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3.5.1 Introduction

This section presents the geologic conditions for the proposed Project area and analyzes: (1) seismic hazards including surface rupture, ground shaking, liquefaction, subsidence, tsunamis, and seiches; (2) other geologic issues including potentially unstable soils and slopes; and (3) mineral resources. This evaluation is based on published reports and the general geologic setting as indicators of potential geologic hazards.

3.5.2 Environmental Setting

3.5.2.1 Regional Setting

The proposed Project is located near sea level on Holocene alluvial outwash materials, Pleistocene terrace deposits, and Pleistocene Palos Verdes Sand, in the southwestern structural block of the Los Angeles Basin Province (Bryant, 1987; Kennedy, 1975; Yerkes et al., 1965). The southwestern structural block, one of four such blocks underlying the Los Angeles Basin, is marked by a northwest-southeast trending fault system (Yerkes et al., 1965) (Figure 3.5-1).

3.5.2.1.1 Seismicity and Major Faults

An earthquake is classified by the magnitude of wave movement (related to the amount of energy released), which traditionally has been quantified using the Richter scale. This is a logarithmic scale, wherein each whole number increase in Richter magnitude (M) represents a tenfold increase in the wave magnitude generated by an earthquake.

A Richter magnitude 8.0 earthquake is not twice as large as a M4.0 earthquake; it is 10,000 times larger (i.e., 10^4 , or $10 \times 10 \times 10 \times 10$). Damage typically begins at M5.0. Earthquakes of M6.0 to 6.9 are classified as moderate; those between 7.0 and 7.9 are classified as major; and those of 8.0 or greater are classified as great.

Southern California is recognized as one of the most seismically active areas in the United States. The region has been subjected to at least 52 major earthquakes, of magnitude 6 or greater, since 1796. Ground motion in the region is generally the result of sudden movements of large blocks of the earth's crust along faults. Great earthquakes, like the 1857 San Andreas Fault earthquake (see Table 3.5-1), are quite rare in Southern California. Earthquakes of magnitude 7.8 or greater occur at the rate of about two or three per 1,000 years, corresponding to a 6 to 9 percent probability in 30 years. However,

1 the probability of a magnitude 7.0 or greater earthquake in Southern California before
2 2024 is 85 percent (Working Group on California Earthquake Probabilities, 1995).

3 Seismic analyses generally include discussions of maximum credible and maximum
4 probable earthquakes. A maximum credible earthquake (MCE) is the largest event a fault
5 is believed to be capable of generating. The probability of occurrence is not considered
6 in this characterization. The maximum probable earthquake (MPE) is the largest
7 earthquake to have occurred on a given fault within the last 200 years, or is an earthquake
8 that ruptures 10 percent of the total length of the fault. In addition, the Port uses a
9 combination of probabilistic and deterministic seismic hazard assessment for seismic
10 design. Probabilistic hazard assessments are required to define two-level design events,
11 including the Operational Level Earthquake (OLE), which is the peak horizontal firm
12 ground acceleration with a 50 percent probability of exceedance in 50 years, and the
13 Contingency Level Earthquake (CLE), which is the peak ground acceleration with a
14 10 percent probability of exceedance in 50 years.

15 **3.5.2.1.2 Faults**

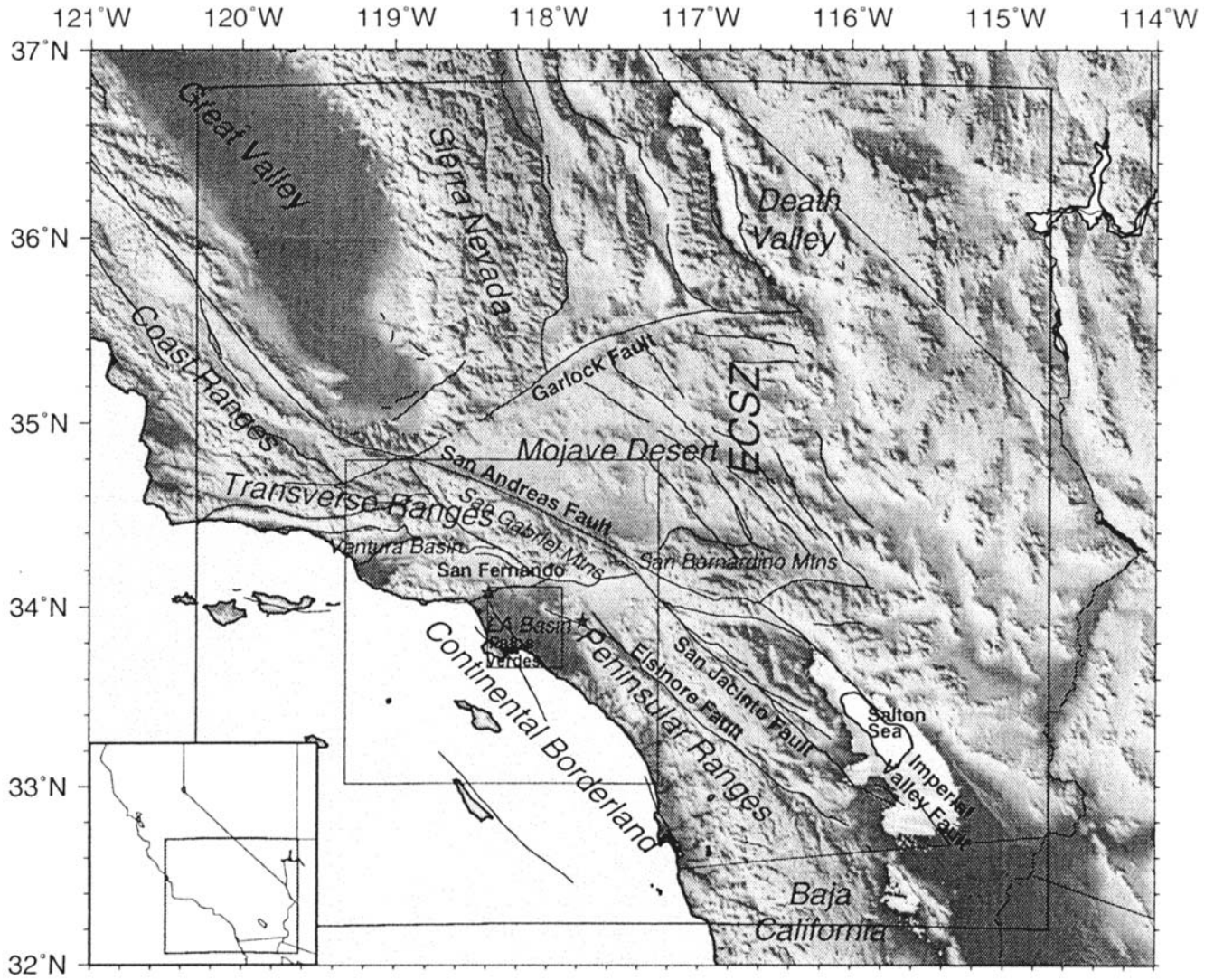
16 Segments of the active Palos Verdes Fault cross the Los Angeles Harbor in the vicinity of
17 the West Basin portion of the Port (Figure 3.5-2). Although well constrained in the
18 channel areas of the Harbor, such as at the intersection of the West Basin and the
19 Southwest Slip, the onshore location of the fault zone in the West Basin area is not well
20 defined. However, current data depicted in Figure 3.5-1 suggest the fault most likely
21 crosses north-northwest across Berths 121-132 and immediately southwest of
22 Berths 136-147. Recent studies indicate that the MCE for the Palos Verdes Fault is
23 Richter magnitude 7.25, with a recurrence interval of 900 years and peak ground
24 accelerations in the Port area of 0.28g and 0.52g, for the OLE and CLE, respectively
25 (EMI, 2001; McNeilan et al., 1996).

26 Numerous other active faults and fault zones are located in the general region, such as the
27 Newport-Inglewood, San Pedro, Whittier-Elsinore, Santa Monica, Hollywood, Raymond,
28 San Fernando, Sierra Madre, Cucamonga, San Jacinto, and San Andreas faults.

29 Table 3.5-2 presents potentially hazardous faults and anticipated earthquake magnitudes
30 in the Los Angeles Basin area.

31 Active faults, such as those noted above, are typical of Southern California. Therefore, it
32 is reasonable to expect a strong ground motion seismic event during the lifetime of any
33 proposed Project in the region.

34 Numerous active faults located offsite are capable of generating earthquakes in the
35 proposed Project area (Tables 3.5-1 and 3.5-2). Most noteworthy, due to its proximity to
36 the site, is the Newport-Inglewood Fault, which has generated earthquakes of magnitudes
37 ranging from 4.7 to 6.3 Richter scale (LAHD, 1991a). Large events could occur on more
38 distant faults in the general area, but because of the greater distance from the site,
39 earthquakes generated on these faults may be considered less significant with respect to
40 ground accelerations.



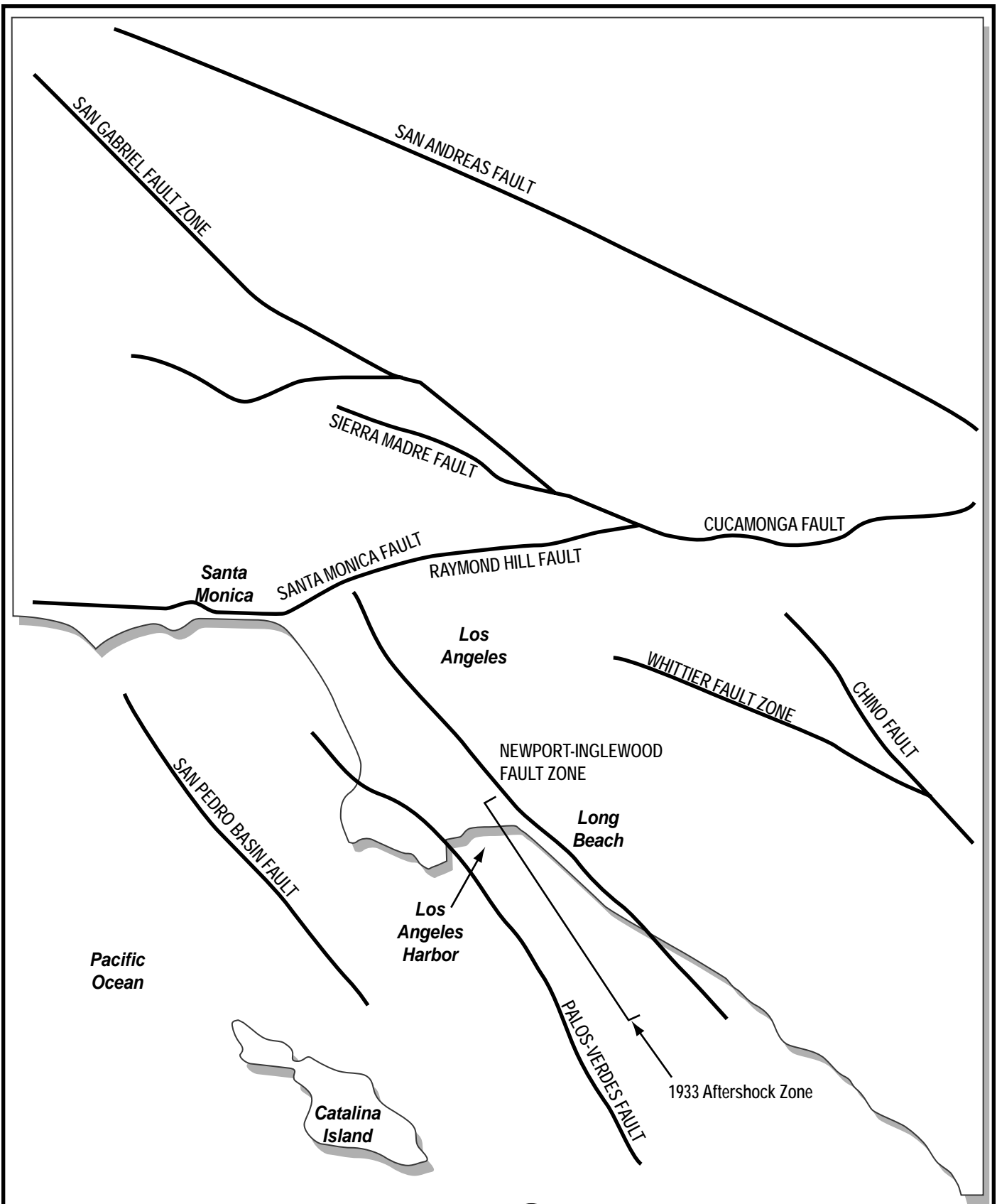
Source: Komatitsch et al., 2004



No Scale

Figure 3.5-1
Topographic Map of
Southern California Showing the
Los Angeles Region
 Berth 97-109
 Container Terminal Project EIS/EIR

CH2MHILL



Source: Los Angeles Harbor Department, 1994



Source: POLA, 2003

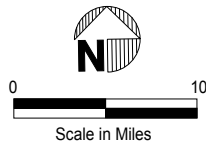


Figure 3.5-2
Major Quaternary Faults (Active and Potentially Active) in the Los Angeles Harbor Vicinity
 Berth 97-109
 Container Terminal Project EIS/EIR

CH2MHILL

Table 3.5-1. Known Earthquakes with Richter Magnitude Greater than 5.5 in the Los Angeles Basin Area

Fault Name	Date	Richter Magnitude
Palos Verdes Fault	*	*
San Pedro Basin Fault	*	*
Santa Monica-Raymond Fault	1855	6.0
San Andreas Fault	1857	8.2
	1952	7.7
Newport-Inglewood Fault	1933	6.3
San Jacinto Fault	1968	6.4
San Fernando/Sierra Madre-Cucamonga Fault	1971	6.4
	1991	6.0
Whittier-Elsinore Fault Zone	1987	5.9
Camp Rock/Emerson Fault	1992	7.4
Blind-thrust fault beneath Northridge	1994	6.6

Notes:

*No known earthquakes within the last 200 years.

Source: Ninyo & Moore, 1992; U.S. Geological Survey/Caltech, 1992, and 1994.

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2**Table 3.5-2.** Hazardous Faults and Bedrock Accelerations — Los Angeles Basin Area

Fault Name	Distance in Miles	Richter Magnitude (Ziony, 1985)	Maximum Credible Earthquake Magnitude (Greensfelder, 1974)	Duration in seconds (Bolt, 1973)
Palos Verdes Fault	<1	6.4-6.6	7.25*	26
Newport-Inglewood Structural Zone	5	6.5-6.7	7	26
San Pedro Basin Fault	15	6.3-6.6	no data	18
Whittier-Elsinore Fault Zone	22	6.4-6.7	7.5	16
Santa Monica-Raymond Fault	23	6.2-6.6	7.5	15
San Fernando-Cucamonga Fault	31	6.4-6.5	6.5	14
San Jacinto Fault	57	6.4-7.0	7.5	22
San Andreas Fault	53	7.2-8.1	8.25	28

Source: Ninyo & Moore, 1992; *EMI, 2001

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In 1974, the California Division of Mines and Geology (CDMG) was designated by the Alquist-Priolo Act as the agency responsible for delineating those faults deemed active and likely to rupture the ground surface. No faults in the area of the Port are currently zoned under the Alquist-Priolo Act; however, there is evidence that the Palos Verdes Fault, which lies beneath the West Basin, may be active and ground rupture cannot be ruled out (Fischer et al., 1987; McNeilan et al., 1996).

3.5.2.1.3 Liquefaction

Liquefaction is defined as the transformation of a granular material from a solid state into a liquefied state as a consequence of increased pore pressure, which results in the loss of grain-to-grain contact. Seismic groundshaking is capable of providing the mechanism for liquefaction, usually in fine-grained, loose to medium dense, saturated sands and silts. The effects of liquefaction may be excessive if total and/or differential settlement of structures occurs on liquefiable soils.

Natural drainages at Port berths have been backfilled with undocumented fill materials. Dredged materials from the harbor area were spread across lower Wilmington from 1905 until 1910 or 1911 (Ludwig, 1927). In addition, the natural alluvial deposits below the site generally are unconsolidated, soft, and saturated. Groundwater is present at depths as shallow as 2 to 6 feet beneath the site. These conditions are conducive to liquefaction.

Some authors (Tinsley and Youd, 1985; Topozada et al., 1988; Davis et al., 1982) have indicated that the liquefaction potential in the Harbor area during a major earthquake on either the San Andreas or Newport-Inglewood Fault is high. The proposed Project site is identified as an area susceptible to liquefaction in the City of Los Angeles General Plan, Safety Element because of the presence of recent alluvial deposits and groundwater less than 30 feet below ground surface (City of Los Angeles, 1996). Other authors indicate that the overall probability of widespread liquefaction of uncompacted hydraulic fills and major damage in the Port is judged to be relatively low; however, even minor damage resulting from liquefaction can be very significant in terms of loss of functionality and repair costs (Pyke, 1990).

3.5.2.1.4 Tsunamis

Tsunamis are gravity waves of long wavelength generated by a sudden disturbance in a body of water. Typically, oceanic tsunamis are the result of sudden vertical movement along a fault rupture in the ocean floor, submarine landslides or subsidence, or volcanic eruption, where the sudden displacement of water sets off transoceanic waves with wavelengths of up to 125 miles and with periods generally from 5 to 60 minutes. The trough of the tsunami wave arrives first leading to the classic retreat of water from the shore as the ocean level drops. This is followed by the arrival of the crest of the wave, which can run up on the shore in the form of bores or surges in shallow water or simple rising and lowering of the water level in relatively deeper water such as in harbor areas.

Tsunamis are a relatively common natural hazard, although most of the events are small in amplitude and not particularly damaging. However, in the event of a large submarine earthquake or landslide, coastal flooding may be caused by either run-up of broken tsunamis in the form of bores and surges or by relatively dynamic flood waves. In the process of bore/surge-type run-up, the onshore flow (up to tens of feet per second) can cause tremendous dynamic loads on the structures onshore in the form of impact forces and drag forces, in addition to hydrostatic loading. The subsequent drawdown of the water after run-up exerts the often crippling opposite drags on the structures and washes loose/broken properties and debris to sea; the floating debris brought back on the next onshore flow have been found to be a significant cause of extensive damage after successive run-up and drawdown. As has been shown historically, the potential loss of human life in the process can be great if such events occur in populated areas.

Abrupt sea level changes associated with tsunamis in the past have reportedly caused damage to moored vessels in the outer portions of the Los Angeles Harbor. The Chilean Earthquake of May 1960, for example, caused local damages of over \$1 million and

1 Harbor closure. One person drowned at Cabrillo Beach and one was injured. Small craft
2 moorings in the Harbor area, especially in the Cerritos Channel, where a seiche occurred,
3 were seriously damaged. Hundreds of small boats broke loose from their moorings,
4 40 sank, and about 200 were damaged. Gasoline from damaged boats caused a major
5 spill in the Harbor waters and created a fire hazard. Currents of up to 8 knots and a
6 6-foot rise of water in a few minutes were observed in the West Basin. The maximum
7 water level fluctuations recorded by gauges were 5.0 feet at Port Berth 60 (near Pilot
8 Station) and 5.8 feet in Long Beach Harbor (National Geophysical Data Center, 1993).

9 Until recently, projected tsunami run-ups along the western U.S. were based on farfield
10 events, such as submarine earthquakes or landslides occurring at great distances from the
11 U.S., as described above for the Chilean Earthquake of May 1960. Based on such distant
12 sources, tsunami-generated wave heights of between 6.5 feet and 8 feet above mean
13 lower low water (MLLW), at 100-year intervals, and between 10 feet and 11 feet, at
14 500-year intervals, were projected, including the effects of astronomical tides (Houston
15 1980). MLLW is the benchmark from which infrastructure (e.g., wharf and berth heights)
16 is measured in the Port. These runup estimates by Houston (1980) were used for the
17 tsunami analysis contained in the Deep Draft Navigation Improvements EIR/EIS in
18 September 1992 (USACE and LAHD, 1992).

19 However, more recent studies (e.g., Synolakis et al., 1997; Borrero et al., 2001 and 2005a)
20 have projected larger tsunami run-ups based on near-field events, such as earthquakes or
21 submarine landslides occurring in proximity to the California coastline. Offshore faults
22 present a larger local tsunami hazard than previously thought, posing a direct threat to
23 nearshore facilities. For example, one of the largest such features, the Catalina Fault, lies
24 directly underneath Catalina Island, located only 22 miles from the Port. Simulations of
25 tsunamis generated by uplift on this fault suggest waves in the Port in excess of 12 feet,
26 with an arrival time within 20 minutes (Legg et al., 2003; Borrero et al., 2005b). These
27 simulations were based on rare events, representing worst-case scenarios.

28 In addition, landslide derived tsunamis are now perceived as a viable local tsunami
29 hazard. Such tsunamis potentially can be more dangerous, due to the lack of warning for
30 such an event. This mechanism is illustrated by an earthquake in 1998, centered onshore
31 Papua-New Guinea, which appears to have created an offshore landslide that caused
32 tsunami inundation heights in excess of 33 feet, claiming more than 2,500 lives. In a
33 study modeling potential tsunami generation by local offshore earthquakes, Legg et al.
34 (2004), consider the relative risk of tsunamis from a large catastrophic submarine
35 landslide (likely generated by a seismic event) in offshore Southern California versus
36 fault-generated tsunamis. The occurrence of a large submarine landslide appears quite
37 rare by comparison with the tectonic faulting events. Although many submarine
38 landslides have been mapped off the Southern California shore, few appear to be of the
39 scale necessary to generate a catastrophic tsunami. Of two large landslides that appear to
40 be of this magnitude, Legg et al. (2004) indicated that one landslide is over 100,000 years
41 old and the other landslide approximately 7,500 year old. In contrast, the recurrence of
42 3- to 20-foot fault movements on offshore faults would be several hundred to several
43 thousand years. Consequently, the study concludes that the most likely direct cause of
44 most of the local tsunamis in Southern California is tectonic movement during large
45 offshore earthquakes.

46 Based on these recent studies (e.g., Synolakis et al., 1997; Borrero et al., 2001), the
47 California State Lands Commission (CSLC) has developed tsunami run-up projections
48 for the Ports of Los Angeles and Long Beach of 8.0 feet and 15.0 feet above mean sea
49 level (msl), at 100- and 500-year intervals, respectively, as a part of their Marine Oil

1 Terminal Engineering and Maintenance Standards (MOTEMS) (CSLC, 2004). However,
2 these projections do not incorporate consideration of the localized landfill configurations,
3 bathymetric features, and the interaction of the diffraction, reflection, and refraction of
4 the tsunami wave propagation within the Los Angeles/Long Beach Port Complex in its
5 predictions of tsunami wave heights.

6 Most recently, a model has been developed specifically for the Los Angeles/Long Beach
7 Port Complex that incorporates consideration of the localized landfill configurations,
8 bathymetric features, and the interaction of the diffraction, reflection, and refraction of
9 tsunami wave propagation, in the predictions of tsunami wave heights (Moffatt and
10 Nichol, 2007) (see tsunami discussion in Appendix J). The Port Complex model uses a
11 methodology similar to the above studies to generate a tsunami wave from several
12 different potential sources, including local earthquakes, remote earthquakes, and local
13 submarine landslides. This model indicates that a reasonable maximum source for future
14 tsunami events at the proposed Project site would either be a magnitude 7 earthquake on
15 the Santa Catalina Fault or a submarine landslide along the nearby Palos Verdes
16 Peninsula.

17 The Port Complex model predicts tsunami wave heights of 1.3 to 5.3 feet above msl at
18 the proposed Project site. The areas of highest anticipated water levels are the northwest
19 section of West Basin (Berths 134 and 135), where maximum water levels of 4.6 to
20 5.3 feet above msl could occur. The area of lowest anticipated tsunami-induced water
21 levels, under this scenario, is the southeast portion of West Basin (Berths 145 to 147),
22 where water levels of 1.3 to 2.0 feet above msl are possible.

23 3.5.2.1.5 Seiches

24 Seiches are seismically induced water waves that surge back and forth in an enclosed
25 basin and may be expected in the harbor as a result of earthquakes. Any significant wave
26 front could cause damage to seawalls and docks, and could breach sea walls at the
27 proposed Project sites. Modern shoreline protection techniques are designed to resist
28 seiche damage. The Los Angeles/Long Beach Port Complex model referred to above
29 considered impacts from tsunamis and seiches. In each case, impacts from a tsunami
30 were equal to or more severe than those from a seiche. As a result, the impact discussion
31 below refers primarily to tsunamis as this will be considered the worst case of potential
32 impacts.

33 3.5.2.1.6 Subsidence

34 Subsidence is the phenomenon where the soils and other earth materials underlying the
35 site settle or compress, resulting in a lower ground surface elevation. Fill and native
36 materials onsite can be water saturated, and a net decrease in the pore pressure and
37 contained water will allow the soil grains to pack closer together. This closer grain
38 packing results in less volume and the lowering of the ground surface.

39 Subsidence in the Los Angeles-Long Beach Harbor area was first observed in 1928. It
40 has affected the majority of the harbor area. Based on extensive studies by the City of
41 Long Beach and the California Division of Oil and Gas and Geothermal Resources, it has
42 been determined that most of the subsidence was the result of oil and gas production from
43 the Wilmington Oil Field following its discovery in 1936.

44 The proposed Project area experienced maximum cumulative subsidence of
45 approximately 1.6 feet, from 1928 to 1970 (Allen, 1973). Today, water injection
46 continues to be maintained at rates greater than the total volume of produced substances,

1 including oil, gas, and water, to prevent further reservoir compaction and subsidence
2 (City of Long Beach, 2006).

3 **3.5.2.1.7 Landslides**

4 Generally, a landslide is defined as the downward and outward movement of loosened
5 rock or earth down a hillside or slope. Landslides can occur either very suddenly or
6 slowly, and frequently accompany other natural hazards such as earthquakes, floods, or
7 wildfires. Most landslides are single events, but more than a third are associated with
8 heavy rains or the melting of winter snows. Landslides can also be triggered by ocean
9 wave action or induced by the undercutting of slopes during construction, improper
10 artificial compaction, or saturation from sprinkler systems or broken water pipes. In
11 areas on hillsides where the ground cover has been destroyed, landslides are probable
12 because there is nothing to hold the soil. Immediate dangers from landslides include
13 destruction of property and possible fatalities from rocks, mud, and water sliding
14 downhill or downstream. Other dangers include broken electrical, water, gas, and sewage
15 lines. The proposed Project site is relatively flat, and no known or probable bedrock
16 landslide areas have been identified (City of Los Angeles, 1996).

17 **3.5.2.1.8 Expansive Soils**

18 Expansive soils generally result from specific clay minerals that expand when saturated
19 and shrink in volume when dry. These expansive clay minerals are common in the
20 geologic units in the adjacent Palos Verdes Peninsula. Clay minerals in geologic units at
21 the proposed Project area could be expansive, and previously imported fill soils could be
22 expansive as well.

23 **3.5.2.1.9 Mineral Resources**

24 The Project site is located adjacent to the Wilmington Oil Field, which is a broad,
25 asymmetric anticline broken by a series of transverse normal faults that have created
26 seven major oil-producing zones (Mayuga, 1970). The field is approximately 11 miles
27 long and 3 miles wide, covering approximately 13,500 acres. This field produced
28 84.4 million barrels of oil from January 1998 through October 2002, making the
29 Wilmington Oil Field the sixth largest producing oil field in the state (California
30 Department of Conservation, 2003).

31 The Project site is located in the West Basin adjacent to the Southwest Slip. The Project
32 site would be located at the ground surface and is composed largely of fill material or
33 surficial alluvial deposits. According to the CDMG, the proposed Project site is located
34 in a Mineral Resource Zone (MRZ) area classified as “MRZ-1,” which is defined as an
35 area where adequate information indicates that no significant mineral deposits (i.e.,
36 aggregate deposits) are present or where it is judged that little likelihood exists for their
37 presence (CDMG, 1987).

38 **3.5.3 Applicable Regulations**

39 **3.5.3.1 Geologic Hazards**

40 Geologic resources and geotechnical hazards in the proposed Project vicinity are
41 governed primarily by the City of Los Angeles. The conservation and safety elements of

1 the City of Los Angeles General Plan contain policies for the protection of geologic
2 features and avoidance of geologic hazards (City of Los Angeles, 1996 and 2001b).
3 Local grading ordinances establish detailed procedures for excavation and earthwork
4 required during construction in backland areas. In addition, City of Los Angeles building
5 codes and building design standards for the Port establish requirements for construction
6 of aboveground structures (City of Los Angeles, 2002b). Most local jurisdictions rely on
7 the 1997 California Uniform Building Code (UBC) as a basis of seismic design.
8 However, with respect to wharf construction, LAHD standards and specifications would
9 be applied to the design of the proposed Project. The LAHD must comply with
10 regulations of the Alquist-Priolo Act, which regulates development near active faults to
11 mitigate the hazard of a surface fault rupture.

12 The MOTEMS were approved by the California Building Standards Commission on
13 January 19, 2005 and are codified as part of California Code of Regulations, Title 24,
14 Part 2, Marine Oil Terminals, Chapter 31F. These standards apply to all existing marine
15 oil terminals in California and include criterion for inspection, structural analysis and
16 design, mooring and berthing, geotechnical considerations, fire, piping, and mechanical
17 and electrical systems. MOTEMS became effective on January 6, 2006 (CSLC, 2005).
18 The process of developing the MOTEMS has produced parallel guidelines and
19 recommended provisions. The Seismic Design Guidelines for Port Structures, published
20 in 2001 by the Port International Navigation Association uses text virtually identical to
21 that found in the MOTEMS. The language for the Port International Navigation
22 Association and the MOTEMS is derived from the Naval Facilities Engineering Service
23 Center Technical Report (TR-2103-SHR), Seismic Criteria for California Marine Oil
24 Terminals (CSLC, 2004).

25 **3.5.3.2 Mineral Resources**

26 Excavations and construction in the immediate vicinity of abandoned oil wells is
27 regulated in accordance with standards and procedures as set forth by the California
28 Department of Conservation Division of Oil, Gas, and Geothermal Resources (DOGGR).
29 If any structure is to be located over or in proximity to a previously abandoned well, the
30 well may require re-abandonment. Public Resources Code, Section 3208.1, authorizes
31 the State Oil and Gas Supervisor to order re-abandonment of any previously abandoned
32 well when construction of any structure over or in proximity to the well could result in a
33 hazard.

34 The Surface Mining and Reclamation Act of 1975 was enacted to promote conservation
35 of the mineral resources of the state and to ensure adequate reclamation of lands once
36 they have been mined. Among other provisions, the Act requires the State Geologist to
37 classify land in California for mineral resource potential. The four categories include:
38 Mineral Resource Zone (MRZ)-1, areas of no mineral resource significance; MRZ-2,
39 areas of identified mineral resource significance; MRZ-3, areas of undetermined mineral
40 resource significance; and MRZ-4, areas of unknown mineral resource significance.

41 The distinction between these categories is important for land use considerations. The
42 presence of known mineral resources, which are of regional significance and possibly
43 unique to that particular area, could potentially result in nonapproval or changes to a
44 given project if it were determined that those mineral resources would no longer be
45 available for extraction and consumptive use. To be considered significant for the
46 purpose of mineral land classification, a mineral deposit, or a group of mineral deposits
47 that can be mined as a unit, must meet marketability and threshold value criteria adopted

1 by the California State Mining and Geology Board. The criteria vary for different
2 minerals depending on the following: (1) whether the minerals are strategic or
3 nonstrategic, (2) the uniqueness or rarity of the minerals, and (3) the commodity-type
4 category (metallic minerals, industrial minerals, or construction materials) of the minerals.
5 The State Geologist submits the mineral land classification report to the State Mining and
6 Geology Board, which transmits the information to appropriate local governments that
7 maintain jurisdictional authority in mining, reclamation, and related land use activities.
8 Local governments are required to incorporate the report and maps into their general
9 plans and consider the information when making land use decisions.

10 **3.5.4 Impacts and Mitigation Measures**

11 **3.5.4.1 Methodology**

12 Geological impacts have been evaluated in two ways: (1) impacts of the proposed
13 Project on the local geologic environment; and (2) impacts of geohazards on components
14 of the proposed Project, that may result in substantial damage to structures or
15 infrastructure or expose people to substantial risk of injury. Impacts would be considered
16 significant if the proposed Project meets any of the significance criteria listed in
17 Section 3.5.4.2.

18 **3.5.4.1.1 CEQA Baseline**

19 Section 15125 of the CEQA Guidelines requires EIRs to include a description of the
20 physical environmental conditions in the vicinity of a project that exist at the time of the
21 NOP. These environmental conditions would normally constitute the baseline physical
22 conditions by which the CEQA lead agency determines whether an impact is significant.
23 For purposes of this Recirculated Draft EIS/EIR, the CEQA baseline for determining the
24 significance of potential Project impacts is the environmental setting prior to March 2001,
25 pursuant to the ASJ described in Chapter 1, Section 1.4.3. The CEQA baseline for this
26 proposed Project includes 45,135 TEUs/year that occurred on the Project site in the year
27 prior to March 2001.

28 The CEQA baseline represents the setting at a fixed point in time and differs from the No
29 Project Alternative (discussed in Section 2.5) in that the No Project Alternative addresses
30 what is likely to happen at the site over time, starting from the existing conditions. The
31 No Project Alternative allows for growth at the Project site that could be expected to
32 occur without additional approvals.

