IV. Environmental Impact Analysis

C. Geology and Soils

1. Introduction

This section of the Draft EIR provides an analysis of the proposed Project's potential impacts with regard to geology and soils. The analysis includes an evaluation of potential geologic hazards associated with fault rupture, seismic ground shaking, seismic-related ground failure (e.g., liquefaction), geologic unit and soil stability, and expansive and corrosive soils. The analysis is based on a review of California regulatory requirements, City of West Hollywood (City) requirements, the *Geotechnical Investigation—Proposed Mixed-Use Development 8920 Sunset Boulevard West Hollywood California* (Geotechnical Report) prepared for the proposed Project by Geocon West, Inc. (July 2, 2015), the *Response to City of West Hollywood Review Comments, Proposed Mixed-Use Development, 8920 Sunset Boulevard, West Hollywood, California* (Geotechnical Response Letter), prepared by Geocon West, Inc. (May 24, 2016), and the *Clarification Letter—Expansive Soils, Proposed Mixed-Use Development, 8920 Sunset Boulevard, West Hollywood, California*, prepared by Geocon West, Inc. (July 11, 2016) included as Appendix C of this Draft EIR.

2. Environmental Setting

a. Regulatory Framework

(1) State of California

(a) Alquist–Priolo Earthquake Fault Zoning Act

The Alquist–Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621) was enacted by the State of California in 1972 to address the hazard of surface faulting to structures for human occupancy.[1] The Alquist–Priolo Earthquake Fault Zoning Act was enacted in response to the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged homes, commercial buildings, and other structures. The primary purpose of the Alquist–Priolo Earthquake Fault Zoning Act is to

[1] *The Alquist–Priolo Earthquake Fault Zoning Act was originally entitled the Alquist–Priolo Geologic Hazards Zone Act.*

prevent the construction of buildings intended for human occupancy on the surface traces of active faults. The Alquist–Priolo Earthquake Fault Zoning Act is also intended to provide citizens with increased safety and to minimize the loss of life during and immediately following earthquakes by facilitating seismic retrofitting to strengthen buildings against ground shaking.

The Alquist–Priolo Earthquake Fault Zoning Act requires the State Geologist to establish regulatory zones, known as "Earthquake Fault Zones," around the surface traces of active faults and to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. Maps are distributed to all affected cities and counties for the control of new or renewed construction and are required to sufficiently define potential surface rupture or fault creep. The State Geologist is charged with continually reviewing new geologic and seismic data, and revising existing zones and delineating additional earthquake fault zones when warranted by new information. Local agencies must 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 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. Although setback distances may vary, a minimum 50-foot setback is required. The Alquist–Priolo Earthquake Fault Zoning Act and its regulations are presented in California Department of Conservation, California Geological Survey, Special Publication 42, *Fault-Rupture Hazard Zones in California*.

(b) Seismic Safety Act

The California Seismic Safety Commission (Commission) was established by the Seismic Safety Act in 1975 with the intent of providing oversight, review, and recommendations to the Governor and State Legislature regarding seismic issues. The Commission's name was changed to Alfred E. Alquist Seismic Safety Commission in 2006. The Commission has adopted several documents based on recorded earthquakes, some of which include the following:[2]

- Guide to Identify & Manage Seismic Risks of Building for Local Governments, reported dated March 9, 2017.

[2] *Alfred E. Alquist Seismic Safety Commission, Publications, www.seismic.ca.gov/pub.html, accessed May 22, 2017.*

- California Earthquake Early Warning System Benefit Study, report dated July 29, 2016.

- The M_w 6.0 South Napa Earthquake of August 24, 2014: A Wake-up Call for Renewed Investment in Seismic Resilience across California, report dated June 2016.

- Select Technologies and Capabilities to Improve Earthquake Resiliency in California, report dated May 2016.

- California Earthquake Loss Reduction Plan: Post-Earthquake Economic Recovery, report dated 2013.

- The Study of Household Preparedness: Preparing California for Earthquakes, report dated July 2009.

(c) 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 Legislature enacted the Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699). 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 to ensure that the geologic and soil conditions of a project site are investigated and appropriate mitigation measures, if any, are incorporated into development plans. The State Mining and Geology Board has promulgated additional regulations and policies to assist municipalities in preparing the Safety Element of applicable general plans and encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety. Under Public Resources Code Section 2697, cities and counties, prior to the approval of a project located in a seismic hazard zone, must require a geotechnical report defining and delineating any seismic hazard. Each city or county shall submit one copy of each geotechnical report, including mitigation measures, to the State Geologist within 30 days of its approval. Public Resources Code Section 2698 does not prevent cities and counties from establishing policies and criteria which are stricter than those established by the State Mining and Geology Board.

State publications supporting the requirements of the Seismic Hazards Mapping Act include the California Geological Survey Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* and California Geological Survey Special Publication 118, *Recommended Criteria for Delineating Seismic Hazard Zones in California*. The objectives of Special Publication 117 are to assist in the evaluation and mitigation of earthquake-related hazards for projects within designated zones of required investigations and to promote uniform and effective statewide implementation of the

evaluation and mitigation elements of the Seismic Hazards Mapping Act. Special Publication 118 implements the requirements of the Seismic Hazards Mapping Act in the production of Probabilistic Seismic Hazard Maps for the state.

