Section 2.2

Physical Environment

2.2 PHYSICAL ENVIRONMENT

2.2.1 Water Resources and Hydrology

This section analyzes potential impacts to groundwater, surface water, flooding, designated beneficial uses, and water quality associated with the proposed Gerald Desmond Bridge Replacement Project. Analysis is based on the *Water Resources and Hydrology Technical Study* completed in February 2006 and updated in July 2008.

2.2.1.1 Regulatory Setting

Federal Regulations

Clean Water Act

The primary federal law governing water quality is the Clean Water Act (CWA) of 1972. This Act provides for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The CWA emphasizes technology-based (end-of-pipe) control strategies and requires discharge permits to use public resources for waste discharge. The Act also limits the amount of pollutants that may be discharged and requires wastewater to be treated with the best treatment technology economically achievable regardless of receiving water conditions.

The 1987 amendments to the CWA included Section 402(p), which establishes a framework for regulating municipal and industrial storm water discharges. The amendment also provides a framework for regulating storm water runoff from construction sites. On November 16, 1990, EPA published final regulations that established requirements for storm water permits.

In 1998, Section 303(d) was amended to the CWA, requiring the state to identify and maintain a list of water bodies that do not meet water quality standards and also to implement a Total Maximum Daily Load (TMDL) program for impaired water bodies. The list of water bodies that do not meet water quality standards is referred to as the CWA Section 303(d) List of Water Quality Limited Segments.

Executive Order 11988: Floodplain Management

EO 11988 (Floodplain Management) of 1977, directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains that may cause short- or long-term adverse impacts, unless it is the only practicable alternative. FHWA requirements for compliance are outlined in 23 CFR 650 Subpart A. To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project

State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is the basic water quality control law for California. The Act authorizes the state to implement the provisions of the CWA. The Porter-Cologne Act establishes a regulatory program to protect the water quality of the state and the beneficial uses of state waters. Under this act, the State Water Resources Control Board (SWRCB) provides policy guidance and review for the Regional Water Quality Control Board (RWQCB), and the RWQCB implements and enforces the provisions of the Act.

Establishment of the National Pollutant Discharge Elimination System (NPDES) regulations in 1987, under Section 402(p) of the CWA, required that EPA delegate the responsibility of the NPDES program to the State. The SWRCB was given the responsibility to enforce the regulations of the NPDES program and did so in the form of the *NPDES Permit for General Construction Activities* (Order No. 99-08-DWQ), which was adopted in 1992 and amended in August of 1999 and 2001. On December 2, 2002, SWRCB approved the "*Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) NPDES General Permit for Construction Activity (One to Five Acres).*" The Permit requires that all owners of land within the State with construction activities resulting in one or more acres of soil disturbance (e.g., clearing, grubbing, grading, trenching, stockpile, utility relocation, temporary haul roads), apply for the General Permit. The purpose of the Permit is to ensure that the landowners:

1. Eliminate or reduce non-storm water discharges to storm drains and receiving waters of the U.S.;

2. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP);
3. Inspect the Water Pollution Controls (WPCs) specified in the SWPPP; and
4. Monitor storm water runoff from construction sites to ensure that the BMPs specified in the SWPPP are effective.

California Coastal Act

Section 307 of the CZMA requires that all federal agencies or licensees with activities directly affecting the coastal zone, or with development projects within that zone, comply with state coastal acts to ensure that those activities or projects are consistent with the CZMA to the maximum extent practicable, with the enforceable polices of approved State management programs. The term “coastal zone” means the coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder) strongly influenced by each other and in proximity to the shorelines of the several coastal states, and it includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. In this case, the state coastal act is the California Coastal Act of 1976, which is the primary law that governs the decisions of the CCC. The Act outlines, among other things, standards for development within the Coastal Zone. The Coastal Act is umbrella legislation designed to encourage local governments to create Local Coastal Plans (LCPs) to govern decisions that determine the short- and long-term conservation and use of coastal resources. These LCPs can be thought of as the equivalent of General Plans for areas within the coastal zone. LCPs must be consistent with the policies of the Coastal Act, and they protect public access and coastal resources. Until the CCC certifies an LCP, the CCC makes the final decisions on all development within a jurisdiction (city or county) within the Coastal Zone. Once an LCP is certified for a jurisdiction, decisions are handled locally, but they can be appealed to the CCC.

1994 Water Quality Control Plan for the Los Angeles Basin (4)

The proposed project is located within the jurisdiction of the Los Angeles RWQCB (Region 4). All projects within the Los Angeles Region are subject to the requirements of the Los Angeles RWQCB. The Los Angeles RWQCB has prepared the *1994 Water Quality Control Plan for the Los Angeles Basin (4)* to help preserve and enhance water quality and to protect the beneficial uses of state waters. The Plan designates beneficial uses for surface and groundwaters, and it sets qualitative and quantitative objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy. The Plan also describes implementation programs to protect the beneficial uses of all waters in the Region and surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan (RWQCB, 1994).

Caltrans Statewide Storm Water Management Plan (SWMP) (June 2007)

The Caltrans SWMP addresses discharges of storm water and authorized non-storm water to waters of the United States, as defined by EPA, and waters of the state of California, as defined by the Porter-Cologne Act. The SWMP describes the Caltrans program and addresses storm water pollution control related to Caltrans activities, including planning, design, construction, maintenance, and operation of roadways and facilities. The SWMP provisions control pollutants to the Maximum Extent Practicable (MEP) as required by the federal CWA. The SWMP is intended to address anticipated requirements for the Caltrans Statewide Permit and the State Construction General Permit Order No. 99-08-DWQ (Construction General Permit). Additionally, the SWMP includes additional program activities requested by SWRCB to track program activities and measure compliance.

Local Regulations

Port of Long Beach Port Master Plan

The Port developed the PMP to ensure that short-term and long-range preferred-use plans are consistent with local, state, and federal laws and regulations. The first PMP for the Port was finalized in June 1978. The purpose of the PMP is to provide a planning tool to guide future port development and to ensure that projects and developments in the Harbor District are consistent with requirements of the California Coastal Act. The PMP is designed to better promote and safely accommodate foreign and domestic waterborne commerce, navigation, and fisheries in the national, state, and local public interest. The PMP also provides additional public recreation facilities within the Port consistent with sound and compatible port planning.

Currently, the Port has a Master Storm Water Program that requires all projects within the Port to implement structural and operational BMPs; however, any proposed construction and operational activities with the potential to affect

storm water runoff would require Caltrans approval. All proposed activities would adhere to Caltrans NPDES policies and procedures.

Permit Requirements

Caltrans Statewide NPDES Storm Water Permit, Order No. 99-06 DWQ, NPDES No. CAS000003 and NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit), Order No. 99-08-DWQ, NPDES No. CAS000002

Caltrans has a statewide NPDES permit that covers all Caltrans work and projects within the state. All projects within Caltrans jurisdiction must conform to the requirements of the Caltrans Statewide NPDES Storm Water Permit, Order No. 99-06-DWQ, NPDES No. CAS000003, adopted by SWRCB on July 15, 1999. This permit allows Caltrans to operate, maintain, and construct on state ROW without applying for individual General Permits for each construction project. The permit requires Caltrans to adhere to the provisions of the Statewide General NPDES Permit for Construction Activities, Order No. 99-08-DWQ, NPDES No. CAS000002. The permit also requires Caltrans to have a site-specific SWPPP prepared for all projects with one or more acres of soil disturbance, and a Notice of Construction (NOC) to be filed with RWQCB at least 30 days prior to any soil-disturbing activities. For any local agency project with construction activity within Caltrans ROW and a total disturbed soil area of one or more acres, the local agency must submit a Notice of Intent (NOI) to SWRCB. In addition, all projects are subject to the BMPs specified in the Caltrans SWMP. The provisions and requirements of the permit are enforced by RWQCBs. Because the proposed project would disturb more than 1-acre (0.4-ha) of soil, the project would gain coverage under the General NPDES Permit for storm water discharges associated with construction activities; therefore, an SWPPP would be required and an NOI must be filed with SWRCB for this project.

