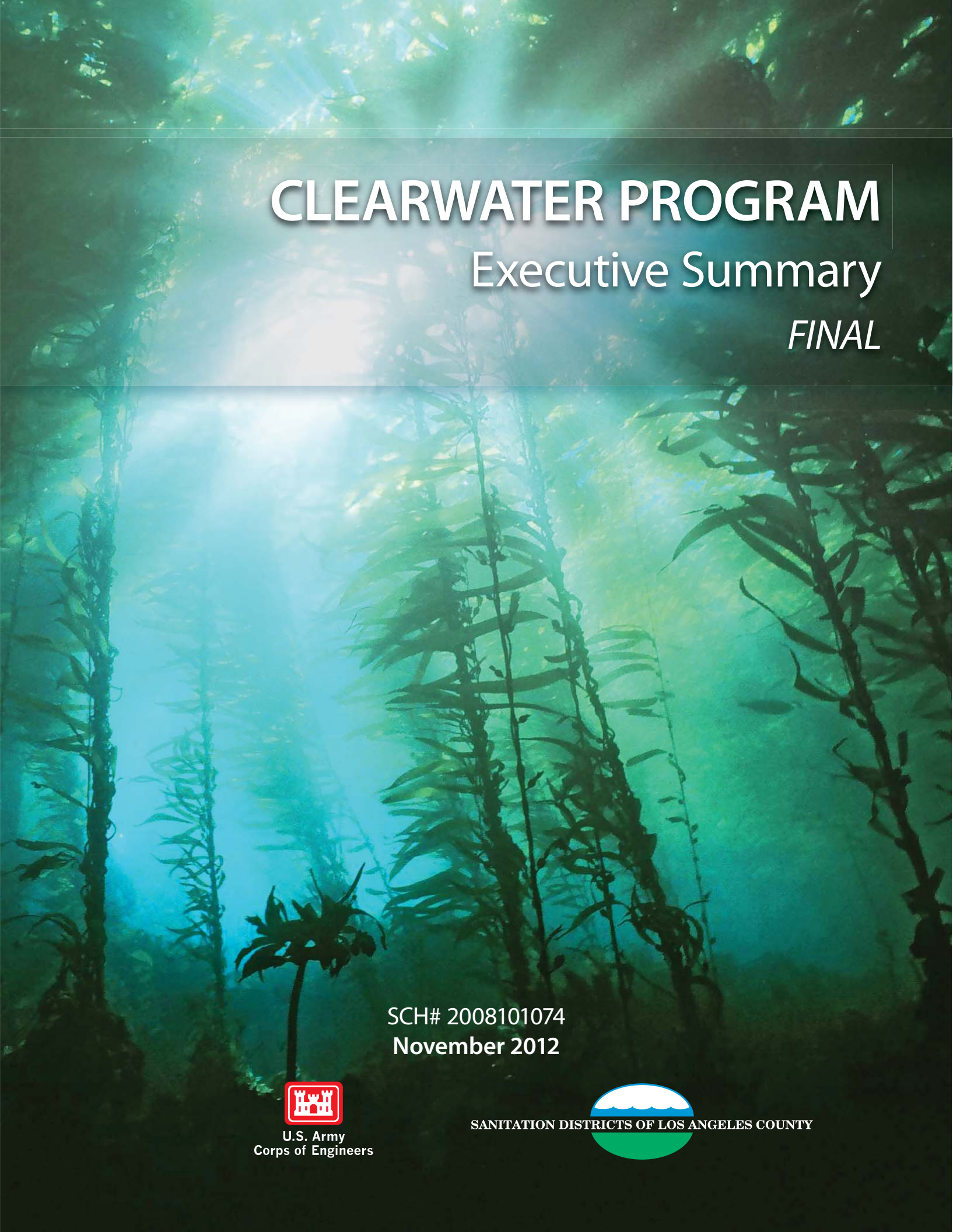

CLEARWATER PROGRAM

Executive Summary

FINAL

SCH# 2008101074

November 2012

U.S. Army
Corps of Engineers

SANITATION DISTRICTS OF LOS ANGELES COUNTY

CLEARWATER PROGRAM

Executive Summary

FINAL

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State Clearinghouse Number: 2008101074

November 2012

Also Available at:

www.ClearwaterProgram.org

CLEARWATER PROGRAM

Executive Summary

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CLEARWATER PROGRAM

Executive Summary

INTRODUCTION

The Clearwater Program is a comprehensive planning effort undertaken by the Sanitation Districts of Los Angeles County (Sanitation Districts). Under the Clearwater Program, a Master Facilities Plan (MFP) was developed for the Joint Outfall System (JOS), a regional wastewater management system serving nearly 5 million people in 73 cities and unincorporated areas of Los Angeles County. The Clearwater Program MFP includes an evaluation of infrastructure needs and will serve to guide the management and development of the JOS through the year 2050.

Certain elements of the Clearwater Program MFP would require federal permits from the U.S. Army Corps of Engineers (Corps). Consequently, the Sanitation Districts partnered with the Corps in preparing a joint environmental document – the Clearwater Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) – to evaluate the potential environmental impacts of the plan recommended in the MFP and its alternatives. The Sanitation Districts are the lead agency for the EIR under the California Environmental Quality Act (CEQA), and the Corps is the federal lead agency for the EIS under the National Environmental Policy Act (NEPA).

"The Clearwater Program facilities plan is unquestionably important. It is directly connected to maintaining the public health and safety of millions of people in Los Angeles County and to protecting the environment."

- Stephen R. Maguin

Chief Engineer and General Manager

In support of the Clearwater Program, the Sanitation Districts conducted over 500 public outreach meetings beginning in 2006.

Sanitation Districts' Mission Statement:

"To protect public health and the environment through innovative and cost-effective wastewater and solid waste management, and in doing so convert waste into resources such as recycled water, energy, and recycled materials."

In developing a plan that meets the future needs of the communities and businesses served by the JOS, the Sanitation Districts felt it was important to involve the public from the onset. Since 2006, the Sanitation Districts have held over 500 public outreach meetings with public officials; civic and community groups; businesses; environmental organizations; news media; and various local, state, and federal agencies. Their input provided valuable guidance during the alternatives analysis and environmental review processes.

A disc containing a digital copy of the Clearwater Program MFP and EIR/EIS is provided in the interior pocket on the back cover of this Executive Summary. In addition, all of the documents can be accessed at www.ClearwaterProgram.org.

BACKGROUND

SANITATION DISTRICTS OF LOS ANGELES COUNTY

After World War I, when Los Angeles County's population began expanding at a rapid rate, the need for a regional sewerage system was recognized. In 1923, the state legislature passed the County Sanitation District Act, allowing for the formation of the initial districts that same year.

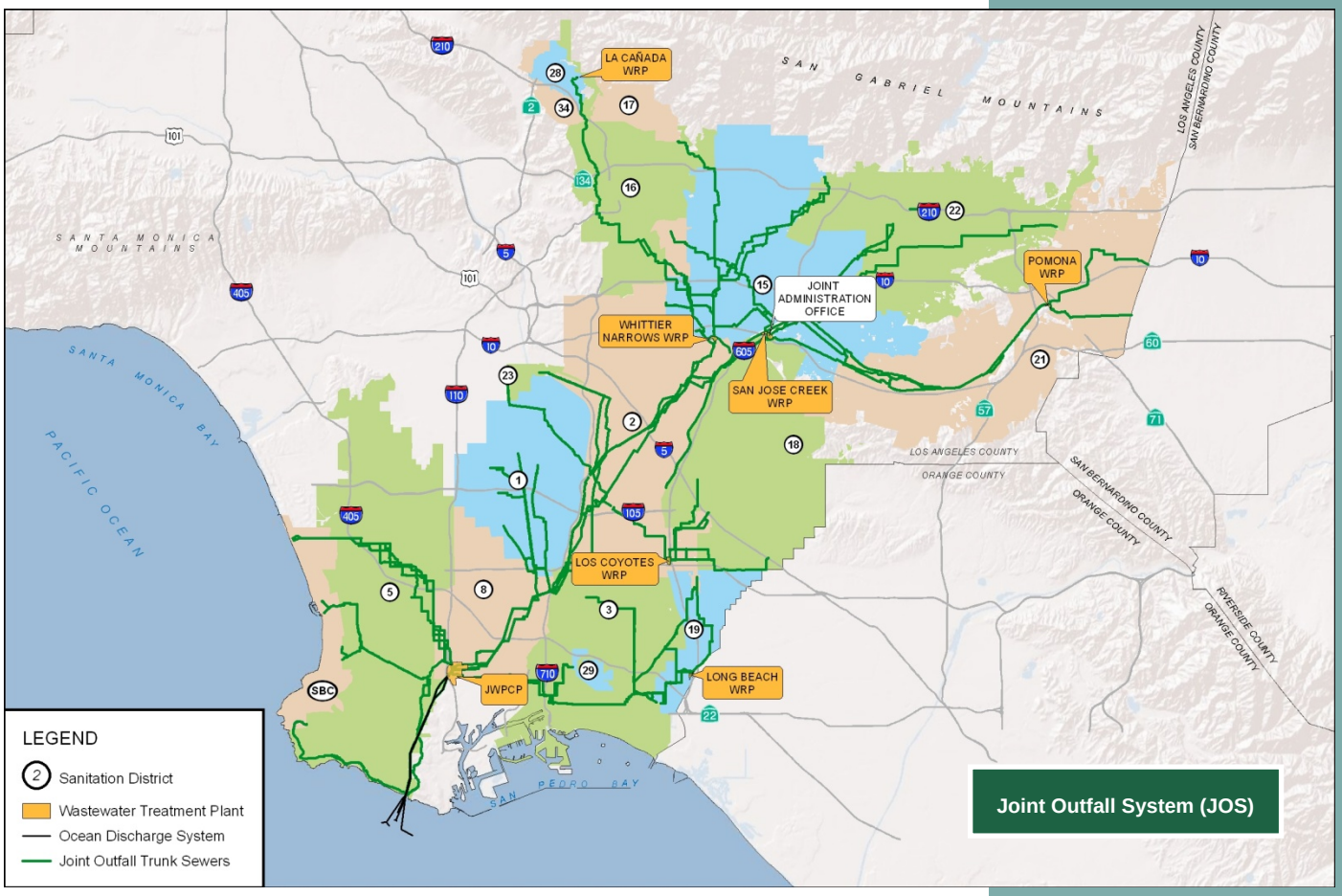
Today the Sanitation Districts consist of 23 independent special districts that operate under a Joint Administration Agreement, sharing staff headquartered near Whittier, CA, with the purpose of serving the wastewater and solid waste management needs of over 5.4 million people in Los Angeles County.

Each district is a separate political entity with its own revenues, expenses, and board of directors. The boards consist of the mayors of each of the cities and the chair of the Los Angeles County Board of Supervisors for the unincorporated areas within the district. District boundaries are generally established by watersheds to take advantage of gravity in transporting wastewater. Consequently, a city may lie in more than one district.

The Sanitation Districts' service area covers approximately 820 square miles, encompassing 78 cities and unincorporated county areas. The Sanitation Districts manage about half of the wastewater in Los Angeles County utilizing 1,400 miles of main trunk sewers and 11 wastewater treatment plants with a total permitted capacity of 650 million gallons per day (MGD). In 2010, the Sanitation Districts' ten water reclamation plants (WRPs) produced approximately 165 MGD of high-quality recycled water, of which 84 MGD was beneficially reused at 640 sites throughout Los Angeles County.

The Sanitation Districts also own and operate solid waste management facilities that meet about one-third of the countywide solid waste management needs. The Sanitation Districts operate three sanitary landfills, four landfill energy recovery facilities, two recycle centers, and three materials recovery/transfer facilities and participate in the operation of two refuse-to-energy facilities.

A foldout figure with tables containing additional information about the Sanitation Districts is included at the end of this document.



JOINT OUTFALL SYSTEM

The JOS is a regional, interconnected wastewater management system shared by 17 of the 23 Sanitation Districts under a partnership agreement, which provides for a combined investment to maintain and operate the conveyance system and the treatment facilities. The JOS serves approximately 4.8 million people in 73 cities and unincorporated county areas, and spans 660 square miles.

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

The wastewater from homes and businesses flows into local sewers, which are owned and operated by individual cities or the county. From the local sewers, the wastewater flows, mainly by gravity, through a 1,230-mile network of larger Sanitation Districts-owned trunk sewers to seven wastewater treatment plants with a combined permitted capacity of 593 MGD.

In the 1960s, the Sanitation Districts adopted a visionary plan to build a system of WRPs to efficiently provide wastewater treatment services while simultaneously effecting future water quality preservation and enhancement; this plan became the foundation of the modern JOS.

The Sanitation Districts own and operate one of the largest wastewater recycling systems in the world.

San Jose Creek WRP

Pomona WRP

Whittier Narrows WRP

Approximately one-third of the wastewater in the JOS system is treated at six WRPs, which produce high-quality recycled water that is beneficially reused (e.g., landscape irrigation and groundwater recharge) or discharged to rivers and streams. The remaining two-thirds, which includes saltier industrial wastewater that is expensive to reclaim, is treated at the Joint Water Pollution Control Plant (JWPCP) in Carson, CA. The solids removed at the WRPs during the treatment process are returned to the trunk sewers to be cost-effectively processed at the JWPCP.

After the wastewater undergoes full secondary treatment at the JWPCP, it meets all regulatory standards for ocean discharge. From the JWPCP, the treated water (effluent) is transported by two 6-mile-long tunnels under the Palos Verdes Peninsula to Royal Palms Beach, where an underground concrete manifold structure connects the tunnels to four ocean outfalls. The outfalls consist of seafloor pipelines that extend up to one-and-one-half miles offshore and reach a depth of 200 feet. The treated effluent exits the outfall pipes through a series of diffuser portholes.

Joint Outfall System Wastewater Treatment Plants

- **San Jose Creek Water Reclamation Plant**

  The San Jose Creek Water Reclamation Plant (SJCWRP) is located on a 51-acre site at 1965 Workman Mill Road near Whittier, CA. The SJCWRP started operation in 1971 and is the Sanitation Districts' largest WRP with a permitted treatment capacity of 100 MGD. In 2010, the plant provided tertiary-level treatment to an average daily flow of 77 MGD, and 42 MGD of the recycled water produced was reused at 84 individual sites, with the majority (37 MGD) used for groundwater recharge.

- **Pomona Water Reclamation Plant**

  The Pomona Water Reclamation Plant (POWRP) is located on a 14-acre site located at 295 Humane Way in Pomona, CA. The POWRP started operation in 1926 and currently has a permitted treatment capacity of 15 MGD. In 2010, the plant provided tertiary-level treatment to an average daily flow of 9 MGD, and 8 MGD of the recycled water produced was beneficially reused at 192 individual sites for irrigation, landscaping, and industrial applications. The remaining recycled water is discharged to San Jose Creek, either percolating into the groundwater or flowing to the ocean.

- **Whittier Narrows Water Reclamation Plant**

  The Whittier Narrows Water Reclamation Plant (WNWRP) is located on a 27-acre site, leased from the Corps, at 301 North Rosemead Boulevard near South El Monte, CA. Placed into operation in 1962, the WNWRP was the first reclamation plant built by the Sanitation Districts for the purpose of demonstrating the feasibility of large-scale water recycling. The plant has a permitted treatment capacity of 15 MGD. In 2010, the WNWRP provided tertiary-level treatment to an average daily flow of 7 MGD, and essentially all of the recycled water produced was reused for groundwater recharge and irrigation at three individual reuse sites.

Los Coyotes Water Reclamation Plant

The Los Coyotes Water Reclamation Plant (LCWRP) is located on a 34-acre site at 16515 Piuma Avenue in Cerritos, CA. The treatment facilities occupy 14 acres on the southwest corner of the site. The remaining 20 acres are leased to the city of Cerritos for use at the Iron-Wood Nine Golf Course. The LCWRP started operation in 1970 and currently has a permitted treatment capacity of 37.5 MGD. In 2010, the plant provided tertiary-level treatment to an average daily flow of 27 MGD, and 5 MGD of the recycled water produced was beneficially reused at 273 individual sites. The remaining recycled water is discharged into the San Gabriel River, which flows directly to the Pacific Ocean.

