3.4 MARINE WATER AND SEDIMENT QUALITY

This section addresses the potential impacts of the Proposed Project and alternatives on marine water and sediment quality. Water quality and sediment quality are considered together because of the high potential for the two media to affect one another through the exchange of pollutants.

3.4.1 Environmental Setting

3.4.1.1 Area of Influence

The area of influence for Project effects on hydrology, water quality, and sediments is defined as the Inner and Outer Harbor areas of Long Beach and Los Angeles Harbors. Los Angeles Harbor is considered because the Project site is adjacent to the Los Angeles Harbor District, and the two harbors freely exchange water via the Cerritos Channel and the Outer Harbor.

3.4.1.2 Setting

This section describes water circulation and water and sediment quality in the vicinity of the Project site. These factors, together with shoreline and bottom habitat types, largely determine the makeup of the resident biological community (Section 3.5) and influence human use of the harbor waters, such as recreational fishing. This section covers the factors of greatest importance to biological communities, including general circulation patterns and the major water quality and sediment parameters, which are temperature, salinity, dissolved oxygen (DO), hydrogen ion concentration (pH), transmissivity (water clarity), metals, and organic contaminants.

The Back Channel and the Cerritos Channel are included on the CWA Section 303(d) list of impaired waters as part of Los Angeles/Long Beach Inner Harbor. These harbor areas, as well as the rest of the harbor complex, are being targeted for development of total maximum daily loads (TMDLs) by the RWQCB.

Circulation

Water circulation in the harbor is driven by tides entering and exiting through Angel’s Gate, Queen’s Gate, and the opening between the Long Beach Breakwater and the shoreline at Seal Beach, and, to a lesser extent, by percolation through the outer breakwaters. Circulation patterns within the harbor are regulated by the complex geometry of the harbor facilities, which have been progressively altered by Port expansion projects over the past 100 years. The primary changes resulting from these projects are alteration of circulation patterns in the Outer Harbor and somewhat reduced flow velocities in certain parts of the Inner and Middle Harbors (e.g., Wang et al. 1995).

Numerical studies have shown that current speed is typically less than 1 foot per second (fps) within the harbor, and less than 0.5 fps in the Cerritos Channel near Pier S (Seabergh et al. 1994; Vermulakonda et al. 1991). Currents in the Cerritos Channel were found to alternate in direction, but were dominated by east-to-west flows during a tidal cycle (Vermulakonda et al. 1991). A dye-tracer study in the POLA and POLB using the Waterways Experiment Station (WES) hydrodynamic numerical model indicated that the Inner Harbor areas (inshore of the Vincent Thomas and Gerald Desmond Bridges) exhibited static circulation patterns (Vermulakonda et al. 1991, as cited in the Los Angeles/Long Beach Harbors Navigation Improvement EIS/EIR; USACE and LAHD 1992). USACE stated that the configuration and location of the Inner Harbor, along with tidal fluctuations, results in less mixing in the Inner Harbor than occurs in the Outer Harbor (USACE and LAHD 1992).

Tidal variations along the coast of Southern California are caused 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. This combination of two harmonic tide waves usually produces two high and two low tides each day, and generates a diurnal inequality, or mixed semidiurnal tide. This causes a difference in height between successive high and low waters. 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).

Winds blowing over the water surface also have a significant effect on the circulation pattern and flow velocities in the Outer Harbor, where active winds tend to increase velocities in the surface layer of the water column while creating a counter-current circulation pattern in the lower layers (Seabergh et al. 1994). Wind effects on circulation in the Inner Harbor areas depend on the orientation and length of a channel segment relative to the dominant wind direction. Since Cerritos Channel is out of alignment with the dominant seasonal wind directions in the harbor area, wind effects on circulation in the channel are generally less pronounced.

The level of flushing in the Outer Harbor is generally good due to proximity to the entrances, but the level of flushing decreases significantly farther into the Inner Harbor. Studies demonstrated that it could take up to approximately 60 days to completely flush the Inner Harbor channels (Bunch et al. 2000). The Cerritos Channel is one of the most poorly flushed regions within the Inner Harbor, resulting in degraded water quality relative to the Outer Harbor. Flushing volume (and therefore residence time) in the Back Channel was also reduced relative to the Outer Harbor, but it was between 20 and 25 percent higher (when comparing the ebb flow volume versus that of the flood tide during spring tide periods) than in the Cerritos Channel (USACE 1984).

None of the Project area is within the 500-year flood zone (Figure 3.4-1). The only sources of flooding at the Project site within the 100-year flood zone would be storm surge, tsunami, or seiche. The potential for seiches and tsunamis has been modeled for the POLB (Moffatt and Nichol 2007b). Tsunamis have demonstrated increased horizontal movements of water (up to 16 knots in the Main Channel of the harbor), but very little vertical movement in the POLB (Curtis 2010; USACE and LAHD 1984). Rainfall events that result in runoff that exceeds the capacity of the storm drains could also cause localized flooding until the runoff drained away.

**Marine Water and Sediment Quality**

Water and sediment quality in Long Beach Harbor are assumed to be influenced by inputs of pollutants via storm water. POLB developed a Storm Water Pollution Prevention Plan (SWPPP) in 1992 to comply with requirements for the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction Activity (General Permit). The program was found to be acceptable by the Los Angeles RWQCB. In 1995, POLB instituted a Master Storm Water Program to provide guidance for Port staff and participating facilities on compliance with storm water regulations. In 1999, the program was expanded to address compliance not only with the Industrial Activities permit, but also with the General Permit for Storm Water Discharges Associated with Construction Activity and the City of Long Beach NPDES Municipal Separate Storm Sewer System (MS4). The program addresses industrial and commercial facilities and POLB’s monitoring program, operation and maintenance activities, development and redevelopment planning, and management of construction activities within the POLB complex.

POLB’s non-point-source NPDES permit requirements are enforced through the Port of Long Beach Master Storm Water Program and various lease requirements with the tenants of POLB. POLB’s Storm Water Program implements both the General Industrial Permit and the city’s NPDES permit for its MS4.

Recently, the two San Pedro Bay ports, in cooperation with EPA and the Los Angeles RWQCB, prepared the San Pedro Bay Water Resources Action Plan (WRAP; POLA/POLB 2009), which describes the measures and programs that the two ports are using to control water pollution and manage contaminated sediments. The WRAP includes a comprehensive review of water quality in the harbors, which is summarized here.
Figure 3.4-1
100-Year and 500-Year Flood Zones

Source: Federal Emergency Management Agency
Water quality parameters within the harbor have been extensively studied over the years through regular monitoring and project-specific sampling programs. Table 3.4-1 shows the typical ranges of temperature, salinity, pH, DO, and transmissivity in the Long Beach and Los Angeles harbors during a year-long monitoring program conducted in 2000 (MEC 2002). More recent data from the 2008–2010 Ambient Water Quality Monitoring program in POLB was also available (MBC 2009a, 2010). Other relatively recent data include a single survey conducted in October 2006 (Weston 2006) and data collected in winter and summer 2009 on both flood and ebb tides along the Back Channel and the Turning Basin (MBC 2009b), and a single survey conducted by SAIC in July 2008 (SAIC 2010). All of these surveys (with the exception of higher pH levels during the Weston survey than usually observed) confirmed the data collected during the year-round study by MEC (MEC 2002).

The results show that temperature, salinity, pH, DO, and transmissivity in the harbors are generally within the expected ranges for coastal waters.

**Salinity.** Salinity in harbor waters varies due to the effects of storm water runoff, waste discharges, rainfall, and evaporation. Harbor salinities usually range from 30.0 to 34.2 parts per thousand (ppt), but salinities ranging from less than 10.0 ppt to greater than 39.0 ppt have been reported (USACE and LAHD 1984). More recently, water quality sampling in Cerritos Channel over seven quarters between late 2008 and January 2010 indicated a more restricted salinity range of a low of 29.7 ppt and a high of 33.6 ppt, with an average range of 32.1 to 33.3 ppt (MBC 2009a, 2010).

Salinity in the surface layer of the water column near stream outlets (Domínguez Channel and the Los Angeles River Estuary) tends to be consistently lower than elsewhere, presumably due to year-round freshwater inputs. Stratification occurs in the Inner Harbor areas during fall and winter due to increased runoff from the watersheds. Measurements in Slip 1 (on Pier D) in Cerritos Channel during 2000 showed salinity to range from 24.8 to 33.0 ppt in bottom waters, while salinity was between 33.1 and 33.6 ppt in surface waters (MEC 2002). In October 2006, salinity in the Project area was approximately 33.3 ppt from surface to bottom (Weston 2006).