The objectives of the General Permit are: (1) to identify pollutant sources that may affect the quality of discharges of storm water associated with construction activity from the project site; and (2) to identify, construct, and implement storm water pollution preventive measures and BMPs to reduce pollutants in storm water discharges from the construction site during construction and after construction is completed. Appropriate BMPs will be obtained from the Caltrans *Project Planning and Design Guide* (2007b), and the Caltrans *Construction Site Best Management Practices (BMPs) Manual* (2003). The Port is required to ensure that a SWPPP and Sampling and Analysis Plan (SAP) are prepared prior to construction activities. The SWPPP shall include the following: erosion and sediment control; non-storm water management; post-construction storm water management; waste management and disposal; maintenance, inspection, and repair of BMPs; employee training to perform inspections of the BMPs at the construction site; and an SAP for contaminated storm water runoff. The SWPPP must describe structural and non-structural BMPs to minimize or eliminate the potential for spills and leakage of construction materials and erosion of disturbed areas by water and wind.

Dewatering Permit

All projects requiring discharges of groundwater from construction and project dewatering to surface waters in coastal watersheds of Los Angeles and Ventura Counties must comply with Order No. R4-2003-0111 (NPDES No. CAG994004). If this project requires dewatering, and it is allowed by RWQCB, then compliance with this Order is necessary.

2.2.1.2 Affected Environment

The Long Beach Harbor consists of the Outer Harbor (south of the Pier T Mole), the Middle Harbor (between the Pier T Mole and Terminal Island), the Inner Harbor (including the Back Channel between Terminal Island and the Mainland to the east), and Cerritos Channel (between Terminal Island and the Mainland to the north). The Gerald Desmond Bridge Replacement Project is located over the Back Channel and connects the city of Long Beach to the east with Terminal Island (See Exhibit 1-1). A summary of the water quality parameters of the Back Channel and Cerritos Channel areas is presented in this section.

Groundwater

The project crosses seawater, and shallow groundwater in the project area is hydraulically separated from inland aquifers by seawater in the Inner Harbor and Cerritos Channel. The groundwater in the area is compromised by seawater intrusion; as a result, the Los Angeles RWQCB (Region 4) has not designated beneficial uses for the groundwater in the harbor area. Shallow groundwater in this area is below sea level due to dewatering operations from the LBGS north of the project area.

The proposed project site is located within the southern portion of the West Coast Groundwater Basin, which extends from the Ballona Escarpment and Baldwin Hills in the northwest, to the San

Gabriel River in the southeast. The shallowest water-bearing zone beneath Terminal Island is in the surficial deposits, comprising the man-made fills and near surface native soils (upper Recent deposits). Regional groundwater is generally encountered in these sediments at depths between ground level and 25 feet bgs. Beneath the surficial deposits, four major aquifers have been reported in the southern portion of the West Coast Basin in the vicinity of the proposed project site. They are, with increasing depth: the Gaspur Aquifer, the Gage Aquifer, the Lynwood Aquifer, and the Silverado Aquifer (CA DWR, 1961).

Shallow groundwater in the western end of the project site beneath the Terminal Island East interchange has been determined to contain volatile organic compounds (VOCs), primarily benzene, from the former Long Beach Naval Shipyard (LBNSY) south of the project area (Bechtel, 1997). Benzene contamination was detected in the uppermost groundwater (to a depth of 37 ft (11 m) bgs) at a maximum concentration of 840 micrograms per liter (µg/L) and within the deepest groundwater (69 ft to 109 ft [21 m to 32 m] bgs) at a concentration of 450 µg/L. One groundwater sampling point was drilled to monitor three groundwater zones in an area located within the Seaside Boulevard ramp loop, approximately 190 ft (60 m) north of the former LBNSY boundary. Benzene contamination was not detected within the upper coarse-grained water-bearing interval (37 ft to 50 ft [11 m to 15 m] bgs), but it was detected at concentrations of 190 µg/L and 1,400 µg/L within the fine-grain water-bearing interval (50 ft to 69 ft [15 m to 21 m] bgs) and the deepest groundwater, respectively. Exhibit 2.2.1-1 shows the approximate limits of groundwater contamination from the former LBNSY.

A groundwater investigation was conducted in the proposed project area in 1997 for the Ocean Boulevard Storm Drain and Pump Station projects (Woodward-Clyde, 1997). Eleven shallow Hydropunch® borings (approximately 7 ft [2 m] bgs) were installed within the western portion of the proposed project area along the north side of Ocean Boulevard between Henry Ford Avenue and the Back Channel (Exhibit 2.2.1-1). Six groundwater samples collected from six borings were selected for laboratory analytical testing. Three of these sample locations (HP-OB01, HP-OB02, and HP-OB03) are located in the area of Henry Ford Avenue and the Terminal Island Freeway (just west of the project area) (Exhibit 2.2.1-1). Sample locations HP-OB07 and HP-OB08 are located near the Terminal Island East gate, and sample location HP-OB05 is located midway between HP-OB03 and HP-OB07 (Exhibit 2.2.1-1). These samples were tested for 19 constituents outlined by RWQCB in Order Number 97-045 for obtaining a General Construction Dewatering NPDES permit. Groundwater analytical results were reported below the NPDES effluent discharge limits for all constituents tested, with the exception of arsenic, chromium, surfactants, turbidity, settleable solids, and suspended solids. Results that exceeded NPDES discharge limits are shown in Table 2.2.1-1.

To further investigate the benzene plume known to exist beneath Terminal Island, an Expanded Groundwater Investigation and Risk Assessment of the Terminal Island Deep Benzene Plume (HLA, 2000) was prepared. This report helped to further delineate the lateral and vertical extent of the benzene plume in relationship to the POLB property. The 2000 investigation concluded that data from the Bechtel investigation (Bechtel, 1998), the Woodward-Clyde investigation (Woodward-Clyde, 1998), and the HLA investigation show that the Gaspur Aquifer flows in a northerly gradient. While the overall gradient is to the north, there appeared to be a cone of depression that has formed around Dry Dock No. 1. Active hydrostatic relief wells were installed at Dry Dock No. 1 between 1973 and 1975. The source of benzene contamination may have existed before Dry Dock No. 1 wells began pumping; therefore, any benzene plume that may have existed would have moved to the north. Once the wells were installed and activated, the plume of benzene may have been reversed or possibly split so that it was moving in two directions (HLA, 2000).

As discussed, extensive soil and groundwater investigations have been performed at the former LBNSY site, and after all of these investigations, the source of the benzene plume is still being disputed by the potential responsible parties.

A *Final Feasibility Study Report, Installation Restoration Program, Sites 9, 12, and 13, Former Long Beach Naval Ship Yard* (Bechtel, 2001) was prepared to identify and evaluate potential remedial action alternatives for VOC-contaminated groundwater and soil at various locations; however, no conclusions with regard to the Gerald Desmond Bridge and the benzene plume can be made from this document because the deep benzene study was separated from Site 9. Site 9 is located within the project limits, approximately 300 ft (91 m) south of West Seaside Boulevard and 600 ft (183 m) west of the intersection of Weaver Street and Corvette Street.

