Appendix IS-2

Geotechnical Assessment

Geotechnologies, Inc.
Consulting Geotechnical Engineers

439 Western Avenue
Glendale, California 91201-2837
818.240.9600 • Fax 818.240.9675

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Hines
444 South Flower Street, Suite 2100
Los Angeles, California 90071

Attention: Ted Hart

Subject: Preliminary Geotechnical Assessment
Proposed Office Building
2045 Violet Street, Los Angeles, California

Dear Mr. Hart:

1.0 INTRODUCTION

This document presents the results of the preliminary geotechnical assessment of the subject site. At the time the following document was submitted, the proposed development was in the pre-design phase and the development team was in the process of securing entitlements from government agencies. The purpose and intent of this document is to assess the soil and geological site conditions and to address geotechnical aspects of the proposed development during the entitlement process. The following report includes information from geotechnical investigations performed in near proximity to the site, engineering analysis, review of published geologic data, and review of available geotechnical engineering information.

The geotechnical evaluation presented herein is not intended for submission to the building official for building permit purposes. A comprehensive geotechnical investigation will be required as the design process proceeds. The geotechnical investigation would be based on subsurface exploration and laboratory testing. Such an investigation will be required by the building official and is a condition of development approval.

2.0 EXECUTIVE SUMMARY

The project site is not located within an earthquake fault zone, or a seismically-induced landslide zone. The site is not located within an area classified as potentially liquefiable. The conditions identified in this report are typical of sites within this area of Los Angeles, and of a type that are routinely addressed through regulatory measures.

As with all of Southern California, the site is subject to potential strong ground motion should a moderate to strong earthquake occur on a local or regional fault. Design of the project in accordance with the provisions of the applicable California Building Code will be required to mitigate the potential effects of strong ground shaking.

Based on previous geotechnical investigations performed near the site, it is the assessment of this firm that the current groundwater level at the site may be as shallow as 90 feet below grade. Review of the Seismic Hazard Zone Report (SHZR) for the Los Angeles 7½-Minute Quadrangle, (CDMG, 1998, Revised 2006), indicates that the historically highest groundwater level in the vicinity of the site is estimated at 160 feet below ground surface. Subterranean walls to be located above the existing and historically highest groundwater levels may be designed for a drained condition, provided that a retaining wall subdrain is installed.

Excavations on the order of 30 to 45 feet in depth will be required for the proposed subterranean parking levels and foundation elements. The excavations are expected to remove the existing fill soils and expose the underlying dense native soils. Preliminarily, it is anticipated that the development may be supported on conventional spread footings and/or mat foundation.

Due to the depth of the proposed subterranean levels and the proximity of property lines and adjacent structures, it should be anticipated that shoring will be required to maintain a stable excavation. Preliminarily, soldier piles are recommended for shoring.

A site-specific geotechnical exploration program including laboratory testing and engineering analyses will be required to prepare a geotechnical engineering investigation for the project site. A comprehensive geotechnical report with design recommendations and parameters will be prepared and submitted to the local governing agency for approval prior to construction. The proposed development shall be designed and constructed in accordance with the provisions of the most current applicable building code and requirements of the local building official.

3.0 PROJECT SCOPE

Preliminary information concerning the proposed development was obtained by review of plans prepared by Rios Clementi Hale Studios, dated July 17, 2020. The proposed development consists of the construction of a 10 to 12-story office building which will likely include three levels of subterranean parking. The proposed structure is anticipated to provide 400,000 square feet of office space including ground floor retail and approximately 1,000 elevated and below grade parking spaces. The existing structures currently located at the southeast and eastern regions of the site will be demolished in preparation for the newly proposed office building.

Preliminarily column loads are estimated to be between 1,200 and 1,500 kips. Wall loads are estimated to range between 15 and 20 kips per lineal foot. Grading will consist of excavations extending from 30 to 45 feet below ground surface for the proposed subterranean parking levels and foundation elements. The enclosed Site Plan illustrates the details of the proposed architectural features anticipated for the development.

4.0 SITE CONDITIONS

The subject site is located at 2045 Violet Street, in the City of Los Angeles, California. The site is currently occupied by a single-story commercial structure in the southeast region of the site and a two to three-story commercial structure along the western perimeter of the site. The central and northeast regions of the site consist of paved parking and planter areas. The site is bounded by East 7th Place to the north, by a paved alleyway to the east, by Violet Street to the south, and by a paved alleyway to the west. The site is indicated relative to nearby topographic features in the enclosed Vicinity Map and Site Plan.

The topography observed across the site appears to descend very slightly to the south. There is an estimated elevation difference of less than one foot across the site for an overall site gradient of approximately 450 to 1 (horizontal to vertical).

Vegetation at the site consists of limited regions of bushes and shrubs contained in small, landscaped areas. Drainage across the site appears to be by sheet flow to the city streets and toward the south.

The eastern perimeter of the project site is positioned in close proximity to an apparent underground pipe or utility as indicated by the NavigateLA website. The designated region is approximately 20 feet wide and is illustrated on the attached Site Plan. The depth, position and status of any underground utility that may exist in the indicated area is not currently known. The ramifications of any subsurface utilities in near proximity to the proposed development are beyond the scope of this report.

5.0 PREVIOUS LOCAL SITE INVESTIGATIONS

This firm has conducted previous geotechnical engineering investigations within the area as indicated on the enclosed Vicinity Map. In addition, this firm has obtained a geotechnical report from Amec Foster Wheeler for an adjacent development located to the north and east of the project site. The investigations in nearest proximity to the proposed development are summarized below. Pertinent results and observations from these previous investigations have been incorporated into the preparation of this report.

1. ***Amec Foster Wheeler, January 19, 2015, Revised Report of Geotechnical Investigation, Proposed Ford Plan Redevelopment, 2030, 2036, 2038, 2042, 2046, 2054 East 7th Street, 2019, 2023, 2027, 2031, 2035, 2037, 2043 East 7th Place, 721, 725. 729, 733, 737, 801, 805, 809, 813 South Santa Fe Avenue, Los Angeles, California, Project OD-13165190.***

   Nine exploratory excavations were drilled during preparation of this geotechnical investigation report. The excavations ranged in depth from 6½ to 50 feet below the existing ground surface within the site. Fill materials were encountered up to 7½ feet below the existing site grade. Groundwater was not encountered during the subsurface exploration of this site. The Plot Plan and boring logs for this investigation are included in the Appendix.

It was recommended that the proposed structures and site improvements be supported on conventional foundations bearing in competent undisturbed alluvial soils.

2. ***Geotechnologies, Inc., June 29, 2006, Geotechnical Engineering Investigation, Proposed 16-Story Residential Tower, 1820 Industrial Street, Los Angeles, California, File Number 19185.***

The site investigation for the project included three borings, drilled to depths ranging between 40 and 100 feet below grade.

The borings encountered limited fill materials overlying natural alluvial soils. To depths ranging between 5 and 10 feet, the natural alluvial soils consisted predominantly of medium dense silty sands and sands, with occasional beds of soft and wet silts. Below a depth of 5 to 10 feet, the natural alluvial soils consisted of very dense, fine to coarse grained sands, with various amounts of gravel and cobbles. Groundwater was encountered at a depth of 91 feet below ground surface.

It was recommended that the 16-story residential tower be supported on a mat foundation system bearing in the very dense sandy soils found at depths between 5 and 10 feet below the ground surface. As an option, the recommended mat foundation may bear in a newly placed compacted fill pad.

3. ***Geotechnologies, Inc., November 17, 2008, Geotechnical Engineering Investigation, Rehabilitation of Existing Warehouse, 1444 South Alameda Street, Los Angeles, California, File Number 19744.***

The investigation for the project included one boring and six test pits. The boring was drilled to a depth of 50 feet, while the test pits were excavated to a depth of 6 feet below grade.

Up to 5½ feet of fill soils were encountered during site exploration. Below this depth, the natural alluvial soils consisted of medium dense to very dense, fine to coarse grained sands, with various amounts of gravel and cobbles. Groundwater was not encountered to the maximum excavated depth of 50 feet.

It was recommended that the proposed improvements be supported on conventional foundations, bearing in existing engineered compacted fill.

4. ***Geotechnologies, Inc., May 12, 2015, Geotechnical Engineering Investigation, Adaptive Re-Use of an Existing Warehouse Structure, 1000 South Santa Fe Avenue, Los Angeles, California, File Number 20945.***

The site investigation included one boring and five test pits. The boring was drilled to a depth of 50 feet, while the test pits were excavated to depths between 5 and 10 feet below grade.

The exploratory excavations encountered limited fill materials of 1½ to 2 feet overlying natural alluvial soils. To a depth of approximately 10 feet, the natural alluvial soils consisted predominantly of interlayered mixtures of sand and silt, which were medium dense or stiff. Below this depth, the natural alluvial soils consisted of medium dense to very dense, fine to coarse grained sands, with various amounts of gravel and cobbles. Groundwater was not encountered to the maximum excavated depth of 50 feet.

It was recommended that the proposed improvements be supported on conventional foundations deepened to bear in natural alluvial soils.

5. ***Geotechnologies, Inc., April 8, 2019, Revised April 23, 2019, Geotechnical Engineering Investigation, Proposed Mixed-Use Development, 2130 Through 2148 East Violet Street, Los Angeles, California, File Number 21017.***

The site investigation for the project included four borings drilled to depths ranging between 40 and 70 feet below grade.

The exploratory excavations encountered existing fill underlain by natural alluvium. Fill materials underlying the site consist of silty sands was observed to depths ranging from 2½ to 3½ feet. Groundwater was not encountered during site exploration to a maximum excavated depth of 70 feet.

It was recommended that the proposed structure be supported conventional foundations bearing on certified recompacted fill.

6.0 ANTICIPATED SUBSURFACE CONDITIONS

Based on review of the previous investigation conducted in the vicinity of the site, review of published geologic maps, and this firm's experience in this area of the City of Los Angeles, it is anticipated the natural soils underlying the subject site consist of alluvium deposited by river and stream action. The upper alluvium is expected to consist of a mixture of fine and granular materials which are anticipated to be medium dense or stiff. Below the upper layer, the alluvium is expected to consist of dense to very dense sands, with various amounts of gravel and cobbles.

It is anticipated that some amount of existing fill materials will overlie the alluvium in and around the subject site. The fill material is considered to be unsuitable for support of new foundation systems or slabs-on-grade. The planned excavation to allow construction of the subterranean levels of the proposed office building is anticipated to remove any fill material that currently exists on the site.

7.0 GROUNDWATER

Review of the Seismic Hazard Zone Report (SHZR) for the Los Angeles 7½-Minute Quadrangle, (CDMG, 1998, Revised 2006), indicates that the historically highest groundwater level in the vicinity of the site is estimated at 160 feet below ground surface. A copy of the Historically Highest Groundwater Levels Map is included in the Appendix of this report.

Static groundwater was not encountered during exploration of nearby sites to a maximum explored depth of 70 feet below grade. Groundwater was, however, observed at a depth of 91 feet during an exploration located to the northwest of the subject site. The locations of nearby site investigations are indicated on the enclosed Vicinity Map.

8.0 LOCAL GEOLOGY

The subject site is located in the Los Angeles Basin. The Los Angeles Basin is located at the northern end of the Peninsular Ranges Geomorphic Province. The basin is bounded by the east and southeast by the Santa Ana Mountains and San Joaquin Hills, to the northwest by the Santa Monica Mountains. The distribution of nearby geologic materials is indicated on the Local Geologic Map enclosed in the Appendix of this report.

9.0 REGIONAL GEOLOGIC SETTINGS

The subject site is located within the northern region Peninsular Ranges Geomorphic Province. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest trending fault zones that either die out to the northwest or terminate at east-west trending reverse faults that form the southern margin of the Transverse Ranges (Yerkes, 1965). Regional geology for the site is presented in the Regional Geologic Map in the Appendix of this report.

10.0 SEISMIC AND GEOLOGIC HAZARDS

a) Regional Faulting

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the Southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

A list of faults located within 60 miles (100 kilometers) from the project site has been provided in the enclosed table entitled Seismic Source Summary Table. This table is based on information provided by the USGS in their 2008 National Seismic Hazard Maps–Source Parameters database. The distances provided in this table are measured from a point selected near the center of the subject site. A Southern California Fault Map has also been enclosed. The following sections describe some of the regional active faults, potentially active faults, blind thrust faults and unnamed faults.

i) Active Faults

Raymond Fault

The Raymond fault is located approximately 6.1 miles northeast of the subject site. Much of the geomorphic evidence for the Raymond fault has been obliterated by urbanization of the San Gabriel Valley. However, a discontinuous escarpment can be traced from Monrovia to the Arroyo Seco in South Pasadena. The very bold, "knife edge" escarpment in Monrovia parallel to Scenic Drive is believed to be a fault scarp of the Raymond fault. Trenching of the Raymond fault is reported to have revealed Holocene movement (Weaver and Dolan, 1997). The Raymond fault has been found to be an effective groundwater barrier which divides the San Gabriel Valley into groundwater sub-basins.

The recurrence interval for the Raymond fault is probably slightly less than 3,000 years, with the most recent documented event occurring approximately 1,600 years ago (Crook, et al, 1978). However, historical accounts of an earthquake that occurred in July 1855 as reported by Toppozada and others, 1981, place the epicenter of a Richter Magnitude 6 earthquake within the Raymond fault. It is believed that the Raymond fault is capable of producing a 6.8 magnitude earthquake. The Raymond Fault is considered active by the California Geological Survey.

Verdugo Fault

The Verdugo fault runs along the southwest edge of the Verdugo Mountains and is located approximately 8.1 miles to the northwest of the site. According to Weber, et.-al., (1980) 2- to 3-meter-high scarps were identified in alluvial fan deposits in the Burbank and Glendale areas. Further to the northwest, in Sun Valley, a fault was reportedly identified at a depth of 40 feet in a sand and gravel pit. Although considered active by the County of Los Angeles, Department of Public Works (Leighton, 1990), and the United States Geological Survey, the fault is not designated with an Earthquake Fault Zone by the California Geological Survey. It is estimated that the Verdugo fault is capable of producing a maximum 6.9 magnitude earthquake.

Sierra Madre Fault System

The Sierra Madre fault alone forms the southern tectonic boundary of the San Gabriel Mountains in the northern San Fernando Valley. It consists of a system of faults approximately 75 miles in length. The individual segments of the Sierra Madre fault system range up to 16 miles in length and display a reverse sense of displacement and dip to the north. The most recently active portions of the zone include the Mission Hills, Sylmar and Lakeview segments, which produced an earthquake in 1971 of magnitude 6.4. Tectonic rupture along the Lakeview Segment during the San Fernando Earthquake of 1971 produced displacements of approximately 2½ to 4 feet upward and southwestward.

It is believed that the Sierra Madre fault zone is capable of producing an earthquake of magnitude 7.3. The closest trace of the fault is located approximately 12.5 miles to the northeast of the subject site.

Hollywood Fault

The Hollywood fault is part of the Transverse Ranges Southern Boundary fault system. The Hollywood fault is located approximately 5.9 miles northwest of site. This 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 Hollywood fault is the eastern segment of the reverse oblique Santa Monica–Hollywood fault. Based on geomorphic evidence, stratigraphic correlation between exploratory borings, and fault trenching studies, this fault is classified as active.

Until recently, the approximately 9.3-mile-long Hollywood fault was considered to be expressed as a series of linear ground-surface geomorphic expressions and south-facing ridges along the south margin of the eastern Santa Monica Mountains and the Hollywood Hills. Multiple recent fault rupture hazard investigations have shown that the Hollywood fault is located south of the ridges and bedrock outcroppings along portions of Sunset Boulevard. The Hollywood fault has not produced any damaging earthquakes during the historical period and has had relatively minor micro-seismic activity. It is estimated that the Hollywood fault is capable of producing a maximum 6.7 magnitude earthquake. In 2014, the California Geological Survey established an Earthquake Fault Zone for the Hollywood Fault.

