Appendix E

Geology Studies

PHASE II SITE-SPECIFIC FAULT RUPTURE INVESTIGATION

9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

GEOCON
WEST, INC.

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

ALLEN MATKINS LECK
GAMBLE MALORY & NATSIS LLP
LOS ANGELES, CALIFORNIA

PROJECT NO. A9009-06-01A

MAY 6, 2014

Project No. A9009-06-01A
May 6, 2014

VIA EMAIL

Allen Matkins Leck Gamble Malory & Natsis LLP
515 South Figueroa Street, 9th Floor
Los Angeles, CA 90071

Attention: Patrick Perry

Subject: REPORT OF PHASE II SITE-SPECIFIC FAULT RUPTURE INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA 90212

Dear Mr. Perry:

Geocon West, Inc. is pleased to submit this report summarizing our Phase II site-specific fault rupture investigation for the proposed development located at 9900 Wilshire Boulevard in the City of Beverly Hills, California. The active Santa Monica Fault Zone and the West Beverly Hills Lineament, a linear geologic feature postulated to be associated with faulting and/or erosion processes, are mapped within the vicinity of the 9900 Wilshire Site. The purpose of our evaluation was to identify faults that may traverse the Site and evaluate the potential for surface fault rupture.

This evaluation was conducted in general accordance with our proposals dated January 23, 2013 and August 28, 2013 and the terms and conditions contained in the Contract between Geocon West Inc. and BH Wilshire International authorized on February 11, 2013. It is our understanding that this report will be submitted to the City of Beverly Hills as part of the review process for a future development at the Site.

We appreciate the opportunity to be of service to you. Please contact us if you have any questions regarding this report, or if we may be of further service.

Very truly yours,

PROFESSIONAL GEOLOGIST
SUSAN FRANZEN KIRKGARD
No. 1754
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Susan F. Kirkgard
CEG 1754

PROFESSIONAL GEOLOGIST
GERALD KASMAN
NO. 2251
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Gerald Kasman
CEG 2251

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1. EXECUTIVE SUMMARY

This report presents the results of our Phase II site-specific fault rupture investigation for 9900 Wilshire Boulevard in the City of Beverly Hills, California (the "Site" or "9900 Wilshire Site"). The purpose of our investigation was to collect site-specific subsurface geologic information in order to assess the age and continuity of on-site stratigraphy and to evaluate the location and activity of faults that may impact proposed development.

We previously reviewed available documents relating to the regional tectonic setting and specific faults that were previously inferred to project on or toward the Site and therefore, potentially affected the proposed development. This "Phase I" report[1] was submitted and reviewed by the City of Beverly Hills (COBH) Technical Reviewer in 2013 (Geocon, 2013).

This Phase II report documents our exploration techniques and findings of a site-specific investigation, conforming to current geologic standards-of-practice for evaluation of potential surface fault rupture. The fundamental conclusions of our investigation are:

1. With a high degree of certainty, active faults (as defined by the State of California [Bryant and Hart, 2007]) do not directly impact the proposed development at the Site.

2. The previously inferred splays of the Newport-Inglewood Fault Zone (also called the West Beverly Hills Lineament) and the Santa Monica Fault Zone, projected toward or into the Site, have been investigated on-site and are now shown to be demonstrably covered by unbroken sediments at least 27,000 to 40,000 years old and therefore, not active.

3. Active northwest-trending splays of the Santa Monica Fault Zone are located off-site to the north and west of the 9900 Wilshire Site. Because of the proximity of these northwest-trending faults to the Site and because of uncertainties in projection between subsurface borings and cone penetration tests, we recommend a 50-foot wide, structural setback zone be established from the northwestern property line, north of boring B13-A along the common boundary between the 9900 Wilshire Site and the adjacent service station property (see Figure 15).

2. INTRODUCTION

This Phase II report presents the results of our fault rupture hazard investigation for 9900 Wilshire Boulevard in the City of Beverly Hills, California (the "Site" or "9900 Wilshire Site"). The location of the Site relative to surrounding features is shown on Figure 1, Vicinity Map.

A compilation geologic map prepared by the California Geological Survey (CGS, 2010) shows that the Santa Monica Fault Zone (SMFZ) and the northern extension of the Newport-Inglewood Fault Zone (NIFZ), also known as the West Beverly Hills Lineament (WBHL), are within the vicinity of

[1] Geocon West, Inc., 2013, *Fault Rupture Hazard Evaluation, 9900 Wilshire Boulevard, Beverly Hills, California*, Prepared for Allen Matkins Leck Gamble Malory & Natsis LLP, Los Angeles, California dated April 22, 2013 (Project No. A9009-06-01).

the 9900 Wilshire Site. Also, recent investigations by Parsons (2011) postulated that traces or splays of the SMFZ and the NIFZ were active according to the current State of California definition (Bryant and Hart, 2007) and project toward the 9900 Wilshire Site. These postulated faults potentially impact proposed development of the 9900 Wilshire Site.

The Geocon (2013) Phase I report summarizes our previous preliminary fault evaluation for the 9900 Wilshire Site that included a review of literature, data generated from local fault investigations, boring data from previous geotechnical investigations at the Site, and reinterpretation of the Parsons (2011) subsurface data including cone penetration tests (CPT) and continuous-core borings pertinent to the Site. We concluded that active faults are not present at the 9900 Wilshire Site (Geocon, 2013). The Geocon (2013) report was submitted to the City of Beverly Hills (COBH) for review.

The COBH Technical Reviewer subsequently requested we perform site-specific geologic standard-of-practice investigation to confirm the conclusions in the Geocon (2013) report. COBH representatives reviewed the scope of the field exploration program for this investigation prior to the beginning of work, and met with us in the field on two occasions to observe the trench exposures and core samples.

The faults investigated at the Site include:

- Inferred northwest-trending faults, associated with the NIFZ/WBHL, inferred by Parsons (2011) to project onto the southern portion of the Site.

- Inferred north-trending faults, associated with the NIFZ/WBHL inferred by GeoVision (2012) based on their interpretation of seismic reflection data.

- Inferred northeast-trending splays of the SMFZ projected by Dolan et al. (2000), TRC (2009), CGS (2010), and Antea Group (2014) near the northwest portion of the Site.

3. PURPOSE AND SCOPE

The purpose of the Phase II investigation was to a) collect site-specific subsurface geologic information, b) utilize that information to assess the age and continuity of the on-site stratigraphy, c) determine the location of faults, if any, at the 9900 Wilshire Site, and d) for any identified faults, determine whether such faults were “active” according to the current State of California definition (Bryant and Hart, 2007).

Our scope of services included the following main tasks:

- Literature review, including published geologic maps and reports, historic topographic maps, available local groundwater level data, and recent nearby fault investigations (Phase I).
- Review of preliminary results of previous seismic reflection survey performed at the Site (GeoVision, 2012).

- Excavation and logging of three exploratory trenches (total 532 lineal feet).
- Drilling and logging of 18 continuous-core hollow stem auger borings.
- Advancing nine cone penetration tests along the northern Site boundary, in the Wilshire Boulevard right-of-way.
- Stratigraphic analysis and correlation of primary stratigraphic units in recovered core samples.
- Estimating the relative age of buried soils in seven recovered cores and three exploratory trenches.
- Preparation of this report that includes the results of our investigation as well as our recommendations based on our findings.