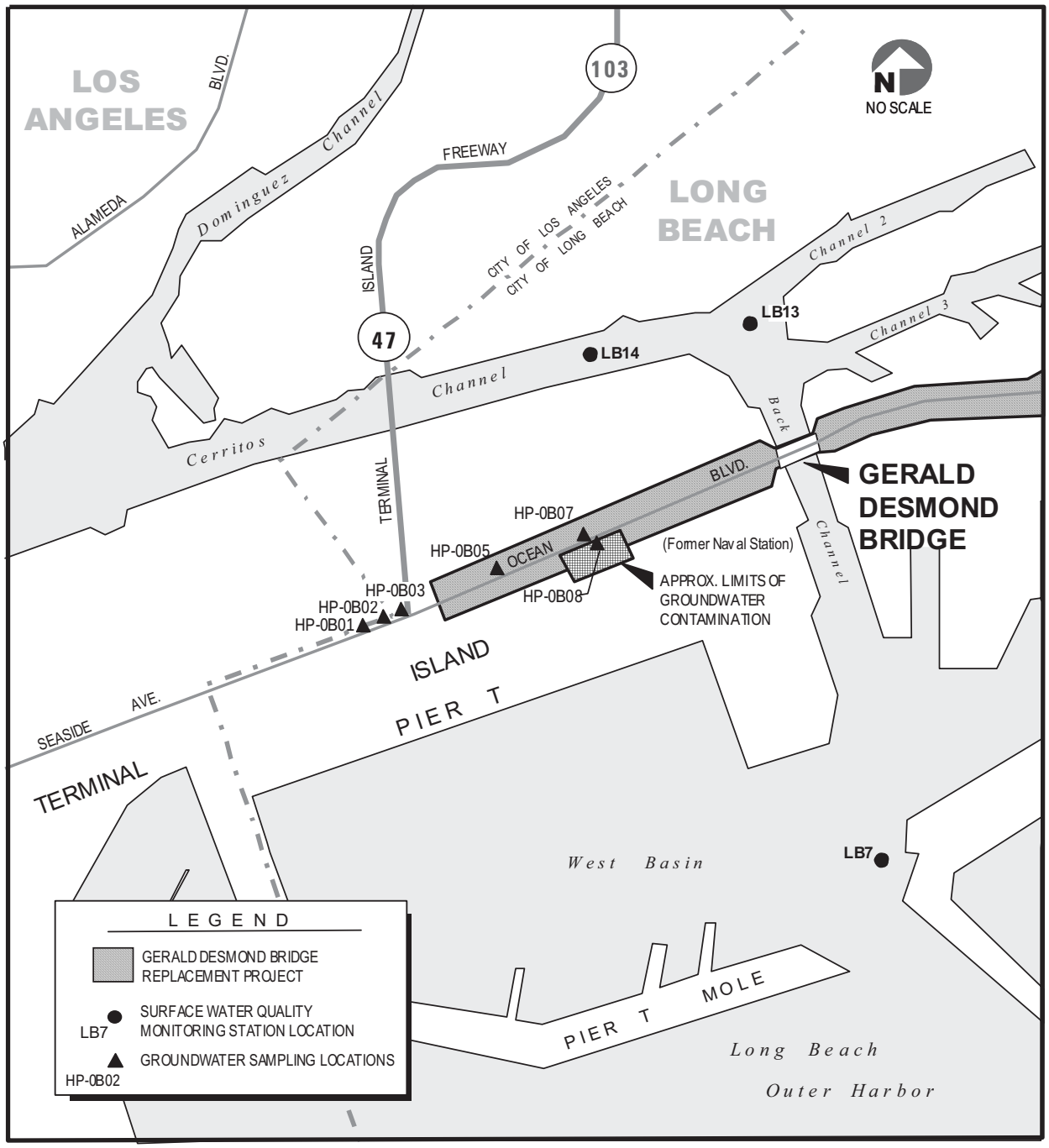

Exhibit 2.2.1-1
Groundwater and Surface Water Sampling Locations
in the Vicinity of the Gerald Desmond Bridge Replacement Project

Table 2.2.1-1
1997 Groundwater Constituents with Levels Exceeding NPDES Discharge Limit

Sample Location	Arsenic (µg/L)	Chromium (µg/L)	Surfactants (mg/L)	Turbidity (NTU)	Settleable Solids (mg/L)	Total Suspended Solids (mg/L)
HP-OB01	ND	380	0.55	3,000	>40	7,000
HP-OB02	140	770	0.46	1,300	>40	4,300
HP-OB03	550	560	0.51	9,000	>40	180,000
HP-OB05	ND	150	0.68	1,800	5.5	2,300
HP-OB07	840	190	1.2	1,700	10	1,600
HP-OB08	ND	440	1.3	1,800	23	2,400
NPDES Daily Maximum	**50**	**50**	**0.5**	**150**	**0.3**	**150**

µg/L: micrograms per liter
mg/L: milligrams per liter
NTU: Nephelometric turbidity units
Source: Woodward Clyde, 1997.

Surface Water

Surface water in the project area primarily consists of water from the Pacific Ocean, incoming freshwater from the Dominguez Channel, and surface runoff from Port lands during precipitation events. The Dominguez Channel drains into the Los Angeles Harbor and the Cerritos Channel west of the project area (see Exhibit 1-1). A portion of the eastern section of the project area drains to the Los Angeles River Estuary (Queensway Bay).

The project lies within the Dominguez Channel Watershed and the Los Angeles Harbor Watershed, and it abuts the Los Angeles River Watershed. The project is located in the Los Angeles-San Gabriel Hydrologic Unit Sub-Area 405.12. There is one TMDL in effect for the Dominguez Channel watershed, which is for trash. The Los Angeles Harbor has one TMDL in effect for bacteria. There are three TMDLs in effect for the Los Angeles River Watershed, which are trash, nitrogen compounds and related effects, and metals. More information regarding TMDLs is provided in Section 2.2.1.1.

The receiving water bodies of the project are Back Channel, Channel No. 3, and the Los Angeles River Estuary (Queensway Bay). The Los Angeles River Estuary (Queensway Bay) is the only receiving water body on the 303 (d) List of Water Quality Limited Segments, and it is listed for the following pollutants: Chlordane (sediment), dichloro-diphenyl-trichloroethane (DDT) (sediment), lead (Pb) (sediment), polychlorinated biphenyls (PCBs) (sediment), sediment toxicity, trash, and zinc (sediment).

Additionally, there are several other water bodies in the project vicinity, including Cerritos Channel, East Basin, West Basin, and the Inner Harbor Turning Basin. Of these water bodies, West Basin and Cerritos Channel are the only two on the 303 (d) List of Water Quality Limited Segments.

Marine water quality within the Ports has been well studied. Recent studies indicate that the water quality within Long Beach Harbor is generally good, and the Port is currently meeting or exceeding the California Ocean Plan 2005 Water Quality Objectives. As results show, water quality in the inner and middle areas of the harbor is poorer than in the outer harbor.

Water quality parameters that are routinely sampled because they can affect biological communities are temperature, salinity, pH, dissolved oxygen, and water clarity. A water quality study was conducted for the Ports in 2002 entitled *The Ports of Long Beach and Los Angeles Year 2000 Biological Baseline Study of San Pedro Bay* (MEC, 2002). Water samples were collected quarterly during 2000 from 28 monitoring locations throughout both harbors with depths ranging from 13 ft to 77 ft (4 m to 23 m).

Three monitoring locations are in proximity to the Gerald Desmond Bridge. These are designated as LB7, LB13, and LB14, and they are shown on Exhibit 2.2.1-1. The depth of water at these locations is approximately 79 ft (24 m), 65 ft (20 m), and 59 ft (18 m), respectively. Water quality

samples were collected quarterly during 2000 at the surface, mid-depth, and bottom. Table 2.2.1-2 summarizes the water quality data for these monitoring locations.

The dissolved oxygen (DO) concentrations in surface, mid-depth, and bottom waters within the study area were consistent with typical values for estuarine and near-coastal waters (MEC, 2002). Annual mean DO concentrations for LB7, LB13, and LB14 ranged from 6.90 to 7.62 milligrams per liter (mg/L), 6.03 to 6.56 mg/L, and 5.89 to 6.40 mg/L for surface, mid-depth, and bottom depth waters, respectively (Table 2.2.1-2). The highest DO concentrations occurred at the surface and decreased with depth, with the lowest concentrations in near-bottom waters. The DO concentrations met the water quality objective of 5 mg/L set forth for harbor waters.