33 **3.5.4.1.2 NEPA Baseline**

34 For purposes of this Recirculated Draft EIS/EIR, the evaluation of significance under
35 NEPA is defined by comparing the proposed Project or other alternative to the NEPA
36 baseline. To ensure a full analysis of the impacts associated with Phases I through III, the
37 NEPA baseline does not include the dredging required for the Berth 100 wharf, the
38 existing bridge across the Southwest Slip, or the 1.3 acres of fill constructed as part of
39 Phase I (i.e., the Project site conditions are considered without the in-water Phase I
40 activities and structures). The NEPA baseline condition for determining significance of
41 impacts includes the full range of construction and operational activities the applicant
42 could implement and is likely to implement absent a permit from the USACE. The
43 NEPA baseline for this project is not fixed. The NEPA baseline includes construction

1 and operation of backlands container operations on as much as 117 acres but does not
2 include wharves, dredging, and improvements that would require federal permits. The
3 NEPA baseline assumes upland development of 117 acres, which is greater than the 2001
4 baseline conditions. In addition, the NEPA baseline would store or manage up to
5 632,500 TEUs onsite, but no annual ships calls are included in the NEPA baseline (see
6 Section 2.6.2 for further information).

7 Unlike the CEQA baseline, which is defined by conditions at a point in time, the NEPA
8 baseline is not bound by statute to a “flat” or “no-growth” scenario. Therefore, the
9 USACE could project increases in operations over the life of a project to properly
10 describe the NEPA baseline condition. Normally, any ultimate permit decision would
11 focus on direct impacts of the proposed Project to the aquatic environment, as well as
12 indirect and cumulative impacts in the uplands determined to be within the scope of
13 federal control and responsibility. Significance of the proposed Project or alternative is
14 defined by comparing the proposed Project or alternative to the NEPA baseline (i.e., the
15 increment). The NEPA baseline conditions are described in Section 2.1.

16 The NEPA baseline also differs from the No Project Alternative, under which the Port
17 would take no further action to construct and develop additional backlands (other than the
18 72 acres that currently are developed). Under the No Project Alternative, no construction
19 would occur other than the Phase I construction. However, the abandonment of the
20 existing bridge and 1.3 acres of fill, as well as removal of the four A-frame cranes built as
21 part of Phase 1, would occur. Forecasted increases in cargo throughput would still occur
22 as greater operational efficiencies are realized.

23 **3.5.4.2 Thresholds of Significance**

24 The following significance criteria are based on the Los Angeles CEQA Thresholds
25 (City of Los Angeles, 2006) and are the basis for determining the significance of impacts
26 associated with geology resulting from development of the proposed Project.

27 Geologic hazard impacts are considered significant if the proposed Project causes or
28 accelerates hazards that would result in substantial damage to structures or infrastructure,
29 or exposes people to substantial risk of injury. Because the region is considered to be
30 geologically active, most projects are exposed to some risk from geologic hazards, such
31 as earthquakes. Geologic impacts are therefore considered significant only if the
32 proposed Project would result in substantial damage to structures or infrastructure, or
33 expose people to substantial risk of injury from:

34 **GEO-1** Fault rupture, seismic ground shaking, liquefaction, or other seismically
35 induced ground failure;

36 **GEO-2** Tsunamis or seiches;

37 **GEO-3** Land subsidence/soil settlement;

38 **GEO-4** Expansive soils;

39 **GEO-5** Landslides, mudflows; or

40 **GEO-6** Unstable soil conditions from excavation, grading, or fill.

1 In addition, a project would normally have a significant impact on landform alteration or
2 mineral resources if:

3 **GEO-7** One or more distinct and prominent geologic or topographic features would be
4 destroyed, permanently covered, or materially and adversely modified. Such
5 features may include, but not be limited to, hilltops, ridges, hillslopes, canyons,
6 ravines, rock outcrops, water bodies, streambeds, and wetlands.

7 **GEO-8** It resulted in the permanent loss of availability of a known mineral resource of
8 regional, state, or local significance that would be of future value to the region
9 and the residents of the state.

10 See Section 3.14 (Water Quality) for significance criteria related to erosion.

11 **3.5.4.3 Impacts and Mitigation Measures**

12 The assessment of impacts is based on regulatory controls and on the assumptions that
13 the proposed Project and all alternatives would include the following:

14 + The Port will design and construct backland improvements in accordance with
15 Los Angeles Building Code, Sections 91.000 through 91.7016 of the Los Angeles
16 Municipal Code, to minimize impacts associated with seismically induced
17 geohazards. Sections 91.000 through 91.7016 of the Los Angeles Municipal Code
18 regulate construction in backland areas of the Port. These building codes and criteria
19 provide requirements for construction, grading, excavations, use of fill, and
20 foundation work, including type of materials, design, procedures, etc. These codes
21 are intended to limit the probability of occurrence and the severity of consequences
22 from geological hazards. Necessary permits, plan checks, and inspections are also
23 specified. The Los Angeles Municipal Code also incorporates structural seismic
24 requirements of the California Uniform Building Code, which classifies almost all of
25 coastal California (including the Project site) in Seismic Zone 4, on a scale of 1 to 4,
26 with 4 being most severe. The Project engineers shall review the Project plans for
27 compliance with the appropriate standards in the building codes.

28 + The Port will design and construct wharf improvements in accordance with MOTEMS
29 and LAHD seismic design and engineering criteria (including recommendations in
30 geotechnical reports that are prepared as part of the design process), to minimize
31 impacts associated with seismically induced geohazards. Such construction shall
32 include, but not be limited to, completion of site-specific geotechnical investigations
33 regarding construction and foundation engineering. Measures pertaining to temporary
34 construction conditions, such as maximum temporary slope gradient, will be
35 incorporated into the design. A licensed geologist or engineer will monitor
36 construction to verify that construction occurs in concurrence with proposed Project
37 design.

1 **3.5.4.3.1 Proposed Project**

2 **3.5.4.3.1.1 Construction Impacts**

3 **Seismicity**

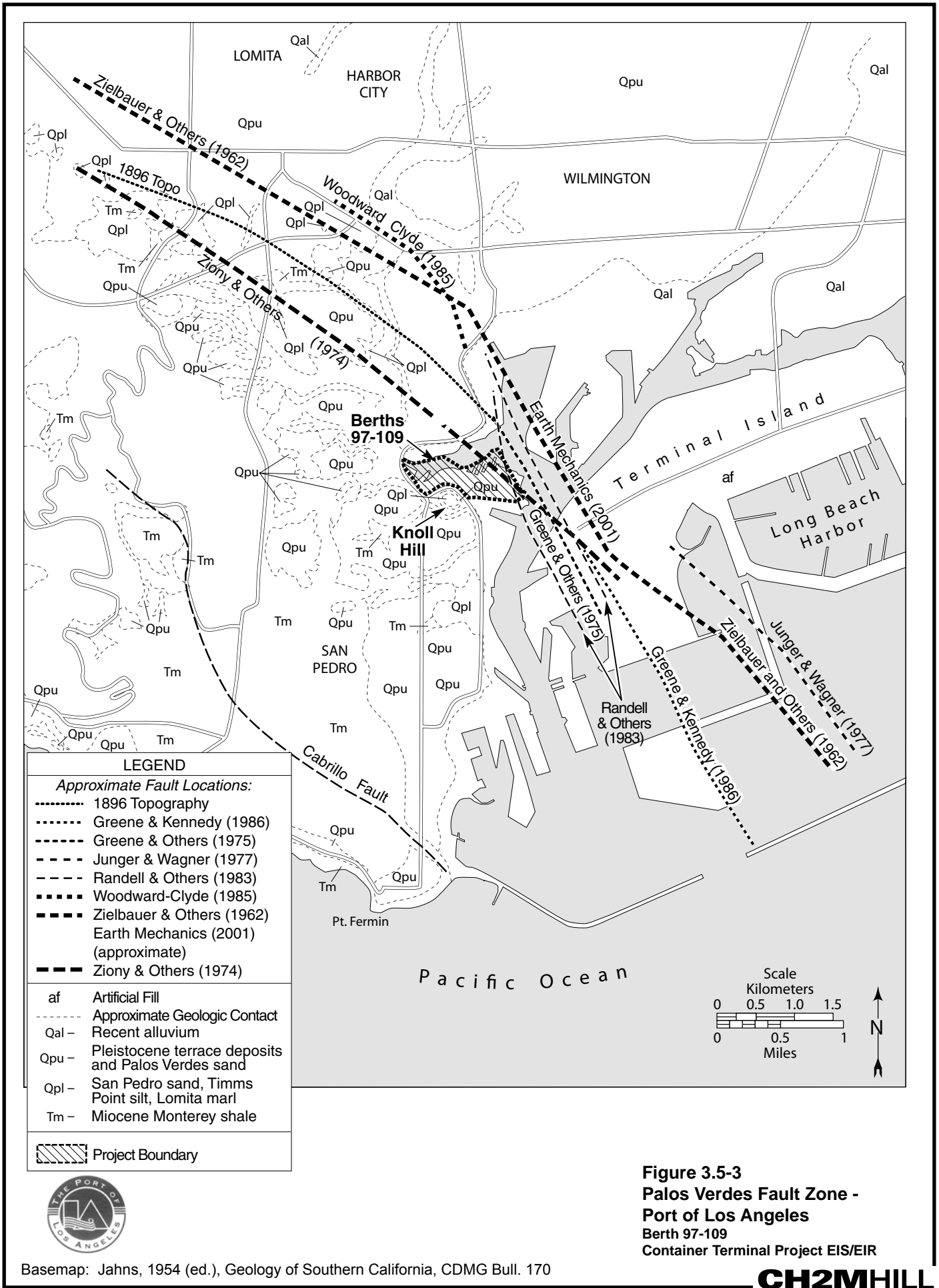
4 **Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone,** 5 **or other regional faults, could produce fault rupture, seismic ground** 6 **shaking, liquefaction, or other seismically induced ground failure** 7 **that would expose people and structures to substantial risk during** 8 **the construction period (through 2012).**

9 There would be a minor increase in the exposure of people and property to seismic
10 hazards relating to current and future baseline conditions. The Berth 97-109 Container
11 Terminal lies in the vicinity of the Palos Verdes Fault zone, and traces of the fault pass
12 beneath the Project area (Figure 3.5-3). Strong-to-intense ground shaking, surface
13 rupture, and liquefaction could occur in these areas, due to the location of the fault
14 beneath the proposed Project area and the presence of water-saturated hydraulic fill.
15 With the exception of ground rupture, similar seismic impacts could occur due to
16 earthquakes on other regional faults. Earthquake-related hazards, such as liquefaction,
17 ground rupture, ground acceleration, and ground shaking cannot be avoided in the
18 Los Angeles region and in particular in the harbor area where the Palos Verdes Fault is
19 present and hydraulic and alluvial fill is pervasive.

20 The Los Angeles Building Code, Sections 91.000 through 91.7016 of the Los Angeles
21 Municipal Code, regulates construction in backland areas of the Port. These building
22 codes and criteria provide requirements for construction, grading, excavations, use of fill,
23 and foundation work, including type of materials, design, procedures, etc. These codes
24 are intended to limit the probability of occurrence and the severity of consequences from
25 geological hazards, such as earthquakes. Necessary permits, plan checks, and inspections
26 are also specified. The Los Angeles Municipal Code also incorporates structural seismic
27 requirements of the California Uniform Building Code, which classifies almost all of
28 coastal California (including the proposed Project site) in Seismic Zone 4, on a scale of
29 1 to 4, with 4 being most severe. The proposed Project engineers would review the
30 proposed Project plans for compliance with the appropriate standards in the building
31 codes.

32 New terminal construction would be designed per the MOTEMS to protect against
33 seismic hazards that could occur. These regulations have recently been drafted by the
34 CSLC and adopted as state law. LAHD standards and specifications would be applied to
35 the seismic design of the proposed Project.

36 Design objectives for all components of the proposed Project: wharf and backland areas;
37 the two bridges spanning the Southwest Slip; and the relocated Catalina Express
38 Terminal are for them to maintain operation following an OLE and to survive without
39 collapse and provide public safety following a CLE. At the lower-level OLE, structures
40 are expected to suffer minor, nonstructural damage and resume operations immediately
41 after an earthquake. At the higher-level CLE, structural damage is permissible as long as
42 public safety is not jeopardized.



1 However, as discovered during the 1971 San Fernando earthquake and the 1994
2 Northridge earthquake, existing building codes are often inadequate to completely protect
3 engineered structures from hazards associated with liquefaction, ground rupture, and
4 large ground accelerations. Consequently, designing new facilities based on existing
5 building codes may not prevent significant damage to structures from a major or great
6 earthquake on the underlying Palos Verdes Fault or any other regional fault. In addition,
7 projects in construction phases are especially susceptible to earthquake damage due to
8 temporary conditions, such as temporary slopes and unfinished structures, which are
9 typically not in a condition to withstand intense ground shaking.

10 **CEQA Impact Determination**

11 As discussed above, seismic activity along the Palos Verdes Fault zone, or other
12 regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or
13 other seismically induced ground failure. Seismic hazards are common to the
14 Los Angeles region and are not increased by the proposed Project. However, because
15 the proposed Project area is potentially underlain by strands of the active Palos
16 Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of
17 seismic impacts. Future construction of new wharves, buildings, bridges, and related
18 infrastructure would occur over multiple years, thus, increasing exposure of people
19 and property during construction to seismic hazards from a major or great earthquake.
20 Such exposure cannot be precluded, even with incorporation of modern construction
21 engineering and safety standards. Therefore, impacts due to seismically induced
22 ground failure are significant under CEQA.

23 *Mitigation Measures*

24 There are no mitigation measures available that would reduce impacts below
25 significance associated with seismically induced ground failure.

26 *Residual Impacts*

27 Design and construction in accordance with applicable laws and regulations
28 pertaining to seismically induced ground movement would minimize structural
29 damage in the event of an earthquake. However, increased exposure of people and
30 property during construction to seismic hazards from a major or great earthquake
31 cannot be precluded even with the incorporation of modern construction engineering
32 and safety standards. Therefore, impacts due to seismically induced ground failure
33 would remain significant and unavoidable.

34 **NEPA Impact Determination**

35 The proposed Project would include the construction of new wharves and backlands
36 that would be susceptible to seismically induced ground shaking, fault rupture, and
37 liquefaction.

38 Seismic hazards are common to the Los Angeles region and are not increased by the
39 proposed Project. However, because the proposed Project area is potentially
40 underlain by strands of the active Palos Verdes Fault and liquefaction-prone
41 hydraulic fill, there is a substantial risk of seismic impacts. Future construction of
42 new wharves, buildings, bridges, and related infrastructure would occur over multiple
43 years, thus, increasing exposure of people and property during construction to
44 seismic hazards from a major or great earthquake. Such exposure cannot be
45 precluded, even with incorporation of modern construction engineering and safety

1 standards. Therefore, impacts due to seismically induced ground failure are
2 significant under NEPA.

3 *Mitigation Measures*

4 There are no mitigation measures available that would reduce impacts below
5 significance associated with seismically induced ground failure.

6 *Residual Impacts*

7 Design and construction in accordance with applicable laws and regulations
8 pertaining to seismically induced ground movement would minimize structural
9 damage in the event of an earthquake. However, increased exposure of people and
10 property during construction to seismic hazards from a major or great earthquake
11 cannot be precluded even with the incorporation of modern construction engineering
12 and safety standards. Therefore, impacts due to seismically induced ground failure
13 would remain significant and unavoidable.

14 **Tsunami Runup**

15 **Impact GEO-2a: Construction on the proposed Project in the Port** 16 **area would expose people and structures to substantial risk** 17 **involving tsunamis or seiches.**

18 Local or distant seismic activity and/or offshore landslides could result in the occurrence
19 of tsunamis or seiches in the proposed Project area and vicinity. Due to the historic
20 occurrence of earthquakes and tsunamis along the Pacific Rim, placement of any
21 development on or near the shore in Southern California, including the proposed Project
22 site, would always involve some measure of risk of impacts from a tsunami or seiche.
23 Although relatively rare, should a large tsunami or seiche occur, it would be expected to
24 cause some amount of property damage and possibly personal injuries to most on or near-
25 shore locations. As a result, this is considered by LAHD as the average, or normal
26 condition for most on- and near-shore locations in Southern California. Therefore, a
27 proposed Project tsunami- or seiche-related impact would be one that would exceed this
28 normal condition and cause substantial damage and/or substantial injuries. For reasons
29 explained below, under a theoretical maximum worst-case scenario, the proposed Project
30 would likely expose people or property to substantial damage or substantial injuries in the
31 event of a tsunami or seiche.

32 Since tsunamis and seiches are derived from wave action, the risk of damage or injuries
33 from these events at any particular location is lessened if the location is high enough
34 above sea level, far enough inland, or protected by manmade structures such as dikes or
35 concrete walls. The height of a given site above sea level is either the result of an
36 artificial structure (e.g., a dock or wall), topography (e.g., a hill or slope), or both, and a
37 key variable related to the height of a site location relative to sea level is the behavior of
38 tides. During high tide, for instance, the distance between the site and sea level is less.
39 During low tide, the distance is greater. How high a site must be located above sea level
40 to avoid substantial wave action during a tsunami or seiche depends upon the height of
41 the tide at the time of the event and the height of the potential tsunami or seiche wave.
42 These factors are considered for the proposed Project site, as described below.

43 The Port is subject to diurnal tides, meaning two high tides and two low tides during a
44 24-hour day. The average of the lowest water level during low tide periods each day is
45 typically set as a benchmark of 0 feet and is defined as Mean Lower-Low Water level

1 (MLLW). For purposes of this discussion, all proposed Project structures and land
2 surfaces are expressed as height above (or below) MLLW. The mean sea level (msl) in
3 the Port is +2.8 feet above MLLW (NOAA, 2005). This height reflects the arithmetic
4 mean of hourly heights observed over the National Tidal Datum Epoch (19 years) and
5 therefore reflects the mean of both high and low tides in the Port. The recently developed
6 Port Complex model described in Section 3.5.2 predicts tsunami wave heights with
7 respect to msl, rather than MLLW, and therefore can be considered a reasonable average
8 condition under which a tsunami might occur. The Port msl of +2.8 feet must be
9 considered in comparing projected tsunami run-up (i.e., amount of wharf overtopping and
10 flooding) to proposed wharf height and topographic elevations, which are measured with
11 respect to MLLW.

12 Generalized modeling completed by Borrero et al., (2005a) indicates that a large
13 submarine landslide off the southern tip of the Palos Verdes Peninsula could result in
14 13 feet of runup in the Port of Los Angeles and Port of Long Beach. Such runup may
15 inundate the proposed Project site and potentially cause up to \$36 billion direct, indirect,
16 and induced losses in the Port areas.

17 Most recently and more definitively, a model has been developed specifically for the
18 Los Angeles/Long Beach Port Complex that incorporates consideration of the localized
19 landfill configurations, bathymetric features, and the interaction of the diffraction,
20 reflection, and refraction of tsunami wave propagation, in the predictions of tsunami
21 wave heights (Moffatt and Nichol, 2007) (see tsunami discussion in Appendix J). Based
22 on this study, a reasonable worst-case scenario for generation of a tsunami or seiche in
23 the San Pedro Bay Ports predicts tsunami wave heights of 1.3 to 5.3 feet above msl at the
24 proposed Project site, under both earthquake and landslide scenarios. Incorporating the
25 Port msl of +2.8 feet, the model predicts tsunami wave heights of 4.1 to 8.1 feet above
26 MLLW at the proposed Project site. Because Berths 97-109 are approximately 12 feet
27 above msl and would be built to have a 15-foot finished grade and wharf, localized
28 tsunami-induced flooding would not occur.

29 While the analysis above considers a reasonable worst-case seismic scenario based on a
30 maximum seismic event, with respect to msl, a theoretical maximum worst-case wave
31 action from a tsunami would result if the single highest tide predicted over the next
32 40 years at the San Pedro Bay Ports was present at the time of the seismic event. The
33 single highest tide predicted over the next 40 years is 7.3 feet above MLLW. This
34 condition is expected to occur less than 1 percent of the time over this 40-year period.
35 If that very rare condition were to coincide with a maximum tsunami event, the model
36 predicts tsunami wave heights of 8.6 to 12.6 feet above MLLW at the proposed Project
37 site. Because the proposed Project site elevation is approximately 12 feet above msl,
38 localized tsunami-induced flooding up to 0.6 foot (about 7 inches) is possible. To
39 determine the extent of potential impacts due to tsunami-induced flooding, Port structural
40 engineers have determined that Port reinforced concrete or steel structures designed to
41 meet California earthquake protocols incorporated into MOTEMS would be expected to
42 survive complete inundation in the event of a tsunami (Los Angeles Harbor Department,
43 2006). It is possible that infrastructure damage and/or injury to personnel could occur as
44 a result of complete site inundation.

45 **Tsunami Probability**

46 As previously discussed, there is a potential for tsunami-induced flooding under the
47 theoretical maximum worst-case scenario. However, the likelihood of a large tsunami is

1 very low, given the relatively short duration of construction activity at the proposed
2 Project site.

3 The most likely worst-case tsunami scenario was based partially on a magnitude
4 7.6 earthquake on the offshore Santa Catalina Fault. The recurrence interval for a
5 magnitude 7.5 earthquake along an offshore fault in the Southern California Continental
6 Borderland is about 10,000 years. Similarly, the recurrence interval of a magnitude
7 7.0 earthquake is about 5,000 years and the recurrence interval of a magnitude
8 6.0 earthquake is about 500 years. However, there is no certainty that any of these
9 earthquake events would result in a tsunami, since only about 10 percent of earthquakes
10 worldwide result in a tsunami. In addition, available evidence indicates that
11 tsunamigenic landslides would be extremely infrequent and occur less often than large
12 earthquakes. This suggests recurrence intervals for such landslide events would be
13 longer than the 10,000-year recurrence interval estimated for a magnitude 7.5 earthquake
14 (Moffatt & Nichol, 2007).

15 **CEQA Impact Determination**

16 Designing new facilities based on existing building codes may not prevent substantial
17 damage to structures from coastal flooding. In addition, projects in construction
18 phases are especially susceptible to damage due to temporary conditions, such as
19 unfinished structures, which are typically not in a condition to withstand coastal
20 flooding. Impacts due to tsunamis and seiches are typical for the entire California
21 coastline and would not be increased by construction of the proposed Project. Under
22 the highly unlikely event of the single highest tide predicted over the next 40 years at
23 the San Pedro Bay Ports coinciding with the theoretical maximum worst-case
24 tsunami scenario, there would be a risk of coastal flooding due to tsunamis and
25 seiches. As a result, impacts during the construction phase would be significant
26 under CEQA.

27 *Mitigation Measures*

28 **GEO-1: Emergency Response Planning. The terminal operator shall work**
29 **with Port engineers and Port police to develop tsunami response**
30 **training and procedures to assure that construction and operations**
31 **personnel will be prepared to act in the event of a large seismic**
32 **event. Such procedures shall include immediate evacuation**
33 **requirements in the event that a large seismic event is felt at the**
34 **proposed Project site, as part of overall emergency response**
35 **planning for the proposed Project.**

36 **Such procedures shall be included in any bid specifications for**
37 **construction or operations personnel, with a copy of such bid**
38 **specifications to be provided to LAHD, including a completed copy**
39 **of its operations emergency response plan prior to commencement of**
40 **construction activities and/or operations.**

41 *Residual Impacts*

42 Emergency planning and coordination between the terminal operator and LAHD, as
43 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
44 during a tsunami. However, even with incorporation of emergency planning and
45 construction procedures in accordance with current City and state regulations,

1 substantial damage and/or injury would occur in the event of a tsunami or seiche.
2 Therefore, residual impacts would remain significant and unavoidable.

3 **NEPA Impact Determination**

4 The proposed Project would include the creation of 2.5 acres of fill at Berth 100, as
5 well as the construction of new wharves, dikes, and backlands, which would be
6 susceptible to tsunamis and seiches. There is a substantial risk of coastal flooding of
7 wharves and associated backland areas due to tsunamis and seiches. Because
8 construction would occur over multiple years, increased exposure of people and
9 property during construction to seismically induced tsunamis or seiches from a major
10 or great earthquake cannot be precluded. Impacts due to tsunamis and seiches are
11 significant under NEPA.

12 *Mitigation Measures*

13 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
14 tsunami and seiche-related impacts.

15 *Residual Impacts*

16 Emergency planning and coordination between the terminal operator and the LAHD,
17 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
18 during a tsunami. However, even with incorporation of emergency planning and
19 construction procedures in accordance with current City and state regulations,
20 substantial damage and injury would occur in the event of a tsunami or seiche.
21 Therefore, residual impacts would remain significant and unavoidable.

22 **Subsidence/Soil Settlement**

23 **Impact GEO-3a: Construction of the proposed Project would not** 24 **result in substantial damage to structures or infrastructure, or** 25 **expose people to substantial risk of injury from subsidence/soil** 26 **settlement.**

27 Subsidence in the vicinity of the proposed Project, due to previous oil extraction in the
28 Port area, has been mitigated and is not anticipated to adversely affect the proposed
29 Project. However, in the absence of proper engineering, proposed structures could be
30 cracked and warped as a result of saturated, unconsolidated/compressible sediments.
31 However, during Project design, the Project engineer would evaluate the settlement
32 potential in all areas where structures are proposed.

33 The settlement potential of existing onshore soils would be evaluated through a site-
34 specific geotechnical investigation, which includes subsurface soil sampling, laboratory
35 analysis of samples collected to determine soil compressibility, and an evaluation of the
36 laboratory testing results by a geotechnical engineer. Recommendations of the engineer
37 would be incorporated into the design specifications for the proposed Project, consistent
38 with City design guidelines, including Sections 91.000 through 91.7016 of the
39 Los Angeles Municipal Code, in conjunction with criteria established by LAHD and
40 Caltrans. Recommendations for soils subject to settlement typically include
41 overexcavation and recompaction of compressible soils, which would allow for
42 construction of a conventional slab-on-grade; or alternatively, installation of concrete or
43 steel foundation piles through the settlement prone soils, to a depth of competent soils.
44 Such geotechnical engineering would substantially reduce the potential for soil settlement

1 and would ensure that construction of the proposed Project would not result in substantial
2 damage to structures or infrastructure, or expose people to substantial risk of injury.

3 The settlement potential associated with creation of 2.5 acres of fill at Berth 100 would
4 similarly be evaluated through a site-specific geotechnical investigation, which includes
5 sampling of sediments to be placed as fill, as well as sampling of the substrate (harbor
6 bottom sediments) on which the fill would be placed. Laboratory analysis of samples
7 would be conducted, under the supervision of a geotechnical engineer, to determine soil
8 compressibility. Recommendations of the engineer would be incorporated into the design
9 specifications for the proposed Project, consistent with City design guidelines, including
10 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction
11 with criteria established by LAHD and Caltrans. Recommendations for sediments
12 subject to settlement typically include placement of excess sediments above final
13 anticipated grade in order to surcharge (or compress) the underlying, newly placed
14 sediments. When geotechnical instrumentation indicates that sufficient compaction has
15 been achieved in the area of newly placed fill, the overburden soil would then be
16 removed and construction would commence. Such geotechnical engineering would
17 substantially reduce the potential for soil settlement and would ensure that construction of
18 2.5 acres of fill would not result in substantial damage to structures or infrastructure, or
19 expose people to substantial risk of injury.

20 **CEQA Impact Determination**

21 Subsidence/soil settlement impacts in backland areas would be less than significant
22 under CEQA because the Project would be designed and constructed in compliance
23 with recommendations of a geotechnical engineer, consistent with Sections 91.000
24 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria
25 established by LAHD and Caltrans. Construction of the proposed Project would not
26 result in substantial damage to structures or infrastructure, or expose people to
27 substantial risk of injury. Impacts would be less than significant.

28 *Mitigation Measures*

29 Because subsidence/soil settlement impacts would be less than significant, no
30 mitigation measures are necessary.

31 *Residual Impacts*

32 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
33 Municipal Code, no mitigation would be required and the residual impacts would be
34 less than significant under CEQA.

35 **NEPA Impact Determination**

36 The federal portions of the proposed Project would be limited to wharf, in-water
37 construction activities (including the creation of 2.5 acres of fill, new wharf
38 construction, and channel deepening), and limited backland areas (see Section 2.4.3,
39 Federal Project). Subsidence/soil settlement impacts associated with creation of
40 2.5 acres of fill would be less than significant under NEPA, with implementation
41 standard geotechnical engineering, including incorporation of Sections 91.000
42 through 91.7016 of the Los Angeles Municipal Code and criteria established by
43 LAHD and Caltrans. Construction of the proposed Project would not result in
44 substantial damage to structures or infrastructure, or expose people to substantial risk
45 of injury. Impacts would be less than significant.

1 *Mitigation Measures*

2 Because subsidence/soil settlement impacts would be less than significant, no
3 mitigation measures are necessary.

4 *Residual Impacts*

5 With implementation of standard geotechnical engineering, no mitigation would be
6 required and the residual impacts would be less than significant under NEPA.

7 **Expansive Soils**

8 **Impact GEO-4a: Construction of the proposed Project would not**
9 **result in substantial damage to structures or infrastructure, or**
10 **expose people to substantial risk of injury from soil expansion.**

11 Expansive soil may be present in the vicinity of the Berths 97-109 area, the site of the
12 relocated Catalina Express Terminal, and in dredged or imported soils used for proposed
13 Project grading. Expansive soils beneath building foundations could result in cracking
14 and distress of foundations. Existing structures built on these sediments could be cracked
15 and warped by such settlement. However, during the proposed Project design phase, the
16 proposed Project engineer would evaluate the expansion potential associated with onsite
17 soils. The soil expansion potential would be evaluated through a site-specific
18 geotechnical investigation, which includes subsurface soil sampling, laboratory analysis
19 of samples collected to determine soil expansion potential, and an evaluation of the
20 laboratory testing results by a geotechnical engineer. Recommendations of the engineer
21 would be incorporated into the design specifications for the proposed Project, consistent
22 with City design guidelines, including Sections 91.000 through 91.7016 of the
23 Los Angeles Municipal Code, in conjunction with criteria established by LAHD.
24 Recommendations for soils subject to expansion typically include overexcavation and
25 replacement of expansive soils with sandy, nonexpansive soils, which would allow for
26 construction of a conventional slab-on-grade; construction of post-tensioning concrete
27 slabs that can accommodate movement of underlying expansive soils; or alternatively,
28 installation of concrete or steel foundation piles through the expansion prone soils, to a
29 depth of nonexpansive soils. Such geotechnical engineering would substantially reduce
30 the potential for soil expansion and accompanying damage to overlying structures.

31 **CEQA Impact Determination**

32 Expansive soil impacts in backland areas would be less than significant under CEQA
33 because the Project would be designed and constructed in compliance with the
34 recommendations of the geotechnical engineer, consistent with implementation of
35 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
36 compliance with criteria established by LAHD. Construction of the proposed Project
37 would not result in substantial damage to structures or infrastructure, or expose
38 people to substantial risk of injury. Impacts would be less than significant.

39 *Mitigation Measures*

40 Because expansive soil impacts would be less than significant, no mitigation
41 measures are necessary.

1 *Residual Impacts*

2 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
3 Municipal Code, no mitigation would be required, and residual impacts would be less
4 than significant under CEQA.

5 **NEPA Impact Determination**

6 The federal portions of the proposed Project would be limited to wharf, in-water
7 construction activities (including the creation of 2.5 acres of fill, new wharf
8 construction, and channel deepening), and limited backland areas (see Section 2.4.3,
9 Federal Project). Expansive soil may be present in dredged or imported soils used for
10 filling the 2.5 acres. Use of expansive soils beneath the foundations of the proposed
11 Project could result in cracking and distress of foundations. However, expansive soil
12 impacts in backland areas would be less than significant under NEPA with
13 implementation of standard geotechnical engineering and Sections 91.000 through
14 91.7016 of the Los Angeles Municipal Code, in conjunction with criteria established
15 by LAHD. Construction of the proposed Project would not result in substantial
16 damage to structures or infrastructure, or expose people to substantial risk of injury.

17 *Mitigation Measures*

18 Because expansive soil impacts would be less than significant, no mitigation
19 measures are necessary.

20 *Residual Impacts*

21 With implementation of standard geotechnical engineering and Sections 91.000
22 through 91.7016 of the Los Angeles Municipal Code, less than significant residual
23 impacts would occur under NEPA.

24 **Landslides and Mudslides**

25 **Impact GEO-5a: Construction of the proposed Project would not**
26 **result in or expose people or property to a substantial risk of**
27 **landslides or mudslides.**

28 The topography in the vicinity of the proposed Project site is flat and not subject to
29 landslides or mudflows.

30 **CEQA Impact Determination**

31 Because the topography in the vicinity of the proposed Project site is flat and not
32 subject to landslides or mudflows, no impacts would occur under CEQA.

33 *Mitigation Measures*

34 Because landslide and mudslide impacts would not occur, no mitigation measures are
35 necessary.

36 *Residual Impacts*

37 With no mitigation required, no residual impacts would occur under CEQA.

1 **NEPA Impact Determination**

2 Because the topography in the vicinity of the proposed Project site is flat and not
3 subject to landslides or mudflows, no impacts would occur under NEPA.

4 *Mitigation Measures*

5 Because landslide and mudslide impacts would not occur, no mitigation measures are
6 necessary.

7 *Residual Impacts*

8 With no mitigation required, no residual impacts would occur under NEPA.

9 **Unstable Soil Conditions**

10 **Impact GEO-6a: Shallow groundwater, which would cause unstable**
11 **collapsible soils, may be encountered during excavation, but would**
12 **not expose people or structures to substantial risk.**

13 Natural alluvial and estuarine deposits, as well as artificial fill consisting of dredged
14 deposits or imported soils, might be encountered during excavations for utility pipeline
15 relocation or for construction of retaining walls, manholes, and other structures.

16 Groundwater is present locally at depths as shallow as 12 feet, and underground utility
17 construction could require excavations to this depth. Materials near and below the
18 shallow groundwater table would be relatively fluid, requiring implementation of
19 standard engineering practices regarding saturated, collapsible soils, such as dredging,
20 dewatering wells, and other special handling procedures to facilitate excavation. For
21 example, dewatering wells would locally increase the depth to groundwater, thus
22 reducing the potential for collapsible soils. Various types of temporary shoring would
23 also be used to stabilize excavations with saturated, collapsible soils. Such engineering
24 practices would be implemented where necessary.