(d) California Building Code

The California Building Code (California Code of Regulations, Title 24) is a compilation of building standards, including seismic safety standards for new buildings. California Building Code (CBC) standards are based on: (i) building standards that have been adopted by state agencies without change from a national model code; (ii) building standards based on a national model code that have been changed to address particular California conditions; and (iii) building standards authorized by the California legislature but not covered by the national model code. Given the state's susceptibility to seismic events, the seismic standards within the CBC are considered to be among the strictest in the world. The CBC includes provisions for demolition and construction, as well as regulations regarding building foundations and soil types. The CBC applies to all occupancies in California, except where stricter standards have been adopted by local agencies. The CBC is published on a triennial basis, and supplements and errata can be issued throughout the cycle. The operative edition of the CBC is the [2016] edition, which became effective on January 1, 2017, and incorporates by adoption the 2012 edition of the International Building Code of the International Code Council, with California amendments. The 2016 CBC 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 provide for the latest in earthquake safety. Specific CBC building and seismic safety regulations have been incorporated by reference in the West Hollywood Building Code (WHBC) with local amendments. As such, the CBC forms the basis of the WHBC.

(2) City of West Hollywood

(a) West Hollywood General Plan Safety Element

The City of West Hollywood General Plan Safety Element, adopted in September 2011, 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 generalized maps of designated areas within the City that are considered susceptible to earthquake-induced hazards such as liquefaction and earthquake-induced landsliding. The following policies regarding geologic hazards are relevant to the proposed project:

- SN-1.2: Allow the consideration of potential natural or man-made hazards in project review and in City operations, considering best practices in hazard-

avoidance and mitigation in the siting, structural engineering, maintenance, and building and landscape design for all development projects.

- SN-1.3: Require fault rupture hazard studies for sites located within the City-defined Fault Precaution Zone delineated around the Hollywood Fault Zone.

- SN-1.4: Maintain high standards for the seismic performance of buildings in all new development, through requirements for detailed geotechnical investigations following state guidelines and prompt adoption and careful enforcement of the best available standards for seismic design.

- SN-1.6: Utilize relevant data on natural hazards, including earthquakes, flooding, liquefaction, landslides, natural gas and subsurface methane gas, and apply this information for purposes of land use planning, including any permitting.

(b) West Hollywood Building Code

Earthwork activities, including grading, are governed by the WHBC, which is contained in West Hollywood Municipal Code (WHMC), Title 13. Chapter 13.04 of the WHMC incorporates by reference Title 26, Building Code, of the Los Angeles County Code, as amended and in effect on January 1, 2017, and the 2016 CBC, with City amendments for additional requirements. Should any conflicts arise between the provisions of the CBC, Los Angeles County Building Code, and the WHBC, the WHBC controls. The Building and Safety Division of the Community Development Department is responsible for implementing and enforcing the provisions of the WHBC.

b. Existing Conditions

(1) Regional Geology

The Project Site is located along the northern margin of the Los Angeles Basin (Basin) on a steep-sloping alluvial fan at the base of the southern flank of the Santa Monica Mountains. The Basin is a coastal plain situated between the Santa Monica Mountains to the north, the Puente Hills and Whittier Fault to the east, the Palos Verdes Peninsula and Pacific Ocean to the west and south, and the Santa Ana Mountains and San Joaquin Hills to the southeast. The Basin is underlain by a deep structural depression, which has been filled by both marine and continental sedimentary deposits that are underlain by a basement complex of igneous and metamorphic composition.

Regionally, the Project Site is located in the southern portion of the Transverse Ranges geomorphic province, near the boundary of the Peninsular Ranges geomorphic province to the south. The Transverse Ranges are characterized by east-west trending geologic structures in contrast to the Peninsular Ranges that are characterized by northwest-trending geologic structures. The boundary between the two geomorphic

provinces is a system of faults that includes the active Malibu Coast, Santa Monica, Hollywood, Raymond, and Sierra Madre fault zones. Based on published geologic maps, splays of the Hollywood fault zone are located approximately 150 feet south of the Project Site. The Hollywood fault zone is discussed further below.

