IV. Environmental Impact Analysis

F. 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 Engineering Investigation – Proposed Academic and Athletic Development at 4141 Whitsett Avenue, Studio City, California* ("Preliminary Geotechnical Report"),[1] which is provided as Appendix G of this Draft EIR. The Preliminary Geotechnical Report was approved by the Los Angeles Department of Building and Safety (LADBS) in December 2020.[2] This section also evaluates the potential for the Project to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. This component of the analysis is in part based on a *Paleontological Resources Assessment Report*,[3] which is included as Appendix G 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 (NPDES)
- Society for Vertebrate Paleontology Standard Guidelines
- Alquist-Priolo Earthquake Act

---

1 Geotechnologies, Inc., Geotechnical Engineering Investigation – Proposed Academic and Athletic Development at 4141 Whitsett Avenue, Studio City, California, 91604, Revised June 19, 2020.

2 City of Los Angeles, Department of Building and Safety, Soil Report Approval Letter, December, 2020. This letter is also included as Appendix G.

3 ESA, Paleontological Resources Assessment Report for the Harvard-Westlake River Park Project, Studio City, Los Angeles, California, 91604, Assessor Parcel Numbers (APN): 2375-018-020 and Portion of APN 2375-018-903 Los Angeles River Parcel 276, February 2021.

- Seismic Hazards Mapping Act
- California Building Code
- California Penal Code Section 622.5
- California Public Resources Code (PRC) Section 5097.5
- Los Angeles General Plan Safety Element
- General Plan Conservation Element
- Los Angeles Municipal Code (LAMC)

(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 (NPDES)

The 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.[4]

[4] U.S. Environmental Protection Agency, Clean Water Act, Section 402: National Pollutant Discharge Elimination System, https://www.epa.gov/cwa-404/clean-water-act-section-402-national-pollutant-discharge-elimination-system, accessed January 26, 2022.

(c) Society for Vertebrate Paleontology Standard Guidelines

The Society for Vertebrate Paleontology (SVP) has established standard guidelines[5] 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 Paleontological Resources Preservation Act (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,[6] 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 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,[7] 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[8], 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

5 Society of Vertebrate Paleontology, Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010,

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.

7 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.

8 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.

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 into State law in the 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.[9]

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

(e) 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*

[9] California Department of General Services website, https://www.dgs.ca.gov/BSC/Codes#@ViewBag.JumpTo/, Accessed January 26, 2022.

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" and 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 bonafide 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 objective that paleontological resources be protected for historical, cultural research, and/or educational purposes. Section 3 sets as a policy to continue 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 LAMC contains the City's Building Code, which incorporates by reference the CBC, with City amendments for additional requirements. 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, 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, LAMC Section 91.1803, 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 a geotechnical engineer and in accordance with LADBS.

b) Existing Conditions

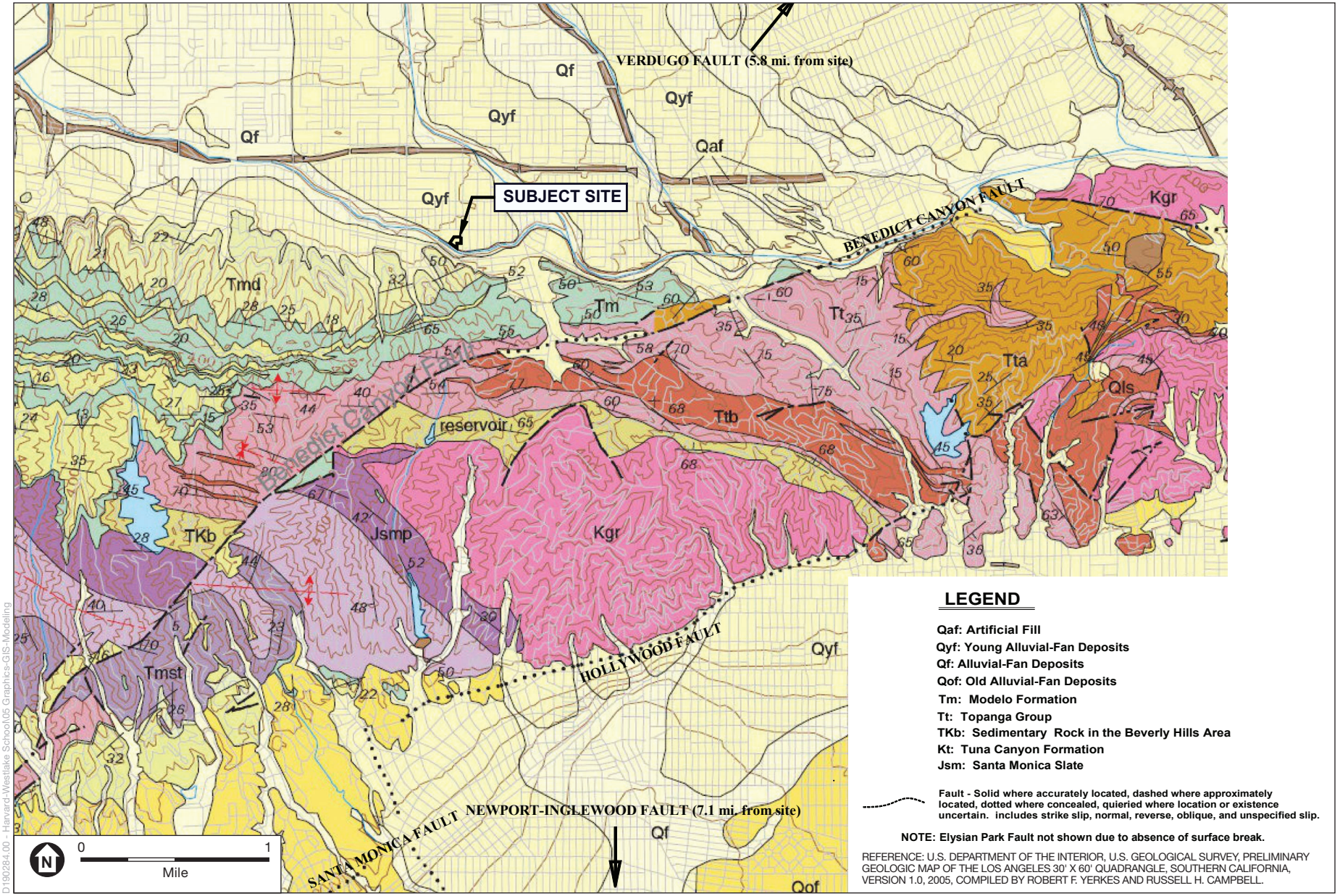
This section summarizes the existing geologic and paleontological conditions outlined in the Preliminary Geotechnical Report and Paleontological Resources Assessment Report prepared for the Project, which are included in Appendix G of this Draft EIR. The information provided below is from this report unless otherwise cited.