### Table 3.4-1. Typical Ranges of Temperature, Salinity, pH, DO, and Transmissivity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Annual Mean Range</th>
<th>Seasonality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>Surface: 16 – 19</td>
<td>Warmest in summer and coldest in spring.</td>
</tr>
<tr>
<td></td>
<td>Mid-depth: 15 – 18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom: 14 – 18</td>
<td></td>
</tr>
<tr>
<td>Salinity (ppt)</td>
<td>Surface: 33.0 – 33.4</td>
<td>Lower salinity in surface layer in Inner Harbor during fall and winter. Minimal seasonality elsewhere.</td>
</tr>
<tr>
<td></td>
<td>Mid-depth: 33.2 – 33.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom: 32.9 – 33.6</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>Surface: 7.9 – 8.1</td>
<td>Lower pH in winter and spring.</td>
</tr>
<tr>
<td></td>
<td>Mid-depth: 7.9 – 8.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom: 7.8 – 8.0</td>
<td></td>
</tr>
<tr>
<td>DO (milligrams per literg)</td>
<td>Surface: 6.7 – 8.1</td>
<td>Lower DO in spring and summer.</td>
</tr>
<tr>
<td></td>
<td>Mid-depth: 6.0 – 7.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom: 4.9 – 7.0</td>
<td></td>
</tr>
<tr>
<td>Transmissivity (%)</td>
<td>Surface: 42.3 – 70.7</td>
<td>Minimal seasonality.</td>
</tr>
<tr>
<td></td>
<td>Mid-depth: 37.9 – 68.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom: 19.6 – 64.4</td>
<td></td>
</tr>
</tbody>
</table>

Source: MEC 2002
Temperature. Water temperatures in the harbor show seasonal and spatial variations that reflect the influence of the ocean, local climate, the physical configuration of the harbor, and circulation patterns. Water in the Inner Harbor areas and shallow basins was found to be slightly (less than 33.8°F) warmer than in outer harbor waters. The water column tends to be isothermal during fall and winter, and stratified during spring and summer, with maximum differences of between about 7°F and 11°F. In 2000, surface water temperatures in Slip 1 averaged 58.6°F in January, 61.9°F in May, 71.8°F in August, and 63.9°F in November. Bottom temperatures were 1.2 to 7.9°F lower, with the larger difference occurring in the spring to summer period (MEC 2002). In October 2006, temperatures were 60.8 to 58.6°F from surface to bottom (Weston 2006).

Nutrients. Nutrients, in addition to the availability of light, can limit photosynthetic production by phytoplankton. Factors that influence nutrient concentrations include biological processes, wastewater discharge, and storm water runoff. Depending on location, depth, and season, nutrients in the Los Angeles/Long Beach Harbor complex may vary in concentration by several orders of magnitude. The enclosed nature of the harbor creates seasonal and spatial deviations in nutrient concentrations from the background concentrations found in the coastal ocean outside the breakwaters. The following ranges of nutrients concentrations were measured in 1978 by Harbors Environmental Projects (HEP 1980): phosphate, 0.172 to 12.39 parts per million (ppm); ammonia, 0.12 to 119.28 ppm; nitrate, 0.00 to 82.97 ppm; and nitrite, 0.00 to 5.38 ppm. Nutrient concentrations were high during periods of high storm water runoff. Other sources of nutrients in harbor waters include wastewater discharges such as from the Terminal Island Treatment Plant (TITP) in the Outer Harbor and industrial discharges. Point-source inputs, such as effluent discharges from wastewater treatment plants, are regulated though discharge permits.

Dissolved Oxygen. DO is a principal indicator of marine water quality, widely used by monitoring agencies. For example, the RWQCB requires that the mean annual DO concentration in a water body be 6 milligrams per liter (mg/l) or greater with no measurement event less than 5 mg/l (SWRCB 1994). DO concentrations may vary considerably based on the influence of a number of parameters such as photosynthesis and respiration of plants and other organisms, waste (nutrient) discharges, surface water mixing through wave action, diffusion rates at the water surface, and disturbance of anaerobic bottom sediments.

Harbor waters are generally well oxygenated in the fall and winter, with DO levels typically above 5 mg/l. However, DO levels fall below 5 mg/l at certain locations during spring and summer. In October 2006, DO was above 7 mg/l from top to bottom (Weston 2006). Sampling in harbor waters in Cerritos Channel and the Turning Basin in July 2008 showed DO in surface, mid-depth, and bottom waters to range from 6.3 to 8.5 mg/l, with no concentrations below 5.0 mg/l (SAIC 2010).

pH. pH is the hydrogen ion concentration, measured on a scale of 0 (highly acidic) to 16 (highly alkaline). Typical pH in the Southern California Bight varies narrowly around a mean of 8.1, decreasing slightly with depth. It can approach 8.6 or higher during phytoplankton blooms and can fall below 7.5 in areas of reduced circulation and organic decomposition. The RWQCB has established an acceptable range of 6.5 to 8.5 with a change in tolerance level of no more than 0.2 due to discharges.

The pH of harbor waters tends to be spatially uniform and correlated seasonally with biochemical processes such as algal photosynthesis. In Long Beach Harbor waters, pH levels have ranged from 7.0 (deeper layers in cooler months) to 8.7 (upper layers in warmer months). Measurements near Pier S in 2000 found pH to be consistently between 7.7 and 8.2 at all depths throughout the year (MEC 2002). In October 2006, pH was 8.3 to 8.4 in the Project area (Weston 2006). More recently, water quality sampling in Cerritos Channel over seven quarters between late 2008 and early 2010 indicated a pH range of 7.7 to 8.3, with an average value of 7.8 to 8.0 (MBC 2009b, 2010).
Transparency/Turbidity. Transparency is a measure of the ability of water to transmit light, or water clarity. In recent decades, water clarity has been measured by a transmissometer, an instrument that measures percent light that transmits across a known distance through water.

Turbidity is also a measure of water clarity as affected by the amount of suspended solids in the water column. Increased turbidity usually results in decreased transparency. Turbidity generally increases as a result of one or a combination of the following conditions: fine sediment from terrestrial runoff or resuspension of fine bottom sediments, planktonic blooms, and dredging activities.

Historically, water clarity in the harbors has varied tremendously both laterally and with depth, but has generally increased since 1967. Transmissivity at several locations within the harbors is typically found to be lower near the bottom, presumably as a result of resuspension of fine sediments by local currents (e.g., MBC 2010; USACE and LAHD 1992; Weston 2006).

In October 2006, transmissivity at the surface in the Project area was 52 percent (Weston 2006). In the Cerritos Channel and at the Turning Basin in the Project area, transmissivity measured at several depths in 2008 ranged from 62.1 to 64.2 percent transmittance in bottom waters and from 62.8 to 65.4 percent in surface waters (SAIC 2010).

Suspended solids concentrations in the Cerritos Channel ranged from 3.2 to 6.5 and averaged 4.7 mg/l during seven quarterly surveys conducted 2008–2010 (MBC 2009a, 2010). In surface waters of the Outer Harbor in an earlier survey, the range was from less than 1 to 22.4 mg/l (USACE and LAHD 1992). One cause of increased suspended solids is phytoplankton blooms following storm runoff events during warm weather.

Contaminants. Sources of contaminants in harbor waters include municipal and industrial wastewaters and storm water runoff, but dilution means that contaminant concentrations in the water column are generally at trace levels. Data from the RWQCB indicate that there are nine major NPDES discharge sources (including one publicly owned treatment works [the TITP]), 48 minor discharges, and 61 discharges covered by general permits (RWQCB 2007) that discharge into San Pedro Bay directly or via Dominguez Channel. Additional storm water runoff enters the harbors through Dominguez Channel and other miscellaneous sources. Maintenance dredging, previous channel deepening projects, and long-term effluent limitations imposed by the RWQCB have resulted in decreased chemical contamination of harbor waters and sediments.

Contaminants in harbor waters can include heavy metals (particularly cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), oil and grease, chlorinated hydrocarbons (e.g., pesticides such as DDTs and chlordane), and PCBs.

