
4.6 GEOLOGY AND SOILS

This section discusses the existing geologic and paleontological setting of the Project Site and assesses the Project's potential impacts related to geologic and seismic conditions and paleontological resources.

4.6.1 SUMMARY OF PREVIOUS ENVIRONMENTAL DOCUMENTATION

MND for the Pacific Place Project

The Geology and Soils analysis for the MND for the Prior Project, approved by the City in 2021, determined that implementation of the Prior Project would have less than significant impacts related to geologic and seismic conditions and paleontological resources after implementation of mitigation.

The MND indicated implementation of the Prior Project would expose people to seismic risks that are typical of Southern California, but determined that there are no active faults traversing the Site. It was further determined that potential impacts related to liquefaction and lateral spreading could occur. These risks and potential impacts were considered less than significant with implementation of mitigation. The MND also addressed potential impacts related to landslides, unstable geologic units or soil (other than liquefaction and lateral spreading), soil erosion and loss of topsoil, expansive soils, and use of septic tanks or alternative wastewater disposal systems and found that would be no impacts or less than significant through compliance with applicable State regulations.

The MND determined that there were no known paleontological resources within or near the Artesia parcels; however, the MND required implementation of mitigation to ensure less than significant impacts related to paleontological resources.

MND Mitigation Measures

The MND required implementation of the following mitigation measures (MMs) regarding geology and soils and paleontological resources to reduce potential impacts associated with implementation of the Prior Project to less than significant levels:

MM GEO-1 The owner and project proponent of development of the McDonald Trust parcels shall be solely responsible for implementing this Mitigation Measure. Before issuance of a grading permit for proposed development of the McDonald Trust parcels, the City of Long Beach or the future Project applicant shall have a geotechnical investigation report (Investigation) conducted for the McDonald Trust parcels. The Investigation shall include sampling and testing of subsurface soil samples; a determination of suitability of site soils for supporting the proposed structure and other improvements; recommendations for grading, site preparation, and foundation design based on identified properties of subsurface site soils; a fault investigation including subsurface investigation in conformance with the Alquist-Priolo Earthquake Fault Zoning Act; a liquefaction analysis conforming with the Seismic Hazards Zoning Act; and analyses addressing other geologic hazards per the standard of care for a geotechnical investigation (e.g., expansive soils). The Investigation report shall be sign-stamped by a California professional geologist or registered geotechnical engineer.

MM GEO-2 After grading details are finalized and topographic information is available for the subject low-lying areas abutting the Artesia parcels, and before issuance of a grading permit by the City of Long Beach, the Project geotechnical engineer shall verify the magnitude of lateral displacement that could occur onsite. The geotechnical engineer shall prepare an addendum to the geotechnical investigation report for the Artesia parcels including any recommendations needed to minimize hazards from lateral displacement; and submit the addendum to City of Long Beach Development Services for review.

MM GEO-3 Prior to the issuance of any grading permit, the Project Applicant/Developer shall provide written evidence to the City of Long Beach that a qualified Paleontologist has been retained to observe grading activities and to salvage and catalog fossils as necessary. The Paleontologist shall be present at the pre-grade conference; shall establish procedures for paleontological resource surveillance; and shall establish, in cooperation with the Project Applicant/Developer, procedures for temporarily halting or redirecting work to permit sampling, identification, and evaluation of the fossils. If the paleontological resources are found to be significant, the Paleontologist shall determine appropriate actions to ensure proper exploration and/or salvage.

Upon completion of grading and excavation activities, the paleontologist shall submit a monitoring report to the City. The report shall include the period of inspection; a catalog and analysis of the fossils found; and the present repository of the fossils.

The Project Applicant/Developer shall be responsible for making arrangements for the preparation of excavated material to the point of identification. In addition, the Project Applicant/Developer shall offer excavated finds for curatorial purposes to the City of Long Beach on a first refusal basis. The Project Applicant/Developer shall also be responsible for paying curatorial fees. These actions, as well as final mitigation and disposition of the resources, shall be subject to approval by the City.

As set forth below, the DEIR analysis confirms that there are no new impacts and no increase in the severity of previously identified impacts beyond those identified in the MND. MND MM GEO-1 from the MND was applicable only to the McDonald Trust Parcels which are no longer a part of the Project; therefore, MND MM GEO-1 is not applicable to this Project and is not included as mitigation in the DEIR. The geotechnical analysis required by MND MM GEO-2 has been completed and submitted to the City, and the requisite addendum, which determined that the potential for liquefaction and lateral spreading is less than significant, is provided in Appendices G-1, G-2, G-3, and G-4 of this DEIR. Therefore, MND MM GEO-2 is not applicable to the Project and is not included as mitigation in the DEIR. MM GEO-3 would still be applicable to the Project and the analysis within this DEIR has determined that implementation of MND MM GEO-3 would still be necessary to mitigate impacts of the Project to a less than significant level. MND MM GEO-3 has been renumbered and is identified in this DEIR as MM GEO-1.

4.6.2 ENVIRONMENTAL SETTING

The following analysis is derived from the following reports:

- *Geotechnical Exploration, Proposed Self-Storage Facility, 3701 North Pacific Place, Long Beach, California* (Geotechnical Study) prepared by Carl Kim Geotechnical, Inc. (CKG), dated November 14, 2019 and revised on September 24, 2021 (CKG 2021a, included as Appendix G-1);

- *Addendum No. 2 to the Geotechnical Exploration Report, Evaluation of Lateral Spreading, Proposed Self-Storage Facility, 3701 North Pacific Place, Long Beach California 90806*, prepared by CKG, dated December 21, 2021 (CKG 2021b, included as Appendix G-3)
- *Cultural and Paleontological Resources Analysis for the 3701 Pacific Place Project, Long Beach, Los Angeles County, California* (Cultural and Paleontological Report) prepared by Psomas and dated July 23, 2020 (Psomas 2020, Appendix E-3).