4. SITE LOCATION AND DESCRIPTION

The 9900 Wilshire Site is bounded by Wilshire Boulevard on the north, Santa Monica Boulevard on the south, the Los Angeles Country Club and a private service station (9988 Wilshire Boulevard) on the west, and Merv Griffin Way on the east. The Site is currently occupied by a parking structure and commercial structure (the former Robinsons May department store) as shown on Figure 2, Site Plan.

Topography at the 9900 Wilshire Site has been altered by grading associated with construction of the existing Robinsons May building in the early 1950's. Current Site topography slopes to the south-southeast and Site elevations range from 268 in the southern portion of the Site adjacent to Santa Monica Boulevard to 291 feet at the northwest corner of the Site, adjacent to Wilshire Boulevard (Psomas, 2006).

Historic topographic maps, based on USGS surveys from 1923 to 1925 (Hoots, 1930), show that elevations at the 9900 Wilshire Site in the 1920's ranged from approximately 270 to 290 feet and sloped gently to the southeast, toward Santa Monica Boulevard, similar to the existing topography (Figure 3). The historic topographic map depicts an active stream channel along the along the western property boundary (adjacent to the Los Angeles Country Club) that followed the natural topography and formed a prominent natural divide between 9900 Wilshire and the adjacent properties to the west. Easements for an active Metropolitan Water District 24-inch water line and a municipal storm drain are located beneath the service driveway along the western property boundary.

The 9900 Wilshire Site is located on the western edge of the alluvial plain that borders the Cheviot Hills on the east (Figure 3) and is within the area of the modern Benedict Canyon drainage which is now obscured by urbanization but is visible on historic aerial photographs and topographic maps from the 1920's and 1930's.

5. INVESTIGATION BACKGROUND

The area around the 9900 Wilshire Site has been postulated to be affected by faulting (Figure 4). The California Geological Survey (CGS, 2010) indicates that a splay of the Santa Monica Fault Zone (SMFZ) is approximately 180 feet northwest of the 9900 Wilshire Site at its closest point (Figure 4). Also, the northern extension of the Newport-Inglewood Fault Zone (NIFZ), known as the West Beverly Hills Lineament (WBHL), may be present near the western Site boundary (Figure 4). Similarly, Dolan et al. (2000) shows the SMFZ near the northwest corner of the Site (Figure 5). However, precise locations and activity of faults are inherently uncertain owing to lack of sufficient subsurface data.

In 2011, Parsons-Brinkerhoff (Parsons) evaluated the risk of fault rupture associated with the SMFZ and the WBHL in the Century City-Beverly Hills area (Parsons, 2011). Their study generated new subsurface data for the Century City-Beverly Hills area based on continuous-core borings, cone penetration tests (CPTs), and seismic reflection surveys. However, trench excavations and soil stratigraphic age dating were not performed. Parsons (2011) interpreted the presence of a northwest-trending, 800-foot-wide zone of faults along the Beverly Hills – Century City boundary, assumed part of the WBHL/NIFZ fault zone (Figure 5). Parsons (2011) also identified multiple splays of the SMFZ, approximately 1,000 feet west of the 9900 Wilshire Site, that were not previously identified (Figure 5). In addition, Parsons (2011) postulated the newly identified WBHL faults and the SMFZ faults were "active" (per the current State of California definition [Bryant and Hart, 2007]) based on the interpreted offset of geologic units at depth and presumed association with nearby active faults. Finally, Parsons (2011) shows three WBHL faults projecting in a northwesterly direction into the southern boundary of the Site and four SMFZ faults projecting in a northeast direction towards the western boundary of the Site (Figure 5).

If valid, the Parsons (2011) interpreted faults would significantly impact proposed development of the 9900 Wilshire Site and many other nearby sites by postulating risk of surface fault rupture. Several of the Parsons (2011) inferred faults project through the Beverly Hills High School site (Figure 5). However, the Leighton (2012) investigation (that included exploratory trenches, continuous-core borings and CPTs, along two transects, and stratigraphic soil-age analysis and numeric soil-age dating) that was reviewed and accepted by the CGS (2013) clearly demonstrated that sediments with a minimum age of 100,000 years are continuous across the site. Thus the high school site is demonstratively free of active faults.

Likewise, several of the Parsons (2011) inferred WBHL faults project through the 10000 Santa Monica site located south of the 9900 Wilshire Site (Figure 5). However, in the Geocon-Feffer (2012) investigation, an excavation of one continuous exploratory trench across the 10000 Santa Monica site exposed continuous unfaulted soils estimated to be a minimum of 100,000 years old, thus demonstrating that the Parsons (2011) inferred faults either do not exist or are not active. Similarly, the findings of the Kenney GeoScience (Kenney, 2012) study provided a regional geologic context to evaluate the site-specific data from local fault investigations. Kenney (2012) assessed stratigraphy, geomorphology, and pedochronology of the region based on re-interpretation of data provided from the Parsons (2011),

Leighton (2012), and Geocon-Feffer (2012) reports, and evaluated location and activity of suspected faults in the Century City and western Beverly Hills areas. The Kenney (2012) regional assessment shows that many of the Parsons (2011) WBHL faults either do not exist or are not active. Kenney (2012) also suggests that some of the Parsons (2011) WBHL faults are better explained as one or more generally east-west trending inactive (pre-Holocene) splays of the SMFZ (designated the Santa Monica Boulevard Fault Zone) rather than possible active faults associated with WBHL. Kenney (2012) concluded that, as related to the 9900 Wilshire Site, the faults proposed by Parsons (2011) as part of the WBHL and the SMFZ either do not exist or are not active (Figure 7).

Similar to the Beverly Hills High School and 10000 Santa Monica sites, several of the Parsons (2011) northeast-trending faults project through the Westfield Century City Mall site (Figure 5). Geocon (2013) recently completed a fault investigation for this site and concludes that some of the Parsons (2011) interpreted faults do exist in this area but are not active based on the presence of a continuous unfaulted marker soil horizon estimated to be a minimum age of about 34,000 years. Kenney (2012) designates these inactive faults as part of the so-called "Santa Monica Boulevard Fault Zone" (SMBFZ), distinguishing them from interpreted active secondary splays of the deeper SMFZ near the geomorphic scarp (Figure 7).

Nonetheless, in conformance with current geologic standards-of-practice, the COBH required that site-specific investigation be carried out at the 9900 Wilshire Site. Of specific concern was a) the potential impact upon proposed development at the Site by the postulated Parsons (2011) WBHL faults near the southern portion of the Site (Figure 6) and b) the need for determination of a more accurate trend of the SMFZ splays near the northwestern portion of the Site as depicted on the CGS (2010) map (Figures 4 and 6) and on the Kenney (2012) map (Figure 7).