Analysis of water samples taken at mid-depth at two locations in the Project area in October 2006 (Weston 2006) showed that most pollutants (Table 3.4-2), including PCBs, pesticides, semi-volatile organic compounds (SVOCs), and organotins, were below detection limits. Arsenic, cadmium, chromium, copper, lead, nickel, and zinc were detected, but concentrations were well below water quality standards (California Toxics Rule levels). In October 2006, November 2008, and February 2009, POLB conducted Port-wide water chemistry studies of mid-water samples at 20 stations during the 2006 survey, and 10 stations during the next two studies. Samples were collected throughout the Inner, Middle, and Outer Harbor regions, and analyzed for a broad range of chemicals of concern, including heavy metals, PCBs, PAHs and other semivolatile organic compounds, butyltins, and pesticides (AMEC 2009).

Overall, the results from the AMEC (2009) study indicated that dissolved metals levels in harbor waters were very low and were protective of marine life. Only copper was observed at concentrations that exceeded state criteria, and in only 5 out of 253 samples tested. In the vast majority of the samples analyzed, the dissolved metals levels were many times lower than the
### Table 3.4-2. Dissolved Contaminants in Harbor Waters near the Project Area

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Units</th>
<th>Water Quality Standard&lt;sup&gt;a&lt;/sup&gt;</th>
<th>East Basin&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Back Channel&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and Grease</td>
<td>mg/l</td>
<td>--</td>
<td>2.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Arsenic</td>
<td>µg/l</td>
<td>36</td>
<td>1.25</td>
<td>1.1</td>
</tr>
<tr>
<td>Cadmium</td>
<td>µg/l</td>
<td>9.3</td>
<td>0.017</td>
<td>0.015</td>
</tr>
<tr>
<td>Chromium (VI)</td>
<td>µg/l</td>
<td>50</td>
<td>0.31</td>
<td>0.27</td>
</tr>
<tr>
<td>Copper</td>
<td>µg/l</td>
<td>3.1</td>
<td>0.46</td>
<td>0.48</td>
</tr>
<tr>
<td>Lead</td>
<td>µg/l</td>
<td>8.1</td>
<td>0.01&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.01&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mercury</td>
<td>µg/l</td>
<td>0.77</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Nickel</td>
<td>µg/l</td>
<td>8.2</td>
<td>0.204</td>
<td>0.129</td>
</tr>
<tr>
<td>Selenium</td>
<td>µg/l</td>
<td>71</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Silver</td>
<td>µg/l</td>
<td>1.9&lt;sup&gt;e&lt;/sup&gt;</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Zinc</td>
<td>µg/l</td>
<td>81</td>
<td>0.88</td>
<td>1.076</td>
</tr>
<tr>
<td>PCBs (Aroclors)</td>
<td>µg/l</td>
<td>0.03</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>4,4'-DDT</td>
<td>µg/l</td>
<td>0.001</td>
<td>&lt;0.050</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>Chlordane</td>
<td>µg/l</td>
<td>0.004</td>
<td>&lt;0.50</td>
<td>&lt;0.50</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>µg/l</td>
<td>0.0019</td>
<td>&lt;0.050</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>Endosulfan</td>
<td>µg/l</td>
<td>0.0087</td>
<td>&lt;0.050</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>Endrin</td>
<td>µg/l</td>
<td>0.0023</td>
<td>&lt;0.050</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>Heptachlor</td>
<td>µg/l</td>
<td>0.0036</td>
<td>&lt;0.050</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>Heptachlor Epoxide</td>
<td>µg/l</td>
<td>0.0036</td>
<td>&lt;0.050</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>Toxaphene</td>
<td>µg/l</td>
<td>0.0002</td>
<td>&lt;2.0</td>
<td>&lt;2.0</td>
</tr>
<tr>
<td>Dibutyltin</td>
<td>µg/l</td>
<td>--</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
</tr>
<tr>
<td>Monobutyltin</td>
<td>µg/l</td>
<td>--</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
</tr>
<tr>
<td>Tetrabutyltin</td>
<td>µg/l</td>
<td>--</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
</tr>
<tr>
<td>Tributyltin</td>
<td>µg/l</td>
<td>--</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
</tr>
<tr>
<td>Semivolatile Organic Compounds</td>
<td>µg/l</td>
<td>7.9&lt;sup&gt;d&lt;/sup&gt;</td>
<td>&lt;2 to -25</td>
<td>&lt;2 to 50</td>
</tr>
</tbody>
</table>

<sup>a</sup> California Toxics Rule, Criterion Continuous Concentration for saltwater

<sup>b</sup> < indicates below method of detection limit indicated

<sup>c</sup> Estimated value

<sup>d</sup> Only pentachlorophenol has a Criterion Continuous Concentration for saltwater

<sup>e</sup> California Toxics Rule, Criterion Maximum Concentration for saltwater (the Criterion Continuous Concentration is generally less than this value)

<sup>c</sup> no published standard

Source: Weston 2006
state standards at which negative impacts on marine life would be expected to occur. The conclusion of this multi-year and spatially diverse sampling was that, in general, dissolved metal inputs from all sources (including upstream discharges, storm water runoff, in-water maintenance activities, and aerial deposition) are not causing an unacceptable buildup of dissolved metals in the water column.

Most of these contaminants have a low solubility in water and adsorb onto particulate matter that settles to the bottom. As a result, these contaminants have been found in harbor sediments, as described below.

Typical organic pollutants of concern in industrial harbor waters include tributyltin (TBT), chlorinated pesticides, PCBs, PAHs, phenols, and phthalates. In general, the concentrations of organic chemicals were found to be very low, and in most cases, below detection limits. Only TBT was detected in concentrations that exceeded National Ambient Water Quality Criteria for non-priority pollutants (no California state criteria, including California Toxics Rule [CTR], exist for TBT). In the POLB, samples were taken at 10 stations throughout the harbor area during three separate monitoring events (October 2006, November 2008, and February 2009). No detectable levels of TBT were observed.

Organic compounds such as pesticides, PCBs, and petroleum compounds are rarely detected during routine sampling because, being poorly soluble in water, they tend to be present at concentrations below the limits of routine chemical analytical techniques. However, the tissues of filter-feeding organisms such as mussels do concentrate such compounds from the water, and thus can be used to detect contamination. Mussel Watch data from Long Beach Harbor for the period of 2004–2005 indicated elevated levels (relative to reference locations) of chlordane, DDT, and dieldrin in mussel tissues (Kimbrough et al. 2008.), indicating that those compounds are likely elevated relative to ocean waters.

Another contaminant source is aerial fallout, but deposition mechanisms are not understood for all potential pollutants, and research on actual concentrations of such pollutants is still not complete. Direct aerial deposition onto the water surface appears at this point to be a minor pollutant in the water. The bulk of the inputs of common airborne pollutants, such as lead, zinc, and dust from paved and unpaved roads, tire wear, and construction areas, actually reach harbor waters via storm drainage (Stolzenbach 2006). Aerial deposition from Port-related sources is expected to decrease in the future as the San Pedro Bay CAAP reduces air pollutants in the Port area.

**Freshwater Quality**

Near-surface waters (freshwater) in the Pier S Harbor area consist primarily of storm water runoff following storm events, which drains into the adjacent harbor waters. Following storm events, the quality of surface water may be degraded due to pollutant loading from petroleum hydrocarbons, metals, and SVOCs, and particulate matter associated with the operation of vessel unloading facilities, industrial land uses, and runoff from roadways. POLB storm drains were sampled from 1994 to the present (MBC 2009c), once each year in dry weather and twice in wet weather. These samples showed that particulates (measured as total suspended solids) increased to more than 200 mg/l at some of the storm drains during storms while concentrations at other drains remained low. The total recoverable petroleum hydrocarbons (TRPH) concentrations varied but were below 6 mg/l in both wet and dry samples in 2008 and undetectable in many of the samples. For metals, only copper, lead, and zinc concentrations in the wet weather samples at many of the stations were consistently above the CTR continuous concentration criteria for saltwater. In the dry weather samples of 2009 there were no exceedances of the CTR criterion. The samples at some locations also contained detectable amounts of SVOCs, but these concentrations were below the CTR criteria. The saltwater criteria were used for comparison because, although water from these drains is generally freshwater (but can be brackish based
on conductivity measurements), it mixes with the marine harbor waters at the discharge point of each drain. After dilution through mixing, concentration of metals are expected to be less than the CTR criteria.