The pH conditions within the study area were within normal ranges for coastal waters (MEC, 2002). Annual pH values for surface, mid-depth, and bottom waters at LB7, LB13, and LB14 ranged from 7.93 to 8.04, 7.92 to 7.97, and 7.88 to 7.93, respectively (Table 2.2.1-2). Changes with depth in pH at these stations typically were minimal. This range was within the water quality objective of 6.5 to 8.5 set forth for harbor waters.

Salinity in the harbor is influenced by the influx of outer ocean waters, evaporation, precipitation, freshwater runoff, and wastewater discharges. Salinity conditions within the study area were within normal ranges for estuarine and near-coastal waters (MEC, 2002). Annual mean salinity values for surface, mid-depth, and bottom waters at LB7, LB13, and LB14 ranged from 33.09 to 33.36 parts per thousand (ppt), 33.35 to 33.46 ppt, and 33.33 to 33.51 ppt, respectively (Table 2.2.1-2). Salinity typically increased with water depth, although the range in salinities at each of these three stations was relatively small (less than 1-ppt).

Water temperatures measured within the study area were within the expected range for estuarine and near-coastal waters (MEC, 2002). Annual mean temperatures in surface, mid-depth, and bottom waters at LB7, LB13, and LB14 ranged from 17.30 to 17.60 degrees Celsius (°C), 15.31 to 16.52 °C, and 14.44 to 15.45 °C, respectively (Table 2.2.1-2). Water temperatures were highest in the surface waters and decreased with depth, with the lowest temperatures in near-bottom waters.

Transmissivity (i.e., water clarity) values measured during this study generally were within ranges expected for coastal ports and harbors (MEC, 2002). Transmissivity can be affected by suspended materials from runoff, dredging activities, shipping operations, and biological factors such as plankton blooms. Annual mean values for light transmittance in surface, mid-depth, and bottom waters ranged from 63.37 percent to 66.66 percent, 55.17 percent to 60.69 percent, and 33.82 percent to 45.24 percent, respectively (Table 2.2.1-2). Water clarity in near-bottom waters was lower than that of surface and mid-depth waters.

In addition to the *Ports of Long Beach and Los Angeles Year 2000 Biological Baseline Study of San Pedro Bay* (MEC, 2002), a more recent water quality study was prepared by Weston Solutions, Inc., titled, *Characterization of Water Quality for Inner, Middle, and Outer Harbor Water Bodies in the Port of Long Beach* (Weston, 2006). This report summarized the results of 20 conductivity, temperature, and depth (CTD) casts (samples) that were conducted throughout the Inner, Middle, and Outer Harbor. Additionally, a midwater sample at each station was taken and analyzed for 160 different chemical constituents.

To summarize the results of the *Characterization of Water Quality for Inner, Middle, and Outer Harbor Water Bodies in the Port of Long Beach* (Weston, 2006), all observed samples revealed typical water conditions consistent with other water quality data taken within the Port. Two areas were seen to have altered the representative background marine conditions due to the proximity of the Los Angles River; however, both of these scenarios are typical within the Port, and the recorded values observed at all stations fell within a range that has been seen in past surveys (Weston, 2006). The water quality sampling stations that are in closest proximity to the proposed project are the seven sites located in the Inner Harbor and one site located in the Los Angeles River. Table 2.2.1-3 summarizes the results from these samples.

Beneficial Uses

Beneficial uses for surface waters in the Long Beach Harbor are designated by RWQCB and are identified in the *Water Quality Control Plan for Los Angeles Region* (Basin Plan) (RWQCB, 1994)[6]. Existing designated beneficial uses for the Long Beach Harbor include Navigation; Water Contact

[6] A previous Bays and Estuaries Plan was adopted in 1991, but it was rescinded in 1994 after it was challenged in court. The Bays and Estuaries Policy adopted in 1974 is still in effect.

Table 2.2.1-2
Mean Values of Surface Water Quality in the Long Beach Harbor in the Vicinity of the Proposed Gerald Desmond Bridge Replacement Project (January-November 2000)

Parameter	LB7	LB13	LB14
Dissolved Oxygen (mg/L)			
Surface	7.6	7.1	6.9
Mid-depth	6.6	6.3	6.0
Bottom	6.2	6.4	5.8
pH (pH units)			
Surface	8.04	7.93	7.93
Mid-depth	7.97	7.92	7.92
Bottom	7.93	7.92	7.88
Salinity (ppt)			
Surface	33.4	33.0	33.1
Mid-depth	33.5	33.4	33.4
Bottom	33.5	33.3	33.4
Temperature (°C)			
Surface	17.3	17.5	17.6
Mid-depth	15.3	16.2	16.5
Bottom	14.4	15.2	15.5
Transmissivity (%)			
Surface	63.37	64.90	66.66
Mid-depth	55.17	60.69	57.81
Bottom	33.82	43.48	45.24

mg/L – milligrams per liter; ppt – parts per thousand; °C – degrees Celsius; % – percent
Source: MEC, 2002.

Table 2.2.1-3
Mean Values of Surface Water Quality Parameters for the Inner Harbor of the Port of Long Beach (October 2006)

Parameter	Average	Range
Dissolved Oxygen (mg/L)		
Surface	6.7	5.6-7.5
Bottom	6.6	5.9-7.4
pH (pH units)		
Surface	8.0	7.6-8.4
Bottom	7.8	7.4-8.2
Salinity (PSU)		
Surface	32.6	28.1-33.3
Bottom	33.0	32.6-33.4
Temperature (°C)		
Surface	17.8	16.0-19.5
Bottom	16.2	14.7-17.2
Transmissivity (%)		
Surface	45%	N/A
Bottom	68%	N/A

mg/L – milligrams per liter; PSU – practical salinity units; °C – degrees Celsius; % – percent
Source: Weston, 2006

Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Marine Habitat; and Rare, Threatened, and Endangered Species. A potential beneficial use for the Long Beach Harbor is shellfish harvesting.

To maintain these beneficial uses, RWQCB has set forth Water Quality Objectives, which are described in the Basin Plan (RWQCB, 1994). Water Quality Objectives are intended to: (1) protect the public health and welfare; and (2) maintain or enhance water quality in relation to the designated existing and potential beneficial uses of the water. At present, two numeric objectives are set for Long Beach Harbor: DO and pH. The mean annual DO concentrations shall be 5 mg/L or greater, with no single determination less than 5 mg/L. The pH in the Long Beach Harbor shall not be less than 6.5 or higher than 8.5 (RWQCB, 1994).

Hydrology and Floodplain

The Dominguez Channel is the major drainage that flows into the Los Angeles-Long Beach Harbor complex. Sediment and contaminants are transported into the harbor with the flows from the Dominguez Channel.

The Dominguez Channel is an 8.5-mi-long (13.7-km) structure that drains an 80-square-mile (207-square-kilometer) area west of the Los Angeles River basin. The channel flows into the Consolidated Slip and subsequently into the East Basin of Los Angeles Harbor and Cerritos Channel. The Dominguez Channel historically transported untreated industrial wastes into Los Angeles Harbor, but such discharges have been significantly reduced through regulation by RWQCB.

Within the project area, the Federal Emergency Management Agency (FEMA) has identified three flood zones on the Flood Insurance Rate Map (FIRM) for this area, which are shown in Exhibit 2.2.1-2. The three flood zones are defined as:

Zone A – Flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis.