It is our understanding that a yet unpublished study has investigated faults that may impact the El Rodeo School site north of the 9900 Wilshire Site, on the north side of Wilshire Boulevard. The CGS geologic map (2010) also shows the SMFZ projecting toward El Rodeo School (Figures 5 and 6). Also, a possible fault-related groundwater barrier (TRC, 2009) may affect the adjacent service station property (9988 Wilshire Boulevard). The groundwater barrier trends parallel to the CGS (2010) mapped fault location (Figures 5 and 6).

6. GEOLOGIC SETTING

6.1 General Geologic Conditions

The 9900 Wilshire Site is approximately 7.6 acres in size, located on the alluvial plain along the eastern edge of the uplifted and dissected Cheviot Hills (Figure 3). Sediments exposed in the uplifted hills are Pleistocene surficial alluvial and fluvial sediments underlain by Pleistocene marine sediments of the San Pedro Formation (Kenney, 2012). Holocene sediments occur locally in modern drainages, including the modern Benedict Canyon drainage, and on the broad south-sloping alluvial fan surface east of the Cheviot Hills.

Holocene alluvial deposits associated with the modern Benedict Canyon drainage are present at the surface on much of the 9900 Wilshire Site (Figure 3). These surficial deposits are underlain by Pleistocene age alluvial sediments that we interpret as older fan and terrace deposits.

Based on topography, Kenney (2012) interprets the Cheviot Hills to be a folded structure with the eastern limb extending east across the WBHL and Benedict Canyon Wash. The Kenney (2012) tectonic model postulates that the deformation and uplift of the hills has been on-going since the late Pleistocene. South of Santa Monica Boulevard, Kenney proposes that the hills have been uplifted along a north-south axis parallel to the WBHL and Benedict Canyon Wash. Kenney's (2012) model suggests that an Ancient Benedict Canyon Wash flowed southwest with sufficient stream power to incise the Cheviot Hills as uplift occurred. Channel incision and the subsequent infilling ceased about 40,000 to 50,000 years ago and resulted in an eastward lateral migration of the Benedict Canyon drainage to its present-day course (Kenney, 2012).

As shown on Figure 4, the Site is located near the intersection of the SMFZ and the NIFZ/WBHL. The faults within these two fault zones are generally poorly understood owing to the lack of subsurface data and urbanization.

6.2 Newport-Inglewood Fault Zone / West Beverly Hills Lineament

The WBHL is a linear geomorphic feature interpreted to be either the northern extension of the NIFZ or an alignment of stream escarpments eroded by Benedict Canyon Wash and other southeast flowing drainages in this area. Near the Site, the WBHL is comprised of east-facing escarpments that separate the elevated terrain on the west from the gently sloping alluvial surface within the Benedict Canyon Drainage on the east. The WBHL has been postulated to constitute the northern extension of the active NIFZ. Based on interpretations of aerial photographs, the WBHL faults branch out as they approach the SMFZ (Dolan et al, 1997). An Alquist-Priolo Earthquake Fault Zone has not been established by the CGS for the WBHL owing to lack of evidence for being "sufficiently active and well-defined".

The Parsons (2011) investigation provides subsurface data for a portion of the WBHL, south of Santa Monica Boulevard, but does not provide for the assessment of the WBHL at the 9900 Wilshire Site. As previously indicated, Parsons (2011) interpreted a broad zone of northwest trending faults in the Century City area, and assumed them to be an active extension of the NIFZ. However, the Leighton (2012) and Geocon-Feffer (2012) investigations and the Kenney (2012) regional assessment now show that the postulated WBHL faults either do not exist or are not active.

Specifically, the Leighton (2012) investigation concludes that the postulated northwest-trending WBHL faults do not exist at Beverly Hills High School. Leighton (2012) reports that sediments at least 70,000 to 100,000 years old on the Beverly Hills High School site are documented to be unfaulted across any reasonable projection of WBHL faults. Additionally, the Geocon-Feffer (2012)

investigation at the 10000 Santa Monica site similarly shows near-surface sediments are a minimum of 30,000 years old and are unfaulted across the 10000 Santa Monica site.

6.3 Santa Monica Fault Zone

The Santa Monica Fault Zone (SMFZ) trends west to east, from the Santa Monica area to the Hollywood area, and is part of a regional fault system that extends for nearly 125 miles along the southern boundary of Transverse Ranges. This fault system is referred to as the Malibu Coast-Santa Monica-Raymond-Cucamonga fault system by Crook et al. (1983) and as the Transverse Ranges Southern Boundary fault system (TRSB) by Dolan et al. (2000). This complex system of west to east trending faults accommodates north-south shortening and uplift, and concurrent westward motion of the Western Transverse Ranges. Individual faults within the TRSB fault system exhibit varying degrees of both left-lateral strike-slip and contractional dip-slip faulting and related folding (Hill et al., 1979; Crook et al., 1983; Jones et al., 1990 and Dolan et al., 2000). All faults within the TRSB fault system show evidence for Quaternary activity and several, including the Santa Monica and Hollywood fault zones, have been demonstrated by site-specific paleoseismic studies to be active during Holocene time (Jones et al., 1990; Weaver and Dolan, 2000; Dolan et al., 2000).

The Santa Monica Fault Zone is an oblique-reverse, left-lateral fault that is thought to be a surface expression of tectonic deformation related to Pliocene-Quaternary structural development of the Santa Monica Mountains. Integration of subsurface oil and gas exploration seismic data and well logs with surficial mapping indicate the mountains are underlain by a large southward-vergent asymmetric anticline formed over a regional north-dipping thrust ramp at a depth of 6 to 9 miles. Davis and Namson (1994) have interpreted the Santa Monica anticlinal structure as a regional-scale fault propagation fold with a steep south-facing forelimb. The SMFZ is shown in their model as an out-of-sequence high-angle fault that branches upward from the main fault ramp (Santa Monica Mountains blind thrust), breaches the forelimb, and extends to the near-surface. Geophysical studies conducted at the Veteran's Administration (VA) property in West Los Angeles indicate the SMFZ is a gently dipping thrust fault with secondary near-vertical faults extending from the primary basal fault toward the ground surface (Pratt et al., 1998; Dolan et al., 2000). These secondary hanging-wall faults exhibit normal displacement but are thought to be primarily left-lateral strike slip.

The Dolan et al. (2000) investigation at the VA property is presently the most detailed paleoseismic study of the SMFZ. Trench stratigraphy with carbon-14 (14C) numerical age-control provided the basis for evaluating total slip, slip rate, and the number and age of displacement events. Dolan et al. (2000) identified five to six ground-rupturing events in the stratigraphic record between approximately 50,000 years and 1,000 to 3,000 years. These events suggest a recurrence interval of about 7,000 to 8,000 years for the SMFZ (Dolan et al., 2000, p.1573).