A. Existing Conditions

Geologic Setting

The Project Site is located near the east edge of West Coast Hydrologic Basin, within the southwestern block of the Los Angeles Basin. This block is roughly rectangular in shape, approximately 28 miles long from northwest to southeast, and 5 to 12 miles wide (CKG 2021a). Most of the block is a low plain extending from Santa Monica in the northwest to Long Beach in the southeast. The southwest portion of the block is marked by the Palos Verdes Hills, which rise to an elevation of approximately 1,300 feet above mean sea level (msl). The Palos Verdes Hills are the most prominent topographic feature of this block and is separated from the nearly flat plain to the north and northeast by the northwest trending Palos Verdes fault (CKG 2021a). The West Coast Hydrologic Basin is bound on the northeast by the Newport-Inglewood Structural Zone, which is marked by series of northwest-trending faults and folds that form a chain of low eroded scarps and elongated hills and terraces that extend from Newport Bay to Beverly Hills (CKG 2021a).

Sediments at the Project Site consist of undocumented fill over varying amounts of sump materials over Holocene to Pleistocene alluvium and Pleistocene Lakewood Formation, which are each described below (CKG 2021a).

Artificial Fill (map symbol Afu)

Approximately 3 to 20 feet of material that appeared to be uncertified cover fill was encountered over sump materials in most locations investigated as part of the subsurface exploration for the Geotechnical Exploration. Encountered materials consisted of a mixture of silt, clay, and sand. Some areas of the Site had liberal amounts of concrete rubble of various sizes. Some locations encountered concrete, brick, or refusal at varying depths indicating the possible presence of buried coarse material. Fill depths are expected to be greater along the edges of the sumps but may be variable (CKG 2021a).

Sump Material (AFs)

Sump materials encountered were highly variable, but generally clayey, very soft in zones with varying amounts of petroleum hydrocarbon content, and moisture content. Soil consistencies encountered varied from stiff to very soft. Thicknesses of sump materials encountered during the current investigations varied from 0 feet to about 20 feet at. The average thickness of sump materials based on the current borings and CPT's is about 10 feet. According to referenced reports wastes were placed within basins with exterior earthen berms. Reportedly during the 1970's, "land farming" activities yielded some processed (dried and recompacted) soils, however zones of sludge or clayey soils near the liquid limit exist in zones (CKG 2021a).

Quaternary Alluvium (Map Symbol - Qal)

Quaternary alluvium consists generally of silt and clay with silty sand, sand, and clayey sand interbeds/ facies typical of fluvial and estuarine sequences. Thicknesses encountered varied from 0 feet to about 21 feet (CKG 2021a).

Lakewood Formation (QL)

The Lakewood Formation is locally interpreted to be comprised of Upper Pleistocene age older alluvium consisting of weakly-cemented to semi-consolidated older alluvium consisting of interbedded claystone, sandy claystone, sandstone and silty sandstone. The material is stiff and dense relative to the overlying alluvium materials (CKG 2021a).