**Sediment Quality**

Surficial sediments in Long Beach Harbor typically contain approximately 70 percent to 90 percent fine-grain material (i.e., silt and clay). The sediments in the Inner Harbor channels and slips were found to exhibit elevated levels of DDT, PCBs, and metals compared with those in the Outer Harbor near Queen’s Gate (SAIC and MEC 1997). Sediment metals levels at the Inner Harbor Turning Basin near Pier S were found to be up to two to three times those in the Outer Harbor. Elevated chlordane was found in Cerritos Channel near Pier S, and elevated TBT and PCBs were observed near Cerritos Channel at the East Turning Basin (SWRCB 1998). The elevated levels of sediment contamination at these locations are expected as a result of legacy industrial discharges, continued industrial Port operations, and urban runoff. Some areas of contaminated sediments have been covered by clean or less contaminated sediments as part of recent landfill construction, thereby sealing them from interchange with the overlying water.

The Cerritos Channel is included on the CWA Section 303(d) list of impaired waters because harbor areas in the channel vicinity have been subject to sediment contamination and are being targeted for TMDL development by the RWQCB. The 2010 CWA 303(d)-listed areas include Long Beach Harbor West Basin and Main Channel for bacteria, benthic community effects, copper, zinc, pesticides, Benzo(a)pyrene, Chrysene (C1-C4), PAHs, and PCBs in sediment/tissue, and sediment toxicity, and Cerritos Channel for ammonia, bis(2ethylhexyl)phthalate/DEHP, coliform bacteria, copper, lead, zinc, hydrogen ion concentration (pH), trash and sediment: chlordane (SWRCB 2010). The reasons for impairment are summarized in Table 3.4-3.

3.4.1.3 Regulatory Setting

**Clean Water Act.** The federal CWA (PL 92-500, as amended) provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation’s waters. Sections 401 through 404 of the CWA require that discharges to waters of the U.S. (including dredge and fill, construction runoff, industrial wastewater, and storm water runoff) be authorized through either individual or general NPDES permits. These permits can include waste discharge requirements (WDRs) issued by the RWQCB. The SWRCB and its regional water quality control boards implement sections of the CWA through the Water Quality Control Plan, Standard Urban Stormwater Mitigation Plans (SUSMP), and permits for discharges. 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.

### Table 3.4-3. Section 303(d) Listed Waters in Long Beach Harbor

<table>
<thead>
<tr>
<th>Listed Waters/Reaches</th>
<th>Impairments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles/Long Beach Outer Harbor, inside breakwater (4,042 acres)</td>
<td>Chromium (total), copper, nickel, PAHs, zinc, DDT, PCBs, sediment toxicity</td>
</tr>
<tr>
<td>Los Angeles/Long Beach Inner Harbor (3,003 acres)</td>
<td>Beach closures, benthic community effects, Benzo(a)pyrene, Chrysene (C1-C4), copper, zinc, DDT, PCBs, PAHs, sediment toxicity</td>
</tr>
<tr>
<td>Cerritos Channel (31 acres)</td>
<td>Ammonia, bis(2ethylhexyl)phthalate/DEHP, coliform bacteria, copper, lead, zinc, trash; pH Sediment: chlordane</td>
</tr>
</tbody>
</table>

Source: SWRCB 2010
Water Quality Control Plan, Los Angeles Region (Basin Plan, Adopted 1994). The SWRCB Basin Plan 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 describe the pollution thresholds beyond which the beneficial uses will be impaired, and describes implementation programs. Beneficial uses and water quality objectives combine to form water quality standards (WQS) under the CWA.

State Water Resources Control Board, Storm Water Permits. The SWRCB has developed a statewide General Permit for Discharges of Storm Water Associated with Construction Activity and an Industrial Storm Water General Permit for projects that do not require individual permits for these activities.

Under the General Permit for Discharges of Storm Water Associated with Construction Activity, all construction activities that disturb 1 acre or more must do the following:

- Prepare and implement a SWPPP that specifies BMPs to prevent construction pollutants from contacting storm water. The intent of the SWPPP and BMPs is to keep all products of erosion from moving off-site into receiving waters.
- Eliminate or reduce non-storm-water discharges to storm sewer systems and other waters of the U.S.
- Perform sampling and analytical monitoring to determine the effectiveness of BMPs in (a) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired for sediment or silt; and (b) reducing or preventing pollutants (even if not visually detectable) in storm water discharges from causing or contributing to exceedances of water quality objectives.

The General Permit for Discharges of Storm Water Associated with Construction Activity (Water Quality Order 97-03-DWQ) effluent limitations require dischargers to “meet all applicable provisions of Sections 301 and 401” of the CWA “using best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT).” Receiving water limitations require storm water discharges to “not cause or contribute to a violation of an applicable water quality standard” and “to reduce or prevent pollutants in storm water discharges.” Dischargers must do as follows:

- Prepare and implement a SWPPP to identify sources of pollution and describe and ensure implementation of BMPs to reduce or prevent industrial pollutants in storm water discharges.
- Eliminate unauthorized non-storm-water discharges to the storm drain system.
- Develop and implement a monitoring program to demonstrate compliance with the General Permit, aid in implementation of the SWPPP, and measure effectiveness of BMPs. The monitoring shall conduct visual observations and analytical sampling of storm water discharges.

State Water Resources Control Board, Standard Urban Stormwater Mitigation Plans. The city of Long Beach is covered under a Permit for Municipal Stormwater and Urban Runoff Discharges (RWQCB Order No. 99-060 and NPDES No. CAS004003). This permit incorporates the Long Beach Storm Water Management Program (LBSWMP) and the Long Beach Monitoring Program (LBMP). The LBSWMP consists of the following elements:

1. Program management
2. Geographic characterization
3. Public agency activities program
4. Development planning/construction program
5. Illicit connection/illicit discharge elimination program
6. Education/public information program
7. Annual reporting program
The LBMP consists of the following:

1. Mass emissions monitoring
2. Multi-species toxicity testing
3. Toxicity identification evaluations
4. BMPs effectiveness evaluations
5. Co-operative monitoring in the Los Angeles River and Los Cerritos Channel

The City of Long Beach must comply with specified receiving water limitations; discharge prohibitions; storm water management, monitoring, and reporting; and special and standard provisions.

California Porter-Cologne Act. This act (State Water Code Sections 13000 et seq.) is the basic water quality control law for California and works in concert with the federal CWA. The state CWA is implemented by the SWRCB and its nine regional boards, which implement the permit provisions of Section 402 and certain planning provisions of Sections 205, 208, and 303 of the federal CWA. This means that the state issues a single discharge permit for purposes of state and federal law. Permits for discharge of pollutants are officially called NPDES permits. Anyone who is discharging waste or proposing to discharge waste that could affect the quality of state waters must file a “report of waste discharge” with the governing RWQCB.

Additional water quality permitting requirements may include an NPDES General Permit for Discharges of Storm Water Associated with Construction Activity (including the development of a SWPPP) from the SWRCB for projects that would disturb more than 1 acre and an Industrial Storm Water General Permit that requires dischargers to develop and implement a SWPPP, eliminate unauthorized non-storm-water discharges, and conduct visual and analytical storm water discharge monitoring to verify the effectiveness of the SWPPP.

California Toxics Rule of 2000 (40 CFR Part 131). This rule establishes numeric criteria for priority toxic pollutants in inland waters and enclosed bays and estuaries to protect ambient aquatic life (23 priority toxics) and human health (57 priority toxics). The toxics rule 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 EPA in its CWA Section 304(a) guidance.

Water Resources Action Plan. Both the POLB and the POLA have collaborated with the RWQCB and EPA in the development of a Water Resources Action Plan (WRAP 2009). The WRAP guides future development in the ports by promoting science-based studies and methods in the integration of regulatory requirements for water and sediment management programs into the existing POLB/POLA environmental policies. The pathways such as landside runoff, aerial deposition, direct discharge, and other regional influences such as river and storm drain inputs from outside of the ports present challenges for the management of water and sediment resources within POLB. The WRAP establishes a framework and mechanisms by which the ports will achieve EPA and RWQCB TMDL goals.

POLB will develop, as a component of the WRAP, a sediment management policy and guidance manuals that will establish the specific application of the Contaminated Sediments Task Force [CSTF] Long-Term Management Strategy to each Port development (see Los Angeles Regional CSTF 2005). The policies establish the procedures for coordination with the responsible regulatory agencies (USACE, EPA, Los Angeles RWQCB, and CCC) and other interested parties (environmental organizations, other agencies, and stakeholders) on a project-specific basis. In developing control measures for sediment management, the options available are based on the guidance contained in the CSTF Strategy, which the ports helped to develop and which has guided the ports’ sediment planning for the past 10 years. That guidance includes a number of key principles: inter-agency coordination in planning efforts, including an open public process; use of various BMPs for dredging, particularly of contaminated sediments; beneficial re-use of all sediments; and employment of a defined hierarchy of disposal methods in the planning process. The
CSTF Strategy considers in-water disposal as a last resort, preferring beneficial re-use, sediment remediation, and confined disposal facilities as being more protective of the environment and incorporating principles of sustainability.

