IV. Environmental Impact Analysis

D. Geology and Soils

1. Introduction

This section evaluates potential existing geologic and soils hazards of the Project, including the potential for the Project to cause direct or indirect impacts associated with existing environmental conditions that could cause, in whole or in part, fault rupture, ground shaking, liquefaction of soils, expansion of soils, and/or landslide. Impacts regarding these topics are based on the *Geotechnical Evaluation Report for CEQA District NoHo Mixed-Use Development* (Geotechnical Evaluation), prepared for the Project by Geotechnical Professionals, Inc., dated March 12, 2020, as well as a response to comments on the Geotechnical Evaluation provided by the Grading Division of the Los Angeles Department of Building and Safety (LADBS) dated March 17, 2021, which are included in Appendix H of this Draft EIR. This section of the Draft EIR also includes an analysis of the Project's potential impacts on paleontological resources. The analysis of paleontological resources is based on a paleontological records search conducted by the Natural History Museum of Los Angeles County (NHMLA) on March 24, 2020, which is included as Appendix I of this Draft EIR.

2. Environmental Setting

a. Regulatory Framework

There are several plans, regulations, and programs that include policies, requirements, and guidelines regarding Geology and Soils at the federal, state, regional, and local levels. As described below, these plans, guidelines, and laws include the following:

- Earthquake Hazards Reduction Act
- National Pollutant Discharge Elimination System
- Paleontological Resources Preservation Act
- Society for Vertebrate Paleontology Standard Guidelines
- Alquist-Priolo Earthquake Act

- Seismic Hazards Mapping Act
- California Building Code
- California Geologic Energy Management Division
- California Penal Code Section 622.5
- California Public Resources Code Section 5097.5
- Los Angeles General Plan Safety Element
- General Plan Conservation Element
- Los Angeles Municipal Code

(1) Federal

(a) Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1977 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the Earthquake Hazards Reduction Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended by the NEHRP Reauthorization Act of 2004 (Public Law 108-360).

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRP designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under NEHRP help inform and guide local planning and building code requirements such as emergency evacuation responsibilities and seismic code standards such as those to which a proposed project would be required to adhere.

(b) National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) Program has been responsible for substantial improvements to our nation's and state's water quality since 1972. The NPDES permit sets erosion control standards and requires implementation of nonpoint source control of surface drainage through the application of a number of Best

Management Practices (BMPs). NPDES permits are required by Section 402 of the Clean Water Act.[1]

(c) Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act (PRPA) was signed into law in 2009. It directs the Department of Agriculture and the Department of the Interior to implement comprehensive paleontological resource management programs on federal lands. The PRPA protects scientifically significant fossils on federal lands and provides a permitting system where researchers can collect and study scientifically significant fossils which will remain in the public trust. The act also allows for the collection of common plant and invertebrate fossils for personal, non-commercial use on federal lands.[2] The PRPA requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land. The PRPA furthers the protection of fossils on federal lands by criminalizing the unauthorized removal of fossils.

(d) Society for Vertebrate Paleontology Standard Guidelines

The Society for Vertebrate Paleontology (SVP) has established standard guidelines[3] that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. The PRPA of 2009 calls for uniform policies and standards that apply to fossils on all federal public lands. All federal land management agencies are required to develop regulations that satisfy the stipulations of the PRPA. As defined by the SVP,[4] significant nonrenewable paleontological resources are:

> *Fossils and fossiliferous deposits here are restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or paleobotanical fossils except when present within a*

---

[1] *United States Environmental Protection Agency, Clean Water Act, Section 402: National Pollutant Discharge Elimination System, www.epa.gov/cwa-404/clean-water-act-section-402-national-pollutant-discharge-elimination-system, accessed March 18, 2021.*

[2] *United States Department of the Interior, National Park Service, Paleontological Resources Preservation Act.*

[3] *Society of Vertebrate Paleontology, Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010, http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_Mitigation_Guidelines.aspx, accessed April 27, 2021.*

[4] *Society of Vertebrate Paleontology, "Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines," Society of Vertebrate Paleontology News Bulletin 163:22-27, 1995.*

given vertebrate assemblage. Certain invertebrate and plant fossils may be defined as significant by a project paleontologist, local paleontologist, specialists, or special interest groups, or by lead agencies or local governments.

As defined by the SVP,[5] significant fossiliferous deposits are:

A rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces, and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years BP [before present].

Based on the significance definitions of the SVP,[6] all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

(2) State

(a) Alquist-Priolo Earthquake Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act) was signed into law December 22, 1972 (revised in 1994), and codified

---

[5] *Society of Vertebrate Paleontology, "Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines," Society of Vertebrate Paleontology News Bulletin 163:22-27, 1995.*

[6] *Society of Vertebrate Paleontology, "Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines," Society of Vertebrate Paleontology News Bulletin 163:22-27, 1995.*

into State law in the Public Resources Code (PRC) as Division 2, Chapter 7.5 to address hazards from earthquake fault zones. The purpose of this law is to mitigate the hazard of surface fault rupture by regulating development near active faults. As required by the Act, the State has delineated Earthquake Fault Zones (formerly Special Studies Zones) along known active faults in California, which vary in width around the fault trace from about 200 to 500 feet on either side of the fault trace. Cities and counties affected by the zones must regulate certain development projects within the zones. The State Geologist is also required to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. Local agencies enforce the Alquist-Priolo Earthquake Fault Zoning Act in the development permit process, where applicable, and may be more restrictive than State law requires. According to the Alquist-Priolo Earthquake Fault Zoning Act, before a project that is within an Alquist-Priolo Earthquake Fault Zone can be permitted, cities and counties shall require a geologic investigation, prepared by a licensed geologist, to demonstrate that buildings will not be constructed across active faults. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back a distance to be established by a California Certified Engineering Geologist. Although setback distances may vary, a minimum 50-foot setback is typically required.