Los Coyotes WRP

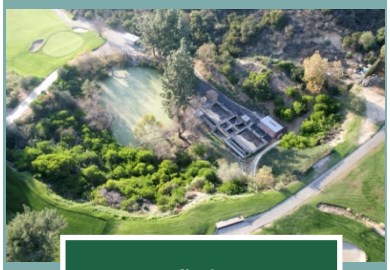
Long Beach Water Reclamation Plant

The Long Beach Water Reclamation Plant (LBWRP) is located on a 17-acre site at 7400 East Willow Street in Long Beach, CA. The LBWRP started operation in 1973 and currently has a permitted treatment capacity of 25 MGD. In 2010, the plant provided tertiary-level treatment to an average daily flow of 18 MGD, and 6 MGD of the recycled water produced was beneficially reused at 56 individual sites. Approximately 2 MGD was sent to the Leo J. Vander Lans Advanced Water Treatment Facility, owned by the Water Replenishment District of Southern California, for further treatment and ultimately used to protect the Central Groundwater Basin from seawater intrusion.

Long Beach WRP

La Cañada Water Reclamation Plant

The La Cañada Water Reclamation Plant (LACAWRP) is located on a 0.3-acre site within the grounds of the La Cañada Flintridge Country Club golf course at 533 Meadow View Drive in La Cañada Flintridge, CA. The LACAWRP started operation in 1962 and currently has a permitted treatment capacity of 0.2 MGD. In 2010, the plant provided extended aeration treatment to an average daily flow of nearly 0.1 MGD, and all of the recycled water produced flows into irrigation system impoundments on the 105-acre golf course.

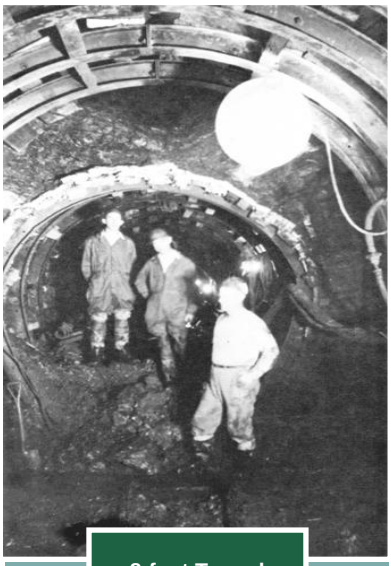


La Cañada WRP

Joint Water Pollution Control Plant

The JWPCP is located on a 420-acre site at 24501 South Figueroa Street in Carson, CA. Approximately 200 acres of the site are used as a buffer area between the operational process areas and the surrounding residential areas. The JWPCP, first operating in 1928, is now the largest facility in the JOS with a permitted treatment capacity of 400 MGD. It is located hydraulically downstream of the WRPs and receives all JOS flows not treated by the WRPs. The wastewater undergoes full secondary treatment and is then safely discharged to the ocean. In 2010, the JWPCP discharged an average daily flow of approximately 280 MGD to the ocean. The JWPCP is the only JOS treatment plant that provides solids processing and energy recovery. The resulting product, called *biosolids*, can be beneficially used, typically as a composted soil amendment.

Joint Water Pollution Control Plant



8-foot Tunnel (1937)

12-foot Tunnel (1958)

Ocean Discharge System

The ocean discharge system is designed to safely convey and discharge treated effluent from the JWPCP into deep ocean waters. It consists of two onshore tunnels, a manifold structure, and four ocean outfalls as described below.

Onshore Tunnels

Two 6-mile-long tunnels convey effluent from the JWPCP to a manifold structure located at Royal Palms Beach, near White Point on the Palos Verdes Peninsula. The first tunnel was completed in 1937 and is 8 feet in diameter. The second tunnel was completed in 1958 and is 12 feet in diameter. Because both tunnels are always in service and flow full every day, neither has been inspected nor repaired for over 50 years.

Manifold Structure

The manifold structure is an underground reinforced concrete vault, located on Sanitation Districts' property at Royal Palms Beach, where the effluent transitions from two tunnels to four ocean outfalls. A system of valves controls which of the four outfalls are active at any given time.

Ocean Outfalls

The four ocean outfalls extend up to one-and-one-half miles offshore from the manifold structure and reach a depth of approximately 200 feet. At about 1,400 feet offshore, the ocean outfalls transition from being underground pipelines to pipelines that sit on the seafloor. The first outfall was constructed in 1937. As wastewater flows increased, three additional outfalls were built between 1947 and 1966.

Ocean Outfall	Year Completed
60-inch diameter	1937
72-inch diameter	1947
90-inch diameter	1957
120-inch diameter	1966

Ocean Outfalls

CLEARWATER PROGRAM GOALS

OBJECTIVES

The Clearwater Program has the following objectives:

- *Provide adequate system capacity to meet the needs of the growing population.*
- *Provide for overall system reliability by allowing for the inspection, maintenance, repair, and replacement of aging infrastructure.*
- *Provide support for emerging recycled water reuse and biosolids beneficial use opportunities.*
- *Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies.*

System Capacity

JOS wastewater flow projections are evaluated in the MFP. The Southern California Association of Governments (SCAG) provided the Sanitation Districts with population forecasts through the year 2050, which served as the basis for the flow projections. SCAG's population forecasts indicate the JOS service area population will increase to approximately 6.3 million by 2050. A geographic information system (GIS) model was used to derive flow projections from the population data. The population increase would result in an average wastewater flow of about 612 MGD in the year 2050. Based on these projections, the JOS system would experience a treatment capacity shortfall of approximately 20 MGD by 2050.

Aging Infrastructure

The Sanitation Districts' philosophy is to design, construct, and maintain reliable systems that have sufficient capacity and redundancy to provide the highest level of public safety and environmental protection. These systems are maintained with routine inspection, repair, and/or replacement as required. However, one critical component of the JOS, the onshore tunnels for the existing ocean discharge system, has not been inspected for over 50 years. Both tunnels cross the active Palos Verdes Fault, which is an additional area of concern. While the Sanitation Districts have no reason to believe serious problems exist with the tunnels, it is imperative that they be properly inspected. Addressing aging infrastructure is an important objective of the Clearwater Program.

The overall goal of the Clearwater Program is to identify a plan that is protective of public health and best meets the needs of the JOS through the year 2050 in a cost-effective and environmentally sound manner.

Emerging Reuse/Use Opportunities

Over 50 percent of recycled water produced by the six WRPs is reused at various sites throughout the local region, reducing the demand on potable freshwater sources, which in turn minimizes the need to import water. In addition, during the treatment process at the JWPCP, solids are digested, producing a biogas that is converted to electricity or used for process heating. As a result, the JWPCP is electrically self-sufficient, and excess electricity is supplied to the power grid. The Sanitation Districts also participate in a wide range of biosolids management programs that promote beneficial use of this wastewater byproduct. Biosolids are beneficially used as a soil amendment for agriculture, in the production of high quality compost, in conversion to renewable fuels, and to help reduce emissions from cement kilns. Environmental benefits associated with these biosolids management programs include a reduction in the consumption of energy and raw materials that would otherwise be required in the production of new materials. The Sanitation Districts are committed to continue supporting emerging recycled water reuse and biosolids beneficial use opportunities.

Water Quality Requirements

The Sanitation Districts maintain a strong record of compliance with water quality regulations and permit requirements. They have also assisted in the drafting and/or review of future requirements. The Sanitation Districts strive to continue providing long-term engineering solutions that meet the constantly evolving and increasingly stringent water quality requirements in a cost-effective and environmentally sound manner.

PURPOSE AND NEEDS

One of the most important outcomes of the Clearwater Program planning process was identifying the need for a new or modified ocean discharge system.

Currently, the Sanitation Districts rely on two onshore tunnels and four offshore ocean outfall structures to convey effluent from the JWPCP, in the city of Carson, to the Pacific Ocean. The two tunnels were constructed in 1937 and 1958 and have not been inspected for over 50 years. Inspection of the tunnels is not possible due to their overall length, limited access, interconnections between the tunnels, and continuous flow through the tunnels. Furthermore, in January 1995, the JOS service area was inundated by two major back-to-back storm events. The resulting peak wastewater flows in the sewerage system from these storm events nearly exceeded the capacity of the JWPCP ocean discharge system. If the tunnels were to be damaged or the capacity of the ocean discharge system exceeded, treated JWPCP effluent would need to be bypassed into the Wilmington Drain, a stormwater channel that flows through Harbor Regional Park. If sufficient capacity were not available in the Wilmington Drain, the sewers tributary to the JWPCP could overflow and untreated wastewater could enter various water courses, such as the Dominguez Channel and the Los Angeles River. The project purpose and needs are to inspect and upgrade the aging ocean discharge system, to provide sufficient capacity in the JOS to accommodate the estimated 2050 peak wastewater flows, and to comply with all applicable water quality standards, including regulations prohibiting sewer overflows. To meet these needs, the Clearwater Program evaluates both modifying the existing ocean discharge system and constructing a new ocean discharge system.

PLANNING PROCESS

The Clearwater Program MFP and the associated EIR/EIS provide both program-wide and project-specific alternatives analyses.

The term *program* is used in reference to options or alternatives that would be implemented over a long period of time and currently do not have a high level of detail. The planning horizon for the MFP is the year 2050. Because of long-term uncertainties, it would be too speculative to consider specific projects that may not be required for decades to come. Furthermore, the JOS is hydraulically interconnected, and changes to one component of the system could have ramifications on the rest of the system. Therefore, due to the uncertainties associated with a long-term planning horizon and the complex interrelationship between the elements of the JOS, the MFP and associated EIR/EIS include a comprehensive, program-wide alternatives analysis that evaluates the entire system.

The term *project* is used to describe a specific component of the comprehensive program. A project would be implemented in the near term; therefore, a greater level of detail is available for analysis in the MFP and the associated EIR/EIS.

The term *recommended plan* is used to describe a combination of the top-ranked program-wide alternative and the top-ranked project-specific alternative.

The Clearwater Program planning process involved the evaluation and screening of program-wide and project-specific alternatives, and combining the top-ranked of each to arrive at a recommended plan.

PROGRAM-WIDE ALTERNATIVES ANALYSIS AND RECOMMENDATIONS

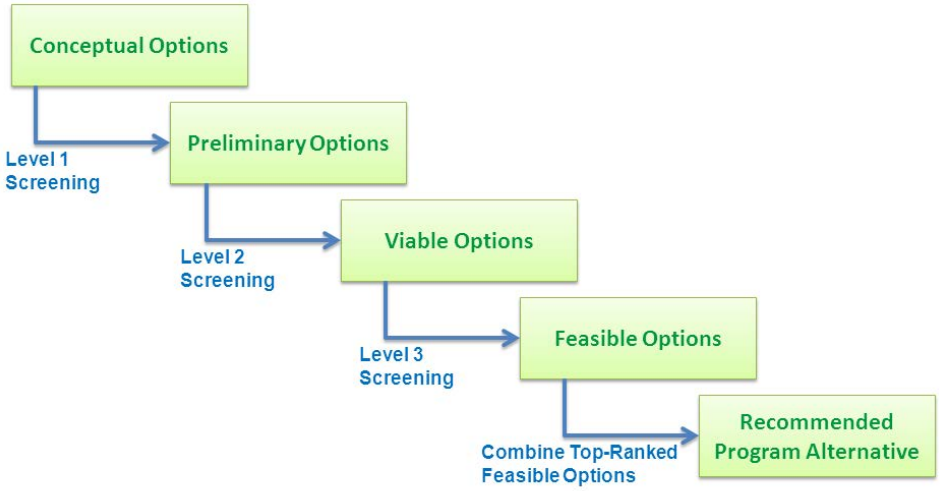
JOINT OUTFALL SYSTEM COMPONENT AREAS

For the purposes of developing and evaluating program-wide alternatives, the JOS was divided into the following five component areas based on primary functionality:

- Wastewater Conveyance and Treatment
- WRP Effluent Management
- Solids Processing
- Biosolids Management
- JWPCP Effluent Management

For each component area, *conceptual options* were developed and screened to determine if they would meet the long-term needs of that portion of the JOS infrastructure.

For each of the five component areas, a multi-step screening process was used to select a recommended program alternative.



PROGRAM-WIDE SCREENING PROCESS

The same multi-step screening process was used to evaluate each of the five component areas.

Level 1 Screening: Conceptual Options

The conceptual options represent a reasonable range of options available to the Sanitation Districts for providing comprehensive wastewater management services within each of the five component areas. The criteria used to screen the conceptual options were derived from the goals and objectives of the Clearwater Program.

Each conceptual option was evaluated based on several screening criteria, such as environmental impacts, cost, and the ability to accommodate future wastewater flows and emerging water recycling opportunities. The highest ranked conceptual options were carried forward to the second level of screening.

Level 2 Screening: Preliminary Options

The options that emerged from the Level 1 screening process were called *preliminary options*. The Level 2 screening process applied more rigorous criteria than Level 1. The preliminary options were qualitatively scored with respect to meeting each of the Level 2 screening criteria.

Level 3 Screening: Viable Options

The options that emerged from the Level 2 screening process were considered to be *viable options*. The Level 3 screening process included an evaluation of the viable options using a multi-criteria decision support software tool that provided the flexibility to investigate a wide range of evaluation approaches and allowed for a sensitivity analysis of outcomes. Each screening criterion was weighted and defined to allow for quantitative scoring.

Feasible Options

The highest scoring options to emerge from the Level 3 screening process were deemed *feasible options*. The top-ranked feasible options from each of the five component areas were combined, resulting in the recommended program alternative.

PROGRAM-WIDE RECOMMENDATIONS

Wastewater Conveyance and Treatment

- **San Jose Creek Water Reclamation Plant – Expansion and Process Optimization**

  Approximately 20 MGD of additional treatment plant capacity is required for the JOS by the 2050 planning horizon. The SJCWRP is the most suitable location for a treatment plant expansion. Therefore, it is recommended that the SJCWRP be expanded from its current permitted capacity of 100 MGD to 125 MGD.

  The current SJCWRP property is large enough to accommodate the recommended expansion (shown in yellow). Consequently, construction of the facilities would not require acquisition of additional land. Based on wastewater flow projections, the SJCWRP expansion would likely be implemented between 2040 and 2050.

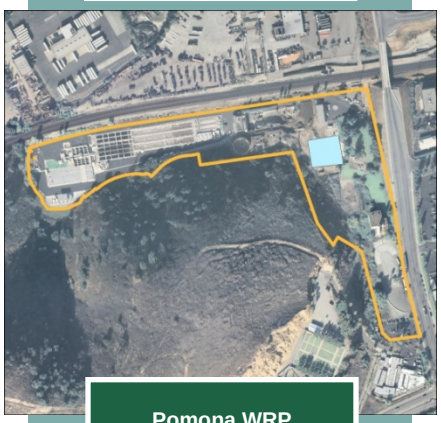
  In addition to a 25-MGD expansion, the SJCWRP would be upgraded to include flow equalization of the primary effluent (shown in blue). The recommended flow equalization volume for the SJCWRP is approximately 31 million gallons (MG), which is 25 percent of the plant's expanded daily permitted flow.

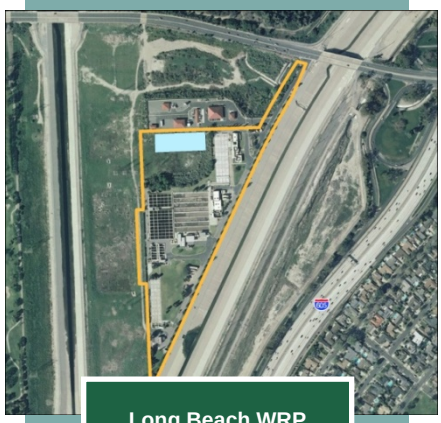
  The current SJCWRP property is large enough to accommodate the process optimization facilities, so additional land would not be required. Process optimization would likely be implemented between 2018 and 2028, depending on future flows, recycled water demands, regulatory requirements, and funding considerations.