Much of the surface expression of the SMFZ is limited to fault-related geomorphic features, many of which have been destroyed by urbanization within the greater Los Angeles area. This has resulted in a poor understanding of the lateral extent, location, and rupture history of the SMFZ. Dolan et al. (2000) identified the fault location based on topographic scarps shown in Figure 8. Both trenching studies and seismic reflections profiles at the VA property (Crook et al., 1983; Pratt et al., 1998; Dolan et al., 2000; Catchings et al., 2001) indicate that the SMFZ topographic scarp contains a series of steeply dipping to sub-vertical faults that offset late Quaternary age sediments. The topographic scarp is visible on historic topographic maps as trending northeast through the Los Angeles Country Club, the 9988 Wilshire site (service station property adjacent to the Site on the northwest), across Wilshire Boulevard and to El Rodeo School (Figures 5 and 6). The topographic scarp is generally coincident with the northern limit of the secondary faulting or hanging wall deformation associated with the primary basal rupture surface of the SMFZ.

The CGS (2010) geologic map of the Los Angeles 30' x 60' Quadrangle (scale 1:100,000) shows the location of the SMFZ approximately 180 feet west of the 9900 Wilshire Site (Figure 4). The depicted location of the SMFZ is based on the location of the geomorphic scarp identified by Dolan et al. (2000) but has not been verified by subsurface exploration near the Site. The fault is shown to terminate on the east at the WBHL. Groundwater levels measured in monitoring wells at 9988 Wilshire (TRC, 2009 and Antea Group, 2014) suggest a groundwater barrier is present near where the CGS (2010) compilation map locates the main trace of the SMFZ. The groundwater barrier likely represents a splay of the SMFZ adjacent to the Site (Figures 5 and 6).

Parsons (2011) identified four northeast-trending splays of the SMFZ within the Los Angeles Country Club (approximately 1,000 feet west of the Site) and several northeast-trending splays south of Santa Monica Boulevard, investigated by Geocon (2013) at the Westfield site. The Parsons (2011) splays of the SMFZ, south of Santa Monica Boulevard, lack geomorphic expression and have been shown to exhibit predominantly strike-slip movement and are not active (Geocon, 2013). The faults within the Los Angeles Country Club, closer to the geomorphic scarp, could be part of the same inactive fault system investigated by Geocon (2013) but likely represent the active reverse faults associated with the geomorphic scarp and warrant further investigation in the area.

Kenney interprets all of the splays of the SMFZ identified by Parsons (2011) as secondary upper plate faults related to the primary basal left-lateral reverse SMFZ that likely daylights south of the Century City area. Kenney (2012) labels these faults as the "Santa Monica Boulevard Fault Zone" (SMBFZ), distinguishing them from the primary basal SMFZ that underlies the Century City area at depth (Figure 7). Kenney (2012) indicates that many of the SMFZ related splays or faults identified by Parsons (2011): a) likely exist, b) are in similar locations proposed by Parsons (2011), and c) are not active. In particular, Kenney concluded that the SMFZ related faults interpreted by Parsons (2011) south of Santa Monica Boulevard are likely inactive based on apparent continuation of unfaulted Pleistocene age

geologic units overlying the faults (Kenney, 2012). This conclusion was confirmed for the specific faults investigated by Geocon (2013) at the Westfield site.

In summary, the intersection of the SMFZ and the WBHL is complex and still poorly understood. The Dolan et al. (2000) study at the VA hospital indicates splays of the SMFZ in the scarp area are active, typically exhibiting reverse motion. In contrast, the Geocon (2013) investigation and the Kenney (2012) regional assessment suggest the SMFZ related faults south of the scarp are not active and exhibit predominantly strike-slip motion with both normal and reverse secondary motion (displacement).

7. FAULT ACTIVITY CRITERIA

The criteria used in our investigation to evaluate fault activity at the 9900 Wilshire Site are the same criteria used by the California Geological Survey that defines an active fault as one that has had surface displacement within Holocene time (about the last 11,000 years). These criteria for defining an active fault are based on criteria developed by the CGS (Bryant and Hart, 2007) for the Alquist-Priolo Earthquake Fault Zoning Program. Faults that have not moved in the last 11,000 years are not considered active.

8. SITE-SPECIFIC INVESTIGATION

8.1 General

Our site-specific investigation at the 9900 Wilshire Site was performed in accordance with CGS Guidelines for Evaluating the Hazard of Surface Fault Rupture (CGS Note 49) and current geologic standards-of-practice and included several methods of analysis and field exploration and review of readily available literature summarized in the Geocon (2013) Phase 1 report. Our review specifically focused on: a) the technical reports for the Parsons (2011) and Leighton (2012) investigations, b) the Kenney (2012) regional assessment, and c) previous geotechnical borings at the 9900 Wilshire Site by MACTEC (2008). We also utilized the stratigraphic age data from our previous fault rupture investigation at 10000 Santa Monica (Geocon-Feffer, 2012) and the recently completed Westfield investigation (Geocon, 2013) (Figures 5 and 6). We also reviewed groundwater level information (Antea Group, 2014; TRC, 2009) collected in nine groundwater monitoring wells at the adjacent service station property to confirm a groundwater barrier is present at that site and to compare general consistency of groundwater levels with those encountered in our borings at 9900 Wilshire.

Our field exploration included the excavation of three exploratory trenches, advancement of nine CPTs, and drilling and logging of 18 continuous-core hollow-stem auger borings along two transects, Transect A oriented in northwest direction along the western Site boundary and Transect B oriented in a general east-west direction within the Wilshire Boulevard right-of-way along the northern Site boundary. Utilities and structures at the Site greatly limited the placement of explorations. Nonetheless, the transects for our site-specific investigation are generally perpendicular to reasonable projections of potential SMFZ faults that may traverse the Site. Average spacing of the explorations was on the order of 40 feet on the western Site boundary and 10 to 40 feet on the northern Site boundary. The three exploratory trenches were purposely

located across projected extensions of the Parsons (2011) WBHL faults and the potential faults identified by GeoVision (2012). Figure 9 shows the location of Parsons (2011) and GeoVision (2012) inferred faults that may impact the Site and the locations of our explorations. Our explorations were surveyed for precise location and elevation (Psomas, 2013). Select photographs of the field investigation are presented in Appendix A.

8.2 Previous Seismic Reflection Survey

GeoVision (2012), under the direction of AMEC, completed a preliminary seismic reflection survey the Site in January 2012. The seismic reflection survey included two seismic lines, Line 1 approximately 369 feet long and Line 2 approximately 339 feet long, both of which extend from the western property line through the parking structure, parallel to Santa Monica Boulevard and the southern property (Figure 9). Anthony Martin and William Dalrymple (geophysicists with GeoVision), suggest that two north-trending faults may traverse the Site (Figure 9). Based on their interpreted northern trend, these faults may be related to the WBHL. Accordingly, these preliminary fault interpretations warranted further site-specific investigation. The seismic interpretations by GeoVision (2012) are included in Appendix B.

8.3 Subsurface Exploration

8.3.1 Exploratory Trenches

Three exploratory trenches were excavated across faults interpreted to be either on-site (GeoVision, 2012) or projecting on-site (Parsons, 2011). Trench 1 was oriented in a northwesterly direction along the west side of the parking structure and traversed the western fault interpreted by GeoVision (2012). Trench 2 was oriented in a northwesterly direction on the east side of the parking structure in a surface parking lot and traversed the eastern fault interpreted by GeoVision (2012). Trench 3 was oriented in a northeasterly direction, in the partial subterranean level of the existing parking garage, and traversed the projection of the two Parsons (2011) postulated WBHL faults that have not been specifically investigated by subsurface exploration as part of the previous fault investigations in the]area. The locations of the three exploratory trenches are shown on Figure 9.