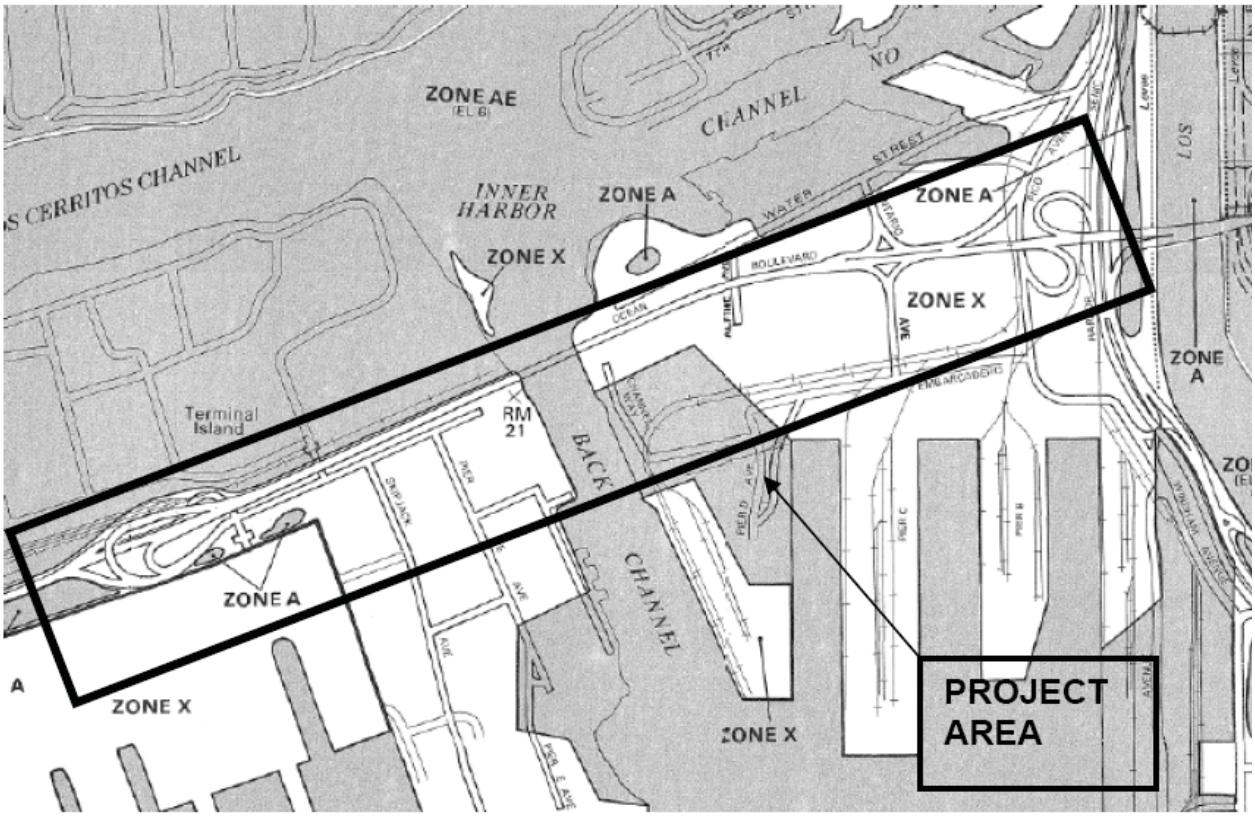

Exhibit 2.2.1-2
FEMA FIRM Map Number 0601360020C

Zone AE – Flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis.

Zone X – Flood insurance rate zone that corresponds to areas outside the 1-percent annual chance floodplain, areas of 1-percent annual chance sheet flow flooding where average depths are less than 1 ft (0.3-m), areas of 1-percent annual chance stream flooding where the contributing drainage area is less than 1 square mi, (0.3 square km) or areas protected from the 1-percent annual chance flood by levees.

To summarize the information shown in Exhibit 2.2.1-2, the area north of Ocean Boulevard on Terminal Island is within the base floodplain, which in this case is a 100-year floodplain. The area south of Ocean Boulevard and the land to the east of the bridge is outside of the base floodplain. The base floodplain is defined as the area subject to flooding by the flood or tide having a 1-percent chance of being exceeded in any given year.

2.2.1.3 Environmental Consequences

Evaluation Criteria

Construction and operational impacts to surface waters were assessed with regard to potential degradation of water quality and changes in surface water flow. Effects on future water quality, with and without implementation of the project alternatives, were estimated based on the potential for runoff to reach surface water resources and types of pollutants anticipated. Construction and operational impacts to groundwater resources were assessed with regard to potential degradation of groundwater quality and changes in groundwater supplies. Floodplain and hydrology impacts were assessed with regard to potential impacts to natural and beneficial floodplain values, whether flows would be impeded or redirected, or if the proposed alternative would result in a substantial risk of loss, injury, or death involving flooding.

No Action Alternative

Surface Water Quality: The No Action Alternative would have no effect on water quality or water resources associated with construction or demolition activities. Consequently, there would be no Disturbed Soil Areas (DSAs) associated with the No Action Alternative.

There would continue to be operational impacts to surface waters associated with the No Action Alternative because storm water would continue to flow from the roadway, untreated, into surrounding Port waters. Currently, there are no existing treatment BMPs in the project vicinity, and under the No Action Alternative, this would continue to be the case. As identified in the North-side, South-side, and Rehabilitation Alternative sections, implementation of these alternatives would result in increased treatment of storm water runoff within the project limits, as opposed to the No Action Alternative.

Groundwater Resources: The No Action Alternative would have no effect on groundwater resources associated with construction, demolition, or operational activities.

Floodplain and Hydrology: The No Action Alternative would have no effects to the designated floodplain or area hydrology associated with construction, demolition, or operational activities.

Construction and Demolition Impacts

North-side Alignment Alternative

Surface Water Quality: The North-side Alignment Alternative would result in an estimated total DSA of 38 acres (15 ha). No construction activities on the proposed or existing bridge would occur within the waters of the channel. All construction activities would be conducted above the channel. During construction, construction materials would be stored on the land adjacent to the east and west bridge accesses and on the bridge itself. Accidental spills or leaks of construction materials, fuels, solvents, paints, and concrete wash water over or near the channel could discharge into the channel, resulting in water quality impacts. Storm water runoff could also transport spilled or leaked materials into the channel. This could result in a temporary adverse effect on water quality in the Long Beach Harbor. Construction areas and staging areas would involve disturbed ground surfaces that would be susceptible to erosion by storm water runoff. Sediment-laden storm water runoff could increase turbidity and decrease DO concentrations in the Back Channel, resulting in a temporary adverse effect on water quality; however, temporary adverse effects to surface water are not anticipated, because a site-specific SWPPP would be implemented, and the selection of appropriate construction site BMPs would ensure no water quality standards or Waste Discharge Requirements (WDRs) would be violated. With implementation of these measures, the potential for adverse effects on surface water would be minimized.

As mentioned in the project description, the proposed project would replace the existing bridge with a 200-ft (61-m) vertical clearance (above MHWL) bridge. This would necessitate relocating the existing power and transmission lines that cross the Cerritos Channel, approximately 300 ft (91.4 m) north of the bridge, with an approximate vertical clearance of 153 ft (46.6 m) above the MHWL, because the higher bridge would result in the transmission lines being the only vertical navigation constraint. Under the recommended relocation scenario (see Exhibit 2.1.4-1), new towers would be installed adjacent to the existing towers on Piers A and S to accommodate a 200-ft (61-m) vertical clearance for all SCE lines. The SWPPP would include construction areas associated with relocation of the SCE transmission lines, and it would identify BMPs designed to prevent pollutants and sediment from entering receiving water bodies. Relocation of the SCE transmission lines would have no adverse effects on surface water quality.

Appropriate BMPs would be obtained from the *Caltrans Storm Water Quality Handbook, Construction Site Best Management Practices Manual* (Caltrans, 2003). The Port is required to ensure that an SWPPP and SAP are prepared and implemented prior to construction activities. The SWPPP would include the following: erosion and sediment control; non-storm water management; post-construction storm water management; waste management and disposal; maintenance, inspection and repair of BMPs; employee training to perform inspections of the BMPS at the construction site; and a SAP for contaminated storm water runoff. The SWPPP must describe structural and non-structural BMPs to minimize or eliminate the potential for spills and leakage of construction materials and erosion of disturbed areas by water and wind. Implementation of an SWPPP during construction of the North-side Alignment Alternative would minimize the potential for adverse effects on surface water quality.