- **Pomona, Los Coyotes, and Long Beach Water Reclamation Plants – Process Optimization**

  The POWRP, LCWRP, and LBWRP would be upgraded to include flow equalization of the primary effluent (shown in blue). The recommended flow equalization volume for the POWRP is 3 MG (approximately 20 percent of the plant's daily permitted flow). The recommended flow equalization volume for the LCWRP is 7.5 MG (approximately 20 percent of the plant's daily permitted flow). The recommended flow equalization volume for the LBWRP is 5 MG (approximately 20 percent of the plant's daily permitted flow).

  The current POWRP, LCWRP, and LBWRP properties are large enough to accommodate the process optimization facilities, so additional land would not be required. Flow equalization facilities at the LCWRP could be built under the existing driving range for the Iron-Wood Nine Golf Course and thus not impact its long-term use. Process optimization would be implemented in the future depending on future flows, recycled water demands, regulatory requirements, and funding considerations.





Sewer Construction

- **Conveyance System – Relief**

  Based on the projected wastewater flows for the year 2050 and a 25-MGD expansion at the SJCWRP, approximately 33 miles of Joint Outfall (JO) trunk sewers would require some type of relief (addition of parallel pipes for increased capacity). The Sanitation Districts would continue to closely monitor the JOS conveyance system throughout the planning period to determine actual relief needs. The future conveyance system improvement projects would be implemented on an as-needed basis.

Solids Processing

One byproduct of wastewater treatment and purification is residual solids, often referred to as *sludge*. It is recommended that solids processing continue to be centralized at the JWPCP using existing systems.

Additional sludge stabilization capacity consisting of six new anaerobic digesters would be required at the JWPCP by 2050 (shown in blue). The current JWPCP property is large enough to accommodate the additional digesters so additional land would not be required. The timing for digester construction is dependent on future trending of sludge production at the JWPCP.

Joint Water Pollution Control Plant

The JWPCP currently produces enough electricity from the biogas produced in the anaerobic digesters to be self-sufficient. Additional gas resulting from an increased number of digesters would be managed by the existing steam boilers and gas turbines. The turbines are currently supplemented with natural gas. As digester gas increases, it would be used in lieu of natural gas.

The capacity of the existing sludge dewatering system is anticipated to be sufficient to meet the projected quantities through 2050. Therefore, no additional sludge dewatering facilities would be required throughout the planning period. During this time, the Sanitation Districts would continue the current program of replacing aging centrifuges as needed.

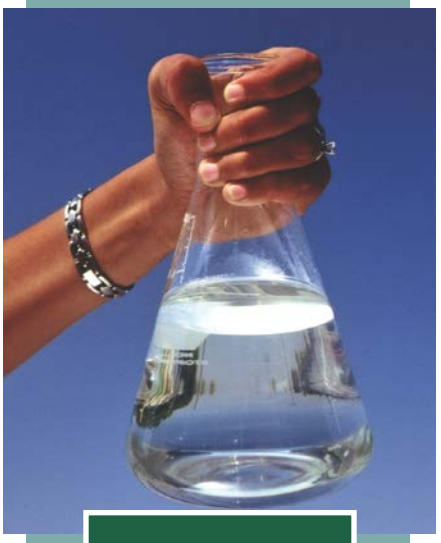
Biosolids Management

Once stabilized and dewatered, the residual solids are converted into a material called *biosolids* that can be beneficially used. It is projected that the JOS biosolids generation rate will increase nearly 30 percent during the planning period. The continuation of the current biosolids management practices is recommended. The Sanitation Districts have a robust and diverse system in place that can handle the projected increase. The Sanitation Districts currently co-dispose biosolids in landfills, but this option will be lost with the scheduled closure of the Puente Hills Landfill (Whittier, CA) in 2013. However, the Westlake Farms Composting Facility (Kings County) should begin operations by the same year, and can be expanded in phases if and when future needs arise. Therefore, it is anticipated that there is no additional physical infrastructure required to accommodate future biosolids management. The Sanitation Districts will continue to explore options that provide for additional biosolids management diversity and further optimize the beneficial use of this material.

Agricultural Use of Composted Biosolids

WRP Effluent Management

The continuation of current practices for WRP effluent management is recommended. The existing effluent management system effectively allows the Sanitation Districts to meet current reuse demands and discharge any excess recycled water to surface waterways. While the amount of reuse is likely to increase in the future, surface water discharge capabilities would be retained. The Sanitation Districts will continue to work cooperatively with water supply agencies to help them expand reuse. In addition, flow equalization at the SJCWRP, POWRP, LCWRP, and LBWRP may facilitate increased reuse by making more recycled water available during periods of the day when demands are greatest.



Recycled Water

JWPCP Effluent Management

The program-wide alternatives analysis process demonstrated an immediate need to address JWPCP effluent management at a project-specific level. Two possible approaches were identified:

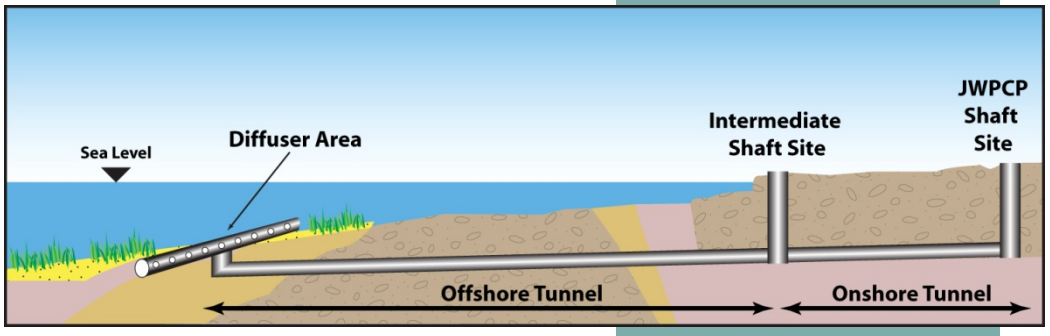
- New Ocean Discharge System: Construction of a new tunnel and ocean outfall between the JWPCP and a new discharge location. The new ocean discharge system would be hydraulically independent of the existing system.
- Modified Ocean Discharge System: Construction of a new tunnel between the JWPCP and the existing ocean outfalls. The new tunnel could be hydraulically separated from the existing tunnels and would rely on the existing outfalls for ocean discharge. This option is viable because recent inspections and physical testing determined that the outfalls have the structural integrity to last well beyond 2050.

PROJECT-SPECIFIC ALTERNATIVES ANALYSIS AND RECOMMENDATIONS

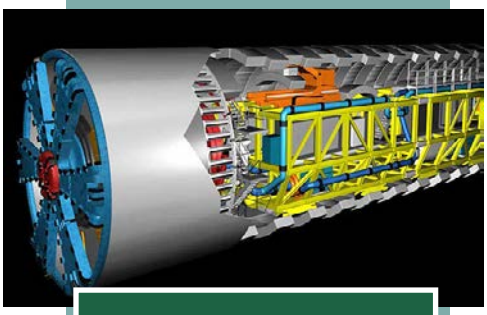
OCEAN DISCHARGE SYSTEM PROJECT ELEMENTS

For the purposes of developing and evaluating project-specific alternatives, the ocean discharge system project was divided into the following five elements based on primary functionality:

- JWPCP Shaft Site
- Onshore Tunnel Alignment
- Intermediate Shaft Site
- Offshore Alignment
- Diffuser Area



Working Shaft Site



Tunnel Boring Machine (TBM)

JWPCP Shaft Site

For all alternatives, the project would originate at the JWPCP, where a working shaft would be constructed to facilitate construction of an onshore tunnel that would convey effluent for ocean discharge. The JWPCP shaft site would require sufficient access and area to permit the insertion of a tunnel boring machine (TBM), ancillary equipment, tunnel segments, and personnel, as well as the continuous removal of materials excavated during the tunneling process.

Tunneling would take place over a period of years during which time the JWPCP shaft site would be an active construction site. Ultimately, the shaft would function to connect existing plant facilities with the new onshore tunnel.

Onshore Tunnel Alignment

The onshore tunnel alignment would begin at the JWPCP and end near the coast. The onshore alignment would be approximately 6 to 7 miles in length, ranging in depth from approximately 70 to 450 feet below ground level. Due to the highly urbanized setting and the required depths of excavation, open-cut trenching for the onshore alignment was deemed infeasible. Therefore, the onshore alignment would be constructed as an 18-foot internal diameter tunnel using a TBM. This approach would avoid the complications of open-cut trenching, including traffic and business disruptions as well as impacts on existing utilities and other underground facilities.

Intermediate Shaft Site

An intermediate shaft site would be developed as a working, access, or exit shaft depending on available area, access, and project requirements.

- Working Shaft: A working shaft site would be used for approximately 4 to 8 years as the aboveground staging area for the tunneling construction and support system activities. The working shaft would serve as the entry point for construction workers and as the exit point for all excavated material.

- Access Shaft: An access shaft site would be used primarily for supplemental ventilation during tunnel construction. It would also be available as an entry and exit point for construction workers, TBM maintenance, and removal of salvageable portions of the TBM at the project's conclusion. The access shaft site would have a land requirement of approximately 0.5 to 3 acres.

- Exit Shaft: An exit shaft site would be used for the removal of the TBM. The exit shaft would have a land requirement of approximately 1 to 4 acres.

Offshore Alignment

The offshore alignment would connect to the onshore tunnel alignment at an intermediate shaft site and extend into the ocean where it would connect to the diffuser. The alignment could consist of a tunnel or a combination of a tunnel and a seafloor pipeline.

Diffuser Area

The diffuser area is where treated effluent would be discharged to the ocean. The length of the diffuser would be approximately 8,000 feet (two 4,000-foot legs). A fundamental requirement for the proposed diffuser is that it should perform as well as the existing diffusers. To meet this requirement, key parameters such as distance from shore, discharge depth, and slope of seafloor were established. In addition, the diffuser area must be geotechnically stable.

PROJECT-SPECIFIC SCREENING PROCESS

The approach used in the MFP to evaluate the ocean discharge system project is similar to the multi-step screening process undertaken for the program-wide assessment of the JOS.

Level 1: Conceptual Study Area

The initial step in the alternatives analysis for the project was to develop a study area representing the conceptual boundary within which elements of a new or modified ocean discharge system could be sited. Four criteria were used to establish the 90-square-mile study area:

- Minimize interferences with discharges from other nearby ocean outfalls, namely the city of Los Angeles' Hyperion outfalls to the north and Orange County Sanitation District's outfalls to the south.
- Stay within the edge of the continental shelf – either the San Pedro Shelf (SP Shelf) or Palos Verdes Shelf (PV Shelf).
- Use a direct route as practicable between the JWPCP and the end of the ocean outfalls (diffuser areas).
- Avoid state Marine Protected Areas (MPAs).

The Sanitation Districts and the Corps conducted over 500 public outreach and agency scoping meetings to solicit valuable input early on in the planning process, well before any decisions were made regarding the alternatives analysis.

Level 2: Preliminary Options

Preliminary project options were developed by applying a set of screening criteria unique to each element. For example, the following criteria were used for the onshore tunnel alignment:

- Use existing easements or public rights-of-way to the maximum extent practicable.
- Allow a sufficient turning radius for the TBM (approximately 800 to 1,000 feet).
- Minimize the overall length of the alignment.

On this basis, 22 preliminary options for the onshore tunnel alignment were identified. Similarly, 2 preliminary options were identified for the JWPCP shaft site, 11 for intermediate shaft sites, and 4 for the diffuser area. Because the offshore alignment is dependent on the locations of the intermediate shaft site and the diffuser area, preliminary options for the offshore alignment were established after the viable options for the intermediate shaft sites and diffuser area were determined.

Level 3: Viable Options and Alternatives

Viable project options were developed by applying a set of screening criteria, unique to each element, to the preliminary options. For example, the following criteria were used for the onshore tunnel alignment:

- Minimize exposure when crossing major geotechnical faults.
- Ensure compatibility (e.g., proximity) with intermediate shaft site locations.
- Reduce the number of easements required.
- For alignments that partially overlap, favor those with shorter overall lengths.

On this basis, the 22 preliminary options for an onshore tunnel alignment were reduced to 8 viable options. Similarly, 2 viable options were identified for the JWPCP shaft site, 3 for intermediate shaft sites, and 3 for the diffuser area. With viable options established for the intermediate shaft site and diffuser area, 12 preliminary options for the offshore alignment, including tunnels and seafloor pipelines, were identified. Applying Level 3 screening criteria, these preliminary options were reduced to 3 viable options for the offshore tunnel alignment.

These viable options for each project element were logically combined into 10 comprehensive viable alternatives for a new or modified ocean discharge system.

Level 4: Feasible Alternatives

The final step in the MFP project-specific alternatives analysis was the rigorous evaluation of the viable alternatives and determination of ranked feasible alternatives to carry forward for detailed environmental analysis in the associated EIR/EIS. A multi-criteria decision support software tool was utilized to facilitate the overall assessment effort. Screening criteria included:

- Environmental Impacts
- Public Input
- Operational Considerations
- Constructability
- Long-Term Uncertainty
- Cost Effectiveness

On the basis of the analysis performed, four viable alternatives were determined to be feasible (shown on the next page). Each would require rehabilitation of the existing ocean outfalls. The feasible project-specific alternatives for a new or modified ocean discharge system, ranked from highest to lowest, are:

- **Alternative 4:** Begin at the JWPCP West shaft site (working shaft); then beneath Figueroa Street, Harbor Regional Park, North Gaffey Street, Capitol Drive, and Western Avenue (through Dodson Avenue); to the Royal Palms shaft site (exit shaft) for a total tunnel length of 6.9 miles; and interconnect to the existing ocean outfalls at the manifold structure. Construction would take approximately 6.5 years at an estimated cost of $550 million.

- **Alternative 1:** Begin at the JWPCP East shaft site (working shaft); then beneath Wilmington Boulevard to the Port of Los Angeles (access shaft at the Trans Pacific Container Service Corporation [TraPac] site and working and/or exit shaft at the former Los Angeles Export Terminal [LAXT] site); through the Southwest Marine shaft site (access shaft); and to the SP Shelf diffuser area approximately 12.4 miles offshore (from TraPac) at a depth of 200 feet for a total tunnel length of 14.4 miles. Construction would take approximately 8 years at an estimated cost of $1,360 million.

- **Alternative 3:** Begin at the JWPCP West shaft site (working shaft); then beneath Figueroa Street and South Gaffey Street to the Angels Gate shaft site (access shaft); and to the PV Shelf diffuser area approximately 2.2 miles offshore (from Angels Gate) at a depth of 175 feet for a total tunnel length of 8.6 miles. Construction would take approximately 6.5 years at an estimated cost of $910 million.

- **Alternative 2:** Begin at the JWPCP East shaft site (working shaft); then beneath Wilmington Boulevard to the Port of Los Angeles (access shaft at TraPac; construction shaft at LAXT); through the Southwest Marine shaft site (access shaft); and to the PV Shelf riser/diffuser area approximately 7.2 miles offshore (from TraPac) at a depth of 175 feet for a total tunnel length of 9.2 miles. Construction would take approximately 6.5 years at an estimated cost of $980 million.

Alternative 4 achieves all of the project goals and objectives at the lowest cost, with the fewest environmental impacts, and least amount of construction risk.


REDONDO BEACH
TORRANCE
Lomita Blvd
CARSON
Sepulveda Blvd
JWPCP
JWPCP East
JWPCP West
LOMITA
WILMINGTON
Anaheim St
ROLLING HILLS ESTATES
Western Ave
LOS ANGELES
Wilmington Blvd
Harry Bridges Blvd
TraPac
RANCHO PALOS VERDES
ROLLING HILLS
Alternative 4
Port of Los Angeles
LAXT
Gaffey St
Pacific Ave
SAN PEDRO
Southwest Marine
Royal Palms
Angels Gate
Alternative 3
Alternative 2
Alternative 1
PACIFIC OCEAN
JWPCP West
JWPCP East
TraPac
Royal Palms
LAXT
Angels Gate
Southwest Marine
LEGEND
Shaft Sites
Alternatives (Project)
Existing Ocean Discharge System
Joint Water Pollution Control Plant
Feasible Project Alternatives
N
0
1
2
Miles

PROJECT-SPECIFIC RECOMMENDATIONS

Alternative 4, which would modify the existing ocean discharge system, was the highest-ranked feasible alternative and thus is the recommended project. The new onshore tunnel, when connected to the existing ocean outfalls, would have a maximum hydraulic capacity of approximately 1,080 MGD, which could accommodate the peak wastewater flows of 927 MGD projected for the year 2050. Therefore, upon completion of the recommended project, the two existing effluent tunnels could be dewatered, inspected, and repaired and/or rehabilitated as necessary.