Trenches 1 and 2 were excavated with a standard rubber-tire backhoe to depths of 7½ to 17 feet below the existing ground surface. The height restriction in the parking garage required use of a mini-excavator for Trench 3, excavated to a depth of approximately 8 feet.

The surface of the natural sediments exposed on both trench walls was cleaned of smeared earth material and closely examined for indications of faulting. These indications could include offset geologic units, contacts, or laminations (bedding), tectonically disturbed or deformed clay layers, clay gouge, soil- or clay-filled fractures, fissures, or striae on surfaces. Distinct geologic units, based on criteria that included lateral continuity, degree of soil development, color, lithology, fabric (i.e. fining

upward sequences), texture, and degree of weathering, were delineated by nails and flagging on one wall of each trench.

The contacts (lithologic and pedogenic) between the designated units, locations of fractures, and unique features exposed in the trench walls were logged in the field. Detailed logging of the trench walls was performed at a scale of 1 inch equals 5 feet. Lateral stationing was established by a standard measuring tape and horizontal string lines (vertical reference datum) were established across each trench.

After the trenches were logged, Dr. Roy Shlemon, COBH Technical Reviewer, visited the Site to observe the trenches and to discuss the preliminary interpretations regarding the age and origin of the exposed sediments.

8.3.2 Exploration Transects

Our exploration program was performed in two transects, one on-site along the western property boundary and one off-site along the north property boundary within the Wilshire Boulevard right-of-way. Spacing between explorations was an average of 10 to 40 feet. The planned location and planned depth of our subsurface explorations were determined based on the following considerations:

- trend of known faults within the Site vicinity,
- locations of postulated faults from previous investigations or published geologic maps,
- locations of prior explorations,
- locations of existing structures and utilities.

Transect A, located along the western property boundary, was explored by drilling 13 continuous-core borings and excavating one exploratory trench (Trench 1). The continuous-core borings were advanced to depths between 70 and 75 feet and the core samples were retained for further evaluation. The total transect length is approximately 820 feet. The transect location and corresponding explorations are shown on Figure 9.

The primary purpose for drilling the borings along Transect B in the Wilshire Boulevard right-of-way was to investigate faults that may extend from the Los Angeles Country Club and traverse the northwest portion of the Site, north of boring B13-A. Explorations could not be located on-site between B13-A and Wilshire Boulevard because of the existing municipal storm drain, an active MWD water line, and the existing commercial building at that location. Also, a transect of explorations in this area, parallel to the property line, would be somewhat parallel to the suspected trend of faults in the area and would likely not yield meaningful results.

Consequently, Transect B was located along the north property boundary, off-site within the Wilshire Boulevard right-of-way. Transect B was specifically designed to intercept reasonable projections of faults that may traverse the northwest portion of the Site (north of borings B12-A and B13A). This transect was explored by advancing nine CPTs and drilling five continuous-core borings. The total transect length is approximately 380 lineal feet and traverses the Dolan et al. (2000) Santa Monica Fault Zone geomorphic scarp and the northerly projection of the groundwater barrier identified at 9988 Wilshire (the adjacent service station property) (TRC, 2009). The locations of the continuous-core borings were discussed with the COBH Technical Reviewer prior to drilling. The borings were advanced to depths of approximately 70 feet beneath the existing ground surface and the core samples were retained for further evaluation. The transect location and corresponding explorations are shown on Figure 9.

8.3.2 Continuous-Core Borings

A total of 18 continuous-core borings were drilled along two transects, A and B, oriented parallel to the western and northern property boundaries with the intent of intercepting potential splays of the SMFZ that may project across the Site. The borings were spaced approximately 40 feet apart along Transect A and approximately 20 to 40 feet apart along Transect B and were drilled to depths between 70 and 75 feet. Continuous sampling of the subsurface materials was performed and the recovered core materials were logged in detail prior to removal from the core barrel. The color was included in the description and classification of the soils encountered based on the Munsell color system (Munsell Soil Color Charts, 1998). The core samples were logged for primary stratigraphy as well as pedogenic horizons (buried soil horizons) indicative of former ground surfaces.

The recovered core samples were placed in boxes and transported to a storage area on-site for further evaluation. Upon completion of the field investigation, the core samples from all of the borings were placed side-by-side and primary stratigraphy and secondary soil development was logged in detail a second time. The detailed logging included comparison of well-defined primary stratigraphy and secondary soil horizons between borings to develop a record of the subsurface stratigraphy and to evaluate lateral continuity of primary stratigraphy and between adjacent borings. The soils were correlated between adjacent borings on the basis of composition, color, texture, and secondary soil development. This information was used to develop a detailed stratigraphic profile (cross section) of the subsurface materials. The locations of the borings are shown on Figure 9. Logs of our borings are presented in Appendix C.

8.3.3 Cone Penetration Tests

Cone Penetration Tests (CPTs) yield relatively high-resolution data correlating soil type and engineering properties of the materials penetrated. A CPT consists of hydraulically advancing an electronic cone at the end of a series of rods into the ground at a constant rate and continuously measuring the resistance of the soil to penetration of the cone. Measurements are made of the tip

stress and sleeve friction; these resistances, along with the friction ratio (defined as the ratio of sleeve friction to tip stress), can be related to common soil properties and soil classification.

Nine CPTs were advanced along Transect B (Wilshire Boulevard) as an initial screening tool to locate areas of deformation and determine where continuous-core borings could be located to provide critical subsurface information to evaluate suspected faults. The CPTs were advanced to depths of approximately 70 feet beneath the existing ground surface. The locations of the CPTs are shown on Figure 9. CPT logs are presented in Appendix D

Our stratigraphic analysis of the CPT data was based on identification of sediment layers that were vertically well-defined and laterally continuous between CPTs. The CPT data provided detailed stratigraphic profiles; correlations between distinct sediment layers are possible within about 6-inch vertical increments. The lateral correlations were based mainly on groups of sediments with similar tip stress (Q_t), and friction ratio (R_f) signatures, in addition to similar soil type. Each CPT location was excavated by hand-augering to a depth of 5 feet beneath the existing ground surface to clear the location for potential underground utilities. Therefore, the upper 5 feet of the CPT signature is not considered in our evaluation.

8.4 Soil Stratigraphy and Relative Age Estimates

The main line of evidence for evaluating the presence or absence of faulting is the continuity of stratigraphy along the exploration transects. An additional line of evidence is the continuity of identified soil horizons (weathering profiles) along the exploration transects.

The CGS, as specified in the Alquist-Priolo Earthquake Fault Zoning Act (Bryant and Hart, 2007), defines an active fault as those that have had surface displacement within Holocene time (about the last 11,000 years). Therefore, it is important to establish the relative age of the sediments at the Site, particularly if they are suspected to be affected by faulting, to establish the age of the potential faults.