(2) Regional Faulting and Seismicity

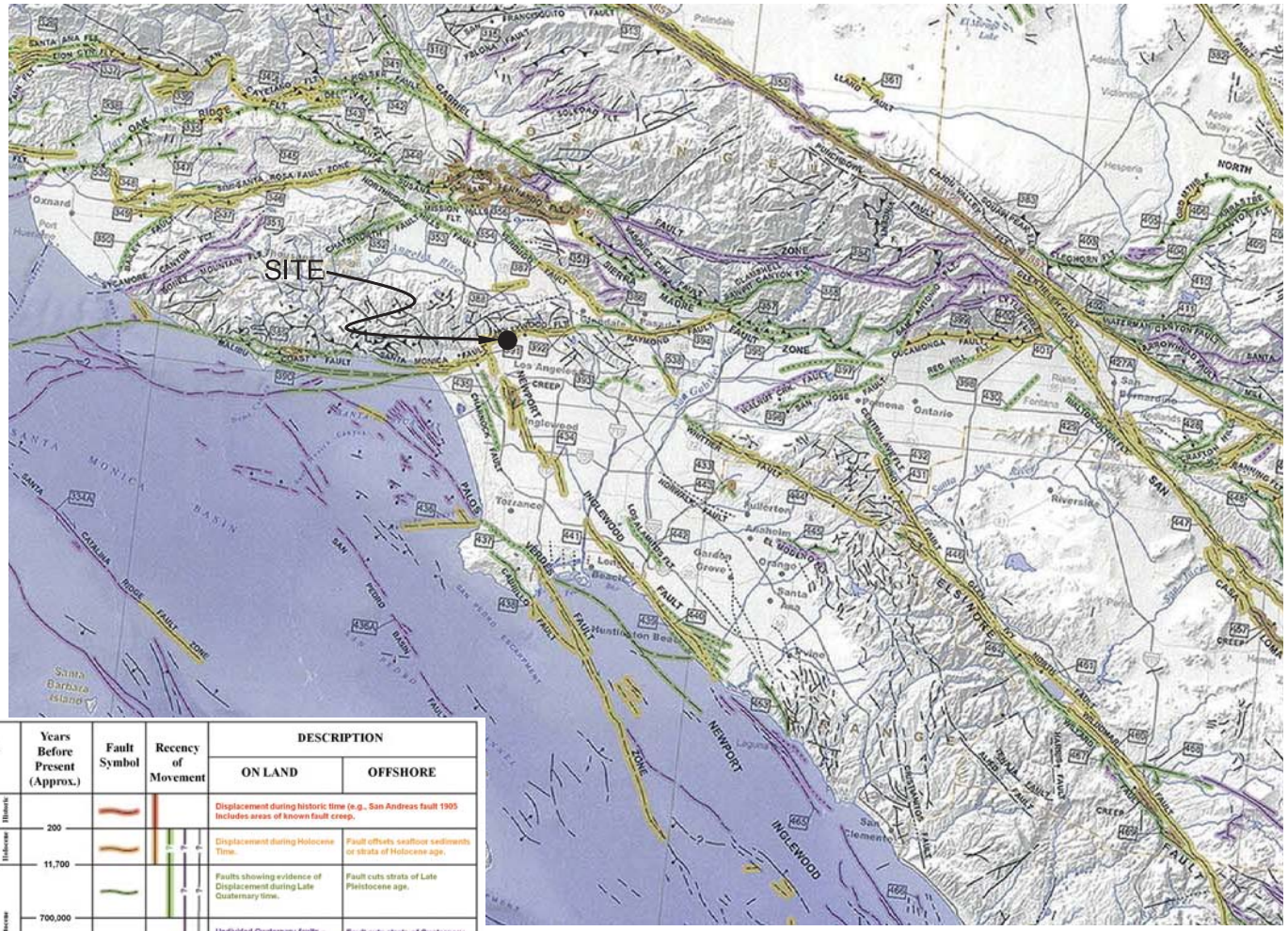
The numerous faults in Southern California include active, potentially active, and inactive faults. Based on criteria established by the California Geological Survey (CGS), active faults are those that have shown evidence of surface displacement within the past 11,000 years (i.e., Holocene-age). Potentially 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 higher than 6.0 occurring on buried thrust faults cannot be precluded.

The locations of significant active and potentially active faults in the Southern California region are shown on the Regional Fault Map in Figure IV.C-1 on page IV.C-7. Descriptions of significant active, potentially active, and blind thrust faults are provided below. In addition, Table IV.C-1 on page IV.C-8 is a partial list of moderate to major magnitude earthquakes that have occurred in Southern California.

(a) Active Faults

As discussed above, active faults are those which show evidence of surface displacement within the last 11,000 years (i.e., Holocene-age). According to the Geotechnical Report, and as shown in Figure IV.C-1, there are no known active faults that cross the Project Site.

The closest known active fault to the Project Site is the Hollywood Fault, located approximately 150 feet to the south. The Hollywood Fault trends east-west along the base of the Santa Monica Mountains from the West Beverly Hills Lineament in the West Hollywood-Beverly Hills area to the Los Feliz area of Los Angeles. The fault is a groundwater barrier within Holocene age sediments. Scarps 1.8 to 2.7 meters (5.9 to 8.9 feet) high in Holocene age flood plain deposits have been suggested along the fault trace in the Atwater area. Studies by several investigators have indicated that the fault is active, based on geomorphic evidence, stratigraphic correlation between exploratory



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g., San Andreas fault 1905 includes areas of known fault creep.	
		Holocene	11,700			Displacement during Holocene Time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene				Faults showing evidence of displacement during Late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		700,000			Undivided Quaternary faults – most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pre-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pleistocene or older age.
			4.5 billion (Age of Earth)				

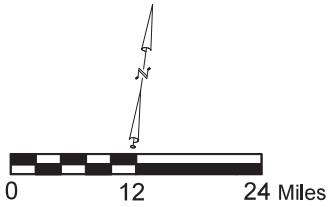


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Figure IV.C-1
Regional Fault Map

Source: Geocon West, Inc., 2015.

Table IV.C-1
Historic Earthquakes in the Southern California Region

Earthquake	Date of Occurrence	Magnitude	Distance (miles) and Direction to Epicenter
San Jacinto–Hemet area	April 21, 1918	6.8	83 ESE
Near Redlands	July 23, 1923	6.3	65 E
Long Beach	March 10, 1933	6.4	41 SE
Tehachapi	July 21, 1952	7.5	73 NW
San Fernando	February 9, 1971	6.6	22 N
Whittier Narrows	October 1, 1987	5.9	18 E
Sierra Madre	June 28, 1991	5.8	25 ENE
Landers	June 28, 1992	7.3	112 E
Big Bear	June 28, 1992	6.4	89 E
Northridge	January 17, 1994	6.7	12 NW
Hector Mine	October 16, 1999	7.1	126 ENE

Source: Geocon West, Inc, July 2, 2015.

borings, and fault trenching studies. Additionally, recent investigations performed in the Hollywood area have demonstrated that Holocene-age alluvial sediments have been offset by several strands of the Hollywood Fault. An Alquist–Priolo Earthquake Fault Zone has recently been established for portions of the Hollywood Fault. The Project Site is not located within the currently established Alquist–Priolo Earthquake Fault Zone for the Hollywood Fault. Also, the City considers the Hollywood Fault active for planning purposes and has established Fault Precaution Zones within the City located within the City-designated zones. The Project Site is not located within a City Fault Precaution Zone.