Project Elements

Project elements include a working shaft site at the JWPCP, an onshore tunnel between the JWPCP and the existing ocean outfall manifold structure at Royal Palms Beach near White Point, an exit shaft site at Royal Palms Beach, and the rehabilitation of the existing ocean outfalls.

- **JWPCP West Shaft Site**

  The JWPCP West shaft site (shown outlined in red) would be located mostly within the JWPCP property boundary on approximately 18 acres to the south and 1 acre to the north of Lomita Boulevard near Figueroa Street and adjacent to the Harbor Freeway in the cities of Los Angeles and Carson. The JWPCP West shaft site would function as a working shaft site and would be used throughout the duration of the project for site preparation, mobilization, shaft construction, staging and support for tunnel construction, and connecting to the existing JWPCP effluent force main. The shaft would serve as the entry/exit point for construction workers, tunnel materials (e.g., liner segments), and equipment as well as the exit point for all excavated material. Where needed, an approximately 20-foot-tall noise barrier would be erected between the major sources of noise at the shaft site and nearby sensitive receptors. It is anticipated that the shaft itself would be constructed in the northern half of the 18-acre portion of the site. Access to the shaft site would likely occur from Figueroa Street via Lomita Boulevard, Pacific Coast Highway, or Sepulveda Boulevard.

JWPCP West Shaft Site

  The shaft depth would be approximately 140 feet below ground surface, and the shaft diameter would be about 40 to 60 feet. Shaft construction would take about 10 to 12 months. During construction of the shaft, an average of 30 trucks per day (about 65 trucks per day maximum) would be required for delivery of supplies and removal of excavated material. During tunneling, an average of 57 trucks per day (about 111 trucks per day maximum) would be required to remove excavated material. Upon completion of the tunneling activities, the shaft would be converted into a drop structure and connected to the existing JWPCP effluent force main, located within the 1-acre portion of the site. This connection would likely either be tunneled or jacked under Lomita Boulevard. Approximately 0.5 acre would be required at the shaft site for permanent aboveground facilities, which would include a ground-level concrete lid over the shaft, a surge tower, vent pipes, access lids, and possibly a pumping plant.

Recommended Alignment

Onshore Tunnel Alignment

The recommended tunnel alignment (shown in green) would begin at the JWPCP West shaft site, continue approximately 2,600 feet south under Figueroa Street, 6,000 feet southwest under Harbor Regional Park, 8,000 feet south under North Gaffey Street, 5,300 feet southwest under Capitol Drive, 5,200 feet south under Western Avenue, 4,000 feet south under South Dodson Avenue, and 5,500 feet southwest under Western Avenue to the Royal Palms shaft site for a total distance of approximately 36,600 feet, or 6.9 miles. The tunnel would terminate adjacent to the existing ocean outfall manifold structure at Royal Palms Beach.

The tunnel would be constructed with a TBM, which would be placed underground at the JWPCP West shaft site. The TBM would be capable of excavating soil/rock and installing a concrete tunnel liner as it advances. The excavated material would be removed for disposal or, where possible, beneficial use. Tunneling, which would occur 20 to 24 hours per day, is expected to advance at an average rate of 35 feet per day through soil and an average rate of 40 feet per day through rock. Tunnel construction for this alignment would take approximately 4 years.

The tunnel would range from approximately 70 to 450 feet below ground surface, except at its connection to the Royal Palms shaft, where it would be approximately 30 feet below ground surface. The tunnel would have an external diameter of about 22 feet and an internal finished diameter of about 18 feet. The tunnel would be constructed of pre-fabricated, steel reinforced concrete liner segments with watertight gaskets.

Tunnel construction would require mobilization of various support equipment for activities such as assembly of the TBM; operation of the tunnel ventilation system; and movement of workers, materials, and equipment between the ground surface and the bottom of the shaft.

Either an earth-pressure balance (EPB) TBM or a slurry TBM would be utilized on this project. The primary difference between the two TBM types is how the excavated material generated from the tunneling operation is removed. With an EPB TBM, specialized locomotives would convey the excavated material in rail cars back through the constructed portion of the tunnel to the JWPCP West shaft for removal by crane. The excavated material would be retained at the surface to allow any water to separate before removal. With a slurry TBM, the excavated material would be blended with a slurry mixture (such as bentonite clay and water) and pumped back through the constructed portion of the tunnel to the ground surface at the JWPCP West shaft and up to the surface through pipes. The excavated material and slurry mixture would be processed at a temporary slurry separation plant, located at the shaft site, which extracts the slurry for reuse. The type of TBM would not be specified until completion of final design.

Royal Palms Shaft Site

The Royal Palms shaft site (shown outlined in red) would be located mostly within Sanitation Districts-owned property surrounding the existing ocean outfall manifold structure on approximately 1 acre at Royal Palms Beach near the access road off of West Paseo Del Mar. The Royal Palms shaft site would function as an exit shaft site for removal of the TBM upon tunnel completion. The shaft site would also be used to connect the new tunnel to the existing ocean outfalls at the manifold structure.

The shaft depth would be approximately 50 feet below ground surface, and the shaft diameter would be about 25 to 35 feet. Shaft construction would take approximately 6 to 9 months. A noise barrier, approximately 20 feet in height, would be erected between the major sources of noise at the shaft site and nearby sensitive receptors.

A new underground manifold structure would be constructed next to the shaft to facilitate connecting the tunnel to the existing ocean outfalls. Valves would be installed to control the amount of effluent flow to each of the outfalls and to allow for isolation of the new tunnel between the Royal Palms and JWPCP West shaft sites. The interconnection work would take approximately 1.5 years.

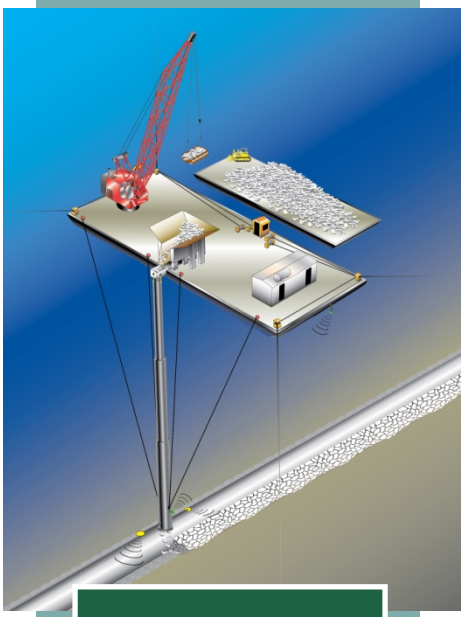
During the shaft construction and the interconnection work, an average of 10 trucks per day (about 40 trucks per day maximum) would be required for delivery of supplies and removal of excavated material. Up to about 17 parking spaces may be affected at certain points during the project, but impacts on parking would be minimal during the peak beach season (Memorial Day through Labor Day).

After construction, the beach parking area would be restored to its original configuration. There would be no permanent aboveground facilities at the shaft site, except ground-level access to the shaft and new manifold structure, vent pipes, and access lids. A permanent access easement of approximately 0.1 acre would be obtained for future operation and maintenance activities.

Royal Palms Shaft Site

Existing Ocean Oufalls Rehabilitation

Under the recommended project, JWPCP effluent would continue to be discharged through the existing ocean outfalls. The recommended plan would include rehabilitation of the three largest existing ocean outfalls and abandonment of the 60-inch outfall. Re-ballasting work would occur on the existing 72-, 90-, and 120-inch outfalls in ocean depths ranging from approximately 20 to 50 feet. Joint repairs would involve temporarily removing some of the existing ballast rock from around the outfalls to fully expose the joint being repaired. A coupling would be installed around the joint and the annular space filled with concrete, and the ballast rock would be replaced around the pipe. Cathodic protection would be restored or added as necessary. Overall, the rehabilitation work, including mobilization, construction, and demobilization, would take approximately 9 months. Once rehabilitated, it is anticipated that the three existing ocean outfalls would have a remaining service life that extends well beyond the 2050 planning horizon.



Outfall Re-Ballasting

Project Implementation Schedule

The estimated implementation schedule for the recommended project is shown below. The actual schedule could vary depending on permitting, right-of-way and land acquisition, final design, funding, and construction considerations.

Activity	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Permitting and Easement/Land Acquisition										
Final Design, Advertise, Bid, and Award										
Submittals and TBM Fabrication										
JWPCP West Shaft Construction										
Site Preparation/TBM Assembly										
Tunneling										
Royal Palms Shaft Construction and Interconnection										
Existing Ocean Outfalls Rehabilitation										

Project Costs

The total capital cost for the modified ocean discharge system is presented below. Although the project cost would be incurred over multiple years in the future, all amounts shown are in 2011 dollars and include design, construction, and project management. The anticipated total project cost in 2021 dollars (at the end of construction) is approximately $740,000,000.

Project Element	Total (2011 Dollars)
JWPCP West Shaft Site	$33,000,000
Tunnel	$478,000,000
Royal Palms Shaft Site	$24,000,000
Existing Ocean Outfalls Rehabilitation	$15,000,000
Total Capital Costs	$550,000,000

Upgrade and Expansion Costs

The capital cost of the recommended project has been split into two subcategories: upgrade and expansion. Upgrade portions of the project benefit existing users by addressing needed improvements or existing deficiencies without providing additional capacity. Expansion portions of the project benefit new users by providing increased capacity to accommodate their discharge. Of the recommended project's $550,000,000 total estimated capital cost, $416,250,000 is attributable to upgrade and $133,750,000 is attributable to expansion. The existing users of the JOS would pay for the upgrade portion through an increase in their annual service charge, and new users would pay for the expansion portion through their connection fees.

Project Financing

The Sanitation Districts would try to obtain state and federal grants to the maximum extent possible to finance the project. However, there is no assurance that any grant funding would be available. Therefore, the plan for financing the project assumes no state or federal grant funding.

There are generally two sources of long-term financing available for wastewater agencies: low-interest State Revolving Fund (SRF) loans and revenue bonds. In some respects, these two sources are very similar in that they both provide project funding with an extended repayment period at a fixed interest rate.

In the case of SRF loans, the repayment period is 20 years, beginning 1 year after the completion of construction at an interest rate equal to one-half of the most current state of California general obligation bond rate. Currently, there is an annual cap of $50 million per agency on SRF loans.

In the case of revenue bonds, the repayment period is typically 30 years with repayment beginning as soon as the bonds are issued. Interest rates are dependent on market conditions on the date the bonds are issued and the financial strength of the Joint Outfall Districts. There are various ways to structure revenue bonds, and the details of the bond financing and repayment would be determined in the future based on the conditions that exist at that time.

Impact on Rates

Because of the current cap on SRF loans, the funding for the recommended project is expected to be a combination of SRF loans and revenue bonds. The expansion-related portions of the recommended project would likely be funded utilizing previously accumulated connection fees currently held in the Joint Outfall Districts' Capital Improvement Fund.

Based on the best available financing assumptions and escalation of construction costs, the recommended project would result in a service charge rate impact of approximately $20 per year per sewage unit (or equivalent single-family home) in 2021 dollars (when construction would be completed). For comparison, the current JOS average annual service charge rate is $146 per sewage unit. It is anticipated that the recommended project would not result in a connection fee rate increase.

The Joint Outfall Districts currently have some of the lowest user rates in the entire country, and the Clearwater Program recommendations will help ensure this trend continues well into the future.

The Sanitation Districts are the lead agency under CEQA and are responsible for preparing the Environmental Impact Report.

ENVIRONMENTAL REVIEW

In conformance with CEQA and NEPA, a joint EIR/EIS was prepared to assess the environmental impacts of the recommended plan (Alternative 4) and three alternatives identified in the Clearwater Program MFP. Both program-wide and project-specific recommendations comprise each alternative.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA requires public agency decision makers to consider and document the environmental effects of their actions. CEQA applies to projects proposed to be undertaken, or requiring approval, by state and local government agencies. Proposed projects undergo an environmental review process to determine whether there may be any environmental impacts.

When a proposed project could result in significant environmental effects, an EIR is prepared. CEQA requires that the EIR evaluate the impacts of the project on the environmental resources of the state and identify ways to mitigate or avoid significant impacts. In instances where significant impacts cannot be mitigated or avoided, the project may nonetheless be carried out or approved if the lead agency finds that economic, legal, social, technological, or other benefits outweigh the unavoidable significant environmental effects.

CEQA Scope of Analysis

The EIR for the Clearwater Program provides a program-level environmental assessment of the following program elements: conveyance improvements, plant expansion, process optimization, WRP effluent management, solids processing, and biosolids management. Because these elements would not be implemented in the near future and/or the actual construction locations are unknown (e.g., sewer relief projects), the project specifics are too speculative for a detailed analysis. Prior to approval of any future projects related to the program elements, the environmental impacts would be reassessed, and appropriate environmental documentation would be prepared at that time.

The EIR for the Clearwater Program provides a project-level environmental assessment of the JWPCP effluent management project alternatives. The alternatives are divided into the following project elements for analysis: onshore tunnel alignment, offshore tunnel alignment, JWPCP shaft site, intermediate shaft site, and diffuser area.

No-Project Alternative

Pursuant to CEQA, an EIR must evaluate a no-project alternative. A no-project alternative describes the no-build scenario and what would be reasonably expected to occur in the foreseeable future if the project were not approved. The No-Project Alternative for the Clearwater Program is Alternative 5. Under Alternative 5, the Sanitation Districts would continue to expand, upgrade, and operate the JOS in accordance with the JOS 2010 Master Facilities Plan (2010 Plan), which was prepared in 1995.

The following related projects and reasonably foreseeable actions as recommended by the 2010 Plan could occur if the Clearwater Program were not approved and implemented:

- Expand the SJCWRP to a treatment capacity of 125 MGD.
- Upgrade and provide relief for the existing conveyance system.
- Continue current WRP effluent management practices.
- Construct additional solids processing facilities.
- Continue current biosolids management practices and identify new practices.
- Continue use of existing ocean discharge system.

Under Alternative 5, the existing ocean discharge system would be insufficient to convey projected peak wastewater flows. Additionally, if the tunnels were to become inoperable or partially obstructed (e.g., due to earthquake damage), flows would need to be discharged to another location. If there were available capacity in the Wilmington Drain, secondary effluent could be bypassed into the Wilmington Drain just north of Lomita Boulevard. If sufficient capacity were not available in the Wilmington Drain, the sewers tributary to the JWPCP could overflow and untreated wastewater could enter various water courses, such as the Dominguez Channel and the Los Angeles River.

CEQA Environmental Baseline

To determine if there would be significant impacts, conditions that would occur under the recommended plan or its alternatives are compared to baseline conditions. In an EIR, the baseline is generally defined as the physical environmental conditions in the vicinity of a proposed project that exist at the time the Notice of Preparation (NOP) was published (October 2008). The lead agency may also consider a baseline condition that better reflects fluctuations resulting from cyclical trends, such as drought and wet weather. Because wastewater flows are subject to such variances, the baseline conditions for the JOS are representative of aggregate data collected from recent years prior to the release of the NOP.

NATIONAL ENVIRONMENTAL POLICY ACT

NEPA requires federal agencies to document and consider the environmental effects of federal actions. When a federal agency determines that a proposed project could result in significant environmental effects, an EIS is required. The purpose of an EIS is to provide full and fair discussion of anticipated environmental impacts, including significant impacts. The EIS must also inform decision makers and the public of the reasonable alternatives that would avoid or minimize significant impacts or would enhance the quality of the human environment. An EIS is both a disclosure document and a tool used by federal officials in conjunction with other relevant material to plan actions and make decisions.