(1) Regional and Local Geologic Setting

The Project Site is located in the San Fernando Valley north of the north flank of the Santa Monica Mountains and Hollywood Hills (the Transverse Ranges Geomorphic Province). The Santa Monica Mountains and Hollywood Hills are characterized by roughly east-west trending mountains. The intervening valleys, such as the San Fernando Valley, are filled with sediments derived from the bordering mountains. As shown in **Figure IV.F-1**, *Regional Fault Map*, and in the Local Geologic Map provided in the Preliminary Geotechnical Report, much of the floor of the San Fernando Valley is classified as "Q," which is related to alluvium and fill soils. The Project Site's "Qyf" designation corresponds to young alluvial fan deposits and sediments near the surface, such as alluvium, clay, sand, and gravel. The adjacent hillsides are bedrock within the Modelo formation, a primarily shale formation extending from 23.03 to 5.333 million years ago.

The northern and southern boundaries of the Santa Monica Mountains are formed by reverse fault scarps.[10] The uplift and folding of the Santa Monica Mountains are a result of north-south shortening due to plate tectonics. This has resulted in local folding and uplift of the mountains along with the propagation of thrust faults (including blind thrust faults).

[10] Reverse fault scarps or thrust faults (as opposed to normal faults) are characterized by overthrusting (one side of the fault pushing over the other.) Because of the overthrust, the hanging wall frequently collapses, making the fault hard to detect.



D190284.00 - Harvard-Westlake School\05 Graphics-GIS-Modeling

SOURCE: Geotechnologies, Inc. 2020

Harvard-Westlake River Park Project

Figure IV.F-1
Regional Fault Map

(1) Site Geology and Generalized Conditions

The majority of the Project Site is generally level, with a total relief of approximately 6 feet across the 17.2-acre site. A 10- to 15-foot-high, 2:1 slope descends toward the Zev Greenway and the Los Angeles River channel along the southern edge of the Project Site. The off-site Zev Greenway has a width of approximately 25 feet adjacent to the vertical walls of the Los Angeles River channel.

Fill materials were encountered during exploration to depths of 7 feet below the existing ground surface. The fill consists of sandy silt, silty sand, sandy clay and clayey sand, which range from light brown to dark brown in color, and are slightly moist to moist, medium dense to dense, and fine to coarse grained.

The native soils underlying the Project Site consist of silty sand, clayey silt, silty clay, clayey sand, sandy silt and sand, which range from light brown to grey to dark brown, and are slightly moist to wet, medium to very dense, or medium firm to stiff, and fine to coarse grained. The native earth materials consist of alluvial sediments deposited by river and stream action typical to this area of the San Fernando Valley.

Bedrock was encountered below the native soils in some of the exploratory borings, at depths ranging from 42.5 to 56.5 feet below the existing site grade. The bedrock consists of shale, siltstone, sandstone and mudstone of the Modelo formation.[11] The Modelo formation dates from the Miocene epoch or from 23.03 million to 5.333 million years ago. The bedrock is light brown to gray to grayish-green to black, moist to very moist, and moderately hard to very hard.

(a) Expansive Soil

Expansive soils are soils that swell when subjected to moisture and shrink when dried. Expansive soils are typically associated with clayey soils. When not addressed, soil expansion can have adverse effects on structures. The field soil classifications and laboratory testing conducted for the Preliminary Geotechnical Report indicated that the near surface soils have a very low to low potential for expansion.

Expansion is numerically rated from 0 to 130 (lower to higher) depending on the capacity of the soil to absorb water. The higher the absorption rate, the greater the expansion capacity. Thus, expansion is evaluated through saturation, with different types of soils showing greater or less propensity to expend under saturated conditions. Under the Expansion Index (EI), 0 to 20 represents very low expansion of soil, 21 to 50 represents low expansion of soil, 51 to 90 represents medium expansion of soil, 91 to 130 represents

[11] The term, “Modelo Formation,” is used interchangeably with “Monterey Formation,” in geologic and paleontological literature related to Southern California. The Monterey Formation applies to the formation constituting a large part of the California coastal area from northern to southern California. The Modelo part of the formation (named after Modelo Canyon in Ventura County) is frequently applied to the Monterey Formation in the San Fernando Valley since there is no consensus among geologists as to the preferred term. The terms are used interchangeably in this Draft EIR section depending on how they appear in the reference literature.

high expansion of soil; and above 130 represents very high expansion of soil. The expansion tests for the Project Site were performed on the samples in accordance with EI testing procedures, as described in the most recent revision of the bulletin, "ASTM D 4829." According to the Preliminary Geotechnical Report, the EI for on-site soils was found to be between 17 and 35 for representative bulk samples, which corresponds to very low to low expansion potential.

(b) Groundwater

Groundwater was encountered during exploration, to depths ranging between 24.5 and 49.5 feet below grade. The historically highest groundwater level for the Project Site was established by review of California Geological Survey Seismic Hazard Zone Report of the Van Nuys Quadrangle, Plate 1.2 entitled "Historically Highest Ground Water Contours" (2005). Review of this plate indicates that the historically highest groundwater level at the Project Site is at the ground surface (0 feet). A copy of Plate 1.2 is provided in the Preliminary Geotechnical Report in Appendix G of this Draft EIR.

Fluctuations in the level of groundwater on-site and in the Project vicinity occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported in the Project's Preliminary Geotechnical Report.

(2) Geologic Hazards

(a) Regional and Local Faulting and Seismicity

A fault is a fracture in the crust of the earth along which rocks or sediment on one side has moved relative to those on the other side.[12] Faults are the result of excessive strain cause by compression or extension within the earth's crust over long periods of time. A fault trace is the line on the earth's surface representing the fault location. Surface rupture occurs when movement along a fault causes ground displacement at the surface. Fault rupture may occur suddenly during an earthquake or slowly in the form of a fault creep. Sudden displacements, or permanent movement of the earth's crust along a fault, are more damaging to structures because they are accompanied by shaking. Fault creep is the slow displacement (movement) of the earth's crust.

Buried, or blind, thrust faults are faults that do not rupture all the way up to the surface, leaving no evidence on the ground.[13] Precisely because they are buried, their existence is usually not known until they produce an earthquake. In the Southern California area, buried thrust faults are typically defined broadly based on an analysis of the seismic wave recordings of hundreds of small and large earthquakes.