Geologic Hazards

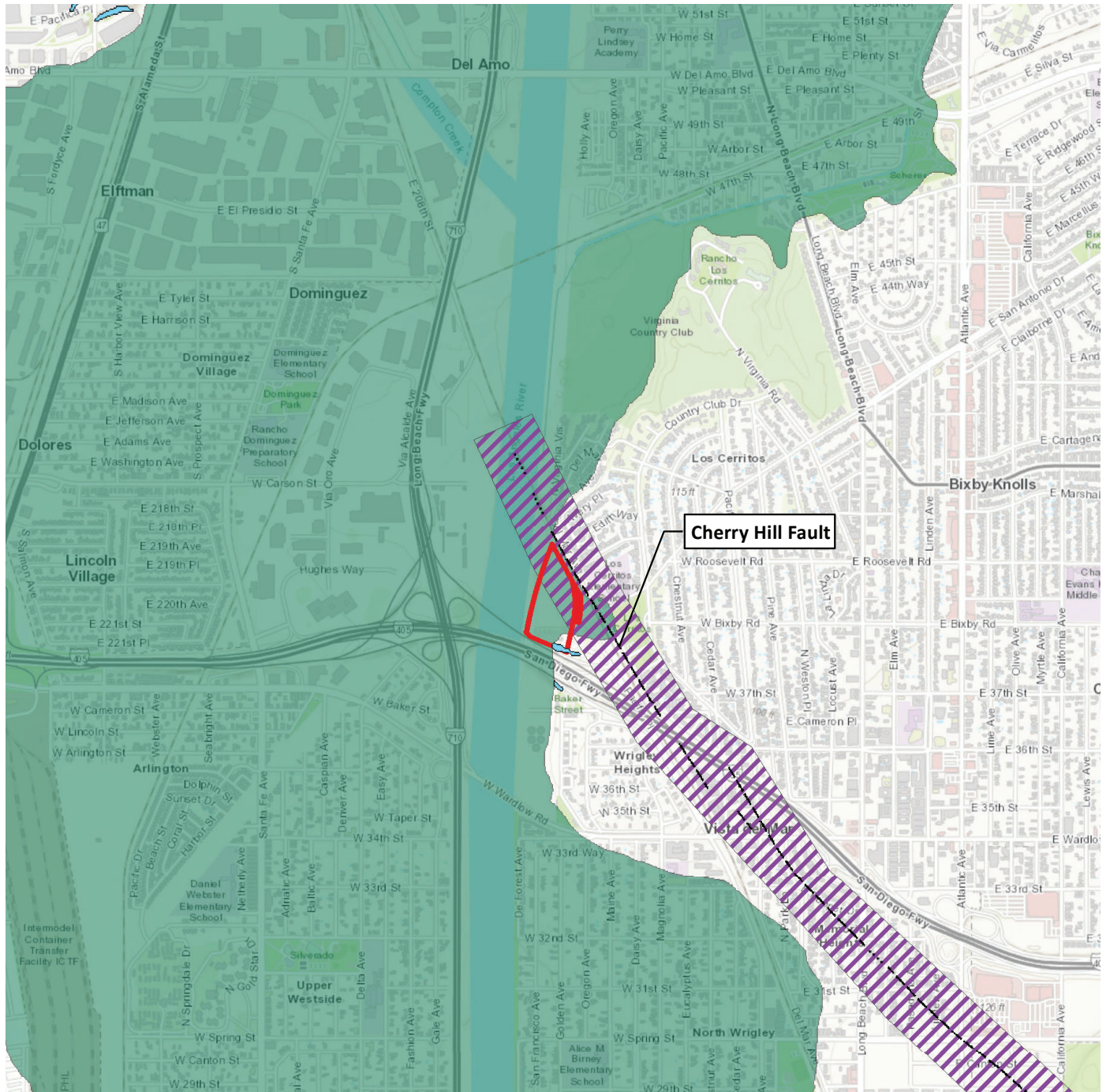
Faulting and Seismicity

As with all of Southern California, the Project Site is located within a seismically active region. The primary seismic parameters to be considered when discussing the potential for earthquake-related hazards are (1) the distance(s) to the causative fault(s), (2) earthquake magnitudes, and (3) expected ground accelerations.

Active faults in the region include the Newport-Inglewood Fault Zone, of which the Cherry Hill Fault is a component; and the Palos Verdes Fault that passes approximately 6.5 miles southwest of the Project Site. The nearest active fault is the Cherry Hill Fault. The Cherry Hill Fault passes immediately east of the Metro A Line tracks just to the northeast of the Site and trends north-northwest. The Cherry Hill Fault is part of the larger Newport-Inglewood Fault Zone, which is considered active (CKG 2021a). Active faults generally are those showing evidence of surface displacement within the last 11,000 years. The Newport-Inglewood Fault Zone is also known to be the source of the Long Beach Earthquake of 1933. The epicenter of that earthquake was near Huntington Beach (SCEDC 2020). A portion of the Project Site is within an Alquist-Priolo Earthquake Fault Zone associated with the Cherry Hill Fault/Newport-Inglewood Fault Zone, as shown on Exhibit 4.6-1, Seismic Hazards.

Secondary Seismic Hazards

Liquefaction refers to loose, saturated sand or silt deposits that behave as a liquid and lose their load-supporting capability when strongly shaken. Loose granular soils and silts that are saturated by relatively shallow groundwater are susceptible to liquefaction. The historic high groundwater level at the Project Site is anticipated to be about 20 feet below ground surface (bgs) near the Los Angeles River Levee. Groundwater was encountered at depths between 45 feet and 57.5 feet bgs during the geotechnical field investigation (CKG 2021a). Most of the Project Site is identified within a Zone of Required Investigation for Liquefaction, and southeastern edge of the Project Site is in a zone of required investigation for earthquake-induced landslides, each mapped by the California Geological Survey (CKG 2021a, CGS 2018).



Legend

- **** Concealed Alquist-Priolo Fault Trace
- Inferred Alquist-Priolo Fault Trace
- Site Boundary
- Landslide Zones
- ▨ Alquist-Priolo Earthquake Fault Zone
- Liquefaction Zones

Base Map: CGS Seismic Hazards Program: Liquefaction and Landslide Zones, California Department of Conservation

Source: Carl Kim Geotechnical, Inc., 2019

Seismic Hazards

Pacific Place Project



Map not to scale

Exhibit 4.6-1



B. Regulatory Framework

Federal

International Building Code

The International Building Code (IBC) is the national model building code providing standardized requirements for construction. The IBC establishes consistent construction guidelines for the nation, and has been adopted with amendments into the California Building Code (CBC). The IBC contains codes related to geology and soils, including Chapter 16 (structural design) and Chapter 18 (soils and foundations).

State

California Building Code

The national model code standards adopted into Title 24, Part 2 of the California Code of Regulations (CCR), also referred to as the CBC, apply to all occupancies in California except for modifications adopted by State agencies and local governing bodies. The CBC establishes general standards for the design and construction of buildings, including provisions related to seismic safety. The CBC provides standards that must be met to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures in its jurisdiction. Chapter 18 of the CBC, Soils and Foundations, specifies the level of soil investigation required by law in California. Requirements in Chapter 18 apply to building and foundations systems and consider reduction of potential seismic hazards. The 2022 CBC would apply to the Project.

Alquist-Priolo Earthquake Fault Zoning Act of 1972

The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) was adopted by the State of California in 1972 to mitigate surface fault rupture hazards along known active faults (California Public Resources Code [PRC] Section 2621 *et. seq.*). The purpose of the Alquist-Priolo Act is to reduce the threat to life and property—specifically from surface fault rupture—by preventing the construction of buildings used for human occupancy on the surface trace of known active faults. Under the Alquist-Priolo Act, the California Geological Survey (CGS) has defined an “active” fault as one that has had surface displacement during the past 11,000 years (Holocene time). This law directs the State Geologist to establish Earthquake Fault Zones (known as “Special Studies Zones” prior to January 1, 1994) to regulate development in designated hazard areas. In accordance with the Alquist-Priolo Act, the State has delineated “Earthquake Fault Zones” along identified active faults throughout California. City and County jurisdictions must require a geologic investigation to demonstrate that a proposed development project, which includes structures for human occupancy, is adequately set back (generally at least 50 feet) from an active fault prior to permitting. Per the Geotechnical Exploration, the Project Site is not within an Earthquake Fault Zone (CKG 2021a).

