that make some sense, and know all of these issues, and don't

continue to bring the burdens to us and the hazards to us. Make the best choices. Take this to the port, spread the cost out, and spare us the hazards and the extra traffic and burdens that we'll bear if you go this route. Don't choose this plan.

And if you do and say there's no choice with this plan, I propose you say there is a public need -- eminent domain. Take those tanks out of here. To kill two birds with one stone and get rid of that hazard and get it out of here and use that site for the public purpose of your operations, and when you're finished, turn that into parking for special events at the port and for park and ride or for parking for the soccer field that's right above it. Take care of our needs, and quit giving us the sharp end of the stick.

MR. AVILA: Thank you, Ms. James.

Katy Watkins.

MS. WATKINS: Good evening. My name is Katy Watkins, and I'm a resident, and I live across from Colony Park.

And I guess I'm going to be somewhat redundant because several people have already made the points I was going to make, one of which is the coordination with the Prop O project in Machado Park, in the Harbor Park about the dredging of the lake. It would be just -- I

can just see all kinds of disaster coming with both of you trying to do it at the same time, dredging of the lake and going underneath it. So I'm hoping that you have addressed that issue. I'd like to be reassured that you have addressed the issue with the Prop O project in Harbor Park. And that's fine. I would trust that you, hopefully, would know what to do with that.

The second is the impacts on the tanks that the previous lady just discussed. I live around the corner from there. If it goes, I'm gone; I'm dead. My whole place goes. If those blow up, there have been studies that the whole area goes. Think about the vibration that you talked about that goes on underneath the ground which has already been established as very unstable tanks. They either need to come out before you do the project, or the project needs to go somewhere else. I am a hundred percent in support of infrastructure projects going forward, but I think this one has some work and some more coordination to do. Thank you.

MR. AVILA: Thank you, Ms. Watkins.

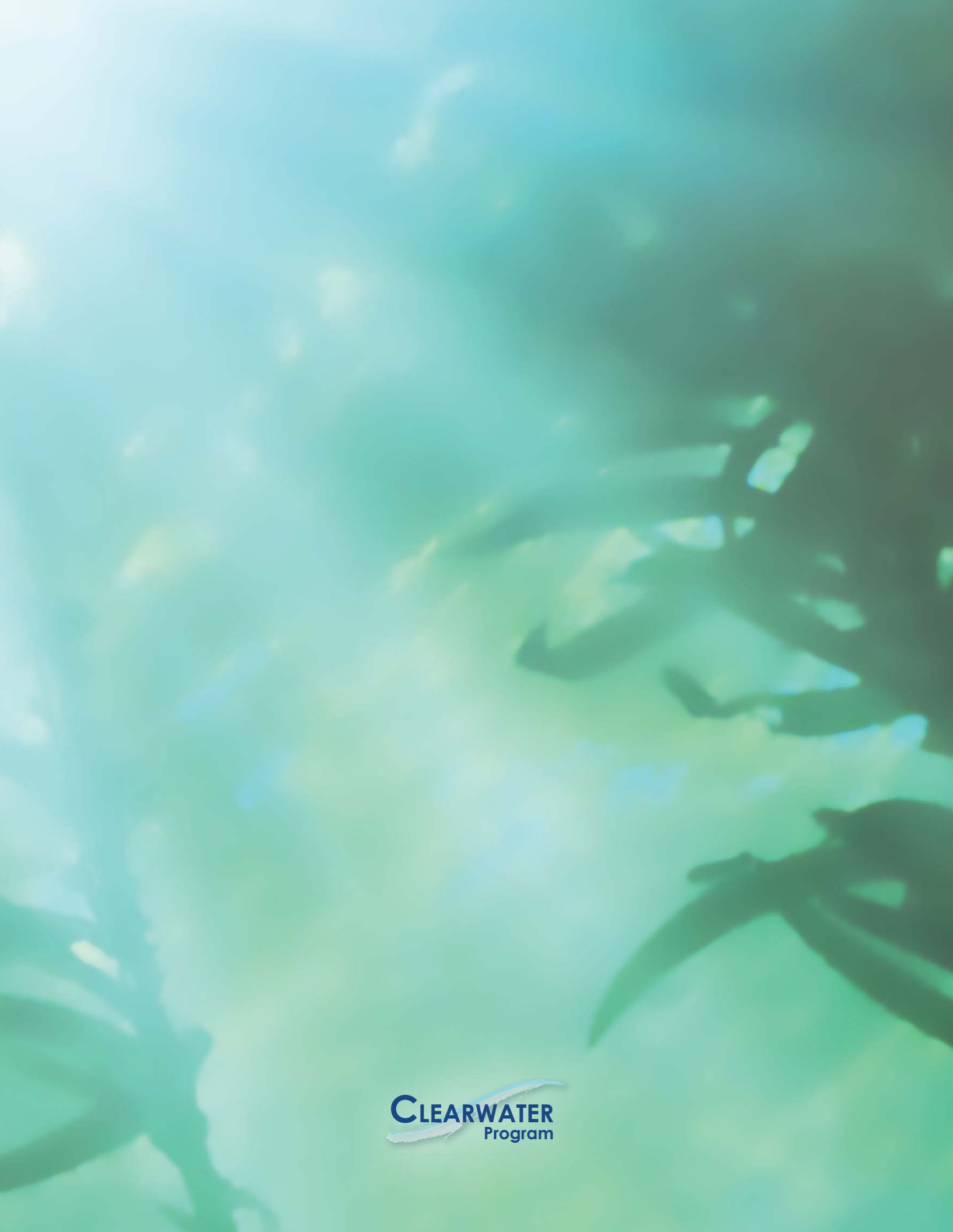
Was there anybody else who wishes to comment this evening?

Well, if not, there are forms for written comments available in different locations around the room, and as we've pointed out, the comment period for

the draft document will remain open until April the 10th, and you can contact these people that's on the back of the agenda either by e-mail or by letter. You can fill out the comment form and provide those, and it will all go into the public record.

The Final EIR/EIS should be completed by fall of this year, at which point a public hearing will be held to consider certification of the Final EIR by the Sanitation Districts Board of Directors, and the Army Corps of Engineers will issue a Record of Decision for the Final EIS. You will be notified when the final documents are available.

With that, I'd like to thank you very much for coming out this evening, and good night.



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