The Corps is the federal lead agency under NEPA and is responsible for preparing the Environmental Impact Statement.

NEPA Scope of Analysis

In contrast to the EIR, the EIS for the Clearwater Program does not include an assessment of the program elements because there is not sufficient federal control and responsibility for the program elements. Therefore, the Corps' NEPA scope of analysis includes only the recommended project and its alternatives, consisting of both onshore and offshore construction activities. Offshore construction activities include regulated activities within the Corps' geographic jurisdiction (i.e., the marine environment) that would require permits from the Corps. As such, all environmental effects associated with offshore construction activities are considered direct impacts in the EIS. Environmental effects associated with onshore construction activities, as well as those effects associated with project operations, would not require a Corps permit and thus are considered indirect impacts in the EIS.

No-Federal-Action Alternative

Pursuant to NEPA, an EIS must evaluate a no-federal-action alternative. The No-Federal-Action Alternative for the Clearwater Program is Alternative 6. Alternative 6 consists of the activities that the Sanitation Districts would perform without the issuance of the Corps' permits. The Corps' permits would be required for the construction of an offshore tunnel, construction of a riser and diffuser, rehabilitation of the existing ocean outfalls, and ocean disposal of dredged material. Without the Corps' permits for the offshore work, the Sanitation Districts would not construct the onshore tunnel and shaft sites and would not rehabilitate the existing ocean outfalls. Therefore, none of the project elements would be constructed under Alternative 6, and the Sanitation Districts would continue to use the existing ocean discharge system, which could result in emergency discharges and/or sewer overflows to various water courses.

NEPA Environmental Baseline

In analyzing a proposed project in a joint CEQA/NEPA format, the Corps must distinguish the scientific and analytical basis for its decisions from the CEQA lead agency's decision. The NEPA baseline condition for determining significance of impacts is generally determined by examining the full range of construction and operational activities the Sanitation Districts could implement, and are likely to implement, absent a Corps permit under Section 10 of the Rivers and Harbors Act, Section 404 of the Clean Water Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. Therefore, in general, the NEPA baseline is identical to baseline conditions associated with the No-Federal-Action Alternative.

Unlike the CEQA baseline, which is typically defined by environmental conditions at a point in time, the NEPA baseline is not restricted to a "no-growth" scenario. For the Clearwater Program EIS, the NEPA baseline represents anticipated conditions at the year when construction of project elements is expected to conclude. Whenever possible, the Corps and the Sanitation Districts have relied on empirical data and best professional judgment to identify future conditions. For resources in which future conditions are identified, the NEPA baseline encompasses the No-Federal-Action Alternative and any identified conditions. For resources in which future conditions are not identified, the NEPA baseline is identical to the No-Federal-Action Alternative.

IMPACTS AND MITIGATION

Threshold of Significance

The threshold of significance for a given environmental effect is the level at which the Sanitation Districts and/or the Corps find an effect of the recommended plan and its alternatives to be significant. A threshold of significance can be defined as a "quantitative or qualitative standard or set of criteria, pursuant to which significance of a given environmental effect may be determined" (CEQA Guidelines). The thresholds of significance provided in the CEQA Guidelines have been used as the basis of the environmental impact analysis for this EIR/EIS. Some thresholds or criteria have been adapted to the specific circumstances of the recommended plan and its alternatives. The Corps has generally adopted the CEQA thresholds presented in this document to meet its NEPA responsibilities.

The difference between an alternative and the environmental baseline is compared to a threshold to determine if an impact is significant.

Mitigation Measures

The EIR/EIS considers feasible mitigation measures to reduce a significant environmental impact to less than significant. To reduce significant effects, mitigation measures must avoid, minimize, rectify, reduce, eliminate, or compensate for a given impact. After the EIR/EIS is certified, a mitigation monitoring program would be adopted to ensure that the mitigation measures are fully implemented.

SIGNIFICANT UNAVOIDABLE IMPACTS

The following sections, organized by resource area, summarize the significant unavoidable impacts of Alternative 4 (recommended alternative) and Alternatives 1, 2, and 3. A significant unavoidable impact results if, even with mitigation, the impact cannot be reduced to less than significant, or if no feasible mitigation exists.

Alternative 5 (No Project) and Alternative 6 (No Federal Action) have significant operational impacts. Both Alternatives 5 and 6 could result in an emergency discharge of secondary effluent to the Wilmington Drain or overflow of untreated wastewater that would enter various water courses. Significant impacts include impacts on water quality (freshwater and marine), geology and soils through erosion if the release resulted in large amounts of fast-moving water, recreation at the harbor because of degraded water quality, and utilities because existing wastewater systems would not be able to accommodate the flows.

Aesthetic Resources

Significant and unavoidable impacts on aesthetic resources would occur during construction of Alternatives 1 through 4 because work would occur adjacent to the coast, a highly valued scenic area protected by local plans to preserve the scenic integrity of coastal views. Rehabilitation of the existing ocean outfalls, which is included in Alternatives 1 through 4, would involve significant aesthetic impacts on land-based views of the ocean during construction. Aesthetic impacts under Alternatives 3 and 4 are related to construction at the Angels Gate and Royal Palms shaft sites, which are both coastal sites close to residential and recreational areas. Under Alternatives 1 and 2, construction activities and the associated noise barrier would degrade visual quality for residents adjacent to the JWPCP East shaft site. Overall, Alternatives 1 through 4 would have significant unavoidable aesthetic impacts during construction associated with a shaft site and rehabilitation of the existing ocean outfalls.

Air Quality

Significant and unavoidable peak day air quality impacts would occur at a regional level during construction Alternatives 1 through 4. Each alternative would exceed the Southern California Air Quality Management District daily significance thresholds for construction-related emissions before mitigation. Specifically, Alternatives 1, 3, and 4 would exceed thresholds for volatile organic compounds (VOC) and nitrogen oxides (NO_X), and Alternative 2 would exceed thresholds for VOC, carbon monoxide (CO), and NO_X. Although mitigation would reduce emissions, impacts would remain significant for NO_X for all alternatives. The magnitude of the significance is directly related to the length of the alignment, the duration of construction, and the overlap of elements during construction with Alternatives 1, 2, and 3 having greater emissions than Alternative 4. Alternative 4 has the smallest emissions contribution of the four alternatives and would be the preferred alternative based on air emissions.

Cultural Resources

Significant and unavoidable impacts on paleontological resources would occur during construction of Alternatives 1 through 4. The rock face being removed during onshore and offshore tunnel construction could not be observed for the presence of paleontological resources; thus, if present, paleontological resources would be destroyed by the TBM. Likewise, at a certain depth, paleontological resources may be encountered during construction at the shaft sites; these resources could not be observed and, if present, would also be destroyed. Impacts are relatively equal across the alternatives, but it is likely that more paleontological resources would be encountered in the longer alignments; thus, Alternatives 3 and 4 are preferred over Alternatives 1 and 2 based on alignment length. Alternative 4 would be the preferred alternative with regard to paleontological resources based on alignment length.

- **Greenhouse Gas Emissions**

  Under CEQA, significant and unavoidable greenhouse gas (GHG) impacts would occur during construction and operation of Alternatives 1 through 4. The magnitude of the significance is directly related to the length of the alignment and the duration of construction. Estimates of total metric tons of carbon dioxide-equivalent (CO_2e) emissions range from largest (Alternative 1) to smallest (Alternative 4). Alternative 4 has the smallest GHG contribution of the four alternatives and would be the preferred alternative based on GHG emissions.

- **Employment, Housing, Socioeconomics, and Environmental Justice**

  Under NEPA, significant and unavoidable environmental justice impacts would occur during construction of Alternatives 1 and 2. Work at the JWPCP East shaft site would result in environmental impacts that are disproportionately high and adverse on minority and low-income populations.

ENVIRONMENTALLY PREFERRED AND SUPERIOR ALTERNATIVE

Alternative 4 (recommended alternative) is the environmentally preferred and superior alternative. Impacts would be reduced for Alternative 4 when compared to Alternatives 1, 2, and 3. Alternative 4 has only two shaft sites, the shortest overall tunneling distance, the fewest number of truck trips, and the shortest construction duration. Alternative 4 would not result in significant and unavoidable environmental impacts that are disproportionately high and adverse on minority and low-income populations. Furthermore, in-water construction activities would be reduced for Alternative 4, which utilizes the existing ocean outfalls and would not require offshore tunneling or new construction of a riser and diffuser. Alternative 4 would reduce the amount of marine vessel activity, eliminate the need for dredge material disposal, reduce the duration of in-water construction, and reduce the amount of air quality impacts and GHG emissions when compared to Alternatives 1, 2, and 3.

Alternative 4 is the environmentally preferred and superior alternative.

AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

CEQA requires that an Executive Summary include a brief summary of areas of controversy known to the lead agency and issues to be resolved. The areas of controversy known to the Sanitation Districts and Corps include potential impacts of tunneling (paleontology, geology, hazards, and noise/vibration), potential impacts near the shaft sites during construction (aesthetics, air quality, geology, GHGs, noise/vibration, and traffic), potential impacts during rehabilitation of the existing ocean outfalls (marine environment), and selection of Alternative 4 as the recommended alternative. These issues are fully discussed in Chapter 28 of the final EIR/EIS. Issues that have yet to be resolved include the potential impacts of various program-wide elements of the Clearwater Program that have not been developed enough to allow for project-specific analysis. These issues, identified in the final EIR/EIS, will be addressed as necessary in supplemental environmental documents prior to implementation of the program-wide elements.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES (PROGRAM-WIDE)

LTS/M – Less than significant impact after mitigation
SU – Impact remains significant and unavoidable after mitigation

IMPACT	MITIGATION MEASURE	PROGRAM ELEMENT
AIR QUALITY		
Impact AQ-2. Would Alternatives 1 through 4 exceed the SCAQMD daily significance thresholds for construction- and/or operation-related emissions?[1]	**MM AQ-2a.** All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. **MM AQ-2b.** All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. **MM AQ-2c.** Fully cover trucks hauling loose material, such as debris or fill, while operating off site. **MM AQ-2d.** Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable. **MM AQ-2e.** Route construction trucks away from congested streets or sensitive receptor areas as feasible.	Clearwater Program would result in significant and unavoidable regional impacts.
BIOLOGICAL RESOURCES		
Impact BIO-2. Would Alternatives 1 through 4 result in direct or indirect take of a federally listed, threatened, or endangered plant or wildlife species?	**MM BIO-2**. To avoid indirect impacts of construction on nesting least Bell's vireo, construction activities within 300 feet of riparian vegetation will be timed to avoid the season when nests may be active (April 1 to July 31). If avoidance of construction within this time period is not feasible, a focused survey for least Bell's vireo will be conducted in the season prior to initiation of construction activities to determine their presence or absence within 300 feet. The focused survey will consist of eight site visits conducted 10 days apart during the period of April 10 to July 31. If occupied habitat and/or nesting individuals are determined to occur within 300 feet of construction, measures to avoid take of least Bell's vireo and occupied habitat will be implemented. These avoidance measures will include conducting a clearance and nest survey within 30 days prior to construction activities to determine the location of nests within 300 feet of construction. Measures, such as erecting a temporary barrier with stacked hay bales, will be implemented to reduce the amount of construction noise and motion in proximity to active nests. In addition, a biologist familiar with least Bell's vireo will periodically monitor construction activities to confirm the least Bell's vireo is not affected by the construction and to ensure avoidance measures remain intact and functional. Night construction within 300 feet of occupied least Bell's vireo nests will not occur unless authorized by the California Department of Fish and Game and U.S. Fish and Wildlife Service.	SJCWRP Plant Expansion – LTS/M
Impact BIO-3. Would Alternatives 1 through 4 result in direct or indirect take of a state-listed, threatened, or endangered plant or wildlife species?	MM BIO-3 (Same as MM BIO-2)	SJCWRP Plant Expansion – LTS/M

IMPACT	MITIGATION MEASURE	PROGRAM ELEMENT
Impact BIO-5. Would Alternatives 1 through 4 result in direct or indirect impacts on any CDFG wildlife species of special concern?	**MM BIO-5a.** To avoid indirect impacts of construction on nesting yellow warbler and yellow-breasted chat, construction activities within 100 feet of riparian vegetation will be timed to occur outside the season when nests may be active (April 1 to July 31). If avoidance of construction within this time period is not feasible, a preconstruction nesting survey for yellow warbler and yellow-breasted chat will be conducted 7 days prior to initiation of construction to determine the presence or absence of nests within 100 feet. If nesting individuals are determined to occur within 100 feet of construction, avoidance and minimization measures will be implemented. These could include erecting a temporary barrier, such as stacked hay bales, adjacent to the nest location to reduce the amount of construction noise and motion entering the riparian habitat.	SJCWRP Plant Expansion – LTS/M
CULTURAL RESOURCES		
Impact CUL-2. Would Alternatives 1 through 4 cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	**MM CUL-2.** In the event that buried archaeological resources are discovered during ground-disturbing activities, work will stop in that area and within 30 feet of the find until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures. Treatment measures may include development of avoidance strategies, capping with fill material, or mitigation of impacts through data recovery programs such as excavation or detailed documentation. During cultural resources monitoring, if the qualified archaeologist determines that the sediments being excavated are previously disturbed or unlikely to contain significant cultural materials, the qualified archaeologist can specify that monitoring be reduced or eliminated.	SJCWRP Plant Expansion – LTS/M SJCWRP Process Optimization – LTS/M POWRP Process Optimization – LTS/M LCWRP Process Optimization – LTS/M LBWRP Process Optimization – LTS/M JWPCP Solids Processing – LTS/M
Impact CUL-3. Would Alternatives 1 through 4 result in disturbance or destruction of a unique paleontological resource or site or a unique geologic feature?	**MM CUL-3.** In the event that potential paleontological resources are discovered during ground-disturbing activities, work will stop in that area and within 30 feet of the find until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate treatment measures. Treatment measures may include monitoring by a qualified paleontologist during construction-related ground-disturbing activities. The monitor will retain the option to reduce monitoring if it is determined that the sediments were previously disturbed. Monitoring may also be reduced if potentially fossiliferous units are not present or, if present, are determined to have a low potential to contain fossil resources. The monitor will be equipped to salvage fossils and samples of sediments as they are unearthed and will be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Recovered specimens will be prepared to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Specimens will be curated into a professional, accredited museum repository with permanent retrievable storage. A report of findings, with an appended itemized inventory of specimens, will be prepared and will signify completion of the mitigation.	SJCWRP Plant Expansion – LTS/M SJCWRP Process Optimization – LTS/M POWRP Process Optimization – LTS/M LCWRP Process Optimization – LTS/M LBWRP Process Optimization – LTS/M JWPCP Solids Processing – LTS/M