During demolition of the existing bridge, there is the potential for debris to fall from the bridge into the Back Channel. The existing bridge may have ACM in the form of expansion joint compound and LBP coatings that would be disturbed by demolition. Asbestos and lead-containing materials and other debris falling into the channel could result in a temporary adverse effect on water quality; however, construction special provisions for the North-side Alignment Alternative would require the use of debris netting to capture any material or debris that could fall from the bridge during construction and demolition. Use of debris netting during construction and demolition would minimize the potential adverse effect from debris falling in surface water.

The following special BMPs, where applicable, would be implemented to prevent debris from falling and depositing into the Back Channel:

- Limit demolition and construction located over the channel during precipitation events.
- Employ nonshattering methods for demolition activities (e.g., wrecking balls would not be acceptable).
- Place platforms under/adjacent to the bridge structures to collect debris.
- Secure all materials on the bridge structures to prevent discharges into the channel via wind.
- Use attachments on equipment, such as backhoes, to catch debris from small demolition operations.
- Stockpile accumulated debris and waste generated from demolition away from the channel.
- Use drip pans during equipment operation, maintenance, cleaning, fueling, and storage for spill prevention. Place drip pans under all vehicles and equipment placed on the bridge structures when expected to be idle for more than 1 hour.
- Ensure that equipment used for this project is leak-free.
- Direct water from concrete curing and finishing operations away from inlets and watercourses to temporary collection facilities so that concrete wastes would be disposed of properly.

As stated above, with implementation of construction special provisions, an SWPPP, construction site BMPs, and adherence to NPDES permit requirements, no adverse impacts would occur to surface water quality during construction of the North-side Alignment Alternative or demolition of the existing bridge.

Groundwater Resources: Benzene-contaminated groundwater was detected south of the project area. It should be noted that the Remedial Investigation Report (Bechtel, 1997) was the most recent report that provided site-specific sampling data to help determine the approximate limits of groundwater contamination; however, the limited

sampling locations in the report prevent a conclusive determination from being made as to the extent to which the plume may have migrated. Additionally, because the Remedial Investigation Report (Bechtel, 1997) is more than 10 years old, the current location and condition of the plume is not known. Exhibit 2.2.1-1 shows the groundwater and surface water sampling locations in the vicinity of the Gerald Desmond Bridge Replacement Project.

During construction of the North-side Alignment Alternative, excavation activities are anticipated to encounter groundwater, and dewatering would be necessary. Dewatering groundwater in the project area is a concern because this can cause the contaminated groundwater plume to migrate to non-contaminated areas. All dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements, including an individual dewatering permit or waste discharge permit, if applicable. Information regarding potential regulatory permits is provided in Section 2.2.1.1. Prior to commencement of dewatering activities, RWQCB would be contacted immediately to provide a recommendation on how to handle the disposal of the dewatering flows. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of.

Bridge pile installation would be conducted by driving piles in lieu of pre-drilling to avoid or minimize the need for additional dewatering. Additionally, the groundwater in this area is likely to be contaminated from seawater intrusion, and it is not an identified drinking water source. Because the groundwater would not be used for any purposes related to the proposed project, groundwater supplies would not be affected. Because proper procedures and regulations regarding dewatering activities would be followed, no temporary adverse impacts to the groundwater or the benzene plume resulting from construction of the North-side Alignment Alternative are anticipated.

Floodplain and Hydrology: Construction and demolition activities associated with the North-side Alignment Alternative would not impede or redirect flows; therefore, they would not result in any adverse effects to the area hydrology or floodplain.

South-side Alignment Alternative

Surface Water Quality: The potential for construction and demolition impacts to surface water quality for the South-side Alignment Alternative would be similar to the North-side Alignment Alternative. The South-side Alignment Alternative would also result in approximately 38 acres (15 ha) of DSA. No construction activities on the proposed or existing bridge would occur within waters of the Back Channel. All construction activities would be conducted above the channel. All construction BMPs and special BMPs identified for the North-side Alignment Alternative would be implemented for the South-side Alignment Alternative. With implementation of construction special provisions, an SWPPP, construction site BMPs, and adherence to NPDES permit requirements, no adverse impacts would occur to surface water quality during construction of the South-side Alignment Alternative.

Groundwater Resources: As described in Section 2.2.1.2, several studies have been conducted regarding the source and location of the benzene plume in the project area; however, the limited sampling locations prevent a conclusive determination from being made as to the extent to which the plume may have migrated. Therefore, there is no basis for determining whether the North-side Alignment Alternative or the South-side Alignment Alternative would have greater potential to impact groundwater resources. As with the North-side Alignment Alternative, excavation activities are anticipated to encounter groundwater, and dewatering would be necessary. As described for the North-side Alignment Alternative, all dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of.

Bridge pile installation would be conducted by driving piles in lieu of pre-drilling to avoid or minimize the need for additional dewatering. Additionally, the groundwater in this area is likely to be contaminated from seawater intrusion, and it is not an identified drinking water source. Because the groundwater would not be used for any purposes related to the proposed project, groundwater supplies would not be affected. Because proper procedures and regulations regarding dewatering activities would be followed, no temporary adverse impacts to the groundwater or the benzene plume resulting from construction

of the South-side Alignment Alternative are anticipated.

Floodplain and Hydrology: Construction and demolition activities associated with the South-side Alignment Alternative would not impede or redirect flows; therefore, they would not result in any adverse effects to the area hydrology or floodplain.

Rehabilitation Alternative

Surface Water Quality: The Rehabilitation Alternative would involve replacement of the bridge deck, replacement of all expansion joints, replacement of the sway bracings for the main span, painting of all steel members, and seismic retrofit of foundations, columns, bent caps, abutments, and superstructure. Retrofit of the foundations and construction of the necessary treatment BMPs are the only construction activities associated with the Rehabilitation Alternative that would result in soil disturbance. The amount of DSA necessary to retrofit the foundations would be less than 1-acre (0.4-ha). Although the Rehabilitation Alternative would require a DSA of less than 1-acre (0.4-ha), excluding construction of proposed treatment BMPs, it is likely that an SWPPP would have to be prepared because a portion of land within the project limits drains to a 303 (d) listed water body – the Los Angeles River; however, with a small DSA and implementation of an SWPPP, the Rehabilitation Alternative would not result in adverse effects to surface water quality associated with construction or demolition activities.

Groundwater Resources: The Rehabilitation Alternative would require retrofitting the foundations, which would entail soil excavation and pile driving the steel casings. Although excavation activities may encounter groundwater, installation of the steel casings would be conducted by pile driving in lieu of pre-drilling to avoid or minimize the need for additional dewatering. The potential for groundwater dewatering is a concern in this area, and it is discussed above, under construction and demolition impacts for the North-side and South-side Alignment Alternatives. All dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of. Groundwater would not be used for any purposes related to the Rehabilitation Alternative; therefore, no temporary adverse impacts to groundwater resources would result from construction activities associated with the Rehabilitation Alternative.

Floodplain and Hydrology: With the Rehabilitation Alternative, there would be no construction or demolition impacts that would impede or redirect flows; therefore, this alternative would not result in any adverse effects to the area hydrology or floodplain.

Operational Impacts

North-side Alignment Alternative

Surface Water Quality: Once constructed, the North-side Alignment Alternative would increase the volume of surface runoff because of the addition of impervious surface area. Within the project limits, the amount of existing impervious surface is 36.09 acres (14.6 ha). The North-side Alignment Alternative would require conversion of 11.46 acres (4.63 ha) of unpaved area to impervious surfaces; therefore, the North-side Alignment Alternative would result in a net increase of 11.46 acres (4.63 ha) of impervious surface compared to the No Action Alternative. The new bridge would be designed so that storm water runoff would flow along gutters towards the ends of the bridge and discharge into proposed treatment BMPs, which at this stage are identified as biofiltration swales and media filters, prior to entering the storm drainage system. Existing drainage patterns would not be altered in the project area. As previously described, the increase in impervious surface area associated with the proposed project would increase the amount of runoff that would be discharged to the existing storm drain system; however, this increase is not substantial enough to require construction of new storm drainage facilities or expansion of existing facilities at the Port. With implementation of the proposed treatment BMPs, storage capacity for runoff would be provided, and the flow velocity in pre- and post-project conditions would be similar. Although the amount of runoff volume would increase, with implementation of the proposed treatment BMPs, the release time would be increased because runoff would be designed to reside in the proposed device for a particular length of time. Ultimately, this would result in a decreased flow rate; therefore, with operations of the North-side Alignment Alternative, there would be no exceedance of the capacity of the existing storm water drainage systems, and there would be no adverse effects on the storm water drainage system.