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (SHMA) was passed in 1990 and directs the California Geological Survey (formerly the California Division of Mines and Geology) to identify and map areas subject to earthquake hazards such as liquefaction, earthquake-induced landslides, and amplified ground shaking (PRC Sections 2690–2699.6). Passed by the State legislature after the 1989 Loma Prieta Earthquake, the SHMA is aimed at reducing the threat to public safety and

minimizing potential loss of life and property in the event of a damaging earthquake event. Seismic Hazard Zone Maps are a product of the resultant Seismic Hazards Mapping Program and are produced to identify Zones of Required Investigation; most developments designed for human occupancy in these zones must conduct site-specific geotechnical investigations to identify the hazard and to develop appropriate mitigation measures prior to permitting by local jurisdictions. The SHMA establishes a Statewide public safety standard for the mitigation of earthquake hazards, including providing guidance for the evaluation and mitigation of earthquake-related hazards for projects in designated zones of required investigations.

California Public Resources Code

California Public Resources Code Section 5097.5 provides for the protection of cultural and paleontological resources and prohibits the removal, destruction, injury, or defacement of archaeological and paleontological features on any lands under the jurisdiction of State or local authorities. The Project would comply with this regulation.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires all projects to consider potential impacts related to unique paleontological resources or geologic features.

Local

Long Beach Municipal Code

The City of Long Beach has adopted the 2022 CBC, as amended, which is codified at Title 18, Long Beach Building Standards Code, of the Long Beach Municipal Code. The City's Building and Safety Bureau of the Department of Development Services is designated to enforce all requirements of the CBC applicable to the erection or construction of buildings or structures in the City.

City of Long Beach General Plan

The City of Long Beach General Plan is a policy document that establishes the goals, policies, and directions the City will take to achieve the vision of the community and guide the future development of the City (City of Long Beach, 2019a). The City of Long Beach General Plan contains twelve elements including Air Quality, Conservation, Historic Preservation, Housing, Land Use, Local Coastal Program, Transportation (known as the Mobility Element), Noise, Open Space and Recreation, Public Safety, Seismic Safety, and Urban Design.

The City of Long Beach Public Safety Element was adopted in 1975. The Public Safety Element contains goals and policies related to fire protection, law enforcement, schools, water, sewer, and storm drain systems as well as other utilities and services, disaster operations, and risk management. This element provides guidance for provision of new and expanded public facilities to support the continued growth of the City, as well as recommendations for both immediate and advance planning actions.

The City of Long Beach Seismic Safety Element was adopted in October 1988. The Seismic Safety Element provides a comprehensive analysis of seismic factors so as to reduce loss of life, injuries, damage to property, and social and economic impacts resulting from future earthquakes. To achieve maximum feasible safety from seismic risk, the Element focuses upon developmental policies as well as the allocation of future land uses.

Goals and recommendations from the Public Safety and Seismic Safety Elements that are related to geology and soils and applicable to the Project are set forth in Table 4.10-1 of Section 4.10, Land Use and Planning, with a Project consistency analysis.

4.6.3 PROJECT IMPACT ANALYSIS

A. Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, a project would result in a significant aesthetics impact if it would:

Threshold 4.6a: *Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:*

- (i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42.*
- (ii) Strong seismic ground shaking.*
- (iii) Seismic-related ground failure, including liquefaction.*
- (iv) Landslides.*

Threshold 4.6b: *Would the project result in substantial soil erosion or the loss of topsoil.*

Threshold 4.6c: *Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.*

Threshold 4.6d: *Would the project be located on expansive soils, as defined in Section 1803.5.3 of the California Building Code (2010), creating substantial direct or indirect risks to life or property.*

Threshold 4.6e: *Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.*

Threshold 4.6f: *Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.*

B. Methodology

Geotechnical Study

The Geotechnical Study, dated November 14, 2019 and revised on September 24, 2021, prepared by CKG (“Geotechnical Study”) and included as Appendix G-1 (CKG 2021a), involved review of geotechnical documents and maps relevant to the Project Site, a site investigation, and subsurface exploration and laboratory testing. A total of seven soil borings and seven cone penetrometer test (CPT) soundings were advanced to depths of 50 to 75 feet bgs to obtain representative subsurface data for grading and foundation design. Additionally, because of the proximity of the Cherry Hill Fault and associated Earthquake Fault Zone, a limited fault

investigation was performed that focused on the site of proposed self-storage building. This involved a transect of eight three borings and eight CPT soundings to assess the critical portion of the building envelope and extending more than 50 feet northeast of the proposed building envelope toward the Cherry Hill Fault for the presence of active fault traces. Laboratory testing was performed on samples taken from the soil borings to assess the soil engineering characteristics of the sediments underlying the Project Site. The locations of the CPT tests and auger borings are shown on Exhibit 4.6-2, Map of Boring and Cone Penetrometer Test Sounding Locations.

Cultural and Paleontological Report

The paleontological resources analysis conducted by Psomas as part of the Cultural and Paleontological Report involved a fossil locality records search conducted on March 12, 2020 and included as Appendix E-3 (Psomas 2020), by Dr. Samuel McLeod from the Natural History Museum of Los Angeles County (LACM) to determine the status and extent of previously recorded paleontological resources on the Project Site and surrounding area. Psomas conducted an archaeological and paleontological pedestrian field survey of the Project Site, which involved walking linear transects. Paleontological resources were searched for by inspecting the geologic features on the property.

C. Standard Requirements

No Standard Requirements related to Geology and Soils are identified.

