3.14

WATER QUALITY, SEDIMENTS, AND OCEANOGRAPHY

3.14.1 Introduction

This section describes the existing environmental and regulatory setting for water quality, sediments, and oceanography, as well as the impacts on water quality, sediments, and oceanography that would result from the proposed Project, and the mitigation measures that would reduce these impacts to a level below significance.

As discussed below in Section 3.14.4.3, "Impact Analysis," construction and operational impacts from the proposed Project on water quality, sediments, and oceanography would be less than significant. No mitigation measures are required.

3.14.2 Environmental Setting

The following discussion addresses the existing water quality, sediments, and oceanography within and near the proposed project area. The discussion relies upon data that represent the environmental baseline date of March 2008, with most of the described data having been collected between 2001 and 2007. This time period represents an interval with relatively representative climate and homogeneous patterns of harbor utilization, and is thus presumed to be representative of environmental baseline conditions. The area has a Mediterranean climate with wet, cool winters, and warm, dry summers. Most rainfall (90%) occurs between the beginning of November and the end of April with an average annual rainfall of 12.1 inches (MEC 2004:2–3). The 50-year, 24-hour estimated precipitation[1] is 4.4 to 4.6 inches (MEC 2004:2–6).

[1] The 50-year, 24-hour precipitation estimate refers to the approximate amount of rainfall that is expected to fall over a 24-hour period during a 50-year storm event or an event that has a 2% probability of occurring during a during a normal year.

3.14.2.1 Regional Setting

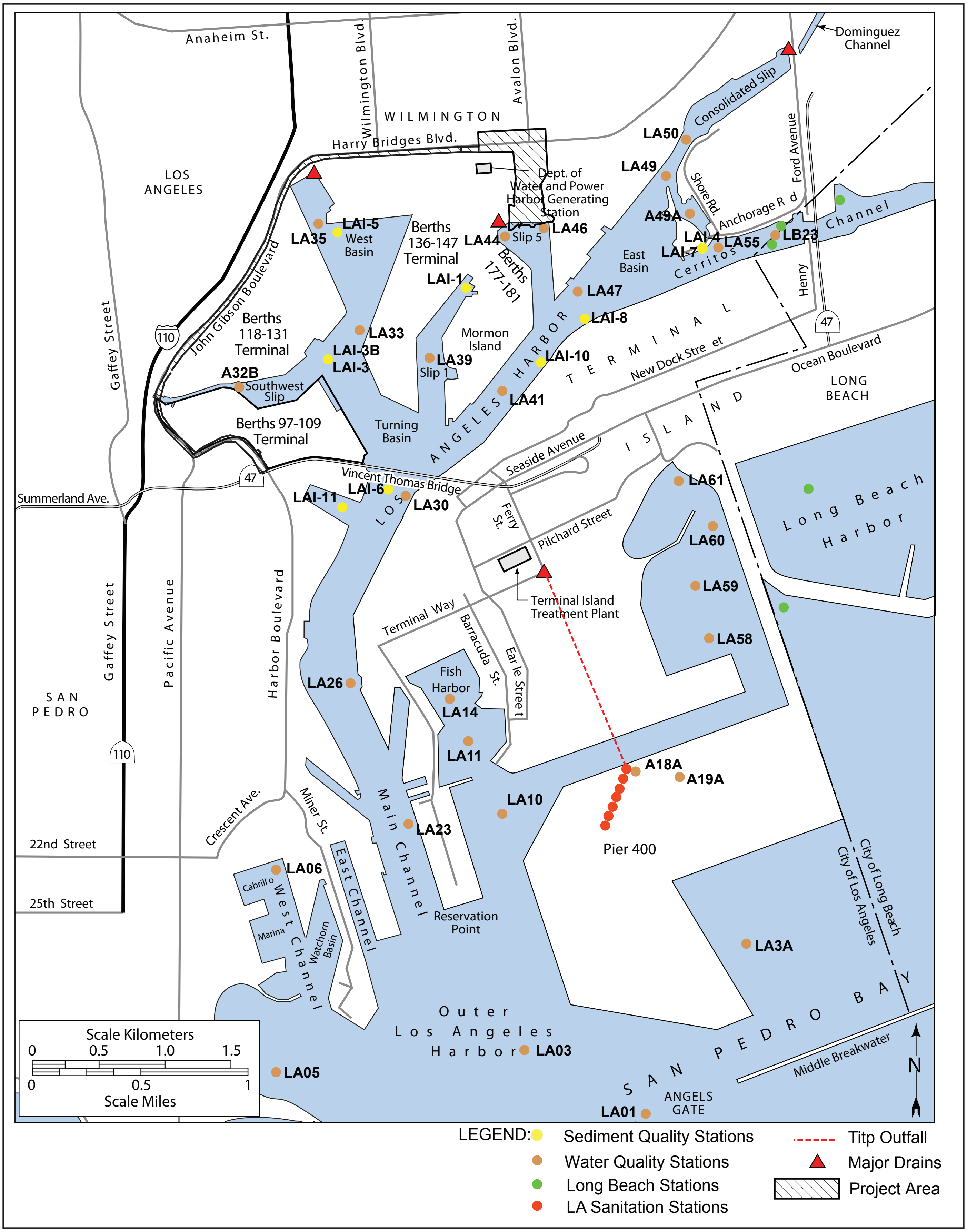
Los Angeles Harbor is located in the Dominguez Watershed, which drains approximately 832 square miles including the harbor area itself. Los Angeles Harbor has been physically modified through previous dredging and filling projects as well as construction of breakwaters and other structures. Los Angeles Harbor is adjacent to Long Beach Harbor. Both function oceanographically as one unit due to an inland connection via Cerritos Channel and because they share Outer Harbors behind the San Pedro, Middle, and Long Beach breakwaters.

The combined Los Angeles/Long Beach Harbor oceanographic unit has two major hydrologic divisions: marine and freshwater. The marine hydrologic division is primarily influenced by the Southern California coastal marine environment known as the Southern California Bight. The main freshwater influx into the Los Angeles Harbor is through the Dominguez Channel Estuary, which enters the harbor about 1 mile east of the waterfront portion of the proposed project area. The estuary extends approximately 8 miles north of the harbor and receives freshwater inputs from approximately 80 square miles of drainage. Another freshwater contributor to the harbor is the discharge of treated sewage from TITP into the Outer Harbor, about 7 miles south of the waterfront portion of the proposed project area (Figure 3.14-1). Sheet runoff and storm drain discharges during and after storm events also add freshwater to the harbor.

3.14.2.1.1 Surface Freshwater

Surface freshwater in the proposed project area is primarily from stormwater runoff, which enters the harbor from numerous storm drains or drainage systems. Slip 5 receives one such drain at its northwest corner. Stormwater systems in the vicinity of the proposed Project are relatively old and have no associated treatment systems, discharging directly to the harbor via a system of catch basins, ditches, and culverts. There are no lakes, streams, or other natural surface water bodies in the proposed project area. The largest stormwater conveyance is the Dominguez Channel, which drains into the East Basin of the harbor. The proposed Project is within the Dominguez Watershed (California State Water Resources Control Board (SWRCB) Hydrologic Unit 405.12), in and adjacent to the Los Angeles Harbor. The watershed (has an area of 133 square miles and is roughly bordered by Inglewood on the north, Compton on the east, Torrance on the west, and the federal breakwaters of Los Angeles and Long Beach Harbors on the south (MEC 2004:1–5). Most land in the watershed is developed (93%), and 62% of stormwater runoff from these lands drains to the Dominguez Channel, which drains to the Los Angeles Harbor. The remaining runoff drains to retention basins into Wilmington Drain, which in turn drains to Machado Lake, or directly into the Los Angeles and Long Beach Harbors (MEC 2004:1–3).

The Dominguez watershed comprises five subwatersheds. Two of these (the Upper Channel and the Lower Channel) drain directly into the Dominguez Channel. The remaining subwatersheds are the retention basins, Machado Lake, and Harbors



Source: Los Angeles Harbor Department (unpublished data)

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Figure 3.14-1
Water Quality and Sediment Sampling Locations
Wilmington Waterfront Development Project

subwatersheds (MEC 2004:2–94). The proposed project area occurs within the Harbors subwatershed, which includes portions of the cities of Los Angeles, Long Beach, Rancho Palos Verdes, and Rolling Hills; has an area of 36.7 square miles; and drains directly into the harbor (MEC 2004:2–100).

All of the developed upland areas in the Dominguez Watershed have storm drains that are designed for a 10-year event and comply with the County's standard urban storm water mitigation plan (see Section 3.14.3.3). These drains are inspected at least annually and maintained as necessary.

The proposed Project includes the San Pedro Buffer Linkage, from which runoff flows primarily to the Southwest Slip and the West Basin; and Wilmington portions of the proposed project area, from which runoff flows primarily to the East Basin. All of these receiving waters are in the Inner Harbor.

3.14.2.1.2 Marine Waters

The Los Angeles Harbor has been physically modified through past dredging and filling projects, as well as construction of breakwaters and other structures. Los Angeles Harbor is adjacent to Long Beach Harbor, and oceanographically they function as one unit. This is due to an inland connection via Cerritos Channel and because they share Outer Harbors behind the San Pedro, Middle, and Long Beach Breakwaters. In addition, there is an opening in the causeway leading to Pier 400 that was designed to enhance circulation.

The existing beneficial uses of coastal and tidal waters in the Inner Harbor areas of Los Angeles Harbor, as identified in the Water Quality Control Plan: Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan), include industrial service supply, navigation, water contact recreation, non-contact water recreation, commercial and sport fishing, preservation of rare and endangered species, marine habitat, and shellfish harvesting (LARWQCB 1994). Waters in the proposed project area that are 303(d)-listed for impairment include the Los Angeles/Long Beach Inner Harbor (California State Water Resources Control Board 2006). Other 303(d)-listed waters in Los Angeles Harbor are summarized in Table 3.14-1. Additionally, certain water quality limited waters have designated plans, called Total Maximum Daily Load (TMDL) plans, designed to limit further impairments and to bring the affected waters into compliance with applicable water quality criteria. A TMDL is the amount of a particular pollutant that a stream, lake, estuary, or other water body can assimilate without violating state water quality standards. Once a TMDL is approved by the LARWQCB responsibility for reducing pollution among both point sources (wastewater NPDES permit holders) and diffuse sources (such as runoff from urban and agricultural sources, leaking underground storage tanks, and septic systems) is assigned so that water quality standards are no longer violated. A TMDL for bacteria has been completed and has been in effect since March 10, 2005, for the waters of Los Angeles Harbor (LARWQCB 2008). This TMDL is implemented as an amendment to the Basin Plan (LARWQCB 2004) and thus follows the same mechanisms for implementation as the Basin Plan. When LARWQCB issues permits such as NPDES permits or Clean Water Act Section 401 certifications, they include permit conditions that ensure compliance with the TMDL. TMDLs for other pollutants in the Dominguez watershed are in development but have not yet been approved (LARWQCD 2008).

The water and sediment quality parameters that could be affected directly by the proposed Project include dissolved oxygen (DO), hydrogen ion concentration (pH), turbidity/transparency, contaminants, and nutrients. Other parameters commonly used to describe marine water quality include salinity and temperature. While the proposed Project would not directly affect salinity and temperature, they are addressed because stormwater runoff from the proposed project area could affect these conditions in receiving waters. Oceanographic conditions that could be affected by the proposed Project include circulation (current patterns) as it may affect water exchange within Slip 5.

Table 3.14-1. Section 303(d)-Listed Waters in Los Angeles Harbor

Listed Waters/Reaches	*Impairments*
Cabrillo Marina (77 acres)	DDT, PCBs
Outer Cabrillo Beach (0.5 miles)	DDT, PCBs
Inner Cabrillo Beach Area (82 acres)	Copper, DDT, PCBs
Los Angeles/Long Beach Outer Harbor, inside breakwater (4,042 acres)	DDT, PCBs, sediment toxicity
Fish Harbor (91 acres)	benzo[a]anthracene, benzo[a]pyrene, chlordane, chrysene, copper, DDT, dibenz[a,h]anthracene, lead, mercury, PAHs, PCBs, phenanthrene, pyrene, sediment toxicity, zinc
Los Angeles/Long Beach Inner Harbor (3,003 acres)	Beach closures, benthic community effects, copper, DDT, PCBs, sediment toxicity, zinc
Los Cerritos Channel (31 acres)	Ammonia, bis(2ethylhexyl)phthalate/DEHP, chlordane (sediment), coliform bacteria, copper, lead, trash, zinc
Consolidated Slip (36 acres)	2-Methyanphthalene, benthic community effects, benzo[a]anthracene, benzo[a]pyrene, cadmium (sediment), chlordane (tissue and sediment), chromium (sediment), chrysene, copper (sediment), DDT (tissue and sediment), dieldrin, lead (sediment), mercury (sediment), PAHs, PCBs (tissue and sediment), phenanthrene, pyrene, sediment toxicity, toxaphene (tissue), zinc (sediment)
Domínguez Channel from Vermont to Estuary (8.3 miles)	Ammonia, benthic community effects, PAHs (benzo[a]pyrene, benzo[a]anthracene, chrysene, phenanthrene, pyrene), chlordane (tissue), coliform bacteria, DDT (tissue and sediment), dieldrin (tissue), lead (tissue), PCBs, zinc (sediment)

Notes:
PCBs = polychlorinated biphenyls
DDT = dichloro-diphenyl-trichloroethane
DEHP = di(2-ethylhexyl)phthalate released from polyvinyl chloride (PVC)
PAHs = polycyclic aromatic hydrocarbons

*Fish consumption advisory
Source: LARWQCB 2007c.