Numeric age-dating techniques, such as radiocarbon dates, are often a desirable method to estimate the relative age of the sediments for evaluating fault activity. When numeric dating methods cannot be used (i.e. owing to the absence of carbon or local contamination), relative age-dating methods can be used to estimate the minimum age of sediments based on the degree of soil development. Owing to the absence of carbon in the trench exposures and core samples, radiocarbon dating was not performed.

Mr. John Helms, CEG, assessed the relative age of sediments in the core samples and trenches. Five representative soil profiles were described from the core samples of Transect A (borings B3-A, B6-A, B7-A, B11-A and B12-A) and two representative soil profiles were described from the core samples of Transect B (borings B2-B and B5-B). Also, three representative soil profiles were described in Trench 1 and one representative soil profile was described in Trench 2 and in Trench 3. The general

descriptions of soil profiles, relative degree of soil development, and estimated age ranges are presented in Appendix E and summarized in Sections 9.0 and 10.0.

9. SUBSURFACE CONDITIONS

9.1 Geologic Units

The surficial geologic units encountered were divided by age and distinct stratigraphic packages and include: Younger Alluvial Deposits (Qya) of Holocene age, Older Alluvial Fan (Qof) and Older Terrace Deposits (Qot) of Pleistocene age, and terrestrial and shallow marine/near shore sediments of the Pleistocene age Lakewood Formation (Qlw). A generalized stratigraphic column of the sediments encountered in our explorations is summarized in Table 1.

Table 1: General Site Stratigraphy

Epoch	Time Scale (Age)	Geologic Symbol	Stratigraphic Unit
Holocene	**Present to 11,000+ years**	**af**	**Artificial Fill** Varying composition, locally containing concrete, asphalt and other debris
		Qal	**Young Alluvial Deposits** Primarily fine-to medium-grained sand and silty sand, minor silt and clay; variable amounts of fine gravel, massive to laminated.
Pleistocene	**11,000+ – ~55,000 years**	**Qof/Qot**	**Older Fan Deposits/Older Terrace Deposits** Older Fan Deposits: Primarily Silt, Silty Sand and Sand and gravel. Locally gravel-rich. Minor primary clay, massive. Older Terrace Deposits: Primarily Sand, Silt, and Clay. Variable amounts of gravel. Local gravel zones and clay-rich zones. Laminated sands characteristic at base of unit.

	~55,000 to ~150,000 years	**Qlw**	**<u>Lakewood Formation[2,3]</u>** Primarily fine-grained interbedded sand, silt and clay deposits, with some sand and gravel zones. Fine-grained laminated or varved sequences common.

The primary geologic units are described in detail in the boring logs and summarized below.

9.1.1 Artificial Fill (af)

Artificial fill was encountered along both exploration transects, particularly in the southern portion of Transect A (borings B1-A, B2-A and B3-A and Trench 1) and in the central portion of Transect B (boring B4-B) adjacent to the storm drain beneath Wilshire Boulevard. The fill was identified by construction debris (concrete, wire, wood, plastic) and observation of obvious mixtures or layers of soil that were not characteristic of natural alluvial processes.

9.1.2 Young Alluvial Deposits (Qal)

The Holocene Young Alluvial Deposits are interpreted as predominantly stream terrace and fluvial deposits originating from the Benedict Canyon drainage. The primary stratigraphy consists of predominantly fine- to medium-grained silty sand and sand with varying amounts of gravel and minor silt and clay. This unit is typically friable and porous and locally contains roots and organics. The young alluvial sediments were encountered along both transects (except the southern portion of Transect A, south of boring B4-A) and Trench 1 and 2. Young alluvium was not encountered in Trench 3.

9.1.3 Older Fan (Qof) and Older Terrace Deposits (Qot)

The Pleistocene older alluvial deposits at the Site are comprised of Older Fan Deposits, including fine-grained, gravel-rich sediments and locally coarsening upward sequences (considered debris flows), underlain by Older Terrace Deposits that generally consist of a series of stacked upward fining sequences characteristic of cyclic erosion and deposition in alluvial environments, and fine-grained laminated deposits that may represent overbank or estuary environments. These units appear to be generally continuous across the Site.

The Older Fan Deposits consist predominantly of fine-grained sand, silty sand and clayey sand with varying amounts of subangular slate gravel. In Trench 3, the Older Fan Deposits are primarily clay and silt with disseminated slate gravel ranging in size from fine to coarse. Strongly-developed

[2] California Department of Water Resources, 1961, *Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County*, Appendix A, Ground Water Geology, Bulletin 104.

[3] MACTEC, 2008, *Report of Geotechnical Investigation, Project Lotus Development, 9900 Wilshire Boulevard, Beverly Hills, California, Prepared for Lotus LLC, Beverly Hills, California*, dated September 2, 2008 (Project No. 49532-08-1181).

pedogenic structure and moderately developed secondary clay films were typically observed in buried soils except where gravel content is greater than approximately 20%.

The Older Terrace Deposits, characterized by a series of stacked fining upward sequences, are generally comprised of fine-grained sand, silty sand, and silt with sand with localized sand and gravel scour units and minor clay and silt beds. These deposits are massive to crudely stratified with varying degrees of oxidation and soil development. The basal unit along Transect A is a distinct laminated sand unit.

9.1.4 Lakewood Formation (Qlw)

The Lakewood Formation is a geologic unit designation used by the California Department of Water Resources (CDWR, 1961) for all older alluvial deposits of 15,000 to 275,000 years of age underlying younger alluvial sediments and late Pleistocene age terrace deposits in the Los Angeles Basin. Kenney (2012) groups the sediments in the Century City-Beverly Hills area as younger Benedict Canyon Wash Deposits (<40,000 years) and older Benedict Canyon Wash Deposits (40,000 years to 150,000 years) and Cheviot Hills Deposits (150,000 to 200,000 years). Based on age, Kenney's (2012) designated geologic units are all part of the Lakewood Formation sediments described by CDWR. We have designated the undifferentiated older alluvial deposits below the Older Terrace Deposits as Lakewood Formation, characterized by distinct predominantly fine-grained sediments with localized terrestrial channel deposits with an estimated minimum age of 55,000 years.

The primary stratigraphy of the designated Lakewood Formation is comprised of fine-grained sediments consisting of very fine sand, silt, silt and clay characteristic of low energy depositional environments such as estuary or lagoon environments. The units are massive to crudely stratified and include fine-grained laminated sands and varved clay sequences. Channel deposits consisting of sand and gravel zones are locally present which can be characterized as typically loose and friable and are locally highly oxidized. Locally, concentrations of calcium carbonate or manganese nodules are present. Soil development is strong in these sediments that are laterally continuous across the Site at depth.

9.2 Groundwater Conditions

Groundwater levels encountered in our explorations indicate the general groundwater gradient across the Site is to the south. The depth to groundwater varies from approximately 33 to 60 feet beneath the existing ground surface corresponding to approximately Elevation 209 to 249 MSL. Table 2 summarizes the groundwater levels encountered in our explorations. Groundwater data from prior explorations on-site (by others prior to 2009) was not considered as part of our evaluation of the Site groundwater conditions because of the time difference between the two sets of data.