25 See Section 3.7 (Groundwater and Soils) regarding potential soil and/or groundwater
26 contamination in construction excavations.

27 **CEQA Impact Determination**

28 With the implementation of standard engineering practices regarding saturated,
29 collapsible soils, people and structures would not be exposed to substantial adverse
30 effects from the proposed Project, and impacts associated with shallow groundwater
31 would be less than significant under CEQA.

32 *Mitigation Measures*

33 Because impacts associated with collapsible soils would be less than significant, no
34 mitigation measures are required.

35 *Residual Impacts*

36 Due to implementation of standard engineering practices regarding saturated,
37 collapsible soils, no mitigation is required, and residual impacts would be less than
38 significant under CEQA.

1 **NEPA Impact Determination**

2 The federal portion of the proposed Project would be limited to wharf, in-water
3 construction activities (including the creation of 2.5 acres of fill, new wharf
4 construction, and channel deepening), and limited backland areas (see Section 2.4.3,
5 Federal Project). Due to implementation of standard engineering practices regarding
6 saturated, collapsible soils, people and structures would not be exposed to substantial
7 adverse effects from the proposed Project and impacts associated with shallow
8 groundwater would be less than significant under NEPA.

9 *Mitigation Measures*

10 Because impacts associated with collapsible soils would be less than significant, no
11 mitigation measures are required.

12 *Residual Impacts*

13 With implementation of standard engineering practices regarding saturated,
14 collapsible soils, there would be less than significant residual impacts under NEPA.

15 **Prominent Geologic and Topographic Features**

16 **Impact GEO-7a: Construction of the proposed Project would not**
17 **result in one or more distinct and prominent geologic or topographic**
18 **features being destroyed, permanently covered, or materially and**
19 **adversely modified.**

20 Since the proposed Project area is relatively flat, with no prominent geologic or
21 topographic features, proposed Project construction would not result in any distinct and
22 prominent geologic or topographic features being destroyed, permanently covered, or
23 materially and adversely modified.

24 **CEQA Impact Determination**

25 Because the topography in the vicinity of the proposed Project site is flat and does
26 not contain prominent geologic or topographic features, no impacts would occur
27 under CEQA.

28 *Mitigation Measures*

29 Because impacts due to removal of prominent geologic or topographic features would
30 not occur, no mitigation measures are necessary.

31 *Residual Impacts*

32 With no mitigation required, no residual impacts would occur under CEQA.

33 **NEPA Impact Determination**

34 Because the topography in the vicinity of the proposed Project site is flat and does
35 not contain prominent geologic or topographic features, no impacts would occur
36 under NEPA.

37 *Mitigation Measures*

38 Because impacts related to removal of prominent geologic or topographic features
39 would not occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, no residual impacts would occur under NEPA.

3 **Mineral Resources**

4 **Impact GEO-8a: Construction of the proposed Project would not**
5 **result in the permanent loss of availability of any mineral resource of**
6 **regional, statewide, or local significance.**

7 With respect to aggregate potential, the proposed Project site is located in MRZ-1, which
8 is defined as an area where adequate information indicates that no significant mineral
9 deposits are present or where it is judged that little likelihood exists for their presence.

10 **CEQA Impact Determination**

11 The Project site does not contain mineral resources. Therefore, the proposed Project
12 would not result in the permanent loss of availability of a known mineral resource
13 that would be of future value to the region and the residents of the state. No impacts
14 would occur under CEQA.

15 *Mitigation Measures*

16 Because no impacts to mineral resources would occur, no mitigation measures are
17 necessary.

18 *Residual Impacts*

19 With no mitigation required, no residual impacts would occur under CEQA.

20 **NEPA Impact Determination**

21 The Project site does not contain mineral resources. Therefore, the proposed Project
22 would not result in the permanent loss of availability of a known mineral resource
23 that would be of future value to the region and the residents of the state and less than
24 significant no impacts to mineral resource impacts would occur under NEPA.

25 *Mitigation Measures*

26 Because no impacts to mineral resources would occur, no mitigation measures are
27 necessary.

28 *Residual Impacts*

29 With no mitigation required, no residual impacts would occur under NEPA.

3.5.4.3.1.2 Operations Impacts

Seismicity

Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the operations period (through 2045).

There would be a minor increase in the exposure of people and property to seismic hazards relative to current and future baseline conditions. The Berth 97-109 Container Terminal lies in the vicinity of the Palos Verdes Fault zone, and traces of the fault pass beneath the Project area (Figure 3.5-1). Strong-to-intense ground shaking, surface rupture, and liquefaction could occur in these areas, due to the location of the fault beneath the proposed Project area and the presence of water-saturated hydraulic fill. With the exception of ground rupture, similar seismic impacts could occur due to earthquakes on other regional faults. Earthquake-related hazards, such as liquefaction, ground rupture, ground acceleration, and ground shaking cannot be avoided in the Los Angeles region and in particular in the harbor area where the Palos Verdes Fault is present and hydraulic and alluvial fill is pervasive.

The Los Angeles Building Code, Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, regulates construction in backland areas of the Port. These building codes and criteria provide requirements for construction, grading, excavations, use of fill, and foundation work, including type of materials, design, procedures, etc. These codes are intended to limit the probability of occurrence and the severity of consequences from geological hazards, such as earthquakes. Necessary permits, plan checks, and inspections are also specified. The Los Angeles Municipal Code also incorporates structural seismic requirements of the California Uniform Building Code, which classifies almost all of coastal California (including the proposed Project site) within Seismic Zone 4, on a scale of 1 to 4, with 4 being most severe. The proposed Project engineers would review the proposed Project plans for compliance with the appropriate standards in the building codes.

Design objectives for wharf and backland areas and the two bridges are for the proposed Project to remain operational following an OLE and to survive without collapse and provide public safety following a CLE. At the lower-level OLE, structures are expected to suffer minor, nonstructural damage and resume operations immediately after an earthquake. At the higher-level CLE, structural damage is permissible as long as public safety is not jeopardized.

However, as discovered during the 1971 San Fernando earthquake and the 1994 Northridge earthquake, existing building codes are often inadequate to completely protect engineered structures from hazards associated with liquefaction, ground rupture, and large ground accelerations. Consequently, designing new facilities based on existing building codes may not prevent significant damage to structures from a major or great earthquake on the underlying Palos Verdes Fault or any other regional fault.

CEQA Impact Determination

As discussed above, seismic activity along the Palos Verdes fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or

1 other seismically induced ground failure. Seismic hazards are common to the
2 Los Angeles region and are not increased by the proposed Project. However, because
3 the proposed Project area is potentially underlain by strands of the active Palos
4 Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of
5 seismic impacts. Increased exposure of people and property during operations to
6 seismic hazards from a major or great earthquake cannot be precluded, even with
7 incorporation of modern construction engineering and safety standards. Therefore,
8 impacts due to seismically induced ground failure are significant under CEQA.

9 *Mitigation Measures*

10 There are no mitigation measures associated with seismically induced ground failure
11 available that would reduce impacts below significance.

12 *Residual Impacts*

13 Design and construction in accordance with applicable laws and regulations
14 pertaining to seismically induced ground movement would minimize structural
15 damage in the event of an earthquake. However, increased exposure of people and
16 property during operations to seismic hazards from a major or great earthquake
17 cannot be precluded even with incorporation of modern construction engineering and
18 safety standards. Therefore, impacts due to seismically induced ground failure would
19 remain significant and unavoidable.

20 **NEPA Impact Determination**

21 The federal portion of the proposed Project would include the construction of new
22 wharves and limited backland areas (see Section 2.4.3, Federal Project) that would be
23 susceptible to seismically induced ground shaking, fault rupture, and liquefaction.

24 Seismic hazards are common to the Los Angeles region and are not increased by the
25 proposed Project. However, because the proposed Project area is potentially
26 underlain by strands of the active Palos Verdes Fault and liquefaction-prone
27 hydraulic fill, there is a substantial risk of seismic impacts. Increased exposure of
28 people and property during operations to seismic hazards from a major or great
29 earthquake cannot be precluded, even with incorporation of modern construction
30 engineering and safety standards. Therefore, impacts due to seismically induced
31 ground failure are significant under NEPA.

32 *Mitigation Measures*

33 There are no mitigation measures available that would reduce impacts below
34 significance associated with seismically induced ground failure.

35 *Residual Impacts*

36 Design and construction in accordance with applicable laws and regulations
37 pertaining to seismically induced ground movement would minimize structural
38 damage in the event of an earthquake. However, increased exposure of people and
39 property during operations to seismic hazards from a major or great earthquake
40 cannot be precluded even with incorporation of modern construction engineering and
41 safety standards. Therefore, impacts due to seismically induced ground failure would
42 remain significant and unavoidable.

Tsunamis and Seiches

Impact GEO-2b: Proposed Project operations within the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches within the proposed Project area and vicinity.

The discussion of **Impact GEO-2a**, above, sets forth the probability and anticipated magnitude of a tsunami at the proposed Project site. As discussed for **Impact GEO-2a**, designing new facilities based on existing building codes may not prevent substantial damage to structures from coastal flooding. Impacts due to seismically induced tsunamis and seiches are typical for the entire California coastline and would not be increased by operation of the proposed Project. However, because the proposed Project elevation is located approximately 12 feet above msl and would be built to have a 15-foot finished grade and wharf, there is a substantial risk of coastal flooding in the event of a tsunami and seiche.

For onsite personnel, the risk of tsunami or seiches is a part of any ocean-shore interface and hence personnel working at the proposed Project berths cannot avoid some risk of exposure. Similarly, berth infrastructure and cargo/containers would be subject to some risk of exposure. Although initial tsunami induced run-up would potentially cause substantial injury and damage to infrastructure and cargo, the drawdown of the water after run-up exerts the often crippling opposite drags on the persons and structures and washes loose/broken properties and debris to sea. The floating debris brought back on the next onshore flow has been found to be a significant cause of extensive damage after successive run-up and drawdown. Similarly, for vessels, the risk of tsunami or seiches is a part of any ocean-shore interface and hence vessels in transit or at berth cannot avoid some risk of exposure. A vessel destined for the proposed Project berths (or any berth in the Port) would be under its own power and have one or more tugs in attendance. Under this circumstance, the vessel would likely be able to maneuver to avoid damage as it would with any ocean wave. The exposure of a tsunami or seiche to a vessel in transit to or from the proposed Project berth, and the associated risk, is no different than for any other vessel entering the Port complex.

Port engineers have indicated that currents moving over 5 meters per second (m/s) could potentially render a ship out of control (Morgan, 2006). Modeling indicates that tsunami-related currents created as a result of a large earthquake on the Santa Catalina Fault or submarine landslide off the coast of the nearby Palos Verdes Peninsula would not create currents in the Port in excess of 5 m/s. Highest anticipated current speeds of 2 m/s would occur in the vicinity of Pier 400 and the entrance to the main channel. Currents in the vicinity of the Vincent Thomas Bridge (less than 500 feet south of the proposed Project area) would be approximately 0.9 m/s (Moffatt and Nichol, 2007).

A vessel docked at one of the proposed Project berths would be subject to the rising and falling of the water levels and the accompanying currents during a tsunami or seiche. Two scenarios could arise. Either the vessel would stay secured to the berth and ride out the tsunami, or the motion during a tsunami would cause the mooring lines of the vessel to break free and the vessel would be set adrift. In the first scenario, the energy of the tsunami wave would be transmitted through the vessel that is moored at berth and into the wharf. Forces transmitted through the vessel would be transferred to the fendering system of the wharf and then to the wharf structure.

1 The existing wharf fendering systems are designed with the assumption that, under a
2 normal docking scenario, a berthing vessel will contact only one fender. For such
3 scenarios, each fender is designed to absorb the berthing energy of the entire vessel.
4 During a tsunami occurrence, the wave is assumed to move the vessel against more than
5 one of the existing fenders, so that the vessel would be contacting a minimum of four to
6 five fenders, often simultaneously. In such cases, the forces experienced by each fender
7 during a tsunami are often less than the standard docking forces that the fendering system
8 is designed because more than one fender would absorb these forces at the same time.
9 Therefore, substantial damage is not expected to the vessel or the wharf in the event that
10 a tsunami was to strike while a vessel was secured at a berth.

11 Under the second scenario, a vessel set adrift in the Port area could have more serious
12 consequences from the potential of collision, including a potential hull breach and
13 possible fuel spill. This scenario is examined in Section 3.8, Hazards and Hazardous
14 Materials.

15 **CEQA Impact Determination**

16 Designing new facilities based on existing building codes may not prevent substantial
17 damage to structures from coastal flooding. Impacts due to seismically induced
18 tsunamis and seiches are typical for the entire California coastline and would not be
19 increased by construction and operation of the proposed Project. However, because
20 the proposed Project elevation is located 12 feet above msl, there is a substantial risk
21 of coastal flooding due to tsunamis and seiches. As described above, impacts from
22 the theoretical maximum worst-case wave action would be significant for the site
23 under CEQA.

24 *Mitigation Measures*

25 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
26 tsunami and seiche-related impacts.

27 *Residual Impacts*

28 Emergency planning and coordination between the terminal operator and LAHD, as
29 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
30 during a tsunami. However, even with incorporation of emergency planning and
31 construction in accordance with current City and state regulations, substantial
32 damage and/or injury could occur in the event of a tsunami or seiche. Therefore,
33 residual impacts would remain significant and unavoidable.

34 **NEPA Impact Determination**

35 There is a substantial risk of coastal flooding of wharves and associated backland
36 areas due to tsunamis and seiches. The federal portions of the proposed Project
37 would result in new wharf construction and a 2.5-acre increase in fill at Berth 100, as
38 well as limited backland areas (see Section 2.4.3, Federal Project). Because
39 operations would occur over an extended period (through at least 2045), increased
40 exposure of people and property during operations to seismically induced tsunamis or
41 seiches from a major or great earthquake cannot be precluded. As described above,
42 impacts from the theoretical maximum worst-case wave action would be significant
43 for the site under NEPA.

1 *Mitigation Measures*

2 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
3 tsunami- and seiche-related impacts.

4 *Residual Impacts*

5 Emergency planning and coordination between the terminal operator and the LAHD,
6 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
7 during a tsunami. However, even with incorporation of emergency planning and
8 construction in accordance with current City and state regulations, substantial
9 damage and injury could occur in the event of a tsunami or seiche. Therefore,
10 residual impacts would remain significant and unavoidable.

11 **Subsidence/Soil Settlement**

12 **Impact GEO-3b: Operation of the proposed Project would not result**
13 **in substantial damage to structures or infrastructure, or expose**
14 **people to substantial risk of injury from subsidence/soil settlement.**

15 As discussed for **Impact GEO-3a**, subsidence in the proposed Project vicinity, due to
16 previous oil extraction in the Port area, has been mitigated and is not anticipated to
17 adversely affect the proposed Project. However, in the absence of proper engineering,
18 proposed structures could be cracked and warped during proposed Project operations as a
19 result of saturated, unconsolidated/compressible sediments. However, during the
20 proposed Project design phase, the proposed Project engineer would evaluate the
21 settlement potential in all areas where structures are proposed. The soil settlement
22 potential would be evaluated during the construction phase, as discussed for **Impact**
23 **GEO-3a**, to reduce the potential for soil settlement.

24 **CEQA Impact Determination**

25 The Project would be designed and constructed in compliance with the
26 recommendations of the geotechnical engineer, consistent with implementation of
27 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
28 conjunction with criteria established by LAHD and Caltrans. Thus, subsidence/soil
29 settlement in backland areas would not result in substantial damage to structures or
30 infrastructure, or expose people to substantial risk of injury. Impacts would be less
31 than significant under CEQA.

32 *Mitigation Measures*

33 Because subsidence/soil settlement impacts would be less than significant, no
34 mitigation measures are necessary.

35 *Residual Impacts*

36 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
37 Municipal Code, resulting in no required mitigation, the residual impacts would be
38 less than significant under CEQA.

39 **NEPA Impact Determination**

40 New wharf construction, the proposed 2.5-acre fill at Berth 100, and limited backland
41 areas (see Section 2.4.3, Federal Project) would take place under the proposed Project.

1 With implementation of standard geotechnical engineering and Sections 91.000
2 through 91.7016 of the Los Angeles Municipal Code, in conjunction with criteria
3 established by LAHD and Caltrans, these activities would not result in substantial
4 damage to structures or infrastructure nor expose people to substantial risk of injury.
5 Subsidence/soil settlement impacts would be less than significant under NEPA.

6 *Mitigation Measures*

7 Because subsidence/soil settlement impacts would be less than significant, no
8 mitigation measures are necessary.

9 *Residual Impacts*

10 With implementation of standard geotechnical engineering, resulting in no required
11 mitigation, the residual impacts would be less than significant under NEPA.

12 **Expansive Soils**

13 **Impact GEO-4b: Operation of the proposed Project would not result** 14 **in substantial damage to structures or infrastructure, or expose** 15 **people to substantial risk of injury from soil expansion.**

16 As described in **Impact GEO-4a**, expansive soil may be present in the vicinity of the
17 Berth 97-109 area and may be present in dredged or imported soils used for proposed
18 Project grading. Use of expansive soils beneath proposed Project foundations could
19 result in cracking and distress of foundations during proposed Project operations.
20 However, during the design phase, the proposed Project engineer would evaluate the
21 expansion potential associated with onsite soils, as described in **Impact GEO-4a**, to
22 reduce the potential for soil expansion and damage to overlying structures.

23 **CEQA Impact Determination**

24 The Project would be designed and constructed in compliance with the
25 recommendations of the geotechnical engineer, consistent with Sections 91.000
26 through 91.7016 of the Los Angeles Municipal Code and in conjunction with criteria
27 established by LAHD. Thus, expansive soil would not result in substantial damage to
28 structures or infrastructure, or expose people to substantial risk of injury and impacts
29 in backland areas would be less than significant under CEQA.

30 *Mitigation Measures*

31 Because expansive soil impacts would be less than significant, no mitigation
32 measures are necessary.

33 *Residual Impacts*

34 With no mitigation required, the residual impacts would be less than significant under
35 CEQA.

36 **NEPA Impact Determination**

37 The federal portions of the proposed Project would be limited to wharf and in-water
38 construction activities, as well as limited backland areas (see Section 2.4.3, Federal
39 Project). Expansive soil may be present in dredged or imported soils used for filling
40 2.5 acres at Berth 100. Use of expansive soils beneath the proposed Project's
41 foundations could result in cracking and distress of foundations. However, with

1 implementation of standard geotechnical engineering and Sections 91.000 through
2 91.7016 of the Los Angeles Municipal Code, in conjunction with criteria established
3 by LAHD, expansive soils would not result in substantial damage to structures or
4 infrastructure, or expose people to substantial risk of injury. Expansive soil impacts
5 in backland areas would be less than significant under NEPA.

6 *Mitigation Measures*

7 Because expansive soil impacts would be less than significant, no mitigation
8 measures are necessary.

9 *Residual Impacts*

10 With no mitigation required, the residual impacts would be less than significant under
11 NEPA.

12 **Landslides and Mudslides**

13 **Impact GEO-5b: Operation of the proposed Project would not result** 14 **in or expose people or property to a substantial risk of landslides or** 15 **mudslides.**

16 The topography in the vicinity of the proposed Project site is flat and not subject to
17 landslides or mudflows.

18 **CEQA Impact Determination**

19 Because the topography in the vicinity of the proposed Project site is flat and not
20 subject to landslides or mudflows, no impacts would occur under CEQA.

21 *Mitigation Measures*

22 Because landslide and mudslide impacts would not occur, no mitigation measures are
23 necessary under CEQA.

24 *Residual Impacts*

25 With no mitigation required, there would be no residual impacts under CEQA.

26 **NEPA Impact Determination**

27 Because the topography in the vicinity of the proposed Project site is flat and not
28 subject to landslides or mudflows, no impacts would occur under NEPA.

29 *Mitigation Measures*

30 Because landslide and mudslide impacts would not occur, no mitigation measures are
31 necessary.

32 *Residual Impacts*

33 With no mitigation required, there would be no residual impacts under NEPA.

Unstable Soil Conditions

Impact GEO-6b: Collapsible soils would have no impact on proposed Project operations and would not expose people or structures to substantial risk.

No excavations would be completed as a part of proposed Project operations; therefore, onsite soils would not be subject to collapse or caving.

CEQA Impact Determination

Excavations would not take place as a part of proposed Project operations; therefore, impacts associated with collapsible soils would not occur under CEQA.

Mitigation Measures

Because impacts associated with collapsible soils would not occur, no mitigation measures are required.

Residual Impacts

With no mitigation required, there would be no residual impacts associated with collapsible soils under CEQA.

NEPA Impact Determination

Excavations would not take place as a part of proposed Project operations; therefore, impacts associated with collapsible soils would not occur under NEPA.

Mitigation Measures

Because impacts associated with collapsible soils would not occur, no mitigation measures are required under NEPA.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Prominent Geologic and Topographic Features

Impact GEO-7b: Operation of the proposed Project would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

Since the proposed Project area is relatively flat, with no prominent geologic or topographic features, proposed Project operations would not result in any distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

CEQA Impact Determination

Because the topography in the vicinity of the proposed Project site is flat and does not contain prominent geologic or topographic features, no impacts would occur under CEQA.

1 *Mitigation Measures*

2 Because impacts due to removal of prominent geologic or topographic features would
3 not occur, no mitigation measures are necessary.

4 *Residual Impacts*

5 With no mitigation required, there would be no residual impacts under CEQA.

6 **NEPA Impact Determination**

7 Because the topography in the vicinity of the proposed Project site is flat and does
8 not contain prominent geologic or topographic features, no impacts would occur
9 under NEPA.

10 *Mitigation Measures*

11 Because impacts related to removal of prominent geologic or topographic features
12 would not occur, no mitigation measures are necessary.

13 *Residual Impacts*

14 With no mitigation required, there would be no residual impacts under NEPA.

15 **Mineral Resources**

16 **Impact GEO-8b: Operation of the proposed Project would not result**
17 **in the permanent loss of availability of any mineral resource of**
18 **regional, statewide, or local significance.**

19 The proposed Project site is located in MRZ-1, which is defined as an area where
20 adequate information indicates that no significant mineral deposits are present or where it
21 is judged that little likelihood exists for their presence. With respect to petroleum
22 resources, the proposed Project site is located adjacent to, but outside, the Wilmington
23 Oil Field.

24 **CEQA Impact Determination**

25 The Project site does not contain mineral resources. Therefore, operation of the
26 proposed Project would not result in the permanent loss of availability of a known
27 mineral resource that would be of future value to the region and the residents of the
28 state. No impacts would occur under CEQA.

29 *Mitigation Measures*

30 Because no impacts to mineral resources would occur, no mitigation measures are
31 necessary.

32 *Residual Impacts*

33 With no mitigation required, no residual impacts would occur under CEQA.

34 **NEPA Impact Determination**

35 The Project site does not contain mineral resources. Therefore, the proposed Project
36 would not result in the permanent loss of availability of a known mineral resource
37 that would be of future value to the region and the residents of the state and less than
38 significant no impacts to mineral resource impacts would occur under NEPA.

1 *Mitigation Measures*

2 Because no impacts to mineral resources would occur, no mitigation measures are
3 necessary.

4 *Residual Impacts*

5 With no mitigation required, no residual impacts would occur under NEPA.

6 *Residual Impacts*

7 With no mitigation required, the residual impacts would be less than significant under
8 NEPA.

9 **3.5.4.3.2 Alternatives**

10 **3.5.4.3.2.1 Alternative 1 – No Project Alternative**

11 Alternative 1 would utilize the terminal site, as constructed under Phase I of the proposed
12 Project, for container storage. Thus, impacts associated with construction of the 72 acres
13 of backlands and in-water elements would be assessed under Alternative 1 although the
14 in-water elements would be abandoned in place. No additional Port action or federal
15 action would occur, and the Port would not take further actions to construct or develop
16 additional backlands. Furthermore, the four existing A-frame cranes would be removed,
17 and the existing wharf at Berth 100 would cease to be used for ship berthing or container
18 loading and unloading operations. The 1.3 acres of fill added to waters of the U.S. during
19 Phase I, as allowed under the ASJ and under USACE permit, would be abandoned in
20 place under Alternative 1. The 72 acres of backland area would be used for storage of
21 containers by Berths 121-131. The Catalina Express Terminal would not be relocated
22 under Alternative 1.

23 **3.5.4.3.2.1.1 Construction Impacts**

24 **Seismicity**

25 **Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone,
26 or other regional faults, would not expose people and structures to
27 substantial risk.**

28 **CEQA Impact Determination**

29 As discussed with respect to the proposed Project, seismic activity along the
30 Palos Verdes Fault zone, or other regional faults, has the potential to produce fault
31 rupture, seismic ground shaking, liquefaction, or other seismically induced ground
32 failure at the terminal site. Phase I activities included construction of Berth 100, the
33 placement of 1.3 acres of fill, installation of dockside cranes, placement of a bridge
34 over the Southwest Slip, and development of 72-acres of backlands. These
35 improvements were completed in 2003. No seismic event occurred during the
36 construction period; therefore, seismic-related impacts under CEQA due to
37 seismically induced ground failure did not occur.

38 *Mitigation Measures*

39 No impacts due to seismically induced ground failure would occur under CEQA; thus,
40 mitigation measures are not required.

1 *Residual Impacts*

2 Residual impacts would not occur.

3 **NEPA Impact Determination**

4 The impacts of this No Project Alternative are not required to be analyzed under
5 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
6 Alternative 2 in this document).

7 *Mitigation Measures*

8 Because there would be no federal action, no mitigation measures would be required.

9 *Residual Impacts*

10 No residual impacts would occur.

11 **Tsunamis and Seiches**

12 **Impact GEO-2a: Tsunamis and seiches would not expose people**
13 **and structures to substantial risk.**

14 **CEQA Impact Determination**

15 As discussed with respect to the proposed Project, the Port would potentially be
16 subject to inundation by a large tsunami as a result of an offshore earthquake or
17 landslide. The improvements made under this alternative were completed in
18 2003; however, no tsunami occurred during the construction period. Therefore,
19 Alternative 1 would not result in tsunami-related impacts to construction.

20 *Mitigation Measures*

21 No mitigation is required.

22 *Residual Impacts*

23 No residual impacts would occur.

24 **NEPA Impact Determination**

25 The impacts of this No Project Alternative are not required to be analyzed under
26 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
27 Alternative 2 in this document).

28 *Mitigation Measures*

29 Because there would be no federal action, no mitigation measures would be required.

30 *Residual Impacts*

31 No residual impacts would occur.

Subsidence/Soil Settlement

Impact GEO-3a: Subsidence/soil settlement would not expose people and structures to substantial risk.

CEQA Impact Determination

Development of the backlands and other infrastructure during Phase I under this alternative was completed in 2003. All facilities were designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans. During construction activities, subsidence or soil settlement that could have exposed people and structures to risk did not occur. Therefore, Alternative 1 would not result in impacts related to subsidence and soil settlement.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Residual impacts would not occur.

NEPA Impact Determination

The impacts of this No Project Alternative are not required to be analyzed under NEPA. NEPA requires the analysis of a No Federal Action alternative (see Alternative 2 in this document).

Mitigation Measures

Because there would be no federal action, no mitigation measures would be required.

Residual Impacts

No residual impacts would occur.

Expansive Soils

Impact GEO-4a: Expansive soil would not expose people and structures to substantial risk.

CEQA Impact Determination

Development of the backlands and other infrastructure during Phase I under this alternative was completed in 2003. All facilities were designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans. During construction activities, expansive soil conditions that could have exposed people and structures to risk did not occur. Therefore, Alternative 1 would not result in impacts related to expansive soils.

1 *Mitigation Measures*
2 No mitigation measures are required.

3 *Residual Impacts*
4 Residual impacts would not occur.

5 **NEPA Impact Determination**

6 The impacts of this No Project Alternative are not required to be analyzed under
7 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
8 Alternative 2 in this document).

9 *Mitigation Measures*
10 Because there would be no federal action, no mitigation measures would be required.

11 *Residual Impacts*
12 There would be no residual impacts.

13 **Landslides and Mudslides**

14 **Impact GEO-5a: Landslides and mudslides would not expose people**
15 **and structures to substantial risk.**

16 **CEQA Impact Determination**

17 Because topography in the vicinity of the Alternative 1 site is flat and not subject to
18 landslides or mudflows, no impacts would occur under CEQA.

19 *Mitigation Measures*
20 No mitigation measures are required.

21 *Residual Impacts*
22 Residual impacts would not occur.

23 **NEPA Impact Determination**

24 The impacts of this No Project Alternative are not required to be analyzed under
25 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
26 Alternative 2 in this document).

27 *Mitigation Measures*
28 Because there would be no federal action, no mitigation measures would be required.

29 *Residual Impacts*
30 No residual impacts would occur.

Unstable Soil Conditions

Impact GEO-6a: Shallow groundwater, which would cause unstable collapsible soils, may be encountered during excavation, but would not expose people or structures to substantial risk.

CEQA Impact Determination

There are no known unstable soil conditions on the Project site, and backlands were designed in accordance with all applicable geotechnical studies and pertinent design standards and specifications for the site. Thus, no impacts due to unstable soil conditions would occur under CEQA.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Residual impacts would not occur.

NEPA Impact Determination

The impacts of this No Project Alternative are not required to be analyzed under NEPA. NEPA requires the analysis of a No Federal Action alternative (see Alternative 2 in this document).

Mitigation Measures

Because there would be no federal action, no mitigation measures would be required.

Residual Impacts

There would be no residual impacts.

Prominent Geologic and Topographic Features

Impact GEO-7a: The No Project Alternative would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

CEQA Impact Determination

Because topography in the vicinity of the Alternative 1 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under CEQA.

Mitigation Measures

In the absence of impacts to prominent geologic or topographic features, mitigation measures are not required.

Residual Impacts

Residual impacts would not occur.

1 **NEPA Impact Determination**

2 The impacts of this No Project Alternative are not required to be analyzed under
3 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
4 Alternative 2 in this document).

5 *Mitigation Measures*

6 Because there would be no federal action, no mitigation measures would be required.

7 *Residual Impacts*

8 There would be no residual impacts.

9 **Mineral Resources**

10 **Impact GEO-8a: The No Project Alternative would not result in the**
11 **permanent loss of availability of any mineral resource of regional,**
12 **statewide, or local significance.**

13 **CEQA Impact Determination**

14 The terminal site does not contain significant mineral resources. Therefore,
15 Alternative 1 would not result in the permanent loss of availability of a known
16 mineral resource that would be of future value to the region and the residents of the
17 state, and no impacts would occur under CEQA.

18 *Mitigation Measures*

19 In the absence of impacts to the availability of any mineral resource of regional,
20 statewide, or local significance, mitigation measures are not required.

21 *Residual Impacts*

22 Residual impacts would not occur.

23 **NEPA Impact Determination**

24 The impacts of this No Project Alternative are not required to be analyzed under
25 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
26 Alternative 2 in this document).

27 *Mitigation Measures*

28 Because there would be no federal action, no mitigation measures would be required.

29 *Residual Impacts*

30 There would be no residual impacts.

3.5.4.3.2.1.2 Operation Impacts

Seismicity

Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk.

Earthquake-related hazards at the Project site under the No Project Alternative would be similar to those described above for the proposed Project. Under Alternative 1, no further development of backlands would occur in the Project area, the four existing A-frame cranes would be removed, and the existing wharves at Berth 100 would cease to be used for ship berthing and container loading/unloading operations. The bridge spanning the Southwest Slip, also constructed during Phase I, would be abandoned in place. This alternative would continue to expose people to substantial risks associated with the geologic environment. These impacts would be less than those described for the proposed Project because the level of development and amount of infrastructure susceptible to seismically induced ground failure would be reduced.

CEQA Impact Determination

As discussed with respect to the proposed Project, seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure. Seismic hazards are common to the Los Angeles region and are not increased by the No Project Alternative. However, because the site is potentially underlain by strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts. Continued exposure of people and property during operations to seismic hazards from a major or great earthquake cannot be precluded, even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure are significant under CEQA.

Mitigation Measures

No mitigation measures associated with seismically induced ground failure are available that would reduce impacts below a level of significance.

Residual Impacts

Impacts due to seismically induced ground failure under Alternative 1 would be significant and unavoidable, which is the same as for the proposed Project.

NEPA Impact Determination

The impacts of this No Project Alternative are not required to be analyzed under NEPA. NEPA requires the analysis of a No Federal Action alternative (see Alternative 2 in this document).

Mitigation Measures

Because there would be no federal action, no mitigation measures would be required.

1 *Residual Impacts*

2 There would be no residual impacts.

3 **Tsunamis and Seiches**

4 **Impact GEO-2b: Operations under the No Project Alternative in the**
5 **Port area would expose people and structures to substantial risk**
6 **involving tsunamis or seiches. Local or distant seismic activity**
7 **and/or offshore landslides could result in the occurrence of tsunamis**
8 **or seiches in the West Basin area.**

9 Risks of seismically induced tsunamis and seiches are typical for the entire California
10 coastline and would not be increased by the No Project Alternative. Because this
11 alternative would result in the storage of containers from the Yang Ming Terminal on
12 72 acres of backlands, this alternative would continue to expose people to substantial
13 risks associated with tsunamis and seiches. However, impacts would be less than those
14 described for the proposed Project because less development and infrastructure would be
15 susceptible to seismically induced ground failure.

16 As discussed for **Impact GEO-2a** for the proposed Project, existing infrastructure may
17 be subject to substantial damage from coastal flooding as a result of a large tsunami or
18 seiche. Because Berths 97-109 are approximately 12 feet above msl, there is a substantial
19 risk of coastal flooding due to tsunamis and seiches.

20 **CEQA Impact Determination**

21 The No Project alternative would continue to expose people and property to flooding
22 from tsunamis and seiches. Therefore, impacts due to tsunamis and seiches are
23 significant under CEQA.