(b) Seismic Hazards Mapping Act

In order to address the effects of strong ground shaking, liquefaction, landslides, and other ground failures due to seismic events, the State of California passed the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690-2699.6). Under the Seismic Hazards Mapping Act, the State Geologist is required to delineate “seismic hazard zones.” Cities and counties must regulate certain development projects within these zones until the geologic and soil conditions of their project sites have been investigated and appropriate mitigation measures, if any, have been incorporated into development plans. The State Mining and Geology Board provides additional regulations and policies to assist municipalities in preparing the Safety Element of their General Plans and to encourage the adaptation of land use management policies and regulations to reduce and mitigate seismic hazards to protect public health and safety. Under PRC Section 2697, cities and counties must require, prior to the approval of a project located in a seismic hazard zone, submission of a geotechnical report defining and delineating any seismic hazard.

(c) California Building Code

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, means of egress facilities, and general stability of buildings. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered

by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or those standards are not enforceable. The provisions of the CBC apply to the construction, alteration, movement, replacement, location, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The 2019 edition of the CBC is based on the 2018 International Building Code (IBC) published by the International Code Council. The code is updated triennially, and the 2019 edition of the CBC was published by the California Building Standards Commission on July 1, 2019, and became effective January 1, 2020. Every three years, the State adopts new codes (known collectively as the California Building Standards Code) to establish uniform standards for the construction and maintenance of buildings, electrical systems, plumbing systems, mechanical systems, and fire and life safety systems. Sections 17922, 17958 and 18941.5 of the California Health and Safety Code require that the latest edition of the California Building Standards Code apply to local construction 180 days after publication. The significant changes to Title 24 in the 2019 edition can be found at California Department of General Services website.[7]

(e) California Geologic Energy Management Division

The California Geologic Energy Management Division (CalGEM) regulates production of oil and gas, as well as geothermal resources, within the State of California. CalGEM requirements in preparation of environmental documents under CEQA are defined in CCR, Title 14, Division 2, Chapter 2. Staff also assists operators in avoiding or reducing environmental impacts from the development of oil, gas, and geothermal resources in California, including subsidence. PRC Sections 3315, et seq. CalGEM regulations, which are defined in CCR, Title 14, Division 2, Chapter 4, include well design and construction standards, surface production equipment and pipeline requirements, and well abandonment procedures and guidelines to ensure effectiveness in preventing migration of oil and gas from a producing zone to shallower zones, including potable groundwater zones, as well as subsidence.

(f) California Penal Code Section 622.5

California Penal Code Section 622.5 provides the following: "Every person, not the owner thereof, who willfully injures, disfigures, defaces, or destroys any object or thing of

[7] *California Department of General Services, Building Standards Commission, California Building Standards Code, www.dgs.ca.gov/BSC/Codes#@ViewBag.JumpTo/, accessed March 18, 2021.*

archeological or historical interest or value, whether situated on private lands or within any public park or place, is guilty of a misdemeanor."

(g) California PRC Section 5097.5

California PRC Section 5097.5 provides protection for paleontological resources on public lands, where Section 5097.5(a) states, in part, that:

> *No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands.*

(3) Local

(a) City of Los Angeles General Plan

(i) Safety Element

The City's General Plan Safety Element, which was adopted in 1996, addresses public safety risks due to natural disasters, including seismic events and geologic conditions, and sets forth guidance for emergency response during such disasters. The Safety Element also provides maps of designated areas within Los Angeles that are considered susceptible to earthquake-induced hazards, such as fault rupture and liquefaction.

(ii) Conservation Element

The City's General Plan Conservation Element recognizes paleontological resources in Section 3: "Archeological and Paleontological" (II-3), specifically the La Brea Tar Pits, and identifies protection of paleontological resources as an objective (II-5). The General Plan identifies site protection as important, stating, "Pursuant to CEQA, if a land development project is within a potentially significant paleontological area, the developer is required to contact a bona fide paleontologist to arrange for assessment of the potential impact and mitigation of potential disruption of or damage to the site. Section 3 of the Conservation Element, adopted in September 2001, includes policies for the protection of paleontological resources. As stated therein, it is the City's policy that paleontological resources be protected for historical, cultural research, and/or educational purposes. Section 3 sets as an objective the identification and protection of significant paleontological

sites and/or resources known to exist or that are identified during "land development, demolition, or property modification activities."

(b) Los Angeles Municipal Code

Chapter IX of the Los Angeles Municipal Code (LAMC) contains the City's Building Code, which incorporates by reference the CBC, with City amendments for additional requirements. The Los Angeles Department of Building and Safety (LADBS) is responsible for implementing the provisions of the LAMC. To that end, LADBS issues building and grading permits for construction projects. Building permits are required for any building or structure that is erected, constructed, enlarged, altered, repaired, moved, improved, removed, converted, or demolished. Grading permits are required for all grading projects other than those specifically exempted by the LAMC. LADBS has the authority to withhold building permit issuance if a project cannot mitigate potential hazards to the project or which are associated with the project. Throughout the permitting, design, and construction phases of a building project, LADBS engineers and inspectors confirm that the requirements of the LAMC pertaining specifically to geoseismic and soils conditions are being implemented by project architects, engineers, and contractors.

The function of the City's Building Code, which comprises Chapter IX of the LAMC, is to protect life safety and ensure compliance with the LAMC. Chapter IX addresses numerous topics, including earthwork and grading activities, import and export of soils, erosion and drainage control, and general construction requirements that address flood and mudflow protection, landslides, and unstable soils. Additionally, the LAMC includes specific requirements addressing seismic design, grading, foundation design, geologic investigations and reports, soil and rock testing, and groundwater.