---

[12] California Department of Conservation Geological Survey, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Special Publication 42, 2018.

[13] United States Geological Survey, Earthquake Glossary, https://earthquake.usgs.gov/learn/glossary/?term=blind%20thrust%20fault#:~:text=A%20thrust%20fault%20that%20does,of%20rock%20in%20the%20crust, accessed October 5, 2021.

Terms, such as “potentially active” and “inactive,” have been commonly used in the past to describe faults that do not meet the State Mining and Geology Board (SMGB) definition of “active fault.” However, these terms have the potential to cause confusion from a regulatory perspective as they are not defined in the Alquist-Priolo Earthquake Fault Zoning Act and may have other non-regulatory meanings in the scientific literature or in other regulatory environments. Below are terms that provide added precision when used in classifying faults regulated by the Alquist-Priolo Earthquake Fault Zoning Act. Faults are classified into three categories on the basis of the absolute age of their most recent movement:

1) Holocene-active faults: Faults that have moved during the past 11,700 years. This age boundary is an absolute age (number of years before present).
2) Pre-Holocene faults: Faults that have not moved in the past 11,700 years and, thus, do not meet the criteria of “Holocene-active fault” as defined in the Alquist-Priolo Earthquake Fault Zoning Act and SMGB regulations. This class of fault is not regulated under the Alquist-Priolo Earthquake Fault Zoning Act.
3) Age-undetermined faults: Faults where the recency of fault movement has not been determined. Faults can be “age-undetermined” if the fault in question has simply not been studied in order to determine its recency of movement. Faults can also be age-undetermined due to limitations in the ability to constrain the timing of the recency of faulting. Examples of such faults are instances where datable materials are not present in the geologic record, or where evidence of recency of movement does not exist due to stripping (either by natural or anthropogenic processes) of Holocene-age deposits. Within the framework of the Alquist-Priolo Earthquake Fault Zoning Act, age-undetermined faults within regulatory Earthquake Fault Zones are considered “Holocene-active” until proven otherwise.

Earthquake Fault Zones are regulatory zones (also known as Alquist-Priolo Earthquake Fault Zones) that encompass traces of Holocene-active faults to address hazards associated with surface fault rupture. Earthquake Fault Zones are delineated by the State Geologist and implemented by lead agencies through permitting, inspection and land-use planning activities (PRC Chapter 7.5, Section 2621). The Project Site is not located within an Alquist-Priolo Earthquake Fault Zone.

The Project Site is located within seismically active Southern California. The location of the Project Site with respect to regional faults with the potential for future seismic activity is provided in **Figure IV.F-1,** *Regional Faults Map*.[14] The Project Site is located

[14] The USGS Regional Fault map represented in Figure IV.F-1 is the official geology map of the region and is useful in illustrating the complex geology and faults of the area surrounding the Project Site. However, it is less useful in locating certain active faults with respect to the State’s current understanding of their locations. For instance, the active fault through the City of Beverly Hills in the approximate location of Sunset Boulevard is the Santa Monica Fault, not the Hollywood Fault as cited on the USGS map. Where the active Hollywood Fault passes into the Hollywood community in the approximate location of Hollywood Boulevard is not shown on the USGS Regional Fault Map. The Regional Fault Map also does not show thrust faults, such as the Verdugo Fault or the Elysian Fault, in which there are no surface breaks.

approximately 0.7 mile to the north of the Benedict Canyon Fault, which trends diagonally eastward through the Santa Monica Mountains and along the northern edge of the easternmost part of the mountains. The Benedict Canyon Fault strikes northeast across the Santa Monica Mountains from the area of Sepulveda Boulevard at Sunset Boulevard, where it is exposed in Cretaceous-age sandstone, to the foothills along the northern flank of the Santa Monica Mountains area, east of Universal City. The fault extends eastward toward the Eagle Rock-Verdugo Fault zone and is considered to be part of the Hollywood - Santa Monica – Raymond system. There is currently no surface evidence to determine the age of the most recent activity of the Benedict Canyon Fault zone. The only evidence for relatively recent movement may occur in the subsurface slightly east of the Santa Monica Mountains where the very gently north-sloping base of apparently more recent groundwater-bearing sediments is offset downward relatively to the north, based on differences in total depth of alluvial deposits in two nearby water wells. No remnants of scarps or other surface features of faulting are preserved in this part of the Los Angeles River drainage which has been in a state of rapid aggradation during Holocene time. The fault varies from sharp and well-defined, where it clearly offsets Miocene sedimentary and volcanic units, to more broad and diffuse (spread out), where it trends through the Jurassic-age Santa Monica Slate. No direct evidence of movement has been observed since late Quaternary time, and, therefore, this fault is not considered active by the California Geologic Survey (CGS).[15]

Based on the USGS Fault Map, represented in Figure IV.F-1, the nearest significant active fault to the Project Site is the Hollywood Fault, which is located 2.3 miles south of the Project Site. This fault is considered to be capable of a magnitude (Mw) 6.6 earthquake.

The potentially active Santa Monica Fault, which is comprised of various segments with several strands, is located 3.2 miles south of the Project Site along the southern edge of the Santa Monica Mountains. The Santa Monica Fault is considered to be capable of a Mw 7.0 earthquake.

The Elysian Park Thrust Fault is located 4.0 miles southeast of the Project Site, with the Elysian Park Anticline located 1.3 miles northeast of the Site. This fault is considered to be capable of a Mw 6.7 earthquake. Due to the lack of ground surface displacement caused by this fault, it is not considered an active fault by the CGS.

The Verdugo Fault, which is located 5.4 miles to the northeast of the Project Site, trends along the base of the southwest side of the Verdugo Mountains. The Verdugo Fault is capable of producing a Mw 6.9 earthquake. Although the Verdugo Fault is considered active by the County of Los Angeles Department of Public Works, the fault is not

[15] United States Geological Survey, Open-File No. 81-296, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones (Weber, Bennett, and Chapman), July 1980, page A-4.

designated within an Earthquake Fault Zone by the CGS due to the lack of surface displacement.

The Newport-Inglewood Fault is located 7.1 miles south of the Project Site. The Newport-Inglewood Fault, which is considered active, extends southeastward from west Los Angeles across the Los Angeles Basin to Newport Beach and possibly offshore beyond San Diego. The fault extends for about 37 miles from the Santa Ana River to the Santa Monica Mountains. The Newport-Inglewood Fault is capable of producing a Mw 6.9 earthquake.