24 *Mitigation Measures*

25 **GEO-1: Emergency Response Planning. The terminal operator shall work**
26 **with Port engineers and Port police to develop tsunami response**
27 **training and procedures to assure that construction and operations**
28 **personnel will be prepared to act in the event of a large seismic**
29 **event. Such procedures shall include immediate evacuation**
30 **requirements in the event that a large seismic event is felt at the**
31 **Project site, as part of overall emergency response planning for**
32 **Alternative 1.**

33 **Such procedures shall be included in any bid specifications for**
34 **construction or operations personnel, with a copy of such bid**
35 **specifications to be provided to LAHD, including a completed copy**
36 **of its operations emergency response plan prior to commencement of**
37 **construction activities and/or operations.**

38 *Residual Impacts*

39 Emergency planning and coordination between the terminal operator and LAHD, as
40 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
41 during a tsunami. However, even with incorporation of emergency planning and
42 construction procedures in accordance with current City and state regulations,

1 substantial damage and/or injury could occur in the event of a tsunami or seiche.
2 Therefore, residual impacts would remain significant and unavoidable.

3 **NEPA Impact Determination**

4 The impacts of this No Project Alternative are not required to be analyzed under
5 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
6 Alternative 2 in this document).

7 *Mitigation Measures*

8 Because there would be no federal action, no mitigation measures would be required.

9 *Residual Impacts*

10 There would be no residual impacts.

11 **Subsidence/Soil Settlement**

12 **Impact GEO-3b: Operations under the No Project Alternative would**
13 **not result in substantial damage to structures or infrastructure, or**
14 **expose people to substantial risk of injury from subsidence/soil**
15 **settlement.**

16 As discussed for **Impact GEO-3a**, subsidence in the vicinity of West Basin, due to
17 previous oil extraction in the Port area, has been mitigated and is not anticipated to
18 adversely affect the site. Because construction would not occur in association with the
19 No Project Alternative, impacts related to cracking and warping of structures during
20 operations as a result of saturated, unconsolidated/compressible sediments would not
21 occur.

22 **CEQA Impact Determination**

23 Because subsidence in the vicinity of West Basin, due to previous oil extraction in
24 the Port area, has been mitigated and is not anticipated to adversely affect the site,
25 impacts would be less than significant from past actions.

26 *Mitigation Measures*

27 Because subsidence/soil settlement impacts would be less than significant, no
28 mitigation measures are necessary.

29 *Residual Impacts*

30 With no mitigation required, there would be no residual impacts.

31 **NEPA Impact Determination**

32 The impacts of this No Project Alternative are not required to be analyzed under
33 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
34 Alternative 2 in this document).

35 *Mitigation Measures*

36 Because there would be no federal action, no mitigation measures would be required.

1 *Residual Impacts*

2 There would be no residual impacts.

3 **Expansive Soils**

4 **Impact GEO-4b: Operations under the No Project Alternative would**
5 **not result in substantial damage to structures or infrastructure, or**
6 **expose people to substantial risk of injury from soil expansion.**

7 All facilities were designed and constructed in compliance with the recommendations of
8 a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the
9 Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and
10 Caltrans.

11 **CEQA Impact Determination**

12 All facilities were designed and constructed according to appropriate standards and
13 specifications. During the operation phase of the No Project Alternative, impacts
14 related to cracking and warping of structures as a result of expansive soils would not
15 occur.

16 *Mitigation Measures*

17 Because no expansive soil impacts would occur, no mitigation measures are
18 necessary.

19 *Residual Impacts*

20 With no mitigation required, there would be no residual impacts under CEQA.

21 **NEPA Impact Determination**

22 The impacts of this No Project Alternative are not required to be analyzed under
23 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
24 Alternative 2 in this document).

25 *Mitigation Measures*

26 Because there would be no federal action, no mitigation measures would be required.

27 *Residual Impacts*

28 There would be no residual impacts.

29 **Landslides and Mudslides**

30 **Impact GEO-5b: Operations under the No Project Alternative would**
31 **not result in or expose people or property to a substantial risk of**
32 **landslides or mudslides.**

33 The topography in the vicinity of the site is flat and not subject to landslides or mudflows.

34 **CEQA Impact Determination**

35 Because the topography in the vicinity of the site is flat and not subject to landslides
36 or mudflows, no impacts would occur under CEQA.

1 *Mitigation Measures*

2 Because landslide and mudslide impacts would not occur, no mitigation measures are
3 necessary.

4 *Residual Impacts*

5 With no mitigation required, there would be no residual impacts under CEQA.

6 **NEPA Impact Determination**

7 The impacts of this No Project Alternative are not required to be analyzed under
8 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
9 Alternative 2 in this document).

10 *Mitigation Measures*

11 Because there would be no federal action, no mitigation measures would be required.

12 *Residual Impacts*

13 There would be no residual impacts.

14 **Unstable Soil Conditions**

15 **Impact GEO-6b: Collapsible soils would have no impact on**
16 **operations under the No Project Alternative and would not expose**
17 **people or structures to substantial risk.**

18 There are no known unstable soil conditions on the project site, and all backlands were
19 designed and developed in accordance with the applicable geotechnical studies for the
20 site.

21 **CEQA Impact Determination**

22 Unstable soil conditions do not exist at the project site, and no impacts associated
23 with collapsible soils would occur under CEQA.

24 *Mitigation Measures*

25 Because impacts associated with collapsible soils would not occur, no mitigation
26 measures are required.

27 *Residual Impacts*

28 With no mitigation required, there would be no residual impacts associated with
29 collapsible soils under CEQA.

30 **NEPA Impact Determination**

31 The impacts of this No Project Alternative are not required to be analyzed under
32 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
33 Alternative 2 in this document).

34 *Mitigation Measures*

35 Because there would be no federal action, no mitigation measures would be required.

1 *Residual Impacts*

2 There would be no residual impacts.

3 **Prominent Geologic and Topographic Features**

4 **Impact GEO-7b: Operations under the No Project Alternative would**
5 **not result in one or more distinct and prominent geologic or**
6 **topographic features being destroyed, permanently covered, or**
7 **materially and adversely modified.**

8 Because the Project area is relatively flat with no prominent geologic or topographic
9 features, operations under the No Project Alternative would not result in any distinct and
10 prominent geologic or topographic features being destroyed, permanently covered, or
11 materially and adversely modified.

12 **CEQA Impact Determination**

13 Because the topography in the vicinity of the site is flat and does not contain
14 prominent geologic or topographic features, no impacts would occur under CEQA.

15 *Mitigation Measures*

16 Because impacts due to removal of prominent geologic or topographic features would
17 not occur, no mitigation measures are necessary.

18 *Residual Impacts*

19 With no mitigation required, there would be no residual impacts under CEQA.

20 **NEPA Impact Determination**

21 The impacts of this No Project Alternative are not required to be analyzed under
22 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
23 Alternative 2 in this document).

24 *Mitigation Measures*

25 Because there would be no federal action, no mitigation measures would be required.

26 *Residual Impacts*

27 There would be no residual impacts.

28 **Mineral Resources**

29 **Impact GEO-8b: Operations of the No Project Alternative would not**
30 **result in the permanent loss of availability of any mineral resource of**
31 **regional, statewide, or local significance.**

32 With respect to aggregate potential, the Alternative 1 site is located in MRZ-1, which is
33 defined as an area where adequate information indicates that no significant mineral
34 deposits are present or where it is judged that little likelihood exists for their presence.
35 With respect to petroleum resources, the Alternative 1 site is located adjacent to, but
36 outside of, the Wilmington Oil Field.

1 **CEQA Impact Determination**

2 The Project site does not contain mineral resources. Therefore, operations under the
3 No Project Alternative would not result in the permanent loss of availability of a
4 known mineral resource that would be of future value to the region and the residents
5 of the state. No impacts would occur under CEQA.

6 *Mitigation Measures*

7 Because no impacts to mineral resources would occur, no mitigation measures are
8 necessary.

9 *Residual Impacts*

10 With no mitigation required, no residual impacts would occur under CEQA.

11 **NEPA Impact Determination**

12 The impacts of this No Project Alternative are not required to be analyzed under
13 NEPA. NEPA requires the analysis of a No Federal Action alternative (see
14 Alternative 2 in this document).

15 *Mitigation Measures*

16 Because there would be no federal action, no mitigation measures would be required.

17 *Residual Impacts*

18 There would be no residual impacts.

19 **3.5.4.3.2.2 Alternative 2 – No Federal Action Alternative**

20 Alternative 2 would utilize the terminal site constructed as part of Phase I for container
21 storage and would increase the backland area (during Phase II) to 117 acres. Because of
22 this, Phase I construction activities are included under Alternative 2 although the in-water
23 elements would not be used. The Phase I dike, fill, and wharf would be abandoned in
24 place. Under Alternative 2, the Port would further develop the area of backlands to
25 117 acres. This action by the Port would not be a federal action or require federal
26 approval. The four existing A-frame cranes would be removed, and the existing wharf at
27 Berth 100 would cease to berth ships or accommodate container loading/unloading
28 operations. The bridge constructed during Phase I would be abandoned and the 1.3 acres
29 of fill added to waters of the U.S. during construction of Phase I of the proposed Project,
30 as allowed under the ASJ and under USACE permit, would be abandoned in place.
31 Alternative 2 would not require relocation of the Catalina Express Terminal.

3.5.4.3.2.2.1 Construction Impacts

Seismicity

Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the construction period (through 2012).

As with the proposed Project, seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure under Alternative 2. Seismic hazards are common to the Los Angeles region and are not increased by this alternative. However, because the site is potentially underlain by strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts.

CEQA Impact Determination

With the exception of 45 acres of backlands that would be developed in Phase II of construction, all facilities were constructed during Phase I. Those facilities involving in-water construction (wharves of Berth 100, fill, and the bridge over the Southwest Slip) would be abandoned in place under Alternative 2. The A-frame cranes installed under Phase I would be removed. Seismic impacts associated with Phase I activities of the No Federal Action alternative (Alternative 2) did not occur. However, because development of new backlands would occur, increased exposure of people and property to seismic hazards from a major or great earthquake cannot be precluded, even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure are significant under CEQA.

Mitigation Measures

No mitigation measures are available that would reduce impacts associated with seismically induced ground failure below a level of significance.

Residual Impacts

Design and construction in accordance with applicable laws and regulations pertaining to seismically induced ground movement would minimize structural damage in the event of an earthquake. However, increased exposure of people and property during construction to seismic hazards from a major or great earthquake cannot be precluded even with the incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure would remain significant and unavoidable.

NEPA Impact Determination

Under this alternative, no further development would occur in the in-water terminal area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction). In addition, backland development under Alternative 2 would be the same as under the NEPA baseline. Therefore, potential impacts under NEPA would not occur because there would be no net change in environmental conditions between Alternative 2 and the NEPA baseline.

1 *Mitigation Measures*

2 No mitigation measures are necessary under NEPA.

3 *Residual Impacts*

4 No residual impacts would occur under NEPA.

5 **Tsunami Runup**

6 **Impact GEO-2a: Alternative 2 construction in the Port area would**
7 **expose people and structures to substantial risk involving tsunamis**
8 **or seiches. Local or distant seismic activity and/or offshore**
9 **landslides could result in the occurrence of tsunamis or seiches in**
10 **West Basin and vicinity.**

11 **CEQA Impact Determination**

12 As discussed with respect to the proposed Project, the Port would potentially be
13 subject to inundation by a large tsunami as a result of an offshore earthquake or
14 landslide. Most of the improvements made under Alternative 2 were completed in
15 2003. During this construction period no tsunami or related seismic activity occurred
16 that exposed people or structures to risk. However, an additional 45 acres of
17 backlands would be developed during Phase II, and people and structures could be
18 exposed to risk from tsunamis and related seismic activity. Therefore, impacts
19 during the construction phase of Alternative 2 would be significant under CEQA.

20 *Mitigation Measures*

21 **MM GEO-1** shall be applied to the CEQA components of the project to reduce
22 tsunami- and seiche-related effects.

23 *Residual Affects*

24 Emergency planning and coordination between the terminal operator and LAHD, as
25 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
26 during a tsunami. However, even with incorporation of emergency planning and
27 construction procedures in accordance with current City and state regulations,
28 substantial damage and/or injury could occur in the event of a tsunami or seiche.
29 Therefore, residual impacts would remain significant and unavoidable.

30 **NEPA Impact Determination**

31 Under this alternative, no further development would occur in the in-water terminal
32 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
33 In addition, backland development under Alternative 2 would be the same as under
34 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
35 because there would be no net change in environmental conditions between
36 Alternative 2 and the NEPA baseline.

37 *Mitigation Measures*

38 No mitigation measures are necessary under NEPA.

1 *Residual Impacts*

2 No residual impacts would occur under NEPA.

3 **Subsidence/Soil Settlement**

4 **Impact GEO-3a: Alternative 2 construction would not result in**
5 **substantial damage to structures or infrastructure, or expose people**
6 **to substantial risk of injury from subsidence/soil settlement.**

7 **CEQA Impact Determination**

8 Development of the backlands and other infrastructure during Phase I under
9 Alternative 2 was completed in 2003. All facilities were designed and constructed in
10 compliance with the recommendations of a geotechnical engineer, consistent with
11 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
12 conjunction with criteria established by LAHD and Caltrans. During construction
13 activities, subsidence or soil settlement that could have exposed people and structures
14 to risk did not occur. It is not likely that such impacts would occur during backlands
15 development during Phase II construction. Alternative 2 would not result in
16 substantial damage to structures or infrastructure or expose people to substantial risk
17 of injury as a result of subsidence or soil settlement. Impacts would be less than
18 significant.

19 *Mitigation Measures*

20 Because subsidence/soil settlement impacts would be less than significant, no
21 mitigation measures are necessary.

22 *Residual Impacts*

23 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
24 Municipal Code resulting in no required mitigation, the residual impacts would be
25 less than significant under CEQA.

26 **NEPA Impact Determination**

27 Under this alternative, no further development would occur in the in-water terminal
28 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
29 In addition, backland development under Alternative 2 would be the same as under
30 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
31 because there would be no net change in environmental conditions between
32 Alternative 2 and the NEPA baseline.

33 *Mitigation Measures*

34 No mitigation measures are necessary under NEPA.

35 *Residual Impacts*

36 No residual impacts would occur under NEPA.

Expansive Soils

Impact GEO-4a: Alternative 2 construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.

CEQA Impact Determination

Development of the backlands and other infrastructure during Phase I under Alternative 2 was completed in 2003. All facilities were designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code and in conjunction with criteria established by LAHD and Caltrans. During construction activities, expansive soil conditions that could have exposed people and structures to risk did not occur. Future backlands development would be conducted according to all pertinent standards and specifications; therefore, Alternative 2 would not result in substantial damage to structures or infrastructure or expose people to substantial risk of injury from expansive soils. Impacts would be less than significant.

Mitigation Measures

Because expansive soil impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, resulting in no required mitigation, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Under this alternative, no further development would occur in the in-water terminal area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction). In addition, backland development under Alternative 2 would be the same as under the NEPA baseline. Therefore, potential impacts under NEPA would not occur because there would be no net change in environmental conditions between Alternative 2 and the NEPA baseline.

Mitigation Measures

No mitigation measures are necessary under NEPA.

Residual Impacts

No residual impacts would occur under NEPA.

Landslides and Mudslides

Impact GEO-5a: Alternative 2 construction would not result in or expose people or property to a substantial risk of landslides or mudslides.

CEQA Impact Determination

Because the topography in the vicinity of the Alternative 2 site is flat and not subject to landslides or mudflows, no impacts would occur under CEQA.

Mitigation Measures

Because landslide and mudslide impacts would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Under this alternative, no further development would occur in the in-water terminal area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction). In addition, backland development under Alternative 2 would be the same as under the NEPA baseline. Therefore, potential impacts under NEPA would not occur because there would be no net change in environmental conditions between Alternative 2 and the NEPA baseline.

Mitigation Measures

No mitigation measures are necessary under NEPA.

Residual Impacts

No residual impacts would occur under NEPA.

Unstable Soil Conditions

Impact GEO-6a: Shallow groundwater, which would cause unstable collapsible soils, may be encountered during excavations, but would not expose people or structures to substantial risk.

CEQA Impact Determination

No known unstable soil conditions are on the Project site, and backlands constructed in Phase I were designed in accordance with all applicable geotechnical studies and pertinent design standards and specifications for the site. Future backlands will be developed according to the same requirements; thus, impacts due to unstable collapsible soils would not occur under CEQA.

Mitigation Measures

Because impacts associated with collapsible soils would not occur, no mitigation measures are required.

1 *Residual Impacts*

2 No residual impacts would occur under CEQA.

3 **NEPA Impact Determination**

4 Under this alternative, no further development would occur in the in-water terminal
5 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
6 In addition, backland development under Alternative 2 would be the same as under
7 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
8 because there would be no net change in environmental conditions between
9 Alternative 2 and the NEPA baseline.

10 *Mitigation Measures*

11 No mitigation measures are necessary under NEPA.

12 *Residual Impacts*

13 No residual impacts would occur under NEPA.

14 **Prominent Geologic and Topographic Features**

15 **Impact GEO-7a: Alternative 2 construction would not result in one or**
16 **more distinct and prominent geologic or topographic features being**
17 **destroyed, permanently covered, or materially and adversely**
18 **modified.**

19 **CEQA Impact Determination**

20 Because the topography in the vicinity of the Alternative 2 site is flat and does not
21 contain prominent geologic or topographic features, no impacts would occur under
22 CEQA.

23 *Mitigation Measures*

24 Because impacts due to removal of prominent geologic or topographic features would
25 not occur, no mitigation measures are necessary.

26 *Residual Impacts*

27 With no mitigation required, there would be no residual impacts under CEQA.

28 **NEPA Impact Determination**

29 Under this alternative, no development would occur in the in-water terminal area (i.e.,
30 no dredging, dike or fill placement, pile installation, or wharf construction). In
31 addition, backland development under Alternative 2 would be the same as under the
32 NEPA baseline. Therefore, potential impacts under NEPA would not occur because
33 there would be no net change in environmental conditions between Alternative 2 and
34 the NEPA baseline.

35 *Mitigation Measures*

36 No mitigation measures are necessary under NEPA.

1 *Residual Impacts*

2 No residual impacts would occur under NEPA.

3 **Mineral Resources**

4 **Impact GEO-8a: Alternative 2 site construction would not result in**
5 **the permanent loss of availability of any mineral resource of regional,**
6 **statewide, or local significance.**

7 **CEQA Impact Determination**

8 The Alternative 2 site does not contain significant mineral resources. Therefore,
9 Alternative 2 would not result in the permanent loss of availability of a known
10 mineral resource that would be of future value to the region and the residents of the
11 state. No impacts would occur under CEQA.

12 *Mitigation Measures*

13 Because no impacts to mineral resources would occur, no mitigation measures are
14 necessary.

15 *Residual Impacts*

16 No residual impacts would occur under CEQA.

17 **NEPA Impact Determination**

18 Under this alternative, no development would occur in the in-water terminal area (i.e.,
19 no dredging, dike or fill placement, pile installation, or wharf construction). In
20 addition, backland development under Alternative 2 would be the same as under the
21 NEPA baseline. Therefore, potential impacts under NEPA would not occur because
22 there would be no net change in environmental conditions between Alternative 2 and
23 the NEPA baseline.

24 *Mitigation Measures*

25 No mitigation measures are necessary under NEPA.

26 *Residual Impacts*

27 No residual impacts would occur under NEPA.

28 **3.5.4.3.2.2.2 Operations Impacts**

29 **Seismicity**

30 **Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone,**
31 **or other regional faults, could produce fault rupture, seismic ground**
32 **shaking, liquefaction, or other seismically induced ground failure**
33 **that would expose people and structures to substantial risk during**
34 **the operations period (through 2045).**

35 Earthquake-related hazards at the Project site under the No Federal Action alternative
36 (Alternative 2) would be similar to those described above for the proposed Project.
37 Under Alternative 2, further development of backlands would occur in the Project area

1 during Phase 2. However, the four existing A-frame cranes would be removed, and the
2 existing wharves at Berth 100 would cease to be used for ship berthing and container
3 loading/unloading operations. The bridge spanning the Southwest Slip, also constructed
4 during Phase I, would be abandoned in place. Alternative 2 would continue to expose
5 people to substantial risks associated with the geologic environment. These impacts
6 would be less than those described for the proposed Project because the level of
7 development and amount of infrastructure susceptible to seismically induced ground
8 failure would be reduced.

9 **CEQA Impact Determination**

10 As discussed with respect to the proposed Project, seismic activity along the
11 Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic
12 ground shaking, liquefaction, or other seismically induced ground failure. Seismic
13 hazards are common to the Los Angeles region and are not increased by the No
14 Project Alternative. However, because the site is potentially underlain by strands of
15 the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is a
16 substantial risk of seismic impacts. Continued exposure of people and property
17 during operations to seismic hazards from a major or great earthquake cannot be
18 precluded, even with incorporation of modern construction engineering and safety
19 standards. Therefore, impacts due to seismically induced ground failure are
20 significant under CEQA.

21 *Mitigation Measures*

22 No mitigation measures associated with seismically induced ground failure are
23 available that would reduce impacts below a level of significance.

24 *Residual Impacts*

25 Design and construction in accordance with applicable laws and regulations
26 pertaining to seismically induced ground movement would minimize structural
27 damage in the event of an earthquake. However, increased exposure of people and
28 property during operations to seismic hazards from a major or great earthquake
29 cannot be precluded even with incorporation of modern construction engineering and
30 safety standards. Therefore, impacts due to seismically induced ground failure would
31 remain significant and unavoidable.

32 **NEPA Impact Determination**

33 Under this alternative, no further development would occur in the in-water terminal
34 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
35 In addition, backland development under Alternative 2 would be the same as under
36 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
37 because there would be no net change in environmental conditions between
38 Alternative 2 and the NEPA baseline.

39 *Mitigation Measures*

40 No mitigation measures are necessary under NEPA.

41 *Residual Impacts*

42 No residual impacts would occur under NEPA.

Tsunamis and Seiches

Impact GEO-2b: Alternative 2 operations in the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches in the Alternative 2 area and vicinity.

Risks of seismically induced tsunamis and seiches are typical for the entire California coastline and would not be increased by the No Federal Action alternative. Because this alternative would result in the storage of containers from the Yang Ming Terminal on 117 acres of backlands, this alternative would continue to expose people to substantial risks associated with tsunamis and seiches. However, impacts would be less than those described for the proposed Project because less development and infrastructure would be susceptible to seismically induced ground failure.

CEQA Impact Determination

The No Project alternative would continue to expose people and property to flooding from tsunamis and seiches. Therefore, impacts during the operations phase of Alternative 2 would be significant under CEQA.

Mitigation Measures

MM GEO-1 shall be applied to the CEQA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning in accordance with current City and state regulations, substantial damage and/or injury could occur in the event of a tsunami or seiche. Therefore, residual impacts would remain significant and unavoidable.

NEPA Impact Determination

Under this alternative, no further development would occur in the in-water terminal area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction). In addition, backland development under Alternative 2 would be the same as under the NEPA baseline. Therefore, potential impacts under NEPA would not occur because there would be no net change in environmental conditions between Alternative 2 and the NEPA baseline.

Mitigation Measures

No mitigation measures are necessary under NEPA.

Residual Impacts

No residual impacts would occur under NEPA.

Subsidence/Soil Settlement

Impact GEO-3b: Alternative 2 operation would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from subsidence/soil settlement.

As discussed for **Impact GEO-3a**, subsidence in the vicinity of West Basin, due to previous oil extraction in the Port area, has been mitigated and is not anticipated to adversely affect the site. Because construction would not occur in association with Alternative 2, impacts related to cracking and warping of structures during operations as a result of saturated, unconsolidated/compressible sediments would not occur.

CEQA Impact Determination

Because subsidence in the vicinity of West Basin, due to previous oil extraction in the Port area, has been mitigated and is not anticipated to adversely affect the site, impacts would be less than significant from past actions.

Mitigation Measures

Because subsidence/soil settlement impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Under this alternative, no further development would occur in the in-water terminal area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction). In addition, backland development under Alternative 2 would be the same as under the NEPA baseline. Therefore, potential impacts under NEPA would not occur because there would be no net change in environmental conditions between Alternative 2 and the NEPA baseline.

Mitigation Measures

No mitigation measures are necessary under NEPA.

Residual Impacts

No residual impacts would occur under NEPA.

Expansive Soils

Impact GEO-4b: Alternative 2 operations would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.

All facilities were designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans. During the operation phase of the No Federal Action alternative, impacts

1 related to cracking and warping of structures as a result of expansive soils would not
2 occur.

3 **CEQA Impact Determination**

4 Soil expansion impacts would not occur during operations under this alternative
5 because all facilities were designed and constructed according to appropriate
6 standards and specifications. No impacts would occur under CEQA.

7 *Mitigation Measures*

8 Because expansive soil impacts would not occur, no mitigation measures are
9 necessary.

10 *Residual Impacts*

11 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
12 Municipal Code, residual impacts would not occur under CEQA.

13 **NEPA Impact Determination**

14 Under this alternative, no further development would occur in the in-water terminal
15 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
16 In addition, backland development under Alternative 2 would be the same as under
17 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
18 because there would be no net change in environmental conditions between
19 Alternative 2 and the NEPA baseline.

20 *Mitigation Measures*

21 No mitigation measures are necessary under NEPA.

22 *Residual Impacts*

23 No residual impacts would occur under NEPA.

24 **Landslides and Mudslides**

25 **Impact GEO-5b: Alternative 2 operations would not result in or**
26 **expose people or property to a substantial risk of landslides or**
27 **mudslides.**

28 **CEQA Impact Determination**

29 Because the topography in the vicinity of the Alternative 2 site is flat and not subject
30 to landslides or mudflows, no impacts would occur under CEQA.

31 *Mitigation Measures*

32 Because landslide and mudslide impacts would not occur, no mitigation measures are
33 necessary.

34 *Residual Impacts*

35 With no mitigation required, there would be no residual impacts under CEQA.

1 **NEPA Impact Determination**

2 Under this alternative, no further development would occur in the in-water terminal
3 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
4 In addition, backland development under Alternative 2 would be the same as under
5 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
6 because there would be no net change in environmental conditions between
7 Alternative 2 and the NEPA baseline.

8 *Mitigation Measures*

9 No mitigation measures are necessary under NEPA.

10 *Residual Impacts*

11 No residual impacts would occur under NEPA.

12 **Unstable Soil Conditions**

13 **Impact GEO-6b: Collapsible soils would have no impact on**
14 **Alternative 2 operations and would not expose people or structures**
15 **to substantial risk.**

16 No known unstable soil conditions are on the Project site, and all backlands were
17 designed and developed in accordance with the applicable geotechnical studies for the
18 site. Thus, impacts due to unstable soil conditions would not occur under the No Federal
19 Action alternative.

20 **CEQA Impact Determination**

21 Unstable soil conditions do not exist at the project site and impacts associated with
22 collapsible soils would not occur under CEQA.

23 *Mitigation Measures*

24 Because impacts associated with collapsible soils would not occur, no mitigation
25 measures are required.

26 *Residual Impacts*

27 With no mitigation required, there would be no residual impacts under CEQA.

28 **NEPA Impact Determination**

29 Under this alternative, no further development would occur in the in-water terminal
30 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
31 In addition, backland development under Alternative 2 would be the same as under
32 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
33 because there would be no net change in environmental conditions between
34 Alternative 2 and the NEPA baseline.

35 *Mitigation Measures*

36 No mitigation measures are necessary under NEPA.

37 *Residual Impacts*

38 No residual impacts would occur under NEPA.

Prominent Geologic and Topographic Features

Impact GEO-7b: Alternative 2 operations would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

CEQA Impact Determination

Because the topography in the vicinity of the Alternative 2 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under CEQA.

Mitigation Measures

Because impacts due to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Under this alternative, no further development would occur in the in-water terminal area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction). In addition, backland development under Alternative 2 would be the same as under the NEPA baseline. Therefore, potential impacts under NEPA would not occur because there would be no net change in environmental conditions between Alternative 2 and the NEPA baseline.

Mitigation Measures

No mitigation measures are necessary under NEPA.

Residual Impacts

No residual impacts would occur under NEPA.

Mineral Resources

Impact GEO-8b: Alternative 2 operations would not result in the permanent loss of availability of any mineral resource of regional, statewide, or local significance.

CEQA Impact Determination

The Alternative 2 site does not contain significant mineral resources. Therefore, Alternative 2 would not result in the permanent loss of availability of a known mineral resource that would be of future value to the region and the residents of the state. No impacts would occur under CEQA.

Mitigation Measures

Because no impacts to mineral resources would occur, no mitigation measures are necessary.

1 *Residual Impacts*
2 With no mitigation required, no residual impacts would occur under CEQA.

3 **NEPA Impact Determination**

4 Under this alternative, no further development would occur in the in-water terminal
5 area (i.e., no dredging, dike or fill placement, pile installation, or wharf construction).
6 In addition, backland development under Alternative 2 would be the same as under
7 the NEPA baseline. Therefore, potential impacts under NEPA would not occur
8 because there would be no net change in environmental conditions between
9 Alternative 2 and the NEPA baseline.

10 *Mitigation Measures*

11 No mitigation measures are necessary under NEPA.

12 *Residual Impacts*

13 No residual impacts would occur under NEPA.

14 **3.5.4.3.2.3 Alternative 3 – Reduced Fill: No New Wharf Construction at Berth 102**

15 **3.5.4.3.2.3.1 Construction Impacts**

16 **Seismicity**

17 **Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone,**
18 **or other regional faults, could produce fault rupture, seismic ground**
19 **shaking, liquefaction, or other seismically induced ground failure**
20 **that would expose people and structures to substantial risk during**
21 **the construction period (through 2012).**

22 **CEQA Impact Determination**

23 Construction impacts of the Reduced Fill: No New Wharf Construction at Berth 102
24 Alternative (Alternative 3) would be similar to but less than those identified for the
25 proposed Project because 925 linear feet of wharf at Berth 102 would not be
26 constructed and only five A-frame cranes would be installed, thus resulting in less
27 infrastructure susceptible to seismically induced ground failure. In all other respects,
28 **Impact GEO-1a** would be the same as under the proposed Project. As with the
29 proposed Project, seismic activity along the Palos Verdes Fault zone, or other
30 regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or
31 other seismically induced ground failure. Seismic hazards are common to the Los
32 Angeles region and are not increased by this alternative. However, because the site is
33 potentially underlain by strands of the active Palos Verdes Fault and liquefaction-
34 prone hydraulic fill, there is a substantial risk of seismic impacts. Existing wharves
35 were constructed to comply with all appropriate and relevant seismic specifications.
36 Future construction of buildings and related infrastructure would occur over multiple
37 years, thus, increasing exposure of people and property during construction to
38 seismic hazards from a major or great earthquake. Such exposure cannot be
39 precluded, even with incorporation of modern construction engineering and safety
40 standards. Therefore, impacts due to seismically induced ground failure are
41 significant under CEQA.

1 ***Mitigation Measures***

2 No mitigation measures are available that would reduce impacts below a level of
3 significance associated with seismically induced ground failure.

4 ***Residual Impacts***

5 Design and construction in accordance with applicable laws and regulations
6 pertaining to seismically induced ground movement would minimize structural
7 damage in the event of an earthquake. However, increased exposure of people and
8 property during construction to seismic hazards from a major or great earthquake
9 cannot be precluded even with incorporation of modern construction engineering and
10 safety standards. Therefore, impacts due to seismically induced ground failure would
11 remain significant and unavoidable.

12 **NEPA Impact Determination**

13 Because Alternative 3 would include less wharf construction, potential impacts
14 would be similar to, but less severe than those described for the proposed Project
15 under the NEPA analysis. Seismic hazards are common to the Los Angeles region
16 and are not increased by Alternative 3. Because the West Basin area is potentially
17 underlain by strands of the active Palos Verdes Fault and liquefaction-prone
18 hydraulic fill, there is a substantial risk of seismic impacts. Because construction
19 would occur over multiple years, increased exposure of people and property during
20 construction to seismic hazards from a major or great earthquake cannot be precluded,
21 even with incorporation of modern construction engineering and safety standards.
22 Therefore, impacts due to seismically induced ground failure are significant under
23 NEPA.

24 ***Mitigation Measures***

25 There are no mitigation measures available that would reduce impacts below a level
26 of significance associated with seismically induced ground failure.

27 ***Residual Impacts***

28 Design and construction in accordance with applicable laws and regulations
29 pertaining to seismically induced ground movement would minimize structural
30 damage in the event of an earthquake. However, increased exposure of people and
31 property during construction to seismic hazards from a major or great earthquake
32 cannot be precluded even with incorporation of modern construction engineering and
33 safety standards. Therefore, impacts due to seismically induced ground failure would
34 remain significant and unavoidable.

Tsunami Runup

Impact GEO-2a: Alternative 3 construction in the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches in West Basin and vicinity.

CEQA Impact Determination

Construction impacts of this alternative would be similar to but less than those identified for the proposed Project because 925 linear feet of wharf at Berth 102 would not be constructed and only five A-frame cranes would be installed, thus resulting in less infrastructure being susceptible to inundation. In all other respects, **Impact GEO-2a** would be the same as under the proposed Project. Therefore, impacts during the construction phase would be significant under CEQA.

Mitigation Measures

MM GEO-1 shall be applied to the CEQA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations, substantial damage and/or injury could occur in the event of a tsunami or seiche. Therefore, residual impacts would remain significant and unavoidable.

NEPA Impact Determination

Because Alternative 3 would include less wharf construction, potential impacts would be similar to, but less severe than those described for the proposed Project under the NEPA analysis. In all other respects, **Impact GEO-2a** would be the same as under the proposed Project. Therefore, impacts due to tsunamis and seiches during the construction phase would be significant under NEPA.

Mitigation Measures

MM GEO-1 shall be applied to the NEPA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and the LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations, substantial damage and injury could occur in the event of a tsunami or seiche. Therefore, residual impacts would remain significant and unavoidable.

Subsidence/Soil Settlement

Impact GEO-3a: Alternative 3 construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from subsidence/soil settlement.