Once these goals are established in NPDES permits, the WRAP will focus on achieving compliance with those permits.

### 3.4.2 Impacts and Mitigation Measures

#### 3.4.2.1 Significance Criteria

Impacts to marine water and sediment quality are considered significant if the Project would:

- **WQ-1:** Result in violation of regulatory standards or guidelines (e.g., California Water Code, Water Quality Control Plan, CWA, California Toxics Rule, and Enclosed Bays and Estuary Plan).

- **WQ-2:** Substantially alter water circulation or currents or result in a long-term detrimental alteration of harbor circulation that would result in reduced water quality.

- **WQ-3:** Result in flooding that could harm people, damage property, or adversely affect biological resources.

- **WQ-4:** Result in wind or water erosion that causes substantial sediment runoff or deposition not contained or controlled on-site.

#### 3.4.2.2 Methodology

Potential water and sediment quality impacts of the Proposed Project and alternatives were assessed through a combination of literature data (including all applicable water quality criteria), results from past projects in POLB, existing sediment quality data, and scientific expertise. For oceanographic resources and flooding, potential impacts were assessed using results from previous modeling studies of the harbor, the Project Description (Section 1), Federal Emergency Management Agency (FEMA) flood zone maps, and preparer expertise.

The assessment of impacts is based on the assumption that the Project would include the following actions as part of any Project implementation:

- A Section 404 (CWA) permit from USACE for dredging, filling, and wharf construction activities.

- A Section 401 (CWA) Certification from the RWQCB for construction dredging and filling activities that contains conditions, including standard WDRs.

- Coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity, which would be obtained for the onshore portions of the Project and which would include a SWPPP that specifies the BMPs the contractors and the Port would be required to implement to control inputs of pollutants to the water.

- All landside contaminated soils would be characterized and remediated in accordance with POLB, RWQCB, and DTSC protocols and clean-up standards.

- Dredged contaminated sediments would be placed in approved confined disposal sites within the harbor that are engineered and constructed in such a manner that the contaminants cannot enter harbor waters after the fill is complete, or at an appropriate upland site.

- The terminal operator would be required by the terms of the lease to participate in the Port of Long Beach Storm Water Program to comply with the Industrial Storm Water General Permit; compliance would include preparing and administering a facility SWPPP.

- Preparation of a Municipal Storm Water and Urban Runoff Discharge Plan for the Project (although it is not legally required, such a
plan would be beneficial to the environment and is, therefore, a part of the Project).

- For dredged sediments placed into confined disposal sites, compliance with the Project-specific Sediment Management Plans (SMPs) that incorporate measures contained in state and federal permits to prevent turbidity, suspended solids, and pollutants from leaving the fill site will be followed. Requirements will be related to material placement, water quality and construction activity monitoring, and adaptive management.

**Proposed Environmental Controls for Construction and Operation**

In addition, the assessment of impacts is based on the following environmental controls that would be included as part of the Pier S Project.

**Environmental Control Measure WQ-1: Construction Storm Water Pollution Prevention Plan (SWPPP).** The Project would conform to the requirements of the General Storm Water Permit for Construction Activities. A SWPPP would be prepared in conformance with the permit and include site inspections, employee training, and BMPs. BMPs would include the following features:

- Erosion control;
- Inlet protection;
- Waste and material management; and
- Equipment management and fueling.

**Environmental Control Measure WQ-2: Dredge Monitoring.** Dredge operations would be conducted in accordance with a USACE Permit and RWQCB WDR and Monitoring Program. WDR-specified water quality data would be collected during dredge operations to ensure conformance with these requirements.

**Environmental Control Measure WQ-3: Wharf Face Drainage.** The wharf deck drainage would be directed landward to a trench drain and water collection area where it would undergo treatment by any one or a combination of settlement, filtration, clarification, and/or oil/water separation.

**Environmental Control Measure WQ-4: Standard Urban Storm Water Mitigation Plan (SUSMP).** Consistent with the WRAP Environmental Control Measure LU-2, Design Guidance Manual, the Project would prepare and implement a SUSMP. The SUSMP would contain required BMPs that would be implemented throughout the Project. The SUSMP would be designed to minimize storm water pollutants of concern, provide storm drain system signage, properly design outdoor material storage areas, properly design trash storage areas, provide proof of ongoing BMP maintenance, and include design standards for structural or treatment control BMPS.

**Environmental Control Measure WQ-5: Operational (SWPPP).** The Project would be included in the Port-wide Master Storm Water Program. Under the program, the Project would develop a SWPPP that would include employee training, inspections, annual certifications, and BMPs. BMPs for operational activities would include, but not be limited to, the following features:

- Storm water treatment;
- Erosion control;
- Spill prevention; and
- Waste collection practices.

### 3.4.2.3 Three-Berth Alternative

**Construction Impacts**

Impact WQ-1: The Three-Berth Alternative construction activities, including dredging, excavation of material, wharf construction and fill operations, spillage from construction equipment and vessels, and runoff from disturbed site surfaces during upland facility construction, would not result in violation of regulatory standards or guidelines (e.g., California Water Code, Water Quality Control Plan, Clean Water Act, California Toxics Rule, and Enclosed Bays and Estuary Plan).
The potential impacts to water quality during construction under the Proposed Project would include those associated with contaminated sediment re-suspension during dredging, excavation of material from behind the existing dike, dike removal, wharf construction, spillage from construction equipment and vessels, and runoff from disturbed site surfaces during backland facility construction.

Sediment re-suspension and the associated turbidity are short-term effects during the period of construction (approximately 9 months) and localized around the site of dredging, excavation, and earthwork. Turbidity levels would return to baseline after the completion of construction operations. Compliance with requirements specified in the RWQCB WDRs and the USACE 404 permit during construction operations would minimize impacts due to sediment re-suspension.

The material from dredging and excavation would be disposed of at an approved Middle Harbor landfill (i.e., Piers D, E, and F). A small amount of chemically suitable dredged material could be disposed of at the Western Anchorage Disposal Site and the approved LA-2 ocean disposal site, if required by timing or capacity constraints at the Middle Harbor sites. Disposal at the Western Anchorage and LA-2 sites would only be undertaken with the approval of USACE and the RWQCB following chemical, and possibly bioassay, testing of the material.

Discharges of fill regulated under Section 404 of the CWA, including the placement of dredged material in confined fills within water of the U.S., as well as the placement of quarry rock, pilings, and other associated wharf work, would require a 401 water quality certification from the RWQCB to certify that those discharges would not violate state water quality standards.

Spill prevention plans developed for the Proposed Project would minimize potential spillage from construction equipment and vessels. Compliance with the State General Permit for Storm Water Discharges Associated with Construction Activities, which requires implementation of storm water runoff and erosion control BMPs at construction sites, would minimize potential water quality effects associated with the sediment-laden storm water runoff from the disturbed Project site.

**CEQA Impact Determination**

Dredging, excavation, filling, new wharf construction, and wharf reconstruction and upgrades during the construction phases of the Project would not involve any direct or intentional discharges of wastes to harbor waters. However, in-water work would disturb and re-suspend bottom sediments with temporary and localized changes to some water quality parameters such as turbidity, DO, nutrients, pH, and contaminants at in-water work locations. Leaks or spills of petroleum products from equipment are not expected to occur during Proposed Project construction, but cannot be ruled out.

Potential impacts to the existing water and sediment quality would be addressed by implementing the requirements of the various permits and management programs that would govern construction activities at the Project site and potential sediment disposal sites. These include the requirements of WDRs and 401 certification from the RWQCB, RWQCB storm water permit for construction activities, and POLB’s SWPPP under the City of Long Beach MS4 NPDES permit and Industrial Storm Water General Permit. With implementation of the control measures specified in the federal and state permits and the Project’s **Environmental Control Measures WQ-1** through **WQ-4**, water quality objectives would not be exceeded outside the mixing zone designated by the permits, and leaks and spills from construction equipment would not create pollution, contamination, or a nuisance, or violate any water quality standards. POLB would conduct sediment analysis as part of the USACE permitting process. Therefore, impacts would be less than significant under CEQA.