Specifically, Chapter IX of LAMC Division 18, Section 91.1803,[8] requires a Final Geotechnical Report with final design recommendations prepared by a California-registered geotechnical engineer and submitted to the LADBS for review prior to issuance of a grading permit. Final foundation design recommendations must be developed during final project design, and other deep foundation systems that may be suitable would be addressed in the Final Geotechnical Report. All earthwork (i.e., excavation, site preparation, any fill backfill placement, etc.) must be conducted with engineering control under observation and testing by the Geotechnical Engineer and in accordance with LADBS.

[8] *California Building Code, 2019 Part 2, Volume 1, Chapter 18, Soils and Foundations, Section 1803, Geotechnical Investigations.*

b. Existing Conditions

(1) Regional Geology

Regionally, the Project Site is located near the border between two of California's geomorphic provinces, the Transverse ranges to the north and the Peninsular Ranges to the South. The Transverse Ranges are characterized by east-west trending mountain ranges, including the Santa Monica and San Gabriel Mountains. The Peninsular Ranges are characterized by northwesterly trending active faults and mountain ranges related to the San Andreas Fault and other major fault systems in the province that extends from the Santa Monica-Hollywood-Raymond Fault System, within the Los Angeles Basin, southeast to Baja California.

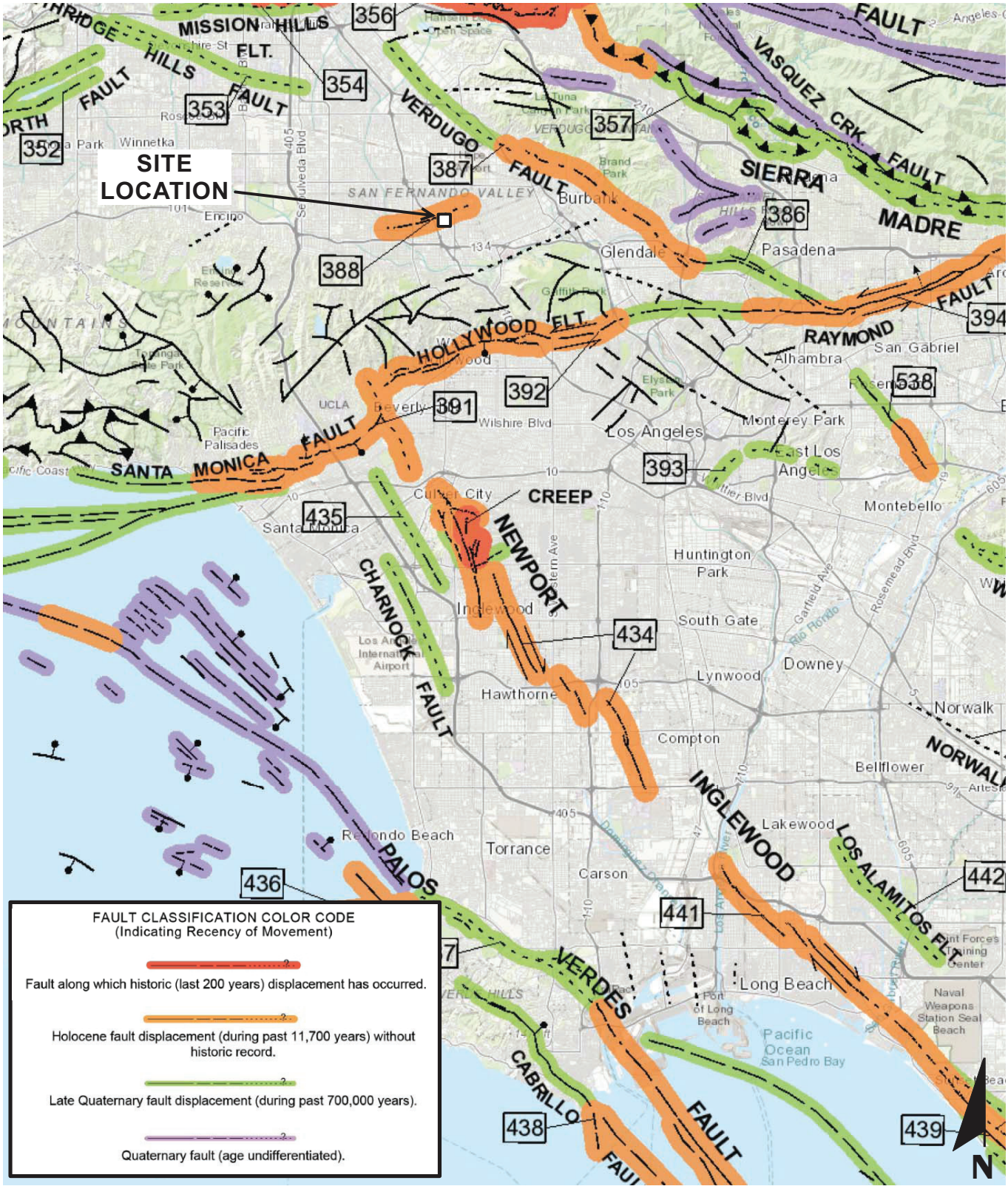
(2) Regional Faulting and Seismicity

The numerous faults in Southern California include active, potentially active, and inactive faults. Based on criteria established by the CGS, active faults are those that have shown evidence of surface displacement within the past 11,000 years (i.e., Holocene-age). Potentially active faults are those that have shown evidence of surface displacement within the last 1.6 million years (i.e., Quaternary-age). Inactive faults are those that have not shown evidence of surface displacement within the last 1.6 million years. The Southern California region also includes blind thrust faults, which are faults without a surface expression. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. Since the seismic risk of these buried thrust faults in terms of recurrence and maximum potential magnitude is not well established, the potential for earthquakes with magnitude (M) higher than 6.0 occurring on buried thrust faults cannot be ruled out. The known faults in the vicinity of the Project Site are discussed below and shown in Figure IV.D-1 on page IV.D-10.