CEQA Impact Determination

Construction impacts of this alternative would be similar to but less than those identified for the proposed Project because 925 linear feet of wharf at Berth 102 would not be constructed and only five A-frame cranes would be installed, thus resulting in less area susceptible to subsidence/soil settlement. In all other respects, **Impact GEO-3a** would be the same as under the proposed Project. Impacts in backland areas would be less than significant under CEQA because Alternative 3 would be designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans. Construction of Alternative 3 would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because subsidence/soil settlement impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Because Alternative 3 would include less wharf construction, potential impacts would be similar to, but less severe than those described for the proposed Project under the NEPA analysis. Impacts in backland areas would be less than significant under NEPA because Alternative 3 would be designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans. Construction of Alternative 3 would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because no subsidence/soil settlement impacts would occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Expansive Soils

Impact GEO-4a: Alternative 3 construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.

CEQA Impact Determination

Construction impacts of this alternative would be similar to but less than those identified for the proposed Project because 925 linear feet of wharf at Berth 102 would not be constructed and only five A-frame cranes would be installed, thus resulting in less area susceptible to expansive soils. In all other respects, **Impact GEO-4a** would be the same as under the proposed Project. Expansive soil impacts in backland areas would be less than significant under CEQA because Alternative 3 would be designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD. Construction of Alternative 3 would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because expansive soil impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Because Alternative 3 would include less wharf construction, potential impacts would be similar to, but less severe than those described for the proposed Project under the NEPA analysis. Expansive soil may be present in dredged or imported soils used for filling the 2.5 acres. Use of expansive soils beneath the foundations of the proposed Project could result in cracking and distress of foundations. However, expansive soil impacts in backland areas would be less than significant under NEPA with implementation of standard geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction with criteria established by LAHD. Construction of Alternative 3 would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because expansive soil impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of standard geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, less than significant residual impacts would occur under NEPA.

Landslides and Mudslides

Impact GEO-5a: Alternative 3 construction would not result in or expose people or property to a substantial risk of landslides or mudslides.

CEQA Impact Determination

Because topography in the vicinity of the Alternative 3 site is flat and not subject to landslides or mudflows, no impacts would occur under CEQA.

Mitigation Measures

Because landslide and mudslide impacts would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Because topography in the vicinity of the Alternative 3 site is flat and not subject to landslides or mudflows, no impacts would occur under NEPA.

Mitigation Measures

Because landslide and mudslide impacts would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Unstable Soil Conditions

Impact GEO-6a: Shallow groundwater, which would cause unstable collapsible soils, may be encountered during excavations, but would not expose people or structures to substantial risk.

CEQA Impact Determination

Construction impacts of this alternative would be similar to but less than those identified for the proposed Project because 925 linear feet of wharf at Berth 102 would not be constructed and only five A-frame cranes would be installed, thus resulting in less infrastructure susceptible to unstable soil conditions. In all other respects, **Impact GEO-6a** would be the same as under the proposed Project. Therefore, impacts associated with shallow groundwater would be less than significant under CEQA due to implementation of standard engineering practices regarding saturated, collapsible soils.

Mitigation Measures

Because impacts associated with collapsible soils would be less than significant, no mitigation measures are required.

1 *Residual Impacts*

2 With no mitigation required, the residual impacts would be less than significant under
3 CEQA.

4 **NEPA Impact Determination**

5 Because Alternative 3 would include less wharf construction, potential impacts
6 would be similar to, but less severe than those described for the proposed Project
7 under the NEPA analysis. Due to implementation of standard engineering practices
8 regarding saturated, collapsible soils, people and structures would not be exposed to
9 substantial adverse effects from the proposed Project and impacts associated with
10 shallow groundwater would be less than significant under NEPA.

11 *Mitigation Measures*

12 Because impacts associated with collapsible soils would be less than significant, no
13 mitigation measures are required.

14 *Residual Impacts*

15 With implementation of standard engineering practices regarding saturated,
16 collapsible soils, there would be less than significant residual impacts under NEPA.

17 **Prominent Geologic and Topographic Features**

18 **Impact GEO-7a: Alternative 3 construction would not result in one or**
19 **more distinct and prominent geologic or topographic features being**
20 **destroyed, permanently covered, or materially and adversely**
21 **modified.**

22 **CEQA Impact Determination**

23 Because topography in the vicinity of the Alternative 3 site is flat and does not
24 contain prominent geologic or topographic features, no impacts would occur under
25 CEQA.

26 *Mitigation Measures*

27 Because impacts due to removal of prominent geologic or topographic features would
28 not occur, no mitigation measures are necessary.

29 *Residual Impacts*

30 With no mitigation required, there would be no residual impacts under CEQA.

31 **NEPA Impact Determination**

32 Because topography in the vicinity of the Alternative 3 Project site is flat and does
33 not contain prominent geologic or topographic features, no impacts would occur
34 under NEPA.

35 *Mitigation Measures*

36 Because impacts related to removal of prominent geologic or topographic features
37 would not occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under NEPA.

3 **Mineral Resources**

4 **Impact GEO-8a: Alternative 3 site construction would not result in**
5 **the permanent loss of availability of any mineral resource of regional,**
6 **statewide, or local significance.**

7 **CEQA Impact Determination**

8 The Alternative 3 site does not contain significant mineral resources. Therefore,
9 Alternative 3 would not result in the permanent loss of availability of a known
10 mineral resource that would be of future value to the region and the residents of the
11 state. No impacts would occur under CEQA.

12 *Mitigation Measures*

13 Because no impacts to mineral resources would occur, no mitigation measures are
14 necessary.

15 *Residual Impacts*

16 With no mitigation required, no residual impacts would occur under CEQA.

17 **NEPA Impact Determination**

18 The Alternative 3 site does not contain significant mineral resources. Therefore,
19 Alternative 3 would not result in the permanent loss of availability of a known
20 mineral resource that would be of future value to the region and the residents of the
21 state and less than significant impacts to mineral resources would occur under NEPA.

22 *Mitigation Measures*

23 Because no impacts to mineral resources would occur, no mitigation measures are
24 necessary.

25 *Residual Impacts*

26 With no mitigation required, no residual impacts would occur under NEPA.

27 **3.5.4.3.2.3.2 Operations Impacts**

28 **Seismicity**

29 **Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone,**
30 **or other regional faults, could produce fault rupture, seismic ground**
31 **shaking, liquefaction, or other seismically induced ground failure**
32 **that would expose people and structures to substantial risk during**
33 **the operations period (through 2045).**

34 **CEQA Impact Determination**

35 Operations impacts of this alternative would be similar to but less than those
36 identified for the proposed Project because 925 linear feet of wharf at Berth 102

1 would not be constructed and only five A-frame cranes would be installed, thus
2 resulting in less infrastructure susceptible to seismically induced ground failure. In
3 all other respects, **Impact GEO-1b** would be the same as under the proposed Project.
4 As with the proposed Project, seismic activity along the Palos Verdes Fault zone, or
5 other regional faults, could produce fault rupture, seismic ground shaking,
6 liquefaction, or other seismically induced ground failure. Seismic hazards are
7 common to the Los Angeles region and are not increased by Alternative 3. However,
8 because the Alternative 3 site is potentially underlain by strands of the active Palos
9 Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of
10 seismic impacts. Increased exposure of people and property during operations to
11 seismic hazards from a major or great earthquake cannot be precluded, even with
12 incorporation of modern construction engineering and safety standards. Therefore,
13 impacts due to seismically induced ground failure are significant under CEQA.

14 *Mitigation Measures*

15 There are no mitigation measures associated with seismically induced ground failure
16 available that would reduce impacts below a level of significance.

17 *Residual Impacts*

18 Design and construction in accordance with applicable laws and regulations
19 pertaining to seismically induced ground movement would minimize structural
20 damage in the event of an earthquake. However, increased exposure of people and
21 property to seismic hazards from a major or great earthquake during operations
22 cannot be precluded even with incorporation of modern construction engineering and
23 safety standards. Therefore, impacts due to seismically induced ground failure would
24 remain significant and unavoidable.

25 **NEPA Impact Determination**

26 Because Alternative 3 would include less wharf construction, potential impacts
27 would be similar to, but less severe than those described for the proposed Project
28 under the NEPA analysis. In all other respects, **Impact GEO-1b** would be the same
29 as under the proposed Project. Seismic hazards are common to the Los Angeles
30 region and are not increased by Alternative 3. However, because the Alternative 3
31 area is potentially underlain by strands of the active Palos Verdes Fault and
32 liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts.
33 Increased exposure of people and property during operations to seismic hazards from
34 a major or great earthquake cannot be precluded, even with incorporation of modern
35 construction engineering and safety standards. Therefore, impacts due to seismically
36 induced ground failure are significant under NEPA.

37 *Mitigation Measures*

38 There are no mitigation measures available associated with seismically induced
39 ground failure that would reduce impacts below a level of significance.

40 *Residual Impacts*

41 Design and construction in accordance with applicable laws and regulations
42 pertaining to seismically induced ground movement would minimize structural
43 damage in the event of an earthquake. However, increased exposure of people and
44 property during operations to seismic hazards from a major or great earthquake
45 cannot be precluded even with incorporation of modern construction engineering and

1 safety standards. Therefore, impacts due to seismically induced ground failure would
2 remain significant and unavoidable.

3 **Tsunamis and Seiches**

4 **Impact GEO-2b: Alternative 3 operations in the Port area would**
5 **expose people and structures to substantial risk involving tsunamis**
6 **or seiches. Local or distant seismic activity and/or offshore**
7 **landslides could result in the occurrence of tsunamis or seiches in**
8 **the Alternative 3 area and vicinity.**

9 **CEQA Impact Determination**

10 Operations impacts of this alternative would be similar to but less than those
11 identified for the proposed Project because 925 linear feet of wharf at Berth 102
12 would not be constructed and only five A-frame cranes would be installed, thus
13 resulting in less infrastructure susceptible to inundation. In all other respects,
14 **Impact GEO-2b** would be the same as the proposed Project. Therefore, impacts
15 during the operations phase of Alternative 3 would be significant under CEQA.

16 *Mitigation Measures*

17 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
18 tsunami- and seiche-related impacts.

19 *Residual Impacts*

20 Emergency planning and coordination between the terminal operator and LAHD, as
21 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
22 during a tsunami. However, even with incorporation of emergency planning and
23 construction procedures in accordance with current City and state regulations,
24 substantial damage and/or injury could occur in the event of a tsunami or seiche.
25 Therefore, residual impacts would remain significant and unavoidable.

26 **NEPA Impact Determination**

27 Because Alternative 3 would include less wharf construction, potential impacts
28 would be similar to, but less severe than those described for the proposed Project
29 under the NEPA analysis. In all other respects, **Impact GEO-2b** would be the same
30 as under the proposed Project. Because operations would occur over an extended
31 period (through at least 2045), increased exposure of people and property during
32 operations to seismically induced tsunamis or seiches from a major or great
33 earthquake cannot be precluded. Impacts from the theoretical maximum worst-case
34 tide and wave action would be significant for the site under NEPA.

35 *Mitigation Measures*

36 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
37 tsunami- and seiche-related impacts.

38 *Residual Impacts*

39 Emergency planning and coordination between the terminal operator and the LAHD,
40 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
41 during a tsunami. However, even with incorporation of emergency planning and

1 construction procedures in accordance with current City and state regulations,
2 substantial damage and injury could occur in the event of a tsunami or seiche.
3 Therefore, residual impacts would remain significant and unavoidable.

4 Therefore, impacts during the operations phase due to tsunamis and seiches would be
5 significant and unavoidable under NEPA.

6 **Subsidence/Soil Settlement**

7 **Impact GEO-3b: Alternative 3 operations would not result in**
8 **substantial damage to structures or infrastructure, or expose people**
9 **to substantial risk of injury from subsidence/soil settlement.**

10 **CEQA Impact Determination**

11 Operations impacts of this alternative would be similar to but less than those
12 identified for the proposed Project because 925 linear feet of wharf at Berth 102
13 would not be constructed and only five A-frame cranes would be installed, thus
14 resulting in less infrastructure susceptible to settlement. In all other respects,
15 **Impact GEO-3b** would be the same as under the proposed Project. Subsidence/soil
16 settlement impacts in backland areas would be less than significant under CEQA
17 because Alternative 3 would be designed and constructed in compliance with the
18 recommendations of a geotechnical engineer, consistent with Sections 91.000
19 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria
20 established by LAHD and Caltrans. Thus, subsidence/soil settlement impacts would
21 be less than significant under CEQA and would not result in substantial damage to
22 structures or infrastructure, or expose people to substantial risk of injury.

23 *Mitigation Measures*

24 Because subsidence/soil settlement impacts would be less than significant, no
25 mitigation measures are necessary.

26 *Residual Impacts*

27 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
28 Municipal Code, the residual impacts would be less than significant under CEQA.

29 **NEPA Impact Determination**

30 Because Alternative 3 would include less wharf construction, potential impacts
31 would be similar to, but less severe than those described for the proposed Project
32 under the NEPA analysis. In all other respects, **Impact GEO-3b** would be the same
33 as under the proposed Project.

34 *Mitigation Measures*

35 Because subsidence/soil settlement impacts would be less than significant, no
36 mitigation measures are necessary.

37 *Residual Impacts*

38 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
39 Municipal Code, the residual impacts would be less than significant under NEPA.

Expansive Soils

Impact GEO-4b: Alternative 3 operations would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.

CEQA Impact Determination

Operations impacts of this alternative would be similar to but less than those identified for the proposed Project because 925 linear feet of wharf at Berth 102 would not be constructed and only five A-frame cranes would be installed, thus resulting in less infrastructure susceptible to soil expansion. In all other respects, **Impact GEO-4b** would be the same as under the proposed Project. Expansive soil impacts in backland areas would be less than significant under CEQA because Alternative 3 would be designed and constructed in compliance with the recommendations of the geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD. Thus, expansive soil impacts would be less than significant under CEQA and would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because expansive soil impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

The federal actions of Alternative 3 would be limited to wharf, in-water construction activities (including the creation of 2.5 acres fill, new wharf construction, and channel deepening, and limited backland areas (see Section 2.4.3, Federal Project). Expansive soil may be present in dredged or imported soils used for filling the 2.5 acres. Use of expansive soils beneath the Alternative 3 Project foundations could result in cracking and distress of foundations. However, expansive soil impacts in backland areas would be less than significant under NEPA with implementation of standard geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction with criteria established by LAHD and would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because expansive soil impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of standard geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, less than significant residual impacts would occur under NEPA.

Landslides and Mudslides

Impact GEO-5b: Alternative 3 operations would not result in or expose people or property to a substantial risk of landslides or mudslides.

CEQA Impact Determination

Because topography in the vicinity of the Alternative 3 site is flat and not subject to landslides or mudflows, no impacts would occur under CEQA.

Mitigation Measures

Because landslide and mudslide impacts would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Because topography in the vicinity of the Alternative 3 site is flat and not subject to landslides or mudflows, no impacts would occur under NEPA.

Mitigation Measures

Because landslide and mudslide impacts would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Unstable Soil Conditions

Impact GEO-6b: Collapsible soils would have no impact on Alternative 3 operations and would not expose people or structures to substantial risk.

CEQA Impact Determination

Because excavations would not be completed as a part of Alternative 3 operations, impacts associated with collapsible soils would not occur under CEQA.

Mitigation Measures

Because impacts associated with collapsible soils would not occur, no mitigation measures are required.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

1 **NEPA Impact Determination**

2 Because excavations would not be completed as a part of Alternative 3 operations,
3 impacts associated with collapsible soils would not occur under NEPA.

4 *Mitigation Measures*

5 Because impacts associated with collapsible soils would not occur, no mitigation
6 measures are required.

7 *Residual Impacts*

8 With no mitigation required, there would be no residual impacts under NEPA.

9 **Prominent Geologic and Topographic Features**

10 **Impact GEO-7b: Alternative 3 operations would not result in one or**
11 **more distinct and prominent geologic or topographic features being**
12 **destroyed, permanently covered, or materially and adversely**
13 **modified.**

14 **CEQA Impact Determination**

15 Because topography in the vicinity of the Alternative 3 site is flat and does not
16 contain prominent geologic or topographic features, no impacts would occur under
17 CEQA.

18 *Mitigation Measures*

19 Because impacts due to removal of prominent geologic or topographic features would
20 not occur, no mitigation measures are necessary.

21 *Residual Impacts*

22 With no mitigation required, there would be no residual impacts under CEQA.

23 **NEPA Impact Determination**

24 Because topography in the vicinity of the Alternative 3 site is flat and does not
25 contain prominent geologic or topographic features, no impacts would occur under
26 NEPA.

27 *Mitigation Measures*

28 Because impacts related to removal of prominent geologic or topographic features
29 would not occur, no mitigation measures are necessary.

30 *Residual Impacts*

31 With no mitigation required, there would be no residual impacts under NEPA.

Mineral Resources

Impact GEO-8b: Alternative 3 operations would not result in the permanent loss of availability of any mineral resource of regional, statewide, or local significance.

CEQA Impact Determination

The Alternative 3 site does not contain significant mineral resources. Therefore, Alternative 3 would not result in the permanent loss of availability of a known mineral resource that would be of future value to the region and the residents of the state. No impacts would occur under CEQA.

Mitigation Measures

Because no impacts to mineral resources would occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, no residual impacts would occur under CEQA.

NEPA Impact Determination

The Alternative 3 site does not contain significant mineral resources. Therefore, Alternative 3 would not result in the permanent loss of availability of a known mineral resource that would be of future value to the region and the residents of the state and less than significant no impacts to mineral resource impacts would occur under NEPA.

Mitigation Measures

Because no impacts to mineral resources would occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, no residual impacts would occur under NEPA.

3.5.4.3.2.4 Alternative 4: Reduced Fill: No South Wharf Extension at Berth 100

3.5.4.3.2.4.1 Construction Impacts

Seismicity

Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the construction period (through 2012).

CEQA Impact Determination

Seismic impacts of the Reduced Fill: No South Wharf Extension at Berth 100 Alternative (Alternative 4) would be similar to but less than those identified for the proposed Project because the proposed 375 linear feet of wharf proposed south of

1 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
2 constructed, and a total of nine A-frame cranes would be installed, thus resulting in
3 less infrastructure that would be susceptible to seismically induced ground failure. In
4 all other respects, **Impact GEO-1a** would be the same as under the proposed Project.
5 Impacts due to seismically induced ground failure are significant under CEQA.

6 *Mitigation Measures*

7 There are no mitigation measures associated with seismically induced ground failure
8 available that would reduce impacts below a level of significance.

9 *Residual Impacts*

10 Design and construction in accordance with applicable laws and regulations
11 pertaining to seismically induced ground movement would minimize structural
12 damage in the event of an earthquake. However, increased exposure of people and
13 property during construction to seismic hazards from a major or great earthquake
14 cannot be precluded even with incorporation of modern construction engineering and
15 safety standards. Therefore, impacts due to seismically induced ground failure would
16 remain significant and unavoidable.

17 **NEPA Impact Determination**

18 Under this alternative, the proposed 375 linear feet of wharf proposed south of
19 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
20 Because Alternative 4 would include less construction, potential impacts would be
21 similar to, but less severe than those described for the proposed Project under the
22 NEPA analysis. In all other respects, **Impact GEO-1a** would be the same as under
23 the proposed Project. Impacts due to seismically induced ground failure are
24 significant under NEPA.

25 *Mitigation Measures*

26 There are no mitigation measures associated with seismically induced ground failure
27 available that would reduce impacts below a level of significance.

28 *Residual Impacts*

29 Design and construction in accordance with applicable laws and regulations
30 pertaining to seismically induced ground movement would minimize structural
31 damage in the event of an earthquake. However, increased exposure of people and
32 property during construction to seismic hazards from a major or great earthquake
33 cannot be precluded even with incorporation of modern construction engineering and
34 safety standards. Therefore, impacts due to seismically induced ground failure would
35 remain significant and unavoidable.

Tsunamis and Seiches

Impact GEO-2a: Alternative 4 construction in the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches in West Basin and vicinity.

CEQA Impact Determination

Impacts of Alternative 4 would be similar to but less than those identified for the proposed Project because the proposed 375 linear feet of wharf proposed south of Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be constructed/developed, and a total of nine A-frame cranes would be installed, thus resulting in less infrastructure that would be susceptible to inundation from tsunamis/seiches. In all other respects, **Impact GEO-2a** would be the same as under the proposed Project. Therefore, impacts during the construction phase would be significant under CEQA.

Mitigation Measures

MM GEO-1 shall be applied to the CEQA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations, substantial damage and/or injury could occur in the event of a tsunami or seiche. Therefore, residual impacts would remain significant and unavoidable.

NEPA Impact Determination

Under this alternative, the proposed 375 linear of wharf proposed south of Berth 100 would not be constructed, and only 1.3 acres of fill would be required. Because Alternative 4 would include less construction, potential impacts would be similar to, but less severe than those described for the proposed Project under the NEPA analysis. In all other respects, **Impact GEO-2a** would be the same as under the proposed Project. Impacts due to seismically induced ground failure are significant under NEPA.

Mitigation Measures

MM GEO-1 shall be applied to the NEPA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and the LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations,

1 substantial damage and injury would occur in the event of a tsunami or seiche.
2 Therefore, residual impacts would remain significant and unavoidable.

3 **Subsidence/Soil Settlement**

4 **Impact GEO-3a: Alternative 4 construction would not result in**
5 **substantial damage to structures or infrastructure, or expose people**
6 **to substantial risk of injury from subsidence/soil settlement.**

7 **CEQA Impact Determination**

8 Impacts of Alternative 4 would be similar to but less than those identified for the
9 proposed Project because the proposed 375 linear feet of wharf proposed south of
10 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
11 constructed/developed, and a total of nine A-frame cranes would be installed, thus
12 resulting in less infrastructure that would be susceptible to subsidence/soil settlement.
13 In all other respects, **Impact GEO-3a** would be the same as under the proposed
14 Project. Impacts would be less than significant under CEQA because Alternative 4
15 would be designed and constructed in compliance with the recommendations of a
16 geotechnical engineer, consistent, with Sections 91.000 through 91.7016 of the Los
17 Angeles Municipal Code, and in conjunction with criteria established by LAHD and
18 Caltrans, and would not result in substantial damage to structures or infrastructure, or
19 expose people to substantial risk of injury.

20 *Mitigation Measures*

21 Because subsidence/soil settlement impacts would be less than significant, no
22 mitigation measures are necessary.

23 *Residual Impacts*

24 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
25 Municipal Code, the residual impacts would be less than significant under CEQA.

26 **NEPA Impact Determination**

27 Under this alternative, the proposed 375 linear feet of wharf proposed south of
28 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
29 Because Alternative 4 would include less construction, potential impacts would be
30 similar to, but less severe than those described for the proposed Project under the
31 NEPA analysis. In all other respects, **Impact GEO-3a** would be the same as under
32 the proposed Project. Impacts would be less than significant under NEPA because
33 Alternative 4 would be designed and constructed in compliance with the
34 recommendations of the geotechnical engineer, consistent with Sections 91.000
35 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria
36 established by LAHD and Caltrans, and would not result in substantial damage to
37 structures or infrastructure, or expose people to substantial risk of injury.

38 *Mitigation Measures*

39 Because subsidence/soil settlement impacts would be less than significant, no
40 mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under NEPA.

3 **Expansive Soils**

4 **Impact GEO-4a: Alternative 4 construction would not result in**
5 **substantial damage to structures or infrastructure, or expose people**
6 **to substantial risk of injury from soil expansion.**

7 **CEQA Impact Determination**

8 Impacts of Alternative 4 would be similar to but less than those identified for the
9 proposed Project because the proposed 375 linear feet of wharf proposed south of
10 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
11 constructed/developed, and a total of nine A-frame cranes would be installed, thus
12 resulting in less infrastructure that would be susceptible to expansive soils. In all
13 other respects, **Impact GEO-4a** would be the same as under the proposed Project.
14 Expansive soil impacts would be less than significant under CEQA because
15 Alternative 4 would be designed and constructed in compliance with the
16 recommendations of the geotechnical engineer, consistent with Sections 91.000
17 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria
18 established by LAHD, and would not result in substantial damage to structures or
19 infrastructure, or expose people to substantial risk of injury.

20 *Mitigation Measures*

21 Because expansive soil impacts would be less than significant, no mitigation
22 measures are necessary.

23 *Residual Impacts*

24 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
25 Municipal Code, the residual impacts would be less than significant under CEQA.

26 **NEPA Impact Determination**

27 Under this alternative, the proposed 375 linear feet of wharf proposed south of
28 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
29 Because Alternative 4 would include less construction, potential impacts would be
30 similar to, but less severe than those described for the proposed Project under the
31 NEPA analysis. In all other respects, **Impact GEO-4a** would be the same as under
32 the proposed Project. Expansive soil impacts would be less than significant under
33 NEPA with implementation of standard geotechnical engineering and
34 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction
35 with criteria established by LAHD and would not result in substantial damage to
36 structures or infrastructure, or expose people to substantial risk of injury.

37 *Mitigation Measures*

38 Because expansive soil impacts would be less than significant, no mitigation
39 measures are necessary.

1 *Residual Impacts*

2 With implementation of standard geotechnical engineering and Sections 91.000
3 through 91.7016 of the Los Angeles Municipal Code, less than significant residual
4 impacts would occur under NEPA.

5 **Landslides and Mudslides**

6 **Impact GEO-5a: Alternative 4 construction would not result in or**
7 **expose people or property to a substantial risk of landslides or**
8 **mudslides.**

9 **CEQA Impact Determination**

10 Because topography in the vicinity of the Alternative 4 site is flat and not subject to
11 landslides or mudflows, no impacts would occur under CEQA.

12 *Mitigation Measures*

13 Because landslide and mudslide impacts would not occur, no mitigation measures are
14 necessary.

15 *Residual Impacts*

16 With no mitigation required, there would be no residual impacts under CEQA.

17 **NEPA Impact Determination**

18 Because topography in the vicinity of the Alternative 4 site is flat and not subject to
19 landslides or mudflows, no impacts would occur under NEPA.

20 *Mitigation Measures*

21 Because landslide and mudslide impacts would not occur, no mitigation measures are
22 necessary.

23 *Residual Impacts*

24 With no mitigation required, there would be no residual impacts under NEPA.

25 **Unstable Soil Conditions**

26 **Impact GEO-6a: Shallow groundwater, which would cause unstable**
27 **collapsible soils, may be encountered during excavations, but would**
28 **not expose people or structures to substantial risk.**

29 See Section 3.7 (Groundwater and Soils) regarding potential soil and/or groundwater
30 contamination in construction excavations.

31 **CEQA Impact Determination**

32 Impacts of Alternative 4 would be similar to but less than those identified for the
33 proposed Project because the proposed 375 linear feet of wharf proposed south of
34 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
35 constructed/developed, and a total of nine A-frame cranes would be installed, thus
36 resulting in less infrastructure that would be susceptible to unstable soil conditions.

1 In all other respects, **Impact GEO-6a** would be the same as under the proposed
2 Project. Therefore, impacts associated with shallow groundwater would be less than
3 significant under CEQA due to implementation of standard engineering practices
4 regarding saturated, collapsible soils.

5 *Mitigation Measures*

6 Because impacts associated with collapsible soils would be less than significant, no
7 mitigation measures are required.

8 *Residual Impacts*

9 With no mitigation required, the residual impacts would be less than significant under
10 CEQA.

11 **NEPA Impact Determination**

12 Under this alternative, the proposed 375 linear feet of wharf proposed south of
13 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
14 Because Alternative 4 would include less construction, potential impacts would be
15 similar to, but less severe than those described for the proposed Project under the
16 NEPA analysis. In all other respects, **Impact GEO-6a** would be the same as under
17 the proposed Project. Due to implementation of standard engineering practices
18 regarding saturated, collapsible soils, people and structures would not be exposed to
19 substantial adverse effects from the proposed Project and impacts associated with
20 shallow groundwater would be less than significant under NEPA.

21 *Mitigation Measures*

22 Because impacts associated with collapsible soils would be less than significant, no
23 mitigation measures are required.

24 *Residual Impacts*

25 With implementation of standard engineering practices regarding saturated,
26 collapsible soils, there would be less than significant residual impacts under NEPA.

27 **Prominent Geologic and Topographic Features**

28 **Impact GEO-7a: Alternative 4 construction would not result in one or**
29 **more distinct and prominent geologic or topographic features being**
30 **destroyed, permanently covered, or materially and adversely**
31 **modified.**

32 **CEQA Impact Determination**

33 Because topography in the vicinity of the Alternative 4 site is flat and does not
34 contain prominent geologic or topographic features, no impacts would occur under
35 CEQA.

36 *Mitigation Measures*

37 Because impacts due to removal of prominent geologic or topographic features would
38 not occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under CEQA.

3 **NEPA Impact Determination**

4 Because topography in the vicinity of the Alternative 4 site is flat and does not
5 contain prominent geologic or topographic features, no impacts would occur under
6 NEPA.

7 *Mitigation Measures*

8 Because impacts due to removal of prominent geologic or topographic features would
9 not occur, no mitigation measures are necessary.

10 *Residual Impacts*

11 With no mitigation required, there would be no residual impacts under NEPA.

12 **Mineral Resources**

13 **Impact GEO-8a: Alternative 4 site construction would not result in**
14 **the permanent loss of availability of any mineral resource of regional,**
15 **statewide, or local significance.**

16 **CEQA Impact Determination**

17 The Alternative 4 site does not contain significant mineral resources. Therefore,
18 Alternative 4 would not result in the permanent loss of availability of a known
19 mineral resource that would be of future value to the region and the residents of the
20 state. No impacts would occur under CEQA.

21 *Mitigation Measures*

22 Because no impacts to mineral resources would occur, no mitigation measures are
23 necessary.

24 *Residual Impacts*

25 With no mitigation required, no residual impacts would occur under CEQA.

26 **NEPA Impact Determination**

27 The Alternative 4 site does not contain significant mineral resources. Therefore,
28 Alternative 4 would not result in the permanent loss of availability of a known
29 mineral resource that would be of future value to the region and the residents of the
30 state and less than significant impacts to mineral resources would occur under NEPA.

31 *Mitigation Measures*

32 Because no impacts to mineral resources would occur, no mitigation measures are
33 necessary.

34 *Residual Impacts*

35 With no mitigation required, no residual impacts would occur under NEPA.

Residual Impacts

With no mitigation required, the residual impacts would be less than significant under NEPA.

3.5.4.3.2.4.2 Operations Impacts

Seismicity

Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the operations period (through 2045).

CEQA Impact Determination

Impacts of Alternative 4 would be similar to but less than those identified for the proposed Project because the proposed 375 linear feet of wharf proposed south of Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be constructed/developed, and a total of nine A-frame cranes would be installed, thus resulting in less infrastructure that would be susceptible to seismically induced ground failure during operations. In all other respects, **Impact GEO-1b** would be the same as under the proposed Project. As with the proposed Project, seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure. Seismic hazards are common to the Los Angeles region and are not increased by Alternative 4. However, because the site is potentially underlain by strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts. Increased exposure of people and property during operations to seismic hazards from a major or great earthquake cannot be precluded, even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure are significant under CEQA.

Mitigation Measures

There are no mitigation measures available that would reduce impacts below a level of significance associated with seismically induced ground failure.

Residual Impacts

Design and construction in accordance with applicable laws and regulations pertaining to seismically induced ground movement would minimize structural damage in the event of an earthquake. However, increased exposure of people and property during operations to seismic hazards from a major or great earthquake cannot be precluded even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure would remain significant and unavoidable.

NEPA Impact Determination

Under this alternative, the proposed 375 linear feet of wharf proposed south of Berth 100 would not be constructed, and only 1.3 acres of fill would be required.

1 Because Alternative 4 would include less construction, potential impacts would be
2 similar to, but less severe than those described for the proposed Project under the
3 NEPA analysis. In all other respects, **Impact GEO-1b** would be the same as under
4 the proposed Project. Seismic hazards are common to the Los Angeles region and are
5 not increased by Alternative 4. However, because the Alternative 4 area is
6 potentially underlain by strands of the active Palos Verdes Fault and liquefaction-
7 prone hydraulic fill, there is a substantial risk of seismic impacts. Because operations
8 would occur over an extended period (through 2045), increased exposure of people
9 and property to seismic hazards from a major or great earthquake cannot be
10 precluded, even with incorporation of modern construction engineering and safety
11 standards. Therefore, impacts due to seismically induced ground failure are
12 significant under NEPA.

13 *Mitigation Measures*

14 There are no mitigation measures available that would reduce impacts below a level
15 of significance associated with seismically induced ground failure.

16 *Residual Impacts*

17 Design and construction in accordance with applicable laws and regulations
18 pertaining to seismically induced ground movement would minimize structural
19 damage in the event of an earthquake. However, increased exposure of people and
20 property during operations to seismic hazards from a major or great earthquake
21 cannot be precluded even with incorporation of modern construction engineering and
22 safety standards. Therefore, impacts due to seismically induced ground failure would
23 remain significant and unavoidable.

24 **Tsunamis and Seiches**

25 **Impact GEO-2b: Alternative 4 operations in the Port area would**
26 **expose people and structures to substantial risk involving tsunamis**
27 **or seiches. Local or distant seismic activity and/or offshore**
28 **landslides could result in the occurrence of tsunamis or seiches in**
29 **the Project area and vicinity.**

30 **CEQA Impact Determination**

31 Impacts of Alternative 4 would be similar to but less than those identified for the
32 proposed Project because the proposed 375 linear feet of wharf proposed south of
33 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
34 constructed/developed, and a total of nine A-frame cranes would be installed, thus
35 resulting in less infrastructure that would be susceptible to tsunamis or seiches. In all
36 other respects, **Impact GEO-2b** would be the same as under the proposed Project.
37 Therefore, impacts during the operations phase would be significant under CEQA.

38 *Mitigation Measures*

39 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
40 tsunami- and seiche-related impacts.