IMPACT	MITIGATION MEASURE	PROGRAM ELEMENT
GEOLOGY, SOILS, AND MINERAL RESOURCES		
Impact GEO-1. Would Alternatives 1 through 4 expose people, structures, or property to major geologic hazards such as landslides, mudslides, or ground failure?	**MM GEO-1.** Perform geotechnical investigations and provide site-specific recommendations for stabilization of temporary and permanent slopes and excavations to reduce risks to structures and construction workers associated with landslides, mudslides, or ground failure. The geotechnical investigation will address the requirements of local grading ordinances, as appropriate. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	POWRP Process Optimization – LTS/M
Impact GEO-3. Would Alternatives 1 through 4 expose people or structures to a potential substantially adverse effect, including the risk of loss, injury, or death involving strong seismic ground shaking?	**MM GEO-3**. Perform geotechnical investigations and provide site-specific recommendations for reducing the adverse effects of seismic ground shaking on planned facilities. The investigations and recommendations will be conducted in accordance with current California Geological Survey guidelines for evaluating and mitigating seismic hazards in California, and will be in compliance with current building codes, as applicable, to reduce the risk of seismic shaking. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	SJCWRP Plant Expansion – LTS/M SJCWRP Process Optimization – LTS/M POWRP Process Optimization – LTS/M LCWRP Process Optimization – LTS/M LBWRP Process Optimization – LTS/M JWPCP Solids Processing – LTS/M
Impact GEO-4. Would Alternatives 1 through 4 expose people or structures to a potential substantially adverse effect including the risk of loss, injury, or death involving substrate consisting of material that is subject to liquefaction or other secondary seismic hazards in the event of ground shaking?	**MM GEO-4.** Perform geotechnical investigations and provide site-specific recommendations to reduce the impacts of liquefaction on planned facilities. The investigations and recommendations will be conducted in accordance with current California Geological Survey guidelines for evaluating and mitigating seismic hazards in California. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	POWRP Process Optimization – LTS/M LCWRP Process Optimization – LTS/M LBWRP Process Optimization – LTS/M
Impact GEO-7. Would Alternatives 1 through 4 be located in soil characterized by shrink-swell potential that might result in deformation of foundations or damage to structures?	**MM GEO-7.** Perform geotechnical investigations and provide site-specific recommendations to reduce the risk of adverse effects on structures due to shrink-swell soil behavior. The investigations will include an analysis of soil expansion potential (i.e., American Society for Testing and Materials D-4829). Remediation may include expansive soil removal, reinforced foundations, and/or special pavement design. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	SJCWRP Plant Expansion – LTS/M SJCWRP Process Optimization – LTS/M POWRP Process Optimization – LTS/M LCWRP Process Optimization – LTS/M LBWRP Process Optimization – LTS/M JWPCP Solids Processing – LTS/M
GREENHOUSE GAS EMISSIONS		
Impact GHG-1. Would Alternatives 1 through 4 generate GHG emissions that would have a significant impact on the environment?[1]	MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d)	Clearwater Program would result in significant and unavoidable regional impacts.
HYDROLOGY, WATER QUALITY, AND PUBLIC HEALTH		
Impact HYD-11. Would Alternatives 1 through 4 be subject to inundation by seiche, tsunami, or mudflow?	**MM HYD-11.** During the final design process, perform a geotechnical investigation. If it is determined that there is a potential for mudflow during construction of process optimization at the Pomona Water Reclamation Plant due to risks associated with severe weather or the combination of severe weather and post-burn conditions on Elephant Hill, a construction safety plan will be developed prior to construction activities and will include procedures to avoid risks to workers during the construction period. Procedures could include sandbagging and reseeding the burned area immediately following a fire to reestablish vegetation to buffer rainfall and promote a root system to help secure soil in place. Additionally, weather patterns will be monitored and construction will cease if weather could contribute to mudflow conditions.	POWRP Process Optimization – LTS/M

IMPACT	MITIGATION MEASURE	PROGRAM ELEMENT
NOISE AND VIBRATIONS (TERRESTRIAL)		
Impact NOI-4. Would Alternatives 1 through 4 result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	**MM NOI-4a.** Employ noise-reducing construction practices such that construction noise does not exceed levels required by local standards. Measures that may be used to limit construction noise include the following: - Limit construction operations to exempt hours - Locate equipment as far as practical from noise-sensitive uses - Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation. - Prohibit gasoline or diesel engines from having unmuffled exhaust - Use noise-reducing enclosures around noise-generating equipment - Construct additional barriers between noise sources and noise-sensitive land uses or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission **MM NOI-4b.** Prior to construction, initiate a complaint/response tracking program. A construction schedule will be made available to schools, child care facilities, and residents in the vicinity of the construction areas, and a noise disturbance coordinator will be designated. The coordinator will be responsible for responding to complaints regarding construction noise, will determine the cause of the complaint, and will ensure that reasonable measures are implemented to correct the problem when feasible. A contact telephone number for the noise disturbance coordinator will be conspicuously posted on construction site fences and will be included in the notification of the construction schedule.	SJCWRP Plant Expansion – LTS/M SJCWRP Process Optimization – LTS/M
TRANSPORTATION AND TRAFFIC		
Impact TRT-1. Would Alternatives 1 through 4 conflict with an applicable plan, ordinance, or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant elements of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	**MM TRT-1.** Prepare and implement a construction traffic management plan. The plan will be submitted to the appropriate local agency for review and approval prior to the start of any construction work. This plan will include such elements as the project schedule, the designation of haul routes for construction-related trucks, the location of access to the construction site, designated staging and parking areas for workers and equipment, any driveway turning movement restrictions, any temporary traffic control devices or flagmen, and any travel time restrictions for construction-related traffic to avoid peak travel periods on selected roadways.	SJCWRP Plant Expansion – LTS/M SJCWRP Process Optimization – LTS/M POWRP Process Optimization – LTS/M LCWRP Process Optimization – LTS/M LBWRP Process Optimization – LTS/M JWPCP Solids Processing – LTS/M

[1] Air quality impacts and greenhouse gas emissions are regional in nature.

LTS/M – Less than significant impact after mitigation

SU – Impact remains significant and unavoidable after mitigation

SIGNIFICANT IMPACTS AND MITIGATION MEASURES (PROJECT-SPECIFIC)

LTS/M – Less than significant impact after mitigation
SU – Impact remains significant and unavoidable after mitigation

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
AESTHETICS					
Impact AES-1. Would Alternatives 1 through 4 conflict with adopted goals or policies that protect visual quality of a designated scenic vista or scenic resource, resulting in an adverse aesthetic impact such as obstruction of view or degradation of visual character?	**MM AES-1.** Implement visual measures to improve the aesthetic quality of the noise barrier to ensure the design blends with the surrounding environment. A mural or similar aesthetic treatment will be applied to the sections of the noise barrier prominently visible to nearby residents and/or recreationists. Appropriate paint type and surfacing materials will be selected to ensure durability of the painted or treated surfaces until the barrier is removed. Barriers will have low-sheen and non-reflective surface materials to reduce the potential for glare. The paint color or aesthetic treatment will be maintained and any graffiti will be removed in a timely manner. During the final design process, the input of residents and/or recreationists that will be affected by the placement of the noise barriers will be accepted. Their comments will be evaluated for inclusion in the design to ensure the final treatment meets expectations to the greatest extent feasible.			Angels Gate Shaft Site – SU	Royal Palms Shaft Site – SU
	No mitigation is feasible.	Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU
Impact AES-3. Would Alternatives 1 through 4 substantially degrade the existing visual character or quality of the site or its surroundings?	MM AES-3a (Same as MM AES-1)	JWPCP East Shaft Site – SU	JWPCP East Shaft Site – SU	JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – SU	JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – SU
	MM AES-3b. Implement visual measures to reduce the visibility of new structures by painting prominent metal surfaces with colors that will blend with the setting. Selected colors will be shades that are slightly darker than the general surrounding area to reduce contrast and promote compositional harmony of architectural features. An appropriate paint type will be selected for the finished structures to ensure long-term durability of the painted surfaces, and the finish will be maintained over time.	JWPCP East Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
	No mitigation is feasible.	Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact AES-5. Would Alternatives 1 through 4 create a new source of substantial light or glare that would adversely affect day or nighttime views of the area?	MM AES-5a (Same as MM AES-1) **MM AES-5b.** Apply minimum lighting standards. Lights will be installed at the lowest practicable height and with the lowest practicable wattage. Lights will be screened and directed downward to the greatest degree possible. The number of nighttime lights will be minimized.	JWPCP East Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
AIR QUALITY					
Impact AQ-2. Would Alternatives 1 through 4 exceed the SCAQMD daily significance thresholds for construction- and/or operation-related emissions?[1]	**MM AQ-2a.** All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. **MM AQ-2b.** All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. **MM AQ-2c.** Fully cover trucks hauling loose material, such as debris or fill, while operating off site. **MM AQ-2d.** Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable. **MM AQ-2e.** Route construction trucks away from congested streets or sensitive receptor areas as feasible.	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU Riser/Diffuser, SP Shelf – SU Existing Ocean Outfalls – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU JWPCP West Shaft Site – SU Angels Gate Shaft Site – SU Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU JWPCP West Shaft Site – SU Royal Palms Shaft Site – SU Existing Ocean Outfalls – SU
	MM AQ-2f. Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles.	Riser/Diffuser, SP Shelf – SU Existing Ocean Outfalls – SU	Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU
	MM AQ-2g. Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive.	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact AQ-3. Would Alternatives 1 through 4 result in emissions in excess of SCAQMD's Localized Significance Thresholds?	MM AQ-3a (Same as MM AQ-2a) MM AQ-3b (Same as MM AQ-2b) MM AQ-3c (Same as MM AQ-2c) MM AQ-3d (Same as MM AQ-2d) MM AQ-3e (Same as MM AQ-2e)	Wilmington to SP Shelf (Onshore) Tunnel – LTS/M Wilmington to SP Shelf (Offshore) Tunnel – LTS/M JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	Wilmington to PV Shelf (Onshore) Tunnel – LTS/M Wilmington to PV Shelf (Offshore) Tunnel – LTS/M JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
	MM AQ-3g (Same as MM AQ-2g)	Wilmington to SP Shelf (Onshore) Tunnel – LTS/M Wilmington to SP Shelf (Offshore) Tunnel – LTS/M	Wilmington to PV Shelf (Onshore) Tunnel – LTS/M Wilmington to PV Shelf (Offshore) Tunnel – LTS/M	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M
BIOLOGICAL RESOURCES					
Impact BIO-5. Would Alternatives 1 through 4 result in direct or indirect impacts on any CDFG wildlife species of special concern?	**MM BIO-5b.** A preconstruction survey for burrowing owl will be conducted within 30 days prior to initiation of construction at the Angels Gate shaft site according to California Department of Fish and Game (CDFG) burrowing owl survey protocol and mitigation guidelines. All suitable habitat on the shaft site and within a 250-foot buffer will be surveyed for burrowing owl and/or evidence of burrowing owl. Mitigation for an occupied burrow will include avoiding construction within 250 feet of an active nest burrow during the February 1 to August 31 nesting season, and 160 feet of an occupied burrow from September 1 to January 31. If construction timing cannot be adjusted to avoid disturbance, or if an occupied burrow would be physically disturbed by construction, the owls would be relocated according to CDFG guidelines.			Angels Gate Shaft Site – LTS/M	

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
CULTURAL RESOURCES					
Impact CUL-2. Would Alternatives 1 through 4 cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	**MM CUL-2.** In the event that buried archaeological resources are discovered during ground-disturbing activities, work will stop in that area and within 30 feet of the find until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures. Treatment measures may include development of avoidance strategies, capping with fill material, or mitigation of impacts through data recovery programs such as excavation or detailed documentation. During cultural resources monitoring, if the qualified archaeologist determines that the sediments being excavated are previously disturbed or unlikely to contain significant cultural materials, the qualified archaeologist can specify that monitoring be reduced or eliminated.	JWPCP East Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
Impact CUL-3. Would Alternatives 1 through 4 result in disturbance or destruction of a unique paleontological resource or site or a unique geologic feature?	**MM CUL-3.** In the event that potential paleontological resources are discovered during ground-disturbing activities, work will stop in that area and within 30 feet of the find until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate treatment measures. Treatment measures may include monitoring by a qualified paleontologist during construction-related ground-disturbing activities. The monitor will retain the option to reduce monitoring if it is determined that the sediments were previously disturbed. Monitoring may also be reduced if potentially fossiliferous units are not present or, if present, are determined to have a low potential to contain fossil resources. The monitor will be equipped to salvage fossils and samples of sediments as they are unearthed and will be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Recovered specimens will be prepared to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Specimens will be curated into a professional, accredited museum repository with permanent retrievable storage. A report of findings, with an appended itemized inventory of specimens, will be prepared and will signify completion of the mitigation.	JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	JWPCP West Shaft Site – SU Angels Gate Shaft Site – SU	JWPCP West Shaft Site – SU Royal Palms Shaft Site – SU
	No mitigation is feasible.	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact CUL-5. Would Alternatives 1 through 4 result in direct or indirect damage or removal of a significant submerged marine cultural resource or result in alteration or cause change to stable environmental conditions for a significant submerged marine cultural resource(s)?	**MM CUL-5.** In the event that potentially historic resources, such as shipwrecks, are encountered in the project area during construction activities, work will stop immediately until a qualified archaeologist can assess the significance of the resource and, if necessary, enact appropriate management measures. This may include the initiation of avoidance or buffer zones, or a data recovery program that may include excavation or documentation of the resource.	Riser/Diffuser, SP Shelf – LTS/M Existing Ocean Outfalls – LTS/M	Riser/Diffuser, PV Shelf – LTS/M Existing Ocean Outfalls – LTS/M	Riser/Diffuser, PV Shelf – LTS/M Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M
GEOLOGY, SOILS, AND MINERAL RESOURCES					
Impact GEO-1. Would Alternatives 1 through 4 expose people, structures, or property to major geologic hazards such as landslides, mudslides, or ground failure?	**MM GEO-1.** Perform geotechnical investigations and provide site-specific recommendations for stabilization of temporary and permanent slopes and excavations to reduce risks to structures and construction workers associated with landslides, mudslides, or ground failure. The geotechnical investigation will address the requirements of local grading ordinances, as appropriate. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
Impact GEO-2. Would Alternatives 1 through 4 expose people or structures to a potential substantially adverse effect, including the risk of loss, injury, or death involving rupture of a known earthquake fault?	**MM GEO-2.** Perform site-specific fault hazard investigations to minimize fault rupture damage and facilitate repair of structures damaged as a result of fault movement. The investigations will be conducted in accordance with current California Geological Survey guidelines for evaluating and mitigating seismic hazards in California. Geologic evaluations of fault crossings will include information to define fault location, fault slip, angle of intersection at the crossing, type of fault slip, width of disturbance, fault dip angle, and design fault displacement. Remediation measures may include engineered backfill, special lining systems, and/or special access provisions for repair. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	Wilmington to SP Shelf (Offshore) Tunnel – LTS/M	Wilmington to PV Shelf (Offshore) Tunnel – LTS/M	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact GEO-3. Would Alternatives 1 through 4 expose people or structures to a potential substantially adverse effect, including the risk of loss, injury, or death involving strong seismic ground shaking?	**MM GEO-3**. Perform geotechnical investigations and provide site-specific recommendations for reducing the adverse effects of seismic ground shaking on planned facilities. The investigations and recommendations will be conducted in accordance with current California Geological Survey guidelines for evaluating and mitigating seismic hazards in California, and will be in compliance with current building codes, as applicable, to reduce the risk of seismic shaking. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	Wilmington to SP Shelf (Onshore) Tunnel – LTS/M Wilmington to SP Shelf (Offshore) Tunnel – LTS/M JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M Riser/Diffuser, SP Shelf – LTS/M	Wilmington to PV Shelf (Onshore) Tunnel – LTS/M Wilmington to PV Shelf (Offshore) Tunnel – LTS/M JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M Riser/Diffuser, PV Shelf – LTS/M	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M Riser/Diffuser, PV Shelf – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
Impact GEO-4. Would Alternatives 1 through 4 expose people or structures to a potential substantially adverse effect including the risk of loss, injury, or death involving substrate consisting of material that is subject to liquefaction or other secondary seismic hazards in the event of ground shaking?	**MM GEO-4.** Perform geotechnical investigations and provide site-specific recommendations to reduce the impacts of liquefaction on planned facilities. The investigations and recommendations will be conducted in accordance with current California Geological Survey guidelines for evaluating and mitigating seismic hazards in California. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M Riser/Diffuser, SP Shelf – LTS/M	JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M Riser/Diffuser, PV Shelf – LTS/M	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Riser/Diffuser, PV Shelf – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact GEO-6. Would Alternatives 1 through 4 result in unstable earth conditions or changes in geologic substructure?	**MM GEO-6a.** During the final design process, perform geotechnical investigations to provide characterization of the subsurface conditions and anticipated ground behavior along the selected tunnel route and at the shaft sites. The objective of these investigations will be to reduce the potential impacts of shaft excavation instability and ground settlement along the tunnel. The investigation will address facilities at risk of damage due to potential tunneling-induced settlements or shaft instability. An appropriate shaft excavation method that minimizes the risk of excavation instability and ground settlement in the vicinity of the shaft will be recommended. Geotechnical criteria for stabilization of shaft excavations will be incorporated into the project design to ensure the safety and stability of excavations. Recommendations for control and monitoring of the tunnel boring machine excavation and proper installation of the tunnel lining system to avoid excessive ground loss at the tunnel heading and shield will be made. Project design documents will also specify contingency measures that will be implemented if excessive settlement were to occur during construction. **MM GEO-6b.** Develop a detailed plan for construction monitoring that will minimize potential ground surface settlements at the shafts and along the onshore tunnel. The objective of the plan will be to reduce the risk of construction instability and to confirm that ground surface settlement is kept to a level that avoids damage to structures above or along the tunnel alignment. The plan will describe the specific monitoring that will be performed before, during, and after construction. Instrumentation (e.g., survey monuments, slope inclinometers, and/or extensometers) may be used to accurately quantify parameters of ground and structure behaviors and to monitor the rate of change. Contingent construction approaches will be implemented if excessive settlement occurs. The plan will address municipality, agency, and third party settlement tolerance requirements as appropriate for the shaft sites and tunnel alignment. Geotechnical inspections will be performed during construction to confirm the encountered subsurface conditions and to provide recommendations for alternate settlement control approaches, if warranted. If the construction monitoring program detects the occurrence of excessive settlement and alternative settlement control measures are inadequate to meet settlement specifications, then further excavation will cease until additional ground support measures are implemented to alleviate the settlement as directed by the project engineer.	Wilmington to SP Shelf (Onshore) Tunnel – LTS/M Wilmington to SP Shelf (Offshore) Tunnel – LTS/M JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	Wilmington to PV Shelf (Onshore) Tunnel – LTS/M Wilmington to PV Shelf (Offshore) Tunnel – LTS/M JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact GEO-7. Would Alternatives 1 through 4 be located in soil characterized by shrink-swell potential that might result in deformation of foundations or damage to structures?	**MM GEO-7.** Perform geotechnical investigations and provide site-specific recommendations to reduce the risk of adverse effects on structures due to shrink-swell soil behavior. The investigations will include an analysis of soil expansion potential (i.e., American Society for Testing and Materials D-4829). Remediation may include expansive soil removal, reinforced foundations, and/or special pavement design. The geotechnical recommendations will be incorporated into the final design and construction of new facilities, as deemed appropriate by the project engineer.	JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M TraPac Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Angels Gate Shaft Site – LTS/M	JWPCP West Shaft Site – LTS/M Royal Palms Shaft Site – LTS/M
GREENHOUSE GAS EMISSIONS[2]					
Impact GHG-1. Would Alternatives 1 through 4 generate GHG emissions that would have a significant impact on the environment?[1]	MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d)	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU Riser/Diffuser, SP Shelf – SU Existing Ocean Outfalls – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU JWPCP West Shaft Site – SU Angels Gate Shaft Site – SU Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU JWPCP West Shaft Site – SU Royal Palms Shaft Site – SU Existing Ocean Outfalls – SU
	MM GHG-1d (same as MM AQ-2f)	Riser/Diffuser, SP Shelf – SU Existing Ocean Outfalls – SU	Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Riser/Diffuser, PV Shelf – SU Existing Ocean Outfalls – SU	Existing Ocean Outfalls – SU
	MM GHG-1e (same as MM AQ-2g)	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
	MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible.	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU JWPCP West Shaft Site – SU Angels Gate Shaft Site – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU JWPCP West Shaft Site – SU Royal Palms Shaft Site – SU
	MM GHG-1g. Use lighter-colored pavement during construction, where feasible.	JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	JWPCP West Shaft Site – SU Angels Gate Shaft Site – SU	JWPCP West Shaft Site – SU Royal Palms Shaft Site – SU
	MM GHG-1h. Recycle construction debris to the maximum extent feasible.	Wilmington to SP Shelf (Onshore) Tunnel – SU Wilmington to SP Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	Wilmington to PV Shelf (Onshore) Tunnel – SU Wilmington to PV Shelf (Offshore) Tunnel – SU JWPCP East Shaft Site – SU TraPac Shaft Site – SU LAXT Shaft Site – SU Southwest Marine Shaft Site – SU	Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – SU Figueroa/ Gaffey to PV Shelf (Offshore) Tunnel – SU JWPCP West Shaft Site – SU Angels Gate Shaft Site – SU	Figueroa/ Western to Royal Palms (Onshore) Tunnel – SU JWPCP West Shaft Site – SU Royal Palms Shaft Site – SU