(a) Active Faults

The Alquist-Priolo Earthquake Fault Zoning Act defines "active" and "potentially active" faults utilizing the same aging criteria as those used by the CGS, as described above. However, according to the Alquist-Priolo Earthquake Fault Zoning Act, only those faults which have direct evidence of movement within the last 11,000 years are required to be zoned.[9] The CGS considers fault movement within this period a characteristic of faults that have a relatively high potential for ground rupture in the future. As discussed in the Regulatory Framework above, the Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish earthquake fault zones around the surface traces of active

[9] *California Department of Conservation, Alquist-Priolo Earthquake Fault Zones, www.conservation.ca.gov/cgs/alquist-priolo, accessed December 16, 2021.*



BASE MAP REPRODUCED FROM FAULT ACTIVITY MAP OF CALIFORNIA BY THE CALIFORNIA GEOLOGICAL SURVEY, C.W. JENNINGS, W.A. BRYANT: DATED 2010

Figure IV.D-1
Regional Fault Map

Source: Geotechnical Professionals Inc., 2020.

faults and to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions.

These zones, which generally extend from 200 to 500 feet on each side of a known active fault, are based on the location precision, complexity, or regional significance of the fault. The zones identify areas where potential surface fault rupture along an active fault could prove hazardous and where special studies are required to characterize hazards to habitable structures. If a site lies within an Earthquake Fault Zone on an official CGS Survey map, then a geologic fault rupture investigation must be performed before issuance of permits to demonstrate that the proposed development is not threatened by surface displacement from the fault.

No known active faults have been mapped within or immediately adjacent to the Project Site. In addition, the Project Site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest major active fault near the Project Site is the Hollywood Fault, located approximately 4.7 miles south of the Project Site.[10],[11] The Hollywood Fault is part of an east-west trending fault complex termed the Santa Monica-Hollywood-Raymond Fault System, which generally forms the southern boundary of the Santa Monica and San Gabriel Mountains north of the fault system, and the Los Angeles Basin south of the fault system. Other nearby active faults include the Santa Monica Fault, the Verdugo Fault, the Elysian Park Thrust, the Sierra Madre (San Fernando) Fault, and the Newport Inglewood Fault.

As illustrated in Figure IV.D-1 on page IV.D-10, the Geotechnical Evaluation initially identified an unnamed (possible) fault that is mapped by CGS and USGS as crossing the northwest corner of the East Site (Block 1), the northwest corner of the Northwest Site (Block 7), and the northwest corner of the West Lot and generally tends east/northwest. As part of the Geotechnical Evaluation prepared for the Project, the potential presence of this fault was studied. This review included documents referenced by CGS and USGS that identify the unnamed possible fault; files for recently completed projects that are near, or transected by, the unnamed possible fault at LADBS; historic aerial photographs and topographic maps for assessment of geomorphic or other features indicating the presence of a fault; and geotechnical/geologic hazard reports for nearby projects. Based on the data reviewed, no evidence beyond that presented in the 1980 study that originally identified the

---

[10] *The Verdugo Fault is closer to the Project Site; however, as noted on page 19 of the Geotechnical Evaluation, "no direct evidence of historical seismicity has been documented" on that fault.*

[11] *The Initial Study included as Appendix A of this Draft EIR cited the City's Zoning Information and Map Access System stating the Hollywood Fault was approximately 2.5 miles from the Project Site. However, given the Hollywood Fault's proximity to Hollywood Boulevard, 4.7 miles as noted in the Geotechnical Evaluation appears to be correct.*

possible fault has been provided to demonstrate that a fault is present within the Project Site. Therefore, as detailed in the Geotechnical Evaluation, further assessment of the unnamed possible fault with additional field explorations within the Project Site was considered unnecessary (see page 18 of the Geotechnical Evaluation included as Appendix H of this Draft EIR).

(b) Seismicity

The Project Site is located in a region that is characterized by moderate to high seismic activity and is likely to be subjected to strong ground shaking due to earthquakes. The Project Site and vicinity has experienced strong ground shaking in the past. According to the California Earthquake Data Center, recent historic earthquakes near the Project Site include the 1933 Long Beach Earthquake (M 6.3), the 1971 Sylmar Earthquake (M 6.6), and the 1994 Northridge Earthquake (M 6.7).

(3) Local Geology

(a) Soil Conditions

The Project Site is located on the southern end of the Northwestern Block of the Los Angeles Basin and at the southern end of the San Fernando Valley. The Los Angeles Basin is a northeast-trending structural basin filled with Tertiary age marine sedimentary rocks at depth and mantled by Recent and Pleistocene age non-marine alluvial sediments deposited by washes and streams flowing northward from the Santa Monica Mountains, located to the south of the Project Site. The San Fernando Valley is an east-west-trending structural trough closely related to the uplift and deformation of the San Gabriel mountain range to the north. As the range has been elevated and deformed as a result of crustal shortening during the Cenozoic time, the San Fernando Valley has subsided and is filled with sediment.

The Project Site is underlain by Quaternary age alluvial sediments and stream channel deposits. The alluvial deposits consist of clay, sand, and gravel. The stream channel deposits consist of gravel and sand.