Based on preliminary design, there are eight potential locations for treatment BMPs for the North-side Alignment Alternative, which are shown on Exhibit 2.2.1-3. Out of these eight potential locations, six sites are proposed to be outfitted with media filters, and two sites are proposed to be outfitted with biofiltration swales. It should be noted that the applicability of each of the Caltrans-approved treatment BMPs was analyzed for this project, and media filters and biofiltration swales were identified as the most feasible treatment BMPs to implement, based on the removal of targeted design constituents (TDCs), site constraints, and design criteria. Examples of a typical biolfiltration swale and a media filter are shown in Exhibits 2.2.1-4 and 2.2.1-5.

The six locations where media filters are proposed for the North-side Alignment Alternative are identified as Locations 1, 2, 5, 6, 7, and 8 on Exhibit 2.2.1-3. Location 1 is inside the loop of the proposed on-ramp from Pier T Avenue to the EB direction of the proposed North-side Alignment Alternative replacement bridge. Location 2 is located adjacent to the EB approach structures, southwest of the LBGS. Location 5 is adjacent to the south side of the EB bridge approach structure, immediately before the split between the Pico Boulevard off-ramp and the connector to NB SR 710. Location 6 is adjacent to the south side of the EB approach structure, after Ocean Boulevard. Location 7 is approximately 200 ft (61 m) northeast of Location 6. Location 8 is on the inside shoulder of the proposed on-ramp from SB Pico Boulevard to the WB approach structure.

There are two locations where biofiltration swales are proposed, which are identified as Locations 3 and 4 on Exhibit 2.2.1-3. Locations 3 and 4 abut the Back Channel, and they are proposed under the southern portion of the cable-stayed structures. Location 3 is on the west bank of the Back Channel, while Location 4 is on the east bank.

With implementation of these treatment BMPs, operation of the North-side Alignment Alternative would not have an adverse effect on water quality.

Operation of the new bridge would be covered under the Caltrans Statewide Storm Water Permit (NPDES No. CAS000003). This includes the maintenance of each of the Caltrans-approved treatment BMPs that would be implemented as part of this project. Bridge maintenance activities may include work such as repairing damage or deterioration in various bridge components; removing debris from piers, bearing seats, and abutments; repairing expansion joints; cleaning and painting structural steel; and sealing concrete surfaces. All maintenance activities would employ BMPs specified in the Caltrans Statewide SWMP (2007c) to eliminate or minimize the potential for pollutants to be picked up by storm water runoff and transported offsite.

Groundwater Resources: Because the proposed treatment BMPs would not infiltrate any runoff into the ground, groundwater would not be affected or used for any purposes related to operation of the North-side Alignment Alternative; therefore, no adverse impacts to groundwater resources would result from operation of the North-side Alignment Alternative.

Floodplain and Hydrology: The North-side Alignment Alternative would require new bridge structures. These structures would be located outside of the channel but within the base floodplain. Placement of the structures within the base floodplain is considered an “encroachment” as defined by EO 11988: Floodplain Management; however, construction of the North-side Alignment Alternative would not result in a “significant encroachment” per 23 CFR 650 Subpart A. A project would be considered to result in a “significant encroachment” if it would result in one or more of the following:

- A significant potential for interruption or termination of a transportation facility, which is needed for emergency vehicles or provides a community's only evacuation route.
- A significant risk *(to life or property)*, or
- A significant adverse impact on natural and beneficial floodplain values.

The project would be designed to not impede or redirect flood flows. The bridge would be placed on piers. There are no levees or dams in the vicinity that would be subject to failure and expose people or structures associated with the proposed project to a significant risk of loss, injury, or death involving flooding. There would be no adverse effects to natural or beneficial floodplain values; therefore, the floodplain would not be adversely affected by operation of the North-side Alignment Alternative. Additionally, the North-side Alignment Alternative would not result in the impendence or redirection of flows; therefore, it would not result in any adverse effects to the area hydrology.

South-side Alignment Alternative

Surface Water Quality: As with the North-side Alignment Alternative, the South-side Alignment

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EXHIBIT 2.2.1-3

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DESIGNED _____ P.E. NO. _____
PROJ. MGR. _____ P.E. NO. _____
SECT. HEAD _____ P.E. NO. _____

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25617 DATE .....
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE .....

Port of LONG BEACH
The Green Port

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
NORTH-SIDE BRIDGE REPLACEMENT ALIGNMENT
POTENTIAL TREATMENT BMP LOCATIONS

SCALE
SHEET _____ OF _____
SPECIFICATION NUMBER _____
DRAWING NUMBER _____

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Exhibit 2.2.1-4 Typical Biofiltration Swale

Exhibit 2.2.1-5 Typical Media Filter (Austin Sand Filter)

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Alternative is anticipated to increase the volume of surface runoff because of the addition of impervious surface area. The increase in surface runoff would be similar to the North-side Alignment Alternative, as the South-side Alignment Alternative would also require conversion of an additional 11.46 acres (4.63 ha) of unpaved area to impervious surfaces. Storm water runoff would be treated in the same manner as the North-side Alignment Alternative, and the same treatment BMPs are proposed, as shown in Exhibit 2.2.1-6. As described with the North-side Alignment Alternative, with implementation of treatment BMPs, there would be no exceedance of the capacity of the existing storm water drainage systems, and there would be no adverse effects on the storm water drainage system associated with operation of the South-side Alignment Alternative.

Preliminary design indicates that as with the North-side Alignment Alternative, there are eight potential locations for treatment BMPs for the South-side Alignment Alternative, which are shown on Exhibit 2.2.1-6. Out of these eight potential locations, six sites are proposed to be outfitted with media filters, and two sites are proposed to be outfitted with biofiltration swales. Although six media filters and two biofiltration swales are the proposed treatment BMPs for both the North-side and South-side Alignment Alternatives, some of the locations of these treatment BMPs will change based on the alternative selected. Proposed BMP Locations 6, 7, and 8 would remain the same for both the North-side and South-side Alignment Alternatives, while Locations 1, 2, 3, 4, 5, and 6 would change. The six locations where media filters are proposed for the South-side Alignment Alternative are identified as Locations 1, 2, 5, 6, 7, and 8 on Exhibit 2.2.1-6. Location 1 is inside the loop of the proposed on-ramp from Pier T Avenue to the EB direction of the proposed South-side Alignment Alternative replacement bridge. Location 2 is adjacent to the EB approach structures, southwest of the LBGS. Location 5 is adjacent to the north side of the WB bridge approach structure. Location 6 is adjacent to the north side of the EB approach structure, after Ocean Boulevard. Location 7 is approximately 200 ft (61 m) northeast of Location 6. Location 8 is on the inside shoulder of the proposed on-ramp from SB Pico Boulevard to the WB approach structure.

There are two locations where biofiltration swales are proposed, which are identified as Locations 3 and 4 on Exhibit 2.2.1-6. Locations 3 and 4 abut the Back Channel, and they are proposed under the northern portion of the cable-stayed structures. Location 3 is on the west bank of the Back Channel, while Location 4 is on the east bank.

With implementation of these treatment BMPs, operation of the South-side Alignment Alternative would not have an adverse effect on water quality.

Groundwater Resources: Because the proposed treatment BMPs would not infiltrate any runoff into the ground, groundwater would not be affected or used for any purposes related to operation of the South-side Alignment Alternative; therefore, no adverse impacts to groundwater resources would result from operation of the South-side Alignment Alternative.