1 *Residual Impacts*

2 Emergency planning and coordination between the terminal operator and LAHD, as
3 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
4 during a tsunami. However, even with incorporation of emergency planning and
5 construction procedures in accordance with current City and state regulations,
6 substantial damage and/or injury could occur in the event of a tsunami or seiche.
7 Therefore, residual impacts would remain significant and unavoidable.

8 **NEPA Impact Determination**

9 Under this alternative, the proposed 375 linear feet of wharf proposed south of
10 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
11 Because Alternative 4 would include less infrastructure, potential impacts would be
12 similar to, but less severe than those described for the proposed Project under the
13 NEPA analysis. In all other respects, **Impact GEO-2b** would be the same as under
14 the proposed Project. Impacts from the theoretical maximum worst-case wave action
15 would be significant for the site under NEPA.

16 *Mitigation Measures*

17 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
18 tsunami- and seiche-related impacts.

19 *Residual Impacts*

20 Emergency planning and coordination between the terminal operator and the LAHD,
21 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
22 during a tsunami. However, even with incorporation of emergency planning and
23 construction procedures in accordance with current City and state regulations,
24 substantial damage and injury could occur in the event of a tsunami or seiche.
25 Therefore, residual impacts would remain significant and unavoidable.

26 **Subsidence/Soil Settlement**

27 **Impact GEO-3b: Alternative 4 operations would not result in**
28 **substantial damage to structures or infrastructure, or expose people**
29 **to substantial risk of injury from subsidence/soil settlement.**

30 **CEQA Impact Determination**

31 Impacts of Alternative 4 would be similar to but less than those identified for the
32 proposed Project because the proposed 375 linear feet of wharf proposed south of
33 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
34 constructed/developed, and a total of nine A-frame cranes would be installed, thus
35 resulting in less infrastructure that would be susceptible to subsidence/soil settlement
36 during operations. In all other respects, **Impact GEO-3b** would be the same as under
37 the proposed Project. Subsidence/soil settlement impacts would be less than
38 significant under CEQA because Alternative 4 would be designed and constructed in
39 compliance with the recommendations of a geotechnical engineer, consistent with
40 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code and in
41 conjunction with criteria established by LAHD and Caltrans. Thus, subsidence/soil
42 settlement impacts would be less than significant under CEQA and would not result

1 in substantial damage to structures or infrastructure, or expose people to substantial
2 risk of injury.

3 *Mitigation Measures*

4 Because subsidence/soil settlement impacts would be less than significant, no
5 mitigation measures are necessary.

6 *Residual Impacts*

7 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
8 Municipal Code, the residual impacts would be less than significant under CEQA.

9 **NEPA Impact Determination**

10 Under this alternative, the proposed 375 linear feet of wharf proposed south of
11 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
12 Because Alternative 4 would include less infrastructure, potential impacts would be
13 similar to, but less severe than those described for the proposed Project under the
14 NEPA analysis. In all other respects, **Impact GEO-3b** would be the same as under
15 the proposed Project. Subsidence/soil settlement impacts associated with these
16 actions would be less than significant under NEPA because these activities would not
17 result in substantial damage to structures or infrastructure, or expose people to
18 substantial risk of injury with implementation of standard geotechnical engineering
19 and Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in
20 conjunction with criteria established by LAHD and Caltrans.

21 *Mitigation Measures*

22 Because subsidence/soil settlement impacts would be less than significant, no
23 mitigation measures are necessary.

24 *Residual Impacts*

25 With implementation of standard geotechnical engineering, resulting in no required
26 mitigation, the residual impacts would be less than significant under NEPA.

27 **Expansive Soils**

28 **Impact GEO-4b: Alternative 4 operations would not result in**
29 **substantial damage to structures or infrastructure, or expose people**
30 **to substantial risk of injury from soil expansion.**

31 **CEQA Impact Determination**

32 Impacts of Alternative 4 would be similar to but less than those identified for the
33 proposed Project because the proposed 375 linear feet of wharf proposed south of
34 Berth 100 and 12 of the 25 acres of backland behind Berth 100 would not be
35 constructed/developed, and a total of nine A-frame cranes would be installed, thus
36 resulting in less infrastructure that would be susceptible to soil expansion during
37 operations. In all other respects, **Impact GEO-4b** would be the same as under the
38 proposed Project. Expansive soil impacts would be less than significant under CEQA
39 because Alternative 4 would be designed and constructed in compliance with the
40 recommendations of the geotechnical engineer, consistent with Sections 91.000
41 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria

1 established by LAHD. Thus, expansive soil impacts would be less than significant
2 under CEQA and would not result in substantial damage to structures or
3 infrastructure, or expose people to substantial risk of injury.

4 *Mitigation Measures*

5 Because expansive soil impacts would be less than significant, no mitigation
6 measures are necessary.

7 *Residual Impacts*

8 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
9 Municipal Code, the residual impacts would be less than significant under CEQA.

10 **NEPA Impact Determination**

11 Under this alternative, the proposed 375 linear feet of wharf proposed south of
12 Berth 100 would not be constructed, and only 1.3 acres of fill would be required.
13 Because Alternative 4 would include less construction, potential impacts would be
14 similar to, but less severe than those described for the proposed Project under the
15 NEPA analysis. In all other respects, **Impact GEO-4b** would be the same as under
16 the proposed Project. Use of expansive soils beneath Alternative 4 Project
17 foundations could result in cracking and distress of foundations. However, expansive
18 soil impacts would be less than significant under NEPA because these activities
19 would not result in substantial damage to structures or infrastructure, or expose
20 people to substantial risk of injury with implementation of standard geotechnical
21 engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal
22 Code, in conjunction with criteria established by LAHD.

23 *Mitigation Measures*

24 Because expansive soil impacts would be less than significant, no mitigation
25 measures are necessary.

26 *Residual Impacts*

27 With implementation of standard geotechnical engineering and Sections 91.000
28 through 91.7016 of the Los Angeles Municipal Code, there would be less than
29 significant residual impacts under NEPA.

30 **Landslides and Mudslides**

31 **Impact GEO-5b: Alternative 4 operations would not result in or**
32 **expose people or property to a substantial risk of landslides or**
33 **mudslides.**

34 **CEQA Impact Determination**

35 Because topography in the vicinity of the Alternative 4 site is flat and not subject to
36 landslides or mudflows, no impacts would occur under CEQA.

37 *Mitigation Measures*

38 Because landslide and mudslide impacts would not occur, no mitigation measures are
39 necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under CEQA.

3 **NEPA Impact Determination**

4 Because topography in the vicinity of the Alternative 4 site is flat and not subject to
5 landslides or mudflows, no impacts would occur under NEPA.

6 *Mitigation Measures*

7 Because landslide and mudslide impacts would not occur, no mitigation measures are
8 necessary.

9 *Residual Impacts*

10 With no mitigation required, there would be no residual impacts under NEPA.

11 **Unstable Soil Conditions**

12 **Impact GEO-6b: Collapsible soils would have no impact on**
13 **Alternative 4 operations and would not expose people or structures**
14 **to substantial risk.**

15 **CEQA Impact Determination**

16 Because excavations would not be completed as a part of Alternative 4 operations,
17 impacts associated with collapsible soils would not occur under CEQA.

18 *Mitigation Measures*

19 Because impacts associated with collapsible soils would not occur, no mitigation
20 measures are required.

21 *Residual Impacts*

22 With no mitigation required, there would be no residual impacts under CEQA.

23 **NEPA Impact Determination**

24 Because excavations would not be completed as a part of Alternative 4 operations,
25 impacts associated with collapsible soils would not occur under NEPA.

26 *Mitigation Measures*

27 Because impacts associated with collapsible soils would not occur, no mitigation
28 measures are required.

29 *Residual Impacts*

30 With no mitigation required, there would be no residual impacts under NEPA.

Prominent Geologic and Topographic Features

Impact GEO-7b: Alternative 4 operations would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

CEQA Impact Determination

Because topography in the vicinity of the Alternative 4 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under CEQA.

Mitigation Measures

Because impacts due to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Because topography in the vicinity of the Alternative 4 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under NEPA.

Mitigation Measures

Because impacts due to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Mineral Resources

Impact GEO-8b: Alternative 4 operations would not result in the permanent loss of availability of any mineral resource of regional, statewide, or local significance.

CEQA Impact Determination

The Alternative 4 site does not contain significant mineral resources. Therefore, Alternative 4 would not result in the permanent loss of availability of a known mineral resource that would be of future value to the region and the residents of the state. No impacts would occur under CEQA.

Mitigation Measures

Because no impacts to mineral resources would occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, no residual impacts would occur under CEQA.

3 **NEPA Impact Determination**

4 The Alternative 4 site does not contain significant mineral resources. Therefore,
5 Alternative 4 would not result in the permanent loss of availability of a known
6 mineral resource that would be of future value to the region and the residents of the
7 state and less than significant no impacts to mineral resource impacts would occur
8 under NEPA.

9 *Mitigation Measures*

10 Because no impacts to mineral resources would occur, no mitigation measures are
11 necessary.

12 *Residual Impacts*

13 With no mitigation required, no residual impacts would occur under NEPA.

14 **3.5.4.3.2.5 Alternative 5 – Reduced Construction and Operation: Phase I**
15 **Construction Only**

16 **3.5.4.3.2.5.1 Construction Impacts**

17 **Seismicity**

18 **Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone,**
19 **or other regional faults, could produce fault rupture, seismic ground**
20 **shaking, liquefaction, or other seismically induced ground failure**
21 **that would expose people and structures to substantial risk during**
22 **the construction period (through 2003).**

23 **CEQA Impact Determination**

24 Under the Reduced Construction and Operation: Phase I Construction Only Alternative
25 (Alternative 5), backlands would be limited to 72 acres, existing equipment and
26 facilities would remain, including four A-frame cranes, the bridge connecting
27 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
28 wharves and the 1.3 acres of fill associated with wharf construction. Phase I
29 construction was completed over a 2-year period from 2002 to 2003. Phase II and III
30 elements would not be implemented, thus resulting in no future construction
31 susceptibility to seismically induced ground failure. As with the proposed Project,
32 seismic activity along the Palos Verdes Fault zone, or other regional faults, could
33 produce fault rupture, seismic ground shaking, liquefaction, or other seismically
34 induced ground failure. Seismic hazards are common to the Los Angeles region and
35 are not increased by this alternative. Although the site is potentially underlain by
36 strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill,
37 construction was completed in 2003, and no seismic event occurred during the
38 construction period. Because of this, there is no risk of seismic impacts during
39 construction. Therefore, because Phase I construction was completed without a
40 significant seismic event, impacts under CEQA due to seismically induced ground
41 failure did not occur.

1 *Mitigation Measures*

2 No mitigation is required.

3 *Residual Impacts*

4 Since Phase I construction has been completed, no impacts during construction from
5 seismically induced ground failure remain.

6 **NEPA Impact Determination**

7 Although the site is potentially underlain by strands of the active Palos Verdes Fault
8 and liquefaction-prone hydraulic fill, construction was completed in 2003, and no
9 seismic event occurred during the construction period. Because of this, there is no
10 risk of seismic impacts during construction. Therefore, because Phase I construction
11 was completed without a significant seismic event, impacts under NEPA due to
12 seismically induced ground failure did not occur.

13 *Mitigation Measures*

14 No mitigation required.

15 *Residual Impacts*

16 Since Phase I construction has been completed, no impacts during construction from
17 seismically induced ground failure remain.

18 **Tsunamis and Seiches**

19 **Impact GEO-2a: Alternative 5 construction in the Port area would**
20 **expose people and structures to substantial risk involving tsunamis**
21 **or seiches. Local or distant seismic activity and/or offshore**
22 **landslides could result in the occurrence of tsunamis or seiches in**
23 **West Basin and vicinity.**

24 **CEQA Impact Determination**

25 Under Alternative 5, backlands would be limited to 72 acres, existing equipment and
26 facilities would remain, including four A-frame cranes, the bridge connecting
27 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
28 wharves and the 1.3 acres of fill associated with wharf construction. As described
29 above, Phase I construction was completed during a 2-year period from 2002 to 2003.
30 Phase II and III elements would not be implemented, thus resulting in no future
31 construction susceptibility to inundation from tsunamis/seiches. Because no tsunami
32 occurred during construction of phase I, no impact occurred under CEQA.

33 *Mitigation Measures*

34 No mitigation required.

35 *Residual Impacts*

36 Since Phase I construction has been completed, no impacts during construction from
37 tsunamis remain.

NEPA Impact Determination

Phase I construction was completed during a 2-year period during 2002 and 2003. Phase II and III elements would not be implemented, thus resulting in no future construction susceptibility to inundation from tsunamis/seiches. Because no tsunami occurred during construction of Phase I, no impact occurred under NEPA.

Mitigation Measures

No mitigation required.

Residual Impacts

Since Phase I construction has been completed, no impacts during construction from tsunamis remain.

Subsidence/Soil Settlement

Impact GEO-3a: Alternative 5 construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from subsidence/soil settlement.

CEQA Impact Determination

Under Alternative 5, backlands were limited to 72 acres, existing equipment and facilities would remain, including four A-frame cranes, the bridge connecting Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of wharves and the 1.3 acres of fill associated with wharf construction. Phase I construction was completed over a 2-year period during 2002 and 2003. Phase II and III elements would not be implemented, thus resulting in no future construction susceptibility to subsidence/soil settlement. Impacts in backland areas would be less than significant under CEQA because Alternative 5 (Phase I) was designed and constructed in compliance with the recommendations of a geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans. Construction of Alternative 5 did not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. No impacts occurred during construction.

Mitigation Measures

Because no subsidence/soil settlement impacts occurred, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts were less than significant under CEQA.

NEPA Impact Determination

Under this alternative, only 1.3 acres of fill would be required, and only 1,200 linear feet of new wharves were constructed, thus resulting in less infrastructure susceptible to seismically induced ground failure than under the proposed Project. Subsidence/soil settlement impacts associated with creation of 1.3 acres of fill would be less than significant under NEPA, with implementation of standard geotechnical engineering,

1 including incorporation of Sections 91.000 through 91.7016 of the Los Angeles
2 Municipal Code and criteria established by LAHD and Caltrans. Construction of
3 Alternative 5 did not result in substantial damage to structures or infrastructure, or
4 expose people to substantial risk of injury from subsidence/soil settlement.

5 *Mitigation Measures*

6 Because no subsidence/soil settlement impacts occurred, no mitigation measures
7 were necessary.

8 *Residual Impacts*

9 With implementation of standard geotechnical engineering, resulting in no required
10 mitigation, no residual impacts occurred under NEPA.

11 **Expansive Soils**

12 **Impact GEO-4a: Alternative 5 construction would not result in**
13 **substantial damage to structures or infrastructure, or expose people**
14 **to substantial risk of injury from soil expansion.**

15 **CEQA Impact Determination**

16 Under Alternative 5, backlands were limited to 72 acres, existing equipment and
17 facilities remain, including four A-frame cranes, the bridge connecting
18 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
19 wharves and the 1.3 acres of fill associated with wharf construction. Phase II and III
20 elements would not be implemented, thus resulting in no future construction
21 susceptibility to expansive soils. Expansive soil impacts in backland areas were less
22 than significant under CEQA because Alternative 5 was designed and constructed in
23 compliance with the recommendations of a geotechnical engineer, consistent with
24 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
25 conjunction with criteria established by LAHD. Construction of Alternative 5 did not
26 result in substantial damage to structures or infrastructure, or expose people to
27 substantial risk of injury from soil expansion.

28 *Mitigation Measures*

29 Because no expansive soil impacts occurred, no mitigation measures were necessary.

30 *Residual Impacts*

31 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
32 Municipal Code, no residual impacts occurred.

33 **NEPA Impact Determination**

34 Under this alternative, only 1.3 acres of fill were required, and only 1,200 linear feet of
35 new wharves were constructed, thus resulting in less infrastructure susceptible to
36 expansive soils. Expansive soil impacts in backland areas were less than significant
37 under NEPA with implementation of standard geotechnical engineering and
38 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction
39 with criteria established by LAHD. Construction of Alternative 5 did not result in
40 substantial damage to structures or infrastructure, or expose people to substantial risk
41 of injury from soil expansion.

1 *Mitigation Measures*
2 Because no expansive soil impacts occurred, no mitigation measures were necessary.

3 *Residual Impacts*
4 With implementation of standard geotechnical engineering and Sections 91.000
5 through 91.7016 of the Los Angeles Municipal Code, no residual impacts occurred
6 under NEPA.

7 **Landslides and Mudslides**

8 **Impact GEO-5a: Alternative 5 construction would not result in or**
9 **expose people or property to a substantial risk of landslides or**
10 **mudslides.**

11 **CEQA Impact Determination**

12 Because topography in the vicinity of the Alternative 5 site is flat and not subject to
13 landslides or mudflows, no impacts occurred under CEQA.

14 *Mitigation Measures*

15 Because landslide and mudslide impacts did not occur, no mitigation measures were
16 necessary.

17 *Residual Impacts*

18 With no mitigation required, there would be no residual impacts under CEQA.

19 **NEPA Impact Determination**

20 Because topography in the vicinity of the Alternative 5 site is flat and not subject to
21 landslides or mudflows, no impacts occurred under NEPA.

22 *Mitigation Measures*

23 Because landslide and mudslide impacts did not occur, no mitigation measures were
24 necessary.

25 *Residual Impacts*

26 With no mitigation required, there were no residual impacts under NEPA.

27 **Unstable Soil Conditions**

28 **Impact GEO-6a: Shallow groundwater, which would cause unstable**
29 **collapsible soils, may be encountered during excavations, but would**
30 **not expose people or structures to substantial risk.**

31 **CEQA Impact Determination**

32 Under Alternative 5, backlands were limited to 72 acres, existing equipment and
33 facilities remain, including four A-frame cranes, the bridge connecting
34 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
35 wharves and the 1.3 acres of fill associated with wharf construction. Elements of
36 Phases II and III would not be implemented, thus resulting in no future construction

1 susceptibility to unstable soil conditions. Due to implementation of standard
2 engineering practices regarding saturated and collapsible soils, no impacts occurred.

3 *Mitigation Measures*

4 Because no impacts associated with collapsible soils occurred, no mitigation
5 measures were required under CEQA.

6 *Residual Impacts*

7 With no mitigation required, no residual impacts occurred under CEQA.

8 **NEPA Impact Determination**

9 Under this alternative, only 1.3 acres of fill were required, and only 1,200 linear feet of
10 new wharves were constructed, thus resulting in less infrastructure susceptible to
11 expansive soils. Due to implementation of standard engineering practices regarding
12 saturated, collapsible soils, people and structures were not exposed to substantial
13 adverse effects from Alternative 5 and impacts associated with shallow groundwater
14 did not occur.

15 *Mitigation Measures*

16 As no impacts associated with collapsible soils occurred, no mitigation measures
17 were required under NEPA.

18 *Residual Impacts*

19 With implementation of standard engineering practices regarding saturated,
20 collapsible soils, no residual impacts occurred under NEPA.

21 **Prominent Geologic and Topographic Features**

22 **Impact GEO-7a: Alternative 5 construction would not result in one or**
23 **more distinct and prominent geologic or topographic features being**
24 **destroyed, permanently covered, or materially and adversely**
25 **modified.**

26 **CEQA Impact Determination**

27 Because topography in the vicinity of the Alternative 5 site is flat and does not
28 contain prominent geologic or topographic features, no impacts occurred under
29 CEQA.

30 *Mitigation Measures*

31 Because impacts due to removal of prominent geologic or topographic features did
32 not occur, no mitigation measures were necessary under CEQA.

33 *Residual Impacts*

34 With no mitigation required, there would be no residual impacts under CEQA.

1 **NEPA Impact Determination**

2 Because topography in the vicinity of the Alternative 5 site is flat and does not
3 contain prominent geologic or topographic features, no impacts occurred under
4 NEPA.

5 *Mitigation Measures*

6 Because impacts due to removal of prominent geologic or topographic features did
7 not occur, no mitigation measures were necessary under NEPA.

8 *Residual Impacts*

9 With no mitigation required, there were no residual impacts under NEPA.

10 **Mineral Resources**

11 **Impact GEO-8a: Alternative 5 site construction would not result in**
12 **the permanent loss of availability of any mineral resource of regional,**
13 **statewide, or local significance.**

14 **CEQA Impact Determination**

15 The Alternative 5 site does not contain significant mineral resources. Therefore,
16 Alternative 5 did not result in the permanent loss of availability of a known mineral
17 resource that would be of future value to the region and the residents of the state. No
18 impacts occurred under CEQA.

19 *Mitigation Measures*

20 Because no impacts to mineral resources occurred, no mitigation measures were
21 necessary under CEQA.

22 *Residual Impacts*

23 With no mitigation required, no residual impacts occurred under CEQA.

24 **NEPA Impact Determination**

25 The Alternative 5 site does not contain significant mineral resources. Therefore,
26 Alternative 5 did not result in the permanent loss of availability of a known mineral
27 resource that would be of future value to the region and the residents of the state and
28 less than significant no impacts to mineral resource impacts occurred under NEPA.

29 *Mitigation Measures*

30 Because no impacts to mineral resources occurred, no mitigation measures were
31 necessary under NEPA.

32 *Residual Impacts*

33 With no mitigation required, no residual impacts occurred under NEPA.

3.5.4.3.2.5.2 Operations Impacts

Seismicity

Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the operations period (through 2045).

CEQA Impact Determination

Under Alternative 5, backlands are limited to 72 acres, existing equipment and facilities would remain, including four A-frame cranes, the bridge connecting Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of wharves and the 1.3 acres of fill associated with wharf construction. Phase I improvements noted above were completed in 2003 and have been operational since 2004. Phase II and III elements would not be implemented, thus resulting in less infrastructure that is susceptible to seismically induced ground failure during operations than under the proposed Project. As with the proposed Project, seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure. Seismic hazards are common to the Los Angeles region and are not increased by Alternative 5. However, because the site is potentially underlain by strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts. Increased exposure of people and property during operations to seismic hazards from a major or great earthquake cannot be precluded, even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure are significant under CEQA.

Mitigation Measures

There are no mitigation measures available that would reduce impacts below a level of significance associated with seismically induced ground failure.

Residual Impacts

Design and construction in accordance with applicable laws and regulations pertaining to seismically induced ground movement would minimize structural damage in the event of an earthquake. However, increased exposure of people and property during operations to seismic hazards from a major or great earthquake cannot be precluded even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure would remain significant and unavoidable.

NEPA Impact Determination

Under this alternative, only 1.3 acres of fill was placed, and only 1,200 linear feet of new wharves were constructed, thus resulting in less infrastructure susceptible to seismically induced ground failure during operations than under the proposed Project. Seismic hazards are common to the Los Angeles region and are not increased by Alternative 5. However, because the Alternative 5 area is potentially underlain by

1 strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is
2 a substantial risk of seismic impacts. Increased exposure of people and property
3 during construction to seismic hazards from a major or great earthquake cannot be
4 precluded, even with incorporation of modern construction engineering and safety
5 standards. Therefore, impacts due to seismically induced ground failure are
6 significant under NEPA.

7 *Mitigation Measures*

8 There are no mitigation measures available that would reduce impacts below a level
9 of significance associated with seismically induced ground failure.

10 *Residual Impacts*

11 Design and construction in accordance with applicable laws and regulations
12 pertaining to seismically induced ground movement would minimize structural
13 damage in the event of an earthquake. However, increased exposure of people and
14 property during construction to seismic hazards from a major or great earthquake
15 cannot be precluded even with incorporation of modern construction engineering and
16 safety standards. Therefore, impacts due to seismically induced ground failure would
17 remain significant and unavoidable.

18 **Tsunamis and Seiches**

19 **Impact GEO-2b: Alternative 5 operations in the Port area would**
20 **expose people and structures to substantial risk involving tsunamis**
21 **or seiches. Local or distant seismic activity and/or offshore**
22 **landslides could result in the occurrence of tsunamis or seiches in**
23 **the Project area and vicinity.**

24 **CEQA Impact Determination**

25 Under Alternative 5, backlands are limited to 72 acres, since Phase I construction was
26 complete in 2003 and has been operational since 2004. Existing equipment and
27 facilities would remain, including four A-frame cranes, the bridge connecting
28 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
29 wharves and the 1.3 acres of fill associated with wharf construction. Phase II and III
30 elements would not be implemented, thus resulting in less infrastructure that is
31 susceptible to inundation than under the proposed Project. In all other respects,
32 **Impact GEO-2b** would be the same as under the proposed Project. Therefore,
33 impacts during the operations phase would be significant under CEQA.

34 *Mitigation Measures*

35 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
36 tsunami- and seiche-related impacts.

37 *Residual Impacts*

38 Emergency planning and coordination between the terminal operator and LAHD, as
39 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
40 during a tsunami. However, even with incorporation of emergency planning and
41 construction in accordance with current City and state regulations, substantial

1 damage and/or injury could occur in the event of a tsunami or seiche. Therefore,
2 residual impacts would remain significant and unavoidable.

3 **NEPA Impact Determination**

4 Under this alternative, 1.3 acres of fill were placed, and 1,200 linear feet of new
5 wharves were constructed. Because operations would occur over an extended period
6 (through at least 2045), increased exposure of people and property during operations
7 to seismically induced tsunamis or seiches from a major or great earthquake cannot
8 be precluded. As described above, impacts from the theoretical maximum worst-case
9 tide and wave action would be significant for the site under NEPA.

10 *Mitigation Measures*

11 **Mitigation Measure GEO-1** shall be applied to the NEPA project impact
12 determination to reduce tsunami- and seiche-related impacts.

13 *Residual Impacts*

14 Emergency planning and coordination between the terminal operator and the LAHD,
15 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
16 during a tsunami. However, even with incorporation of emergency planning and
17 construction procedures in accordance with current City and state regulations,
18 substantial damage and injury could occur in the event of a tsunami or seiche.
19 Therefore, residual impacts would remain significant and unavoidable.

20 **Subsidence/Soil Settlement**

21 **Impact GEO-3b: Alternative 5 operations would not result in**
22 **substantial damage to structures or infrastructure, or expose people**
23 **to substantial risk of injury from subsidence/soil settlement.**

24 **CEQA Impact Determination**

25 Under Alternative 5, backlands are limited to 72 acres, existing equipment and
26 facilities would remain, including four A-frame cranes, the bridge connecting
27 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
28 wharves and the 1.3 acres of fill associated with wharf construction. Phase II and III
29 elements would not be implemented, thus resulting in less infrastructure that is
30 susceptible to subsidence/soil settlement during operations than under the proposed
31 Project. In all other respects, **Impact GEO-3b** would be the same as under the
32 proposed Project. Subsidence/soil settlement impacts would be less than significant
33 under CEQA because Alternative 5 would be designed and constructed in compliance
34 with the recommendations of the geotechnical engineers, consistent with
35 implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal
36 Code, and in conjunction with criteria established by LAHD and Caltrans. Thus,
37 subsidence/soil settlement impacts would be less than significant under CEQA and
38 would not result in substantial damage to structures or infrastructure, or expose
39 people to substantial risk of injury.

40 *Mitigation Measures*

41 Because subsidence/soil settlement impacts would be less than significant, no
42 mitigation measures are necessary.

1 *Residual Impacts*

2 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
3 Municipal Code, the residual impacts would be less than significant under CEQA.

4 **NEPA Impact Determination**

5 Under this alternative, 1.3 acres of fill were placed, and 1,200 linear feet of new
6 wharves were constructed. Subsidence/soil settlement impacts associated with
7 terminal operations would be less than significant under NEPA because these
8 activities would not result in substantial damage to structures or infrastructure nor
9 expose people to substantial risk of injury with implementation of standard
10 geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles
11 Municipal Code, in conjunction with criteria established by LAHD and Caltrans.

12 *Mitigation Measures*

13 Because settlement/soil subsidence impacts would be less than significant, no
14 mitigation measures are necessary.

15 *Residual Impacts*

16 With implementation of standard geotechnical engineering, resulting in no required
17 mitigation, the residual impacts would be less than significant under NEPA.

18 **Expansive Soils**

19 **Impact GEO-4b: Alternative 5 operations would not result in**
20 **substantial damage to structures or infrastructure, or expose people**
21 **to substantial risk of injury from soil expansion.**

22 **CEQA Impact Determination**

23 Under Alternative 5, backlands are limited to 72 acres, existing equipment and
24 facilities would remain, including four A-frame cranes, the bridge connecting
25 Berths 121-131 to Berths 97-109, the paved backlands, and 1,200 linear feet of
26 wharves and the 1.3 acres of fill associated with wharf construction. Phase II and III
27 elements would not be implemented, thus resulting in less infrastructure that is
28 susceptible to soil expansion during operations than under the proposed Project. In
29 all other respects, **Impact GEO-4b** would be the same as under the proposed Project.
30 Expansive soil impacts in backland areas would be less than significant under CEQA
31 because Alternative 5 would be designed and constructed in compliance with the
32 recommendations of the geotechnical engineers, consistent with Sections 91.000
33 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria
34 established by LAHD. Thus, expansive soil impacts would be less than significant
35 under CEQA and would not result in substantial damage to structures or
36 infrastructure, or expose people to substantial risk of injury.

37 *Mitigation Measures*

38 Because expansive soil impacts would be less than significant, no mitigation
39 measures are necessary.

1 *Residual Impacts*

2 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
3 Municipal Code, the residual impacts would be less than significant under CEQA.

4 **NEPA Impact Determination**

5 Under this alternative, only 1.3 acres of fill were placed, and only 1,200 linear feet of
6 new wharves were constructed, which is not part of the NEPA baseline. Expansive
7 soil impacts would be less than significant under NEPA because these activities
8 would not result in substantial damage to structures or infrastructure nor expose
9 people to substantial risk of injury with implementation of standard geotechnical
10 engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal
11 Code, in conjunction with criteria established by LAHD.

12 *Mitigation Measures*

13 Because expansive soil impacts would be less than significant, no mitigation
14 measures are necessary.

15 *Residual Impacts*

16 With implementation of standard geotechnical engineering and Sections 91.000
17 through 91.7016 of the Los Angeles Municipal Code, there would be less than
18 significant residual impacts under NEPA.

19 **Landslides and Mudslides**

20 **Impact GEO-5b: Alternative 5 operations would not result in or**
21 **expose people or property to a substantial risk of landslides or**
22 **mudslides.**

23 **CEQA Impact Determination**

24 Because topography in the vicinity of the Alternative 5 site is flat and not subject to
25 landslides or mudflows, no impacts would occur under CEQA.

26 *Mitigation Measures*

27 Because landslide and mudslide impacts would not occur, no mitigation measures are
28 necessary.

29 *Residual Impacts*

30 With no mitigation required, there would be no residual impacts under CEQA.

31 **NEPA Impact Determination**

32 Because topography in the vicinity of the Alternative 5 site is flat and not subject to
33 landslides or mudflows, no impacts would occur under NEPA.

34 *Mitigation Measures*

35 Because landslide and mudslide impacts would not occur, no mitigation measures are
36 necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under NEPA.

3 **Unstable Soil Conditions**

4 **Impact GEO-6b: Collapsible soils would have no impact on**
5 **Alternative 5 operations and would not expose people or structures**
6 **to substantial risk.**

7 **CEQA Impact Determination**

8 Because excavations would not be completed as a part of Alternative 5 operations,
9 impacts associated with collapsible soils would not occur under CEQA.

10 *Mitigation Measures*

11 Because impacts associated with collapsible soils would not occur, no mitigation
12 measures are required.

13 *Residual Impacts*

14 With no mitigation required, there would be no residual impacts under CEQA.

15 **NEPA Impact Determination**

16 Because excavations would not be completed as a part of Alternative 5 operations,
17 impacts associated with collapsible soils would not occur under NEPA.

18 *Mitigation Measures*

19 Because impacts associated with collapsible soils would not occur, no mitigation
20 measures are required.

21 *Residual Impacts*

22 With no mitigation required, there would be no residual impacts under NEPA.

23 **Prominent Geologic and Topographic Features**

24 **Impact GEO-7b: Alternative 5 operations would not result in one or**
25 **more distinct and prominent geologic or topographic features being**
26 **destroyed, permanently covered, or materially and adversely**
27 **modified.**

28 **CEQA Impact Determination**

29 Because topography in the vicinity of the Alternative 5 site is flat and does not
30 contain prominent geologic or topographic features, no impacts would occur under
31 CEQA.

32 *Mitigation Measures*

33 Because impacts due to removal of prominent geologic or topographic features would
34 not occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under CEQA.

3 **NEPA Impact Determination**

4 Because topography in the vicinity of the Alternative 5 site is flat and does not
5 contain prominent geologic or topographic features, no impacts would occur under
6 CEQA.

7 *Mitigation Measures*

8 Because impacts due to removal of prominent geologic or topographic features would
9 not occur, no mitigation measures are necessary.

10 *Residual Impacts*

11 With no mitigation required, there would be no residual impacts under CEQA.

12 **Mineral Resources**

13 **Impact GEO-8b: Alternative 5 operations would not result in the**
14 **permanent loss of availability of any mineral resource of regional,**
15 **statewide, or local significance.**

16 **CEQA Impact Determination**

17 The Alternative 5 site does not contain significant mineral resources. Therefore,
18 Alternative 5 would not result in the permanent loss of availability of a known
19 mineral resource that would be of future value to the region and the residents of the
20 state. No impacts would occur under CEQA.

21 *Mitigation Measures*

22 Because no impacts to mineral resources would occur, no mitigation measures are
23 necessary.

24 *Residual Impacts*

25 With no mitigation required, no residual impacts would occur under CEQA.

26 **NEPA Impact Determination**

27 The Alternative 5 site does not contain significant mineral resources. Therefore,
28 Alternative 5 would not result in the permanent loss of availability of a known
29 mineral resource that would be of future value to the region and the residents of the
30 state and less than significant no impacts to mineral resource impacts would occur
31 under NEPA.