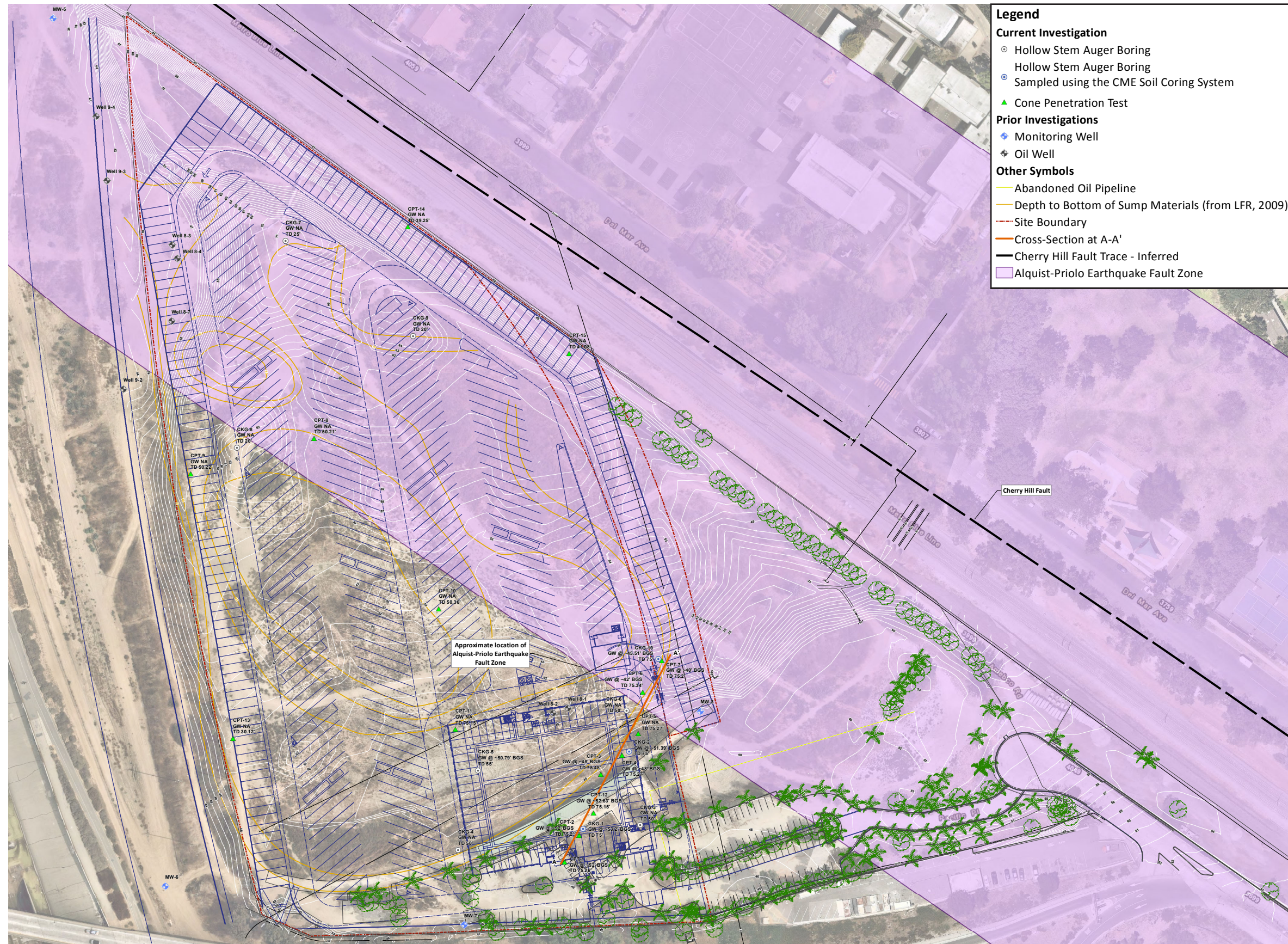
D. Impact Analysis

Threshold 4.6a: *Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:*

- (i) ***Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.***
- (ii) ***Strong seismic ground shaking?***
- (iii) ***Liquefaction?***
- (iv) ***Landslides?***

Rupture of Earthquake Faults

As discussed above and shown on Exhibit 4.6-1, Seismic Hazards, a portion of the Project Site is within an Alquist-Priolo Earthquake Fault Zone (EFZ) associated with the Cherry Hill Fault/Newport-Inglewood Fault Zone. Based on the results of the limited fault investigation conducted as part of the Geotechnical Study, the three-story self-storage building would be located approximately 465 feet west of the mapped trace of the Cherry Hill Fault. The proposed building appears to be a few tens of feet outside of the EFZ. The Geotechnical Study determined that there was no evidence of faulting within the proposed building footprint, and the proposed location of the four-story storage building is outside of the associated Alquist-Priolo Earthquake Fault Zone. Therefore, the Geotechnical Study concluded that surface rupture of an active fault is unlikely to affect the Project Site and no fault setback would be required to implement the



Source: Carl Kim Geotechnical, Inc., 2019

Boring and Cone Penetrometer Test Sounding Locations

Exhibit 4.6-2

Pacific Place Project



Project as proposed. Accordingly, Project impacts related to Alquist-Priolo earthquake faults are considered less than significant.

Seismic Ground Shaking

The Project Site is located in the seismically active southern California region and may be subject to strong seismic ground shaking resulting from a major earthquake on one or more faults in the area within the lifetime of the Project. The potential for strong seismic ground shaking is an existing seismic hazard that affects the Project Site, and the development of the Project would not exacerbate this condition. The Geotechnical Study calculated the peak ground acceleration on-site, with an estimated average return period of 2,475 years, at 0.63g (where g is the acceleration of gravity). Ground acceleration of 0.63g correlates with intensity VIII on the Modified Mercalli Intensity (MMI) Scale, a subjective scale of how earthquakes are felt by people and the effects of earthquakes on buildings. In an intensity VIII earthquake, damage is slight in specially designed structures; considerable damage occurs in ordinary substantial buildings with partial collapse; and damage is great in poorly built structures. Chimneys, factory stacks, columns, monuments, and walls fall, and heavy furniture is overturned (CKG 2021a). The effects of ground shaking on the Project can be minimized if the proposed structures are designed and constructed in conformance with current building codes and engineering practices. Earthquake-resistant design and materials used in new construction must meet the current seismic engineering standards of the CBC Seismic Zone 4 requirements (incorporated by reference in the Long Beach Municipal Code Chapter 18.40), in effect at the time of design and construction of the Project. Compliance with these standards would reduce the risk to people and structures to the maximum extent practicable under current engineering practice. The Geotechnical Study outlines the site- and Project-specific requirements to meet CBC standards, including provision of seismic design parameters and design specifications to ensure the Project is built in compliance with the CBC. Therefore, the Project would not directly or indirectly cause substantial adverse effects from strong ground shaking. Therefore, impacts related to ground shaking would be less than significant.