Other nearby active faults are the Newport-Inglewood Fault Zone, the Santa Monica Fault, and the Raymond Fault located approximately 2.0 miles west, 2.3 miles southwest, and 8.9 miles east of the Project Site, respectively. The active San Andreas Fault Zone is located approximately 35 miles northeast of the Project Site.

(b) Potentially Active Faults

The closest potentially active fault to the Project Site is the Overland Avenue Fault located approximately 4.3 miles to the southwest. Other nearby potentially active faults are the MacArthur Fault, the Charnock Fault, and the Coyote Pass Fault, located approximately 5.6 miles southeast, 6.7 miles southwest, and 11.0 miles southeast of the Project Site, respectively.

(c) Blind Thrust Faults

Several buried thrust faults, commonly referred to as blind thrusts, underlie the Los Angeles Basin. These faults are not exposed at the ground surface and are typically identified at depths greater than 3 kilometers (1.86 miles). The 1987 Whittier Narrows earthquake was a result of movement on the Puente Hills Blind Thrust Fault and the 1994 Northridge earthquake was a result of movement on the Northridge Thrust Fault. These thrust faults and others in the region are not exposed at the surface and do not present a potential surface fault rupture hazard; however, these faults are considered active and capable of generating future earthquakes that could result in moderate to significant ground shaking at the Project Site.

(d) Surface Ground Rupture

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, the Alquist–Priolo Earthquake Fault Zoning Act requires the State Geologist to establish and map fault rupture zones (termed earthquake fault zones) around the surface traces of active faults and to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. In addition, the Safety Element under the City's General Plan 2035designates fault rupture study areas extending along the Hollywood Fault to establish areas of hazard potential due to fault rupture.

The Alquist–Priolo Earthquake Fault Zoning Act defines "active" and "potentially active" faults utilizing the same aging criteria as that used by the CGS described above. Therefore, the Alquist–Priolo Earthquake Fault Zoning Act identifies zones that include faults which have direct evidence of movement within the last 11,000 years. 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 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, based on the location precision, complexity, or regional significance of the fault, identify areas where potential surface fault rupture along an active fault could prove hazardous and identify where special studies are required to characterize hazards to habitable structures. If a site lies within an Earthquake Fault Zone on an official CGS map, then a geologic fault rupture investigation must be performed before the issuance of permits to demonstrate that the proposed development is not threatened by surface displacement from the fault.

At the local level, the City designates Fault Precaution Zones extending along the Hollywood Fault to establish areas of hazard potential due to fault rupture. As noted above, the Hollywood Fault is located approximately 150 feet south of the Project Site. However, as shown in Figure IV.C-2 on page IV.C-11, the Project Site is not located within a City-designated Fault Precaution Zone for the Hollywood Fault. Additionally, as indicated in the Geotechnical Report, it is not located within an Alquist–Priolo Earthquake Fault Zone. No active or potentially active faults with the potential for surface fault rupture are known to pass directly beneath the Project Site. Fault rupture hazard investigations were completed for the adjacent properties to the west and south (i.e., at 8950 Sunset Boulevard and 1016, 1018, and 1020 Hilldale Avenue) in 1998.[3] These investigations concluded that active faults do not traverse these sites. Based on the absence of faulting on the adjacent sites and the location of the Project Site outside of the state- and City-designated zones for surface fault rupture hazards, the potential for surface rupture due to faulting beneath the Project Site is considered low.

(3) Local Geology

(a) Soil Conditions

Based on the Geotechnical Report included in Appendix C of this Draft EIR, the Project Site is underlain by artificial fill and Quaternary age alluvial fan deposits consisting of varying amounts of unconsolidated to moderately consolidated clayey sand and sandy clay originating from the Santa Monica Mountains to the north. The artificial fill was encountered to a maximum depth of 9 feet below existing ground surface. The artificial fill consists of yellowing brown silty sand and is characterized as slightly moist and medium dense. The fill is likely present due to past grading and construction at the Project Site. The Quaternary age alluvial fan deposits were encountered beneath the fill and consist primarily of yellowish brown to dark reddish brown, poorly graded sand, sandy silt, clayey sand, and sand with clay. The alluvial soils are primarily moist to wet and loose to very dense.

(b) Groundwater

The Project Site is located within the Hollywood Groundwater Basin of the Los Angeles County Coastal Plan Basins. Based on a review of the Seismic Hazard Zone Report for the Beverly Hills 7.5 Minute Quadrangle, Los Angeles County, California (1998),

[3] *According to the Geotechnical Report, the previous fault investigation at the 8950 Sunset site was performed by Applied Earth Science in 1998 and included drilling nine hollow stem auger borings. The previous investigation at the 1016-1020 Hilldale Avenue site was performed by Advanced Geotechniques in 1998 and included drilling five hollow stem auger borings.*