Whittier-Elsinore Fault System

The Whittier fault is located approximately 10.8 miles southeast of the site. The Whittier fault together with the Chino fault comprises the northernmost extension of the northwest trending Elsinore fault system. The mapped surface of the Whittier fault extends in a west-northwest direction for a distance of 20 miles from the Santa Ana River to the terminus of the Puente Hills. The Whittier fault is essentially a strike-slip, northeast dipping fault zone which also exhibits evidence of reverse movement along with en echelon[a] fault segments, en echelon folds and anatomizing (braided) fault segments. Right lateral offsets of stream drainages of up to 8800 feet (Durham and Yerkes, 1964) and vertical separation of the basement complex of 6,000 to 12,000 feet (Yerkes, 1972), have been documented. It is believed that the Whittier fault is capable of producing a 7.8 magnitude earthquake.

The Whittier Narrows earthquakes of October 1, 1987, and October 4, 1987, occurred in the area between the westernmost terminus of the mapped trace of the Whittier fault and the frontal fault system. The main 5.9 magnitude shock of October 1, 1987 was not caused by slip on the Whittier fault. The quake ruptured a gently dipping thrust fault with an east-west strike (Haukson, Jones, Davis and others, 1988). In contrast, the earthquake of October 4, 1987, is assumed to have occurred on the Whittier fault as focal mechanisms show mostly strike-slip movement with a small reverse component on a steeply dipping northwest striking plane (Haukson, Jones, Davis and others, 1988).

San Gabriel Fault System

The San Gabriel fault system is located approximately 19.8 miles north of the subject site. The San Gabriel fault system comprises a series of subparallel, steeply north-dipping faults trending approximately north 40 degrees west with a right-lateral sense of displacement. There is also a small component of vertical dip-slip

[a] *En echelon refers to closely-spaced, parallel or subparallel, overlapping or step-like minor structural features.*

separation. The fault system exhibits a strong topographic expression and extends approximately 90 miles from San Antonio Canyon on the southeast to Frazier Mountain on the northwest. The estimated right lateral displacement on the fault varies from 34 miles (Crowell, 1982) to 40 miles (Ehlig, 1986), to 10 miles (Weber, 1982). Most scholars accept the larger displacement values and place the majority of activity between the Late Miocene and Late Pliocene Epochs of the Tertiary Era (65 to 1.8 million years before present).

Portions of the San Gabriel fault system are considered active by California Geological Survey. Recent seismic exploration in the Valencia area (Cotton and others, 1983; Cotton, 1985) has established Holocene offset. Radiocarbon data acquired by Cotton (1985) indicate that faulting in the Valencia area occurred between 3,500 and 1,500 years before present.

It is hypothesized by Ehlig (1986) and Stitt (1986) that the Holocene offset on the San Gabriel fault system is due to sympathetic (passive) movement as a result of north-south compression of the upper Santa Susana thrust sheet. Seismic evidence indicates that the San Gabriel fault system is truncated at depth by the younger, north-dipping Santa Susana-Sierra Madre faults (Oakeshott, 1975; Namson and Davis, 1988).

Newport-Inglewood Fault System

The Newport-Inglewood fault zone is a broad zone of discontinuous north to northwestern echelon faults and northwest to west trending folds. The closest fault segment of this fault system to the subject site is located about 7.6 miles to the southwest. The fault zone extends southeastward from West Los Angeles, across the Los Angeles Basin, to Newport Beach and possibly offshore beyond San Diego (Barrows, 1974; Weber, 1982; Ziony, 1985).

The onshore segment of the Newport-Inglewood fault zone extends for about 37 miles from the Santa Ana River to the Santa Monica Mountains. Here it is overridden by, or merges with, the east-west trending Santa Monica zone of reverse faults.

The surface expression of the Newport-Inglewood fault zone is made up of a strikingly linear alignment of domal hills and mesas that rise on the order of 400 feet above the surrounding plains. From the northern end to its southernmost onshore expression, the Newport-Inglewood fault zone is made up of: Cheviot Hills, Baldwin Hills, Rosecrans Hills, Dominguez Hills, Signal Hill-Reservoir Hill, Alamitos Heights, Landing Hill, Bolsa Chica Mesa, Huntington Beach Mesa, and Newport Mesa. Several single and multiple fault strands, arranged in a roughly left stepping en echelon arrangement, make up the fault zone and account for the uplifted mesas.

The most significant earthquake associated with the Newport-Inglewood fault system was the Long Beach earthquake of 1933 with a magnitude of 6.3 on the Richter scale. It is believed that the Newport-Inglewood fault zone is capable of producing a 7.5 magnitude earthquake.

Santa Susana Fault

The Santa Susana fault extends approximately 17 miles west-northwest from the northwest edge of the San Fernando Valley into Ventura County and is at the surface high on the south flank of the Santa Susana Mountains. The fault ends near the point where it overrides the south-side-up South strand of the Oak Ridge fault. The Santa Susana fault strikes northeast at the Fernando lateral ramp and turns east at the northern margin of the Sylmar Basin to become the Sierra Madre fault. This fault is exposed near the base of the San Gabriel Mountains for approximately 46 miles from the San Fernando Pass at the Fernando lateral ramp east to its intersection with the San Antonio Canyon fault in the eastern San Gabriel Mountains, east of which the range front is formed by the Cucamonga fault. The Santa Susana fault has not experienced any recent major ruptures except for a slight rupture during the 6.5 magnitude 1971 Sylmar earthquake.[b] The Santa Susana Fault is considered to be active by the County of Los Angeles. It is believed that the Santa Susana fault has the potential to produce a 6.9 magnitude earthquake. The closest trace of the fault is located approximately 25.2 miles northwest of the site.

Malibu Coast Fault

The Malibu Coast fault is part of the Transverse Ranges Southern Boundary fault system, a west-trending system of reverse, oblique-slip, and strike-slip faults that extends for more than approximately 124 miles along the southern edge of the Transverse Ranges and includes the Hollywood, Raymond, Anacapa–Dume, Malibu Coast, Santa Cruz Island, and Santa Rosa Island faults.

The Malibu Coast fault zone runs in an east-west orientation onshore subparallel to and along the shoreline for a linear distance of about 17 miles through the Malibu City limits, but also extends offshore to the east and west for a total length of approximately 37.5 miles. The onshore Malibu Coast fault zone involves a broad, wide zone of faulting and shearing as much as 1 mile in width. While the Malibu Coast Fault Zone has not been officially designated as an active fault zone by the State of California and no Special Studies Zones have been delineated along any part of the fault zone under the Alquist-Priolo Act of 1972, evidence for Holocene activity (movement in the last 11,000 years) has been established in several

[b] *California Institute of Technology, Southern California Data Center. Chronological Earthquake Index, www.data.scec.org/significant/santasusana.html; accessed May 24, 2012.*

locations along individual fault splays within the fault zone. Due to such evidence, several fault splays within the onshore portion of the fault zone are identified as active.[c]

Large historic earthquakes along the Malibu Coast fault include the 1979, 5.2 magnitude earthquake and the 1989, 5.0 magnitude earthquake.[d] The Malibu Coast fault zone is approximately 16.9 miles to the west of the site. This fault is believed to be capable of producing a maximum 7.0 magnitude earthquake.

Palos Verdes Fault

Studies indicate that there are several active on-shore extensions of the strike-slip Palos Verdes fault, which is located approximately 16.7 miles southwest of site. Geophysical data also indicate the off-shore extensions of the fault are active, offsetting Holocene age deposits. No historic large magnitude earthquakes are associated with this fault. However, the fault is considered active by the California Geological Survey. It is estimated that the Palos Verdes fault is capable of producing a maximum 7.7 magnitude earthquake.

San Andreas Fault System

The San Andreas Fault system forms a major plate tectonic boundary along the western portion of North America. The system is predominantly a series of northwest trending faults characterized by a predominant right lateral sense of movement. At its closest point, the San Andreas Fault system is located approximately 35.0 miles to the northeast of the site.

The San Andreas and associated faults have had a long history of inferred and historic earthquakes. Cumulative displacement along the system exceeds 150 miles in the past 25 million years (Jahns, 1973). Large historic earthquakes have occurred at Fort Tejon in 1857, at Point Reyes in 1906, and at Loma Prieta in 1989. Based on single-event rupture length, the maximum Richter magnitude earthquake is expected to be approximately 8.25 (Allen, 1968). The recurrence interval for large earthquakes on the southern portion of the fault system is on the order of 100 to 200 years.

[c] *City of Malibu Planning Department, Malibu General Plan, Chapter 5.0, Safety and Health Element, http://qcode.us/codes/malibu-general-plan/; accessed October 25, 2012.*
[d] *California Institute of Technology, Southern California Data Center. Chronological Earthquake Index, www.data.scec.org/significant/malibu1979.html; accessed October 25, 2012.*

ii) Potentially Active Faults

Santa Monica Fault

The Santa Monica fault, located approximately 6.1 miles to the northwest of the site, is also part of the Transverse Ranges Southern Boundary fault system. The Santa Monica fault extends east from the coastline in Pacific Palisades through Santa Monica and West Los Angeles and merges with the Hollywood fault at the West Beverly Hills Lineament in Beverly Hills where its strike is northeast. It is believed that at least six surface ruptures have occurred in the past 50 thousand years. In addition, a well-documented surface rupture occurred between 10 and 17 thousand years ago, although a more recent earthquake probably occurred 1 to 3 thousand years ago. This leads to an average earthquake recurrence interval of 7 to 8 thousand years.[e] It is thought that the Santa Monica fault system may produce earthquakes with a maximum magnitude of 7.4.

Anacapa-Dume Fault

The Anacapa–Dume fault, located approximately 18.5 miles to the west of the subject site, is a near-vertical offshore escarpment exceeding 600 meters locally, with a total length exceeding 62 miles. This fault is also part of the Transverse Ranges Southern Boundary fault system. It occurs as close as 3.6 miles offshore south of Malibu at its western end, but trends northeast where it merges with the offshore segments of the Santa Monica Fault Zone. It is believed that the Anacapa–Dume fault is responsible for generating the historic 1930 magnitude 5.2 Santa Monica earthquake, the 1973 magnitude 5.3 Point Mugu earthquake, and the 1979 and 1989 Malibu earthquakes, each of which possessed a magnitude of 5.0.[f] The Anacapa–Dume fault is thought to be capable of producing a maximum magnitude 7.2 earthquake.

iii) Blind Thrusts Faults and Unnamed Faults

Blind or buried thrust faults are faults without a surface expression but are a significant source of seismic activity. By definition, these faults have no surface trace, therefore the potential for ground surface rupture is considered remote. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the Southern California area. Due to the buried nature of these thrust faults, their existence is sometimes not known until

[e] *Southern California Earthquake Center, a National Science Foundation and U.S. Geological Survey Center. Active Faults in the Los Angeles Metropolitan Region, www.scec.org/research/special/SCEC001activefaultsLA.pdf; accessed May 24, 2012.*
[f] *City of Malibu Planning Department. Malibu General Plan, Chapter 5.0, Safety and Health Element, http://qcode.us/codes/malibu-general-plan/; accessed May 24, 2012.*

they produce an earthquake. Two blind thrust faults in the Los Angeles metropolitan area are the Puente Hills blind thrust and the Elysian Park blind thrust. Another blind thrust fault of note is the Northridge fault located in the northwestern portion of the San Fernando Valley.

The Elysian Park anticline is thought to overlie the Elysian Park blind thrust. This fault has been estimated to cause an earthquake every 500 to 1,300 years in the magnitude range 6.2 to 6.7. The Elysian Park thrust fault is located approximately 2.4 miles to the north of the site. According to the Bureau of Engineering Department of Public Works NavigateLA website, the Upper Elysian Park fault is located 2.6 miles north of the site and the Lower Elysian Park fault is located 1.5 miles southwest of the site as indicated on the attached Local Fault Map.

The Puente Hills blind thrust fault extends eastward from Downtown Los Angeles to the City of Brea in northern Orange County. The Puente Hills blind thrust fault includes three north-dipping segments, named from east to west as the Coyote Hills segment, the Santa Fe Springs segment, and the Los Angeles segment. These segments are overlain by folds expressed at the surface as the Coyote Hills, Santa Fe Springs Anticline, and the Montebello Hills. The closest segment of the Puente Hills Blind Thrust is located approximately 3.4 miles to the south of the site.

The Santa Fe Springs segment of the Puente Hills blind thrust fault is believed to be the cause of the October 1, 1987, Whittier Narrows Earthquake. The epicenter of this seismic event is located approximately nine miles east of the subject site. Based on deformation of late Quaternary age sediments above this fault system and the occurrence of the Whittier Narrows earthquake, the Puente Hills blind thrust fault is considered an active fault capable of generating future earthquakes beneath the Los Angeles Basin. A maximum moment magnitude of 7.0 is estimated by researchers for the Puente Hills blind thrust fault.

The Mw 6.7 Northridge earthquake was caused by the sudden rupture of a previously unknown, blind thrust fault. This fault has since been named the Northridge Thrust; however, it is also known in some of the literature as the Pico Thrust. It has been assigned a maximum magnitude of 6.9 and a 1,500-to-1,800-year recurrence interval. The Northridge thrust is located 20.9 miles to the northwest of the site.

According to the Website NavigateLA, established by the City of Los Angeles, Bureau of Engineering, Department of Public Works, an unnamed northwest-southeast trending fault is located approximately 1.2 miles northeast of the site as indicated by the attached Local Fault Map. The fault source is listed as the California Geological Survey (CGS) digital database of Quaternary and Younger Faults from Fault Activity Map of California. Geologic maps by Lamar (1970), Dibblee (1989), Yerkes, et al, (1977), and the Department of Water Resources (1961) do not indicate this fault. The fault does not have a designated fault rupture hazard zone (Bryant, W.A. and Hart, E.W. 2007). Based on the research by this firm, the presence of the fault as shown on the NavigateLA Website could not be corroborated or verified with other references.

b) Local Faulting

The Raymond fault, located approximately 6.1 miles northeast of the site, contributes significantly to the historic seismic activity of the localized region as exemplified by the Pasadena earthquake of 1988 (discussed below). The Northridge fault is located 20.9 miles to the northwest of the site. The Northridge fault specifically has demonstrated recent activity within the region and is credited with the Northridge Earthquake of 1994. Unnamed quaternary and pre-quaternary faults lie to the north and south of the site as indicated on the attached Local Fault Map. The nearest projected fault is identified as the Lower Elysian Park fault and is located approximately 1.5 miles southwest of the site.

c) Significant Seismic Events (>4.0 Magnitude)

Significant seismic event earthquakes (>4.0 Mag) for the greater Los Angeles area (for incident dates later than 1933) are indicated on the attached map entitled Historical Seismic Event Map – Regional. Seismic events in close proximity to the site are indicated on the Historical Seismic Event Map – Local. Historical earthquake events in close proximity to the site are discussed as follows:

Northridge Earthquake -

The Northridge earthquake event took place on January 17, 1994 at 4:30 AM on a blind thrust fault directly beneath the urban developed area of the San Fernando Valley within the City of Los Angeles. Significant and widespread damage was incurred by the Northridge event including: Section collapse of major freeways, office buildings, parking structures, and residential structures. Due to the high acceleration in both vertical and horizontal direction, some structures were lifted from their foundations.