Table 2: Summary of Groundwater Levels

(October 2013 ï January 2014)

Exploration	Exploration Elevation (feet)	Date Measured	Groundwater Depth (feet)		Groundwater Elevation (feet)	
			Encountered During Drilling	Static Groundwater	Encountered During Drilling	Static Groundwater
B1-A	269.7	10/3/13	60.4	ND	209.3	ND
B2-A	268.1	10/3/13	55.0	50.5	213.1	217.6
B3-A	268.4	10/4/13	55.0	53.0	213.4	215.4
B4-A	268.5	10/7/13	55.0	50.4	213.5	218.1
B5-A	272.3	10/7/13	55.0	ND	217.3	ND
B6-A	270.6	10/8/13	45.0	41.9	225.6	228.7
B7-A	270.7	10/8/13	40.0	38.0	230.7	232.7
B8-A	271.0	10/9/13	40.0	38.6	231.0	232.4
B9-A	269.7	10/9/13	38.0	ND	231.7	ND
B10-A	270.0	10/11/13	33.0	ND	237.0	ND
B11-A	273.8	10/10/13	48.5	45.5	225.3	228.3
B12-A	277.9	10/10/13	50.0	ND	227.9	ND
B13-A	277.80	1/24/14	50.0	48.5	227.8	229.3
B1-B	288.0	1/19/14	57.0	54.0	231.0	234.0
B2-B	288.6	1/20/14	58.0	54.5	230.6	234.1
B3-B	290.0	1/21/14	59.4	ND	230.6	ND
B4-B	291.7	1/22/14	43.0	34.3	248.7	257.4
B5-B	293.4	1/27/14	45.0	40.5	248.4	252.9
C1	295.9	10/31/13	ND	24.0+*	ND	271.9
C2	294.4	10/31/13	ND	24.3+*	ND	270.1
C3	292.5	10/30/13	ND	22.5+*	ND	270
C4	289.8	10/30/13	ND	55.0+*	ND	234.8
C5	288.3	10/30/13	ND	50.4+*	ND	237.9
C6	287.3	10/30/13	ND	50.7+*	ND	236.6
C7	286.3	10/30/13	ND	50.0+*	ND	236.3
C8	285.6	10/31/13	ND	50.0+*	ND	235.6
C9	285.0	10/31/13	ND	52.5+*	ND	232.5

* Groundwater depths and elevations are estimated

ND = Not Determined

10. SOIL STRATIGRAPHY AND RELATIVE AGE ESTIMATES

Five soil profiles from the three trench exposures were described in detail (Appendix E). In addition, five representative soil profiles from borings along Transect A (borings B3-A, B6-A, B7-A, B11-A and B12-A) and two representative soil profiles from borings along Transect B (borings B2-B and B5-B) were described in detail (Appendix E). The soil descriptions are used to calculate various soil development indices (or SDIs). The SDI values were then compared to the SDI values from similar described soils with known ages to estimate minimum age ranges for the soils at the Site.

The soils across the Site mainly developed in alluvial environments. All 12 of the soil profiles from the 3 trench exposures and the borings along Transects A and B consist of stacked and truncated buried argillic and cambic diagnostic subsurface soil horizons. The truncated buried soils range from slightly developed to strongly developed. The slightly developed soils typically are 10YR to 7.5YR in color. The more strongly developed profiles are typically 7.5YR in color with thin to moderately developed secondary clay films that bridge mineral grains and line ped faces, characteristic of argillic (Bt) horizons.

The soils observed across the Site are Holocene to Pleistocene in age. Age estimates range from 4,000 to 12,000 years for the young and thin surficial alluvial stream terrace deposit studied along the northern portion of the project Site. An older and thick alluvial fan deposit that underlies the entire project Site has relative age ranging from 15,000 to 27,000 years (Appendix E).

The near-surface buried soil profiles across the project Site are laterally continuous and relatively flat lying. Lateral variability in the soils across the Site is as a result of localized scouring, infilling, and stacking of these materials in an alluvial environment. In this sedimentological environment, surfaces that have been stable long enough to form weak and robust soils can suddenly be buried by a new deposit, or scoured out (truncated) and possibly in-filled with younger material. The amount of erosion that has occurred with each truncated soil under study is unknown. Thus, the relative age estimates are the minimum, and the underlying sediments (parent material) are inherently older.

Table 3 summarizes stratigraphic units observed at the Site, location, and relative age estimates.

Table 3: Stratigraphic Units and Relative Age Estimates

Stratigraphic Unit	Location	Relative Age Estimates (ka)
Qyt	Central Portion of site (T-1 and T-2)	4 - 8
	Northern portion of site (B-7, B-11, B-2b)	8 - 12
	Northwestern portion of site (B-13, B-5b)	12 - 20
Qof	Southern Portion of Site (T-3, B-3)	15 - 30
	Central Portion of site (T-1 and T-2)	19 - 38
	Northern portion of site (B-7, B-11, B-2b)	23 - 42
	Northwestern portion of site (B-13, B-5b)	27 - 50
Qot1	Southern Portion of Site (T-3, B-3)	23 - 48
	Central Portion of site (T-1, T-2 and B-7)	27 - 50
	Northern portion of site (B-2b)	31 - 54
	Northwestern portion of site (B-13, B-5b)	39 - 70
Qot2	Southern Portion of Site (B-3)	27 - 50
	Central Portion of site (B-7)	35 - 62
	Northern portion of site (B-2b)	39 - 66
	Northwestern portion of site (B-5b)	43 - 78
Qot3+4	Southern Portion of Site (B-3)	31 - 58
	Central Portion of site (B-7)	39 -70
	Northern portion of site (B-2b)	43 - 74
	Northwestern portion of site (B-5b)	51 - 91
Qot5	Southern Portion of Site (B-3)	32 - 64
	Central Portion of site (B-7, B-11)	40 - 86
	Northern portion of site (B-2b)	44 - 78
	Northwestern portion of site (B-5b)	55 - 99
Qot6	Central Portion of site (B-7, B-11)	44 - 94
	Northern portion of site (B-2b)	48 - 86
Qoa1	Southern Portion of Site (B-3)	55 - 104
	Central Portion of site (B-7)	59 - 112
	Northern portion of site (B-2b)	56 - 98
	Northwestern portion of site (B-5b)	63 -111
Qoa 2+3	Northern portion of site (B-2b)	79 - 140
	Northwestern portion of site (B-5b)	71 - 123

Detailed stratigraphic analysis report is presented in Appendix E.

11. DATA INTERPRETATION

11.1 General

Our detailed investigation utilizes multiple lines of analysis and includes correlations of primary stratigraphy, buried soils, and groundwater levels to evaluate the presence and activity of faults at the Site. Primary stratigraphy is Holocene stream terrace and fluvial deposits (Young Alluvial Deposits) underlain by Pleistocene alluvial fan deposits (Older Fan Deposits). The fan deposits are fine-grained, gravel-rich sediments (interpreted to be debris flows originating from Benedict Canyon) that truncate the underlying Pleistocene terrace deposits (Older Terrace Deposits). The terrace deposits are characterized by stacked fining-upward-sequences comprised primarily of varying amounts of sand, silt and gravel. The older fan deposits and the upper portion of the underlying terrace deposits are laterally continuous and unbroken across the Site.