(b) Groundwater

According to the Geotechnical Evaluation included in Appendix H of this Draft EIR, the historic high groundwater level beneath the Project Site is approximately 10 feet below the existing grade in the site vicinity. As part of the Geotechnical Evaluation, field explorations were conducted to evaluate the current groundwater levels beneath the Project Site. As reported, groundwater was not encountered in the borings drilled to a depth of up to 121 feet as part of the study.

(c) Liquefaction

Liquefaction is a phenomenon whereby saturated, granular soils lose their inherent shear strength due to excess pore water pressure buildup, such as that generated during repeated cyclic loading from an earthquake. Liquefaction is associated primarily with low density, granular, saturated soil in areas where the groundwater table is 50 feet or less below the ground surface. Liquefaction-related effects can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading. The Project Site is located in an area designated by the State Geologist as a "zone of required investigation" due to the potential for earth-quake induced liquefaction and ZIMAS identifies the Project Site as being within a liquefaction zone.

(d) Lateral Spreading

Lateral spreading is a phenomenon in which large blocks of intact, non-liquefied soil move downslope on a liquefied soil layer. Lateral spreading is often a regional event. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along gently sloping ground toward an unconfined area, such as an unlined river channel. The Project Site is located in a liquefiable area, however because the Project Site is in a relatively level area, the potential for lateral spreading is considered low.

(e) Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring, or is planned at the Project Site. Therefore, there is little to no potential for ground subsidence due to withdrawal of fluid or gas at the Project Site.

(f) Expansive Soils

Expansive soils generally consist of clays that can shrink and swell with changes in moisture content. Movement of soils in response to shrinkage and swelling has the potential to impact near-surface improvements such as lightly loaded foundations, floor slabs, and flatwork. Based on the data reviewed for the Geotechnical Evaluation, near surface soils are anticipated to have no to very low expansion potential.

(4) Paleontological Resources

Paleontology is the study of fossils, which are the remains of ancient life forms. On March 24, 2020, a Project-specific paleontological records search was conducted through the NHMLA, which is included as Appendix I of this Draft EIR. The results of the

paleontological records search indicate there are no previously encountered vertebrate fossil localities located within the Project Site. However, there are localities that have been identified nearby from the same sedimentary deposits that occur at depth within the Project area, as identified below.

Based on the records search, the Project Site contains surficial deposits composed of younger Quaternary Alluvium, derived primarily as alluvial fan deposits from the San Gabriel Mountains to the northeast via the Central Branch of the Tujunga Wash that currently flows just to the west of the Project Site. These deposits typically do not contain significant vertebrate fossils in the uppermost layers, but may contain significant fossil vertebrate remains in older deposits at depth.

The closest comparable vertebrate-fossil locality, LACM 6970, is a general locality south-southeast of the Project Site along Lankershim Boulevard between Hortense Street in the north and Aqua Vista Street in the south. That locality produced fossil specimens of camel, *Camelhops hesternus,* bison, *Bison antiquus*, and ground sloth, *Glossotherium harlani*, at approximately 60 feet to 80 feet below grade during excavations for the Metrorail Redline Universal City Tunnel.

3. Project Impacts

a. Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Project would have a significant impact related to geology and soils if it would result in any of the following:

Threshold (a): 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[12] Special Publication 42.

ii. Strong seismic ground shaking

iii. Seismic-related ground failure, including liquefaction

[12] *Now the CGS.*

iv. Landslides

Threshold (b): Result in substantial soil erosion or the loss of topsoil.

Threshold (c): 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 (d): Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

Threshold (e): Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater.

Threshold (f): Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

For this analysis, the Appendix G Thresholds listed above are relied upon. The analysis utilizes factors and considerations identified in the City's 2006 L.A. CEQA Thresholds Guide, as appropriate, to assist in answering the Appendix G Threshold questions.

The L.A. CEQA Thresholds Guide identifies the following criteria to evaluate impacts related to geology and soils impacts:

(1) Geologic Hazards

- Cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

(2) Sedimentation and Erosion

- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or
- Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition which would not be contained or controlled on-site.

(3) Paleontological Resources

- Whether, or the degree to which, the project might result in the permanent loss of, or loss of access to, a paleontological resource; and
- Whether the paleontological resource is of regional or statewide significance.

b. Methodology

To evaluate potential impacts relative to geology and soils, the Geotechnical Evaluation was prepared by Geotechnical Professionals, Inc., as provided in Appendix H, of this Draft EIR. The Geotechnical Evaluation included a review of published geologic data relevant to the Project Site and Off-Site Metro Parking Areas, subsurface cone penetration tests, soils test borings, and data from previous geological investigations performed within and adjacent to the Project Site and Off-Site Metro Parking Areas.

To address potential impacts associated with paleontological resources, a formal records search was conducted to assess the paleontological sensitivity of the Project Site, Off-Site Metro Parking Areas, and vicinity. The records search is included as Appendix I of this Draft EIR. In addition, an evaluation of existing conditions and previous disturbances within the Project Site and Off-Site Metro Parking Areas, the geology of the Project Site and Off-Site Metro Parking Areas, and the anticipated depths of grading were evaluated to determine the potential for uncovering paleontological resources.

c. Project Design Features

No specific project design features are proposed with regard to geology and soils.

d. Analysis of Project Impacts

Threshold (a): 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[13] Special Publication 42.