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
LAND USE AND PLANNING					
Impact LU-2. Would Alternatives 1 through 4 conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	**MM LU-2.** Prior to construction, the existing land use designation and zoning will be amended as required through a general plan amendment, specific plan amendment, and/or zone change.			Angels Gate Shaft Site – LTS/M	Royal Palms Shaft Site – LTS/M
MARINE ENVIRONMENT (MARINE HYDROLOGY, WATER QUALITY, BIOLOGICAL RESOURCES, NOISE, AND PUBLIC HEALTH)					
Impact MAR-1. Would Alternatives 1 through 4 create pollution, contamination, or nuisance, as defined in Section 13050 of the CWC; or cause regulatory standards to be violated, as defined in the applicable NPDES permit(s) or State Water Quality Control Plan for ocean waters for concentration and emissions of discharge?	**MM MAR-1a.** During riser and diffuser construction, analyses of contaminant concentrations (i.e., metals, dichlorodiphenyltrichloroethane [DDT], polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons [PAHs]) in waters near the dredging operations will be required if the contaminant levels in the dredged sediments are known to be elevated and represent a potential risk to beneficial uses. Monitoring data will be used to demonstrate that water quality limits specified in applicable state and federal permits are not exceeded. Corrective or adaptive actions consistent with state and federal permits will be implemented if the monitoring data indicate that water quality conditions outside the mixing zone are above the permit-specified limits. **MM MAR-1b.** Prepare and implement a contaminated sediment management plan that is consistent with practices outlined in the Los Angeles Regional Contaminated Sediment Task Force long-term management strategy if contaminant levels in the dredged sediments are known to be elevated and represent a potential risk. At a minimum, the plan will include site-specific best management practices at the immediate work site to reduce the potential area of exposure to contaminated sediments.	Riser/Diffuser, SP Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact MAR-3. Would Alternatives 1 through 4 result in the substantial loss of individuals or the reduction of existing habitat of a state- or federally listed endangered, threatened, rare, protected, candidate, or sensitive plant or animal species or a species of special concern?	**MM MAR-3a.** Prepare and implement a collision protection plan to address sensitive and protected species. All construction personnel and boat operators will receive protected species training. The training will include review of the plan as well as identification of animals, species, and habitats potentially present in the project area. **MM MAR-3b.** Restrict tugs, tugs with barges under tow, and large work vessels to speeds of 12 knots (14 miles per hour [mph]) or less at all times. Maneuverable single hull vessels such as crew or supply boats may proceed at speeds of 20 knots (23 mph) or less under most conditions, but will reduce speed to 12 knots or less when whales or sea turtles are located or reported in the project area. **MM MAR-3c.** Immediately report all vessel collisions with marine mammals or sea turtles to the National Marine Fisheries Service. **MM MAR-3d.** Limit the deployment of any material that has the potential to entangle marine mammals or sea turtles (e.g., anchor lines, cables, rope, other construction debris) to only as long as necessary. **MM MAR-e.** Remove as much slack as possible from any potentially entangling material to the point of not jeopardizing construction operations. **MM MAR-3f.** Position temporary mooring buoys with heavy steel cables or chains to minimize potential entanglements. **MM MAR-3g.** In the event that a marine mammal or sea turtle becomes entangled, immediately seek guidance from the National Marine Fisheries Service for safe disentanglement options. **MM MAR-3h.** Implement a "soft start" method for all pile driving by operating the hammer at less than full capacity (i.e., approximately 40 to 60 percent energy levels) with no less than a 1-minute interval between each strike for a 5-minute period on initial driving for the day, or after a delay of 15 minutes between strikes. **MM MAR-3i.** Prepare and implement a pile driving management plan. The plan will require that a National Marine Fisheries Service-approved observer be stationed on the work platform or work vessel to monitor the presence of sensitive marine species in the construction area on all days when pile driving is taking place. The observer will survey the project vicinity before pile driving is started and give approval before such work begins. The observer will continue to advise the construction crew throughout the day to modify or stop pile driving if a sensitive or protected species travels within injury distances.	Riser/Diffuser, SP Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
	MM MAR-3j. Within 90 days prior to initiation of the rehabilitation work, survey the existing ocean outfall pipelines for black abalone at depths between the 15- and 55-foot isobaths in areas potentially affected by the work. The survey team will include divers/biologists experienced in locating abalone. If black abalone are determined to be present, consult with the National Marine Fisheries Service to develop a black abalone transplantation plan that includes the identification of a suitable nearby transplant location, temporary holding and transport methods, and reporting requirements. Implementation of the plan will occur no more than 30 days preceding the in-water rehabilitation activities and will be conducted by qualified divers/biologists.	Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M
Impact MAR-4. Would Alternatives 1 through 4 result in the substantial loss, degradation, or disruption of marine habitat or local biological communities?	MM MAR-4a (Same as MM MAR-3h) MM MAR-4b (Same as MM MAR-3i) **MM MAR-4c.** Prepare and implement an anchoring plan prior to in-water construction activities in accordance with the U.S. Army Corps of Engineers' permitting requirements. The plan will identify deployment methods for anchors, lines, cables, and moorings to minimize damage to hard-bottom substrate.	Riser/Diffuser, SP Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	
Impact MAR-5. Would Alternatives 1 through 4 interfere with the movement/ migration corridors of marine biota?	MM MAR-5a (Same as MM MAR-3a) MM MAR-5b (Same as MM MAR-3b) MM MAR-5c (Same as MM MAR-3c) MM MAR-5d (Same as MM MAR-3d) MM MAR-5e (Same as MM MAR-3e) MM MAR-5f (Same as MM MAR-3f) MM MAR-5g (Same as MM MAR-3g) MM MAR-5h (Same as MM MAR-3h) MM MAR-5i (Same as MM MAR-3i)	Riser/Diffuser, SP Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	
Impact MAR-7. Would Alternatives 1 through 4 impair beneficial uses designated in the California Ocean Plan?	MM MAR-7a (Same as MM MAR-3a) MM MAR-7b (Same as MM MAR-3b) MM MAR-7c (Same as MM MAR-3c) MM MAR-7d (Same as MM MAR-3d) MM MAR-7e (Same as MM MAR-3e) MM MAR-7f (Same as MM MAR-3f) MM MAR-7g (Same as MM MAR-3g) MM MAR-7h (Same as MM MAR-3h) MM MAR-7i (Same as MM MAR-3i) MM MAR-7j (Same as MM MAR-4c)	Riser/Diffuser, SP Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	Riser/Diffuser, PV Shelf – LTS/M	
	MM MAR-7k (Same as MM MAR-3j)	Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M	Existing Ocean Outfalls – LTS/M
	MM MAR-7l (Same as MM AES-5b)				Royal Palms Shaft Site – LTS/M

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
NOISE AND VIBRATIONS (TERRESTRIAL)					
Impact NOI-1. Would Alternatives 1 through 4 expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	**MM NOI-1a.** Employ noise-reducing construction practices such that construction noise does not exceed levels required by local standards. Measures that may be used to limit construction noise include the following: - Limit construction operations to exempt hours - Locate equipment as far a practical from noise-sensitive uses - Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation - Prohibit gasoline or diesel engines from having unmuffled exhaust - Use noise-reducing enclosures around noise-generating equipment - Construct additional barriers between noise sources and noise-sensitive land uses or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission **MM NOI-1b.** Prior to construction, initiate a complaint/response tracking program. A construction schedule will be made available to schools, child care facilities, and residents in the vicinity of the construction areas, and a noise disturbance coordinator will be designated. The coordinator will be responsible for responding to complaints regarding construction noise, will determine the cause of the complaint, and will ensure that reasonable measures are implemented to correct the problem when feasible. A contact telephone number for the noise disturbance coordinator will be conspicuously posted on construction site fences and will be included in the notification of the construction schedule.	JWPCP East Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	Angels Gate Shaft Site – LTS/M	Royal Palms Shaft Site – LTS/M

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
Impact NOI-2. Would Alternatives 1 through 4 expose persons to or generate excessive groundborne vibration or groundborne noise levels?	**MM NOI-2a.** Prepare and implement a rail maintenance plan for reducing groundborne noise caused by haul train activities. The plan will include routine inspection and maintenance of locomotives, especially those parts that affect the wheel/rail interface to ensure there are no open joints or discontinuities that would cause excessive noise at the wheel/rail interface. **MM NOI-2b.** Prepare and implement a vibration control plan to reduce groundborne noise (and vibration) levels. The plan will ensure that groundborne noise levels from operation of locomotives do not exceed the Federal Transit Administration Guidance Manual's threshold level of 45 dBA (A-weighted decibels). The plan may include measures such as the use of: - Haul Train Speed Restrictions – Lower speed limits for haul trains operating within 110 diagonal feet of vibration-sensitive buildings - Ballast Mats – A ballast mat consisting of a pad made of rubber or rubber-like material placed on an asphalt or concrete base with the normal ballast, ties, and rail on top - Resilient Fasteners – Resilient fasteners for reducing the amount of vibration energy that is transferred into the track substructure and for minimizing groundborne vibration in frequencies above 30 hertz			Figueroa/ Gaffey to PV Shelf (Onshore) Tunnel – LTS/M	Figueroa/ Western to Royal Palms (Onshore) Tunnel – LTS/M
Impact NOI-4. Would Alternatives 1 through 4 result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	MM NOI-4a (Same as MM NOI-1a) MM NOI-4b (Same as MM NOI-1b)	JWPCP East Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	JWPCP East Shaft Site – LTS/M LAXT Shaft Site – LTS/M Southwest Marine Shaft Site – LTS/M	Angels Gate Shaft Site – LTS/M	Royal Palms Shaft Site – LTS/M
EMPLOYMENT, HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE[2]					
Impact SOC-3. Would Alternatives 1 through 4 result in environmental impacts that are disproportionately high and adverse on minority and low-income populations?[3]	**MM AES-3a.** Implement visual measures to improve the aesthetic quality of the noise barrier to ensure the design blends with the surrounding environment. A mural or similar aesthetic treatment will be applied to the sections of the noise barrier prominently visible to nearby residents and/or recreationists. Appropriate paint type and surfacing materials will be selected to ensure durability of the painted or treated surfaces until the barrier is removed. Barriers will have low-sheen and non-reflective surface materials to reduce the potential for glare. The paint color or aesthetic treatment will be maintained and any graffiti will be removed in a timely manner. During the final design process, the input of residents and/or recreationists that will be affected by the placement of the noise barriers will be accepted. Their comments will be evaluated for inclusion in the design to ensure the final treatment meets expectations to the greatest extent feasible.	JWPCP East Shaft Site – SU	JWPCP East Shaft Site – SU		

IMPACT	MITIGATION MEASURE	PROJECT ALTERNATIVE 1	PROJECT ALTERNATIVE 2	PROJECT ALTERNATIVE 3	PROJECT ALTERNATIVE 4
RECREATION					
Impact REC-1. Would Alternatives 1 through 4 result in substantial loss or diminished quality of recreational, educational, or visitor-oriented opportunities, facilities, or resources?	MM REC-1a (Same as MM NOI-1a) MM REC-1b (Same as MM NOI-1b)			Angels Gate Shaft Site – LTS/M	Royal Palms Shaft Site – LTS/M

[1] Air quality impacts and greenhouse gas emissions are regional in nature.

[2] The President's Council on Environmental Quality issued draft guidance on how greenhouse gas emissions should be handled under NEPA. Based on this guidance, the Corps will not make an impact determination under NEPA for greenhouse gas emissions but, instead, use a reference point above which they are required to consider any additional environmental review. Consequently, the anticipated emissions for each project alternative are disclosed relative to the NEPA baseline without expressing a judgment as to their significance.

[3] Impact SOC-3 analyzes disproportionately high and adverse impacts on minority and low-income populations as required under NEPA; therefore, there is no CEQA analysis provided under Impact SOC 3.