According to research of available literature and results of Project Site reconnaissance by Geotechnologies, Inc. staff, no known Holocene-active or Pre-Holocene faults underlie the Project Site.

(b) Ground Surface Rupture

Surface rupture is defined as ground displacement that occurs along the surface trace of a fault during an earthquake. Based on research of available literature and the Project Site reconnaissance by Geotechnologies, Inc. staff, there are no known active or potentially active faults underlying the Project Site. Therefore, the potential for surface ground rupture at the Project Site is considered low.

(c) Site Stability - Liquefaction, Lateral Spreading, and Seismic Settlement

Liquefaction involves the temporary loss in strength of a saturated silty to cohesionless soil caused by the build-up of pore water pressure during cyclic loading, such as that produced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

Liquefaction typically occurs in areas where groundwater is less than 50 feet from the surface, and where the soils are composed of poorly consolidated, fine to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

The Seismic Hazards Zone Map of the Van Nuys Quadrangle by the State of California, indicates that the Project Site is located within a designated "Liquefaction Area."[16] This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. This designation is also indicated in the City's ZIMAS records for the Project Site.[17]

[16] Seismic Hazards Zone Map of the Van Nuys Quadrangle by the California Geological Survey, formerly California Divisions of Mines and Geology(CDMG) (998), cited in and provided as an attachment to the Geotechnologies, Inc. Report contained in Appendix G of this Draft EIR.

[17] Los Angeles Department of Planning, ZIMAS, http://zimas.lacity/org/. Accessed November 18, 2020.

The vast majority of liquefaction hazards are associated with sandy soils and silty soils of low plasticity. Soils having a plasticity index (PI) greater than 18 exhibit clay-like behavior, and the liquefaction potential of these soils are considered to be low. The results of on-site testing (shown on Plate F of the Preliminary Geotechnical Report in Appendix G of this Draft EIR) indicate that some soil layers below the Project Site have a PI greater than 18. Therefore, some of the below ground soils are not considered prone to liquefaction. However, the liquefaction analyses, which indicate that potentially liquefiable layers occur from depths of 0 to 20 feet and 27.5 to 50 feet, show that other on-site soil layers and/or lenses may liquefy in the event of an earthquake on a local or regional fault. The soils analysis, as discussed in the Preliminary Geotechnical Report, indicates that potentially liquefiable soils occur throughout the Project Site, with the shallowest potentially liquefiable soils occurring at a depth just below the ground surface, with the deepest occurring at a depth of approximately 65 feet. The potentially liquefiable layers and/or lenses are between approximately a few inches and 3 feet in thickness. Such conditions have the potential to also result in dynamic settlement and lateral spreading hazards.

Lateral spreading is the most pervasive type of liquefaction-induced ground failure. During lateral spread, blocks of mostly intact, surficial soil displace downslope or toward a free face along a shear zone that has formed within the liquefied sediment. As discussed in the Preliminary Geotechnical Report, the potentially liquefiable layer underlying the Project Site consists of a stratified layer, which is not expected to be continuous, and, as such, the potential for lateral spread is considered to be remote for the Project Site.

(d) Slope Stability and Seismically Induced Landslides

The Project Site is virtually flat, with a gradient of approximately 6 feet across the 17.2-acre parcel. The Project Site is not identified in City records as either a hillside or as a landslide area.[18] As such, no issues related to slope stability or seismically induced landslides are anticipated under existing conditions.

(e) Oil Fields and Methane

The Project Site is not located within the limits of an oil field, and no oil wells are known to have been drilled on the Project Site. In addition, the Project Site is not located within a City of Los Angeles Methane Zone or Methane Buffer Zone.[19] The Project Site is not located within an area of potential subsidence associated with mineral extraction or other geologic conditions, such as limestone dissolution or groundwater withdrawal.

(3) Paleontological Resources

The following is based on the Paleontological Resources Assessment Report contained in Appendix G of this Draft EIR. As discussed therein, paleontological resources are

[18] Los Angeles Department of Planning, ZIMAS, http://zimas.lacity/org/, accessed November 18, 2020.

[19] Los Angeles Department of Planning, ZIMAS, http://zimas.lacity/org/, accessed November 18, 2020.

generally located in soils in which the age of the soils corresponds to the time period in which fossilized animals were alive and present.

According to the Paleontological Resources Assessment Report, the underlying Holocene-age alluvium, Qay1, was deposited between 1,000 and 10,000 years ago, encompassing the SVP's age threshold of 5,000 years old for what constitute fossil resources. Therefore, the Project Site's basal layers may be of appropriate age to contain fossil specimens. The Qay1 alluvium, which is first detected between 2 to 7 feet below grade and extends from 42.5 to 54.6 feet in depth, has a low-to-high potential for encountering paleontological resources with increasing depth. The Qay2 Holocene-age alluvium, located at similar depths as the Qay1 alluvium, was deposited less than 1,000 years ago and is too young to contain fossil specimens and, therefore, has low potential to contain paleontological resources. If present, underlying Pleistocene-age alluvium (Qao) located between 20 and 42.5 to 54.6 feet in depth is of appropriate age and has produced a number of fossil specimens in the San Fernando Valley and, therefore, is assigned a high paleontological sensitivity. The Modelo Formation underlying the Project Site has produced important vertebrate fossils in the Los Angeles Basin, including localities near the Project site. Recent discoveries of articulated fish, as well as significant improvements in the age dating of the formation, expand the sensitivity of the formation. Based on the available evidence, the Modelo Formation is assigned a high potential to contain paleontological resources.

Geotechnical testing undertaken for the Project indicates the surface of the Project Site is comprised of fill material. Testing indicates that the fill materials extend from 2 feet to 7 feet deep across the Project Site. These materials overlay the Qay1 and Qay2 alluvium. As with the Qay1 and Qay2 soils, the fill materials would not likely contain in situ fossil because of the more recent age of the fill materials.

Geologic mapping indicates the surface of the Project Site consists of Holocene-age (11,650 years ago to present) alluvium, and includes soils units Qay1 and Qay2 (alluvium). The Qay1 and Qay2 soils overlie Pleistocene-age (2,580,000 to 11,700 years ago) Quaternary alluvium (Qao). Very old soils from the Miocene-age (23.03 million to 5.333 million years ago) Modelo formation (Tmd) underlie the Quaternary alluvium. The Qay1 alluvial unit was deposited from 1,000-10,000 year ago; whereas; the Qay2 alluvial unit was deposited less than 1,000 years ago. Because it is newer, the shallower Qay 2 soil is less likely to contain fossils than the older Qay 1 soil. It is presumed the Holocene-age Qay1 alluvium overlies the older Modelo (Miocene-age) formation, ranging below 42.5 feet to 54.6 feet.