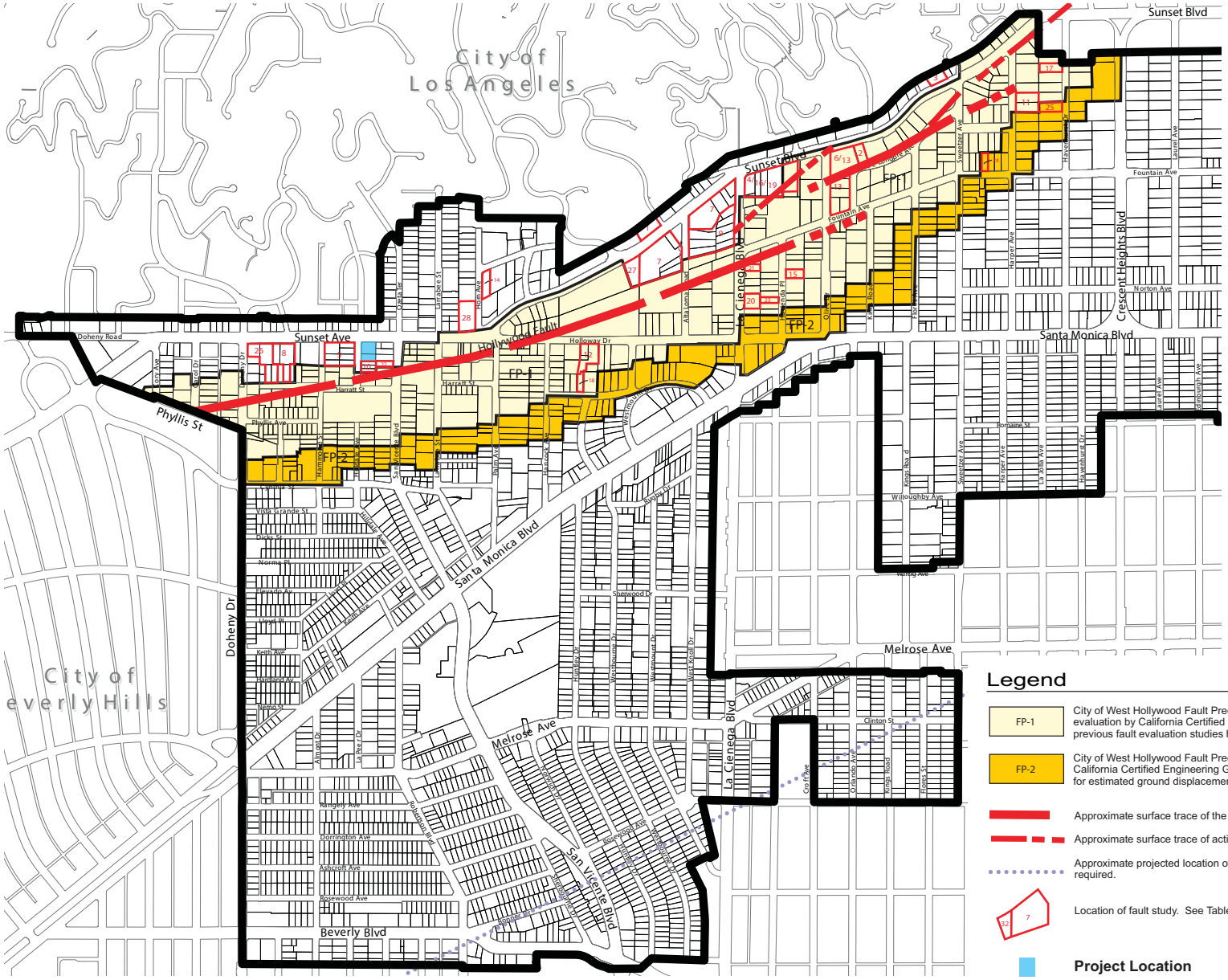

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Figure IV.C-2
Hollywood Fault Zone Map

Source: City of West Hollywood General Plan, 2010.

the historically highest groundwater level in the area is approximately 22 feet beneath the ground surface (bgs). The City also reports the same level. Groundwater was encountered at a depth of 38 feet bgs as reported in the Geotechnical Report. An additional boring completed in May 2016 for the Geotechnical Response Letter encountered groundwater at a depth of 36 feet bgs. As indicated in the Geotechnical Report, previous investigations on adjacent properties found groundwater at depths of 22.5 to 53 feet bgs. Based on the conditions encountered during site exploration in connection with these investigations, groundwater may be encountered during construction activities. If groundwater is present above the depth of the subterranean level, temporary dewatering would be necessary to maintain a safe working environment during excavation and construction activities.

(c) Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures. Liquefaction occurs primarily in saturated, loose, fine to medium-grained soils in areas where the groundwater table is 50 feet or less below the ground surface.

The State of California Seismic Hazard Zone Map for the Beverly Hills Quadrangle (1998) indicates that the Project Site is not located in an area susceptible to liquefaction. The City's General Plan indicates that the Project Site is not located within a liquefaction hazard zone.[4] The alluvial materials beneath the groundwater table are consolidated, older alluvial deposits that are not prone to liquefaction.

However, based on the Project Site's proximity to a liquefaction hazard zone and the results of soil borings completed as part of the Geotechnical Report, the City requested the liquefaction potential of the on-site soils be evaluated. A supplemental site exploration was performed on May 2, 2016, where additional soil borings was drilled and samples were taken. The soils were visually examined, classified, and logged in accordance with the Unified Soil Classification System and evaluated for liquefaction potential using standard procedures. The liquefaction analysis was performed for the Maximum Considered Earthquake (MCE) defined by American Society of Civil Engineers (ASCE) 7-10[5] as the

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[4] *West Hollywood General Plan 2035, Safety Element, Figure 10-2, Seismic Hazard Zones, September 6, 2011, p. 10-9.*

[5] *American Society of Civil Engineers, ASCE 7-10: Minimum Design Loads for Buildings and Other Structures, 2011.*

hazard level with a 2-percent probability of exceedance within 50 years, using the historic high groundwater depth of 22 feet bgs, a magnitude 6.71 earthquake, and a peak acceleration of 0.948 g. Based on this analysis, the Project Site could be susceptible to up to 0.9 inch of settlement during an MCE event.