LTS/M – Less than significant impact after mitigation

SU – Impact remains significant and unavoidable after mitigation

SANITATION DISTRICTS OF LOS ANGELES COUNTY

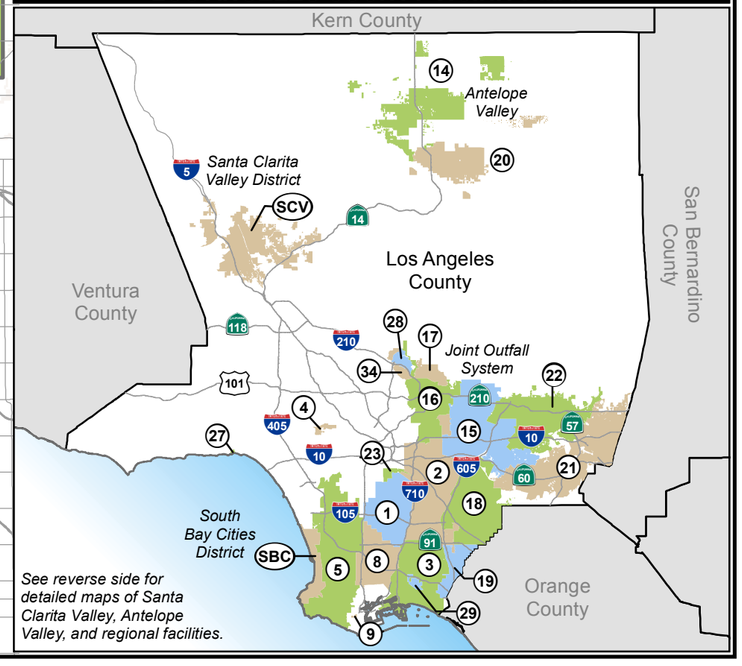
LEGEND

- ACTIVE SOLID WASTE FACILITIES
- CLOSED SANITARY LANDFILLS
- WATER RECLAMATION PLANTS (WRP) and JOINT WATER POLLUTION CONTROL PLANT (JWPCP)
- MAIN TRUNK SEWERS
- OUTFALLS AND EFFLUENT LINES
- RECYCLED WATER LINES
- (14) SANITATION DISTRICT
- PUMPING PLANTS
- GAS-TO-ENERGY FACILITIES
- REFUSE-TO-ENERGY FACILITIES
- RECYCLE CENTERS
- ☆ INTERMODAL FACILITY (IMF) and MATERIALS RECOVERY (MR) / TRANSFER FACILITIES (TF)

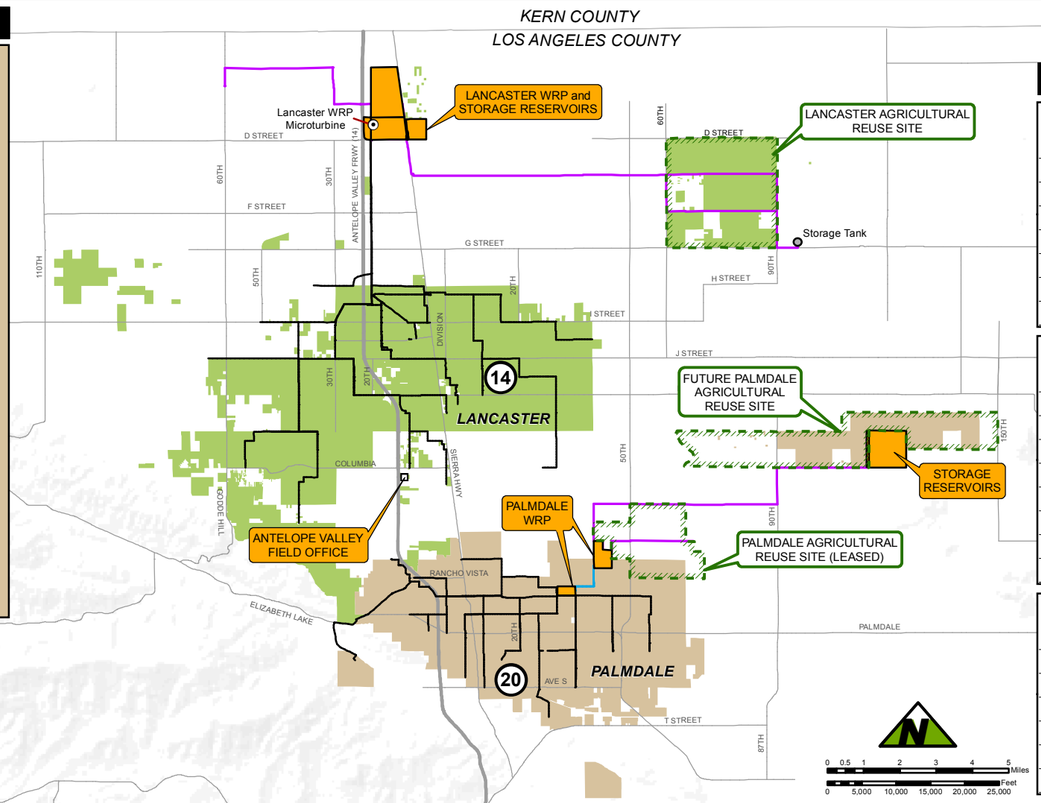
0 0.5 1 2 3 4 5 Miles
0 5,000 10,000 15,000 20,000 25,000 Feet

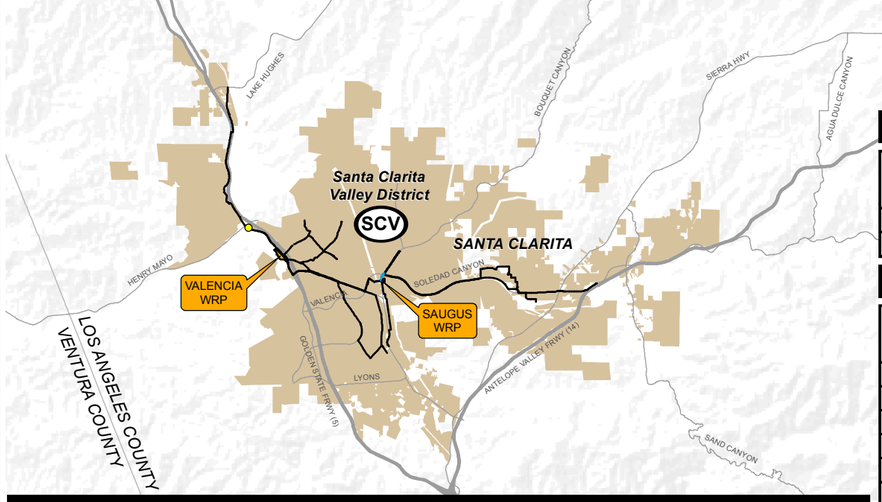
06/25/2011

LOS ANGELES COUNTY VICINITY MAP



REGIONAL FACILITIES





LEGEND

- ACTIVE SOLID WASTE FACILITIES
- WATER RECLAMATION FACILITIES and FIELD OFFICES
- AGRICULTURAL REUSE SITES
- COMPOSTING FACILITIES
- SANITATION DISTRICT (14)
- PUMPING PLANTS
- MAIN TRUNK SEWERS
- OUTFALLS AND EFFLUENT LINES
- RECYCLED WATER PIPELINES

COMPOSTING FACILITIES

Composting Facility	Placed in Operation
Inland Empire	4/16/2007
Westlake Farms	Under Construction

WASTEWATER FACILITIES

Facility	Placed in Operation	Permitted Capacity	Miles of Outfalls / Effluent Lines	Area in Acres
JWPCP	2-4-28	400 mgd	18.9	381.1
Long Beach WRP	5-22-73	25 mgd	0	17.2
Los Coyotes WRP	10-14-70	37.5 mgd	0	35.8
Whittier Narrows WRP	7-27-62	15 mgd	1.5	26.7
San Jose Creek WRP	6-29-71	100 mgd	9.9	50.8
Pomona WRP	4-15-54	15 mgd	0	12.4
La Canada WRP	11-2-62	0.2 mgd	0	0.3
Valencia WRP	3-25-66	21.6 mgd	0.3	26.0
Saugus WRP	7-1-62	7 mgd	0.6	4.1
Palmdale WRP	11-28-52	12 mgd	3.8	278.4
Lancaster WRP	10-1-59	18 mgd	0	1391.8

Energy Facilities	Placed in Operation	Net Electricity Production
JWPCP Total Energy	12-20-85	22 MW
Lancaster Microturbine	4-13-05	225 kW

SANITATION DISTRICTS OF LOS ANGELES COUNTY

SOLID WASTE FACILITIES

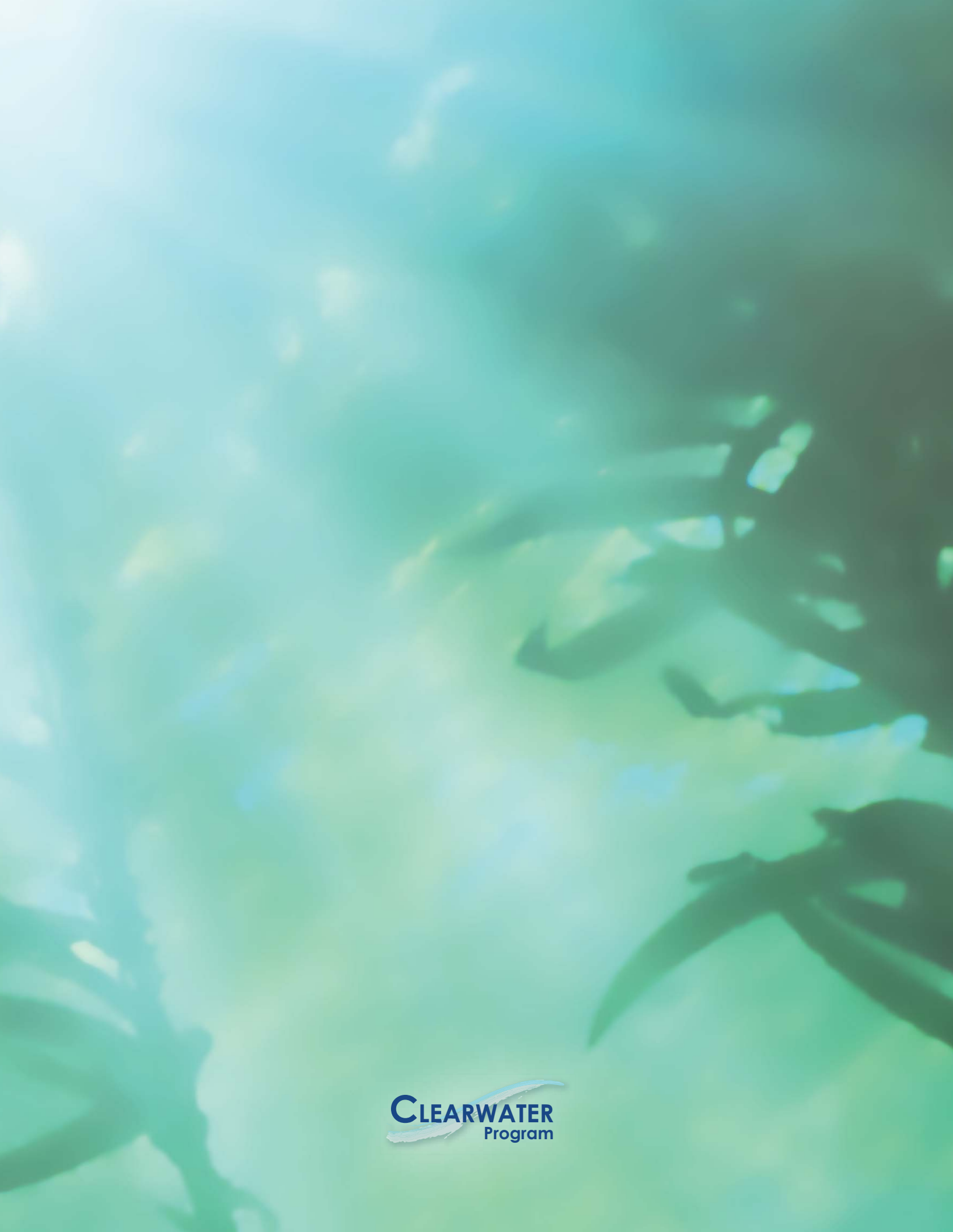
Sanitary Landfills	Placed in Operation	Area in Acres	Status
Palos Verdes	5-15-57	288	Closed 12-31-80
Spadra	7-15-57	338	Closed 4-8-00
Mission Canyon	6-1-60	373	Closed 1-9-82
Scholl Canyon	3-22-61	431	Operating
Calabasas	2-14-61	500	Operating
Puente Hills	5-19-58	1368	Operating
Mesquite	Operational 2009		

Energy Facilities	Operational	Net Electricity Production
Puente Hills Gas Turbine	1-1-83	1.4 MW
Commerce Refuse-To-Energy	1-1-87	10 MW
Puente Hills Gas-To-Energy	1-1-87	46 MW
Palos Verdes Gas-To-Energy	12-20-88	2.4 MW
SERRF Refuse-To-Energy	12-1-88	30 MW
Spadra Gas-To-Energy	4-5-91	6 MW
Calabasas Gas-To-Energy	7-12-10	6 MW
Puente Hills Engines	5-1-05	5.4 MW

Other Solid Waste Facilities	Operational
South Gate TF	1-2-58
Palos Verdes Recycle Center	11-1-76
Puente Hills Recycle Center	10-25-82
DART MR/TF	3-2-98
Puente Hills MR/TF	7-11-05
Puente Hills IMF	Under Construction

DISTRICTS DATA

District	Date of Formation	Placed in Operation	Area (Sq. Miles)	Population 2010	Cities/ Partial Cities	Miles of District Sewers	Pump Stations	Wastewater Management
SBC	12-24-23	9-12-26	14.8	116,370	8	25.3	11	Joint Outfall System
1	11-17-24	2-13-28	41.6	566,108	11	104.6	1	Joint Outfall System
2	2-25-24	2-13-28	75.9	686,409	19	220.7	4	Joint Outfall System
3	5-19-24	5-20-48	52.1	503,422	4	74.4	6	Joint Outfall System
4	3-17-24	12-9-26	1.9	35,281	2	6.3	0	LA City Sewerage System
5	3-31-24	2-13-28	87.9	736,189	15	184.2	11	Joint Outfall System
8	9-21-25	2-13-28	31.1	139,524	4	85.2	3	Joint Outfall System
9	8-16-26	5-10-27	0.2	2,428	1	0.0	0	LA City Sewerage System
14	8-31-38	12-2-41	46.2	194,066	2	71.9	0	Lancaster Sewerage System
15	1-2-45	2-27-48	77.6	580,064	20	142.9	2	Joint Outfall System
16	1-2-46	2-27-48	37.3	264,392	5	40.6	0	Joint Outfall System
17	1-2-46	11-23-49	7.7	56,415	1	5.4	0	Joint Outfall System
18	11-23-48	7-1-50	60.1	337,157	11	84.7	3	Joint Outfall System
19	3-28-50	5-19-51	14.3	90,667	5	34.5	2	Joint Outfall System
20	8-7-51	9-8-52	32.4	125,155	1	41.8	0	Palmdale Sewerage System
21	11-13-51	8-21-54	82.0	405,673	9	85.6	4	Joint Outfall System
22	9-22-53	12-6-54	62.9	327,555	12	100.6	0	Joint Outfall System
23	7-10-56	7-14-59	2.5	112	1	2.1	0	Joint Outfall System
SCV	1-2-61	5-10-62	57.4	245,968	1	41.7	1	Santa Clarita Valley Sewerage System
27	4-20-61	4-2-62	0.2	2,269	0	0.4	1	LA City Sewerage System
28	9-14-61	11-2-62	4.1	11,299	1	4.1	0	Joint Outfall System
29	9-20-62	11-12-64	2.2	11,072	1	37.4	3	Joint Outfall System
34	10-31-67	*Inactive*	3.9	7,620	1	0.0	0	*Inactive*
Total			***796.3***	***5,445,214***	***78***	***1394.3***	***52***	


CLEARWATER
Program