Building code revisions and earthquake mitigation policies were initiated in response to the Northridge earthquake. Due to the significant vertical accelerations, design methodologies were re-evaluated to account for vertical as well as lateral earthquake accelerations. In addition, the City of Los Angeles and adjacent unincorporated regions recently require seismic retrofit of soft-story residential structures, in part, due to lessons learned from the Northridge seismic event.

San Fernando Earthquake -

Also known as the Sylmar Earthquake, the San Fernando Earthquake took place on February 9, 1971 at 6:01 AM. The earthquake was centered along the San Fernando thrust fault and exhibited surface rupture roughly 12 miles in length and a maximum slip of up to 6 feet. The San Fernando Earthquake caused approximately 500 million in property damage and 65 fatalities - primarily as a result of the partial collapse of the Veteran's Administration Hospital.

In response to the San Fernando Earthquake, building codes were strengthened. In addition, the Alquist-Priolo Special Studies Zone Act was passed in 1972 which prohibits structures designed for human occupancy to be positioned in close proximity to active fault traces.

Whittier Narrows Earthquake -

The Whittier Narrows earthquakes of October 1, 1987, and October 4, 1987, occurred in the area between the westernmost terminus of the mapped trace of the Whittier fault and the frontal fault system in a previously unknown thrust fault approximately 20 km east of downtown Los Angeles as indicated by the Historical Seismic Event Map – Local. The main 5.9 magnitude shock of October 1, 1987 was not caused by slip on the Whittier fault. The quake ruptured a gently dipping thrust fault with an east-west strike (Haukson, Jones, Davis and others, 1988). In contrast, the earthquake of October 4, 1987, is assumed to have occurred on the Whittier fault as focal mechanisms show mostly strike-slip movement with a small reverse component on a steeply dipping northwest striking plane (Haukson, Jones, Davis and others, 1988).

The most significant structural damage was concentrated in the uptown district of Whitter, the old downtown section of Alhambra and the regions of Pasadena that include older structures. Unreinforced masonry structures and structures which exhibit "soft-story" design sustained the most severe damage during the Whittier Narrows seismic event.

Pasadena Earthquake -

The Pasadena earthquake of December 3, 1988 has an established epicenter to the southeast of the site as indicated by the attached Historic Seismic Event Map – Local. The earthquake was followed by an unusually small number of aftershocks. The Pasadena event of 1988 was determined to be associated with the Raymond fault and provided a clear example of left-lateral movement along the fault. The Montebello earthquake of 1989 is considered to be a potential aftershock of the Pasadena earthquake.

Montebello Earthquake -

The Montebello earthquake of June 12, 1989 was measured as a magnitude 4.9 event and was located just east of downtown Los Angeles and southeast of the site. The event was followed 25 minutes later by a magnitude 4.4 aftershock. The earthquake originated from a depth of 15.6 km, similar to the depth of the Pasadena earthquake which occurred six months earlier. As previously stated, it is considered by many that the Montebello earthquake is likely to be an aftershock of the Pasadena earthquake.

d) Surface Ground Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines “active” and “potentially active” faults utilizing the same aging criteria as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as a characteristic for faults that have a relatively high potential for ground rupture in the future.

CGS policy is to delineate a boundary on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Surface rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on review of the Seismic Hazard Zones Map, Los Angeles, the nearest earthquake fault zone is located approximately 6.0 miles to the north of the site for the Hollywood fault. A copy of the Earthquake Fault Zone Map may be found in the Appendix of this report.

e) Seismicity

As with all of Southern California, the project site is subject to potential strong ground motion, should a moderate to strong earthquake occur on a local or regional fault. Design of any proposed structures on the site in accordance with the provisions of the applicable California Building Code will mitigate the potential effects of strong ground shaking.

f) Deaggregated Seismic Source Parameters

The peak ground acceleration (PGA_M) and modal magnitude for the site was obtained from the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2020). The parameters are based on a 2 percent in 50 years ground motion (2475-year return period). A shear wave velocity (Vs30) of 360 meters per second was utilized in the computation. The USGS program indicates a PGA_M of 0.87g and a modal magnitude of 6.51 for the site.

g) ASCE 7-16 / 2019 California Building Code Seismic Parameters

A geophysical study may be commissioned in order to more accurately establish the site classification based on shear wave measurements and related geophysical criteria. Preliminarily, based on information derived from subsurface geologic characterizations of nearby projects, the subject site is classified as Site Class D, which corresponds to a “Stiff Soil” Profile, according to Table 20.3-1 of ASCE 7-16. This information and the site coordinates were input into the SEAOC/OSHPD seismic utility program in order to calculate ground motion parameters for the site.

CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
California Building Code	2019
ASCE Design Standard	7-16
Risk Category	II
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	1.916g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	1.916g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	0.277g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.683g
Site Coefficient (F_v)	1.7*
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.161g*
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.774g*

* *According to ASCE 7-16, a Long Period Site Coefficient (F_v) of 1.7 may be utilized provided that the value of the Seismic Response Coefficient (C_S) is determined by Equation 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Equation 12.8-3 for $T_L \geq T > 1.5T_s$ or equation 12.8-4 for $T > T_L$. Alternatively, a site-specific ground motion hazard analysis may be performed in accordance with ASCE 7-16 Section 21.1 and/or a ground motion hazard analysis in accordance with ASCE 7-16 Section 21.2 to determine ground motions for any structure.*

h) 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.

As established by the Seismic Hazards Maps of the State of California (CDMG, 1999), the site is not located within an area considered to be potentially liquefiable. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. A copy of this map is included in the Appendix.

Preliminarily, based on the predicted density of the soils underlying the site, the current groundwater level observed in nearby site investigations, and the mapped depth to the historically highest groundwater level, the soils underlying the site are not considered to be susceptible to liquefaction during the ground motion anticipated during a design-based earthquake.

i) Dynamic 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 the proposed structure should be expected as a result of strong ground-shaking, however, due to the anticipated uniform nature of the underlying geologic materials, excessive differential settlements are not expected to occur.

j) Regional Subsidence

The site is not located within a zone of known subsidence due to oil or other fluid withdrawal.

k) Landsliding

The probability of seismically-induced landslides occurring on the site is considered to be negligible due to the general lack of substantive elevation difference across or adjacent to the site. Therefore, potential impacts related to landsliding would be less than significant.

l) <u>Collapsible Soils</u>

Based on previous geotechnical investigations conducted within the vicinity of the site, the soils underlying the area would not be considered prone to hydroconsolidation.

m) <u>Expansive Soils</u>

The geologic materials previously tested by this firm and others for nearby sites ranged from the very low to moderate expansion range. Accordingly, the geologic materials are anticipated to be in the low to moderate expansion range within the subject site. Special design considerations for mitigation of highly expansive soils will not likely be required. Design of the proposed structure in accordance with the California Building Code is anticipated to fully mitigate the potential effects of moderately expansive soils.

n) <u>Tsunamis, Seiches and Flooding</u>

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. The site is high enough and far enough from the ocean to preclude being prone to hazards of a tsunami.

Review of the County of Los Angeles Flood and Inundation Hazards Map (Leighton, 1990), indicates the site lies within an inundation boundary due to a seiche or a breached upgradient reservoir. A determination of whether a higher site elevation would remove the site from the potential inundation zones is beyond the scope of this investigation.

Review of the applicable Flood Insurance Rate Map indicates the site lies within an area of minimal flood hazard. A copy of this map is enclosed herein.

o) <u>Oil Fields and Oil Wells</u>

Based on review of the City of Los Angeles online mapping resource (Bureau of Engineering, Department of Public Works, http://navigatela.lacity.org/navigatela/), the site is not located within the limits of an oil field. No evidence of an oil or gas well has been drilled within the site. The closest oil wells in proximity to the site are about 0.6 miles away and are located to the northwest. A copy of the Oil Well Location Map is included in the Appendix of this report.

p) <u>Methane Zone</u>

According to the City of Los Angeles Methane Hazards Assessment Map, the site address is not located within a methane zone as designated by the City of Los Angeles. A copy of this map is included herein entitled Methane Zone Risk Map.

q) Temporary Excavations

All required excavations are expected to be sloped, or properly shored, in accordance with the provisions of the applicable building code. Required shoring systems may include soldier piles with rakers and/or tiebacks. Tiebacks would likely extend below adjacent properties and public right of ways. Appropriate notifications and agreements should be obtained by the development team prior to tieback installations. Construction activity associated with the proposed project which complies with local safety regulations is not anticipated to initiate or induce any on-site or off-site landslide.

r) Septic Tanks

It is the understanding of this firm that sewers are available at the site for wastewater disposal. No septic tanks or alternative disposal systems are necessary or anticipated for the proposed site project.

s) Ground Failure

The proposed construction is not anticipated to cause, or increase the potential for any seismic related ground failure on the project site or adjacent sites. The project site is not located within an Earthquake Fault Zone, or a Seismically Induced Landslide Zone. The proposed shoring system and structure are anticipated to be designed in accordance with the Los Angeles Building Code and will mitigate the potential effects of ground failure.

t) Erosion

The project would not result in substantial off site soil erosion or the loss of topsoil due to the paved nature of the surrounding sites, and the lack of elevation difference slope geometry across or adjacent to the site. In addition, earthwork activities associated with the grading and export of soil would occur in accordance with the city requirements as specified in the Los Angeles Building Code and through the grading plan review and approval process. Grading and erosion control measures would be implemented during site grading to reduce erosion impacts as part of the regulatory requirements.

u) Landform Alterations

There are no significant hills, canyons, ravines, outcrops or other geologic or topographic features on the site. Accordingly, the proposed project is not anticipated to adversely affect any prominent geologic or topographic features.

11.0 PRELIMINARY RECOMMENDATIONS

Based upon near proximity explorations, laboratory testing, and research, it is the preliminary finding of Geotechnologies, Inc. that development of the site in accordance with the currently proposed project is considered feasible from a geotechnical engineering standpoint. These recommendations are preliminary in nature as they are based on information obtained from previous nearby site projects.

A site-specific geotechnical exploration program including laboratory testing and engineering analyses will be required to prepare a geotechnical engineering investigation for the project site. A comprehensive geotechnical report with design recommendations and parameters will be prepared and submitted to the local governing agency for approval prior to construction. The proposed development shall be designed and constructed in accordance with the provisions of the most current applicable building code and requirements of the local building official.

The project site is not located within an earthquake fault zone, or a seismically-induced landslide zone. The site is not located within an area classified as potentially liquefiable. The conditions identified in this report are typical of sites within this area of Los Angeles, and of a type that are routinely addressed through regulatory measures.

Based on previous geotechnical investigations performed near the site, it is the assessment of this firm that the current groundwater level at the site may be as shallow as 90 feet below grade. Review of the Seismic Hazard Zone Report (SHZR) for the Los Angeles 7½-Minute Quadrangle, (CDMG, 1998, Revised 2006), indicates that the historically highest groundwater level in the vicinity of the site is estimated at 160 feet below ground surface. Subterranean walls to be located above the existing and historically highest groundwater levels may be designed for a drained condition, provided that a retaining wall subdrain is installed.

Excavations on the order of 30 to 45 feet in depth will be required for the proposed subterranean parking levels and foundation elements. The excavations are expected to remove the existing fill soils and expose the underlying dense native soils. Preliminarily, it is anticipated that the development may be supported on conventional spread footings and/or mat foundation.

Due to the depth of the proposed subterranean levels and the proximity of property lines and adjacent structures, it should be anticipated that shoring will be required to maintain a stable excavation. Preliminarily, soldier piles are recommended for shoring.

As with all of Southern California, the site is subject to potential strong ground motion should a moderate to strong earthquake occur on a local or regional fault. Design of the project in accordance with the provisions of the applicable California Building Code will be required to mitigate the potential effects of strong ground shaking.

Stormwater Infiltration

Compliance to LID requirements and the City of Los Angeles Building and Safety Guidelines regarding stormwater management within the site is potentially viable based on current development plans and favorable geologic conditions encountered on nearby sites. In addition, stormwater infiltration into onsite soils will likely be feasible based on preliminary geologic assessment. Note: Onsite percolation testing and evaluation will be necessary to determine actual infiltration capability including site specific design values.

12.0 CLOSURE

This report is general in nature and does not present specific geotechnical design criteria sufficient for use during design phase of the development. A comprehensive geotechnical investigation including subsurface exploration and laboratory testing should be prepared for design input, when necessary.

Geotechnologies, Inc. appreciates the opportunity to provide our services on this project. Should you have any questions, please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

REGISTERED PROFESSIONAL ENGINEER SCOTT T. PRINCE No. 83961 Exp. 09/30/21 CIVIL STATE OF CALIFORNIA

SCOTT T. PRINCE
R.C.E. 83961

REGISTERED PROFESSIONAL ENGINEER GREGORIO VARELA No. 81201 Exp. 9/30/21 CIVIL STATE OF CALIFORNIA

GREGORIO VARELA
R.C.E. 81201

STP/GV:km/dy

Enclosures: References
Vicinity Map
Site Plan
Local Geologic Map
Regional Geologic Map
Historically Highest Groundwater Levels
Southern California Fault Map
Seismic Source Summary Table
Local Fault Map
Historical Seismic Event Map - Regional
Historical Seismic Event Map - Local
Earthquake Fault Zone Map
Oil Well Location Map
Methane Zone Risk Map
Flood Insurance Rate Map
Seismic Hazard Zone Map

Enclosures – continued:
Plot Plan – Report by Amec Foster Wheeler, Project OD-13165190 (1 page)
Boring Logs - Report by Amec Foster Wheeler Project OD-13165190 (13 pages)

Distribution: (3) Addressee

E-mail to: [Ted.Hart@hines.com], Attn: Ted Hart

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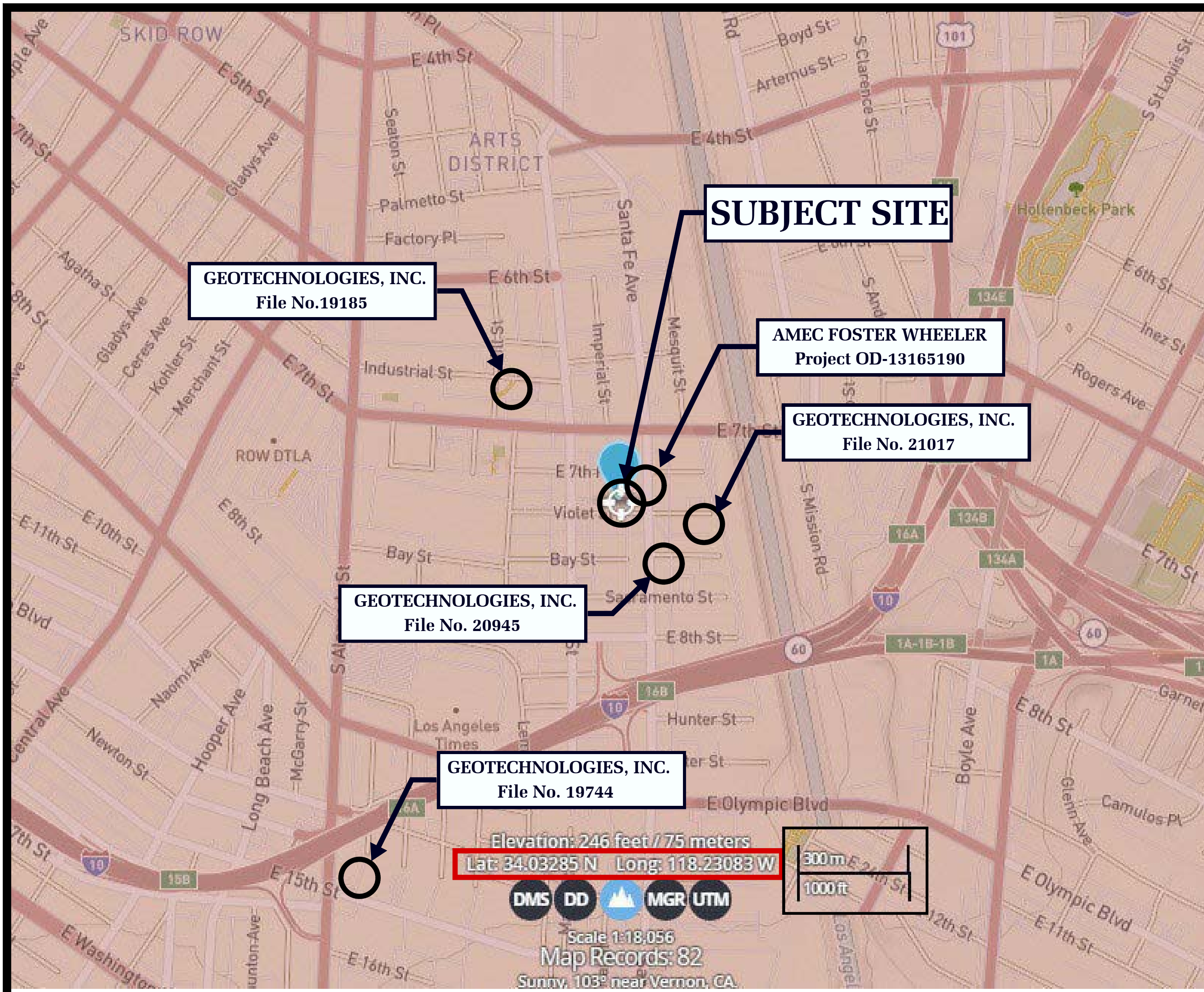