Liquefaction

Liquefaction is the loss of soil strength or stiffness due to a buildup of pore-water pressure during severe ground shaking, associated primarily with continuous layers of loose (low density), saturated, fine-to-medium grained, cohesionless soils. As the shaking action of an earthquake progresses, the soil grains are rearranged and the soil densifies within a short period of time. Rapid densification of the soil results in a buildup of pore-water pressure. When the pore-water pressure approaches the overburden pressure, the soil reduces greatly in strength and temporarily behaves similarly to a fluid. Effects of liquefaction can include sand boils, excessive settlement, and bearing capacity failures below structural foundations. As discussed previously, most of the Project Site is identified by the CGS as within a Zone of Required Investigation for Liquefaction. Accordingly, a site-specific liquefaction analysis was conducted as part of the Geotechnical Study and determined that liquefaction potential is generally limited to isolated, non-continuous zones. It was concluded that the overall liquefaction potential for the Project Site is deemed low (CKG 2021a). Regardless, the Project would be designed and constructed in accordance with the recommendations of the Geotechnical Study and CBC requirements to ensure that isolated areas with liquefaction potential are properly remediated. Therefore, the Project would not directly or indirectly cause substantial adverse effects from liquefaction. Therefore, impacts related to liquefaction would be less than significant.

Landslides

As discussed previously, the southeastern edge of the Project Site is identified by CGS as within a Zone of Required Investigation for earthquake-induced landslides. The affected area appears to be a small area where a slope ascends southward offsite toward the 710/405 interchange. Based on the relatively gentle topography of the Site and surrounding areas, the Geotechnical Study concluded the potential for seismically-induced slope instability (i.e., landslides) is considered low provided slopes are not over-steepened (CKG 2021a). Therefore, the Project would not directly or indirectly cause substantial adverse effects from landslides, and impacts related to landslides would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Rupture of Earthquake Faults: A less than significant impact would occur and therefore no mitigation is required.

Seismic Ground Shaking: A less than significant impact would occur and therefore no mitigation is required.

Liquefaction: A less than significant impact would occur and therefore no mitigation is required.

Landslides: A less than significant impact would occur and therefore no mitigation is required.

Impact Comparison Summary: The DEIR's analysis on this issue is consistent with the impact analysis in the MND, which identified no impact related to fault rupture, strong ground shaking, liquefaction, and landslides, such that there would be a less than significant impact with no mitigation required. Impacts regarding seismically induced ground shaking, seismically induced ground failure, and landslides were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

Threshold 4.6b: *Would the project result in substantial soil erosion or the loss of topsoil?*

The largest source of erosion and topsoil loss is uncontrolled drainage during construction. As discussed in more detail in Section 4.9, Hydrology and Water Quality, of this Draft EIR, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into "waters of the U.S.". Construction activities shall be conducted in compliance with the statewide NPDES General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities (Order No 2022-0057-DWQ, NPDES No. CAS000002), adopted by the State Water Resources Control Board (SWRCB) on September 8, 2022 (Construction General Permit). In compliance with the Construction General Permit, erosion potential during construction of the proposed Project would be managed with Best Management Practices (BMPs) implemented on the Project Site as part of a Storm Water Pollution Prevention Plan (SWPPP) during construction activities in accordance with NPDES requirements.

Before commencing the soil stockpile surcharge (Surcharge) program, as required by the Construction General Permit and the Project's SMP, the Applicant prepared and submitted to the SWRCB a Notice of Intent and SWPPP, which was approved by the SWRCB and is available online in the SWRCB's SMARTS system (Waste Discharge Identification [WDID] number 4 19C391158). The SWPPP was designed to address site-specific conditions related to Project construction. The SWPPP identified and described the sources of sediment and other pollutants that may affect the quality of storm water discharges; it also analyzes and requires implementation and maintenance of BMPs to reduce or eliminate sediment, pollutants adhering to sediment, and other non-sediment pollutants in storm water and non-storm water discharges. In accordance with the SWPPP, sediment basins, silt fences, check dams, fiber rolls, berms, and other structural BMPs were constructed onsite prior to commencing the Surcharge program to prevent stormwater from carrying sediment offsite and eroding onsite materials. As required by the SWPPP, stormwater collected by the sediment basins is, after settlement of particles, pumped to authorized discharge points directing the stormwater to existing storm drains offsite. The SWPPP also set forth when and where water quality sampling must occur to confirm the discharge limits set by the NPDES permit are met and that Project construction activities do not impair or contribute to impairment of the beneficial uses of surface waters. Because the Surcharge pile remains onsite, the BMPs were required to be maintained and currently remain in place, and the non-structural BMPs, water quality monitoring, and other measures required by the SWPPP have continued to be implemented.

Implementation of the BMPs in the SWPPP have and would continue to ensure that construction-related erosion impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Soil Erosion or Loss of Top Soil: A less than significant impact would occur and therefore no mitigation is required.

Impact Comparison Summary: With implementation of the Construction General Permit, the Project would not result in substantial soil erosion or loss of topsoil, and impacts would be less than significant. Therefore, no mitigation measures are required. The DEIR's analysis on this issue is consistent with the impact analysis in the MND, which identified no impact related to erosion and loss of topsoil.