32 *Mitigation Measures*

33 Because no impacts to mineral resources would occur, no mitigation measures are
34 necessary.

35 *Residual Impacts*

36 With no mitigation required, no residual impacts would occur under NEPA.

1 **3.5.4.3.2.6 Alternative 6 – Omni Cargo Terminal**

2 **3.5.4.3.2.6.1 Construction Impacts**

3 **Seismicity**

4 **Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone,**
5 **or other regional faults, could produce fault rupture, seismic ground**
6 **shaking, liquefaction, or other seismically induced ground failure**
7 **that would expose people and structures to substantial risk during**
8 **the construction period (through 2012).**

9 **CEQA Impact Determination**

10 Construction impacts of the Omni Cargo Terminal Alternative (Alternative 6) would
11 be similar to those identified for the proposed Project because the amount of wharves
12 and backlands would be the same. Five fewer cranes would be installed than for the
13 proposed Project, but transit storage sheds would be constructed. In all other respects,
14 **Impact GEO-1a** would be the same as under the proposed Project. As with the
15 proposed Project, seismic activity along the Palos Verdes Fault zone, or other
16 regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or
17 other seismically induced ground failure. Seismic hazards are common to the
18 Los Angeles region and are not increased by this alternative. However, because the
19 site is potentially underlain by strands of the active Palos Verdes Fault and
20 liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts.
21 Seismic upgrades would be completed on existing wharves, resulting in beneficial
22 impacts. However, because construction of buildings and related infrastructure
23 would occur over multiple years, increased exposure of people and property during
24 construction to seismic hazards from a major or great earthquake cannot be precluded,
25 even with incorporation of modern construction engineering and safety standards.
26 Therefore, impacts due to seismically induced ground failure are significant and
27 unavoidable under CEQA.

28 *Mitigation Measures*

29 There are no mitigation measures available that would reduce impacts below a level
30 of significance associated with seismically induced ground failure.

31 *Residual Impacts*

32 Design and construction in accordance with applicable laws and regulations
33 pertaining to seismically induced ground movement would minimize structural
34 damage in the event of an earthquake. However, increased exposure of people and
35 property during construction to seismic hazards from a major or great earthquake
36 cannot be precluded even with incorporation of modern construction engineering and
37 safety standards. Therefore, impacts due to seismically induced ground failure would
38 remain significant and unavoidable.

39 **NEPA Impact Determination**

40 Alternative 6 would include the same amount of wharf construction, fill, and
41 backlands as the proposed Project, and **Impact GEO-2a** would be the same as under
42 the proposed Project under the NEPA analysis. Seismic hazards are common to the
43 Los Angeles region and are not increased by Alternative 6. Because the terminal site

1 is potentially underlain by strands of the active Palos Verdes Fault and liquefaction-
2 prone hydraulic fill, there is a substantial risk of seismic impacts. Because
3 construction would occur over multiple years, increased exposure of people and
4 property during construction to seismic hazards from a major or great earthquake
5 cannot be precluded, even with incorporation of modern construction engineering and
6 safety standards. Therefore, impacts due to seismically induced ground failure are
7 significant and unavoidable under NEPA.

8 *Mitigation Measures*

9 There are no mitigation measures available that would reduce impacts below a level
10 of significance associated with seismically induced ground failure.

11 *Residual Impacts*

12 Design and construction in accordance with applicable laws and regulations
13 pertaining to seismically induced ground movement would minimize structural
14 damage in the event of an earthquake. However, increased exposure of people and
15 property during construction to seismic hazards from a major or great earthquake
16 cannot be precluded even with incorporation of modern construction engineering and
17 safety standards. Therefore, impacts due to seismically induced ground failure would
18 remain significant and unavoidable.

19 **Tsunami Runup**

20 **Impact GEO-2a: Alternative 6 construction in the Port area would**
21 **expose people and structures to substantial risk involving tsunamis**
22 **or seiches. Local or distant seismic activity and/or offshore**
23 **landslides could result in the occurrence of tsunamis or seiches in**
24 **West Basin and vicinity.**

25 **CEQA Impact Determination**

26 Construction impacts of Alternative 6 would be similar to those identified for the
27 proposed Project because the level of development of the terminal site would be
28 approximately the same under each scenario. Thus, **Impact GEO-2a** would be the
29 same as under the proposed Project. Therefore, impacts during the construction
30 phase would be significant and unavoidable under CEQA.

31 *Mitigation Measures*

32 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
33 tsunami- and seiche-related impacts.

34 *Residual Impacts*

35 Emergency planning and coordination between the terminal operator and LAHD, as
36 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
37 during a tsunami. However, even with incorporation of emergency planning and
38 construction procedures in accordance with current City and state regulations,
39 substantial damage and/or injury could occur in the event of a tsunami or seiche.
40 Therefore, residual impacts would remain significant and unavoidable.

NEPA Impact Determination

Alternative 6 would include the same amount of wharf construction, fill, and backlands as the proposed Project, and **Impact GEO-2a** would be the same as under the proposed Project under the NEPA analysis. Therefore, impacts due to tsunamis and seiches during the construction phase would be significant and unavoidable under NEPA.

Mitigation Measures

MM GEO-1 shall be applied to the NEPA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and the LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations, substantial damage and injury could occur in the event of a tsunami or seiche. Therefore, residual impacts would remain significant and unavoidable.

Subsidence/Soil Settlement

Impact GEO-3a: Alternative 6 construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from subsidence/soil settlement.

CEQA Impact Determination

Construction impacts of Alternative 6 would be similar to those identified for the proposed Project because the level of development of the terminal site would be approximately the same under each scenario. Thus, **Impact GEO-3a** would be the same as under the proposed Project. Impacts would be less than significant under CEQA because Alternative 6 would be designed and constructed in compliance with the recommendations of the geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD and Caltrans, and would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because subsidence/soil settlement impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Alternative 6 would include the same amount of wharf construction, fill, and backlands as the proposed Project, and **Impact GEO-3a** would be as described for the proposed Project under the NEPA analysis. Impacts would be less than

1 significant under NEPA because Alternative 6 would be designed and constructed in
2 compliance with the recommendations of the geotechnical engineer, consistent with
3 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
4 conjunction with criteria established by LAHD and Caltrans, and would not result in
5 substantial damage to structures or infrastructure, or expose people to substantial risk
6 of injury.

7 *Mitigation Measures*

8 Because no subsidence/soil settlement impacts would occur, no mitigation measures
9 are necessary.

10 *Residual Impacts*

11 With no mitigation required, there would be no residual impacts under NEPA.

12 **Expansive Soils**

13 **Impact GEO-4a: Alternative 6 construction would not result in**
14 **substantial damage to structures or infrastructure, or expose people**
15 **to substantial risk of injury from soil expansion.**

16 **CEQA Impact Determination**

17 Construction impacts of Alternative 6 would be similar to those identified for the
18 proposed Project because the level of development of the terminal site would be
19 approximately the same under each scenario. Thus, **Impact GEO-4a** would be the
20 same as under the proposed Project. Expansive soil impacts would be less than
21 significant under CEQA because Alternative 6 would be designed and constructed in
22 compliance with the recommendations of the geotechnical engineer, consistent with
23 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
24 conjunction with criteria established by LAHD, and would not result in substantial
25 damage to structures or infrastructure, or expose people to substantial risk of injury.

26 *Mitigation Measures*

27 Because expansive soil impacts would be less than significant, no mitigation
28 measures are necessary.

29 *Residual Impacts*

30 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
31 Municipal Code, the residual impacts would be less than significant under CEQA.

32 **NEPA Impact Determination**

33 Alternative 6 would include the same amount of wharf construction, fill, and
34 backlands as the proposed Project, and **Impact GEO-4a** would be as described for
35 the proposed Project under the NEPA analysis. Expansive soil may be present in
36 dredged or imported soils used for filling the 2.5 acres. Use of expansive soils
37 beneath Alternative 6 foundations could result in cracking and distress of foundations.
38 However, expansive soil impacts in backland areas would be less than significant
39 under NEPA with implementation of standard geotechnical engineering and
40 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction

1 with criteria established by LAHD and would not result in substantial damage to
2 structures or infrastructure, or expose people to substantial risk of injury.

3 *Mitigation Measures*

4 Because expansive soil impacts would be less than significant, no mitigation
5 measures are necessary.

6 *Residual Impacts*

7 With implementation of standard geotechnical engineering and Sections 91.000
8 through 91.7016 of the Los Angeles Municipal Code, less than significant residual
9 impacts would occur under NEPA.

10 **Landslides and Mudslides**

11 **Impact GEO-5a: Alternative 6 construction would not result in or**
12 **expose people or property to a substantial risk of landslides or**
13 **mudslides.**

14 **CEQA Impact Determination**

15 Because topography in the vicinity of the Alternative 6 site is flat and not subject to
16 landslides or mudflows, no impacts would occur under CEQA.

17 *Mitigation Measures*

18 Because landslide and mudslide impacts would not occur, no mitigation measures are
19 necessary.

20 *Residual Impacts*

21 With no mitigation required, there would be no residual impacts under CEQA.

22 **NEPA Impact Determination**

23 Because topography in the vicinity of the Alternative 6 site is flat and not subject to
24 landslides or mudflows, no impacts would occur under NEPA.

25 *Mitigation Measures*

26 Because landslide and mudslide impacts would not occur, no mitigation measures are
27 necessary.

28 *Residual Impacts*

29 With no mitigation required, there would be no residual impacts under NEPA.

Unstable Soil Conditions

Impact GEO-6a: Shallow groundwater, which would cause unstable collapsible soils, may be encountered during excavations, but would not expose people or structures to substantial risk.

CEQA Impact Determination

Construction impacts of Alternative 6 would be similar to those identified for the proposed Project because the level of development of the terminal site would be approximately the same under each scenario. Thus, **Impact GEO-6a** would be the same as under the proposed Project. Therefore, impacts associated with shallow groundwater would be less than significant under CEQA due to implementation of standard engineering practices regarding saturated, collapsible soils.

Mitigation Measures

Because impacts associated with collapsible soils would be less than significant, no mitigation measures are required.

Residual Impacts

With no mitigation required, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Alternative 6 would include the same amount of wharf construction, fill, and backlands as the proposed Project, and **Impact GEO-6a** would be as described for the proposed Project under the NEPA analysis. Due to implementation of standard engineering practices regarding saturated, collapsible soils, people and structures would not be exposed to substantial adverse effects from Alternative 6, and impacts associated with shallow groundwater would be less than significant under NEPA.

Mitigation Measures

Because impacts associated with collapsible soils would be less than significant, no mitigation measures are required.

Residual Impacts

With implementation of standard engineering practices regarding saturated, collapsible soils, there would be less than significant residual impacts under NEPA.

Prominent Geologic and Topographic Features

Impact GEO-7a: Alternative 6 construction would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

CEQA Impact Determination

Because topography in the vicinity of the Alternative 6 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under CEQA.

Mitigation Measures

Because impacts due to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Because topography in the vicinity of the Alternative 6 Project site is flat and does not contain prominent geologic or topographic features, no impacts would occur under NEPA.

Mitigation Measures

Because impacts related to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Mineral Resources

Impact GEO-8a: Alternative 6 site construction would not result in the permanent loss of availability of any mineral resource of regional, statewide, or local significance.

CEQA Impact Determination

The Alternative 6 site does not contain significant mineral resources. Therefore, Alternative 6 would not result in the permanent loss of availability of a known mineral resource that would be of future value to the region and the residents of the state. No impacts would occur under CEQA.

Mitigation Measures

Because no impacts to mineral resources would occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, no residual impacts would occur under CEQA.

3 **NEPA Impact Determination**

4 The Alternative 6 site does not contain significant mineral resources. Therefore,
5 Alternative 6 would not result in the permanent loss of availability of a known
6 mineral resource that would be of future value to the region and the residents of the
7 state and less than significant no impacts to mineral resource impacts would occur
8 under NEPA.

9 *Mitigation Measures*

10 Because no impacts to mineral resources would occur, no mitigation measures are
11 necessary.

12 *Residual Impacts*

13 With no mitigation required, no residual impacts would occur under NEPA.

14 **3.5.4.3.2.6.2 Operations Impacts**

15 **Seismicity**

16 **Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone,
17 or other regional faults, could produce fault rupture, seismic ground
18 shaking, liquefaction, or other seismically induced ground failure
19 that would expose people and structures to substantial risk during
20 the operations period (through 2045).**

21 **CEQA Impact Determination**

22 Operations impacts of Alternative 6 would be similar to those identified for the
23 proposed Project because the level of development of the terminal site would be
24 approximately the same under each scenario. Thus, **Impact GEO-1b** would be the
25 same as under the proposed Project. As with the proposed Project, seismic activity
26 along the Palos Verdes Fault zone, or other regional faults, could produce fault
27 rupture, seismic ground shaking, liquefaction, or other seismically induced ground
28 failure. Seismic hazards are common to the Los Angeles region and are not increased
29 by Alternative 6. However, because the Alternative 6 site is potentially underlain by
30 strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is
31 a substantial risk of seismic impacts. Increased exposure of people and property
32 during operations to seismic hazards from a major or great earthquake cannot be
33 precluded, even with incorporation of modern construction engineering and safety
34 standards. Therefore, impacts due to seismically induced ground failure are
35 significant and unavoidable under CEQA.

36 *Mitigation Measures*

37 There are no mitigation measures available that would reduce impacts below a level
38 of significance associated with seismically induced ground failure.

1 *Residual Impacts*

2 Design and construction in accordance with applicable laws and regulations
3 pertaining to seismically induced ground movement would minimize structural
4 damage in the event of an earthquake. However, increased exposure of people and
5 property during operations to seismic hazards from a major or great earthquake
6 cannot be precluded even with incorporation of modern construction engineering and
7 safety standards. Therefore, impacts due to seismically induced ground failure would
8 remain significant and unavoidable.

9 **NEPA Impact Determination**

10 Alternative 6 would include the same amount of wharf construction, fill, and
11 backlands as the proposed Project, and **Impact GEO-1b** would be as described for
12 the proposed Project under the NEPA analysis. Seismic hazards are common to the
13 Los Angeles region and are not increased by Alternative 6. However, because the
14 Alternative 6 area is potentially underlain by strands of the active Palos Verdes Fault
15 and liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts.
16 Increased exposure of people and property during operations to seismic hazards from
17 a major or great earthquake cannot be precluded, even with incorporation of modern
18 construction engineering and safety standards. Therefore, impacts due to seismically
19 induced ground failure are significant and unavoidable under NEPA.

20 *Mitigation Measures*

21 There are no mitigation measures available that would reduce impacts below a level
22 of significance associated with seismically induced ground failure.

23 *Residual Impacts*

24 Design and construction in accordance with applicable laws and regulations
25 pertaining to seismically induced ground movement would minimize structural
26 damage in the event of an earthquake. However, increased exposure of people and
27 property during operations to seismic hazards from a major or great earthquake
28 cannot be precluded even with incorporation of modern construction engineering and
29 safety standards. Therefore, impacts due to seismically induced ground failure would
30 remain significant and unavoidable.

31 **Tsunamis and Seiches**

32 **Impact GEO-2b: Alternative 6 operations in the Port area would**
33 **expose people and structures to substantial risk involving tsunamis**
34 **or seiches. Local or distant seismic activity and/or offshore**
35 **landslides could result in the occurrence of tsunamis or seiches in**
36 **the Alternative 6 area and vicinity.**

37 **CEQA Impact Determination**

38 Operations impacts of Alternative 6 would be similar to those identified for the
39 proposed Project because the level of development of the terminal site would be
40 approximately the same under each scenario. Thus, **Impact GEO-2b** would be the
41 same as under the proposed Project. Therefore, impacts during the operations phase
42 of Alternative 6 would be significant and unavoidable under CEQA.

1 *Mitigation Measures*

2 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
3 tsunami- and seiche-related impacts.

4 *Residual Impacts*

5 Emergency planning and coordination between the terminal operator and LAHD, as
6 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
7 during a tsunami. However, even with incorporation of emergency planning and
8 construction procedures in accordance with current City and state regulations,
9 substantial damage and/or injury could occur in the event of a tsunami or seiche.
10 Therefore, residual impacts would remain significant and unavoidable.

11 **NEPA Impact Determination**

12 Alternative 6 would include the same amount of wharf construction, fill, and
13 backlands as the proposed Project, and **Impact GEO-4a** would be as described for
14 the proposed Project under the NEPA analysis. Because operations would occur over
15 an extended period (through at least 2045), increased exposure of people and
16 property during operations to seismically induced tsunamis or seiches from a major
17 or great earthquake cannot be precluded. Impacts from the theoretical maximum
18 worst-case wave action would be significant and unavoidable for the site under
19 NEPA.

20 *Mitigation Measures*

21 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
22 tsunami- and seiche-related impacts.

23 *Residual Impacts*

24 Emergency planning and coordination between the terminal operator and the LAHD,
25 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
26 during a tsunami. However, even with incorporation of emergency planning and
27 construction procedures in accordance with current City and state regulations,
28 substantial damage and injury could occur in the event of a tsunami or seiche.
29 Therefore, residual impacts would remain significant and unavoidable.

30 Therefore, impacts during the operations phase due to tsunamis and seiches would be
31 significant and unavoidable under NEPA.

32 **Subsidence/Soil Settlement**

33 **Impact GEO-3b: Alternative 6 operations would not result in**
34 **substantial damage to structures or infrastructure, or expose people**
35 **to substantial risk of injury from subsidence/soil settlement.**

36 **CEQA Impact Determination**

37 Operations impacts of Alternative 6 would be similar to those identified for the
38 proposed Project because the level of development of the terminal site would be
39 approximately the same under each scenario. Thus, **Impact GEO-3b** would be the
40 same as under the proposed Project. Subsidence/soil settlement impacts would be
41 less than significant under CEQA because Alternative 6 would be designed and

1 constructed in compliance with the recommendations of the geotechnical engineer,
2 consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code,
3 and in conjunction with criteria established by LAHD and Caltrans. Thus,
4 subsidence/soil settlement impacts would be less than significant under CEQA and
5 would not result in substantial damage to structures or infrastructure, or expose
6 people to substantial risk of injury.

7 *Mitigation Measures*

8 Because subsidence/soil settlement impacts would be less than significant, no
9 mitigation measures are necessary.

10 *Residual Impacts*

11 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
12 Municipal Code, the residual impacts would be less than significant under CEQA.

13 **NEPA Impact Determination**

14 Alternative 6 would include the same amount of wharf construction, fill, and
15 backlands as the proposed Project, and **Impact GEO-4a** would be as described for
16 the proposed Project under the NEPA analysis. Subsidence/soil settlement impacts
17 associated with these actions would be less than significant under NEPA because
18 these activities would not result in substantial damage to structures or infrastructure
19 nor expose people to substantial risk of injury with implementation of standard
20 geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles
21 Municipal Code, in conjunction with criteria established by LAHD and Caltrans.

22 *Mitigation Measures*

23 Because subsidence/soil settlement impacts would be less than significant, no
24 mitigation measures are necessary.

25 *Residual Impacts*

26 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
27 Municipal Code, the residual impacts would be less than significant under NEPA.

28 **Expansive Soils**

29 **Impact GEO-4b: Alternative 6 operations would not result in**
30 **substantial damage to structures or infrastructure, or expose people**
31 **to substantial risk of injury from soil expansion.**

32 **CEQA Impact Determination**

33 Operations impacts of Alternative 6 would be similar to those identified for the
34 proposed Project because the level of development of the terminal site would be
35 approximately the same under each scenario. Thus, **Impact GEO-4b** would be the
36 same as under the proposed Project. Expansive soil impacts would be less than
37 significant under CEQA because Alternative 6 would be designed and constructed in
38 compliance with the recommendations of the geotechnical engineer, consistent with
39 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in
40 conjunction with criteria established by LAHD. Thus, expansive soil impacts would

1 be less than significant under CEQA and would not result in substantial damage to
2 structures or infrastructure, or expose people to substantial risk of injury.

3 *Mitigation Measures*

4 Because expansive soil impacts would be less than significant, no mitigation
5 measures are necessary.

6 *Residual Impacts*

7 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
8 Municipal Code, the residual impacts would be less than significant under CEQA.

9 **NEPA Impact Determination**

10 The federal portions of Alternative 6 would be limited to wharf and in-water
11 construction activities, including the creation of 2.5 acres fill, new wharf construction,
12 and channel deepening, as well as limited backland areas (same as the proposed
13 Project described in Section 2.4.3, Federal Project). Expansive soil may be present in
14 dredged or imported soils used for filling the 2.5 acres. Use of expansive soils
15 beneath Alternative 6 foundations could result in cracking and distress of foundations.
16 However, expansive soil impacts in backland areas would be less than significant
17 under NEPA with implementation of standard geotechnical engineering and
18 Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction
19 with criteria established by LAHD and would not result in substantial damage to
20 structures or infrastructure, or expose people to substantial risk of injury.

21 *Mitigation Measures*

22 Because expansive soil impacts would be less than significant, no mitigation
23 measures are necessary.

24 *Residual Impacts*

25 With implementation of standard geotechnical engineering and Sections 91.000
26 through 91.7016 of the Los Angeles Municipal Code, less than significant residual
27 impacts would occur under NEPA.

28 **Landslides and Mudslides**

29 **Impact GEO-5b: Alternative 6 operations would not result in or**
30 **expose people or property to a substantial risk of landslides or**
31 **mudslides.**

32 **CEQA Impact Determination**

33 Because topography in the vicinity of the Alternative 6 site is flat and not subject to
34 landslides or mudflows, no impacts would occur under CEQA.

35 *Mitigation Measures*

36 Because landslide and mudslide impacts would not occur, no mitigation measures are
37 necessary.

38 *Residual Impacts*

39 With no mitigation required, there would be no residual impacts under CEQA.

1 **NEPA Impact Determination**

2 Because topography in the vicinity of the Alternative 6 site is flat and not subject to
3 landslides or mudflows, no impacts would occur under NEPA.

4 *Mitigation Measures*

5 Because landslide and mudslide impacts would not occur, no mitigation measures are
6 necessary.

7 *Residual Impacts*

8 With no mitigation required, there would be no residual impacts under NEPA.

9 **Unstable Soil Conditions**

10 **Impact GEO-6b: Collapsible soils would have no impact on**
11 **Alternative 6 operations and would not expose people or structures**
12 **to substantial risk.**

13 **CEQA Impact Determination**

14 Because excavations would not occur as a part of Alternative 6 operations, impacts
15 associated with collapsible soils would not occur under CEQA.

16 *Mitigation Measures*

17 Because impacts associated with collapsible soils would not occur, no mitigation
18 measures are required.

19 *Residual Impacts*

20 With no mitigation required, there would be no residual impacts under CEQA.

21 **NEPA Impact Determination**

22 Because excavations would not occur as a part of Alternative 6 operations, impacts
23 associated with collapsible soils would not occur under NEPA.

24 *Mitigation Measures*

25 Because impacts associated with collapsible soils would not occur, no mitigation
26 measures are required.

27 *Residual Impacts*

28 With no mitigation required, there would be no residual impacts under NEPA.

Prominent Geologic and Topographic Features

Impact GEO-7b: Alternative 6 operations would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.

CEQA Impact Determination

Because topography in the vicinity of the Alternative 6 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under CEQA.

Mitigation Measures

Because impacts due to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under CEQA.

NEPA Impact Determination

Because topography in the vicinity of the Alternative 6 site is flat and does not contain prominent geologic or topographic features, no impacts would occur under NEPA.

Mitigation Measures

Because impacts related to removal of prominent geologic or topographic features would not occur, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Mineral Resources

Impact GEO-8b: Alternative 6 operations would not result in the permanent loss of availability of any mineral resource of regional, statewide, or local significance.

CEQA Impact Determination

The Alternative 6 site does not contain significant mineral resources. Therefore, Alternative 6 would not result in the permanent loss of availability of a known mineral resource that would be of future value to the region and the residents of the state. No impacts would occur under CEQA.

Mitigation Measures

Because no impacts to mineral resources would occur, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, no residual impacts would occur under CEQA.

3 **NEPA Impact Determination**

4 The Alternative 6 site does not contain significant mineral resources. Therefore,
5 Alternative 6 would not result in the permanent loss of availability of a known
6 mineral resource that would be of future value to the region and the residents of the
7 state and less than significant no impacts to mineral resource impacts would occur
8 under NEPA.

9 *Mitigation Measures*

10 Because no impacts to significant mineral resources would occur, no mitigation
11 measures are necessary.

12 *Residual Impacts*

13 With no mitigation required, no residual impacts would occur under NEPA.

14 **3.5.4.3.2.7 Alternative 7 – Nonshipping Use**

15 Alternative 7 would utilize the terminal site constructed as part of Phase I for a Regional
16 Center of retail, office park, and light industrial uses. Because of this, the Phase I
17 construction activities are included under Alternative 7 even though the in-water
18 elements would not be used, i.e., the dike, fill, and the wharf would be abandoned in
19 place.

20 Alternative 7 would convert the 72 acres of backlands from shipping and containerized
21 storage to retail, office park, and light industrial uses on a site totaling 117 acres. A
22 public dock would be constructed but would be developed only to support small
23 watercraft. Additional wharves would not be constructed and the Catalina Express
24 Terminal would not be relocated under this alternative.

25 **3.5.4.3.2.7.1 Construction Impacts**

26 **Seismicity**

27 **Impact GEO-1a: Seismic activity along the Palos Verdes Fault zone,**
28 **or other regional faults, could produce fault rupture, seismic ground**
29 **shaking, liquefaction, or other seismically induced ground failure**
30 **that would expose people and structures to substantial risk during**
31 **the construction period (through 2012).**

32 **CEQA Impact Determination**

33 Seismic impacts for the Nonshipping Use Alternative (Alternative 7) would be similar
34 to those described for the proposed Project. Less acreage would be developed
35 (117 acres), less fill would be placed and new bridge construction would not occur.
36 Existing developments, however, would be abandoned in place or removed and
37 mixed use retail/commercial buildings and related infrastructure would be
38 constructed. A public dock would be constructed to support the onsite retail and
39 restaurant uses. This dock would be constructed to provide service and access to
40 smaller watercraft (such as small boats, wave runners, and kayaks). The public dock

1 would likely be a floating dock with access ramps connected to the existing wharf or
2 adjacent area to allow recreational users access to the Regional Center. All facilities
3 and infrastructure included in this alternative would be susceptible to seismically
4 induced ground failure, and **Impact GEO-1a** would be the same as under the
5 proposed Project. As with the proposed Project, seismic activity along the Palos
6 Verdes Fault zone, or other regional faults, could produce fault rupture, seismic
7 ground shaking, liquefaction, or other seismically induced ground failure. Seismic
8 hazards are common to the Los Angeles region and are not increased by this
9 alternative. However, because the site is potentially underlain by strands of the
10 active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is a substantial
11 risk of seismic impacts. Because construction would occur over an extended period
12 (through 2012), increased exposure of people and property during construction to
13 seismic hazards from a major or great earthquake cannot be precluded, even with
14 incorporation of modern construction engineering and safety standards. Therefore,
15 impacts due to seismically induced ground failure are significant under CEQA.

16 *Mitigation Measures*

17 There are no mitigation measures available that would reduce impacts below a level
18 of significance associated with seismically induced ground failure.

19 *Residual Impacts*

20 Design and construction in accordance with applicable laws and regulations
21 pertaining to seismically induced ground movement would minimize structural
22 damage in the event of an earthquake. However, increased exposure of people and
23 property during construction to seismic hazards from a major or great earthquake
24 cannot be precluded even with incorporation of modern construction engineering and
25 safety standards. Therefore, impacts due to seismically induced ground failure would
26 remain significant and unavoidable.

27 **NEPA Impact Determination**

28 Under this alternative, a public dock would be constructed to support the onsite retail
29 and restaurant uses that were not included in the NEPA baseline conditions. This
30 dock would be constructed to provide service and access to smaller watercraft (such
31 as small boats, wave runners, and kayaks). The public dock would likely be a
32 floating dock with access ramps connected to the existing wharf or adjacent area to
33 allow recreational users access to the Regional Center. Potential impacts associated
34 with Alternative 7 would be similar to those described for the proposed Project under
35 the NEPA analysis, and **Impact GEO-1a** would be the same as under the proposed
36 Project. Seismic hazards are common to the Los Angeles region and are not
37 increased by Alternative 7. Because the West Basin area is potentially underlain by
38 strands of the active Palos Verdes Fault and liquefaction-prone hydraulic fill, there is
39 a substantial risk of seismic impacts. Because construction would occur over
40 multiple years, increased exposure of people and property during construction to
41 seismic hazards from a major or great earthquake cannot be precluded, even with
42 incorporation of modern construction engineering and safety standards. Therefore,
43 impacts due to seismically induced ground failure are significant under NEPA.

44 *Mitigation Measures*

45 There are no mitigation measures available that would reduce impacts below a level
46 of significance associated with seismically induced ground failure.

Residual Impacts

Design and construction in accordance with applicable laws and regulations pertaining to seismically induced ground movement would minimize structural damage in the event of an earthquake. However, increased exposure of people and property during construction to seismic hazards from a major or great earthquake cannot be precluded even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure would remain significant and unavoidable.

Tsunami Runup

Impact GEO-2a: Alternative 7 construction in the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches in West Basin and vicinity.

CEQA Impact Determination

Impacts for Alternative 7 would be similar to those described for the proposed Project. Less acreage would be developed (117 acres), less fill would be placed and new bridge construction would not occur. Existing developments, however, would be abandoned in place or removed and mixed use retail/commercial buildings and related infrastructure would be constructed. A public dock would be constructed to support the onsite retail and restaurant uses. This dock would be constructed to provide service and access to smaller watercraft (such as small boats, wave runners, and kayaks). The public dock likely would be a floating dock with access ramps connected to the existing wharf or adjacent area to allow recreational users access to the Regional Center. Although the existing development would be demolished, the mixed use commercial/retail buildings and infrastructure included in this alternative would be susceptible to inundation. **Impact GEO-2a** would be the same as under the proposed Project. Therefore, impacts during the construction phase of Alternative 7 would be significant under CEQA.

Mitigation Measures

MM GEO-1 shall be applied to the CEQA project impact determination to reduce tsunami- and seiche-related impacts.

Residual Impacts

Emergency planning and coordination between the terminal operator and LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations, substantial damage and/or injury could occur in the event of a tsunami or seiche. Therefore, residual impacts would remain significant and unavoidable.

NEPA Impact Determination

Under this alternative, construction that would occur in the in-water area would include improvements at Berth 102 to install floating dock(s) and ramps for public recreational uses that were not part of the NEPA baseline. Potential impacts

1 associated with Alternative 6 would be similar to those described for the proposed
2 Project under the NEPA analysis, and **Impact GEO-2a** would be the same as under
3 the proposed Project. Therefore, impacts due to tsunamis and seiches during the
4 construction phase would be significant under NEPA.

5 *Mitigation Measures*

6 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
7 tsunami- and seiche-related impacts.

8 *Residual Impacts*

9 Emergency planning and coordination between the terminal operator and the LAHD,
10 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
11 during a tsunami. However, even with incorporation of emergency planning and
12 construction procedures in accordance with current City and state regulations,
13 substantial damage and injury could occur in the event of a tsunami or seiche.
14 Therefore, residual impacts would remain significant and unavoidable.

15 **Subsidence/Soil Settlement**

16 **Impact GEO-3a: Alternative 7 construction would not result in**
17 **substantial damage to structures or infrastructure, or expose people**
18 **to substantial risk of injury from subsidence/soil settlement.**

19 **CEQA Impact Determination**

20 Impacts for Alternative 7 would be similar to those described for the proposed
21 Project. Less acreage would be developed (117 acres), less fill would be placed, and
22 new bridge construction would not occur. Existing developments, however, would
23 be abandoned in place or removed and mixed use retail/commercial buildings and
24 related infrastructure would be constructed. A public dock would be constructed to
25 support the onsite retail and restaurant uses. This dock would be constructed to
26 provide service and access to smaller watercraft (such as small boats, wave runners,
27 and kayaks). The public dock likely would be a floating dock with access ramps
28 connected to the existing wharf or adjacent area to allow recreational users access to
29 the Regional Center. **Impact GEO-3a** would be the same as under the proposed
30 Project. Impacts in would be less than significant under CEQA because Alternative 7
31 would be designed and constructed in compliance with the recommendations of the
32 geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the
33 Los Angeles Municipal Code, and in conjunction with criteria established by LAHD
34 and Caltrans and would not result in substantial damage to structures or infrastructure
35 nor expose people to substantial risk of injury.

36 *Mitigation Measures*

37 Because subsidence/soil settlement impacts would be less than significant, no
38 mitigation measures are necessary.

39 *Residual Impacts*

40 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
41 Municipal Code resulting in no required mitigation, the residual impacts would be
42 less than significant under CEQA.

NEPA Impact Determination

Under this alternative, development that would occur in the in-water area would include improvements at Berth 102 to install floating dock(s) and ramps for public recreational uses that were not part of the NEPA baseline. Potential impacts associated with Alternative 7 would be similar to those described for the proposed Project under the NEPA analysis, and **Impact GEO-3a** would be the same as under the proposed Project. Impacts would be less than significant under NEPA because Alternative 7 would be designed and constructed in compliance with the recommendations of the geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code and in conjunction with criteria established by LAHD and Caltrans and would not result in substantial damage to structures or infrastructure nor expose people to substantial risk of injury.

Mitigation Measures

Because subsidence/soil settlement impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With no mitigation required, there would be no residual impacts under NEPA.

Expansive Soils

Impact GEO-4a: Alternative 7 construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.