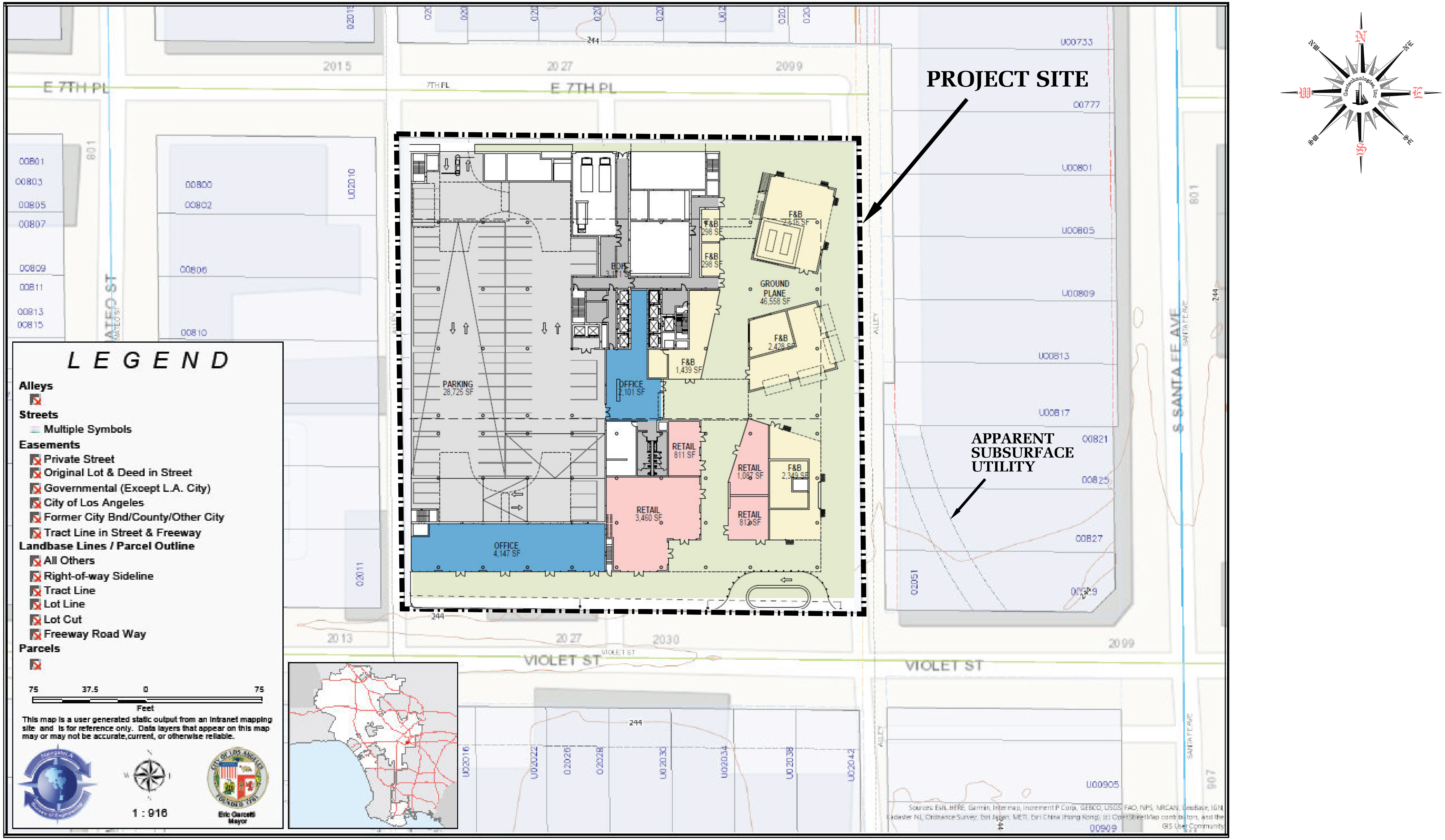
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES,
LOS ANGELES, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

FILE NO. 22039



SITE PLAN

HINES
2045 VIOLET ST., LOS ANGELES

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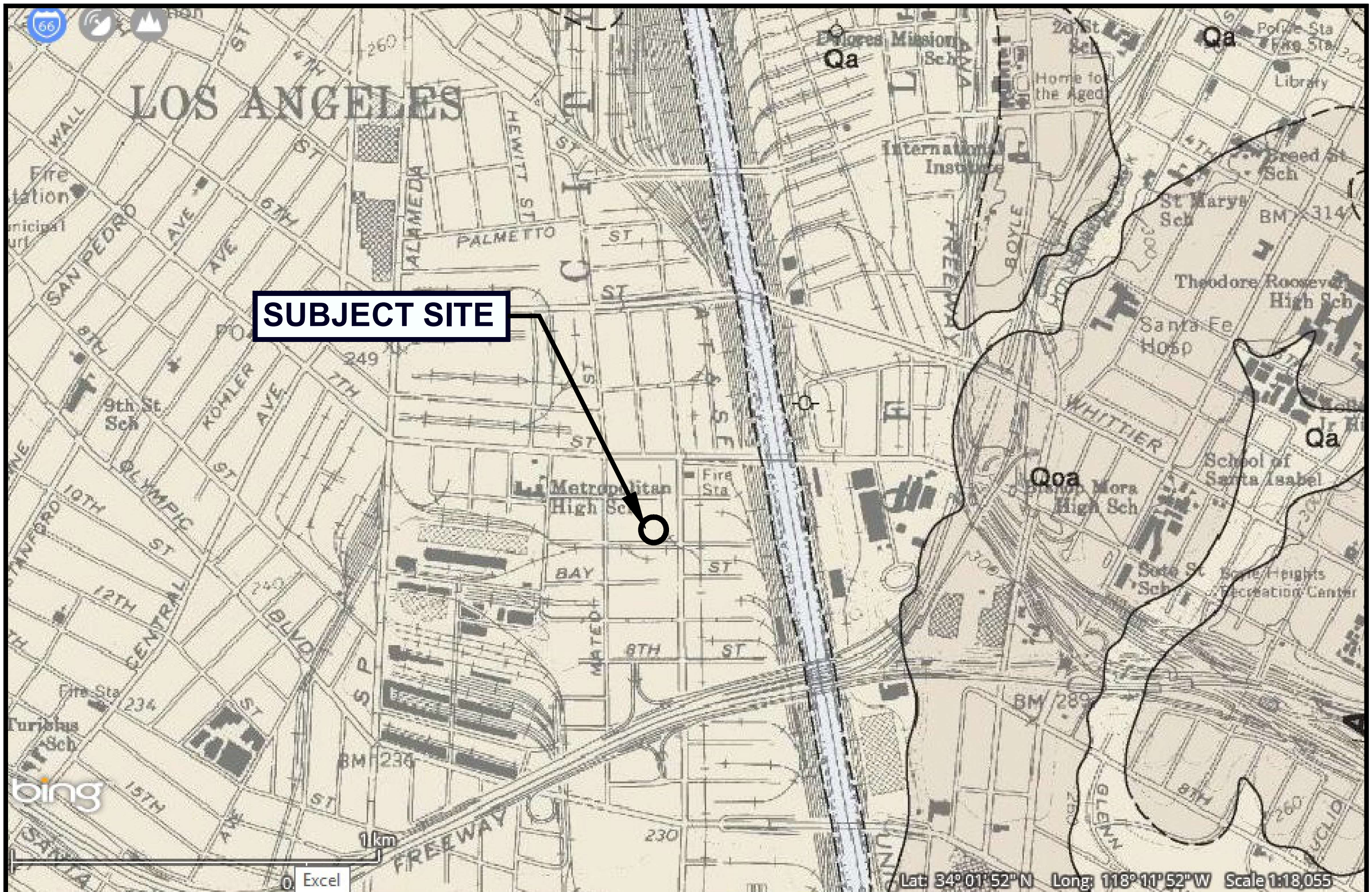
FILE No. 22039 | DRAWN BY: TC

DATE: October 2020

REFERENCES: http://navigatela.lacity.org/NavigateLA/
DATED OCTOBER 12, 2020

LEVEL 01 - AREAS PLAN PROVIDED BY RIOS
DATED JULY 17, 2020



LEGEND

Qa: Surficial Sediments - Alluvium:unconsolidated floodplain deposits of silt, sand and gravel

Qoa: Older Surficial Sediments - remnants of older weakly consolidated alluvial deposits of gravel, sand and silt

Folds - arrow on axial trace of fold indicates direction of plunge

Fault - dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful

REFERENCE: DIBBLEE, T.W., (1989) GEOLOGIC MAP OF THE LOS ANGELES QUADRANGLES (#DF-22)

N

LOCAL GEOLOGIC MAP - DIBBLEE

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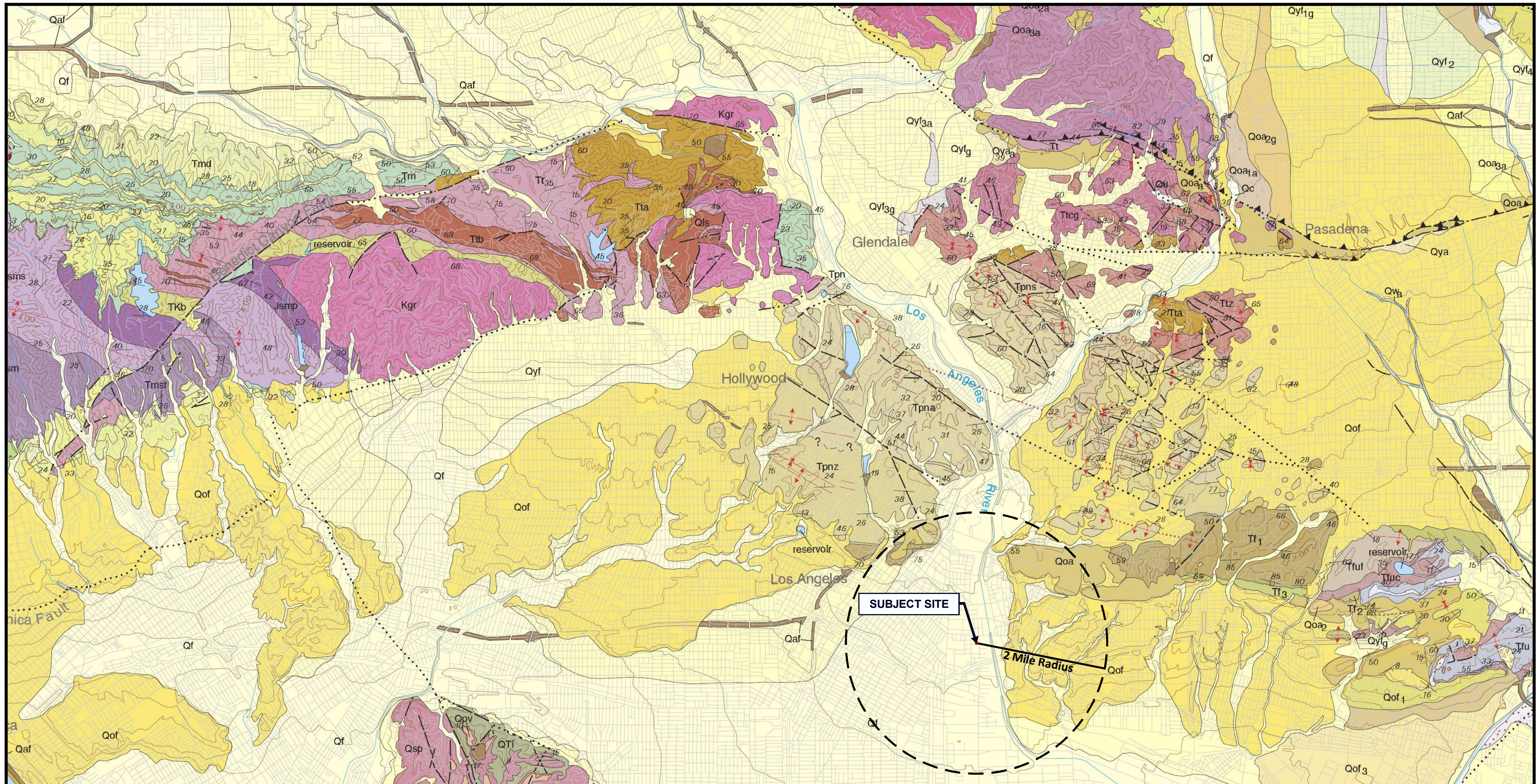
FILE NO. 22039



Scale 1:100,000

1 .5 0 1 2 3 4 5 6 7 MILES

1 .5 0 1 2 3 4 5 6 7 KILOMETERS

Contour Interval 40m

LEGEND

Qaf: Artificial Fill
Qf: Alluvial-Fan Deposits
Qof: Old Alluvial-Fan Deposits
Qoa: Old Alluvium
Tf: Fernando Formation

Fault - Solid where accurately located, dashed where approximately located, dotted where concealed, quieried where location or existence uncertain. includes strike slip, normal, reverse, oblique, and unspecified slip.