A database search for records of fossil localities in and around the Project Site was conducted by the Natural History Museum of Los Angeles County (LACM) in October 2020. The LACM database search found no known recorded paleontological resources on the Project Site. However, four fossil localities originating from the Miocene-age Modelo Formation have been previously identified within distances ranging from 465 feet to 1.10 miles from the Project Site. These fossil localities include specimens of scallops,

unspecified invertebrates, and fish. Although not included as part of LACM's records search conducted for this Project, records searches conducted for other projects in the vicinity of the Project Site and within the San Fernando Valley indicate a number fossil localities in the region originating from Pleistocene-age alluvial sediments, which are presumed to underlie the Qay1 alluvial deposits. These fossil localities include specimens of megafauna of the Pleistocene epoch (a period dating from 2.6 million years ago until about 11,700 years ago) and were recovered from depths ranging from 14 feet to 100 feet below the ground surface.

The Paleontological Resources Assessment Report assigned the geologic units within the Project Site a paleontological sensitivity category (high, undetermined, low) based on the SVP guidelines. The fill within the Project Site has no paleontological sensitivity. However, due to the age of the alluvium beneath the fill (early Holocene and older), the known and potential underlying geologic units – alluvium and the Modelo Formation – have the potential to yield paleontological resources. A discussion of the SVP guidelines and categories of paleontological sensitivity is provided in the Methodology subsection, below. The Project's impact analysis below identifies the assigned sensitivity categories from the Paleontological Resources Assessment Report for the Project Site's underlying geologic units, which vary from low to high.

3. Project Impacts

a) Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, a project would have a significant impact related to geology and soils if it would:

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[20] Special Publication 42;***
- ***ii. Strong seismic ground shaking;***
- ***iii. Seismic-related ground failure, including liquefaction;***
- ***iv. Landslides;***

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

[20] Now the California Geological Survey (CGS).

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 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property;[21]

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; or

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

For this analysis, the Appendix G Thresholds 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 factors to evaluate geology and soils impacts include:

(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) Landform Alteration

- Cause one or more distinct and prominent geologic or topographic features to be destroyed, permanently covered, or materially and adversely modified as a result of the project. Such features may include, but are not limited to, hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, and wetlands.

[21] The CBC, based on the International Building Code and the now defunct Uniform Building Code, no longer includes a Table 18-1-B. Instead, Section 1803.5.3 of the CBC describes the criteria for analyzing expansive soils.

(4) Paleontological Resources

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

b) Methodology

(1) Geology and Soils

To evaluate potential impacts relative to geology and soils, Geotechnologies, Inc. prepared a Preliminary Geotechnical Report for the Project, included herein as Appendix G of the Draft EIR. The Preliminary Geotechnical Report includes a review of available data, geologic mapping, field exploration (i.e., exploratory soil borings), laboratory testing, geophysical surveys, liquefaction analysis, and engineering analysis. Refer to Preliminary Geotechnical Report, which is included as Appendix G of this Draft EIR, for further details of the methodologies and procedures associated with these components of the Preliminary Geotechnical Report. The Preliminary Geotechnical Report was prepared according to requirements established by LADBS.

The investigations included in the Preliminary Geotechnical Report evaluated the underlying geologic and soil conditions to determine the potential for the Project to directly or indirectly cause hazardous conditions and identified preliminary foundation requirements needed to ensure that new building construction and surface parking would be safe. The report provides sufficient detail to determine whether the Project Site is suitable for the intended use and whether more detailed studies are required to address specific geological issues. The report also identifies considerations to be taken into account in the design of building foundations.

According to LAMC Section 91.1803, a Final Geotechnical Report must also be prepared based on final construction and building plans prepared by the Applicant and reviewed by the City prior to the issuance of building permits to construct the Project. Based on the ground conditions and building design, the Final Geotechnical Report would include specific recommendations for site preparation, excavation, foundation design and shoring/retaining wall specifications.

The Project would be regulated by the various laws, regulations, and policies summarized in Subsection 2.a, Regulatory Framework, above. Compliance by the Project with applicable federal, State, and local laws and regulations is assumed in this analysis, and local and State agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations would be a condition of permit approval.

(2) Paleontological Resources

The analysis of paleontological resources is summarized from the Paleontological Resources Assessment Report (contained in Appendix G of this Draft EIR). The analysis is based on a review of LACM paleontological records search results and other documentation regarding disturbances to the Project Site and its subsurface geological conditions (e.g., the Preliminary Geotechnical Report provided in Appendix G of this Draft EIR). The objective of the record search through the LACM was to determine the geological formations underlying the Project Site, whether any paleontological localities have previously been identified within the Project Site or in the same or similar formations near the Project Site, and the potential for excavations associated with the Project to encounter paleontological resources. These methods are consistent with the SVP guidelines for assessing the importance of paleontological resources in areas of potential environmental effect. Although no known resources were identified within the Project Site from the LACM search, this does not preclude the possibility of unknown buried paleontological resources within the Project Site that may be impacted during construction of the Project. The potential to encounter paleontological resources during construction at the Project Site was determined by reviewing the results of the records search, the depth of native versus fill soils, land use history, past disturbances, and the extent of the proposed excavation area for the Project.

The SVP has established standard guidelines, which 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. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements pursuant to the standard guidelines. Similarly, most state regulatory agencies with paleontological resource-specific laws, ordinances, regulations, and standards (LORS) accept and use the professional standards set forth by the SVP.

As defined by the SVP, and discussed under Regulatory Framework, above, significant paleontological resources are fossils and deposits containing fossils.