3.14.2.1.3 Water Quality

Water quality conditions in the harbor complex and proposed project area have been summarized from a 2000 baseline study (MEC 2002) and other sources as cited below. Water and sediment quality sampling throughout the harbor is not undertaken on an annual basis, and the most recent comprehensive sediment quality surveys were completed in 2000. The Port has been conducting voluntary monthly monitoring of physical parameters since the late 1960s at approximately 30 stations distributed throughout the harbor. The Port began a Port Wide Water Quality study in 2004 to establish a baseline of chemical parameters in the ambient water for use in future water quality programs. This expanded sampling includes organic and inorganic priority pollutants and analytes of interest in TMDLs and is conducted generally twice per year (one during wet season and one during dry season). Other water quality sampling programs include those related to the Main Channel and Inner Cabrillo Beach bacteria TMDL. The Port cooperated with the City and County of Los Angeles in implementing a study plan to assess bacterial levels in the Main Channel and Inner Harbor along with special focused studies at selected areas. The Port along with the City/County working group is continuing to investigate four areas that were determined to be isolated bacterial hot spots. Additionally, the Port was a participant in the Bight '03 Regional Monitoring Program managed by Southern California Coastal Water Research Project and is also involved in the Bight '08 Program. This program has water, sediment, and biological monitoring components.

Port water quality sampling data was reviewed for 2000 to 2008. No trend is apparent in the data, so all appear to represent baseline conditions. Additionally, detailed sampling for water quality was performed throughout the harbor in January 2008 (LAHD 2008; A. Jirik, pers. comm. 2008).

Water quality in the Los Angeles Harbor is influenced by a number of factors including climate, circulation, biological activity, surface runoff, effluent discharges, and accidental discharges of pollutants related to shipping activities. Parameters such as salinity, pH, temperature, and transparency/turbidity are influenced primarily by large scale oceanographic and meteorological conditions, while dissolved oxygen and nutrients are related to local processes in addition to regional conditions.

Surface runoff, effluent discharges, and historical and recent watershed inputs affect water and sediment quality within the harbor. As of 2008, there were a total of 62 active NPDES permitted discharges in the Dominguez Watershed (LARWQCB 2007b).

Discharge permits typically specify maximum allowable concentrations and mass emission rates for effluent constituents. Numeric criteria for priority pollutants in discharge permits may be based on limits contained in the California Ocean Plan or by the California Toxics Rule (65 FR 31681-31719). The relative contributions (i.e., loadings) to the Los Angeles Harbor from regulated point source and unregulated non-point sources are expected to vary for individual contaminants. Specific loadings for stressors identified on the 303(d) list are not well-characterized, but they are expected to be addressed by future TMDL studies.

Discharges from storm drains into the Southwest Slip, West Basin, and Slip 5 also can affect water quality in receiving waters for the proposed Project. Information to characterize the quality of this storm runoff is unavailable. However, Los Angeles County Department of Public Works (LACDPW 2002) evaluated water quality at a sampling location on the Dominguez Channel by comparing sampling data to the Ocean Plan, Basin Plan, California Toxics Rule, and AB411 standards. LACDPW concluded the following: coliform levels exceeded AB411 standards; ammonia levels exceeded Basin Plan objectives; dissolved copper exceeded Basin Plan objectives, and total copper concentrations exceeded Ocean Plan objectives; and total zinc concentrations exceeded Ocean Plan objectives. Another study performed at the Port of Long Beach in 2005 (MBC 2005) examined storm drain runoff from port facilities and found pollutants such as metals and semi-volatile organic compounds (SVOCs). At a few sample locations copper, lead, mercury, nickel, and zinc occurred in stormwater samples at concentrations that exceeded the standards for marine waters. Existing conditions for runoff into Southwest Slip, West Basin, and Slip 5 are expected to be similar to those for Dominguez Channel and the Port of Long Beach because land uses are similar.

As mentioned above, the LAHD has been monitoring water quality on a monthly basis in the harbor since 1967. In 2000, the Ports of Los Angeles and Long Beach completed water quality measurements for the harbor complex for the Year 2000 baseline study (MEC 2002), and additional measurements were collected for the Ports in 2008 (LAHD 2008). Nine monitoring stations were located in the immediate vicinity of the proposed Project, in the Main Channel, the Southwest Slip, the West Basin, Slip 1, Slip 5, and East Basin (see Figure 3.14-1). Water quality parameters measured at these stations included dissolved oxygen, biochemical oxygen demand, temperature, and transparency. The Port of Los Angeles has been collecting data for these stations at approximately monthly intervals for many years. Arithmetic mean values of selected surface water quality constituents at these locations, for the period from January 2000 to July 2008 (the most recent available data), are shown in Table 3.14-2. In addition, in January 2008 the Port performed a detailed analysis of water quality that measured contaminant levels at all stations mentioned above. The sampling included a very wide array of compounds including measurement of 13 general chemistry parameters, 172 organic compounds, 4 butyltins, both dissolved and total content of 21 metals, and bacteria. Detailed results of that sampling are presented in Appendix J. No PAHs, PCBs, pesticides, or other organic compounds were detected. Butyltins were not detected. Metals and bacteria were detected in varying amounts that did not exceed water quality criteria.

Table 3.14-2. Arithmetic Mean of Monthly Measured Values of Water Quality Constituents in Surface Waters near the Proposed Project Area, 2000–2008.

	Habitat/ Station	*LA30*	*LA32B*	*LA33*	*LA35*	*LA39*	*LA41*	*LA44*	*LA46*	*LA47*
Dissolved Oxygen (mg/l)	Surface	6.4	6.5	6.6	6.5	6.6	6.5	6.4	6.3	6.4
	Bottom	6.7	6.7	6.7	6.6	6.7	6.5	6.5	6.5	6.6
Biochemical Oxygen Demand	Surface	0.9	0.9	1.1	0.9	1.8	1.0	0.9	0.8	0.9
	Bottom	0.8	0.8	0.9	0.7	1.3	0.8	0.6	0.6	0.9
Temperature (°C)	Surface	16.4	16.2	16.0	16.2	16.0	16.9	16.8	16.9	16.9
	Bottom	16.8	16.1	16.0	16.1	16.0	16.9	16.8	16.9	16.9
Transparency (feet)	Surface	8.4	7.1	7.5	9.0	9.2	9.2	9.7	10.5	9.1
Source: Port of Los Angeles 2008.										

Dissolved Oxygen

Dissolved oxygen (DO) is a principal indicator of water quality. The EPA and the Los Angeles RWQCB (LARWQCB) have established a DO concentration of 5 milligrams per liter (mg/l) as the minimum allowable concentration for aquatic habitats (U.S. Environmental Protection Agency 1986:211; LARWQCB 1994). The LARWQCB also requires that the mean annual DO concentration be 7 mg/l or greater, with no event less than 5 mg/l and a mean annual DO concentration in the Outer Harbor of 6 mg/l. DO concentrations may vary considerably based on the influence of a number of parameters:

- respiration of plants and other organisms,
- waste (nutrient, oxygen demanding substances) discharges,
- surface water mixing through wave action,
- diffusion rates at the water surface,
- water depth, and
- disturbance of bottom sediments that contain oxidizable material.

As recently as the late 1960s, DO levels at some locations in Los Angeles Harbor were so low that little or no marine life could survive. Since that time, regulations have reduced direct waste discharges into the harbor, resulting in improved DO levels throughout the harbor (MEC 2002).

Algal (dinoflagellate) blooms occur occasionally within the harbor, typically associated with high solar radiation and nutrient levels, such as on sunny days following storm events. These blooms can severely reduce DO levels, but the effects are usually localized and short-lived. Disturbances of anaerobic sediments by dredging activities also result in short-term, localized DO reductions due to resuspension of materials with a high oxygen demand. Water quality monitoring associated with a dredging operation at Southwest Slip in June 2003 recorded DO concentrations from 7.8 to 7.9 mg/l throughout the water column (POLA 2007). In this case, dredging did not result in reduced DO concentrations.

Water quality monitoring from 2000 to 2007 found DO levels generally greater than the water quality criterion of 5.0 mg/l at the three water quality stations (LA-44, LA-46, and LA-47) near or within Slip 5 (Tables 13.4-2 and 3.14-3). Out of 294 surface DO measurements at these three sites since January 2000, there have been 12 measurements below 5 mg/l, and two below 4 mg/l. In the same period, 294 bottom DO measurements have recorded seven measurements below 5 mg/l, and two below 4 mg/l. There have been no noteworthy spatial patterns in the measured DO concentrations at the sampling locations. The lowest and highest DO concentrations at the three sampling locations occurred during October–November and June–July, respectively (POLA 2008), with fall minima averaging 5.8 mg/l and summer maxima averaging 7.2 mg/l. Overall, DO concentrations near the proposed project area are at levels below LARWQCB standards about 3% of the time (POLA 2008).

This is documented by monthly measurements of dissolved oxygen at three sites in the vicinity of the proposed Project: LA44, in the northwest corner of Slip 5; LA 46, in the northeast corner of Slip 5; and LA 47, in the inner harbor just outside of Slip 5. The recorded dissolved oxygen measurements shown in Table 3.14-3 indicate considerable variability (scatter), but no trend over the past several years. This pattern indicates that it is reasonable to use data collected since 2000 to assist in characterizing the 2008 baseline water quality conditions.

Table 3.14-3. Port of Los Angeles, Inner Harbor Water Quality Data—Surface Dissolved Oxygen Ranges, 2000–2008

Year	*Station LA-44 (mg/l)*	*Station LA-46 (mg/l)*	*Station LA-47 (mg/l)*
2000	5.0–8.5	5.8–7.4	5.0–8.6
2001	5.2–8.0	3.7–7.8	4.0–7.8
2002	5.2–7.3	4.8–7.5	4.5–7.3
2003	4.6–7.9	0.8–7.7	4.3–7.6
2004	6.3–7.9	6.3–8.0	6.1–8.4
2005	5.1–8.6	5.0–7.9	4.9–8.5
2006	5.2–7.7	5.4–7.3	5.3–8.1
2007	5.6–6.8	5.0–6.9	5.4–6.7
2008 (January–July)	5.4–8.5	5.7–7.6	5.4–8.5
Source: Port of Los Angeles 2008.			

pH

Hydrogen ion concentration (pH) in marine waters is affected by plant and animal metabolism, mixing with water with different pH values from external sources, and (on a small scale) disturbances in the water column that cause redistribution of waters with varying pH levels or the resuspension of bottom sediments. The LARWQCB has established an acceptable range of 6.5–8.5 pH units with a change tolerance level of no more than 0.2 units due to discharges (LARWQCB 1994:3–15). In the open ocean, pH levels typically range from 8.0–8.3 (LAHD 2002:3.9-3). In the Outer Harbors, pH levels have ranged from 8.1 (upper level in warmer months) to 7.4 (lower levels in cooler months). In the Los Angeles Inner Harbor waters, pH levels measured from January to November of 2000 ranged from 7.70 to 8.03 (MEC 2002). There are no measurements available that are more recent, but uses of the harbor in 2000 were generally similar to those at the 2008 environmental baseline date, and other parameters measured during the 2000–2008 period (DO, BOD, temperature, transparency) show no evidence of a long-term trend. Thus, the 2000 pH values are considered representative of baseline conditions in the Los Angeles Inner Harbor. There are no data on pH levels in and near the proposed project area, but there are no local discharges or other factors that would cause pH levels in Slip 5 to differ substantially from pH levels measured elsewhere in the Inner Harbor.

Turbidity and Transparency

Turbidity is the measure of suspended solids in the water column. Water clarity, or how well water transmits light, is known as transparency. Increased turbidity usually results in decreased transparency. Turbidity generally increases as a result of one or a combination of the following conditions: suspended sediment from terrestrial runoff; planktonic bloom resulting from favorable environmental conditions such as abundant light and high nutrient loads; vessel-related disturbances; and dredging (MEC 2002:2–6). In general, the transparency of the harbor has improved since 1967 though individual measurements vary substantially (LAHD 2002:3.9-4). Average transparency values at nine water quality stations near or within the proposed project area range from 7.1 to 10.5 feet (Table 3.14-2). During the 2000–2008 monitoring period, transparencies have varied widely from 1 to 19 feet, with the lowest measurements (7.1 feet average) in February and the highest (10.1 feet average) in November (POLA 2008). For comparison, transparency measurements elsewhere within the Port range from 19.7 feet in the Outer Harbor to 7.4 feet in the Main Channel (POLA 2007). These data, having been collected monthly for a period (2000–2008) leading up to the environmental baseline date, provide information about baseline water quality conditions in the proposed project area and vicinity.

Contaminants

Contaminants in harbor waters can originate from a number of sources within and outside of the Port. Potential sources of trace metals and organics include municipal and industrial wastewater discharges, stormwater runoff, dry weather flows, leaching from ship hull anti-fouling paints, petroleum or waste spills, atmospheric deposition, and resuspension of bottom sediments containing legacy (i.e., historically deposited) contaminants such as DDT and PCBs. Most of the metal, pesticide, and PAH contaminants that enter the harbor have a low solubility in water and adsorb onto particulate matter that eventually settles to the bottom and accumulates in bottom sediments. Dredging projects in both the Inner and Outer Harbor areas, including the Los Angeles Harbor Deepening Project (USACE and LAHD 1984, in LAHD 2002), have removed contaminated sediments from the harbor. In addition, some contaminated sediment areas have been covered by less contaminated sediments as part of construction of landfills or shallow water habitat, thereby sealing them from exchange with the overlying water. Controls on other discharge sources have also contributed to decreases over time in the input of contaminants.

As discussed at the beginning of this section, draft TMDLs have been or are currently being prepared in response to 303d listings within the proposed project area. A bacteria TMDL has been completed for Los Angeles Harbor Main Channel. EPA and LARWQCB are in the process of preparing additional TMDLs and are working with a stakeholder technical advisory committee: Dominguez Channel and the Los Angeles and Long Beach Harbors Toxic and Metal TMDLs (Anchor et al. 2005:123). LAHD is an active participant in both processes.