REGIONAL GEOLOGIC MAP

HINES
2045 VIOLET ST., LOS ANGELES

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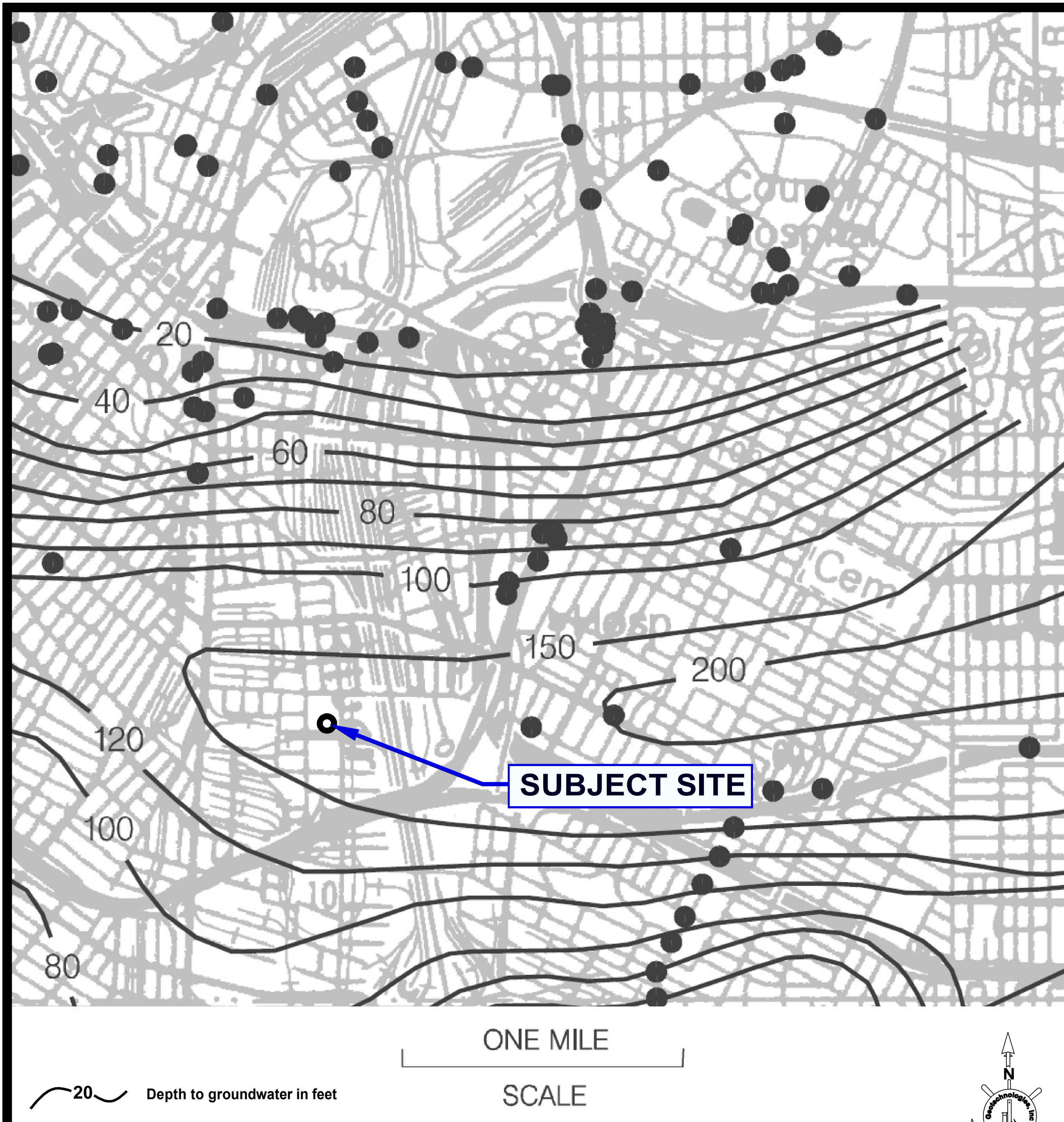
FILE NO. 22039

REFERENCE: U.S. DEPARTMENT OF THE INTERIOR, U.S. GEOLOGICAL SURVEY, PRELIMINARY GEOLOGIC MAP OF THE LOS ANGELES 30' X 60' QUADRANGLE, SOUTHERN CALIFORNIA, VERSION 1.0, 2005, COMPILED BY ROBERT F. YERKES AND RUSSELL H. CAMPBELL.



REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 029
LOS ANGELES 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

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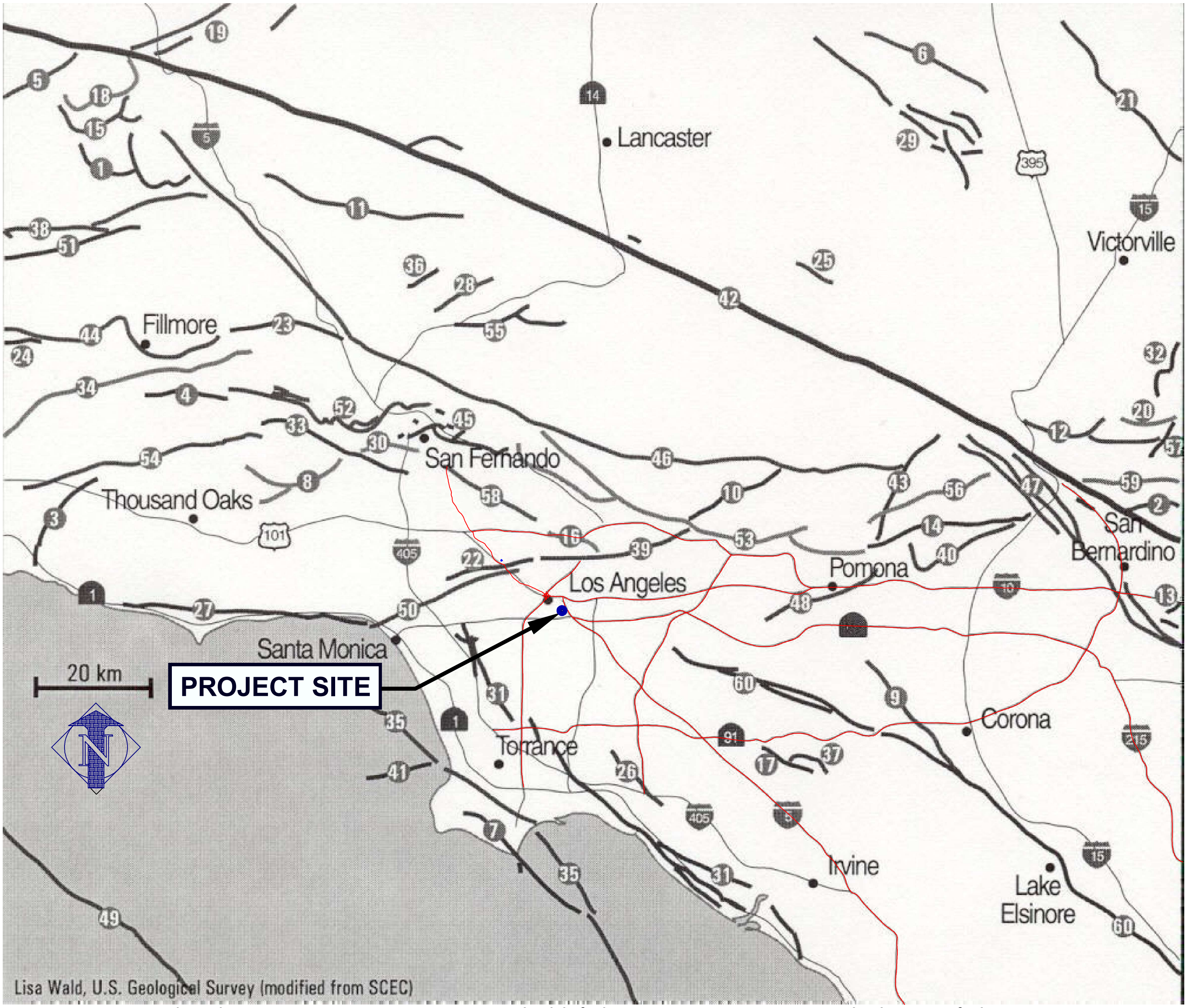


1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek fault
16 Eagle Rock fault
17 El Modeno fault
18 Frazier Mountain thrust
19 Garlock fault zone
20 Grass Valley fault
21 Helendale fault
22 Hollywood fault
23 Holser fault
24 Lion Canyon fault
25 Llano fault
26 Los Alamitos fault
27 Malibu Coast fault
28 Mint Canyon fault
29 Mirage Valley fault zone
30 Mission Hills fault
31 Newport Inglewood fault zone
32 North Frontal fault zone
33 Northridge Hills fault
34 Oak Ridge fault
35 Palos Verdes fault zone
36 Pelona fault
37 Peralta Hills fault
38 Pine Mountain fault
39 Raymond fault
40 Red Hill (Etiwanda Ave) fault
41 Redondo Canyon fault
42 San Andreas Fault
43 San Antonio fault
44 San Cayetano fault
45 San Fernando fault zone
46 San Gabriel fault zone
47 San Jacinto fault
48 San Jose fault
49 Santa Cruz-Santa Catalina Ridge f.z.
50 Santa Monica fault
51 Santa Ynez fault
52 Santa Susana fault zone
53 Sierra Madre fault zone
54 Simi fault
55 Soledad Canyon fault
56 Stoddard Canyon fault
57 Tunnel Ridge fault
58 Verdugo fault
59 Waterman Canyon fault
60 Whittier fault

REFERENCE: http://pasadena.wr.usgs.gov/info/images/LA%20Faults.pdf

SOUTHERN CALIFORNIA FAULT MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

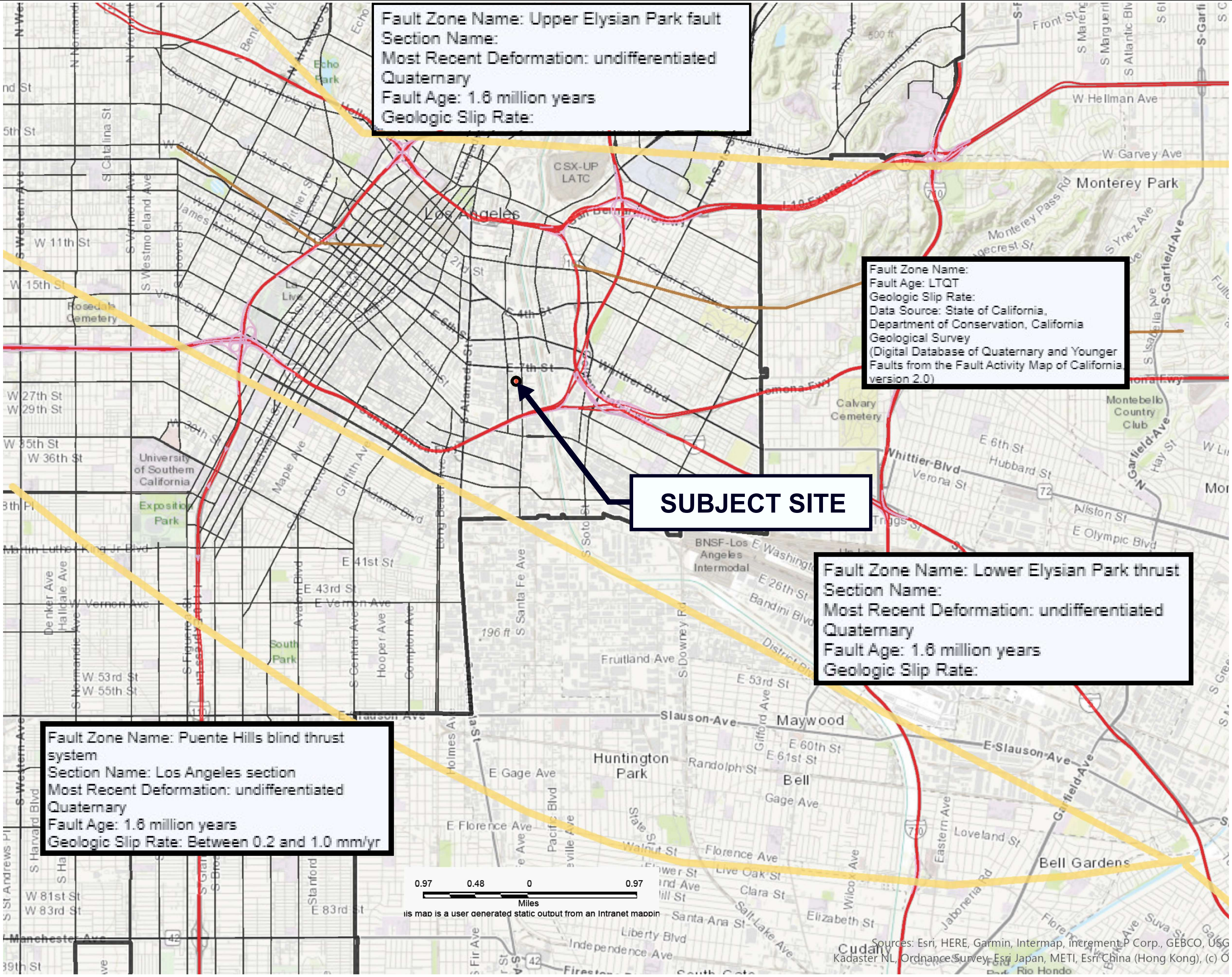
FILE NO. 22039

Seismic Source Summary Table

Hines
File No. 22039

Name	Distance in Miles	Pref Slip Rate (mm/yr)	Dip (deg)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)	Mag*
Elysian Park (Upper)	2.35	1.3	50	NE	reverse	3	15	20	6.7
Puente Hills (LA)	3.36	0.7	27	N	thrust	2.1	15	22	7.0
Hollywood	5.90	1	70	N	strike slip	0	17	17	6.7
Santa Monica Connected alt 2	6.09	2.4	44		strike slip	0.8	11	93	7.4
Raymond	6.12	1.5	79	N	strike slip	0	16	22	6.8
Newport Inglewood Connected	7.64	1.3	90	V	strike slip	0	11	208	7.5
Verdugo	8.07	0.5	55	NE	reverse	0	15	29	6.9
Puente Hills (Santa Fe Springs)	10.16	0.7	29	N	thrust	2.8	15	11	4.7
Santa Monica Connected alt 1	10.70	2.6	51		strike slip	0	16	79	7.3
Elsinore	10.79	n/a	84	NE	strike slip	0	16	199	7.7
Sierra Madre	12.47	2	53	N	reverse	0	14	57	7.2
Puente Hills (Coyote Hills)	14.44	0.7	26	N	thrust	2.8	15	17	6.9
Clamshell-Sawpit	16.59	0.5	50	NW	reverse	0	14	16	6.7
Palos Verdes Connected	16.73	3	90	V	strike slip	0	10	285	7.7
Malibu Coast, alt 1	16.92	0.3	75	N	strike slip	0	8	38	6.7
Sierra Madre (San Fernando)	17.31	2	45	N	thrust	0	13	18	6.7
Anacapa-Dume, alt 2	18.48	3	41	N	thrust	1.2	12	65	7.2
San Gabriel	19.83	1	61	N	strike slip	0	15	71	7.3
San Jose	20.17	0.5	74	NW	strike slip	0	15	20	6.7
Northridge	20.86	1.5	35	S	thrust	7.4	17	33	6.9
Santa Susana, alt 1	25.15	5	55	N	reverse	0	16	27	6.9
Chino, alt 2	27.82	1	65	SW	strike slip	0	14	29	6.8
San Joaquin Hills	28.89	0.5	23	SW	thrust	2	13	27	7.1
Cucamonga	29.46	5	45	N	thrust	0	8	28	6.7
Holser, alt 1	32.14	0.4	58	S	reverse	0	19	20	6.8
Simi-Santa Rosa	32.56	1	60		strike slip	1	12	39	6.9
S. San Andreas	35.00	n/a	86		strike slip	0	14	442	8.0
Oak Ridge (Onshore)	37.78	4	65	S	reverse	1	19	49	7.2
San Cayetano	41.21	6	42	N	thrust	0	16	42	7.2
San Jacinto	42.14	n/a	90	V	strike slip	0	16	88	7.4
Cleghorn	47.88	3	90	V	strike slip	0	16	25	6.8
Santa Ynez Connected	54.10	2	70		strike slip	0	11	132	7.4
Coronado Bank	54.96	3	90	V	strike slip	0	9	186	7.4
Pitas Point Connected	56.38	1	55		reverse	1.2	13	78	7.3
Ventura-Pitas Point	56.38	1	64	N	reverse	1	15	44	7.0
North Frontal (West)	58.45	1	49	S	reverse	0	16	50	7.2
Santa Cruz Island	59.21	1	90	V	strike slip	0	13	69	7.2
Channel Islands Thrust	59.27	1.5	20	N	thrust	5	12	59	7.3