(d) Seismically Induced Settlement

Seismically induced settlement refers to a combination of dry dynamic settlement (pertaining to soils above the groundwater table) and liquefaction settlement (pertaining to soils below the groundwater table) involving the compaction of dry or moist cohesionless soils may also occur during a major earthquake. As discussed above, the alluvial materials beneath the groundwater table are consolidated, older alluvial deposits that are not prone to settlement. However, as discussed above, the liquefaction settlement analysis completed for the Project Site indicates site soils below the groundwater table could be prone to approximately 0.9 inch of settlement during an MCE event. As for the soils above the groundwater table, excavation for the proposed Project would extend below the historic high groundwater depth of the Project Site, and the sediments above the groundwater table would be removed. Therefore, there is no potential for dynamic dry settlement.

(e) Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas or as a result of decomposition of natural organic materials. Soils that are particularly subject to subsidence include those with high silt or clay content. The Project Site is located outside the boundary of an area identified in the Safety Element of the City's General Plan 2035 as a former marsh. In addition, significant organic materials were not encountered in soil borings performed at the Project Site. Therefore, the potential for subsidence related to decomposition of organic materials at the Project Site is considered low.

With respect to oil and gas withdrawal, only marginal activity currently exists in the Salt Lake Oilfield (located approximately 0.9 mile south of the Project Site) and water injection and flooding operations as part of secondary recovery are believed to have largely mitigated hazards related to fluid or gas withdrawal in the area. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or 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) Slope Stability

The topography of the Project Site and the vicinity slopes to the south-southeast with approximately 18 feet of vertical relief. According to the Safety Element of the City's

General Plan 2035, the Project Site is not identified as having a potential for slope instability. Additionally, the Project Site is not identified as having a potential for seismic slope instability by the state. There are no known landslides near the Project Site, and the Project Site is not located in the path of any known or potential landslides. Therefore, slope stability hazards are not anticipated to adversely affect the Project Site.

(g) Expansive Soils

Expansive soils are soils that swell when subjected to moisture and shrink when dried. Expansive soils are typically associated with clayey soils. Based on the depth of the proposed Project's subterranean levels, the proposed structure would not be prone to the effects of expansive soils. Furthermore, the soils found near the surface are predominately granular, and therefore, are expected to have a low to medium expansive potential, and may swell or shrink due to change in moisture content.

(h) Other Geologic Conditions

Based on a review of the California Division of Oil, Gas, and Geothermal Oil and Gas Well Location Map W1-5, the Project Site is not located within the limits of an oil field and oil wells are not located in the immediate vicinity. Lastly, no distinct or prominent geologic or topographic features such as hilltops, ridges, hillslopes, canyons, ravines, rock outcrops, water bodies, streambeds, or wetlands are located at the Project Site.

3. Project Impacts

a. Methodology

To evaluate potential impacts relative to geology and soils, a Geotechnical Report was prepared for the Project Site in July 2015. The Geotechnical Report included a review of published geologic data relevant to the Project Site, subsurface exploration, sampling and logging of the subsurface soils, laboratory testing, and engineering analysis. Preliminary recommendations regarding the design and construction of the proposed Project are based on these results. A supplemental letter was prepared in May 2016 to respond to the City's comments on the Geotechnical Report. Another supplemental letter was prepared in July 2016 to provide clarification on the presence of expansive soils at the Project Site. The Geotechnical Report and the two supplemental letters are provided in Appendix C of this Draft EIR, respectively.

b. Thresholds of Significance

Appendix G of the CEQA Guidelines provides a set of sample questions that address impacts with regard to geology and soils. Based on these questions from the

CEQA Guidelines, a significant impact from geologic conditions would occur if the Proposed Project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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[6] Special Publication 42.
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.
- Result in substantial soil erosion or the loss of topsoil.
- 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.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- 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 waste water.

With regard to the above thresholds, as evaluated in Section VII, Effects Not Found to Be Significant, of this Draft EIR, the Project Site is located within a community served by existing sewage infrastructure and would not use septic tanks or alternative wastewater disposal systems. Therefore, no impact related to the use of septic tanks or alternative wastewater disposal systems would occur, and no further analysis is required.

c. Project Design Features

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

[6] *Now the California Geological Survey.*

d. Analysis of Project Impacts

(1) Seismic Hazards

(a) Surface Ground Rupture

Ground rupture is the visible breaking and displacement of the earth's surface along the trace of a fault during an earthquake. 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 or Seismic Hazard Zone, or within a Hollywood Fault Precaution Zone designated by the City. According to the Geotechnical Report, the nearest active fault to the Project Site is the Hollywood Fault, located approximately 150 feet to the south. In spite of its proximity to the Hollywood Fault, due to the lack of active faulting under the Project Site, the potential for surface rupture is not anticipated to adversely affect the Project Site. Thus, the proposed Project would not cause or accelerate geologic hazards related to fault rupture, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. Impacts associated with surface rupture from a known earthquake fault would be less than significant, and no mitigation measures are required.