[13] *Now the CGS.*

(1) Impact Analysis

Ground rupture is the visible breaking and displacement of the earth's surface along the trace of a fault during an earthquake. As previously discussed, based on research of available literature and the findings of the Geotechnical Evaluation, no known active or potentially active faults underlie the Project Site. In addition, the Project Site is not located within a state-designated Alquist-Priolo Earthquake Fault Zone. As noted above, according to the Geotechnical Evaluation, there is an unnamed possible fault mapped by CGS and USGS as crossing the northwest corner of the East Site (Block 1), the northwest corner of the Northwest Site (Block 7), and the West Lot and projecting towards the east/northwest. However, the Geotechnical Evaluation conducted further evaluation of documents referenced by CGS and USGS that identify the unnamed possible fault, files for recently completed projects that are near, or transected by, the unnamed possible fault at the City of Los Angeles Building Department, historical aerial photographs and topographic maps that are available online for assessment of geomorphic or other features indicating the presence of a fault, and geotechnical/geologic hazard reports for nearby projects. Based on that research and analysis, the Geotechnical Evaluation concluded that the unnamed possible fault at the Project Site is unlikely to be present in this location, and the potential for the Project to exacerbate the possibility of surface rupture due to the unnamed possible fault is unlikely. Other major active faults closest to the Project Site include the Hollywood Fault, located approximately 4.7 miles south of the Project Site. Therefore, no active faults with the potential for surface fault rupture are known to pass directly beneath the Project Site, and the potential for surface rupture due to faulting occurring beneath the Project Site, is considered low. Furthermore, the Project is typical of urban environments and would not involve mining operations, deep excavation into the earth, or boring of large areas creating unstable seismic conditions or stresses in the earth's crust. **Thus, based on the above, the Project would not directly or indirectly cause or exacerbate potential substantial adverse effects, including the risk of loss, injury, or death related to fault rupture. Impacts associated with surface rupture from a known earthquake fault would be less than significant**

(2) Mitigation Measures

Project-level impacts related to fault rupture would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to fault rupture were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

Threshold (a): Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

ii. Strong seismic ground shaking?

(1) Impact Analysis

As described above, the Project Site is located within the seismically active region of Southern California and would potentially be subject to strong seismic ground shaking if a moderate to strong earthquake occurs on a local or regional fault. However, state and local code requirements, as discussed above in the Regulatory Framework, ensure that buildings are designed and constructed in a manner that, although the buildings may sustain damage during a major earthquake, would reduce the substantial risk that buildings would collapse. Specifically, the state and City mandate compliance with numerous rules related to seismic safety, including the Alquist-Priolo Earthquake Fault Zoning Act, Seismic Safety Act, Seismic Hazards Mapping Act, the California Building Code, the City's General Plan Safety Element, and the Los Angeles Building Code. Pursuant to those laws, the Project must demonstrate compliance with the applicable provisions of these safety requirements before permits can be issued for construction of the Project. Accordingly, the design and construction of the Project would comply with all applicable existing regulatory requirements, the applicable provisions of the Los Angeles Building Code relating to seismic safety, and the application of accepted and proven construction engineering practices, including the specific geotechnical design recommendations set forth for the Project in the Geotechnical Evaluation.

Specifically, the Project would comply with the Los Angeles Building Code, which incorporates current seismic design provisions of the 2019 California Building Code, with City amendments, to minimize seismic impacts. The 2019 California Building Code incorporates the latest seismic design standards for structural loads and materials, as well as provisions from the National Earthquake Hazards Reduction Program to mitigate losses from an earthquake and maximize earthquake safety. LADBS is responsible for implementing the provisions of the Los Angeles Building Code, and the Project would be required to comply with the plan review and permitting requirements of LADBS, including the recommendations provided in a final, site-specific geotechnical report subject to review and approval by LADBS.

The Project is typical of urban environments and would not involve mining operations, deep excavation into the earth, or boring of large areas creating unstable seismic conditions or stresses in the earth's crust. Furthermore, as discussed above, there are no known active or potentially active faults that underlie the Project Site. Accordingly, the Project would not exacerbate seismic conditions or other geologic conditions on the Project Site or vicinity.

Therefore, through compliance with regulatory requirements and site-specific geotechnical recommendations contained in a final design-level geotechnical engineering report, the Project would not directly or indirectly cause or exacerbate potential substantial adverse effects, including the risk of loss, injury, or death related to strong seismic ground shaking. Thus, impacts related to strong seismic ground shaking would be less than significant.

(2) Mitigation Measures

Project-level impacts related to strong seismic ground shaking would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to strong seismic ground shaking were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

Threshold (a): Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iii. Seismic-related ground failure, including liquefaction?

(1) Impact Analysis

As discussed above, according to the State of California Seismic Hazard Zones Map for the Los Angeles Quadrangle, the Project Site is located in an area designated as a "zone of required investigation" due to the potential for earthquake-induced liquefaction and ZIMAS identifies the Project Site as being within a liquefaction zone.

As previously discussed, the Project Site has historic high groundwater reported to be as shallow as 10 feet below grade. Under this groundwater condition, there would be a potential for liquefaction to occur at the site during an earthquake. Manifestation of liquefaction is likely to result in loss of bearing support and liquefaction-induced settlement, should it occur. According to the Geotechnical Evaluation, there could be two to three inches of liquefaction induced settlement occurring at the Project Site between depths of approximately 10 to 45 feet below grade under historic high groundwater conditions. Approximately 50-percent of this settlement would occur between depths of approximately 33 and 45 feet below grade. At Parcel 3 (the western portion of Block 0), there could be as much as four and a half inches of liquefaction induced settlement under the same conditions. However, as discussed in the Geotechnical Evaluation, groundwater was not encountered in borings drilled to a depth of 121 feet and a geological review of available

regional groundwater for the San Fernando Valley Groundwater Basin in the area concluded current groundwater levels are on the order of 110 to 120 feet below the surface and have been at least 100 feet below the surface since around 1956. If the groundwater is deeper than 45 feet below grade, the potential for liquefaction and its associated effects to occur, is unlikely. Additionally, because the Project Site is in a relatively level area, the potential for lateral spreading to occur is also considered to be remote.