There are few data describing metal contamination in harbor waters (LAHD 2002:3.9-4). Sampling for the enhanced water quality monitoring program at Station LA-30 (Figure 3.14-1) in September 2005 found concentrations of copper at 0.5–1.0 micrograms per liter (µg/l), mercury at 0.002 to 0.6 µg/l, zinc at 1.2–4.9 µg/l, and a variety of other trace metals (POLA 2007). Sources of contaminants include historical deposition, municipal and industrial wastewaters, marine vessel activities, and stormwater runoff (Anchor et al. 2005:110; LARWQCB 2007a:2.1-5). Maintenance dredging and long-term effluent limitations imposed by LARWQCB appear to be helping to decrease chemical contamination in harbor waters and sediments (LAHD 2002:3.9-4; LARWQCB 2007a:2.1-5).

Nutrients

Nutrients are necessary for primary production of organic matter by phytoplankton. Low nutrient concentrations can limit the photosynthetic production, whereas excess nutrient concentrations can cause eutrophication and promote harmful algal blooms. Major nutrients that may limit phytoplankton photosynthesis are phosphates and nitrates. The availability of phosphates and nitrates changes from day to day and is influenced by factors that include biological processes, wastewater discharge, and stormwater runoff. Point source discharges are regulated through discharge permits, and stormwater discharges are regulated though municipal and industrial stormwater permits. The harbor, as an enclosed water body, has different seasonal and spatial variation in nutrient concentration than what is observed outside the breakwater (LAHD 2002:3.9-4)

Data on nutrient (total Kjeldahl nitrogen) data in the harbor were collected by the Port (POLA 2008) in January 2008. Measurements at the nine stations listed in Table 3.14-2 varied from 0.56 to 0.98 mg/l, in addition to two samples measured below the detection limit of 0.50 mg/l. These are very low values, indicating that nitrogen, at the time of measurement, was likely not contributing to water quality limitations in the harbor. However, it is possible that higher nitrogen concentrations occur at other times of the year or in response to isolated events such as a flush of stormwater from upland areas adjoining the harbor. In the Los Angeles Harbor, no data relevant to the environmental baseline are available to describe other measures of nutrient abundance such as phosphate, nitrate, or nitrite concentrations. However, the low BOD values and generally high dissolved oxygen values listed in Table 3.14-2 are consistent with a diagnosis that harbor waters are generally not limited by excessive nutrient loading.

Temperature

The seasonal and spatial variation in water temperature in the harbor reflects the influence of the ocean, local climate, the physical configuration of the harbor, and circulation patterns. General seasonal trends in water temperature consist of uniform, cooler temperatures throughout the water column in the winter and spring, and of stratified, warmer temperatures with cooler waters at the bottom in the summer and fall. The stratified summer and fall conditions may be attributed to warmer ocean currents, local warming of surface waters through insolation, and reduced runoff into nearshore waters. Inter-annual or longer-term patterns in water temperatures reflect the influences of oceanographic conditions, such as those associated with El Niño/La Niña cycles (MEC 2002). In 2000, surface water temperatures in the West Basin averaged 59.4°F (15.4°C) in January, 61.9°F (16.6°C) in May, 73.4°F (23.0°C) in August, and 63.9°F (17.7°C) in November. Bottom temperatures were 0.7 to 6.3°F (0.4 to 3.5°C) lower with the larger difference in the summer (MEC 2002). These temperatures are similar to monitoring conducted by MBC in the West Basin (2003), which ranged from 59.5 to 61.7°F (15.3 to 16.5°C) in the winter to 66.9 to 74.3°F (19.4 to 23.5°C) in the summer (MBC 2006). In Slip 5, water quality data collected at stations LA-44 and LA-46 between 2000 and 2008 (Appendix J) indicate that both surface and bottom temperatures are similar at both stations. Bottom temperatures vary from a low of approximately 58.3°F (14.6°C) in February to a high of approximately 66.9°F (19.4°C) in July. Surface temperatures vary from a low of approximately 57.9°F (14.4°C) in February to a high of approximately 67.6°F (19.8°C) in July. The similarity between surface and bottom temperatures indicates that the harbor is not thermally stratified and, thus, that surface and bottom waters are mixed by processes such as tides, wind, and wave action.

Salinity

Variations in salinity occur due to the effects of stormwater runoff, waste discharges, rainfall, and evaporation (LAHD 2002:3.9-5). Salinity in the Outer Harbor is generally higher in the summer (due to warmer weather evaporation) than in the winter (due to less evaporation in cooler weather and freshwater inputs from storms), and deeper Outer Harbor locations were typically more saline than shallower locations (MEC 1988). Typical salinity for coastal waters is around 33 parts per thousand (ppt). Measurements in the West Basin during 2000 and 2003 showed salinity values ranging from 32.8 to 33.6 ppt in surface and bottom waters (MEC 2002; MBC 2003). No records of salinity in Slip 5 exist, but given the extent of tidal mixing in the Inner Harbor (discussed in the Oceanography section below), and in view of the presence of large stormwater drains in both the West Basin and Slip 5, it is likely that salinity patterns in Slip 5 are close to those observed in the West Basin.

Storm drains empty into the northwest corner of Slip 5, the western end of the Southwest Slip and into the West Basin (Figure 3.14-1). Stormwater discharges cause reduced salinity during storm runoff events, particularly in surface waters because freshwater is lighter and floats on top of the denser seawater. As the fresher runoff waters mix with the seawater, due to wind, vessel traffic, tidal currents, and diffusion, the salinity of the runoff plume increases (POLA 2007).

3.14.2.1.4 Marine Sediments

Sediments in the proposed project area are primarily composed of nearshore marine or estuarine sediments that were either deposited in place along the margin of the early San Pedro embayment or subsequently dredged and placed at their current locations as fill material. Spills of petroleum products and hazardous substances due to long-term industrial land use have probably resulted in the sediment contamination levels currently observed, which are detailed below. The California SWRCB (2006) has listed various areas in the Los Angeles/Long Beach Harbor complex as an impaired waterbody under Section 303(d) of the Clean Water Act for specific sediment contaminants (see Table 3.14-1).

The MEC (2002) biological baseline study results suggest that the removal of contaminated sediments during the Channel Deepening Project has led to a significant improvement in the environmental quality of the Harbor. Although the Inner Harbor is significantly cleaner than it was 25 years ago, some areas still exhibit the effects of historic deposits of pollution in the sediments and from the existing point and nonpoint discharges (LARWQCB 2002). Localized areas of contaminated sediment still remain.

Currently, no numerical sediment quality objectives exist to compare to the sediment testing results; however, sediment quality objectives are being developed by the California SWRCB. Therefore, recent sediment testing results are used to characterize sediment quality by comparisons to published guidelines (California Department of Water Resources 1995) and exceedance criteria (Chapter 3 of the Basin Plan [LARWQCB 1994 and amendments] and the California Toxics Rule [65FR31682-31719]) as follows:

ERL (Effect Range Low): Concentrations below the ERL value represent a minimal-effects range, a range intended to estimate conditions in which effects would be rarely observed (California Department of Water Resources 1995).

ERM (Effect Range Medium): Concentrations above the ERL but below the ERM represent a possible-effects range within which effects would occasionally occur.

Concentrations above the ERM represent a probable-effects range within which effects would frequently occur (California Department of Water Resources 1995).

In 2002, the LAHD collected sediment quality data for Slip 5 in connection with proposals for maintenance dredging at Berths 177–179, and at Berths 180–181. These areas collectively comprise the entire west shore of Slip 5. No sediment quality data have been located for the sediments at the head (north end) of Slip 5, where all in-water work for the proposed Project would occur, although Berth 177 is near this area. Sediment quality data have also been collected for other areas near the proposed project area, including the West Basin, Southwest Slip, Inner Harbor, and East Basin, and are summarized here.

Potential contaminants within sediments in the proposed project area include:

- metals (particularly cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc);
- oil and grease;
- chlorinated hydrocarbons (particularly DDT and DDE); and
- PCBs.

These contaminants were found in harbor sediments prior to the Los Angeles Harbor Deepening Project (USACE and LAHD 1984 in LAHD 2002:3.9-4) and are listed on the California SWRCB's 2006 303(d) list for various Los Angeles Harbor water features (SWRCB 2006; Table 3.14-1). Although a large portion of contaminated sediments have been removed via channel deepening and maintenance dredging activities, contaminated sediments remain in localized areas (LAHD 2002:3.9-4, LARWQCB 2007a:2.1-5), and the level of contamination varies substantially through the Los Angeles Inner Harbor (LARWQCB 2007a:1–4).

Physical and chemical analysis of sediments, pore water[2], and overlying water was conducted during October 2006 in support of development and implementation of a sediment TMDL for the Los Angeles/Long Beach Harbors (Weston Solutions 2007). The sampling and analysis included 13 sites within the proposed project area in the Inner, Middle, and Outer Harbors (Figure 3.14-1). The samples were analyzed for all priority pollutant metals, pesticides, PCBs (including Aroclors[3]), organotins, and PAHs. Results of this testing are summarized in the remainder of this section. These data, having been collected during the baseline evaluation period, represent baseline conditions in the harbor.

Slip 5

In 2002, the Port collected sediment quality data for Slip 5 in connection with proposals for maintenance dredging at Berths 177–179, and at Berths 180–181

[2] Water in pore spaces within sediments.
[3] Aroclors are a subgroup of PCBs..

(Kinnetic/Toxscan 2003). However, the sampled sediments were subsequently removed via dredging and, due to their high level of contamination, disposed at an upland location. There are no data available to describe sediment quality in Slip 5. Given the locally high concentrations of contaminants found in other waters of the Los Angeles Inner Harbor and the long history of industrial use of Slip 5, it is likely that locally high concentrations of contaminants occur at locations in Slip 5. .

West Basin

Numerous sediment quality analyses have been performed in the West Basin. Results have generally documented a fairly high level of variability from one sample site to another. Sampling has included the following:

- Bulk sediment analyses for grain size, total organic carbon, dissolved organic carbon, priority pollutant metals, oil and grease, ammonia, total and dissolved sulfides, petroleum hydrocarbons, PAHs, chlorinated pesticides, PCBs, selected SVOCs, and organotins(Weston Solutions 2007). Sampling was performed in October 2006 .
- Bulk sediment chemical analyses for grain size, ammonia, total sulfides, water soluble sulfides, total organic carbon, total solids, 10 types of heavy metals, organotins, petroleum hydrocarbons, 14 types of PAHs, 18 types of chlorinated pesticides, 8 types of PCBs, phenols, and phthalates(AMEC 2003b); elutriate testing and bioassays were also performed for the metals and organic constituents. Sampling was performed in 2003 .
- Grain size and metals were sampled in 2003 (MBC 2003).
- Bulk sediment chemical analyses for grain size, ammonia, total sulfides, total volatile solids, water soluble sulfides, oil and grease, petroleum hydrocarbons, percent solids, total organic carbon, 10 types of heavy metals, 4 types of organotins, 21 types of chlorinated pesticides, 4 types of PCBs, and 20 types of semi-volatiles including petroleum constituents, PAHs, and phthalates (Kinnetic Laboratories/ToxScan 2002). Elutriate samples were also analyzed for most of the same constituents. Sampling was performed in 1996 and 1997.
- Metals were sampled in April 1997 (Ogden 1997).

Sediment quality data reported below are considered representative of baseline conditions in 2008 because the magnitude and composition of source inputs to the West Basin have remained similar over this period. Local areas have been disturbed by dredging, but the principal contaminants found in sediments in the Los Angeles Inner Harbor have continued to appear in samples dating from the late 1990s to the most recent work, and sediments in the harbor are 303(d) listed for most of these same contaminants. It is thus highly unlikely that dredging in recent years has eliminated potential water quality problems associated with sediment contamination, and, on balance, the results of these past studies are probably strongly indicative of the types and concentrations of sediment contaminants existing in the Los Angeles Inner Harbor at the date of the environmental baseline.

Sediment in the West Basin is 51 to 63% sand, and 37 to 48% silt and clay (MEC 2002, MBC 2003). Most constituents in most samples were non-detects or were below the ERL levels. However, the following exceptions were observed in one or more samples:

- Arsenic exceeded the ERL (AMEC 2003a, Weston Solutions 2007).
- Copper exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; AMEC 2003a; MBC 2003; Weston Solutions 2007).
- Mercury exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; AMEC 2003a; Weston Solutions 2007).
- Nickel exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; AMEC 2003a; Weston Solutions 2007).
- Lead exceeded the ERL (AMEC 2003a).
- Zinc exceeded the ERL (Weston Solutions 2007).
- Total DDTs exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; AMEC 2003a; Weston Solutions 2007).
- DDE exceeded the ERM (Kinnetic Laboratories/ToxScan 2002; Weston Solutions 2007).
- Total PCBs exceeded the ERL (Weston Solutions 2007) and the ERM (Kinnetic Laboratories/ToxScan 2002).
- Total high-molecular-weight (HMW) PAHs exceeded the ERL (Weston Solutions 2007).
- Total PAHs exceeded the ERL (Kinnetic Laboratories/ToxScan 2002) and ERM (Weston Solutions 2007).
- Bioassays: suspended particulate phase tests indicated no significant toxicity but slight reductions in development (AMEC 2003a).
- Bioassays: solid phase tests found significant toxicity to a benthic amphipod (Kinnetic Laboratories/ToxScan 2002).
- Bioaccumulation: statistically significant lead, mercury, DDD, and PCB accumulations (Kinnetic Laboratories/ToxScan 2002).
- Bioaccumulation: statistically significant PAH accumulations (AMEC 2003a).
- DDE/DDT, chlordane, dieldrin, and limited PAHs exceeded the ERL and/or ERM (MEC 2001)

Southwest Slip

Limited sediment quality analyses have been performed in the Southwest Slip. Sampling has included the following:

- Bulk sediment chemical analyses for grain size, ammonia, total sulfides, total volatile solids, water soluble sulfides, oil and grease, petroleum hydrocarbons, percent solids, total organic carbon, 10 types of heavy metals, 4 types of organotins, 21 types of chlorinated pesticides, 4 types of PCBs, and 20 types of semi-volatiles including petroleum constituents, PAHs, and phthalates (Kinnetic Laboratories/ToxScan 2002). Elutriate samples were also analyzed for most of the same constituents. Sampling was performed in 1996 and 1997.
- Metals, PAHs, and PCBs were sampled in 1997 (California SWRCB et al. 1998).