CEQA Impact Determination

Impacts for Alternative 7 would be similar to those described for the proposed Project. Less acreage would be developed (117 acres), less fill would be placed, and new bridge construction would not occur. Existing developments, however, would be abandoned in place or removed and mixed use retail/commercial buildings and related infrastructure would be constructed. A public dock would be constructed to support the onsite retail and restaurant uses. This dock would be constructed to provide service and access to smaller watercraft (such as small boats, wave runners, and kayaks). The public dock likely would be a floating dock with access ramps connected to the existing wharf or adjacent area to allow recreational users access to the Regional Center. **Impact GEO-4a** would be the same as under the proposed Project. Expansive soil impacts would be less than significant under CEQA because Alternative 7 would be designed and constructed in compliance with the recommendations of the geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD, and would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Mitigation Measures

Because expansive soil impacts would be less than significant, no mitigation measures are necessary.

1 *Residual Impacts*

2 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
3 Municipal Code, resulting in no required mitigation, the residual impacts would be
4 less than significant under CEQA.

5 **NEPA Impact Determination**

6 Under this alternative, development that would occur in the in-water area would
7 include improvements at Berth 102 to install floating dock(s) and ramps for public
8 recreational uses that are not a part of the NEPA baseline. Potential impacts
9 associated with Alternative 7 would be similar to those described for the proposed
10 Project under the NEPA analysis, and **Impact GEO-4a** would be the same as under
11 the proposed Project. Expansive soil impacts in Alternative 7 areas would be less
12 than significant under NEPA with implementation of standard geotechnical
13 engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal
14 Code in conjunction with criteria established by LAHD and would not result in
15 substantial damage to structures or infrastructure, or expose people to substantial risk
16 of injury.

17 *Mitigation Measures*

18 Because expansive soil impacts would be less than significant, no mitigation
19 measures are necessary.

20 *Residual Impacts*

21 With implementation of standard geotechnical engineering and Sections 91.000
22 through 91.7016 of the Los Angeles Municipal Code, less than significant residual
23 impacts would occur under NEPA.

24 **Landslides and Mudslides**

25 **Impact GEO-5a: Alternative 7 construction would not result in or**
26 **expose people or property to a substantial risk of landslides or**
27 **mudslides.**

28 **CEQA Impact Determination**

29 Because topography in the vicinity of the Alternative 7 site is flat and not subject to
30 landslides or mudflows, no impacts would occur under CEQA.

31 *Mitigation Measures*

32 Because landslide and mudslide impacts would not occur, no mitigation measures are
33 necessary.

34 *Residual Impacts*

35 With no mitigation required, there would be no residual impacts under CEQA.

36 **NEPA Impact Determination**

37 Because topography in the vicinity of the Alternative 7 site is flat and not subject to
38 landslides or mudflows, no impacts would occur under NEPA.

1 *Mitigation Measures*

2 Because landslide and mudslide impacts would not occur, no mitigation measures are
3 necessary.

4 *Residual Impacts*

5 With no mitigation required, there would be no residual impacts under NEPA.

6 **Unstable Soil Conditions**

7 **Impact GEO-6a: Shallow groundwater, which would cause unstable**
8 **collapsible soils, may be encountered during excavations, but would**
9 **not expose people or structures to substantial risk.**

10 **CEQA Impact Determination**

11 Impacts for Alternative 7 would be similar to those described for the proposed
12 Project. Less acreage would be developed (117 acres), less fill would be placed, and
13 new bridge construction would not occur. Existing developments, however, would
14 be abandoned in place or removed and mixed use retail/commercial buildings and
15 related infrastructure would be constructed. A public dock would be constructed to
16 support the onsite retail and restaurant uses. This dock would be constructed to
17 provide service and access to smaller watercraft (such as small boats, wave runners,
18 and kayaks). The public dock likely would be a floating dock with access ramps
19 connected to the existing wharf or adjacent area to allow recreational users access to
20 the Regional Center. **Impact GEO-6a** would be the same as under the proposed
21 Project. Impacts associated with shallow groundwater would be less than significant
22 under CEQA due to implementation of standard engineering practices regarding
23 saturated, collapsible soils.

24 *Mitigation Measures*

25 Because impacts associated with collapsible soils would be less than significant, no
26 mitigation measures are required.

27 *Residual Impacts*

28 The residual impacts would be less than significant under CEQA.

29 **NEPA Impact Determination**

30 Under this alternative, development that would occur in the in-water area would
31 include improvements at Berth 102 to install floating dock(s) and ramps for public
32 recreational uses that are not a part of the NEPA baseline. Potential impacts
33 associated with Alternative 7 would be similar to those described for the proposed
34 Project under the NEPA analysis, and **Impact GEO-4a** would be the same as under
35 the proposed Project. Due to implementation of standard engineering practices
36 regarding saturated, collapsible soils, people and structures would not be exposed to
37 substantial adverse effects from the proposed Project, and impacts associated with
38 shallow groundwater would be less than significant under NEPA.

39 *Mitigation Measures*

40 Because shallow groundwater and collapsible soils impacts would be less than
41 significant, no mitigation measures are necessary.

1 *Residual Impacts*

2 With no mitigation required, there would be no residual impacts under NEPA.

3 **Prominent Geologic and Topographic Features**

4 **Impact GEO-7a: Alternative 7 construction would not result in one or**
5 **more distinct and prominent geologic or topographic features being**
6 **destroyed, permanently covered, or materially and adversely**
7 **modified.**

8 **CEQA Impact Determination**

9 Because topography in the vicinity of the Alternative 7 site is flat and does not
10 contain prominent geologic or topographic features, no impacts would occur under
11 CEQA.

12 *Mitigation Measures*

13 Because impacts due to removal of prominent geologic or topographic features would
14 not occur, no mitigation measures are necessary.

15 *Residual Impacts*

16 With no mitigation required, there would be no residual impacts under CEQA.

17 **NEPA Impact Determination**

18 Because topography in the vicinity of the Alternative 7 site is flat and does not
19 contain prominent geologic or topographic features, no impacts would occur under
20 NEPA.

21 *Mitigation Measures*

22 Because impacts related to removal of prominent geologic or topographic features
23 would not occur, no mitigation measures are necessary.

24 *Residual Impacts*

25 With no mitigation required, there would be no residual impacts under NEPA.

26 **Mineral Resources**

27 **Impact GEO-8a: Alternative 7 site construction would not result in**
28 **the permanent loss of availability of any mineral resource of regional,**
29 **statewide, or local significance.**

30 **CEQA Impact Determination**

31 The Alternative 7 site does not contain significant mineral resources. Therefore,
32 Alternative 7 would not result in the permanent loss of availability of a known
33 mineral resource that would be of future value to the region and the residents of the
34 state. No impacts would occur under CEQA.

1 *Mitigation Measures*

2 Because no impacts to significant mineral resources would occur, no mitigation
3 measures are necessary.

4 *Residual Impacts*

5 With no mitigation required, no residual impacts would occur under CEQA.

6 **NEPA Impact Determination**

7 The Alternative 7 site does not contain significant mineral resources. Therefore,
8 Alternative 7 would not result in the permanent loss of availability of a known
9 mineral resource that would be of future value to the region and the residents of the
10 state and less than significant no impacts to mineral resource impacts would occur
11 under NEPA.

12 *Mitigation Measures*

13 Because no impacts to significant mineral resources would occur, no mitigation
14 measures are necessary.

15 *Residual Impacts*

16 With no mitigation required, no residual impacts would occur under NEPA.

17 **3.5.4.3.2.7.2 Operations Impacts**

18 **Seismicity**

19 **Impact GEO-1b: Seismic activity along the Palos Verdes Fault zone,**
20 **or other regional faults, could produce fault rupture, seismic ground**
21 **shaking, liquefaction, or other seismically induced ground failure**
22 **that would expose people and structures to substantial risk during**
23 **the operations period (through 2045).**

24 **CEQA Impact Determination**

25 Seismic impacts for the Nonshipping Use Alternative (Alternative 7) would be similar
26 to those described for the proposed Project. Less acreage would be developed
27 (117 acres), less fill would be placed and new bridge construction would not occur.
28 Existing developments, however, would be abandoned in place or removed and
29 mixed use retail/commercial buildings and related infrastructure would be
30 constructed. A public dock would be constructed to support the onsite retail and
31 restaurant uses. This dock would be constructed to provide service and access to
32 smaller watercraft (such as small boats, wave runners, and kayaks). The public dock
33 likely would be a floating dock with access ramps connected to the existing wharf or
34 adjacent area to allow recreational users access to the Regional Center. The number
35 of persons present at the Regional Center during the day would exceed those
36 associated with the proposed Project. **Impact GEO-1b** would be the same as, or
37 greater than, under the proposed Project. As with the proposed Project, seismic
38 activity along the Palos Verdes Fault zone, or other regional faults, could produce
39 fault rupture, seismic ground shaking, liquefaction, or other seismically induced
40 ground failure. Seismic hazards are common to the Los Angeles region and are not
41 increased by Alternative 7. However, because the Alternative 7 site is potentially

1 underlain by strands of the active Palos Verdes Fault and liquefaction-prone
2 hydraulic fill, there is a substantial risk of seismic impacts. Because Alternative 7
3 includes uses that would involve a higher level of public use and more people onsite
4 occur over an extended period, increased exposure of people and property during
5 operations to seismic hazards from a major or great earthquake cannot be precluded,
6 even with incorporation of modern construction engineering and safety standards.
7 Therefore, impacts due to seismically induced ground failure are significant under
8 CEQA.

9 *Mitigation Measures*

10 There are no mitigation measures available that would reduce impacts below a level
11 of significance associated with seismically induced ground failure.

12 *Residual Impacts*

13 Design and construction in accordance with applicable laws and regulations
14 pertaining to seismically induced ground movement would minimize structural
15 damage in the event of an earthquake. However, increased exposure of people and
16 property during operations to seismic hazards from a major or great earthquake
17 cannot be precluded even with incorporation of modern construction engineering and
18 safety standards. Therefore, impacts due to seismically induced ground failure would
19 remain significant and unavoidable.

20 **NEPA Impact Determination**

21 Under this alternative, development that would occur in the in-water area would
22 include improvements at Berth 102 to install floating dock(s) and ramps for public
23 recreational uses that were not part of the NEPA baseline. Potential impacts
24 associated with Alternative 7 would be similar to those described for the proposed
25 Project under the NEPA analysis, and **Impact GEO-1b** would be the same as, or
26 greater than, under the proposed Project. Seismic hazards are common to the
27 Los Angeles region and are not increased by Alternative 7. Because the West Basin
28 area is potentially underlain by strands of the active Palos Verdes Fault and
29 liquefaction-prone hydraulic fill, there is a substantial risk of seismic impacts.
30 Because Alternative 7 includes uses that will involve a higher level of public use and
31 more people onsite occur over an extended period (through 2045), increased exposure
32 of people and property during operations to seismic hazards from a major or great
33 earthquake cannot be precluded, even with incorporation of modern construction
34 engineering and safety standards. Therefore, impacts due to seismically induced
35 ground failure are significant under NEPA.

36 *Mitigation Measures*

37 There are no mitigation measures available that would reduce impacts below a level
38 of significance associated with seismically induced ground failure.

39 *Residual Impacts*

40 Design and construction in accordance with applicable laws and regulations
41 pertaining to seismically induced ground movement would minimize structural
42 damage in the event of an earthquake. However, increased exposure of people and
43 property during construction to seismic hazards from a major or great earthquake
44 cannot be precluded even with incorporation of modern construction engineering and

1 safety standards. Therefore, impacts due to seismically induced ground failure would
2 remain significant and unavoidable.

3 **Tsunamis and Seiches**

4 **Impact GEO-2b: Alternative 7 operations in the Port area would**
5 **expose people and structures to substantial risk involving tsunamis**
6 **or seiches. Local or distant seismic activity and/or offshore**
7 **landslides could result in the occurrence of tsunamis or seiches in**
8 **the Alternative 7 area and vicinity.**

9 **CEQA Impact Determination**

10 Impacts for Alternative 7 would be similar to those described for the proposed
11 Project. Less acreage would be developed (117 acres), less fill would be placed, and
12 new bridge construction would not occur. Existing developments, however, would
13 be abandoned in place or removed and mixed use retail/commercial buildings and
14 related infrastructure would be constructed. A public dock would be constructed to
15 support the onsite retail and restaurant uses. This dock would be constructed to
16 provide service and access to smaller watercraft (such as small boats, wave runners,
17 and kayaks). The public dock would likely be a floating dock with access ramps
18 connected to the existing wharf or adjacent area to allow recreational users access to
19 the Regional Center. The number of persons present at the Regional Center during
20 the day would exceed those associated with the proposed Project. **Impact GEO-2b**
21 would be the same as, or greater than, under the proposed Project. Therefore,
22 impacts during the operations phase of Alternative 7 would be significant under
23 CEQA.

24 *Mitigation Measures*

25 **MM GEO-1** shall be applied to the CEQA project impact determination to reduce
26 tsunami- and seiche-related impacts.

27 *Residual Impacts*

28 Emergency planning and coordination between the terminal operator and LAHD, as
29 outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
30 during a tsunami. However, even with incorporation of emergency planning and
31 construction procedures in accordance with current City and state regulations,
32 substantial damage and/or injury could occur in the event of a tsunami or seiche.
33 Therefore, residual impacts would remain significant and unavoidable.

34 **NEPA Impact Determination**

35 Under this alternative, development that would occur in the in-water area would
36 include improvements at Berth 102 to install floating dock(s) and ramps for public
37 recreational uses that were not part of the NEPA baseline. Potential impacts
38 associated with Alternative 7 would be similar to those described for the proposed
39 Project under the NEPA analysis. Because Alternative 7 would involve more people
40 (employees and customers) in operation of a mixed use commercial/retail
41 development, potential impacts would be similar to, or more severe than, those
42 described for the proposed Project under the NEPA analysis. **Impact GEO-2b**
43 would be the same as, or greater than, under the proposed Project. Therefore,

1 impacts due to tsunamis and seiches during the construction phase would be
2 significant under NEPA.

3 *Mitigation Measures*

4 **MM GEO-1** shall be applied to the NEPA project impact determination to reduce
5 tsunami- and seiche-related impacts.

6 *Residual Impacts*

7 Emergency planning and coordination between the terminal operator and the LAHD,
8 as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel
9 during a tsunami. However, even with incorporation of emergency planning and
10 construction procedures in accordance with current City and state regulations,
11 substantial damage and injury could occur in the event of a tsunami or seiche.
12 Therefore, residual impacts would remain significant and unavoidable.

13 **Subsidence/Soil Settlement**

14 **Impact GEO-3b: Alternative 7 operation would not result in**
15 **substantial damage to structures or infrastructure, or expose people**
16 **to substantial risk of injury from subsidence/soil settlement.**

17 **CEQA Impact Determination**

18 Impacts for Alternative 7 would be similar to those described for the proposed
19 Project. Less acreage would be developed (117 acres), less fill would be placed, and
20 new bridge construction would not occur. Existing developments, however, would
21 be abandoned in place or removed, and mixed use retail/commercial buildings and
22 related infrastructure would be constructed. A public dock would be constructed to
23 support the onsite retail and restaurant uses. This dock would be constructed to
24 provide service and access to smaller watercraft (such as small boats, wave runners,
25 and kayaks). The public dock likely would be a floating dock with access ramps
26 connected to the existing wharf or adjacent area to allow recreational users access to
27 the Regional Center. The number of persons present at the Regional Center during
28 the day would exceed those associated with the proposed Project. **Impact GEO-3b**
29 would be the same as under the proposed Project. Subsidence/soil settlement impacts
30 would be less than significant under CEQA because Alternative 7 would be designed
31 and constructed in compliance with the recommendations of the geotechnical
32 engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles
33 Municipal Code and in conjunction with criteria established by LAHD and Caltrans.
34 Thus, subsidence/soil settlement impacts would be less than significant under CEQA
35 and would not result in substantial damage to structures or infrastructure, or expose
36 people to substantial risk of injury.

37 *Mitigation Measures*

38 Because subsidence/soil settlement impacts would be less than significant, no
39 mitigation measures are necessary.

40 *Residual Impacts*

41 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
42 Municipal Code, the residual impacts would be less than significant under CEQA.

NEPA Impact Determination

Under this alternative, development that would occur in the in-water area would include improvements at Berth 102 to install floating dock(s) and ramps for public recreational uses that were not part of the NEPA baseline. **Impact GEO-3b** would be the same as, or greater than, under the proposed Project. Subsidence/soil settlement impacts associated with these actions would be less than significant under NEPA because these activities would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury with implementation of standard geotechnical engineering and Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, in conjunction with criteria established by LAHD and Caltrans.

Mitigation Measures

Because subsidence/soil settlement impacts would be less than significant, no mitigation measures are necessary.

Residual Impacts

With implementation of Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, the residual impacts would be less than significant under NEPA.

Expansive Soils

Impact GEO-4b: Alternative 7 operations would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.

CEQA Impact Determination

Impacts for Alternative 7 would be similar to those described for the proposed Project. Less acreage would be developed (117 acres), less fill would be placed, and new bridge construction would not occur. Existing developments, however, would be abandoned in place or removed, and mixed use retail/commercial buildings and related infrastructure would be constructed. A public dock would be constructed to support the onsite retail and restaurant uses. This dock would be constructed to provide service and access to smaller watercraft (such as small boats, wave runners, and kayaks). The public dock likely would be a floating dock with access ramps connected to the existing wharf or adjacent area to allow recreational users access to the Regional Center. The number of persons present at the Regional Center during the day would exceed those associated with the proposed Project. **Impact GEO-4b** would be the same as, or greater than, under the proposed Project. Expansive soil impacts would be less than significant under CEQA because Alternative 7 would be designed and constructed in compliance with the recommendations of the geotechnical engineer, consistent with Sections 91.000 through 91.7016 of the Los Angeles Municipal Code, and in conjunction with criteria established by LAHD. Thus, expansive soil impacts would be less than significant under CEQA and would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

1 *Mitigation Measures*

2 Because expansive soil impacts would be less than significant, no mitigation
3 measures are necessary.

4 *Residual Impacts*

5 With implementation of Sections 91.000 through 91.7016 of the Los Angeles
6 Municipal Code, the residual impacts would be less than significant under CEQA.

7 **NEPA Impact Determination**

8 Under this alternative, development that would occur in the in-water area would
9 include improvements at Berth 102 to install floating dock(s) and ramps for public
10 recreational uses that were not part of the NEPA baseline. **Impact GEO-4b** would
11 be the same, or greater, than under the proposed Project. Expansive soil impacts in
12 Alternative 7 areas would be less than significant under NEPA with implementation
13 of standard geotechnical engineering and Sections 91.000 through 91.7016 of the
14 Los Angeles Municipal Code, in conjunction with criteria established by LAHD and
15 would not result in substantial damage to structures or infrastructure, or expose
16 people to substantial risk of injury.

17 *Mitigation Measures*

18 Because impacts associated with expansive soils would not occur, no mitigation
19 measures are required.

20 *Residual Impacts*

21 With no mitigation required, there would be no residual impacts under NEPA.

22 **Landslides and Mudslides**

23 **Impact GEO-5b: Alternative 7 operations would not result in or**
24 **expose people or property to a substantial risk of landslides or**
25 **mudslides.**

26 **CEQA Impact Determination**

27 Because topography in the vicinity of the Alternative 7 site is flat and not subject to
28 landslides or mudflows, no impacts would occur under CEQA.

29 *Mitigation Measures*

30 Because landslide and mudslide impacts would not occur, no mitigation measures are
31 necessary.

32 *Residual Impacts*

33 With no mitigation required, there would be no residual impacts under CEQA.

34 **NEPA Impact Determination**

35 Because topography in the vicinity of the Alternative 7 site is flat and not subject to
36 landslides or mudflows, no impacts would occur under NEPA.

1 *Mitigation Measures*

2 Because landslide and mudslide impacts would not occur, no mitigation measures are
3 necessary.

4 *Residual Impacts*

5 With no mitigation required, there would be no residual impacts under NEPA.

6 **Unstable Soil Conditions**

7 **Impact GEO-6b: Collapsible soils would have no impact on**
8 **Alternative 7 operations and would not expose people or structures**
9 **to substantial risk.**

10 **CEQA Impact Determination**

11 Because excavations would not be completed as a part of Alternative 7 operations,
12 impacts associated with collapsible soils would not occur under CEQA.

13 *Mitigation Measures*

14 Because impacts associated with collapsible soils would not occur, no mitigation
15 measures are required.

16 *Residual Impacts*

17 With no mitigation required, there would be no residual impacts under CEQA.

18 **NEPA Impact Determination**

19 Because excavations would not be completed as a part of Alternative 7 operations,
20 impacts associated with collapsible soils would not occur under NEPA.

21 *Mitigation Measures*

22 Because impacts associated with collapsible soils would not occur, no mitigation
23 measures are required.

24 *Residual Impacts*

25 With no mitigation required, there would be no residual impacts under NEPA.

26 **Prominent Geologic and Topographic Features**

27 **Impact GEO-7b: Alternative 7 operations would not result in one or**
28 **more distinct and prominent geologic or topographic features being**
29 **destroyed, permanently covered, or materially and adversely**
30 **modified.**

31 **CEQA Impact Determination**

32 Because topography in the vicinity of the Alternative 7 site is flat and does not
33 contain prominent geologic or topographic features, no impacts would occur under
34 CEQA.

1 *Mitigation Measures*

2 Because impacts due to removal of prominent geologic or topographic features would
3 not occur, no mitigation measures are necessary.

4 *Residual Impacts*

5 With no mitigation required, there would be no residual impacts under CEQA.

6 **NEPA Impact Determination**

7 Because topography in the vicinity of the Alternative 7 site is flat and does not
8 contain prominent geologic or topographic features, no impacts would occur under
9 NEPA.

10 *Mitigation Measures*

11 Because impacts related to removal of prominent geologic or topographic features
12 would not occur, no mitigation measures are necessary.

13 *Residual Impacts*

14 With no mitigation required, there would be no residual impacts under NEPA.

15 **Mineral Resources**

16 **Impact GEO-8b: Alternative 7 operations would not result in the**
17 **permanent loss of availability of any mineral resource of regional,**
18 **statewide, or local significance.**

19 **CEQA Impact Determination**

20 The Alternative 7 site does not contain significant mineral resources. Therefore,
21 Alternative 7 would not result in the permanent loss of availability of a known
22 mineral resource that would be of future value to the region and the residents of the
23 state. No impacts would occur under CEQA.

24 *Mitigation Measures*

25 Because no impacts to significant mineral resources would occur, no mitigation
26 measures are necessary.

27 *Residual Impacts*

28 With no mitigation required, no residual impacts would occur under CEQA.

29 **NEPA Impact Determination**

30 The Alternative 7 site does not contain significant mineral resources. Therefore,
31 Alternative 7 would not result in the permanent loss of availability of a known
32 mineral resource that would be of future value to the region and the residents of the
33 state and less than significant no impacts to mineral resource impacts would occur
34 under NEPA.

35 *Mitigation Measures*

36 Because no impacts to mineral resources would occur, no mitigation measures are
37 necessary.

1 *Residual Impacts*

2 With no mitigation required, no residual impacts would occur under NEPA.

3 **3.5.4.4 Summary of Impact Determinations**

4 The following Table 3.5-3 summarizes the CEQA and NEPA impact determinations of
5 the proposed Project and its alternatives related to Geology, as described in the detailed
6 discussion in Sections 3.5.4.3.1 and 3.5.4.3.2. This table is meant to allow easy
7 comparison between the potential impacts of the proposed Project and its alternatives
8 with respect to this resource. Identified potential impacts may be based on federal, state,
9 or City of Los Angeles significance criteria, Port criteria, and the scientific judgment of
10 the report preparers.

11 For each type of potential impact, the table describes the impact, notes the CEQA and
12 NEPA impact determinations, describes any applicable mitigation measures, and notes
13 the residual impacts (i.e., the impact remaining after mitigation). All impacts, whether
14 significant or not, are included in this table. Note that impact descriptions for each of the
15 Alternatives are the same as for the proposed Project, unless otherwise noted.

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology				
Proposed Project	GEO-1a: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the construction period (through 2012).	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2a: Project construction in the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches in the proposed Project area and vicinity.	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-3a: Project construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from subsidence/soil settlement.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4a: Project construction would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5a: Project construction would not result in or expose people or property to a substantial risk of landslides or mudflows.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a: Shallow groundwater, which would cause unstable collapsible soils, may be encountered during excavation, but would not expose people or structures to substantial risk.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Proposed Project (continued)	GEO-7a: Project construction would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a: Project construction would not result in the permanent loss of availability of a known mineral resource of regional, statewide, or local significance.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-1b: Seismic activity along the Palos Verdes Fault zone, or other regional faults, could produce fault rupture, seismic ground shaking, liquefaction, or other seismically induced ground failure that would expose people and structures to substantial risk during the operations period (through 2045).	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2b: Project operations in the Port area would expose people and structures to substantial risk involving tsunamis or seiches. Local or distant seismic activity and/or offshore landslides could result in the occurrence of tsunamis or seiches in the proposed Project area and vicinity.	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-3b: Project operation would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from subsidence/soil settlement.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4b: Project operation would not result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury from soil expansion.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Proposed Project (continued)	GEO-5b: Project operation would not result in or expose people or property to a substantial risk of landslides or mudflows.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b: Collapsible soils would have less than significant impact on proposed Project operations and would not expose people or structures to substantial risk.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-7b: Project operations would not result in one or more distinct and prominent geologic or topographic features being destroyed, permanently covered, or materially and adversely modified.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b: Project operations would not result in the permanent loss of availability of a known mineral resource of regional, statewide, or local significance.	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
Alternative 1 (No Project)	GEO-1a	CEQA: No impact NEPA: Not applicable	Mitigation not required Mitigation not required	CEQA: No impact NEPA: Not applicable
	GEO-2a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-3a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-4a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-5a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-6a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-7a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 1 (continued)	GEO-8a	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-1b	CEQA: Significant impact	No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-2b	CEQA: Significant impact	No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact
		NEPA: Not applicable	Mitigation not required	NEPA: Not applicable
	GEO-3b	CEQA: Less than significant impact NEPA: Not applicable	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Not applicable
	GEO-4b	CEQA: No impact NEPA: Not applicable	Mitigation not required Mitigation not required	CEQA: No impact NEPA: Not applicable
	GEO-5b	CEQA: No impact NEPA: Not applicable	Mitigation not required Mitigation not required	CEQA: No impact NEPA: Not applicable
	GEO-6b	CEQA: No impact NEPA: Not applicable	Mitigation not required Mitigation not required	CEQA: No impact NEPA: Not applicable
GEO-7b	CEQA: No impact NEPA: Not applicable	Mitigation not required Mitigation not required	CEQA: No impact NEPA: Not applicable	
GEO-8b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact	

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 2	GEO-1a	CEQA: Significant impact NEPA: No impact	No mitigation measures are available to reduce below significance Mitigation not required	CEQA: Significant and unavoidable impact NEPA: No impact
	GEO-2a	CEQA: Significant impact NEPA: No impact	MM GEO-1 Mitigation not required	CEQA: Significant and unavoidable impact NEPA: No impact
	GEO-3a	CEQA: Less than significant impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: No impact
	GEO-4a	CEQA: Less than significant impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: No impact
	GEO-5a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-7a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-1b	CEQA: Significant impact NEPA: No impact	No mitigation measures are available to reduce below significance Mitigation not required	CEQA: Significant and unavoidable impact NEPA: No impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 2 (continued)	GEO-2b	CEQA: Significant impact NEPA: No impact	MM GEO-1 Mitigation not required	CEQA: Significant and unavoidable impact NEPA: No impact
	GEO-3b	CEQA: Less than significant impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: No impact
	GEO-4b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-5b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-7b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
Alternative 3	GEO-1a	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2a	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 3 (continued)	GEO-3a	CEQA: Less than significant impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: No impact
	GEO-4a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-7a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-1b	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2b	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 3 (continued)	GEO-3b	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4b	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-7b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
Alternative 4	GEO-1a	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2a	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 4 (continued)	GEO-3a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-7a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-1b	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2b	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 4 (continued)	GEO-3b	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4b	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-7b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
Alternative 5	GEO-1a	CEQA: No Impact NEPA: No Impact	No mitigation required No mitigation required	CEQA: No Impact NEPA: No Impact
	GEO-2a	CEQA: No Impact NEPA: No Impact	No mitigation required No mitigation required	CEQA: No Impact NEPA: No Impact
	GEO-3a	CEQA: No Impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No Impact NEPA: No Impact
	GEO-4a	CEQA: No Impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No Impact NEPA: No Impact
	GEO-5a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a	CEQA: No Impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No Impact NEPA: No Impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 5 (continued)	GEO-7a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-1b	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2b	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-3b	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4b	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-7b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 6	GEO-1a	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2a	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-3a	CEQA: Less than significant impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: No impact
	GEO-4a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-7a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 6 (continued)	GEO-1b	CEQA: Significant impact	No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact
		NEPA: Significant impact	No mitigation measures are available to reduce below significance	NEPA: Significant and unavoidable impact
	GEO-2b	CEQA: Significant impact	MM GEO-1	CEQA: Significant and unavoidable impact
		NEPA: Significant impact	MM GEO-1	NEPA: Significant and unavoidable impact
	GEO-3b	CEQA: Less than significant impact	Mitigation not required	CEQA: Less than significant impact
		NEPA: Less than significant impact	Mitigation not required	NEPA: Less than significant impact
	GEO-4b	CEQA: Less than significant impact	Mitigation not required	CEQA: Less than significant impact
		NEPA: Less than significant impact	Mitigation not required	NEPA: Less than significant impact
	GEO-5b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b	CEQA No impact	Mitigation not required	CEQA: No impact
		NEPA: No impact	Mitigation not required	NEPA: No impact
	GEO-7b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: No impact	Mitigation not required	NEPA: No impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 7	GEO-1a	CEQA: Significant impact NEPA: Significant impact	No mitigation measures are available to reduce below significance No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-2a	CEQA: Significant impact NEPA: Significant impact	MM GEO-1 MM GEO-1	CEQA: Significant and unavoidable impact NEPA: Significant and unavoidable impact
	GEO-3a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-4a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-5a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6a	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	GEO-7a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8a	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact

Table 3.5-3. Summary Matrix of Potential Impacts and Mitigation Measures for Geology Associated with the Proposed Project and Alternatives (continued)

Alternative	Environmental Impacts*	Impact Determination	Mitigation Measures	Residual Impacts after Mitigation
3.5 Geology (continued)				
Alternative 7 (continued)	GEO-1b	CEQA: Significant impact	No mitigation measures are available to reduce below significance	CEQA: Significant and unavoidable impact
		NEPA: Significant impact	No mitigation measures are available to reduce below significance	NEPA: Significant and unavoidable impact
	GEO-2b	CEQA: Significant impact	MM GEO-1	CEQA: Significant and unavoidable impact
		NEPA: Significant impact	MM GEO-1	NEPA: Significant and unavoidable impact
	GEO-3b	CEQA: Less than significant impact	Mitigation not required	CEQA: Less than significant impact
		NEPA: Less than significant impact	Mitigation not required	Less than significant impact
	GEO-4b	CEQA: Less than significant impact	Mitigation not required	CEQA: Less than significant impact
		NEPA: Less than significant impact	Mitigation not required	NEPA: Less than significant impact
	GEO-5b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-6b	CEQA No impact	Mitigation not required	CEQA: No impact
		NEPA: No impact	Mitigation not required	NEPA: No impact
	GEO-7b	CEQA: No impact NEPA: No impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No impact
	GEO-8b	CEQA: No impact	Mitigation not required	CEQA: No impact
		NEPA: No impact	Mitigation not required	NEPA: No impact
Note: *Unless otherwise noted, all impact descriptions for each of the Alternatives are the same as those described for the Proposed Project.				

3.5.4.5 Mitigation Monitoring

In instances where the **MM GEO-1** Emergency Response Planning Mitigation Measure is necessary, the terminal operator shall work with Port engineers and Port police to develop tsunami response training and procedures to assure that construction and operations personnel will be prepared to act in the event of a large seismic event.

The below mitigation monitoring program is applicable to the proposed Project, Alternatives 2, 3, 4, 6, and 7.

GEO-2: Construction on the proposed Project in the Port area would expose people and structures to substantial risk involving tsunamis or seiches	
Mitigation Measure	GEO-1: Emergency Response Planning. The terminal operator shall work with Port engineers and Port police to develop tsunami response training and procedures to assure that construction and operations personnel will be prepared to act in the event of a large seismic event. Such procedures shall include immediate evacuation requirements in the event that a large seismic event is felt at the proposed Project site, as part of overall emergency response planning for this proposed Project.
Timing	Prior to Construction and/or operation
Methodology	Such procedures shall be included in any bid specifications for construction or operations personnel, with a copy of such bid specifications to be provided to LAHD, including a completed copy of its operations emergency response plan prior to commencement of construction activities and/or operations. Such procedures shall include immediate evacuation requirements in the event that a large seismic event is felt at the proposed Project site, as part of overall emergency response planning for this proposed Project
Responsible Parties	LAHD
Residual Impacts	Significant after mitigation.

3.5.5 Significant Unavoidable Adverse Impacts

Impacts 1a, 1b, 2a, and 2b would remain significant and unavoidable for the proposed Project, and Alternatives 3, 4, 6, and 7. Impacts 1b and 2b would remain significant and unavoidable under Alternative 5. Impacts 1a, 1b, 2a, and 2b would remain significant and unavoidable under Alternative 2 (CEQA only) and impacts 1b and 2b would remain significant and unavoidable under Alternative 1 (CEQA only).

Design and construction in accordance with applicable laws and regulations pertaining to seismically induced ground movement would minimize structural damage in the event of an earthquake. However, increased exposure of people and property during construction and operation to seismic hazards from a major or great earthquake cannot be precluded, even with incorporation of modern construction engineering and safety standards.

Emergency planning and coordination between the terminal operator and the LAHD, as outlined in **MM GEO-1**, would contribute in reducing injuries to onsite personnel during a tsunami. However, even with incorporation of emergency planning and construction procedures in accordance with current City and state regulations, substantial damage and injury could occur in the event of a tsunami or seiche. Therefore, potential impacts due to seismically induced ground failure or in the event of a tsunami or seiche would remain significant for the proposed Project and its alternatives.