The Project is typical of urban environments and would not involve mining operations, deep excavation into the earth, or boring of large areas creating unstable seismic conditions or stresses in the earth's crust. Furthermore, as discussed above, there are no active or potentially active faults that underlie the Project Site. Additionally, the Project will not exacerbate the liquefaction potential of the site from its current condition because it will not involve raising groundwater levels to above 45 feet below ground surface or result in lower density granular soils across the site (factors that would increase the potential for liquefaction to occur). Accordingly, the Project would not exacerbate seismic conditions, the potential for seismic related ground failure, including liquefaction, or other geologic conditions on the Project Site or vicinity.

Nevertheless, the Project would be designed in accordance with the Los Angeles Building Code and would include design features such as designing the building foundations to accommodate the potential effects of liquefaction or the liquefiable soils would be mitigated through application of round improvement methods approved by LADBS. **Therefore, based on the above, the Project would not directly or indirectly cause or exacerbate potential substantial adverse effects, including the risk of loss, injury, or death related to seismic-related ground failure, including liquefaction. Impacts associated with seismic-related ground failure, including liquefaction, would be less than significant.**

(2) Mitigation Measures

Project-level impacts related to liquefaction would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to liquefaction were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

Threshold (a): Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iv. Landslides?

As discussed in Section VI, Other CEQA Considerations, of this Draft EIR, and evaluated in the Initial Study prepared for the Project, included in Appendix A of this Draft EIR, the Project Site is not located in a landslide area as mapped by the state, nor is the Project Site mapped as a landslide area by the City. **As determined in the Initial Study, the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death related to landslides. As such, impacts with respect to Threshold (a)iv, would not occur. No further analysis is required.**

Threshold (b): Would the Project result in substantial soil erosion or the loss of topsoil?

As discussed in Section VI, Other CEQA Considerations, of this Draft EIR, and evaluated in the Initial Study prepared for the Project, included in Appendix A of this Draft EIR, all grading activities would require grading permits from LADBS, which would include requirements and standards designed to ensure that substantial soil erosion does not occur. In addition, on-site grading and site preparation would comply with all applicable provisions of Chapter IX, Article 1 of the LAMC, which addresses grading, excavations, and fills. Furthermore, the Project would be required to comply with the City's Low-Impact Development (LID) ordinance and implement standard erosion controls to limit stormwater runoff, which can contribute to erosion. Regarding soil erosion during Project operations, the potential would be negligible since the Project Site would mostly remain fully developed. **Therefore, as determined in the Initial Study, with compliance with regulatory requirements, the Project would not result in substantial soil erosion or the loss of topsoil. As such, impacts with respect to Threshold (b) would be less than significant. No further analysis is required.**

Threshold (c): 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?

(1) Impact Analysis

As discussed above, the Project Site is not located in a landslide area as mapped by the state, nor is the Project Site mapped as a landslide area by the City. **Therefore, no impact related to landslides would occur.**

As previously noted, although the Project Site is within a designated liquefaction zone, because the Project Site is in a relatively level area, the potential for lateral spreading

to occur during liquefaction is considered remote. Specifically, the Project will not increase the potential for lateral spreading to occur because the Project will not increase the potential for liquefaction to occur; include major changes to site grades resulting in overall steeper sloped ground surface; or include a deep open free-face excavation (like a canal or river bank) at the lower end of the Project Site (factors that would increase the potential lateral spreading to occur). **As such, the Project would not be located on and or exacerbate a geologic unit or soil that is unstable, which could potentially result in lateral spreading. Impacts related to lateral spreading would be less than significant, and no mitigation measures are required.**

As previously discussed, subsidence generally occurs when a large portion of land is displaced vertically, usually due to the rapid and intensive withdrawal of subterranean fluids such as groundwater or oil. The Project Site is not within an area of known subsidence associated with fluid withdrawal, peat oxidation (natural decay of organic peat materials), or hydrocompaction (compression of soils due to introduction of water). Because current groundwater is 110 to 120 feet below site grades and has been down at least 100 feet below grade since 1956, and because the Project will not include the withdrawal of groundwater, it is unlikely the Project will cause ground subsidence. Therefore, there is little to no potential for ground subsidence due to withdrawal of fluid or gas at the Project Site. **As such, the Project would not be located on and or exacerbate a geologic unit or soil that is unstable, which could potentially result in subsidence. Impacts related to subsidence would be less than significant, and no mitigation measures are required.**

As noted above, the Project is located in a State designated Liquefaction Hazard Zone. However, as discussed above, the potential for liquefaction on the Project Site is low due to the currently estimated groundwater depth. The Project will not exacerbate the liquefaction potential of the Project Site because it will not involve raising groundwater levels to above 45 feet below ground surface or result in lower density granular soils across the site (factors that would increase the potential for liquefaction to occur). Nevertheless, the Project would be designed in accordance with the Los Angeles Building Code and would include regulatory compliance measures, site-specific recommendations to address liquefaction from the Geotechnical Evaluation, and compliance with standard engineering practices to accommodate the potential effects of liquefaction or the liquefiable soils would be mitigated through application of ground improvement methods. **As such, the Project would not exacerbate a geologic unit or soil that is unstable, which could potentially result in liquefaction. Impacts associated with liquefaction would be less than significant, and no mitigation measures are required.**

Collapsible soils consist of loose, dry, low-density materials that become weaker and more compressible with the addition of water or excessive loading. According to the Geotechnical Evaluation, the subsurface profile of the Project Site consists of shallow fills

underlain by native soils. The fill soils that underlie the Project Site consist of loose to medium dense silty sand that were encountered in one boring drilled to a depth of approximately five feet below existing grade. The native soils underlying the shallow fills consist of medium dense to dense, fine to coarse grained, sands and silty sands with trace amounts of gravel up to the depths of approximately 38 to 45 feet below the existing grade. Layers of very stiff sandy silts, clayey thickness, were encountered approximately 27 to 33 feet below grade. Therefore, due to the type and density of the soils underlying the Project Site, the Project Site soils would not be considered collapsible soils. **As such, the Project would not be located on and or exacerbate a geologic unit or soil that is unstable or that would become unstable as a result of the Project and potentially result in collapse. Impacts associated with collapsible soils would be less than significant, and no mitigation measures are required.**