As further defined by the SVP, significant fossiliferous deposits are a rock unit or formation that contains significant nonrenewable paleontologic resources. This means one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils. All identifiable vertebrate fossils have scientific value and are, therefore, considered scientifically significant. All geologic units that have previously yielded vertebrate fossils are considered to have high sensitivity for the presence of fossils in the future. Paleontological sensitivity is the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit; for this reason, paleontological sensitivity depends on the known fossil data collected from the entire geologic unit, not just a specific survey. The SVP defines four categories of

paleontological sensitivity or, per the SVP guidelines, potential, for the presence of paleontological resources – high, low, undetermined, and no potential – as follows:

- **High Potential.** Rock units that have yielded vertebrate or significant invertebrate, plant, or trace fossils are considered to have a high potential for containing additional significant paleontological resources. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, (1) sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras [rock fragments and particles from volcanic eruptions]); (2) some low-grade metamorphic rocks, which contain significant paleontological resources anywhere within their geographical extent; and (3) sedimentary rock units temporally or lithologically suitable for the preservation of fossils. The latter includes middle Holocene and older, fine-grained fluvial sandstones, argillaceous (i.e., clay-bearing) and carbonate-rich paleosols (rock units representing former, now lithified, soils), cross-bedded point bar sandstones, fine-grained marine sandstones, etc.
- **Low Potential.** Some rock units have been concluded to contain low potential for yielding scientifically significant fossils based on field survey findings or reported reports in the paleontological literature by qualified professional paleontologists. These conclusions may be based on the fact that certain rock units are poorly represented by fossil specimens in institutional collections, leading to the determination that they are not generally fossil-bearing, or on general scientific consensus that a given rock unit only preserves fossils in rare circumstances and their presence of fossils is an exception in such units, not the rule, as in basalt flows or colluvium deposited during Holocene time. Rock units with low potential typically do not require impact mitigation measures to protect fossils.
- **Undetermined Potential.** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before development of a paleontological resource impact mitigation program. In cases where no subsurface data are available, strategically located excavations into subsurface stratigraphy can determine paleontological potential.
- **No Potential.** Some rock units have no potential to contain significant paleontological resources. An example is high-grade metamorphic rocks, which have typically been distorted or recrystallized through intense processes of heat or other stresses (e.g., gneisses and schists). Similarly, plutonic igneous rocks, such as granite, are considered to have no potential to yield fossils, as they are formed from (liquid) magma that has dissolved the original rock matrix, including any fossils it may once have contained. Rock units with no potential to yield fossils require no protections; no impacts are anticipated on such units, and no mitigation is not required.

For geologic units with high potential, full-time monitoring is appropriate during any project-related ground disturbance because of the risk to paleontological resources. For geologic units with low potential, protection or salvage efforts is not generally required because of the low risk of encountering paleontological resources. For geologic units with undetermined potential, accepted professional practice recommends field surveys conducted by a qualified vertebrate paleontologist to determine the paleontologic potential of the rock units present in the study area, which, in turn, prescribes how mitigation measures should be assigned.

c) Project Design Features

No specific Project Design Features are proposed with regard to geology, soils, seismicity, or paleontological resources.

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[22] Special Publication 42.

(1) Impact Analysis

As discussed above in Subsection 2.b, Existing Conditions, the site-specific Preliminary Geotechnical Report concluded that there is no active faulting beneath the Project Site. In addition, the Project Site is not located within an Alquist-Priolo Earthquake Fault Zone. **Therefore, because the Preliminary Geotechnical Report concluded there is no active faulting beneath the Project Site, the Project would not exacerbate existing environmental conditions by bringing people or structures into areas potentially susceptible to substantial adverse effects, including fault rupture. Further, the Project would not directly or indirectly cause substantial adverse effects, including risk of loss, injury, or death involving fault rupture, and, as such, the impact related to fault rupture would be less than significant.**

(2) Mitigation Measures

Impacts regarding fault rupture were determined to be less than significant. Therefore, no mitigation measures are required.

[22] Now the CGS.

(3) Level of Significance After Mitigation

Impacts regarding fault rupture would be less than significant without mitigation. Therefore, no mitigation measures were required or included, 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 discussed above, the Preliminary Geotechnical Report concluded that there is no active faulting beneath the Project Site. However, the Project Site is located within the seismically active region of Southern California. The level of ground shaking that would be experienced at the Project Site from regional faults would be a function of several factors, including earthquake magnitude, type of faulting, rupture propagation path, distance from the epicenter, earthquake depth, duration of shaking, site topography, and site geology.

The Project would not involve mining operations, boring of large areas, or the extraction or injection of oil or groundwater that could create unstable seismic conditions that would exacerbate potential on-site environmental conditions or otherwise directly or indirectly cause ground shaking. Moreover, as is true for any new project development in Los Angeles, the Project's building design and construction must conform to the current seismic design provisions of the City's Building Code, which incorporates relevant provisions of the CBC. The Los Angeles Building Code incorporates the latest seismic design standards for structural loads and materials to accommodate maximum ground accelerations expected from known faults. The Preliminary Geotechnical Report provided preliminary site-specific design recommendations and parameters regarding grading and earthwork, temporary excavation and shoring, drainage, foundations, floor slab support, basement walls, and pavement design. The Preliminary Geotechnical Report concluded that development of the Project is feasible from a geotechnical perspective, provided that the applicable regulations are met, and construction and design are performed in accordance with its recommendations, and that a design-level geotechnical report (or Final Geotechnical Report) will be required to develop geotechnical recommendations for final design. Per City Building Code and CBC requirements, prior to issuance of a grading permit, a qualified geotechnical engineer must prepare and submit to the LADBS a Final Geotechnical Report that includes site-specific design recommendations for seismic safety and design requirements for foundations, retaining walls/shoring and excavation to meet applicable State and City regulatory requirements.

Thus, compliance with applicable regulatory requirements (i.e., the City of Los Angeles Building Code and the CBC) and incorporation of the recommendations of the Final Geotechnical Report would reduce the potential for significant damage to structures

resulting from strong seismic ground shaking and the exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury or death. **Therefore, based on the above, development of the Project would not exacerbate seismic conditions. Further, the Project would not directly or indirectly cause substantial adverse effects, including risk of loss, injury, or death involving strong seismic ground shaking hazards, and, as such, the impact related to ground shaking would be less than significant.**

(2) Mitigation Measures

Impacts regarding strong seismic ground shaking were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Impacts regarding strong seismic ground shaking would be less than significant without mitigation. Therefore, no mitigation measures were required or included, 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 previously discussed, the Project Site is located in an area susceptible to liquefaction and is identified as being located within a liquefaction area by regional geology maps and the City's ZIMAS. Liquefaction typically occurs in shallow groundwater areas where there are loose, cohesionless, fine grained soils. According to the Preliminary Geotechnical Report, groundwater was encountered during previous explorations at the Project Site at 24.5 and 49.5 feet below the ground surface. The historically highest groundwater level for the Project Site was established to be 0 feet below grade or at ground surface. The Project Site and much of the surrounding area contain looser, alluvial soils, fill, and higher water tables and are, thus, designated as having risk of liquefaction.

In order to reduce the potential seismically-induced liquefaction, the Preliminary Geotechnical Report recommends that the existing upper soils be removed and recompacted for support of the proposed structures. For the at-grade portion of the proposed gymnasium, as well as the pool structure, the soils located within these building areas would be removed to a minimum depth of 15 feet to 21 feet below the existing grade. In addition, the removal would extend horizontally beyond the edge of the foundation by 3 feet.[23]

[23] Geotechnologies, Inc., Geotechnical Engineering Investigation – Proposed Academic and Athletic Development at 4141 Whitsett Avenue, Studio City, California, 91604, Revised June 19, 2020, page 14.