Floodplain and Hydrology: The South-side Alignment Alternative would require new bridge structures, similar to those of the North-side Alignment Alternative. All structures would be located outside of the channel; however, unlike the bridge structures for the North-side Alignment Alternative, all structures necessary for the South-side Alignment Alternative would be located outside of the base floodplain. This is because the boundary of the base floodplain is north of the existing Gerald Desmond Bridge to the south, and moving the bridge further south would locate the bridge further from the base floodplain zone.

The bridge would be placed on piers. There are no levees or dams in the vicinity that would be subject to failure and expose people or structures associated with the proposed project to a significant risk of loss, injury, or death involving flooding. There would be no adverse effects to natural or beneficial floodplain values; therefore, the floodplain would not be adversely affected by operation of the South-side Alignment Alternative. Additionally, the South-side Alignment Alternative would not result in the impendence or redirection of flows; therefore, it would not result in any adverse effects to the area hydrology.

Rehabilitation Alternative

Surface Water Quality: Because the Rehabilitation Alternative would require compliance with NPDES regulatory requirements, treatment BMPs would be a necessary component of this alternative. Storm water runoff would be treated in a similar manner as the North-side and South-side Alignment Alternatives, and most of the same treatment BMPs are proposed, as shown in Exhibit 2.2.1-7. Because the Rehabilitation Alternative would not add any additional impervious surfaces, no new runoff would be generated, and there would be no

exceedance of the capacity of the existing storm water drainage system. There would be no adverse effects on the storm water drainage system associated with operation of the Rehabilitation Alternative.

Preliminary design indicates that there are five potential locations for treatment BMPs for the Rehabilitation Alternative, which are shown on Exhibit 2.2.1-7. Out of these five potential locations, three sites are proposed to be outfitted with media filters, and two sites are proposed to be outfitted with biofiltration swales. The three locations where media filters are proposed for the Rehabilitation Alternative are identified as Locations 1, 2, and 5 on Exhibit 2.2.1-7. Location 1 is inside the loop of the existing WB off-ramp to Pier T. Location 2 is adjacent to the WB shoulder of Ocean Boulevard, southwest of the LBGS. Location 5 is adjacent to the north side of the WB bridge approach structure.

There are two locations where biofiltration swales are proposed, which are identified as Locations 3 and 4 on Exhibit 2.2.1-7. Locations 3 and 4 abut the Back Channel, and Location 3 is on the west bank of the Back Channel, while Location 4 is on the east bank.

With implementation of these treatment BMPs, operation of the Rehabilitation Alternative would not have an adverse effect on water quality.

Groundwater Resources: Groundwater would not be affected or used for any purposes related to the Rehabilitation Alternative; therefore, no adverse impacts to groundwater resources would result from operations associated with the Rehabilitation Alternative.

Floodplain and Hydrology: Operations associated with the Rehabilitation Alternative would not impede or redirect flows; therefore, they would not result in any adverse effects to the area hydrology or floodplain.

2.2.1.4 Avoidance, Minimization and/or Mitigation Measures

With implementation of the above-mentioned treatment BMPs, construction special provisions, and construction site BMPs, and by adhering to NPDES guidelines, no adverse effects would occur to water resources or hydrology during construction or operation of the new bridge or rehabilitation of the old bridge; therefore, no mitigation measures are required.

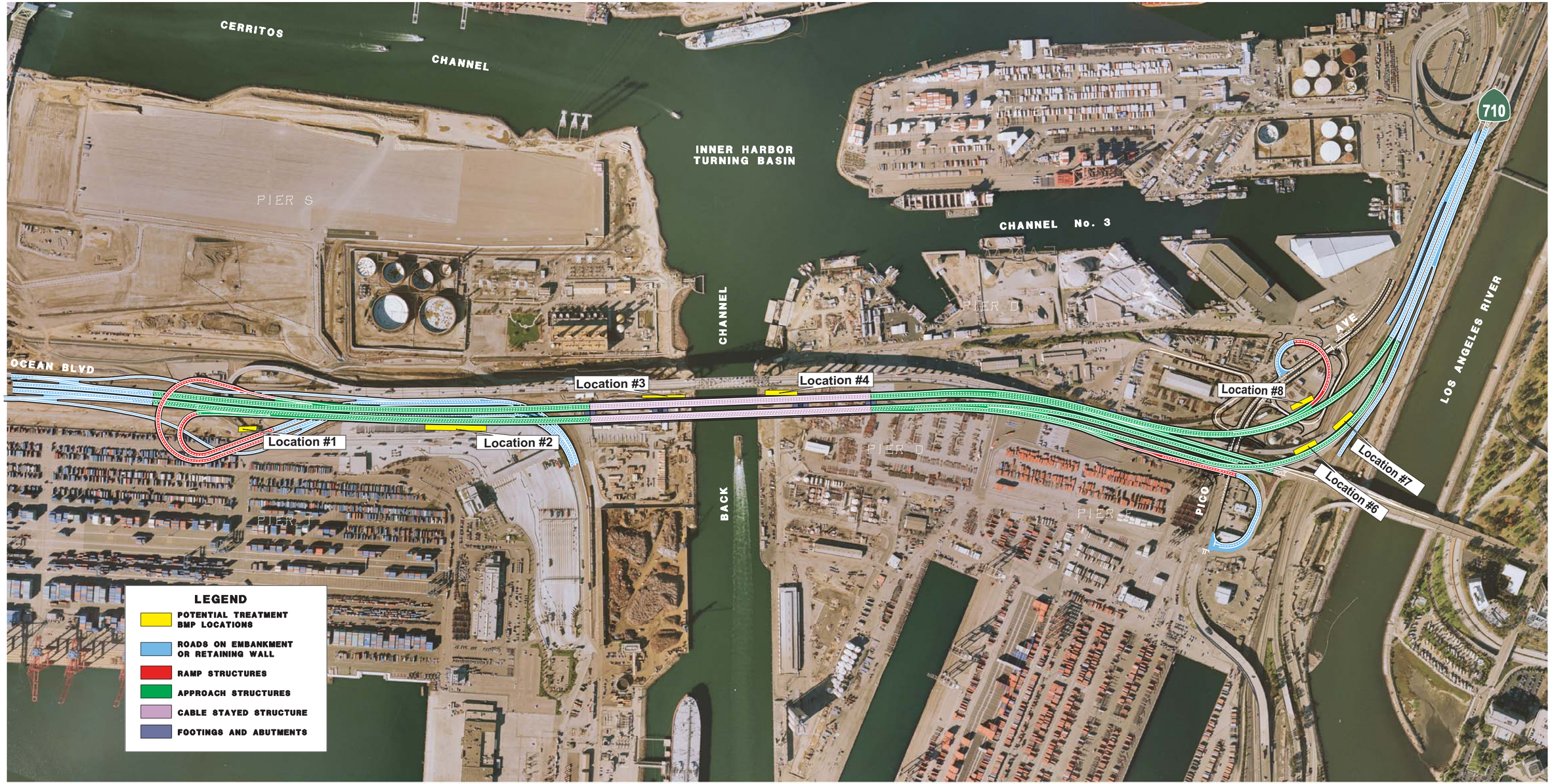

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EXHIBIT 2.2.1-6

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SECT. HEAD _____ P.E. NO. _____

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25671 DATE.....

CHIEF HARBOR ENGINEER P.E. NO. C-43067 DATE.....

Port of LONG BEACH
The Green Port

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
SOUTH-SIDE BRIDGE REPLACEMENT ALIGNMENT
POTENTIAL TREATMENT BMP LOCATIONS

SCALE
SHEET OF
SPECIFICATION NUMBER
DRAWING NUMBER

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EXHIBIT 2.2.1-7

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SECT. HEAD ____ P.E. NO. C-

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25077 DATE.....
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE.....

Port of LONG BEACH
The Green Port

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

REHABILITATION ALTERNATIVE

SCALE
SHEET ____ OF ____
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