Reference: USGS National Seismic Hazard Maps - Source Parameters
*Maximum Magnitude - Ellsworth



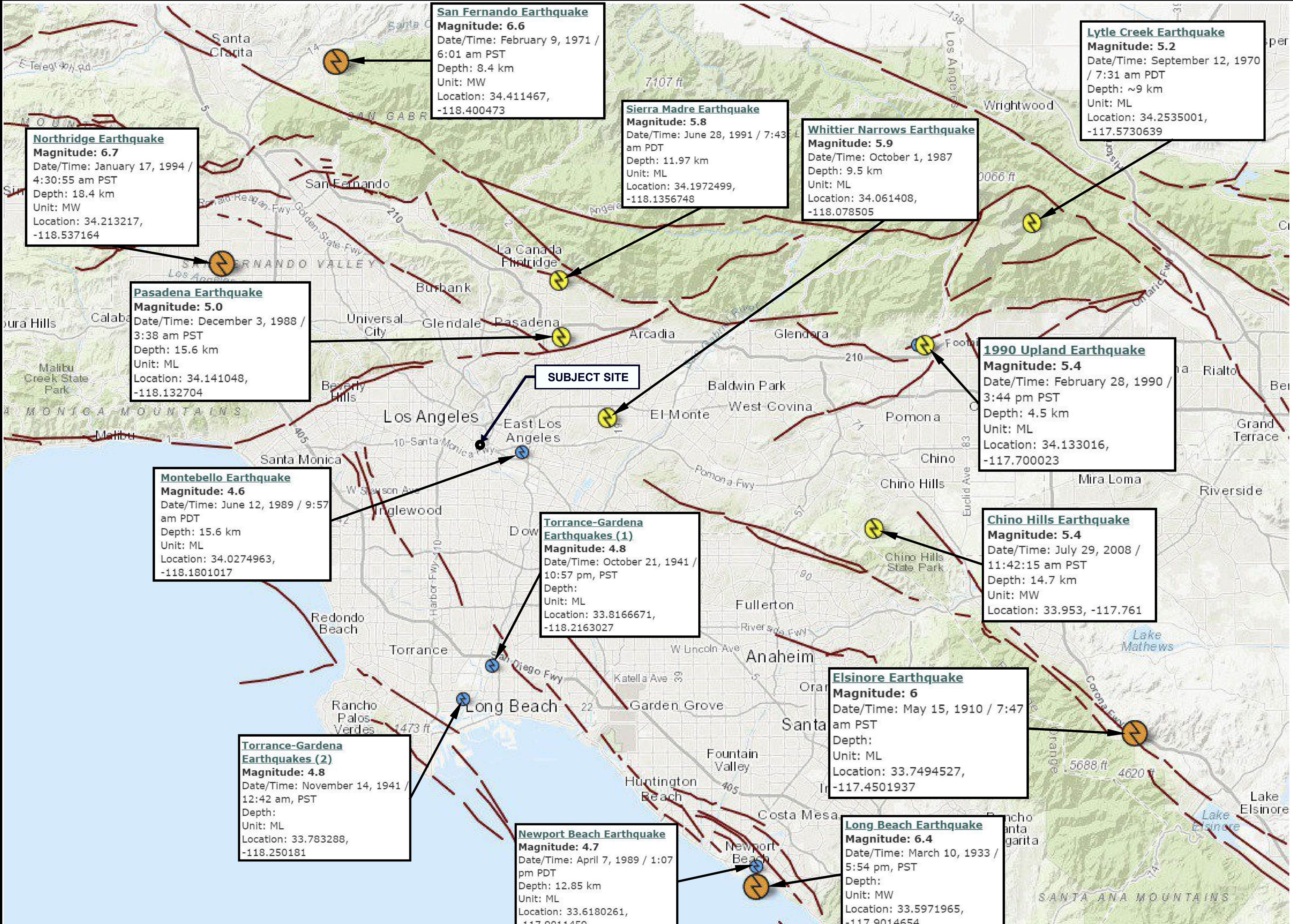
REFERENCE: FAULT ACTIVIY MAP OF CALIFORNIA (2010), NAVIGATE L.A.
NAVIGATE L.A., CITY OF LOS ANGELES

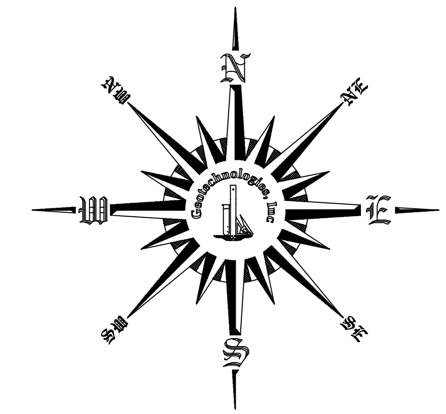
LOCAL FAULT MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES, BURBANK

FILE No. 22039





SIGNIFICANT EVENT BY MAGNITUDE:

Marker	Magnitude
(blue)	☑ 4 ≤ 4.9
(yellow)	☑ 5 ≤ 5.9
(orange)	☑ 6 ≤ 6.9
(red)	☑ 7 ≤ 9.0

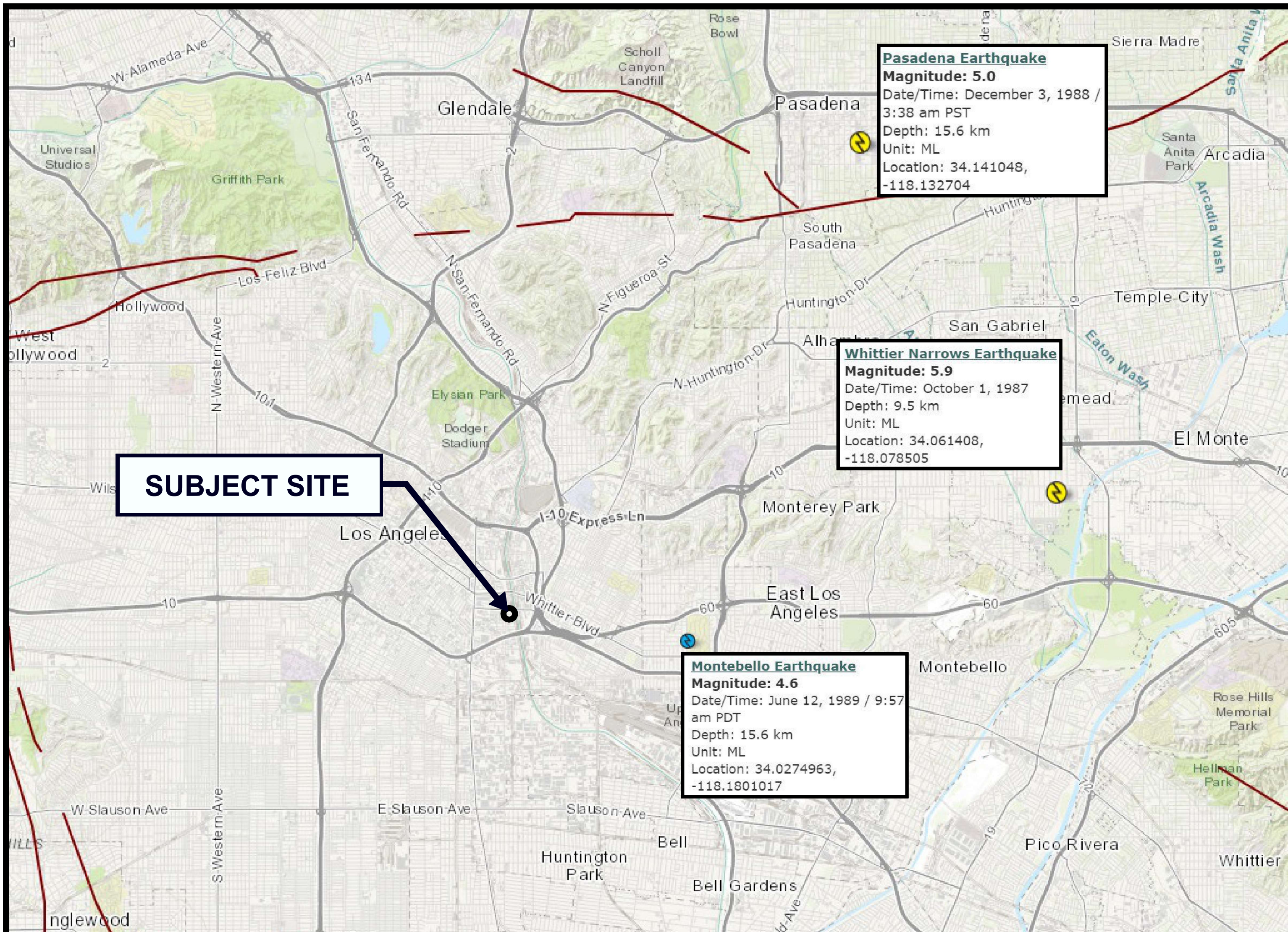
REFERENCE: SIGNIFICANT EARTHQUAKE AND FAULTS, SOUTHERN CALIFORNIA EARTHQUAKE DATA CENTER, CALTECH

HISTORICAL SEISMIC EVENT MAP - REGIONAL

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

FILE NO. 22039



SIGNIFICANT EVENT BY MAGNITUDE:

Marker	Magnitude
	☑ 4 ≤ 4.9
	☑ 5 ≤ 5.9
	☑ 6 ≤ 6.9
	☑ 7 ≤ 9.0

N

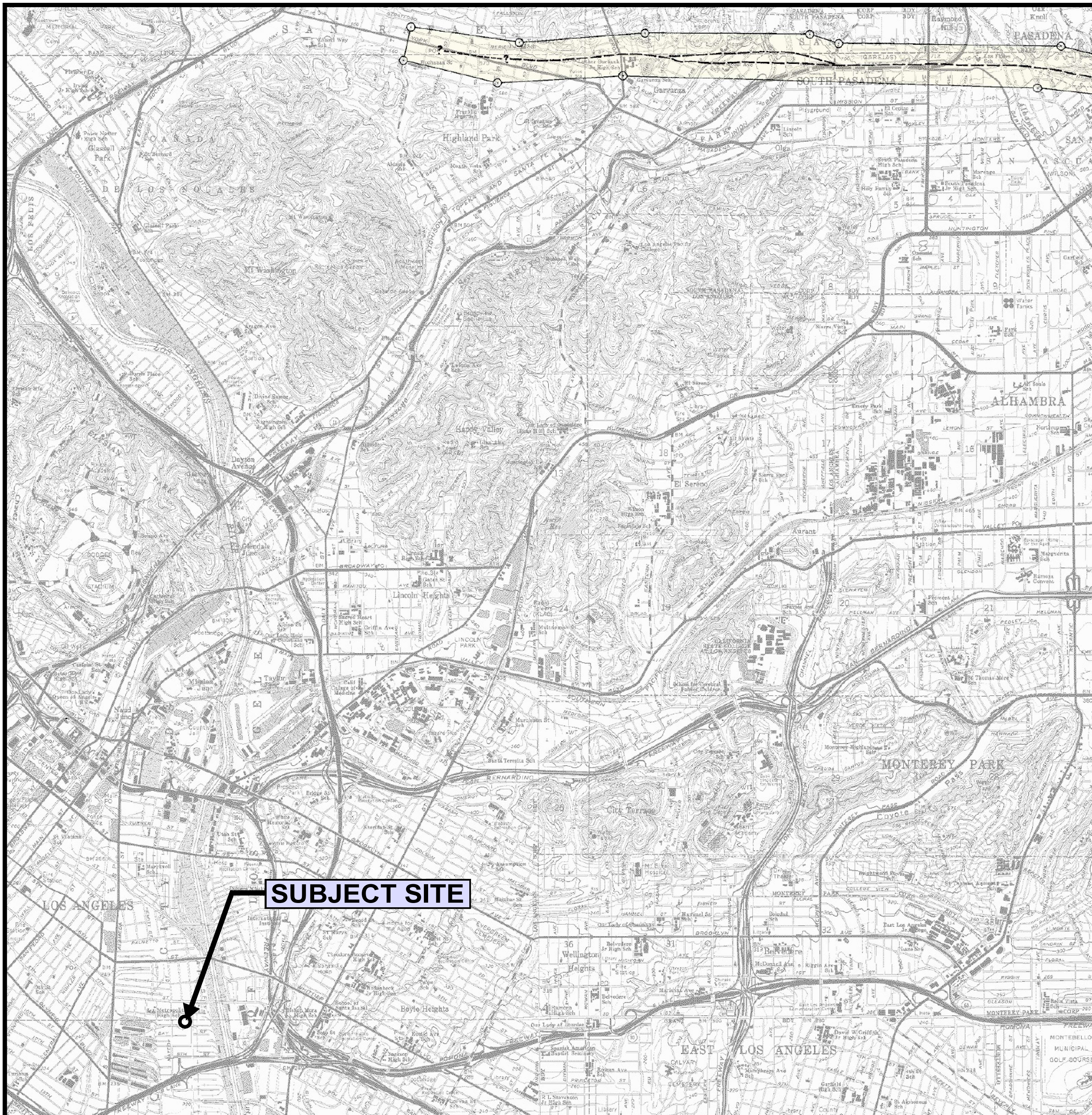
REFERENCE: SIGNIFICANT EARTHQUAKE AND FAULTS, SOUTHERN CALIFORNIA EARTHQUAKE DATA CENTER, CALTECH