Sediment quality data reported below are considered representative of baseline conditions in 2008 because the magnitude and composition of source inputs to the Southwest Slip have remained similar over this period. Local areas have been disturbed by dredging, but the principal contaminants found in sediments in the Los Angeles Inner Harbor have continued to appear in samples dating from the late 1990s to the most recent work, and sediments in the harbor are 303(d) listed for most of these same contaminants. It is thus highly unlikely that dredging in recent years has eliminated potential water quality problems associated with sediment contamination, and, on balance, the results of these past studies are probably strongly indicative of the types and concentrations of sediment contaminants existing in the Los Angeles Inner Harbor at the date of the environmental baseline.

Most constituents in most samples were non-detects or were below the ERL levels. However, the following exceptions were observed in one or more samples:

- Cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc exceeded the ERM (Kinnetic Laboratories/ToxScan 2002).
- Mercury exceeded the ERM (California SWRCB et al. 1998; Kinnetic Laboratories/ToxScan 2002).
- DDT exceeded the ERM (Kinnetic Laboratories/ToxScan 2002).
- PCBs and PAHs exceeded the ERM (California SWRCB et al. 1998; Kinnetic Laboratories/ToxScan 2002).
- PAHs and PCBs were associated with amphipod toxicity (California SWRCB et al. 1998).
- Bioaccumulation: statistically significant accumulation of 8 metals, PAHs, DDE, and PCBs in worms and clams (Kinnetic Laboratories/ToxScan, 2002).

Inner Harbor and East Basin

Sediment quality analyses performed in the main channel of the Inner Harbor and the East Basin have generally documented a fairly high level of variability from one sample site to another. Sampling has included the following:

- Bulk sediment analyses for grain size, ammonia, total sulfides, total volatile solids, water soluble sulfides, oil and grease, petroleum hydrocarbons, percent solids, total organic carbon, 10 types of heavy metals, 4 types of organotins, 21 types of chlorinated pesticides, 4 types of PCBs, and 20 types of semi-volatiles including petroleum constituents, PAHs, and phthalates. Elutriate samples were also analyzed for most of the same constituents. Sampling was performed in 1996 and 1997 (Kinnetic Laboratories/ToxScan 2002).
- Bulk sediment analyses for grain size, total organic carbon, dissolved organic carbon, priority pollutant metals, oil and grease, ammonia, total and dissolved sulfides, petroleum hydrocarbons, PAHs, chlorinated pesticides, PCBs, selected semi-volatile organic compounds, and organotins. Sampling was performed in October 2006 (Weston Solutions 2007).

Sediment quality data reported below are considered representative of baseline conditions in 2008 because the magnitude and composition of source inputs to the Inner Harbor and East Basin have remained similar over this period. Local areas have been disturbed by dredging, but the principal contaminants found in sediments in the Los Angeles Inner Harbor have continued to appear in samples dating from the late 1990s to the most recent work, and sediments in the harbor are 303(d) listed for most of these same contaminants. It is thus highly unlikely that dredging in recent years has eliminated potential water quality problems associated with sediment contamination, and, on balance, the results of these past studies are probably strongly indicative of the types and concentrations of sediment contaminants existing in the Los Angeles Inner Harbor at the date of the environmental baseline.

Grain size in the Inner Harbor is highly variable, with 19 to 91% sand, 6 to 52% silt, and 3 to 31% clay (Kinnetic Laboratories/ToxScan 2002; Weston Solutions 2007). Most constituents in most samples were non-detects or were below the ERL levels. However, the following exceptions were observed in one or more samples:

- Arsenic exceeded the ERL (Weston Solutions 2007).
- Copper exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; Weston Solutions 2007).
- Mercury exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; Weston Solutions 2007).
- Lead exceeded the ERL (Weston Solutions 2007).
- Nickel exceeded the ERL (Kinnetic Laboratories/ToxScan 2002; Weston Solutions 2007).
- Zinc exceeded the ERL (Weston Solutions 2007).

- DDD exceeded the ERL (Weston Solutions 2007).
- DDE exceeded the ERM (Kinnetic Laboratories/ToxScan 2002, Weston Solutions 2007).
- Total chlordane exceeded the ERL (Weston Solutions 2007).
- Total DDTs exceeded the ERL (Weston Solutions 2007) and the ERM (Kinnetic Laboratories/ToxScan 2002).
- Total HMW PAHs exceeded the ERL (Weston Solutions 2007).
- Total PCBs exceeded the ERL (Kinnetic Laboratories/ToxScan 2002).

3.14.2.2 Oceanography

Los Angeles Harbor is a southern extension of the relatively flat coastal plain, bounded on the west by the Palos Verdes Hills, which offer protection to the bay from prevailing westerly winds and ocean currents. The harbor was originally an estuary that received freshwater from the Los Angeles and San Gabriel Rivers. Over the past 80 to 100 years, development of the Los Angeles/Long Beach Harbor complex, through dredging, filling, and channelization, has completely altered the local estuarine physiography.

3.14.2.2.1 Tides

Tides are the result of astronomical and meteorological conditions. Tidal variations along the coast of Southern California are influenced primarily by the passage of two harmonic tide waves, one with a period of 12.5 hours and the other with a period of 25 hours (LAHD 2002:3.9-6). This combination of two harmonic tide waves usually produces two high and two low tides each day. The twice daily (semidiurnal) tide of 12.5 hours predominates over the daily (diurnal) tide of 25 hours in Los Angeles Harbor, generating a diurnal inequality, or mixed semidiurnal tide. This causes a difference in height between successive high and low waters ("water" is commonly used in this context instead of "tide"). The result is two high waters and two low waters each day, consisting of a higher high water (HHW) and a lower high water (LHW), and a higher low water (HLW) and a lower low water (LLW).

The mean tidal range for the Outer Harbor, calculated by averaging the difference between all high and low waters, is 3.76 feet; and the mean diurnal range, calculated by averaging the difference between all the HHW and LLW, is approximately 5.6 feet (USACE and LAHD 1992:4B-6). The extreme tidal range (between maximum high and maximum low waters) is about 10.5 feet; the highest and lowest tides reported are 7.96 feet above mean lower low water (MLLW) and 2.56 feet below MLLW, respectively (USACE and LAHD 1992:4B-6). MLLW is the mean of all LLWs, equal to 2.8 feet below MSL. It is the datum from which southern California tides are measured (i.e., 0 feet MLLW = -2.8 feet MSL). (LAHD 2002:3.9-6)

Available Los Angeles Harbor tide data from 1923 to 1984 indicate that the highest water elevations usually occur during November through March. These higher water elevations typically range from +7 to +7.5 feet MLLW. The more severe offshore storms usually occur along the California coast during this same period. (LAHD 2002:3.9-6).

3.14.2.2.2 Waves

Ocean waves impinging on the southern California coast can be divided into three primary categories according to origin: Southern Hemisphere swell, Northern Hemisphere swell, and seas generated by local winds. Los Angeles Harbor is directly exposed to ocean swells entering from two main exposure windows to the south and southeast, regardless of swell origin. The more severe waves from extra-tropical storms (Hawaiian storms) enter from the south to southeast direction. The Channel Islands, particularly Santa Catalina Island, provide some shelter from these larger waves, depending on the direction of approach. The other major exposure window opens to the south, allowing swells to enter from storms in the Southern Hemisphere, tropical storms (chubascos), and southerly waves from extra-tropical storms.

Waves and seas entering Los Angeles Harbor are greatly diminished by the time they reach the Inner Harbor. Most swells from the Southern Hemisphere arrive at Los Angeles from May through October. Southern Hemisphere swells characteristically have low heights and long wave periods (wave period is a measurement of the time between two consecutive peaks as they pass a stationary location). Typical swells rarely exceed 4 feet in height in deep water. However, with periods as long as 18–21 seconds, they can break at over twice their deepwater wave height. (LAHD 2002:3.9-6 to 3.9-7.)

Northern Hemisphere swells occur primarily from November through April. Deepwater significant wave heights have ranged up to 20 feet, but are typically less than 12 feet. Northern Hemisphere wave periods generally range from 12–18 seconds. (LAHD 2002:3.9-7)

Local wind-generated waves are predominantly from the west and southwest; however, they can occur from all offshore directions throughout the year, as can waves generated by diurnal sea breezes. Local waves are usually less than 6 feet in height, with wave periods of less than 10 seconds. (LAHD 2002:3.9–7)

3.14.2.2.3 Circulation and Flushing

Circulation patterns in Los Angeles Harbor are established and maintained by tidal currents. Flood (rising) tides in Los Angeles Harbor flow into the harbor and up the channels, while ebb (falling) tides flow down the channels and out of the harbor. In addition to the protection the Federal Breakwater provides to the Los Angeles and Long Beach Harbors, the Federal Breakwater also reduces water exchange between the Ports and San Pedro Bay (MEC 2002:2–7). In the Outer Harbor, near Angels and

Queen's Gates, maximum surface tidal velocities reach approximately 0.8 feet per second (fps), while minimum tidal velocities of 0.088 fps occur in the Inner Harbor area (Wang et al. 1995 in LAHD 2002:3.9-7). The maximum velocity of water entering and leaving the harbor through Angels Gate is 0.8 fps on flood tides and 0.3 fps on ebb tides (MEC 2002).

Circulation patterns in the harbor are determined by a combination of tide, wind, thermal structure, and local topography. The net tidal exchange is inward through Angels Gate and outward through Queen's Gate, between the Middle and Long Beach Breakwater and the gap between the eastern end of Long Beach Breakwater and Alamitos Bay. Thus, there is a net eastward flow within the harbor (LAHD 1993 in LAHD 2002:3.9-7). Overall tidal exchange rates fluctuate between 8 and 25%, with the flushing rate estimated at 90 tidal cycles (Maloney and Chan 1974).

There is less tidal mixing in the Inner Harbor than in the Outer Harbor. Tidal-induced water exchange in the Inner Los Angeles Harbor averages 22% of the total harbor water volume per day (USACE and LAHD 1980 in LAHD 2002:3.9-7). Neglecting stormwater and industrial discharges, flushing efficiency of the harbor has been determined using the tidal prism method. Overall tidal exchange rates fluctuate between 8 and 25%, with the flushing rate estimated at 90 tidal cycles, or 47 days (Maloney and Chan 1974 in LAHD 2002:3.9-7).

3.14.2.2.4 Flooding

Most of the proposed project area lies within a 100-year flood plain, as determined by the Federal Emergency Management Agency (FEMA). The proposed project area was formerly a marsh, which has been modified by dredging and filling, resulting in elevations of only 10 to 15 feet above sea level. Flooding in this area occurs because of its location near Dominguez Channel, and because of low land elevations. The proposed project area is predominantly paved or otherwise impervious, resulting in minimal surface water infiltration during rainfall events and flooding. The only potential sources of flooding at the site would be storm surge, tsunami, or seiche. The latter two sources are discussed in Section 3.5, "Geology." Storm surge is elevation of the water level that results from reduced barometric pressure and wind stress during storm events. Storm surge is relatively small (less than 1 foot) along the Southern California coast when compared with tidal fluctuations. For example, the winter storm of January 17 and 18, 1988, produced the all-time record low barometric pressure. Measured water level at the Los Angeles Harbor gauge during this event was 0.7 foot above predicted astronomical levels (Rossmiller 2007). Thus, storm surge is likely to make at most a minor contribution to flooding in the Los Angeles Harbor area.

3.14.3 Applicable Regulations

A variety of federal, state, and local agencies have jurisdiction over the proposed project area. Important agencies and statutory authorities relevant to water quality, sediments, and oceanography as it relates to the proposed Project are outlined below.

3.14.3.1 Federal Regulations

3.14.3.1.1 Clean Water Act

The federal Water Pollution Control Act Amendments of 1972, better known as the Clean Water Act (33 U.S. Government Code [USC] 1251–1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's water." Important applicable sections of the Act are as follows:

- Section 303 requires states to develop water quality standards for all waters and submit to the EPA for approval all new or revised standards established for inland surface and ocean waters. Under Section 303(d), the state is required to list water segments that do not meet water quality standards and to develop action plans, called TMDLs, to improve water quality.
- Section 304 provides for water quality standards, criteria, and guidelines. The guidelines are enforced under the California Toxics Rule, described below (Section 3.14.3.2.3).
- Section 401 requires an applicant for any federal permit that proposes an activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Act. Certification is provided by the RWQCB.
- Section 402 establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the United States. This permit program is administered by the RWQCB, and is discussed further below.
- Section 404 provides for issuance of dredge/fill permits by the USACE. Permits typically include conditions to minimize impacts on water quality. Common conditions include 1) USACE review and approval of sediment quality analysis prior to dredging, 2) a detailed pre- and post-construction monitoring plan that includes disposal site monitoring, 3) timing and water quality restrictions on flow back of dredged water at the dredging site, and 4) requiring compensation for loss of waters of the United States, including wetlands.

3.14.3.2 State Regulations

3.14.3.2.1 Porter-Cologne Water Quality Control Act

The State of California's Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) is the principal law governing water quality regulation within California. The act established the California State Water Resources Control Board and nine regional water quality control boards, which are charged with implementing its provisions and which have primary responsibility for protecting water quality in California. The Porter-Cologne Act also implements many provisions of the federal CWA, such as the NPDES permitting program. CWA Section 401 gives the California SWRCB the authority to review any proposed federally permitted or federally licensed activity that may impact water quality and to certify, condition, or deny the activity if it does not comply with state water quality standards. If the California SWRCB imposes a condition on its certification, those conditions must be included in the federal permit or license. The Porter-Cologne Act also requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. Beneficial uses are discussed below.