(2) Mitigation Measures

Project-level impacts related to geologic or soil stability would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to geologic or soil stability were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

Threshold (d): Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

(1) Impact Analysis

Expansive soils generally consist of clays that can shrink and swell with changes in moisture content. Movement of soils in response to shrinkage and swelling has the potential to impact near-surface improvements such as lightly loaded foundations, floor slabs, and flatwork. As discussed in the Geotechnical Evaluation, based on the data reviewed, near surface soils are anticipated to have no to very low expansion potential. The Project will not exacerbate the expansion potential of the on-site soils because it will not create or import soils with a higher expansion potential. **Therefore, the potential for expansive soils to impact the Project Site is considered to be very low and impacts would be less than significant.**

(2) Mitigation Measures

Project-level impacts related to expansive soils would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to expansive soils were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

Threshold (e): Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?

As discussed in Section VI, Other CEQA Considerations, of this Draft EIR, and evaluated in the Initial Study prepared for the Project, included in Appendix A of this Draft EIR, the Project Site is located within a community served by existing wastewater infrastructure. As such, the Project would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, the Project would have no impact related to the ability of soils to support septic tanks or alternative wastewater disposal systems. **As determined in the Initial Study, the Project would not result in impacts related to the ability of soils to support septic tanks or alternative wastewater disposal systems. Therefore, impacts with respect to Threshold (e) would not occur. No further analysis is required.**

Threshold (f): Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

(1) Impact Analysis

As previously discussed, a records search conducted for the Project Site indicates there are no previously encountered fossil vertebrate localities located within the Project Site. The closest identified localities in proximity to the Project Site were collected at depths between 60 and 80 feet below the surface area. The paleontological records search indicates that grading or very shallow excavations in the uppermost layers of soil and Quaternary deposits in the Project Site are unlikely to discover significant vertebrate fossils. However, according to the paleontological records search, deeper excavations have the potential to encounter significant remains of fossil vertebrates. Grading to a maximum depth of approximately 60 feet would occur within the Project Site. Thus, it is possible that paleontological artifacts that were not recovered during prior construction or other human activity may be present.

However, the City has established a standard condition of approval to address inadvertent discovery of paleontological resources. Should paleontological resources be inadvertently encountered, this condition of approval provides for temporary halting construction activities near the encounter so the find can be evaluated. A paleontologist shall temporarily divert or redirect grading and excavation activities in the area of the exposed material to facilitate evaluation and, if necessary, salvage. The paleontologist shall then assess the discovered material(s) and prepare a survey, study or report evaluating the impact. The Applicant shall then comply with the recommendations of the evaluating paleontologist, and a copy of the paleontological survey report shall be submitted to the Los Angeles County Natural History Museum and the Department of City Planning. Ground-disturbing activities may resume once the paleontologist's recommendations have been implemented to the satisfaction of the paleontologist. In accordance with the condition of approval, all activities would be conducted in accordance with regulatory requirements.

As discussed above, there are no unique geologic or topographic features (i.e., hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, or wetlands) on the Project Site or vicinity. Therefore, the Project would not destroy any unique geologic or topographic features.

With implementation of the City's established condition of approval to address any inadvertent discovery of paleontological resources, Project impacts would be less than significant and no mitigation measures are required.

(2) Mitigation Measures

Project-level impacts related to paleontological resources would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to paleontological resources were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.

e. Cumulative Impacts

(1) Impact Analysis

Due to the site-specific nature of geological conditions (i.e., soils, geological features, subsurface features, seismic features, etc.), geology impacts are typically assessed on a project-by-project basis, rather than on a cumulative basis. Nonetheless,

cumulative growth through 2037, the Project's anticipated build-out year, (inclusive of the 34 related projects identified in Section III, Environmental Setting, of this Draft EIR) would expose a greater number of people to seismic hazards. However, as with the Project, related projects and other future development projects would be subject to established guidelines and regulations pertaining to building design and seismic safety, including those set forth in the California Building Code and Los Angeles Building Code as well as site-specific geotechnical evaluations that would identify potential effects related to the underlying geologic and soil conditions for a particular related project site. Additionally, as discussed above, the Project would not exacerbate existing geologic conditions and would not combine with the related projects to do so in a manner that could result in cumulative impacts. **Therefore, with adherence to applicable regulations and any site-specific recommendations set forth in a site-specific geotechnical evaluation, the Project and related projects would not result in significant cumulative impacts related to geological and soil conditions. As such, the Project's contribution would not be cumulatively considerable, and cumulative impacts would be less than significant.**

With regard to potential cumulative impacts related to paleontological resources, the Project vicinity is located within an urbanized area that has been disturbed and developed over time. Therefore, any subsurface paleontological resources have likely been disturbed by present development. As with the Project, each related project would be subject to the City's standard condition of approval to address the potential for uncovering of paleontological resources. **Therefore, based on the above, the Project and related projects would not result in significant cumulative impacts to paleontological resources. As such, the Project's contribution would not be cumulatively considerable, and cumulative impacts would be less than significant.**

(2) Mitigation Measures

Cumulative impacts related to geology and soils and paleontological resources would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Cumulative impacts related to geology and soils and paleontological resources were determined to be less than significant without mitigation. Therefore, no mitigation measures were required, and the impact level remains less than significant.