**Mitigation Measures**

Since no significant impacts to the existing water or sediment quality conditions would occur from
construction of the Proposed Project, no mitigation measures would be required. In compliance with RWQCB’s Waste Discharge Requirement/401 Certification, a Sediment Analysis Plan (SAP) shall be prepared by POLB at a later date. If applicable, the assessment of maintenance dredging will be covered under the USACE Regional General Permit No. 28.

Significance of Impacts after Mitigation

Impacts on water quality during Proposed Project in-water construction would be less than significant.

NEPA Impact Determination

Impacts from dredging, excavation, filling, new wharf construction, and wharf reconstruction and upgrades during construction of the Proposed Project would be the same as described for the CEQA determination. Therefore, less-than-significant impacts would occur under NEPA.

Mitigation Measures

Since no significant impacts to the existing water or sediment quality conditions would occur from construction of the Proposed Project, no additional mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water quality during Proposed Project in-water construction would be less than significant.

Operational Impacts

Impact WQ-2: The Three-Berth Alternative project operation activities would not substantially alter water circulation or currents or result in a long-term detrimental alteration of harbor circulation or water quality.

Portions of the Back Channel would be dredged to improve navigation safety, and portions of the Cerritos Channel would be dredged to widen and improve safety. Widening of the channels would increase the portion of the cross-sectional flow area within the tidal prism, which would provide improved water circulation through the channels and among Inner Harbor areas. Improved circulation would lessen the potential for the occurrence of stagnant water. On the other hand, deepening the channels would increase the total water volume stored below the tidal prism, which would tend to increase the average water residence times in the Inner Harbor.

CEQA Impact Determination

There would be no significant changes to the existing circulation conditions in the Inner Harbor, as the increased tidal flow volume would be approximately balanced by the increased water residence time. In any case, since the localized modifications to either tidal prism or water storage are generally small compared with the harbor-wide tidal prism and total water volume, the proposed changes are not likely to significantly alter harbor-wide circulation or flushing conditions. Therefore, less-than-significant operational impacts to the existing water circulation conditions would be expected under the Proposed Project.

Mitigation Measures

Since no significant impacts to water circulation would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water circulation during Proposed Project operation would be less than significant.

NEPA Impact Determination

The potential impacts related to modifications of the tidal prism and total water volume would be the same as described under CEQA; that is, no significant net changes to the existing circulation conditions would occur. Therefore, less-than-significant operational impacts to the existing water circulation conditions would occur under NEPA.
Mitigation Measures

Since no significant impacts to water circulation would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water quality during Proposed Project operation would be less than significant.

Impact WQ-3: Three-Berth Alternative implementation would not result in flooding that could harm people, damage property, or adversely affect biological resources.

Storm water discharges from the new terminal would be accommodated by the new storm drain system, which would be sized to accommodate the 100-year flood. An extreme storm event could result in temporary ponding of water on the terminal and adjacent land, but, given the essentially flat nature of the site, there would be no generation of rapid currents that could threaten people or property. The structures on the site would be industrial, and, in the event of an extreme storm that caused on-site flooding, workers would be evacuated from the site. As the upland portions of the Project area would not support any biological resources, any flooding that did occur would not affect biological resources.

The potential for flooding to occur as a result of a tsunami or seiches is discussed in Section 3.1, Geology, and the potential for flooding or storm water discharges to affect biological resources is discussed in Section 3.5, Biota and Habitats.

CEQA Impact Determination

The potential for damage to people or property as a result of on-site flooding is very low. There is no potential for damage to biological resources. Therefore, Proposed Project impacts related to flooding would be less than significant under CEQA.

Mitigation Measures

Since no significant impacts related to flooding would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to flooding during Proposed Project operation would be less than significant.

NEPA Impact Determination

The potential for damage to people or property as a result of on-site flooding is very low. There is no potential for damage to biological resources. Therefore, Proposed Project impacts related to flooding would be less than significant under NEPA.

Mitigation Measures

Since no significant impacts related to flooding would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to flooding during Proposed Project operation would be less than significant.

Impact WQ-4: The Three-Berth Alternative would not result in wind and water erosion that would cause substantial sediment runoff or deposition not contained or controlled on-site.

During operation of the Proposed Project, the majority of the site would be paved or landscaped. In addition, the site is essentially flat and incorporates Environmental Control Measure WQ-5, which includes BMPs to reduce the potential for erosion.

CEQA Impact Determination

Because the Project site would be paved and landscaped and incorporate Environmental Control Measure WQ-5, which includes BMPs, impacts related to wind and water erosion and
Mitigation Measures

Since no significant impacts related to wind and water erosion and runoff would occur from operation of the Project, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to wind and water erosion and runoff during Proposed Project operation would be less than significant.

NEPA Impact Determination

Because the Project site would be paved and landscaped and incorporate BMPs, impacts related to wind and water erosion and runoff would be less than significant under NEPA.

Mitigation Measures

Since no significant impacts related to wind and water erosion and runoff would occur from operation of the Proposed Project, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to wind and water erosion and runoff during Proposed Project operation would be less than significant.

3.4.2.4 Two-Berth Alternative

The Two-Berth Alternative is similar to the Proposed Project except for a shorter wharf, smaller terminal size, and fewer container cranes.

Construction Impacts

Impact WQ-1: The Two-Berth Alternative construction activities, including dredging, excavation of material, wharf construction and fill operations, spillage from construction equipment and vessels, and runoff from disturbed site surfaces during upland facility construction, could potentially result in violation of regulatory standards or guidelines (e.g., California Water Code, Water Quality Control Plan, Clean Water Act, California Toxics Rule, and Enclosed Bays and Estuary Plan).

CEQA Impact Determination

A shorter wharf and smaller terminal size under the Two-Berth Alternative would entail a reduced potential for contaminated sediment re-suspension and turbidity generation during dredging, dike removal, wharf construction, and fill operations; reduced potential for spillage from construction equipment and vessels; and decreased runoff from disturbed site surfaces during backland facility construction, compared to the Proposed Project. However, it should be noted that the dike work is the same for both the Three- and Two-Berth Alternatives to facilitate Cerritos Channel widening. Therefore, dredge/excavation quantities would be the same for both alternatives.

Sediment re-suspension and the associated turbidity are short-term effects during the period of construction (approximately 9 months) and localized around the site of dredging, excavation, and earthwork. The material from dredging and excavation would be disposed of at agency-approved confined disposal sites and/or at upland sites. POLB shall conduct sediment analysis as part of the USACE permitting process. Project effects and compliance issues would be similar but proportionately less with the Two-Berth Alternative from those previously discussed for the Three-Berth Alternative. The Two-Berth Alternative would still be required to implement the environmental control measures specified in the federal and state permits and Project Environmental Control Measures WQ-1 through WQ-4. Since no significant construction impacts to the existing water and sediment quality conditions (as previously discussed for the Proposed Project) under the criteria for WQ-1 would occur under the Three-Berth Alternative the same would be expected under the Two-Berth Alternative.
Mitigation Measures

Since no significant impacts to the existing water or sediment quality conditions would occur from construction of the Proposed Project, the same would be expected under the Two-Berth Alternative and no mitigation measures would be required. In compliance with RWQCB’s Waste Discharge Requirement/401 Certification, a SAP shall be prepared by POLB at a later date. If applicable, the assessment of maintenance dredging will be covered under the USACE Regional General Permit No. 28.

Significance of Impacts after Mitigation

Impacts on water quality during Two-Berth Alternative in-water construction would be less than significant.

NEPA Impact Determination

Impacts from dredging, excavating, filling, new wharf construction, and wharf reconstruction, and upgrades during construction would be the same as described for the CEQA determination. Therefore, less-than-significant impacts would occur under NEPA.

Mitigation Measures

Since no significant impacts to the existing water or sediment quality conditions would occur from construction of the Two-Berth Alternative, no additional mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water quality during in-water construction would be less than significant.

Operational Impacts

Impact WQ-2: Two-Berth Alternative operation activities would not substantially alter water circulation or currents or result in a long-term detrimental alteration of harbor circulation or water quality.

CEQA Impact Determination

Potential impacts to water circulation under the Two-Berth Alternative would be similar to those under the Three-Berth Alternative as modifications to the cross section of Cerritos Channel and the Back Channel would be identical, and these modifications were found to be not significant for impacts under criterion WQ-2. Therefore, no significant operational impacts under criterion WQ-2 with the existing water circulation conditions are expected to occur under the Two-Berth Alternative.

Mitigation Measures

Since no significant impacts to water circulation would occur from operation of the Project, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water circulation during operation would be less than significant.