(b) Strong Seismic Ground Shaking

The Project Site is located within the seismically active region of Southern California and would potentially be subject to strong ground motion if a moderate to strong earthquake occurs on a local or regional fault. These potentially significant impacts at the Project Site can be overcome through engineering design solutions that would reduce the substantial risk of exposing people or structures to loss or injury. State and local code requirements 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. The potentially significant impacts related to seismic ground shaking at the Project Site can be reduced to less than significant through conformance with existing state laws, City ordinances, and the application of accepted and proven construction engineering practices. The Geotechnical Report contains preliminary recommendations for the type of engineering practices that would be used to minimize risks associated with seismic shaking. Those recommendations are included below as Mitigation Measure C-1. Mitigation Measure C-1 includes the requirement that a final design-level geotechnical report would be prepared by the Applicant and reviewed to the satisfaction of the Building and Safety Division before the issuance of grading permits. The final recommendations from that report would be enforced before construction of the proposed Project.

Both 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 CBC, the General Plan Safety Element, and the WHBC. Pursuant to these laws and the mitigation measures proposed in this Draft EIR, the proposed Project must demonstrate compliance with the applicable provisions of these safety requirements before permits can be issued for the proposed Project.

Based on the Geotechnical Report, the Project Site is suitable for development, and the proposed Project may be constructed using standard, accepted, and proven engineering practices considering the seismic shaking potential and geologic conditions at the Project Site. As with other development projects in the Southern California region, the proposed Project would comply with the current seismic design provisions of the 2016 CBC to minimize seismic impacts. The 2016 CBC 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 provide for the latest in earthquake safety. In addition, construction of the proposed Project would be required to adhere to the seismic safety requirements contained in the WHBC (Title 13, Chapter 13.04). As discussed above, the WHBC incorporates by reference the Los Angeles County Building Code and the 2016 CBC, with City amendments for additional requirements. The West Hollywood Community Development Department, Building and Safety Division is responsible for implementing the provisions of the WHBC. The proposed Project would also be required to comply with the site plan review and permitting requirements of the Community Development Department, including the recommendations provided in a final, site-specific geotechnical report subject to review and approval by the Division of Building and Safety. Through compliance with regulatory requirements, site-specific geotechnical recommendations contained in a final design-level geotechnical engineering report that will take into consideration the engineering properties and the projected load and specify exact design requirements, and adherence to Mitigation Measure C-1, which requires review and approval of the proposed Project's final design plans and geotechnical report, as well as adherence to applicable state and local codes, the proposed Project would not cause or accelerate geologic hazards related to strong seismic ground shaking, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. Accordingly, impacts related to strong seismic ground shaking would be less than significant.

(c) Liquefaction

Due to the Project Site's proximity to a liquefaction hazard zone a supplemental site exploration and liquefaction analysis was performed on May 2, 2016, where an additional soil boring was drilled and soil samples were taken. The liquefaction analysis was performed for an MCE level by using a historic high groundwater level of 22 feet bgs, a magnitude 6.71 earthquake, and a peak horizontal acceleration of 0.948 g. Based on the results of this analysis, the proposed subterranean structure could be susceptible to up to 0.9 inch of settlement during an MCE level seismic event. Consequently, the proposed

structure is recommended to be designed for a combined static and seismically induced differential settlement of one inch over a distance of 20 feet as identified in the Geotechnical Response Letter. Detailed results from the liquefaction analysis are included in the Geotechnical Response Letter included as Appendix C of this Draft EIR.

Mitigation Measure C-1 would require the Applicant to prepare and implement a final, site-specific geotechnical report that addresses the recommendations contained in the Geotechnical Report and supplemental letters, which include design recommendations to counter the potential settlement as a result of liquefaction discussed above. With implementation of this mitigation measure, impacts associated with liquefaction would be less than significant.

(d) Seismically Induced Settlement

Seismically induced settlement or compaction of dry or moist cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures. Some seismically induced settlement of structures within the Project Site should be expected as a result of strong ground shaking. While there is no potential of any hazard due to dry dynamic settlement since the excavation proposed for the Project would remove the sediments above the groundwater table and extend below the historic high groundwater level, the Project Site may be susceptible to liquefaction settlement (for the soils below the groundwater table) of approximately 0.9 inch during an MCE event. However, Mitigation Measure C-1 would require the Applicant to prepare and implement a final, site-specific geotechnical report that addresses the recommendations contained in the Geotechnical Response Letter, which include design recommendations to counter this potential settlement. The proposed Project would also be required to comply with the site plan review and permitting requirements of the Community Development Department, Building and Safety Division. Therefore, with implementation of Mitigation Measure C-1, the proposed Project would not cause or accelerate geologic hazards related to seismically-induced settlement that would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury, and impacts related to settlement would be reduced to a less-than-significant level.

(2) Soil Erosion

As discussed in greater detail in Section IV.F, Hydrology and Water Quality, of the Draft EIR, Project-related construction activities would occur in accordance with erosion control requirements, including grading and dust control measures, imposed by the City pursuant to grading permit regulations. Based on its size (less than 1 acre), the Project Site would not require coverage under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. However, a local stormwater pollution prevention

plan (LSWPPP) and erosion control plan (ECP) would be prepared in accordance with Project Design Feature F-3 and County and local codes. As part of the LSWPPP and ECP, Best Management Practices (BMPs) would be implemented during construction to reduce sedimentation and erosion levels to the maximum extent possible. In addition, Project construction contractors would be required to comply with grading permit regulations, which require the implementation of necessary measures, plans, and inspections to reduce sedimentation and erosion. With compliance with regulatory requirements that include the implementation of BMPs, impacts related to soil erosion would be less than significant, and no mitigation measures would be required.

(3) Soil Stability

(a) Landslides

The Project Site is not identified as having a potential for slope instability by either the state or the City. There are no known landslides near the Project Site, and the Project Site in not located within the path of any known or potential landslides. Therefore, the proposed Project would not cause or accelerate geologic hazards related to landslides, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. Impacts related to landslides would be less than significant, and no mitigation measures are required.