For the proposed subterranean garage, the subterranean basement below the gymnasium, and for the underground stormwater retention tank, the soils located within their building area would be removed to a depth of 3 feet below the bottom of the foundations. A horizontal over-excavation beyond the edge of the proposed foundations is not necessary.

Finally, the Preliminary Geotechnical Report did not recommend the use of groundwater recharge mechanisms given the likelihood of water remaining perched above the underlying layer of bedrock, which would increase the risk of earthquake-induced liquefaction.[24]

In accordance with the City requirements, where elements of a proposed development extend below the historically highest groundwater level, structural elements would either be designed to resist potential hydrostatic forces, or a permanent dewatering system would be installed so that external water pressure does not develop against the proposed retaining walls and mat footing also reducing liquefaction potential.

Excavations on-site would require suitable engineered stabilization in accordance with applicable City and CBC requirements that ensure settlement does not result in adverse safety effects during Project construction or operation. Application of appropriate engineering controls and compliance with applicable code and regulatory requirements for planned excavation and construction activities on-site would preclude site slope stability geologic hazards at the Project Site and protect surrounding developments. Per City Building Code requirements, prior to the issuance of a grading permit, a qualified geotechnical engineer must prepare and submit to the LADBS a Final Geotechnical Report that includes site-specific design recommendations for seismic safety and design requirements for foundations, retaining walls/shoring and excavation to meet applicable state and City regulatory requirements. Through compliance with regulatory requirements and site-specific geotechnical recommendations, including dewatering and construction on a mat foundation system, the Project would not exacerbate, cause, or accelerate geologic hazards related to seismically induced ground failure, including liquefaction.

Based on the above, development of the Project would not exacerbate conditions related to seismic-related ground failure, including liquefaction. Further, the Project would not directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving seismic-related ground failure, including liquefaction, and, as such, the impact related to seismic-related ground failure would be less than significant.

[24] Geotechnologies, Inc., Geotechnical Engineering Investigation – Proposed Academic and Athletic Development at 4141 Whitsett Avenue, Studio City, California, 91604, Revised June 19, 2020, page 47.

(2) Mitigation Measures

Impacts regarding seismic-related ground failure were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Impacts regarding seismic-related ground failure would be less than significant without mitigation. Therefore, no mitigation measures were required or included, 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 the Initial Study (Appendix A of this Draft EIR), the Project Site is not located within a City-designated landslide area and no hillside areas or steep slopes occur adjacent to the Project Site. **Thus, the Project would have no impact with respect to Threshold (a.iv), and no further analysis is required.**

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

(1) Impact Analysis

(a) Construction Impacts

Project construction would result in ground surface disruption during excavation and grading that would create the potential for erosion to occur. However, wind erosion would be minimized through implementation of soil stabilization measures required by SCAQMD Rule 403 (Fugitive Dust), such as daily watering (see Section IV.A, *Air Quality*, of this Draft EIR for further discussion). The potential for water erosion would be reduced by the implementation of standard erosion control measures during site preparation and grading activities, as discussed in more detail under Section IV.I, *Hydrology and Water Quality*, of this Draft EIR, since the Project would be subject to existing regulations associated with the protection of water quality. Construction activities would be conducted in accordance with applicable City standard erosion control practices required pursuant to the CBC and the requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit issued by the Los Angeles Regional Water Quality Control Board (LARWQCB). In accordance with these requirements, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared that incorporates best management practices (BMPs) to control water erosion during the Project's construction period. **Thus, in conjunction with compliance with applicable code and regulatory requirements, impacts associated with substantial erosion or loss of topsoil as a result of the Project would be less than significant.**

(b) Operational Impacts

Following construction, the Project Site would be covered completely by pavement, structures, artificial turf (playing fields), and landscaping, which would not leave exposed areas of bare soil susceptible to erosion. The vast majority of the Project Site's surfaces would consist of paved areas, permeable pathways, the historic putting green, artificial turf, landscaping, buildings, and/or other surfaces not susceptible to significant erosion or loss of topsoil. **As such, Project operation would have a less-than-significant impact related to erosion and loss of topsoil.**

(2) Mitigation Measures

Impacts regarding substantial soil erosion or the loss of topsoil were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Impacts regarding substantial soil erosion or the loss of topsoil would be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

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

(a) Construction Impacts

Lateral spreading is the most pervasive type of liquefaction-induced ground failure. During lateral spread, blocks of mostly intact, surficial soil displace downslope. As discussed in the Preliminary Geotechnical Report, the potentially liquefiable layer underlying the Project Site consists of a stratified layer, which is not expected to be continuous and, as such, the potential for lateral spread is considered to be remote for the Project Site.[25] In addition, as discussed above in Threshold (a)iii, all required excavations would be conducted in accordance with the applicable provisions of the CBC incorporated into the City's Building Code to minimize the potential for site stability hazards during temporary excavation activities. Per City Building Code requirements, prior to issuance of a grading permit, a qualified geotechnical engineer must prepare and submit to the LADBS a Final Geotechnical Report that includes site-specific design recommendations for seismic safety and design requirements for foundations, retaining walls/shoring and excavation to meet applicable state and City code and regulatory requirements. As with the Preliminary Geotechnical Report, the Final Geotechnical Report would recommend an

[25] Geotechnologies, Inc., Geotechnical Engineering Investigation – Proposed Academic and Athletic Development at 4141 Whitsett Avenue, Studio City, California, 91604, Revised June 19, 2020, page 12.

appropriate shoring system, dewatering, retaining walls with subdrains or weepholes, and other suitable excavation engineering techniques.

Based on the above, the Project would not exacerbate existing conditions with regard to geologic or soil stability. **Further, development of the Project would not 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. Therefore, impacts associated with unstable geologic units or soils on the Project Site as a result of the Project would be less than significant.**

(b) Operational Impacts

Once constructed, the majority of the Project Site's surfaces would be comprised of paved areas, the historic putting green, artificial turf, landscaping, buildings, and/or other surfaces not susceptible to significant soil stability hazards. **Therefore, the Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project and, as such, would have a less than significant impact related to unstable soil conditions.**

(2) Mitigation Measures

Impacts regarding unstable soils were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Impacts regarding unstable soils would be less than significant without mitigation. Therefore, no mitigation measures were required or included, 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

(a) Construction Impacts

As discussed above, geotechnical testing of the Project's native soils indicates that the on-site geologic materials are in the very low to low expansion range. However, the Preliminary Geotechnical Report added that "the more clayey, wetter and/or expansive materials should be exported."[26]

[26] Geotechnologies, Inc., Geotechnical Engineering Investigation – Proposed Academic and Athletic Development at 4141 Whitsett Avenue, Studio City, California, 91604, Revised June 19, 2020, page 25.