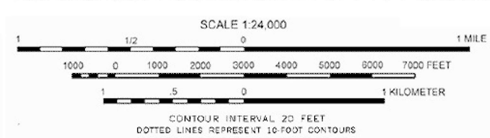
HISTORICAL SEISMIC EVENT MAP - LOCAL

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES, BURBANK

FILE No. 22039





REFERENCE: EARTHQUAKE FAULT ZONES, LOS ANGELES QUADRANGLE, CALIFORNIA GEOLOGICAL SURVEY, JANUARY 1977

Earthquake Fault Zones

Alquist-Priolo Earthquake Fault Zone

EARTHQUAKE FAULT ZONE

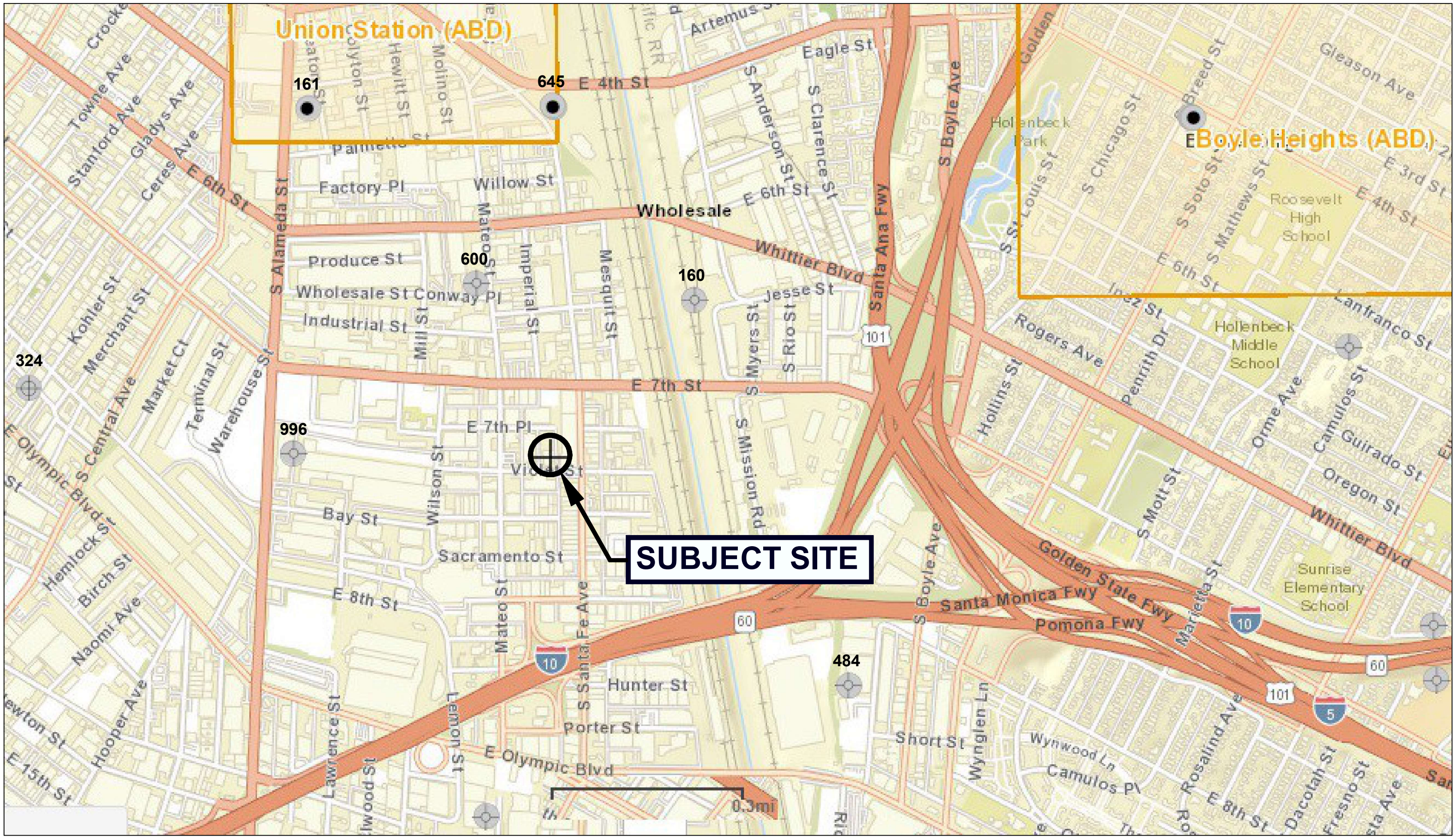
Geotechnologies, Inc.

Consulting Geotechnical Engineers

HINES

2045 VIOLET ST., LOS ANGELES

FILE NO. 22039



OIL WELL LEGEND

API NO.	OPERATOR, WELL NO.
160	Atlantic Richfield Co., #1-1
600	Phillips Petroleum Co., #1
996	Chevron U.S.A., Inc., #1
324	Chevron U.S.A., Inc., #1
161	Atlantic Richfield Co., #1
645	Chalmers-Santa Fe LLC, #2
484	D. Herbert Hostetter, #2

N

REFERENCE: DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES WELL FINDER, STATE OF CALIFORNIA, 2014

OIL WELL LOCATION MAP

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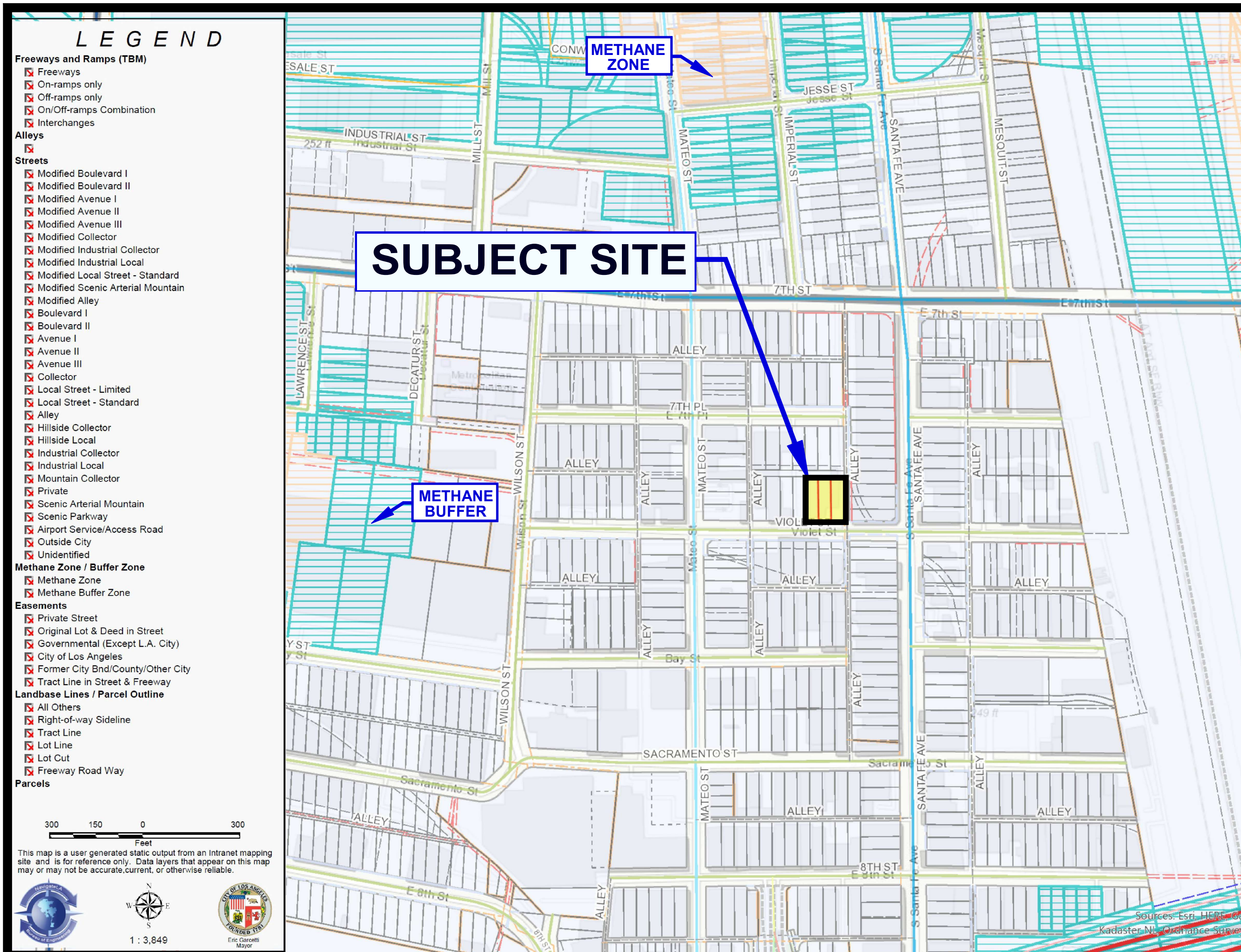
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

FILE NO. 22039



NOT IN METHANE ZONE

REFERENCE: http://navigatela.lacity.org/NavigateLA/

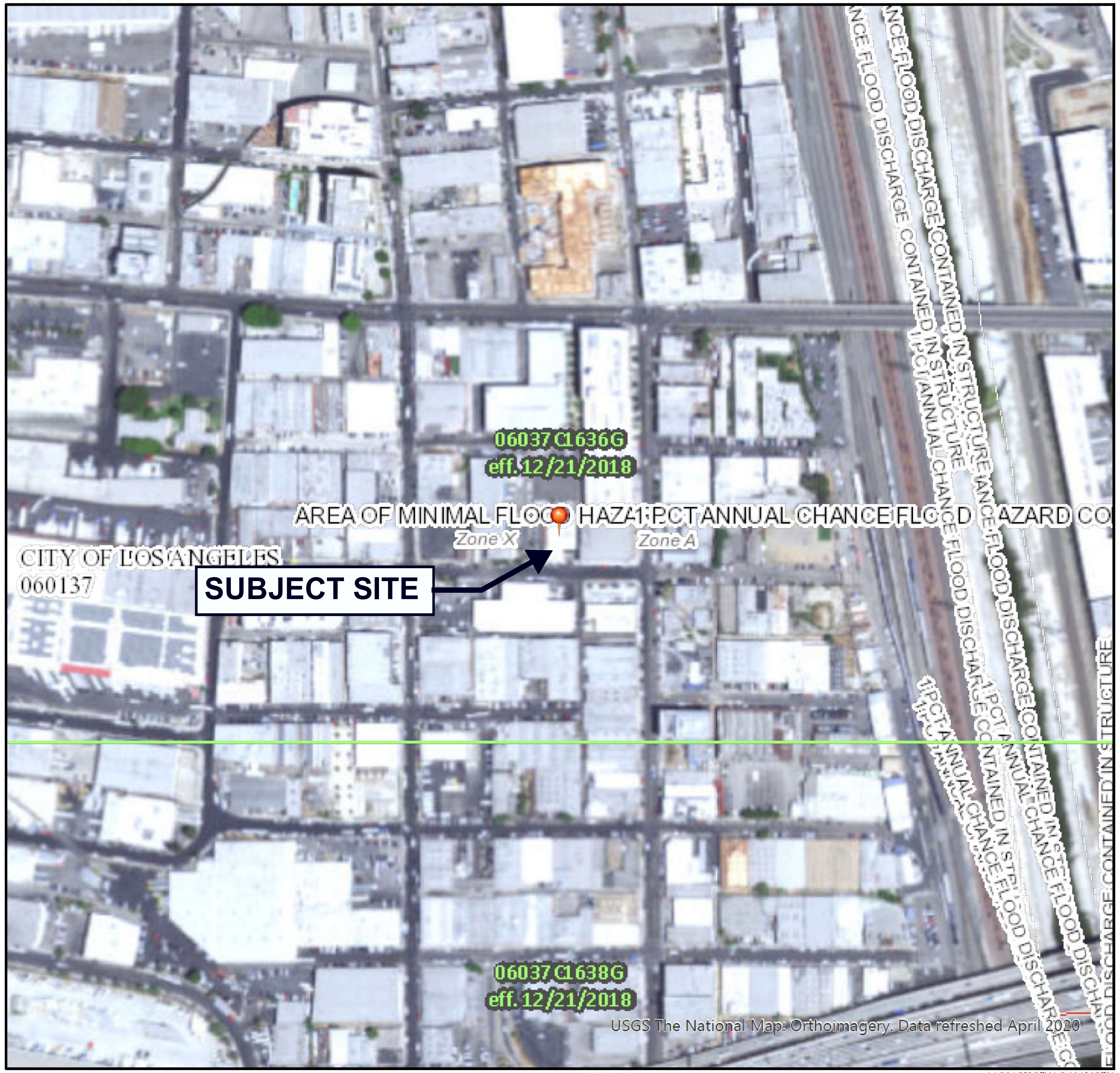
METHANE ZONE RISK MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

FILE NO. 22039

118°14'10"W 34°2'13"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

118°13'32"W 34°1'43"N

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) *Zone A, V, A99*
		With BFE or Depth *Zone AE, AO, AH, VE, AR*
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
		Future Conditions 1% Annual Chance Flood Hazard *Zone X*
		Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
		Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
		Effective LOMRs
		Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES	20.2 / 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
	513	Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/30/2020 at 4:47 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

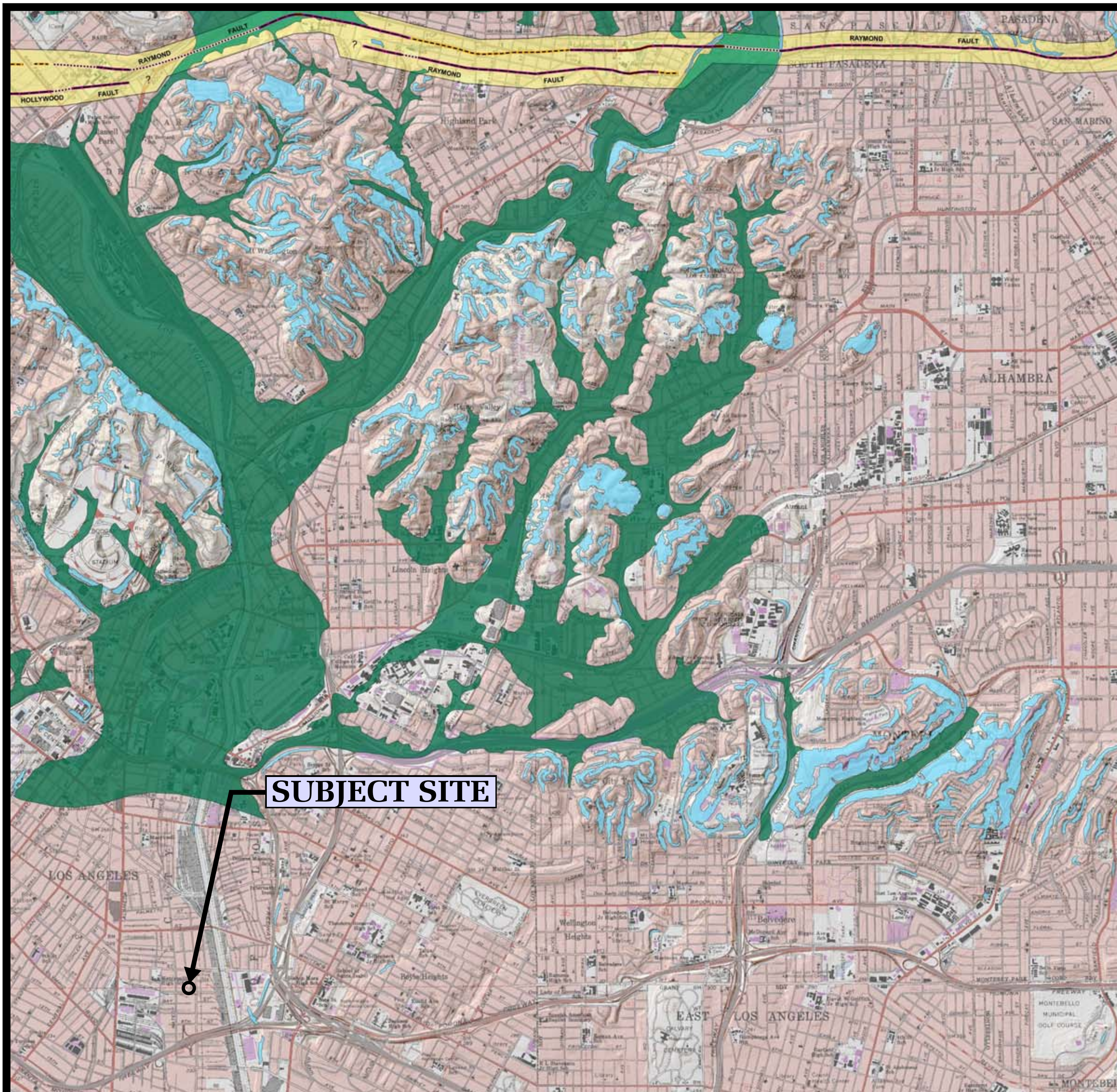
FLOOD INSURANCE RATE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

FILE No. 22039 **DRAWN BY: TC**

DATE: October 2020



Scale 1: 24000

Contour Interval 20 Feet

Earthquake Fault Zones
Alquist-Priolo Earthquake Fault Zone

LIQUEFACTION AREA

REFERENCE: EARTHQUAKE FAULT ZONES, HOLLYWOOD QUADRANGLE: CALIFORNIA GEOLOGICAL SURVEY, NOVEMBER 2014

SEISMIC HAZARD ZONE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

HINES
2045 VIOLET ST., LOS ANGELES

FILE NO. 22039

LEGEND

6 ● BORING LOCATION (January, 2014)