3.14.3.2.2 Water Quality Control Plan, Los Angeles Region (Basin Plan)

The Basin Plan (*Water Quality Control Plan: Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* [LARWQCB 1994]) is designed to preserve and enhance water quality and to protect beneficial uses of regional waters (inland surface waters, groundwater, and coastal waters such as bays and estuaries). The Basin Plan designates beneficial uses of surface water and groundwater, such as contact recreation or municipal drinking water supply. The Basin Plan also establishes water quality objectives, which are defined as "the allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance in a specific area."

The Basin Plan specifies water quality objectives for a number of constituents/characteristics that could be affected by the proposed Project. These constituents include: bioaccumulation, biostimulatory substances, chemical constituents, dissolved oxygen, oil and grease, pesticides, pH, polychlorinated biphenyls, suspended solids, toxicity, and turbidity. With the exceptions of DO and pH, water quality objectives for most of these constituents are expressed as descriptive rather than numerical limits. For example, the Basin Plan defines limits for chemical contaminants in terms of bioaccumulation, chemical constituents, pesticides, PCBs, and toxicity as follows:

- Toxic pollutants shall not be present at levels that bioaccumulate in aquatic life to levels which are harmful to aquatic life or human health;

- Surface waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use;
- No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life;
- All waters shall be maintained free of toxic substances in concentrations that are toxic to, or produce detrimental physiological responses in human, plant, animal, or aquatic life. There shall be no chronic toxicity in ambient waters outside mixing zones.

The Basin Plan also specifies water quality objectives for other constituents, including ammonia, bacteria, total chlorine residual, and radioactive substances. These are not evaluated in this draft EIR because the proposed Project does not include any discharges or activities that would affect the water quality objectives for these parameters.

Construction and Industrial Permitting

The LARWQCB administers the NPDES permitting program for construction and industrial activities. Two of these permits, issued by the California SWRCB, are a statewide general construction activities storm water permit (GCASP) and a statewide general industrial activities storm water permit (GIASP). The GCASP requires all dischargers where construction activity disturbs 1 acre or more to:

- develop and implement a SWPPP, which specifies BMPs that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters;
- eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the United States; and
- perform inspections of all BMPs.

Similar to the GCASP, the GIASP requires industrial stormwater dischargers to:

- develop and implement a SWPPP to reduce or prevent industrial pollutants in stormwater discharges;
- eliminate unauthorized non-storm discharges; and
- conduct visual and analytical stormwater discharge monitoring to indicate the effectiveness of the SWPPP in reducing or preventing pollutants in stormwater discharges.

Best management practices that could be implemented as part of the GIASP or GCASP requirements are described below.

Best Management Practices

The term BMPs refers to a variety of measures used to reduce pollutants in stormwater and other non–point source runoff. Measures range from source control, such as use of permeable pavement, to treatment of polluted runoff, such as use of detention or retention basins and constructed wetlands. Maintenance practices (e.g., street sweeping) and public outreach campaigns also fall under the category of BMPs. The effectiveness of a particular BMP is highly contingent upon the context in which it is applied and the method in which it is implemented. Expected effectiveness of BMPs is summarized in Table 3.14-4. As demonstrated below, BMPs are best used in combination to most effectively remove target pollutants.

Post-Construction Permitting

On January 26, 2000, the LARWQCB adopted and approved Board Resolution No. R-00-02, which requires new development and significant redevelopment projects in Los Angeles County to control the discharge of stormwater pollutants in post-construction stormwater. The Regional Board Executive Officer issued the approved SUSMPs on March 8, 2000. The California SWRCB in large part affirmed the LARWQCB action and SUSMPs in State Board Order No. WQ 2000-11, issued on October 5, 2000.

The City of Los Angeles, and therefore the LAHD, is covered under the Permit for Municipal Storm Water and Urban Runoff Discharges within Los Angeles County (LARWQCB Order No. 01-182) and is obligated to incorporate provisions of this document in City permitting actions. The municipal permit incorporates Standard Urban Stormwater Mitigation Plan (SUSMP) requirements, and these include a treatment control BMP for projects falling within certain development and redevelopment categories. The treatment control BMP requirement applies throughout the proposed project area and requires infiltration, filtration, or treatment of the runoff from the first 0.75 inches of rainfall (or equivalent numerical design criteria) prior to its discharge to a stormwater conveyance system.

Table 3.14-4. Best Management Practice Expected Pollutant Removal Efficiency

BMP Type	*Typical Pollutant Removal (percent)*				
	Suspended Solids	*Nitrogen*	*Phosphorus*	*Pathogens*	*Metals*
STRUCTURAL					
Dry detention basins	30–65	15–45	15–45	<30	15–45
Retention basins	50–80	30–65	30–65	<30	50–80
Constructed wetlands	50–80	<30	15–45	<30	50–80
Infiltration basins	50–80	50–80	50–80	65–100	50–80
Infiltration trenches/dry wells	50–80	50–80	15–45	65–100	50–80
Porous pavement	65–100	65–100	30–65	65–100	65–100
Grassed swales	30–65	15–45	15–45	<30	15–45
Vegetated filter strips	50–80	50–80	50–80	<30	50–80
Surface sand filters	50–80	<30	50–80	<30	50–80
Other media filters	65–100	15–45	<30	<30	50–80
CONSTRUCTION SITE					
Silt fence	50–80	N/A	N/A	N/A	N/A
Sediment basin	55–100	N/A	N/A	N/A	N/A
Sediment trap	60	N/A	N/A	N/A	N/A
Sources: EPA 1993, 1999					

3.14.3.2.3 California Toxics Rule

This rule establishes numeric criteria for priority toxic pollutants in inland waters, as well as enclosed bays and estuaries, to protect ambient aquatic life (23 priority toxics) and human health (57 priority toxics). The California Toxics Rule (CTR) also includes provisions for compliance schedules to be issued for new or revised NPDES permit limits when certain conditions are met. The numeric criteria are the same as those recommended by the EPA in its CWA Section 304(a) guidance.

3.14.3.3 Local Regulations

3.14.3.3.1 City of Los Angeles Stormwater Ordinance

The Stormwater Ordinance, LAMC 64.70, makes it a crime (misdemeanor, punishable by fine, imprisonment, or both) to discharge pollutants into a stormwater disposal system. The Stormwater Ordinance is the primary vehicle for City enforcement of NPDES permits.

3.14.3.3.2 Port of Los Angeles Tariff No. 4

Port of Los Angeles Tariff No. 4 describes the rates, charges, rules, and regulations of the Port of Los Angeles. The tariff applies to all persons making use of the navigable waters of Los Angeles Harbor. Included is information about pilotage, dockage, wharfage, passengers, free time, wharf demurrage, wharf storage, space assignments, cranes, and other operational rules and regulations. Certain provisions of Tariff No. 4 are intended to ensure safe and lawful operations of vessels while in the Port and thereby function to minimize the risk of accidents that could cause impairment of water quality. Sections of Tariff No. 4 that have particular relevance to water quality regulation include Section 17, which governs the handling of hazardous materials; and Section 18, which includes prohibitions related to waste oil, materials dumping, oil discharges, regulation of ballast water, and related activities that may potentially affect water quality.

3.14.3.3.3 Port of Los Angeles Clean Marinas Program

The Clean Marinas Program for the Port of Los Angeles is a non-regulatory program that encourages recreational boaters and marina operators to use BMPs to prevent the discharge of pollutants into the harbor from boating activities. As part of the program, a number of innovative clean water measures have been developed that are unique to the Port. These measures and BMPs are implemented via voluntary incentives, Port lease requirements, CEQA mitigation requirements, and/or federal, state, and local regulations. (POLA 2005.)

3.14.4 Impact Analysis

3.14.4.1 Methodology

Potential impacts of the proposed Project on water quality, sediments, and oceanography were assessed through a combination of literature review (including applicable water quality criteria), review of the results of past dredge and fill projects in the Port, review of water quality data collected in surface waters near the proposed project area, results from previous testing of Los Angeles Harbor sediments, and scientific expertise of the preparers. Impacts are considered significant if any of the significance criteria described below would be met or exceeded as a result of the effects of construction or operation of the proposed Project.

The assessment of impacts is based on the assumption that the proposed Project would include the following:

- An individual NPDES permit for construction stormwater discharges or coverage under the General Construction Activity Storm Water Permit for the onshore portions of the proposed Project would be obtained by the tenant. The associated SWPPP would contain the following measures:
  - Equipment would be inspected regularly (daily) during construction, and any leaks found would be repaired immediately.
  - Refueling of vehicles and equipment would be in a designated, contained area.
  - Drip pans would be used under stationary equipment (e.g., diesel fuel generators), during refueling, and when equipment is maintained.
  - Drip pans would be covered during rainfall to prevent washout of pollutants.
  - Appropriate containment structures would be built and maintained to prevent offsite transport of pollutants from spills and construction debris.
- Monitoring would be performed to verify that the BMPs were implemented and kept in good working order.
- Other standard operating procedures and BMPs for Port construction projects would be followed.
- All onshore contaminated upland soils would be characterized and remediated in accordance with LAHD, LARWQCB, DTSC, and Los Angeles County Fire Department protocol and clean-up standards.
- The tenant would obtain and implement the appropriate stormwater discharge permits for operations.
- A Section 404 (of the Clean Water Act) and Section 10 (of the Rivers and Harbors Act) permit from the USACE would be secured for construction activities in waters of the harbor.
- A Section 401 (of the Clean Water Act) Water Quality Certification from the LARWQCB, including standard Waste Discharge Requirements (WDRs), would be secured for in-water work activities.
- A Debris Management Plan and SPCC Plan would be prepared and implemented prior to the start of demolition and construction activities associated with the proposed Project.
- In-water construction areas, other than areas where isolated removal of wood pilings or dolphins occur, would be isolated from harbor waters by placement of silt curtains extending from the bottom to above the waterline, extending so as to enclose all of the waters where in-water work would occur.
- In-water demolition of isolated wood pilings and dolphins would occur during slack water conditions.
- Tarps or other barriers would be rigged in areas of over-water work so as to prevent demolition or construction debris from falling into the water.
- The Water Quality Certification would define a “mixing zone” around the construction operations. The mixing zone would be equivalent to a zone of

dilution and, per the Basin Plan (LARWQCB 1994), "[a]llowable zones of dilution within which high concentrations may be tolerated could be defined for each discharge in specific Waste Discharge Requirements."

3.14.4.2 Thresholds of Significance

The *L.A. CEQA Thresholds Guide* (City of Los Angeles 2006) sets forth specific thresholds to be utilized in determining the significance of impacts to water resources. The thresholds guide does not address some of the potential impacts of the proposed Project related to modification of aquatic sediments, dredging, and creation or alteration of artificial waterways. The guide also does not provide screening criteria for some less likely but still potential impacts of the proposed Project related to hydromodifications, alterations of circulation, and flushing within the harbor. Potential impacts on aquatic sediments and the impacts of dredging are discussed here under thresholds WQ-2, WQ-3, and WQ-4 listed below. Potential impacts on artificial waterways and oceanography are discussed under thresholds WQ-2 and WQ-3.

These thresholds are unique to the proposed Project. If a threshold or portion of a threshold is not applicable to the proposed Project, it is so noted. Thresholds related to groundwater impacts are not included here; however, see Section 3.6, "Groundwater and Soils," for a discussion of the impacts on groundwater resources. The following factors are used to determine significance for water quality, sediments, and oceanography.

WQ-1: A project would have a significant impact if it would cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources.

WQ-2: A project would have a significant impact if it would substantially reduce or increase the amount of surface water in a water body.

WQ-3: A project would have a significant impact if it would result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow.

WQ-4: A project would have a significant impact if it would result in discharges that create pollution, contamination or nuisance as defined in Section 13050 of the California Water Code (CWC) or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

1) "**Pollution**" means an alteration of the quality of the waters of the state to a degree that unreasonably affects either of the following: (1) the waters for beneficial uses; or (2) facilities that serve these beneficial uses. "Pollution" may include "Contamination."

2) "**Contamination**" means an impairment of the quality of the waters of the state by waste to a degree that creates a hazard to the public health through poisoning or through the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.

3) "**Nuisance**" means anything that meets all of the following requirements: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and (3) occurs during, or as a result of, the treatment or disposal of wastes.

3.14.4.3 Impacts and Mitigation

3.14.4.3.1 Construction Impacts

Impact WQ-1a: Construction of the proposed Project would not cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources.

Although most of the proposed project site is located within a 100-year flood zone, construction activities would not increase the potential for flooding on site because existing drainage would be maintained. Site elevations would remain generally the same as a result of proposed Project. The proposed Project would entail conversion of 7.10 acres of existing pervious surface to new impervious surface, along with conversion of 8.61 acres of existing impervious surface to new pervious surface, resulting in a net decrease in total impervious surface of 1.51 acres. This small change would slightly but not measurably decrease the potential for flooding. The allocation of runoff between various discharge points would not change in comparison to existing conditions, so individual sites within the proposed project area would be at the same risk of flooding as they are under current conditions, and the flooding risk in adjacent areas would remain unchanged.

Proposed project site grading would direct runoff from the site to storm drains designed for a 10-year event, which is the standard design capacity for the storm drain systems in the vicinity of the harbor. Runoff associated with larger storm events (e.g., 50-or 100-year events) could exceed the capacity of the storm drain system, resulting in temporary ponding of water on site. However, because the proposed project site terrain is flat, and the runoff velocity would not be increased by construction activities, the proposed Project would not increase the risk of flooding or severity of flooding impacts relative to the baseline conditions.

Impact Determination

The proposed Project would not increase potential for flooding or increase risks to humans, property, or sensitive biological resources. Therefore, impacts from flooding would be less than significant.

Mitigation Measures

No mitigation is required.