Soil expansion would be further evaluated for the Project Site as part of the Final Geotechnical Report, which must be approved by LADBS and include site-specific design recommendations for addressing expansive soils. Further, compliance with standard construction and engineering practices (i.e., on-site excavation requiring suitable engineered stabilization in accordance with CBC and proper engineering erosion control and proper engineering drainage design) addressing expansive soils and building code regulations pertinent to foundation stability would ensure that expansive soils are removed, as necessary. **Based on the above, development of the Project would not be located on expansive soils creating substantial risks to life or property and as such, would not exacerbate existing environmental conditions that could create a substantial to life or property due to expansive soils. Therefore, impacts regarding expansive soils would be less than significant.**

(b) Operational Impacts

Once constructed, the majority of the Project Site's surfaces would be comprised of paved areas, the historic putting green, artificial turf, landscaping, buildings, and/or other surfaces such that near surface soils that may have been susceptible to expansion would have been removed. **Therefore, Project operation would have no impact related to expansive soil conditions.**

(2) Mitigation Measures

Impacts regarding corrosive or expansive soils were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Impacts regarding expansive soils would be less than significant without mitigation. Therefore, no mitigation measures were required or included, 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 the Initial Study (Appendix A of this Draft EIR), the Project would not include the use of septic tanks or alternative waste water disposal systems. The Project Site is located in an urbanized area where wastewater infrastructure is currently in place. **Thus, the Project would have no impact with respect to Threshold (e), and no further analysis is required.**

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

(1) Impact Analysis

Project development would disturb a majority of the Project Site (746,532 square feet)[27] and require excavation and grading of the Project Site to a maximum depth of approximately 21 feet for construction of the below-grade parking facility, gymnasium basement, and the 1 million-gallon stormwater capture and reuse system. Unadjusted rough grading cut volumes would be approximately 251,836 cubic yards, and the fill volume would be approximately 1,836 cubic yards, for a net cut/fill volume of approximately 250,000 cubic yards.[28] Ground disturbing activities associated with the Project would disturb sediments associated with the Qay1 alluvial unit and the Pleistocene-age alluvium, which have low to high and high sensitivity for paleontological resources, respectively. Accordingly, the Project would have the potential to encounter paleontological resources on-site during site excavation.

The City has established a standard condition of approval to address inadvertent discovery of paleontological resources. Should paleontological resources be inadvertently encountered, the condition of approval provides for temporary halting of construction activities near the encounter so the find can be evaluated. A paleontologist would temporarily divert or redirect grading and excavation activities in the area of the exposed material to facilitate evaluation and, if necessary, salvage. The paleontologist would then assess the discovered material(s) and prepare a survey, study, or report evaluating the impact. Harvard-Westlake School would then comply with the recommendations of the evaluating paleontologist, and a copy of the paleontological survey report would 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.

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.

---

[27] The total conservatively assumes all portions of the Project Site (i.e., 17.2 acres or 749,344 square feet) would be disturbed less the existing buildings on the Project Site (i.e., 2,700 square feet). Disturbed areas included in this total consist of Project improvements, such as graded and excavated areas, as well as minor disturbances, such as minor landscaping upgrades to understory vegetation, replacement of poles, etc.

[28] "Unadjusted" cut and fill is a programmed estimate that does not account for minor shrinkage from compaction, swelling, or other factors that may require final manual adjustments to achieve finished gradients/ heights.

Therefore, while development of the Project Site has some potential to encounter buried paleontological resources, with implementation of the City's standard condition of approval to address inadvertent discovery of paleontological resources, the Project would not directly or indirectly destroy a unique paleontological resource or site or unique geological feature, and impacts would be less than significant.

(2) Mitigation Measures

Impacts regarding paleontological resources were determined to be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Impacts regarding paleontological resources were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

e) Cumulative Impacts

(1) Impact Analysis

(a) Geology and Soils

Due to the site-specific nature of geological conditions (i.e. soils, geological features, subsurface features, seismic features, etc.), geology and soils impacts are typically assessed on a project-by-project basis rather than on a cumulative basis. Nonetheless, the five related projects in the area are located on Ventura Boulevard, within the similar alluvial soils types as the Project Site and in proximity to the Los Angeles River, in which a high water table under these sites is anticipated. As such, in addition to impacts related to seismic shaking hazards, the related projects could also have similar geologic hazards related to soil stability hazards (i.e., liquefaction). As with the Project, related projects must comply with CBC and City regulations related to seismic safety, grading foundation design, and other geotechnical issues. The larger related projects would be required to comply with the requirements of the NPDES Construction General Permit and implement BMPs during construction to reduce surface erosion. With implementation of BMPs and compliance with CBC and LAMC requirements that address seismic shaking, soil stability, standards for grading practices, and other regulations, the Project and related projects would not result in significant geologic impacts. **With adherence to applicable State and City Building Code regulations, Project impacts with regard to the exacerbation of geological and soils conditions, soil erosion, and other geologic hazards would not be cumulatively considerable, and cumulative impacts with regard to geology and soils would be less than significant.**

(b) Paleontological Resources

With regard to paleontological resources, although projects within the cumulative study area for the Project include construction excavation on parcels that have been disturbed or are already developed, as well as on open space parcels, related projects on these sites would have the potential to disturb geological units that are sensitive for paleontological resources. Generally, however, projects that require substantial excavation would be subject to environmental review under CEQA. If the potential for significant impacts on paleontological resources were identified given the site characteristics and development program of the related projects, the City's standard condition of approval to address inadvertent discovery of paleontological resources would be required. **With implementation of the standard condition of approval, Project impacts related to paleontological resources would not be cumulatively considerable, and cumulative impacts to paleontological resources would be less than significant.**

(2) Mitigation Measures

Cumulative impacts related to geologic hazards, erosion of soils, other geological issues, and paleontological resources were determined to be less than significant. Therefore, no mitigation measures are required for these issues.

(3) Level of Significance After Mitigation

With compliance with the State and City Building Code regulations, where applicable, Project-level and cumulative impacts related to geologic hazards, erosion of soils, other geological issues, and paleontological resources would be less than significant. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

This page intentionally left blank