9 ◑ BORING LOCATION (October, 2014)

P-2 ◎ PERMEABILITY TEST LOCATION (October, 2014)

A—A' CROSS SECTION LOCATION

Reference:

LOS ANGELES COUNTY ORTHOIMAGERY, 2010

0 50' 100' 200'

SCALE: 1" = 100'

amec foster wheeler

Amec Foster Wheeler
Environment & Infrastructure, Inc.
6001 Rickenbacker Road
Los Angeles, CA 90040
Phone (323) 889-5300
Fax (323) 721-6700

Proposed Ford Plant Redevelopment
2030 East 7th Street
Los Angeles, California

LT.LNG:	
PREPARED BY:	VMN
SCALE:	1" = 100'
DRAWN:	LT
CHKD:	LT
DATE:	10/10/2014

PLOT PLAN

FIGURE NO. 2

PROJECT NO. OD-13165190

Path: G:\4953_Geotech\2014\OD-13165190 Ford Plant Redev\CAD\DWG\OD-13165190_Fig-2_Plot-Plan(14.11.19).dwg [B-17x11]
Date: January 19, 2015 - 4:50pm By: vo.nguyen

BORING 1

DATE DRILLED: January 16, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0							4-inch thick Asphalt Concrete
							SM	FILL - SILTY SAND - slightly moist, medium brown, fine to medium grained, some gravel, some asphalt concrete and brick fragments (up to 3 inches in size)
	5		8.0	111	13			
							SP-SM	**ALLUVIUM** POORLY GRADED SAND with SILT - loose to medium dense, dry, light brown, fine to medium grained, 10% Passing No. 200 Sieve
		14						
	10		1.3		14			
								Cobbles (up to 6 inches in size)
							SW	WELL GRADED SAND with GRAVEL - medium dense, slightly moist, light brownish gray, fine to coarse, some fine to coarse gravel (up to 1 inch in size), some cobbles (up to 6 inches in size)
		11						
	15				24			
								Becomes very dense (5% Passing No. 200 Sieve)
		67						
	20							Becomes medium dense
			3.1	106	25			
							SP	POORLY GRADED SAND - medium dense, slightly moist, light brownish gray, fine to medium grained, some gravels
	25	17						
							SW	WELL GRADED SAND with GRAVEL - medium dense, slightly moist, light gray, fine to coarse gravels (up to 3 inches in size), some cobbles (up to 10 inches in size)
	30		2.4	103	44			
	35	92						
	40		1.4	98	65			

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL (NO DECIMAL) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\ 00 OTHER OFFICES\OD-13165190 FORD PLANT REDEV\OD13165190.GPJ 1/19/15

BORING 1 (Continued)

DATE DRILLED: January 16, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	DESCRIPTION
							Cobbles (up to 12 inches in size)
	45	50/3"					
	50				50/3"		Sample not recovered END OF BORING AT 50 FEET
	55						
	60						
	65						
	70						
	75						
	80						

NOTES:

Hand augered upper 5 feet to avoid damage to utilities.
Groundwater was not encountered. Boring backfilled and tamped with soil cuttings.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140-pound automatic hammer falling 30 inches.

*Number of blows to drive the Crandall sampler 12 inches using a 140-pound automatic hammer falling 30 inches.

** Elevations not available.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: LH
Checked By: LT

BORING 2

DATE DRILLED: January 16, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SM	3-inch thick Asphalt Concrete FILL - SILTY SAND - slightly moist, dark brown, fine to medium grained, with concrete, brick, and asphalt concrete fragments (up to 4 inches in size) Becomes light brown
	5		8.9	104	7			
		7					SM	**ALLUVIUM** SILTY SAND - very loose, moist, fine to medium grained, slightly porous
							SP	POORLY GRADED SAND - loose to medium dense, sligthly moist, light brownish gray, fine to medium grained, some coarse, some gravel
	10		7.6	100	12			
		16						
							SW	WELL GRADED SAND with SILT and GRAVEL - medium dense, slightly moist, light brownish gray, fine to coarse, fine to coarse gravels (up to 3 inches in size) (10% Passing No. 200 Sieve)
	15		3.8	98	17			
		22						
	20		2.5	108	35			
							SP	POORLY GRADED SAND - medium dense, slightly moist, light brownish gray, fine to medium grained, some coarse
	25	17						
							SW	WELL GRADED SAND with GRAVEL - medium dense, slightly moist, light brownish gray, fine to coarse grained, fine to coarse gravels (up to 3 inches in size)
	30		3.1	107	20			
								Cobbles (up to 10 inches in size)
	35	47						Becomes dense
	40		--	--	50/4"			Sample not recovered, becomes very dense

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT

BORING 2 (Continued)

DATE DRILLED: January 16, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	DESCRIPTION
							More gravels and cobbles
							Cobbles (up to 12 inches in size)
	45	72/9"					
							Becomes coarser
	50		--	--	50/1"		Sample not recovered END OF BORING AT 50 FEET
	55						
	60						
	65						
	70						
	75						
	80						

NOTES:

Hand augered upper 5 feet to avoid damage to utilities.
Groundwater was not encountered. Boring backfilled and tamped with soil cuttings.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL (NO DECIMAL) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\ 00 OTHER OFFICES\OD-13165190 FORD PLANT REDEV\OD13165190.GPJ 1/19/15

Field Tech: AR
Prepared By: LH
Checked By: LT

Proposed Ford Plant Development
Los Angeles, California

amec foster wheeler

LOG OF BORING
Project: OD13165190 Figure: A-1.2b

BORING 3

DATE DRILLED: January 17, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
	0						4-inch thick Asphalt Concrete
						SM	FILL - SILTY SAND - slightly moist, brown, fine to medium grained, some concrete and brick fragments
						SM	**ALLUVIUM** POORLY GRADED SAND - very loose to loose, slightly moist, light brown, fine to medium grained
	5		7.4	99	4		Thin layer of medium brownish gray SANDY SILT, slightly moist, highly porous Becomes light brownish gray
		5					
						SP	POORLY GRADED SAND - loose, slightly moist, light brown, fine to medium grained
	10		2.5	103	14		
		50/3"					Becomes very dense Some gravels (up to 4 inches in size)
	15		--	--	22	SW	WELL GRADED SAND - medium dense to very dense, slightly moist, light brownish gray, fine to coarse grained, fine to coarse gravels (up to 3 inches in size), 3% Passing No. 200 Sieve, disturbed sample
		52					
	20		4.8	101	29		More gravels and cobbles
						SM	SILTY SAND with GRAVEL - medium dense, slightly moist, brown, fine to medium grained, some coarse
	25	12					Becomes coarser
						SW	WELL GRADED SAND with GRAVEL - dense, slightly moist, light brownish gray, fine to coarse grained, fine to coarse gravels (up to 3 inches in size), some cobbles (up to 5 inches in size)
	30		3.8	117	49		
						SP	POORLY GRADED SAND with SILT and GRAVEL - medium dense, slightly moist, light brownish gray, fine to medium grained
	35	16					6% Passing No. 200 Sieve
						SW	WELL GRADED SAND with Gravel - very dense, slightly moist, light brownish gray, fine to coarse grained, fine to coarse gravels (up to 3 inch in size), some cobbles (up to 12 inches in size)
	40				79		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT

BORING 3 (Continued)

DATE DRILLED: January 17, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	Description
	45	50/6"					
							Becomes coarser, more gravels and cobbles
	50		--	--	50/2"		Sample not recovered END OF BORING AT 50 FEET
	55						
	60						
	65						
	70						
	75						
	80						

NOTES:

Hand augered upper 5 feet to avoid damage to utilities.
Groundwater was not encountered. Boring backfilled and tamped with soil cuttings.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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Field Tech: AR
Prepared By: LH
Checked By: LT

BORING 4

DATE DRILLED: January 16, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						SM	3-inch thick Asphalt Concrete FILL - SILTY SAND - moist, light brown, fine to medium grained
							SM	**ALLUVIUM** SILTY SAND - very loose to medium dense, slightly moist, light brown, fine to medium grained Thin layer of medium brown SANDY SILT, highly porous
	5		6.4	95	5			
		11						Some silt nodules, moist
							SP	POORLY GRADED SAND with GRAVEL- medium dense, slightly moist, light brownish gray, fine to medium grained, with alternating WELL GRADED SAND layers
	10				34			
							SW	WELL GRADED SAND with GRAVEL - medium dense, slightly moist, light brownish gray, fine to coarse grained, fine to coarse gravels (up to 3 inches in size)
		22						
	15		2.2	96	18			
		53						Becomes very dense
								8-inch cobble Less gravel
	20		5.8	100	24			
								6 to 8-inch cobbles
							SP	POORLY GRADED SAND - medium dense to dense, slightly moist, light brownish gray, fine to medium grained, some gravels
	25	19						
	30		--	--	67			Sample not recovered Becomes coarser, 6-inch cobble
							SW	WELL GRADED SAND with Gravel - very dense, light brownish gray, slightly moist, fine to coarse grained, fine to coarse gravel (up to 3 inches in size), some cobbles and boulders (up to 14 inches in size)
	35	78						
	40		4.9	104	78			

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(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT

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THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING 4 (Continued)

DATE DRILLED: January 16, 2014
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
	45	87/9"				X
	50					
	55					
	60					
	65					
	70					
	75					
	80					

END OF BORING AT 48 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities.
Groundwater was not encountered. Refusal encountered at 48 feet due to hard drilling. Boring backfilled and tamped with soil cuttings.

Field Tech: AR
Prepared By: LH
Checked By: LT

Proposed Ford Plant Development
Los Angeles, California

amec foster wheeler

LOG OF BORING
Project: OD13165190 Figure: A-1.4b

BORING 5

DATE DRILLED: January 15, 2014
EQUIPMENT USED: Hand Auger
HOLE DIAMETER (in.): 6
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0							5-inch thick concrete slab
							SW	FILL - WELL GRADED SAND - slightly moist, fine to coarse grained, some coarse gravels (up to 3 inches in size)
			10.7	80	35		SP	**ALLUVIUM** POORLY GRADED SAND - moist, light gray, fine to medium grained, some coarse, some fine to coarse gravels (up 3 inches in size)
	5		--	--	65			Sample not recovered
			--	--	100			6-inch cobble, sample not recovered
								END OF BORING AT 7 FEET
	10							
	15							
	20							
	25							
	30							
	35							
	40							

NOTES:

Groundwater was not encountered. Boring backfilled and tamped with soil cuttings.

*Number of blows to drive the Crandall sampler 12 inches using a 50-pound manual hammer falling approximately 17 inches.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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Field Tech: AR
Prepared By: LH
Checked By: LT

BORING 6

DATE DRILLED: January 15, 2014
EQUIPMENT USED: Hand Auger
HOLE DIAMETER (in.): 6
ELEVATION (ft.): NA **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.		DESCRIPTION
	0						SW	3-inch thick concrete slab **ALLUVIUM** WELL GRADED SAND - slightly moist, light gray, fine to coarse, some fine to coarse gravels (up to 3 inches in size)
					75	X		
	5		6.4	104	75	X		
			2.0	113	75	X		Boulder END OF BORING AT 7½ FEET
	10							
	15							
	20							
	25							
	30							
	35							
	40							

NOTES:

Groundwater was not encountered. Boring backfilled and tamped with soil cuttings.

*Number of blows to drive the Crandall sampler 12 inches using a 50-pound manual hammer falling approximately 17 inches.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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Field Tech: AR
Prepared By: LH
Checked By: LT

BORING 7

DATE DRILLED: October 6, 2014
EQUIPMENT USED: Hollow Stem-Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 240.1**

ELEVATION (ft)	DEPTH (ft)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
							8-inch thick Concrete Slab-on-Grade
							FILL - POORLY GRADED SAND - moist, light brownish-gray, some silt
		9.4	106	10	⊠		
235	5	14.4	100	5	⊠	ML	SANDY SILT - moist, dark brown, fine to medium sand, (55% Passing No. 200 Sieve)
						SM	SILTY SAND - moist, light brown, fine to medium grained, (27% Passing No. 200 Sieve)
		7.3	97	7	⊠		
230	10	--	--	9	○	SP	POORLY GRADED SAND - moist, light gray to white, some fine to coarse grained (No recovery)
		2.7	104	20	⊠		Becomes slightly coarser, trace gravel
225	15	--	--	22	○		(No recovery)
220	20	1.8	116	30	⊠		Fine to medium grained, few coarse, more gravel (up to 3-inch in size)
215	25	1.9	111	41	⊠		END OF BORING AT 25 FEET
210	30						
205	35						
	40						

NOTES:

Groundwater was not encountered. Boring was backfilled with soil cuttings, tamped, and patched with quick cement.

*Number of blows to drive the Crandall sampler 12 inches using a 140 pound automatic hammer falling 30 inches.

** Elevations based on existing foundation plan, dated 2-26-1923.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: WL
Checked By: LT

Proposed Seismic Upgrade
2030 East 7th Street
Los Angeles, California

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LOG OF BORING
Project: OD-13165190 Figure: A-1.7

BORING 8

DATE DRILLED: October 6, 2014
EQUIPMENT USED: Hollow Stem-Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 240.1**

ELEVATION (ft)	DEPTH (ft)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
	0					8-inch thick Concrete Slab-on-Grade
						FILL - SILTY SAND - moist, dark brown, fine to medium grained, trace fine gravel
		13.8	105	18		Light brown, nail encountered
235	5	18.7	90	5	SM	SILTY SAND - moist, medium to dark brown, fine grained
		7.9	98	9		Becomes yellowish-brown, fine to medium grained, few gravel, (20% Passing No. 200 Sieve)
230	10	3.0	93	8		
		1.8	91	30		More gravel
						Cobbles (up to 5-inch in size)
225	15			21		More gravel
						Cobbles (up to 6-inch in size)
220	20	2.4	112	39		
215	25	--	--	16		(No recovery)
						END OF BORING AT 25 FEET
210	30					
205	35					
	40					

NOTES:

Groundwater was not encountered. Boring was backfilled with soil cuttings, tamped, and patched with quick cement.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: WL
Checked By: LT

Proposed Seismic Upgrade
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LOG OF BORING
Project: OD-13165190 Figure: A-1.8

BORING 9

DATE DRILLED: October 6, 2014
EQUIPMENT USED: Hollow Stem-Auger
HOLE DIAMETER (in.): 8
ELEVATION (ft.): 240.1**

ELEVATION (ft)	DEPTH (ft)	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
							6-inch thick Concrete Slab-on-Grade
							FILL - SILTY SAND and POORLY GRADED SAND - moist, medium brown, fine to medium grained
		6.5	93	9			
235	5	6.4	95	4		SM	SILTY SAND - moist, medium brown, fine grained, slightly porous, (32% Passing No. 200 Sieve)
						SP	POORLY GRADED SAND - moist, light gray to white, fine to medium grained
		2.8	86	9			
230	10	--	--	14			No recovery
		--	--	21			No recovery - some gravel
225	15	1.6	95	21			
220	20	1.6	115	21			Becomes coarser and more gravel
						SW	WELL GRADED SAND - moist, light gray, fine to coarse grained, some gravel
215	25	1.8	115	38			END OF BORING AT 25 FEET
210	30						
205	35						
	40						

NOTES:

Groundwater was not encountered. Boring was backfilled with soil cuttings, tamped, and patched with quick cement.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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Field Tech: AR
Prepared By: WL
Checked By: LT

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LOG OF BORING
Project: OD-13165190 Figure: A-1.9