Threshold 4.6c: ***Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?***

Landslides

The potential for liquefaction and landslides is addressed above under Threshold 4.6a. As previously discussed for Threshold 4.6a, the Project Site is identified by the CGS as within a Zone of Required Investigation for Liquefaction, and accordingly, a site-specific liquefaction analysis was conducted as part of the Geotechnical Study. This analysis determined that liquefaction potential is generally limited to isolated, non-continuous zones, and the overall liquefaction potential for the Project Site is deemed low (CKG 2021a). Additionally, although the southeastern edge of the Project Site is identified by CGS as within a Zone of Required Investigation for

earthquake-induced landslides, the Geotechnical Study concluded the potential for seismically-induced slope instability (i.e., landslides) is considered low provided slopes are not over-steepened (CKG 2021a). Additionally, the Project would be designed and constructed in accordance with the recommendations of the Geotechnical Study and CBC requirements, and impacts related to liquefaction and landslides would be less than significant.

Liquefaction and Lateral Spreading

For lateral spreading or flow failure to occur, a continuous, a laterally unconstrained liquefiable zone must be free to move along gently sloping ground toward an unconfined area. Due to the presence of low-lying areas west and east of the Project Site, the Geotechnical Study included a site-specific assessment of lateral spreading. The results indicated that the magnitude of lateral displacement is less than the threshold requiring mitigation (4 inches) (CKG 2021c). Accordingly, the Geotechnical Study concluded the potential for lateral spreading flow failure is considered less than significant.

Subsidence

As stated in the Geotechnical Study, the Project Site is not within an area of known significant subsidence associated with groundwater or petroleum withdrawal, peat oxidation, or hydro-compaction. However, the sludges and wet, uncompacted sump materials at the Project Site would continue to densify over time and induce localized subsidence and settlement. Based on the proposed grading of the Project Site, which includes up to 10 feet of additional fill over some areas, over 12 inches of ground surface settlement may occur. As such, these materials are unsuitable for support of foundations and floor slab for the proposed building (CKG 2021a). The Project would be designed and constructed in accordance with the recommendations of the Geotechnical Study and CBC requirements to ensure that adverse soil engineering conditions are properly remediated. Therefore, less than significant impacts related to subsidence and settlement would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Landslides: A less than significant impact would occur and therefore no mitigation is required.

Liquefaction and Lateral Spreading: A less than significant impact would occur and therefore no mitigation is required.

Subsidence: A less than significant impact would occur and therefore no mitigation is required.

Impact Comparison Summary: The Project would result in a less than significant impact related to liquefaction, landslides, and subsidence due to settlement, and lateral spreading. The Project would result in similar impacts when compared with the impact analysis in the MND, which identified a less than significant impact with mitigation incorporated pursuant to this threshold.

Threshold 4.6d: *Would the project be located on expansive soil, as defined in Section 1803.5.3 of the California Building Code (2010), creating substantial direct or indirect risks to life or property?*

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and which shrink when dried. Foundations constructed on these soils are subject to uplifting forces caused by the swelling. Without proper remedial measures, heaving and cracking of both building foundations and slabs- on-grade could result. Tests of expansion potential on soil samples taken from borings advanced on the Project Site yielded expansion potential results ranging from low to high, representing a potential significant impact.

The Geotechnical Study recommends that clay soils be over excavated to allow placement of at least two feet of relatively non-expansive soils beneath all concrete slabs and walks. The Project would be designed and constructed in accordance with the recommendations of the Geotechnical Study and CBC requirements to ensure that adverse soil engineering conditions are properly remediated. Therefore, impacts related to expansive soils would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Expansive Soil: A less than significant impact would occur and therefore no mitigation is required.

Impact Comparison Summary: The Project would result in a less than significant impact. The Project would result in similar impacts when compared with the impact analysis in the MND, which identified a less than significant impacts related to expansive soils.

Threshold 4.6e: *Would the project have soils incapable of adequately supporting the use of septic tanks or alterative wastewater disposal systems where sewers are not available for the disposal of wastewater?*

The Project would not involve the use of septic tanks or alternative wastewater disposal systems. No impacts would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Wastewater Disposal Systems: No impact would occur and therefore no mitigation is required.

Impact Comparison Summary: The Project would result in no impact. The Project would result in similar impacts when compared with the impact analysis in the MND, which identified no impact related to elated to use of septic tanks or alternative wastewater disposal systems.

Threshold 4.6f: *Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

A significant paleontological impact would occur if grading or excavation activities associated with the Project disturb paleontological resources. The paleontological records search at the LACM

revealed that the Project area is comprised of younger and older terrestrial Quaternary alluvial fan sediments the Project Site. The surficial Quaternary alluvial deposits are not likely to contain significant vertebrate fossils; however, deeper excavations within the Quaternary alluvium at the proposed Project Site may encounter significant fossils. There were no fossil localities found during the LACM records search that lie within the Project Site, although many have been recorded nearby from older Quaternary sediments. Grading or very shallow excavations in the uppermost few feet of the younger Quaternary alluvial sediments in the proposed project area are unlikely to uncover significant fossil vertebrate remains. Deeper excavations in the Quaternary alluvium at the proposed Project Site that extend down into older deposits and all excavation into the older Quaternary sediments, however, may encounter significant vertebrate fossils (Psomas 2020). Therefore, the Project has the potential to impact paleontological resources, resulting in a potentially significant effect.

Mitigation Measures

MM GEO-1 Prior to the issuance of any grading permit, the Project Applicant/Developer shall provide written evidence to the City of Long Beach that a qualified Paleontologist has been retained to observe grading activities and to salvage and catalog fossils as necessary. The Paleontologist shall be present at the pre-grade conference; shall establish procedures for paleontological resource surveillance; and shall establish, in cooperation with the Project Applicant/Developer, procedures for temporarily halting or redirecting work to permit sampling, identification, and evaluation of the fossils. If the paleontological resources are found to be significant, the Paleontologist shall determine appropriate actions to ensure proper exploration and/or salvage.

Upon completion of grading and excavation activities, the paleontologist shall submit a monitoring report to the City. The report shall include the period of inspection; a catalog and analysis of the fossils found; and the present repository of the fossils.