NEPA Impact Determination

The potential impacts related to modifications of the tidal prism and total water volume would be the same as described under CEQA; that is, no significant net changes to the existing circulation conditions would occur. Therefore, less-than-significant operational impacts to the existing water circulation conditions would occur under NEPA.

Mitigation Measures

Since no significant impacts to water circulation would occur from operation of the Project, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water circulation during operation would be less than significant.

Impact WQ-3: Two-Berth Alternative implementation would not result in flooding that could harm people, damage property, or adversely affect biological resources.
CEQA Impact Determination

Storm water discharges from the new terminal would be accommodated by the new storm drain system, which would be sized to accommodate at least the 100-year flood. As discussed for the Proposed Project, similar impacts would be expected with the Two-Berth Alternative, although the impacts would be proportionately less.

The potential for flooding to occur as a result of a tsunami or seiches is discussed in Section 3.1, Geology, and the potential for flooding or storm water discharges to affect biological resources is discussed in Section 3.5, Biota and Habitats.

A smaller terminal size would result in a reduced volume of storm water runoff that would require management on a long-term basis. Generally, fewer container cranes operating at the terminal would decrease the possibility of oil or fuel spills from equipment use and maintenance. Potential impacts to water and sediment quality conditions in regards to criterion WQ-3 under the Two-Berth Alternative would, thus, be less than those under the Three-Berth Alternative. Since no significant operational impacts under criterion WQ-3 were found under the Proposed Project, no impacts to the existing water and sediment quality conditions would occur under the Two-Berth Alternative.

Mitigation Measures

Since no significant impacts related to flooding would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to flooding during operation would be less than significant.

NEPA Impact Determination

The potential for damage to people or property as a result of on-site flooding is very low. There is no potential for damage to biological resources. Therefore, impacts related to flooding would be less than significant under NEPA.

Mitigation Measures

Since no significant impacts related to flooding would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to flooding during operation would be less than significant.

Impact WQ-4: The Two-Berth Alternative would not result in wind and water erosion that would cause substantial sediment runoff or deposition not contained or controlled onsite.

Spill prevention plans developed for the Three-Berth Alternative would be appropriate for the Two-Berth Alternative and minimize potential spillage from construction equipment and vessels. Compliance with all regulations, including Environmental Control Measure WQ-5, which includes BMPs, would be the same as those previously outlined for the Three-Berth Alternative.

CEQA Impact Determination

Because the Project site would be paved and landscaped and incorporate Environmental Control Measure WQ-5, which includes BMPs, impacts related to wind and water erosion and runoff would be less than significant under CEQA.

Mitigation Measures

Since no significant impacts related to wind and water erosion and runoff would occur from operation of the Project, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to wind and water erosion and runoff during operation would be less than significant.
NEPA Impact Determination

Because the Project site would be paved and landscaped and incorporate BMPs, impacts related to wind and water erosion and runoff would be less than significant under NEPA.

Mitigation Measures

Since no significant impacts related to wind and water erosion and runoff would occur from operation of the Two-Berth Alternative, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts related to wind and water erosion and runoff during operation would be less than significant.

3.4.2.5 Multi-Use Storage Alternative

The Multi-Use Storage Alternative does not involve wharf construction or any other construction activities in either the Cerritos or the Back Channels. The Multi-Use Storage Alternative calls for the same terminal size and utilities as the Two-Berth Alternative, but with no cranes or rail yard and fewer buildings. Potential impacts to water and sediment quality conditions under the Multi-Use Storage Alternative during construction would be less than those under the Two-Berth Alternative.

Construction Impacts

Impact WQ-1: The Multi-Use Storage Alternative would not result in violation of regulatory standards or guidelines (e.g., California Water Code, Water Quality Control Plan, Clean Water Act, California Toxics Rule, and Enclosed Bays and Estuary Plan).

CEQA Impact Determination

The absence of dredging, excavation, or fill operations under the Multi-Use Storage Alternative eliminates any potential impacts to the existing water or sediment quality conditions due to contaminated sediment re-suspension and turbidity generation during construction that would occur under other alternatives. The need for the disposal of potentially contaminated material would also be eliminated. Potential impacts to water and sediment quality conditions under this alternative would originate only from backland facility construction. Environmental Control Measures WQ-1, WQ-3, and WQ-4 would still be applicable under the Multi-Use Storage Alternative. Therefore, impacts would be less than significant.

Mitigation Measures

Since no significant impacts to the existing water or sediment quality conditions would occur from construction of the Multi-Use Storage Alternative, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water quality during in-water construction of the Multi-Use Storage Alternative would be less than significant.

NEPA Impact Determination

Since the Multi-Use Storage Alternative is equivalent to the NEPA Baseline, there would be no impacts related to water quality or sediments under NEPA.

Mitigation Measures

Since there would be no impacts related to water quality or sediments under NEPA, no mitigation measures would be required.

Significance of Impacts after Mitigation

No impacts would occur on water quality or sediments during operation.

Operational Impacts

Impact WQ-2: Multi-Use Storage Alternative operation activities would not substantially alter water circulation or currents or result in a long-term detrimental alteration of harbor circulation or water quality.
CEQA Impact Determination

Since the Multi-Use Storage Alternative does not involve wharf construction or any other construction activities in Cerritos Channel, no operational impacts to the existing circulation would occur. Since none of the Back Channel or portions of the Cerritos Channel would be dredged for construction, the water circulation in those areas would remain at ambient conditions, and no impacts would occur.

Mitigation Measures

Since no significant impacts to water circulation would occur from operation of the terminal, no mitigation measures would be required.

Significance of Impacts after Mitigation

Impacts on water circulation during operation would be less than significant.

NEPA Impact Determination

Since the Multi-Use Storage Alternative is equivalent to the NEPA Baseline, there would be no impacts related to water quality or sediments under NEPA.

Mitigation Measures

Since there would be no impacts related to water quality or sediments under NEPA, no mitigation measures would be required.

Significance of Impacts after Mitigation

No impacts would occur on water quality or sediments during operation.

Impact WQ-3: Multi-Use Storage Alternative implementation would not result in flooding that could harm people, damage property, or adversely affect biological resources.

Storm water discharges from the Multi-Use Storage Alternative would be accommodated by the new storm drain system, which would be sized to accommodate the 100-year flood. An extreme storm event could result in temporary ponding of water at the Multi-Use Storage facility and adjacent land, but, given the essentially flat nature of the site, there would be no generation of rapid currents that could threaten people or property. The structures on the site would be industrial, and in the event of an extreme storm that caused on-site flooding, workers would be evacuated from the site. As the upland portions of the area do not support any biological resources, any flooding that did occur would not affect biological resources.

The potential for flooding to occur as a result of a tsunami or seiches is discussed in Section 3.1, Geology, and the potential for flooding or storm water discharges to affect biological resources is discussed in Section 3.5, Biota and Habitats.

CEQA Impact Determination

Impacts during construction and operation of backlands improvements for the Multi-Use Storage Alternative on water quality would be as described for the Proposed Project. These activities would not increase the potential for flooding, and impacts would be less than significant under CEQA.

Mitigation Measures

As impacts on water quality during construction for the Multi-Use Storage Alternative would be less than significant, no mitigation is required.

Significance of Impacts after Mitigation

Impacts on water quality during construction for the Multi-use Storage Alternative would be less than significant.

NEPA Impact Determination

Since the Multi-Use Storage Alternative is equivalent to the NEPA Baseline, there would be no impacts related to water quality or sediments under NEPA.
Mitigation Measures

Since there would be no impacts related to water quality or sediments under NEPA, no mitigation measures would be required.

Significance of Impacts after Mitigation

No impacts would occur on water quality or sediments during operation.

Impact WQ-4: The Multi-Use Storage Alternative would not result in wind and water erosion that would cause substantial sediment runoff or deposition not contained or controlled on-site.

During operation of the Multi-Use Storage Alternative, the majority of the site would be paved or landscaped. In addition, the site is essentially flat and incorporates regulations, including Environmental Control Measure WQ-5, which includes BMPs to reduce the potential for erosion.

CEQA Impact Determination

Impacts during construction and operation of backlands improvements for the Multi-Use Storage Alternative on water quality would be as described for the Proposed Project. These activities would not increase erosion, and impacts would be less than significant under CEQA.

Mitigation Measures

As impacts on water quality during construction for the Multi-Use Storage Alternative would be less than significant, no mitigation is required.

Significance of Impacts after Mitigation

Impacts on water quality during construction for the Multi-use Storage Alternative would be less than significant.