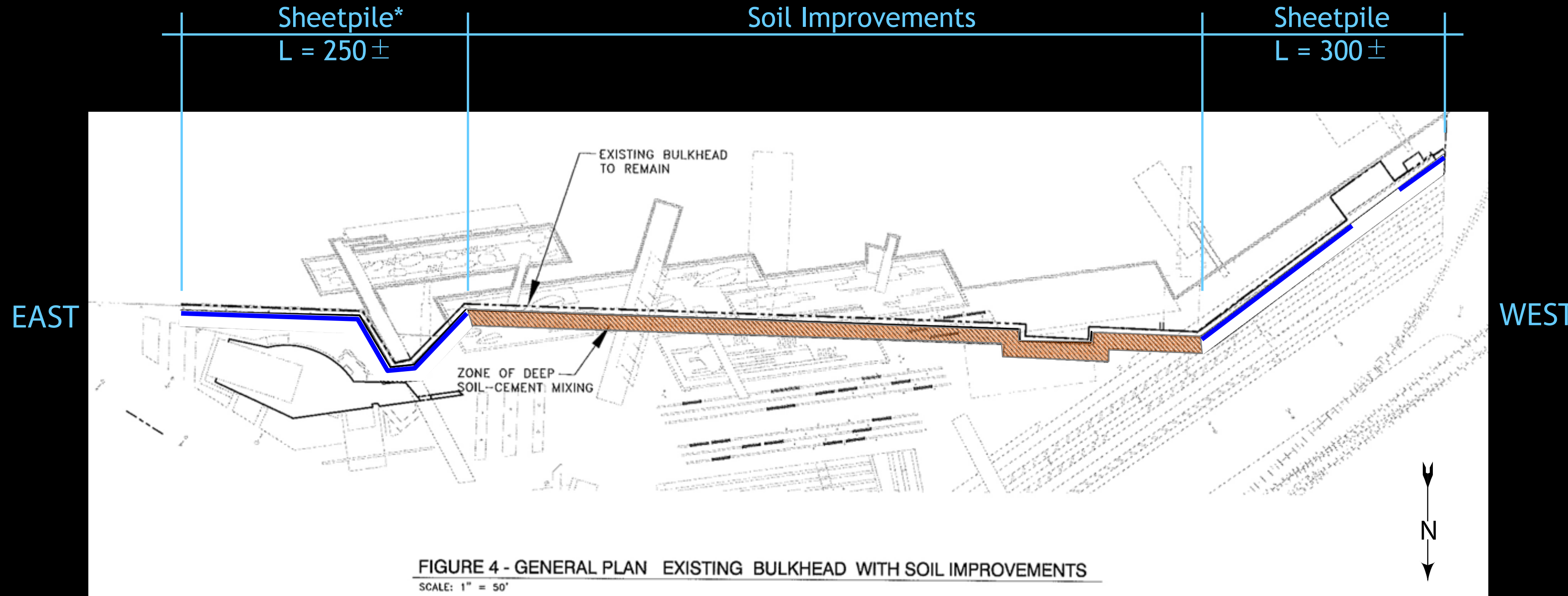
Residual Impacts

Impacts would be less than significant.

Impact WQ-2a: Construction of the proposed Project would not substantially reduce or increase the amount of surface water in a water body.

The additional placement of 750 24-inch concrete piles would result in a net decrease in the surface area of Slip 5 of 1,636 square feet. This impact would be partially offset by the removal of the existing piles associated with two existing docks that would be removed. However, the existing piles that would be removed are few in number and small in size compared to the new piles that would be placed. The current area of Slip 5 is approximately 1,710,000 square feet, so placement of the new piles, disregarding the offset due to removal of existing piles, would only reduce the effective area of the slip by 0.1%. This would not be expected to measurably alter the volume of water in the harbor.

The proposed Project would also entail placement and removal of existing fill associated with replacement of a 550-foot length of existing bulkhead at the head of Slip 5 (Figure 3.14-2). Under this proposal, the existing concrete bulkhead wall would remain in place, and a new steel sheet pile wall would be installed immediately waterward from the existing wall. This action would fill 2,200 square feet of Slip 5. Combined with the pile placement described above, the total reduction in Slip 5 area would be 4,720 square feet, a reduction of 0.29% compared to existing conditions. This is a very minor change that would not be expected to measurably alter the volume of water in the harbor. Moreover, the harbor water is seawater that is not subject to substantial consumptive uses, so the change in volume would not alter the utility of the harbor waters. Thus the proposed change does not amount to a substantial change in the amount of surface water in Slip 5, or, by extension, in the Los Angeles Harbor. Certain beneficial uses of waters in the Inner Harbor, including navigation, non-contact water recreation, aquatic habitat, and industrial service supply, would benefit from the availability of new dock and moorage space provided by the proposed new floating docks. These beneficial uses also would not be impaired by the small changes in water surface area and restriction of access to water surface that would be occasioned by the proposed Project .



Fill (for sheetpile):

From 40% design – assume 4' from bulkhead wall to sheetpile

A_F = 1000 sf East

A_F = 1200 sf West

* Grade raised approximately 3' using lightweight backfill in this area

Wharf + Bulkhead
Avalon Waterfront Park

SOURCE: Sasaki (2008)

ICF Jones & Stokes
an ICF International Company

Figure 3.14-2
Proposed Bulkhead Wall Design
Wilmington Waterfront Development Project

Impact Determination

The proposed Project would have a minimal impact on the amount of surface water in Slip 5 and, by extension, in Los Angeles Harbor. The change would tend to decrease the surface area of Slip 5 by approximately 0.29%. This is not a substantial amount. This change would have a minor beneficial impact on the utilization of the surface water resource in the proposed project area because it would facilitate use of the project area by the small, primarily recreational vessels that would use the new floating docks. Impacts would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact WQ-3a: Construction of the proposed Project would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow.

The proposed Project does not alter the discharge of surface waters to Los Angeles Harbor. Thus it has a limited potential to alter surface water movement. However, the proposed Project would entail fill along 550 feet of bulkhead at the head of Slip 5 due to placement of a steel bulkhead immediately waterward of the existing concrete bulkhead. The proposed Project also entails placement of silt curtains enclosing the area of proposed piling installation, followed by installation of an additional 750 pilings to support overwater structures, covering approximately 61,100 square feet of the harbor within Slip 5. Silt curtains would only be used as required by permits authorizing the proposed work. It is expected that curtains would not be required for work entailing piling removal because the action of cutting a piling at the mud line entails little disturbance of sediments and little potential to result in water quality impairment. It is expected that silt curtains would be required for seawall replacement, piling installation, and movement of rock slope protection, because each of these activities has a high potential to result in suspension of sediments, causing temporary water quality impairment. Silt curtains would then act to limit the extent of impaired waters.

The bulkhead changes and piling placements would slightly affect water flow velocities and cause slightly altered flow paths beneath the dock. However, these changes would not be sufficient to cause any material changes in the value of the resource represented by the water. No adverse water quality impacts would result from the altered water flows; no substrate disturbance would result from the altered flows; and no existing beneficial uses would be impaired as a result of the flow alteration (note that impacts on one beneficial use, biological resources, are separately addressed in Section 3.3, "Biological Resources"). These changes would, however, be permanent. They would begin during construction, when flow in the area would be altered by piling placement and bulkhead relocation.

Small, local, short-term flow alteration could also be caused by the in-water location of equipment used in piling and bulkhead placement, such as silt curtains. The silt curtains would largely isolate the waters contained within the curtains, and certain water quality parameters within the enclosed area would be expected to indicate water quality impairment. The purpose of the silt curtains is to retard water flow so that such water quality impairments would not be conveyed to waters outside of the curtained areas. The Section 401 certification would recognize this by allowing excursions in certain water quality parameters to occur within the curtained area. Curtains would not be removed until those water quality excursions had abated. Curtain placement, use, and removal would not result in any permanent alteration of in the movement of surface water within the harbor.

Impact Determination

Construction of the proposed Project would not result in a permanent adverse change in surface water movement because the proposed Project would not create any barriers to water movement through the Los Angeles Harbor. Small but likely measurable changes in water flow would occur in close proximity (within a few feet) of the pilings placed to support the waterfront promenade. Similarly small changes could occur in close proximity to the steel bulkhead. These changes would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow. Use of silt curtains during construction would result in a temporary restriction of surface water movement. Such use would be required and authorized by permits for the proposed work. The change in surface water movement would be beneficial rather than adverse, functioning to limit the extent of water quality impacts from the proposed Project. The use of silt curtains would have no permanent effect on the movement of surface water. Thus the impacts on surface water movement would be less than significant.

<u>Mitigation Measures</u>

No mitigation is required.

<u>Residual Impacts</u>

Impacts would be less than significant.

Impact WQ-4a-1: In-water and over-water construction[4] for the proposed Project would not result in discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

Proposed in-water and overwater construction activities would include:

- wood piling and dolphin removal
- wood pier demolition
- wood and concrete bulkhead demolition
- removal and replacement of rock slope protection
- placement and removal of silt curtains[5]
- sheet pile bulkhead installation
- round concrete pile installation
- wood and concrete pier deck installation
- concrete dock installation

The locations of these activities are discussed in Table 3.14-3. All have the potential to result in water quality impacts, as follows:

Wood piling and dolphin[6] removal: Wood pilings would be cut at the mudline[7]. This is the usual practice for wood piling removal because it results in less sediment disturbance than pulling the piling. Also, old pilings frequently break off when attempts are made to extract them via pulling. Most wood material currently in-water or over-water at the site has probably been treated with creosote, a complex mix of PAHs. Wood demolition debris would be tested for contamination and disposed at an appropriate upland facility. Sawdust and leaching of freshly exposed over-water and in-water wood surfaces created during demolition would provide pathways for delivery of creosote to harbor waters. Most of the delivered contaminants would subsequently be flushed from the harbor by tidal circulation, but some would be adsorbed to particles settling as sediment, and some would be taken up by aquatic

[4] The term "in-water construction" refers to work performed within areas below the high tide line. It does not necessarily refer to work that actually occurs in the water. Minimizing or avoiding the need for work in the water is one of the most important ways of mitigating the impacts of in-water work. For instance, a pile driven in the dry, below-the-high-tide line, during low tide, would be in-water work.
[5] Silt curtains are devices deployed in water to control suspended solids or turbidity resulting from dredging operations. They are commonly made of durable, reusable geotextile fabrics such as PVC and urethane.
[6] A dolphin is a buoy, pile, or group of piles used for mooring boats.
[7] The sediment/water interface.

organisms. These impacts, however, would be offset by the benefits of permanently removing creosote-treated wood from harbor waters.

During in-water removal of pilings and dolphins, some bottom sediments would be disturbed, resulting in resuspension of sediments. The local and temporary effects of sediment suspension would be minimized by performing wood piling and dolphin removal during slack water, at which time sediment would likely resettle quickly and within a short distance of the work area. Potential water quality issues arising from sediment resuspension include turbidity, changes in dissolved oxygen concentration, changes in biological oxygen demand (BOD), changes in pH, and the introduction of contaminated sediment into the water column.

- **Turbidity, dissolved oxygen, and BOD**. Sediment resuspension would result in local and temporary turbidity increases. The suspended sediments could also contain organic material that would oxidize or support microbial activity, thereby increasing BOD and contributing to a localized short-term reduction in DO levels in harbor waters. A study of agitation dredging in Savannah Harbor, another harbor that has predominantly silty-sandy substrates, measured low, near-field reductions in DO concentrations near a dredge, but measured decrease in DO was equal to or less than observed in background samples, indicating that observed DO variability in the dredge plume was within the range of natural variation (Semmes et al. 2003). Dredging is an activity that results in much more extensive sediment suspension, compared to that associated with pile removal or any of the other demolition and construction activities proposed for work in Slip 5. Therefore, reductions in DO levels associated with proposed project demolition and construction activities are not expected to persist or cause detrimental effects on biological resources, and are not expected to cause DO levels to fall below the water quality objective of 5 mg/l. DO levels in Slip 5 occasionally have been recorded as falling below the water quality objective, as discussed in Section 3.14.2.1.2. It is possible that DO levels below 5 mg/l could be recorded in the proposed project area during construction activities. However, such an event is not expected to occur as a response to construction activity.
- **pH**. Changes in pH may occur due to reducing conditions in sediments resuspended into the water column. Seawater, however, is a buffer solution (Sverdrup et al. 1942) that acts to repress any change in pH. Therefore, any measurable change in pH would likely be highly localized and temporary, and would not result in persistent changes to ambient pH levels of more than 0.2 units. Thus, the water quality objective for pH would likely not be exceeded.
- **Contaminants**. The resuspended sediment is likely to have substantial loads of numerous contaminants including metals, pesticides, PCBs, and PAHs. The magnitude of contaminant releases would be related to the bulk contaminant concentrations of the disturbed sediments, as well as the organic content and grain size, which affect the binding capacity of sediments for contaminants. As the sediment characteristics vary across the proposed project site, the magnitude of contaminant releases, and water quality effects, would also vary. Assuming that sediment contaminants in the pile driving and dock installation areas were similar in species and concentration to those identified in sediments that have been dredged along the western berths of Slip 5 (Kinnetic Laboratories/ToxScan

2003), contaminant releases from sediments disturbed by dredging and other demolition and construction activities would be unlikely to substantially affect the concentrations or bioavailability of contaminants in waters in the proposed project area. The results of elutriate tests on Slip 5 sediment contaminants indicate that almost all contaminants are insoluble and would be redeposited rather than entering the water column (Kinnetic/Toxscan 2003), and the location of the work area near the head of Slip 5 would result in redeposition generally occurring within the confines of Slip 5 without affecting other waters of the Harbor. Contaminants would resettle to the bottom within a period of several hours. Transport of suspended particles by tidal currents would result in some redistribution of sediment. Concentrations of any contaminants that may occur in sediments adjacent to the work area are not expected to be measurably altered by demolition activities.

Wood pier demolition: Wood pier demolition would result in the same types of water quality impacts described above for wood piling and dolphin removal. The impact is slightly different because more of the removed wood is located over water rather than in the water, and larger structures are involved in the demolition. These impacts would be minimized by rigging tarps or other barriers to prevent demolition debris from falling into the water, and confining turbidity and sediment suspension to a small area by isolating the demolition area with silt curtains.