The Project Applicant/Developer shall be responsible for making arrangements for the preparation of excavated material to the point of identification. In addition, the Project Applicant/Developer shall offer excavated finds for curatorial purposes to the City of Long Beach on a first refusal basis. The Project Applicant/Developer shall also be responsible for paying curatorial fees. These actions, as well as final mitigation and disposition of the resources, shall be subject to approval by the City.

Level of Significance After Mitigation

Unique Paleontological Resource or Site or Geologic Feature: The Project would incorporate **MM GEO-1**, which requires a qualified paleontologist to be obtained to observe grading activities and salvage and catalogue fossils if encountered. Therefore, with implementation of **MM GEO-1**, impacts related to paleontological resources would be less than significant.

Impact Comparison Summary: The Project would result in a less than significant impact with mitigation. The Project would result in similar impacts when compared with the impact analysis in the MND, which identified a less than significant impact with mitigation related to paleontological resources.

4.6.4 CUMULATIVE IMPACTS

Projects considered in the cumulative impact analysis consist of six projects within the City of Long Beach. These projects are described in more detail in Table 4-1, Cumulative Projects List, which is provided in Section 4.0, Impact Analysis.

Project development would not have a substantial adverse effect involving the rupture of an earthquake fault, or seismic-related ground shaking, liquefaction, or landslides. The Project would not have a significant impact related to soil erosion or the loss of top soil. Additionally, the Project would not have a significant potential to result in on- or off-site landslides, lateral spreading, subsidence,

Geology and soils impacts are generally site-specific and there is typically little, if any, cumulative relationship between the development of a project and development within a larger cumulative area (e.g., City-wide development). For example, development at the Project Site would not alter geologic events or soil features/characteristics (such as ground shaking, seismic intensity, or settlement) at other locations; therefore, the Project would not directly affect the level of intensity at which a seismic event or geologic hazard on an adjacent site is experienced. However, development of the Project and future development in the City may expose more persons to seismic hazards, compliance with all requirements and standards for seismic activity would reduce the potential impacts.

It is likely that most, if not all, of the cumulative projects would result in native ground disturbance that could encounter and affect paleontological resources, resulting in a potentially significant impact.

Mitigation Measures

MM GEO-1 Prior to the issuance of any grading permit, the Project Applicant/Developer shall provide written evidence to the City of Long Beach that a qualified Paleontologist has been retained to observe grading activities and to salvage and catalog fossils as necessary. The Paleontologist shall be present at the pre-grade conference; shall establish procedures for paleontological resource surveillance; and shall establish, in cooperation with the Project Applicant/Developer, procedures for temporarily halting or redirecting work to permit sampling, identification, and evaluation of the fossils. If the paleontological resources are found to be significant, the Paleontologist shall determine appropriate actions to ensure proper exploration and/or salvage.

Upon completion of grading and excavation activities, the paleontologist shall submit a monitoring report to the City. The report shall include the period of inspection; a catalog and analysis of the fossils found; and the present repository of the fossils.

The Project Applicant/Developer shall be responsible for making arrangements for the preparation of excavated material to the point of identification. In addition, the Project Applicant/Developer shall offer excavated finds for curatorial purposes to the City of Long Beach on a first refusal basis. The Project Applicant/Developer shall also be responsible for paying curatorial fees. These actions, as well as final mitigation and disposition of the resources, shall be subject to approval by the City.

Level of Significance After Mitigation

Cumulative Impacts: The Project and any other development projects would be required to comply with the applicable State and local agency grading manuals and ordinances. As with the Project, future development would also be required to have site-specific geotechnical investigations to identify the geologic and seismic characteristics on a site and provide recommendations for engineering design and construction to ensure the structural integrity of proposed development. These recommendations would be incorporated into project design. Compliance of individual projects with the recommendations of the applicable geotechnical investigation would prevent cumulatively significant hazards associated with seismic conditions, unstable soils, lateral spreading, liquefaction, soil collapse, expansive soil, soil erosion, and other geologic issues. Therefore, the Project's contribution to cumulative geology and soils impacts would not be cumulatively considerable and the Project would not create a significant cumulative impact with implementation of **MM GEO-1** and compliance with applicable seismic design criteria in the CBC and the City's grading regulations. Therefore, with implementation of mitigation, the Project's contribution would not be cumulatively considerable and therefore would not contribute to a significant cumulative impact.

4.6.5 REFERENCES

- California Geological Survey (CGS). 2018 (March 27, 2024 access date). Data Viewer. <https://maps.conservation.ca.gov/cgs/DataViewer/>.
- Carl Kim Geotechnical, Inc. (CKG). 2021a (September 24, revised date). *Geotechnical Exploration, Proposed Self-Storage Facility, 3701 North Pacific Place, Long Beach, California*. Hillsborough, CA: CKG. (Appendix G-1).
- . 2021b (December 21). *Addendum No. 2 to the Geotechnical Exploration Report, Evaluation of Lateral Spreading, Proposed Self-Storage Facility, 3701 North Pacific Place, Long Beach California 90806*. Hillsborough, CA: CKG. (Appendix G-3).
- Long Beach, City of. 2004 (Reprint of May 1975). *Long Beach General Plan Program Public Safety Element*. Long Beach, CA: the City. <https://longbeach.gov/globalassets/lbcd/media-library/documents/planning/advance/general-plan/public-safety>.
- . 1988 (October). *City of Long Beach General Plan Seismic Safety Element*. Long Beach, CA: the City. https://longbeach.gov/globalassets/lbcd/media-library/documents/planning/advance/general-plan/seismic-safety-element_reduced.
- Psomas. 2020 (July 23). *Cultural and Paleontological Resources Analysis for the 3701 Pacific Place Project, Long Beach, Los Angeles County, California*. Pasadena, CA: Psomas. (Appendix E-3).
- Southern California Earthquake Data Center (SCEDC). 2020 (March 19, access date). Long Beach Earthquake. <https://scedc.caltech.edu/significant/longbeach1933.html>.

This page intentionally left blank