(b) Lateral Spreading and Collapse

According to the Geotechnical Report, the soils underlying the Project Site consist of Quaternary age alluvial fan deposits below a layer of fill observed to be up to nine feet bgs on the Project Site. The anticipated maximum depth of excavation for Project development is approximately 79 feet bgs. The excavation would mostly be comprised of consolidated alluvial soils consisting of poorly graded sand, sandy silt, clayey sand, and sand with clay. As discussed in the Geotechnical Report and required by Mitigation Measure C-1, all required excavations would be sloped, or properly shored, in accordance with the provisions of the CBC and additional WHBC requirements, as applicable, to prevent lateral spreading and collapse. All construction activities for the proposed Project would adhere to the requirements of the WHMC and the 2016 CBC. Furthermore, Mitigation Measure C-1 would require the Applicant to prepare and implement a final, site-specific geotechnical report that addresses the recommendations contained in the Geotechnical Report. All recommendations contained in the final, site-specific geotechnical report would be incorporated in the proposed Project's design. The final design-level geotechnical report, which will be reviewed and approved by the Division of Building and Safety prior to construction of the proposed Project, will take into consideration the engineering properties of the Project Site and specify exact design requirements. Thus, with implementation of

Mitigation Measure C-1, impacts related to lateral spreading and collapse would be less than significant.

(c) Subsidence

The Project Site is not located within an area of known ground subsidence. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or is planned at the Project Site. As previously discussed, the Project Site is located outside the boundary of an area identified by the City as a former marsh. In addition, significant organic materials were not encountered in soil borings performed at the Project Site. Thus, based on the lack of any significant organic materials in the soil and the absence of any large-scale extraction of groundwater, gas, oil, or geothermal energy at the Project Site, the proposed Project would not cause or accelerate geologic hazards related to subsidence, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury. Impacts related to subsidence would be less than significant, and no mitigation measures are required.

(4) Expansive Soils

The soils found near the surface are predominately granular and, therefore, are expected to have a low to medium expansive potential. Potentially expansive soil may swell or shrink due to change in moisture content. However, based on the depth of the proposed subterranean levels, the proposed structure would not be prone to the effects of expansive soils.[7] Therefore, impacts related to expansive soils would be less than significant, and no mitigation measures are required.

4. Cumulative Impacts

Due to the site-specific nature of geological conditions (i.e., soils, geological features, subsurface features, seismic features, etc.), geologic impacts are typically assessed on a project-by-project basis, rather than on a cumulative basis. The impacts on each site would be specific to that site and its users and would not be common or contribute to (or shared with, in an additive sense) the impacts on other sites.

Nevertheless, cumulative growth through 2020 (the proposed Project's buildout year) (inclusive of the 191 related projects identified in Section III, Environmental Setting, of this Draft EIR) would expose a greater number of people to seismic hazards. However, as

[7] *Geocon West, Inc., "Clarification Letter—Expansive Soils," July 11, 2016. Included as Appendix C of this Draft EIR.*

with the proposed 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 CBC, the WHBC, the City of Los Angeles Building Code, and the City of Beverly Hills Building Code. Furthermore, as with the proposed Project, each related project would be subject to review and approval by their respective jurisdiction. This process will identify any site-specific geotechnical recommendations and/or mitigation measures required of the related projects to address geology and soils impacts. Therefore, with adherence to applicable regulations, as well as review and approval of each related project by their respective jurisdictions, cumulative impacts with regard to geology and soils would be less than significant.

5. Mitigation Measures

In addition to the regulatory requirements set forth above, the following mitigation measure is included to ensure that potential impacts related to geology and soils would be less than significant:

Mitigation Measure C-1: Prior to issuance of grading permits, the Applicant shall submit final design plans and a geotechnical engineering report to the Community Development Department, Building and Safety Division for review and approval. The design-level geotechnical engineering report shall be used for final design of the foundation system for the structures and shall take into consideration the engineering properties beneath the proposed structure and the projected load. The final report shall specify exact design coefficients that are needed by structural engineers to determine the type and sizing of structural building materials. The final report shall be subject to the specific performance criteria imposed by all applicable state and local codes and standards. The final geotechnical report shall be prepared by a registered civil engineer or certified engineering geologist and include appropriate measures to minimize seismic hazards and ensure structural safety of the proposed structure. The proposed structure shall be designed and constructed in accordance with all applicable provisions of the applicable California Building Code and the West Hollywood Building Code. The site-specific geotechnical report shall incorporate each of the recommendations provided in the *Geotechnical Investigation, Proposed Mixed-Use Development, 8920 Sunset Boulevard, West Hollywood, California,* prepared by Geocon West, Inc., (July 2, 2015) as well as the *Response to City of West Hollywood Review Comments, Proposed Mixed-Use Development, 8920 Sunset Boulevard, West Hollywood, California,* prepared by Geocon West, Inc. (May 24, 2016). Where differing information exists, the recommendations presented in the later document shall supersede

the former. As such, the recommendations from the May 2016 report shall take precedence and be incorporated into the proposed building design accordingly. All recommendations contained in the final site-specific geotechnical report will be incorporated in the Project design.

6. Level of Significance After Mitigation

Considering the rigorous investigation process required under the engineering standard of care, compliance with state laws and City regulatory requirements, technical review and approval by the Building and Safety Division of the City's Community Development Department of a design-level geotechnical engineering report, and with implementation of Mitigation Measure C-1, Project-level impacts related to geology and soils would be less than significant. Cumulative impacts with regard to geology and soils would also be less than significant.