Wood and concrete bulkhead demolition: Wood and concrete bulkhead demolition would result in the same types of water quality impacts described above for wood pier demolition and would be subject to the same mitigation. Additionally, bulkhead demolition would expose terrestrial sediments to the water column. Although the affected areas have not yet been tested, virtually all sediments in the inner Los Angeles Harbor that have not been dredged since 2000 have been found to contain substantial amounts of organic and metallic contaminants, as detailed in Section 3.14.2. It is therefore likely that at least some of the sediments in areas proposed for in-water work are contaminated. The use of silt curtains to isolate the work area would minimize the risk of contamination of harbor waters.

Removal and replacement of rock slope protection: Rock slope protection would be removed and partly replaced in the area of sheet pile bulkhead installation. This activity is necessary in order for the sheet pile work to be performed. The area affected would be approximately 300 feet long and 12 feet wide, thus affecting an area of approximately 3,600 square feet. Of this area, 2,200 square feet would be permanently disturbed by sheet pile placement, and rock slope protection would be replaced in the remaining 1,400 square feet. During in-water removal of rock slope protection, some bottom sediments would be disturbed, resulting in resuspension of sediments likely to have substantial loads of numerous contaminants including metals, pesticides, PCBs, and PAHs. The suspended sediments would result in local and temporary turbidity increases, and the suspension of organic matter could increase BOD in the water column, leading to a reduction in dissolved oxygen as microbial respiration occurred during metabolism of the organic matter. Additionally, contaminants in the resuspended sediment could be redeposited elsewhere in the harbor. However, results of elutriate tests on Slip 5 sedimentary contaminants indicate that almost all contaminants are insoluble and would be redeposited rather than entering the water column, and the location of the work area near the head of Slip 5 would result in redeposition generally occurring within the confines of Slip 5 without affecting other waters of the Harbor. The local and temporary effects of sediment suspension would be further diminished by performing rock slope protection in an area isolated from Slip 5 by silt curtains.

Placement and removal of silt curtains: Although silt curtains are intended to confine contaminants to a relatively small portion of the water column occurring in close proximity to an in-water or over-water work area, there are water quality impacts arising from silt curtain placement and removal. Placement and removal activities can cause local turbidity and sediment suspension created at the interface where the curtain is anchored at the bottom, usually by weights. Waters within the silt curtain would be relatively stagnant and may be subject to reduced dissolved oxygen concentration and increased BOD relative to adjacent unconfined waters, and there is also a greater risk that waters within the curtain would be exposed to contaminants derived from disturbance of sediments, erosion of adjacent fill materials, or spills of fuel, lubricants, and other construction chemicals. These risks would, however, be authorized under the terms of the construction NPDES permit for the proposed Project.

Sheet pile bulkhead installation: The proposed Project would reconstruct the existing bulkhead, which is an old, piecemeal structure that does not meet current seismic design standards. Two different structural systems would be used to reconstruct the bulkhead: (1) a deep soil–cement mixing landward of the existing bulkhead, with no work waterward of the existing bulkhead, and (2) a sheet pile bulkhead, located waterward of the existing bulkhead. The first system would be used to the maximum extent possible and would reinforce the majority of the length of the existing bulkhead, from the eastern end to the 45-degree break in the layout line at the western end. The second system would be used for the approximately 290 lineal feet of bulkhead west of the 45-degree break, where significant utilities immediately behind the bulkhead wall prevent the use of deep soil–cement mixing. This second system would require the filling of approximately 2,200 square feet (0.05 acre) of marine habitat below the mean higher high water (MHHW) line. The sheet pile bulkhead would require the sheet pile be driven using both a vibratory and an impact pile driver. Sheet pile bulkhead installation would be subject to the impacts described above that are associated with erosion of fill materials in areas of bulkhead removal, and also those impacts associated with resuspension of bottom sediments, which would occur due to bed deformation and vibration in areas near where the sheet pile is driven into the bottom. As described above, water quality impacts would be confined by performing the activity in an area isolated by silt curtains, and impacts would be both local and temporary. The area of sediments potentially disturbed during this activity would be the same area described above for placement and removal of rock slope protection, i.e., approximately 3,600 square feet, of which 2,200 square feet would be a permanent impact due to placement of fill behind the bulkhead, and the remainder would be a temporary impact.

Round concrete pile installation: Pile installation would include placement of 750 new concrete piles, each approximately 24 inches in diameter, to support the waterfront promenade, a 43,220-square-foot structure built over the water. In addition, 478 concrete pilings would replace the existing wood pilings supporting approximately 17,880 square feet of deck area. Sediments disturbed by the driving of replacement piles are largely accounted for in the *Wood piling and dolphin removal* discussion above. A small number of additional piles would be placed to stabilize the floating wood dock described below. Piles would be driven with a combination of vibratory and impact hammer methods, which would utilize a slow-start method as detailed in Chapter 3.3, "Biological Resources." Sediments would be disturbed during pile placement. Assuming that an annulus of sediment 1 foot wide would be disturbed during pile placement, this activity would disturb and potentially generate turbidity from approximately 15,400 square feet of bottom sediments (this includes turbidity from driving the replacement piles also largely accounted for in the discussion, *Wood piling and dolphin removal*). It is assumed that these pilings would all be placed in open water, although some may be placed subaerially during low tides; thus sediment disturbance would directly affect waters of Slip 5.Bottom deformation and vibration would result in local resuspension of bottom sediments, with potential impacts as described above for other bottom deforming activities such as pile removal and sheet pile placement. As described above, water quality impacts would be confined by performing the activity in an area isolated by silt curtains, and impacts would be both local and temporary.

Concrete pier deck installation: Assuming that concrete pier decks are of cast-in-place construction, high alkalinity caused by waters contacting the curing concrete is possible. The primary contact mechanisms are rainfall and water sprayed on the concrete to ensure proper curing. Techniques such as protecting the curing concrete from rainfall, minimizing water spray so that there is no runoff into the harbor waters, and suspension of tarps to collect and detain spray runoff, would minimize delivery of excessive alkalinity to harbor waters. Seawater is a pH buffer (Sverdrup 1942), so any pH excursions due to runoff of water from curing concrete would be small.

Concrete dock installation: Dock installation would include placement and anchoring of 5,870 square feet of floating concrete dock that would be fabricated offsite. Assuming that the dock was fabricated in an upland location, dock installation would not result in any impacts on water quality.

None of the proposed in-water or over-water work activities are expected to affect the temperature or salinity of waters within the proposed project area because these activities would not involve any wastewater discharges or processes that would affect baseline conditions for temperature or salinity.

Impact Determination

In-water and over-water demolition and construction activities during the construction phases of the proposed Project would not entail any direct discharges of waste to waters of the harbor. Activities related to construction of the proposed Project would disturb and resuspend bottom sediments, which would result in temporary and localized changes to some water quality indicators. Such changes would only be observable within a few feet of the activity, and would be minimized by use of silt curtains. Elutriate testing results presented in Section 3.14.2.1.3

indicate that such disturbance of sediments in the proposed project area would not cause significant toxicity, contaminant bioaccumulation, or releases of contaminants to surface waters because almost all contaminants are insoluble and would be redeposited rather than entering the water column. Impacts on water quality from in-water and over-water construction activities would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact WQ-4a-2: Stormwater discharged during construction of the proposed Project would not result in discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.

Ground disturbances and construction activities would occur due to construction of the proposed Project (as described in Section 2.4.2). These activities could result in temporary impacts on surface water quality through runoff of soils, asphalt leachate, concrete washwater, and other construction materials. No upland fresh surface water bodies currently exist within the area of disturbance for the proposed Project. Thus, impacts on surface water quality related to construction of the proposed Project would be limited to stormwater runoff and, eventually, waters of the harbor that receive runoff from the watershed. Runoff from onshore construction sites would enter the harbor primarily through storm drains. Most runoff would occur during storm events, although some runoff could occur from water use as part of construction activities, such as dust control. Runoff from the proposed project site would be regulated under a construction SWPPP prepared in accordance with the GCASP and implemented prior to start of any construction activities. This construction SWPPP would specify BMPs to control releases of soils and contaminants and adverse impacts on receiving water quality.

Erosion controls are used during construction to reduce the amount of soils disturbed and to prevent disturbed soils from entering runoff. Erosion controls can include both logistical practices, such as scheduling construction to avoid the November–April rainy season, and sediment control practices. Typically, erosion control programs consist of a system of practices that are tailored to site-specific conditions. The combined effectiveness of the erosion and sediment control systems is not easily predicted or quantified (EPA 1993).

The WDRs for stormwater runoff in the County of Los Angeles and incorporated cities covered under NPDES Permit No. CAS004001 (13 December 2001) require implementation of runoff control from all construction sites. Prior to the start of construction activities for the proposed Project, the contractor would prepare a SWPPP that specifies logistics and schedule for construction activities that would minimize potentials for erosion and standard practices that include monitoring and maintenance of control measures named in the SWPPP. Control measures would be installed at the construction sites prior to ground disturbance. Implementation of all conditions of proposed project permits would minimize proposed project–related runoff into the harbor and impacts on water quality.

Standard BMPs, such as soil barriers, sedimentation basins, and site contouring, would be used during construction activities to minimize runoff of soils and associated contaminants in compliance with the GCASP (Water Quality Order 99-08-DWQ) and a construction SWPPP. Sediment basins and sediment traps are engineered impoundments that allow soils to settle out of runoff prior to discharge to receiving waters. Filter fabric fences and strawbale barriers are used under different site conditions to filter soils from runoff. Inlet protection consists of a barrier placed around a storm drain drop inlet to trap soils before they enter a storm drain. One or more of these types of runoff control structures would be placed and maintained around each construction area to minimize loss of site soils to the storm drain system. As another standard measure, concrete truck wash water and runoff of any water that has come in contact with wet cement would be contained on site so that it does not run off into the harbor.

Most BMPs used to treat urban runoff are designed to remove or reduce trash, nutrients, or contaminants associated with suspended particles (Brown and Bay 2007:207–226). Studies by Caltrans (2004) determined that BMPs that used infiltration or sand filtration methods were most effective at reducing levels of suspended solids, nutrients, and metals in runoff. The EPA (1993) reported that measures such as sedimentation basins, sediment traps, strawbale barriers, and filter fabric fences were about 60–70% effective at removing soils from runoff. In contrast, recent studies by Brown and Bay (2007) showed that effectiveness at removing suspended solids and reducing toxicity varied among BMPs tested, including hydrodynamic and biofiltration methods, and results for individual BMPs were inconsistent. BMPs designed to remove suspended particles are not effective at reducing toxicity associated with dissolved components in the runoff (Brown and Bay 2007). Although the specific BMPs that would be used, as well as the effectiveness of the BMPs under conditions at the proposed project site, are uncertain, the data cited above indicate that erosion and runoff control BMPs would likely be 60%or more effective at removing soils from runoff that occurred during construction. A limited area of soils would be subject to erosion because the large majority of the proposed project area is flat and runoff patterns can be easily controlled by grading and temporary berms. Moreover, rainfall events in southern California are of limited duration. These factors indicate that a minimal amount of soil would be delivered to the harbor by runoff.

Runoff from a construction site could contain a variety of contaminants, including metals and PAHs, associated with construction materials, stockpiled soils, and spills of oil or other petroleum products. Impacts on surface water quality from accidental spills are addressed below. Specific concentrations and mass loadings of contaminants in runoff would vary greatly depending on the amounts and composition of soils and debris carried by the runoff. As discussed in Section 3.6, "Groundwater and Soils," upland portions of the proposed project site have been affected historically by releases of hazardous materials and petroleum products. In addition, structures built prior to 1980 may contain lead paint and asbestos-containing materials (Ninyo & Moore 2008:41–42). However, all existing Port tenants have contractually agreed to complete restoration of the premises, including clean-up of any hazardous materials contamination on or arising from the premises, before the expiration of, or earlier termination of, each tenant agreement. Also, mitigation measure MM GW-2 (see Section 3.6, "Groundwater and Soils") specifies that LAHD would remediate all contaminated soils within the proposed project boundaries for the site, such that contamination levels are below action levels established by the lead regulatory agency, prior to or during demolition and grading activities. Therefore, historical soil contamination would not be expected to contribute to contaminant loading from runoff into the harbor.

Standard Port BMPs specify procedures for handling, storage, and disposal of contaminated materials encountered during excavation. These procedures would be followed for upland construction activities associated with the proposed Project to ensure that any contaminants potentially present in soil or groundwater were not transported off site by runoff.

Runoff from most upland portions of the proposed project site would flow into Slip 5, but runoff from the San Pedro-Buffer Linkage portion of the proposed project site would flow into the West Basin, including the Southwest Slip. As discussed above, the SWPPP and implementation and maintenance of construction BMPs would minimize the potential for offsite transport of soils and contaminants present in the soil from the proposed project site that could degrade water quality within the harbor. This runoff would deliver fresh water that, depending on the strength and duration of the storm event, could be more turbid and have lower salinity and DO levels compared to the receiving waters. These freshwater discharges would coincide with discharges from other drainage systems and storm drains discharging to the harbor. Nevertheless, subsequent mixing of runoff and receiving waters, and settling of particles carried by runoff into the harbor, would prevent persistent changes in the quality of receiving waters.

As mentioned, water quality within the harbor is affected episodically by stormwater runoff from the watershed. Because the (approximately) 94-acre proposed project area represents only 0.5% of the area of the harbor's subwatershed, runoff from the upland portion of the proposed project area would represent a small (about 0.5%) contribution to the total stormwater loading to the harbor. Furthermore, stormwater BMPs would minimize the potential for offsite transport of soils and contaminants that could degrade water quality within the Los Angeles Harbor. While runoff from the proposed project site would contribute to changes in receiving waters that could cause water quality standards to be exceeded, the proposed Project would not create conditions that increase the relative contribution or contaminant mass loadings relative to baseline conditions. Since the receiving waters for runoff from the proposed Project do not support submerged aquatic vegetation, coral reefs, or other sensitive species and the closest occurrence of such resources is an area of aquatic vegetation in the Outer Harbor, runoff from the proposed project site would receive at least several orders of magnitude of dilution before reaching areas of aquatic vegetation (see Section 3.3, "Biological Resources"). Therefore, construction runoff also would not affect beneficial uses related to aquatic vegetation.