NEPA Impact Determination

Since the Multi-Use Storage Alternative is equivalent to the NEPA Baseline, there would be no impacts related to water quality or sediments under NEPA.

Mitigation Measures

Since there would be no impacts related to water quality or sediments under NEPA, no mitigation measures would be required.

Significance of Impacts after Mitigation

No impacts would occur on water quality or sediments during operation.

3.4.2.6 No Project Alternative

Under the No Project Alternative, there would be no construction, and operational activities would be the same as at present, i.e., small-scale container and cargo storage, and sediment and soil stockpiling.

CEQA Impact Determination

No changes in water circulation, flooding potential, or erosion would occur under the No Project Alternative. Accordingly, no impacts on water quality would occur under CEQA.

Mitigation Measures

As no impacts on water quality would occur for the No Project Alternative, no mitigation is required.

Significance of Impacts after Mitigation

No impacts on water quality would occur for the No Project Alternative.

NEPA Impact Determination

Under this alternative, no in-water construction or operational activities would occur. Therefore, no impacts on water or sediment quality would occur under NEPA.

Mitigation Measures

As no impacts on water quality would occur for the No Project Alternative, no mitigation is required.
Significance of Impacts after Mitigation

No impacts on water quality would occur for the No Project Alternative.

3.4.3 Cumulative Impacts

3.4.3.1 Three-Berth Alternative

The region of influence for cumulative impacts on marine waters is the Long Beach-Los Angeles Harbor complex (Inner and Outer Harbor areas). Cumulative projects such as the proposed Piers G & J Redevelopment Project, Pier T, T.T.I. (formerly Hanjin) Terminal Project, Middle Harbor Project, Gerald Desmond Bridge Replacement Project, Berths 136-149 Marine Terminal, Evergreen Redevelopment/YTI Wharf Upgrade Project, Berths 97-109 Container Terminal Project, Channel Deepening Project, Plains All American Oil Marine Terminal, Cabrillo Way Marina (Phase 2) Project, Pier 300 APL Container Terminal Expansion Project, Berths 212-224 YTI Project, Artificial Reef Project, and Berths 121-131 Yang Ming Container Terminal (Table 2-1 and Figure 2-1) would directly affect marine water quality and hydrology through fill (approximately 277 acres, of which about 105 acres are completed or under construction), dredging, wharf construction or reconstruction, rock dike construction, and other construction activities (e.g., boat slips and artificial reef). All of these projects would have the potential to affect harbor water quality through runoff of sediments and pollutants during construction and operational activities.

Construction activities in harbor waters from the cumulative projects, such as dredging and wharf construction, would cause suspension of sediments that could alter water quality parameters (e.g., DO, nutrients, and turbidity). These effects are generally of short duration, affect small localized areas that are usually not adjacent to each other during construction, and do not occur simultaneously for all projects. Cumulative impacts of such disturbances on water quality would be less than significant because the effects would be dispersed in time and space and are not expected to exceed regulatory water quality standards. Furthermore, sampling in 2000 and subsequent years indicated that water quality in the harbor has not been degraded even with continued developments over more than 10 years (see Section 3.4.1). The removal of contaminated sediments by dredging is considered to have had an overall beneficial effect on harbor waters by decreasing biological contact with contaminants that would otherwise be concentrated in the food web. In-water construction activities for the Project would have less-than-significant impacts and would not make a cumulatively considerable contribution to effects on water quality.

Temporary disturbances on land during construction of cumulative project facilities could add a small amount of soils in runoff to harbor waters. Runoff from these projects, however, would not occur simultaneously, but would be spread over time. Cumulative impacts would be less than significant due, in part, to this dispersal and also due to the small amount of land affected by each project and to implementation of Environmental Control Measures WQ-1 through WQ-4 required in project permits, such as SWPPPs.

Runoff during operations of the cumulative projects could change as industrial uses and the amount of paving change, but such changes would be small, since most areas are already developed and would be merely redeveloped. Thus, cumulative impacts to water quality would be less than significant. Project backland upgrades and rail yard construction and operation of these facilities would have less-than-significant impacts on water quality, and the Project would not make a cumulatively considerable contribution to effects on water quality.

Several of the cumulative projects would add vessel traffic to the harbors above baseline levels. That increase in traffic would increase the potential for discharges and accidental spills that could affect water quality. The cumulative impact of discharge from vessels would be less than significant due to the small number of additional vessels relative to the total entering the harbor annually and to implementation of existing
discharge controls. For example, as part of the WRAP, the ports produced a guidance manual for on-water activities, including cargo vessel operations, that helps vessel operators minimize vessel-related pollution. The small increase in vessel traffic in the harbor caused by the Project would not make a cumulatively considerable contribution to effects on water quality.

Five of the cumulative projects involve placement of fill in harbor waters; however, these will do little to alter water circulation patterns because the areas to be filled are small (less than 53 acres each) relative to the overall water area in the ports, generally in dead-end slips, and scattered throughout the harbor. Thus, placement of fill in harbor waters would result in less-than-significant cumulative impacts on harbor circulation. This Project would actually increase the amount of open water by up to 10.3 acres (depending on the alternative), and, therefore, could result in a minor increase in circulation throughout the harbor. As none of the alternatives would result in a loss of harbor waters, they would not contribute to a cumulative impact.

The actual area of the terminal would be decreased by up to 10.3 acres; therefore, there will be less surface area and less potential to add to impacts from cumulative surface runoff into the harbor.

### 3.4.3.2 Two-Berth Alternative

Construction-related cumulative impacts for the Two-Berth Alternative would be similar to the Three-Berth Alternative and, hence, less than significant. Cumulative construction impacts of dredging and wharf construction on water quality would be less than significant because the effects would be dispersed in time and space and are not expected to exceed regulatory water quality standards. As with the Three-Berth Alternative, in-water construction activities for the Two-Berth Alternative would have less-than-significant impacts and would not make a cumulatively considerable contribution to effects on water quality.

Runoff to harbor waters from temporary disturbances on land during construction of cumulative project facilities for the Two-Berth Alternative would be similar to the Three-Berth Alternative and, hence, less than significant. This is due in part to the dispersal of soils and also due to the small amount of land affected by each project and to implementation of Environmental Control Measures WQ-1 through WQ-4 required in project permits, such as SWPPPs.

Runoff during operations of the cumulative projects could change as industrial uses and the amount of paving change, but such changes would be small since most areas are already developed and would be merely redeveloped. Thus, cumulative impacts to water quality would be less than significant. Runoff during operations of the cumulative projects for the Two-Berth Alternative would be similar to the Three-Berth Alternative and, hence, adverse but less than significant.

Similar to the Three-Berth Alternative, the small increase in vessel traffic in the harbor caused by the Two-Berth Alternative would not make a cumulatively considerable contribution to effects on water quality.

Similar to the Three-Berth Alternative, placement of fill in harbor waters would result in less-than-significant cumulative impacts on harbor circulation.

As none of the alternatives would result in a loss of harbor waters, they would not contribute to a cumulative impact.

### 3.4.3.3 Multi-Use Storage Alternative

Unlike the Three- and Two-Berth Alternatives, the Multi-Use Storage Alternative would have no construction impacts of dredging and wharf construction on water quality, and would not contribute to cumulative impacts.

Similar to the Three- and Two-Berth Alternatives, runoff to harbor waters from temporary disturbances on land during construction of cumulative project facilities for
the Multi-Use Storage Alternative would be less than significant. This is due, in part, to the dispersal of soils and also due to the small amount of land affected by each project and to implementation of Environmental Control Measures WQ-1 through WQ-4 required in project permits, such as SWPPPs.

Similar to the Three- and Two-Berth Alternatives, the small increase in vessel traffic in the harbor caused by the Multi-Use Storage Alternative would not make a cumulatively considerable contribution to effects on water quality.

Unlike the Three- and Two-Berth Alternatives, Multi-Use Storage Alternative implementation would not involve the placement of fill in harbor waters would, therefore, not result in any cumulative impacts on harbor circulation.

As none of the alternatives would result in a loss of harbor waters, they would not contribute to a cumulative impact.

3.4.3.4 No Project Alternative

Since no development would occur under this alternative, no cumulative impacts or contribution to the cumulative impacts related to construction impacts of dredging, fill placement, and wharf construction on water quality and runoff impacts from construction and operation would occur.

3.4.4 Mitigation Monitoring Program

As no mitigation measures are required to address impacts on water and sediment quality, no mitigation monitoring program is required. However, it should be noted that Environmental Control Measures WQ-1 through WQ-5 have been incorporated into the Project to reduce potential impacts.