Impact Determination

Construction activities associated with upland and road improvements for the proposed Project have the potential to adversely affect the quality of stormwater runoff. However, the proposed Project would implement a SWPPP incorporating BMPs, such as sediment basins or traps and fabric filter fences or strawbale barriers, to control runoff of eroded soils and pollutants. The SWPPP also would incorporate monitoring requirements intended to minimize potential impacts and verify BMP effectiveness. These measures, combined with remediation of sites prior to construction and the low potential for erosion, would limit the soil and contaminant loading to Slip 5 and other waters of the Inner Harbor. Discharges of stormwater runoff to the harbor would also comply with specific conditions contained in the construction SWPPP that would control releases of contaminants to receiving waters. Therefore runoff from upland construction activities would not create pollution, contamination, a nuisance, or violate any water quality standards; and impacts on water quality would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact WQ-4a-3: Construction of the proposed Project would not result in accidental discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.

Accidents resulting in spills of fuel, lubricants, or hydraulic fluid from equipment used during demolition and construction could occur during the proposed Project. Based on past history for this type of work in the harbor, accidental leaks and spills of large volumes of hazardous materials or wastes containing contaminants during onshore construction activities have a very low probability of occurring because large volumes of these materials typically are not used or stored at construction sites (see Section 3.7, "Hazards and Hazardous Materials"). Spills associated with construction equipment, such as oil/fluid drips or gasoline/diesel spills during fueling, typically involve small volumes that can be effectively contained within the work area and cleaned up immediately (Port of Los Angeles Spill Prevention and Control procedures [CA012]). Construction and industrial SWPPPs and standard Port BMPs listed in Section 3.14.3.2.2 (e.g., use of drip pans, contained refueling areas, regular inspections of equipment and vehicles, and immediate repairs of leaks) would reduce the potential for materials from onshore construction activities to be transported off site and enter storm drains or the harbor.

Some pile and dolphin removal, some pile installation, and installation of the floating docks would be performed with the assistance of barge and boat mounted equipment. Accidents or spills from such in-water construction equipment could result in direct releases of petroleum materials or other contaminants to harbor waters. The magnitude of impacts on water quality would depend on the spill volume, characteristics of the spilled materials, and effectiveness of containment and cleanup measures. As previously noted, precautions would be taken to minimize this risk, and contractors would have spill response materials on hand. Nonetheless, given the extent and duration of the proposed work, it is likely that some spill incidents would occur, resulting in localized and short-term degradation of water quality in the work area.

The Basin Plan (LARWQCB 1994) water quality objective for oil and grease states that "[w]aters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses." Spill prevention and cleanup procedures for the proposed Project would be addressed in a SWPPP that would be implemented by the construction contractor. The plan would include a spill prevention, control, and countermeasures plan defining actions to minimize potential for spills and providing for efficient response to spill events, to minimize the magnitude of the spill and the extent of impacts.

Impact Determination

Standard precautions contained in the SWPPP are sufficient to ensure that spills or leaks that occur on land are contained and cleaned up with negligible impacts on surface water quality. Spills from in-water equipment could directly affect water quality within the harbor, resulting in a visible film on the surface of the water; however, the probability of such an accidental spill causing a nuisance or adversely affecting beneficial uses is low. Effective response to such a spill would be provided via a SPCC plan that would be implemented by the construction contractor. The plan would define actions to minimize the potential for spills and provide efficient responses to spill events to minimize the magnitude of the spill and extent of impacts. Therefore, accidental spills of pollutants would cause less-than-significant impacts.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

3.14.4.3.2 Operations Impacts

Impact WQ-1b: Operation of the proposed Project would not cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources.

Proposed project operations would not increase the potential for flooding on site due to the presence of existing and installed storm drains. Site elevations would be as established during construction (described above). The proposed Project would entail conversion of 7.10 acres of existing pervious surface to new impervious surface, along with conversion of 8.61 acres of existing impervious surface to new pervious surface, resulting in a net decrease in total impervious surface of 1.51 acres. This small change would slightly but not measurably decrease the potential for flooding. The allocation of runoff between various discharge points would not change in comparison to existing conditions, so individual sites within the proposed project area would be at the same risk of flooding as they are under current conditions, and flooding risk in adjacent areas would remain unchanged. In addition, proposed project operations would not increase the runoff velocity. Therefore, proposed project operations would not increase the risk of flooding or the risks to people, property, or biological resources (as assessed in Section 3.3, "Biological Resources").

Impact Determination

The proposed Project would not increase potential for flooding or increase risks to humans, property, or sensitive biological resources. Therefore, impacts from flooding would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact WQ-2b: Operation of the proposed Project would not substantially reduce or increase the amount of surface water in a water body.

Operations would entail no consumptive use of harbor waters and thus would not drain any areas of the harbor. Operations would place no fill in harbor waters, and would remove no material from harbor waters. Thus, there is no mechanism by which operation of the proposed Project could affect the amount of surface water in the Los Angeles Harbor.

Impact Determination

The proposed Project would have no impact on the amount of surface water in Slip 5 or, by extension, in Los Angeles Harbor. No impact would occur.

Mitigation Measures

No mitigation is required.

Residual Impacts

No impact would occur.

Impact WQ-3b: Operation of the proposed Project would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow.

Operation of the proposed Project does not alter the discharge of surface waters to Los Angeles Harbor. Thus it has a limited potential to alter surface water movement. Operation of the proposed Project would result in utilization of the proposed Project by small recreational vessels that would access the floating docks. Such vessels cause minor displacements of surface water during their movement and have very localized effects on currents and flow while they are docked. Such effects are normally unmeasurable at distances of more than a few tens of feet from the vessel and do not either individually or collectively comprise a long-term or substantial alteration of surface water movement.

Impact Determination

Operation of the proposed Project would not result in a permanent adverse change in surface water movement because the proposed Project would not in any way affect water movement at any but the very localized scales associated with movement and moorage of small recreational vessels. Small but likely measurable changes in water flow would occur in close proximity (within a few tens of feet) of vessels docking, sailing, or moored at the floating docks. These changes would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow. Thus the impacts would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact WQ-4b: Operation of the proposed Project would not result in discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.

Operation of the proposed project facilities would not involve any new direct point source discharges of wastes or wastewaters to the harbor. In addition, the proposed Project would result in an increase in pervious area with the addition of parks and green space, which would reduce stormwater runoff volumes. Stormwater runoff from the proposed project site would be collected on site by the storm drain system and discharged to the harbor, similar to existing conditions. The increased surface area of parking facilities, with many locations across the proposed project area, would generate particulates and other debris that would be conveyed by runoff from the site. Because stormwater discharges in the area currently receive no treatment, the stormwater treatment technologies implemented under the proposed Project would result in a substantial reduction in the concentrations of various pollutants that are commonly present in stormwater runoff from industrialized areas. Those pollutants and the effectiveness of treatment technologies are described further below.

Operations of gasoline and diesel powered equipment and vehicles within the proposed Project would generate air emissions containing particulate pollutants. A portion of these particulates would be deposited on the site and be subject to subsequent transport by storm runoff into harbor waters.

The facilities associated with the proposed Project would be operated in accordance with one or more industrial SWPPPs that contain monitoring requirements to ensure that stormwater quality complies with permit conditions. Stormwater runoff associated with facility operations would also be governed by SUSMP requirements that would be incorporated into the proposed project plan, and that must be approved prior to issuance of building and grading permits. The SUSMP for the Los Angeles County Urban Runoff and Stormwater NPDES Permit requires "minimization of the pollutants of concern" by incorporating "a BMP or combination of BMPs best suited to maximize the reduction of pollutant loadings in that runoff to the maximum extent possible" (SWRCB 2000). Examples of BMPs used for minimizing the introduction of pollutants of concern from site runoff include oil/water separators, catch basin inserts, storm drain inserts, and media filtration. All of these BMPs would likely be used by the proposed Project. These BMPs must meet specified design standards to mitigate (infiltrate or treat) stormwater runoff and control peak flow discharges. Where structural or treatment control BMPs are provided, Port tenants are required to provide verification of maintenance provisions. Regulatory controls for runoff and storm drain discharges are designed to reduce impacts on water quality and would be fully implemented for the proposed Project. Tenants would be required to obtain and meet all conditions of applicable stormwater discharge permits as well as meet all LAHD pollution control requirements.

Several additional stormwater BMPs are discussed by Brown and Bay (2007). Although some of the BMPs evaluated therein were found to be effective at reducing overall toxicity and contamination within stormwater, others were found to have no effect on toxicity. Brown and Bay found that created wetlands were the only BMPs evaluated that effectively reduced dissolved metals and organic toxins in runoff; other BMPs evaluated, including those involving settling, filtration, and ultraviolet sterilization, were not effective at removing dissolved toxins. However, created wetlands are generally not practicable as BMPs in the Los Angeles climate, except at those rare sites where wetland hydrology is reliably available. Therefore, BMPs implemented under the proposed Project are unlikely to substantially reduce dissolved metals and organic toxins in stormwater relative to baseline conditions.

Stormwater sampling in the Port of Long Beach in 2005 (MBC 2005) showed that pollutants such as metals and semi-volatile organic compounds (SVOCs) were present in runoff from port facilities. Copper, lead, mercury, nickel, and zinc occurred in stormwater samples at concentrations that exceeded the standards for marine waters at a few locations. It is reasonable to expect that these findings would also apply to stormwater runoff from the proposed project site.

The proposed Project would cause very little change in vessel traffic in the harbor. The proposed Project would provide no service whatsoever to large commercial vessels. Although a floating dock would be provided, it would only serve private recreational vessels and would not provide permanent moorage, and thus would not increase capacity for recreational vessels in the LA/LB harbor. Therefore, the facility would cause no net increase in discharges or other water quality impacts associated with recreational vessels. Nonetheless there would be increased recreational vessel use of the area near the proposed Project's floating docks in Slip 5. This would create a local source of contamination from copper-based antifouling paints that are commonly used on recreational vessels, and a local source of potential accidental or illegal discharges, which could reasonably be expected to increase in proportion to the increased recreational vessel traffic. However, the contributions from antifouling paints would be negligible because the dock would only be used as a temporary moorage by relatively small numbers of small vessels. The dock operator would be required to have an SPCC plan to address accidental or illegal spills. Thus, measurable impacts on water quality due to dock operations would be accidental, rare, and low in magnitude.

Impact Determination

Upland operations associated with the proposed Project would not result in direct discharges of wastes. Stormwater runoff from the proposed project site might reasonably be expected to contain suspended and dissolved pollutants originating within the proposed project area. Discharges of stormwater would comply with NPDES discharge permit limits and would generally contribute to water quality comparable to or better than existing conditions. Therefore, the impact to water quality from stormwater discharges would be less than significant under CEQA.

There is potential for an increase in accidental spills and illegal discharges due to increased vessel calls at the facility, and many vessels using the facility would have antifouling hull paints that could leach copper into the water. However, the intensity of vessel use, the small size of the vessels, and the absence of permanent moorage facilities all contribute to a determination that water quality impacts attributable to vessel use would be accidental, rare, and low in magnitude. Therefore, the impact on water quality from operational discharges and leaching is less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

3.14.4.3.3 Summary of Impact Determinations

Table 3.14-5 summarizes the impact determinations of the proposed Project related to water quality, sediments, and oceanography, as described in the detailed discussion in Section 3.14.4.3.1. Identified potential impacts may be based on federal, state, and City of Los Angeles significance criteria, LAHD criteria, and the scientific judgment of the report preparers.

For each type of potential impact, the table describes the impact, notes the CEQA impact determination, describes any applicable mitigation measures, and notes the residual impacts (i.e., the impact remaining after mitigation). All impacts, whether significant or not, are included in this table.

1 **Table 3.14-5.** Summary Matrix of Potential Impacts and Mitigation Measures for Water Quality,
2 Sediments, and Oceanography Associated with the Proposed Project

Environmental Impacts	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
3.14 Water Quality, Sediments, and Oceanography			
Construction			
WQ-1a: Construction of the proposed Project would not cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources.	Less than significant	No mitigation is required.	Less than significant
WQ-2a: Construction of the proposed Project would not substantially reduce or increase the amount of surface water in a water body.	Less than significant	No mitigation is required.	Less than significant
WQ-3a: Construction of the proposed Project would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow.	Less than significant	No mitigation is required.	Less than significant
WQ-4a-1: In-water and over-water construction for the proposed Project would not result in discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.	Less than significant	No mitigation is required.	Less than significant

Environmental Impacts	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
WQ-4a-2: Stormwater discharged during construction of the proposed Project would not result in discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.	Less than significant	No mitigation is required.	Less than significant
WQ-4a-3: Construction and operation of the proposed Project would not result in accidental discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.	Less than significant	No mitigation is required.	Less than significant
Operations			
WQ-1b: Operation of the proposed Project would not cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources.	Less than significant	No mitigation is required.	Less than significant
WQ-2b: Operation of the proposed Project would not substantially reduce or increase the amount of surface water in a water body.	No impact would occur.	No mitigation is required.	No impact would occur.

Environmental Impacts	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
WQ-3b: Operation of the proposed Project would result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the velocity or direction of water flow.	Less than significant	No mitigation is required.	Less than significant
Impact WQ-4b: Operation of the proposed Project would not result in discharges that create pollution, contamination, or nuisance as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or water quality control plan for the receiving water body.	Less than significant	No mitigation is required.	Less than significant

3.14.4.4 Mitigation Monitoring

No mitigation is required for any of the identified impacts; therefore, mitigation monitoring is not required.

3.14.5 Significant Unavoidable Impacts

No significant unavoidable impacts on water quality, sediments, and oceanography would occur during construction or operation of the proposed Project or any of the alternatives.