Pleistocene Lakewood Formation sediments (undifferentiated older alluvial sediments) are present below the older terrace deposits that are comprised of primarily fine-grained massive to varved sediments characteristic of low energy environments with localized fine- to coarse-grained sand and gravel deposits. The younger alluvial deposits, older fan deposits and upper portion of the terrace deposits can be correlated across the entire project area.

The entire stratigraphic section is subhorizontal except locally in the northern portion of Transect A (Figure 12) and along the eastern portion of Transect B (Figure 13) where the geologic units are inclined less than three degrees and roughly mimic the slope of the ground surface. Correlation of buried soils (based on soil development, estimated age, and elevation) generally supports this interpretation. Faults are interpreted to be present where primary stratigraphy and distinct stratigraphic units do not correlate between borings and where an apparent vertical displacement of distinct stratigraphic units is observed.

Based on our analysis, we interpret that faults are present at the Site at depth but are not active. Also, several active faults are likely present adjacent to the Site on the north and northwest, but are located more than 50 feet from the Site northern boundary.

The activity of interpreted faults is based on the age of unfaulted geologic units determined by detailed stratigraphic analysis and soil-age estimates that generally coincide with soil-age data from the recent nearby fault investigations (Geocon, 2013; Geocon-Feffer, 2012). We thus constrain the age of faulting with a high degree of confidence based on the correlation of primary stratigraphy, groundwater levels, and the soil-age stratigraphic analysis.

11.2 Exploratory Trenches

11.2.1 General

As previously described, each trench was excavated across the surface projection of a fault interpreted by GeoVision (2012) or Parsons (2011) to be either on-site or projecting toward the Site. The exposed stratigraphy in the trenches is sufficiently well defined to evaluate continuity of geologic units. We thus find positive evidence for continuous unfaulted sediments of sufficient age to rule out the presence of active faulting within the limits of each trench.

11.2.2 Trench 1

Trench 1, on the west side of the parking structure, traversed the western fault interpreted by GeoVision (2012) (Figure 9). Artificial fill of varying thickness was exposed along the entire trench to a maximum thickness of approximately 7 feet. Exposed geologic units include Young Alluvial Deposits (Units 1, 7, 8 and 9), over Older Fan Deposits (Units 2 and 3) and Older Terrace Deposits (Units 4 and 5).

The exposed stratigraphic section is well-defined and continuous across the length of the trench except where the Young Alluvial Deposits are locally removed by grading and near Stations 1+00, 1+15, and 1+49 where channel incision has removed the Young Alluvial Deposits, the Older Fan Deposits, and the upper portion of the Older Terrace Deposits and subsequently in-filled with younger channel sediments. The channel bottoms were observed in the trench and the geologic units exposed beneath the channels are continuous across the trench. The entire stratigraphic section is estimated to have a minimum age of 27,000 to 31,000 years except in the vicinity of the channels where a large section of the older fan and terrace deposits have been removed. In these areas, the minimum age of the stratigraphic section is estimated to be 20,000 years (Appendix E).

As illustrated on Figure 10, there is positive evidence for continuous unbroken, pre-Holocene sediments to rule out active faulting within the limits of Trench 1.

11.2.3 Trench 2

Trench 2, on the east side of the parking structure in a surface parking lot, traversed the eastern fault interpreted by GeoVision (2012) (Figure 9). Minimal artificial fill (less than several inches beneath the asphalt paving) was observed in this trench and is not depicted on the log. Exposed geologic units include Young Alluvial Deposits (Units 1 and 2) over Older Fan Deposits (Unit 3) and Older Terrace Deposits (Units 4 and 5). The exposed stratigraphic section is well-defined and continuous across the length of the trench. The entire stratigraphic section has a minimum age estimate of 35,000 years (Appendix E).

Here, too, Trench 2 (Figure 11) provides evidence for continuous unbroken, pre-Holocene sediments to negate active faulting within the limits of Trench 2.

11.2.4 Trench 3

Trench 3, in the partial subterranean level of the parking garage, traversed the projections of the two Parsons (2011) postulated WBHL faults (Figure 9). Artificial fill was not observed in Trench 3. Exposed geologic units include Older Fan Deposits (Unit 1) over Older Terrace Deposits (Units 2 through and 5) and the entire stratigraphic section is estimated to be a minimum age of 27,000 years old. Here too, sediment ages are based on soil-stratigraphic estimates (Appendix E). Channels (Units 6 and 7) have eroded the Older Terrace Deposits east of Station 0+80. The older of the two channel deposits (Unit 6) locally eroded Units 3, 4 and 5 (estimated minimum age of 27,000 years). The younger channel (Unit 7) locally eroded Unit 2 (minimum age of approximately 23,000 years) and the older channel deposits (Unit 6). Since Unit 1 (estimated minimum age of 15,000 years) overlies these channels and is stratigraphically higher and younger, we can estimate the minimum age of the youngest channel post-dates the age of Unit 2 but pre-dates the age of Unit 1.

Trench 3 (Figure 11) thus similarly exposes continuous unbroken, pre-Holocene sediments and eliminates the potential for active faults in the area.

11.3 Transect A

The distinct primary stratigraphic units observed along Transect A include a) Older Fan Deposits, b) laminated sand unit near the base of the Older Terrace Deposits, and c) top of the Lakewood Formation. These units and corresponding contacts were encountered in all the borings along Transect A and thus are correlated with a high degree of confidence along the length of the transect. Also, most strongly-developed argillic soil horizons are correlated between borings along Transect A with a high degree of confidence based relative profile development.

The basal contact of the Older Fan Deposits is distinct and has locally eroded the underlying Older Terrace Deposits. This contact was particularly well-defined throughout the trenches and in the core samples. Also, the laminated sand unit is distinct in the core samples, characterized by laminated or very thin alternating beds of very fine- to fine-grained sand, silty sand and silt. The top of the Lakewood Formation, characterized by a clay-rich soil horizon, was typically gray or poorly oxidized and visibly marked a distinct contact, separating the Older Terrace Deposits from the underlying predominantly fine-grained Lakewood Formation sediments (primarily silt and clay and very fine-grained sands) that were commonly varved or laminated. The basal unit of the overlying Older Terrace Deposits locally scours the top of the Lakewood Formation units. The Lakewood Formation marks a distinct change from a higher energy or stream-related depositional environment to a low-energy depositional environment characteristic of estuaries or lagoons. Figure 12 depicts the subsurface conditions encountered along Transect A.

Based on our analysis, we interpret five faults are present at depth along Transect A where the marker laminated sand and the Lakewood Formation sediments are clearly offset. The faults are designated

Fault A, B, C, D and E (from south to north) (Figure 12). In most cases, as shown on Figure 12, groundwater levels were similarly affected in the areas of interpreted faults evidenced by differences in elevation on either side of the fault.

These faults are widely spaced and may represent a branching out of splays of the SMFZ as it intersects with the WBHL. These faults are not active based on the estimated minimum age of the unfaulted sediments (minimum age of approximately 27,000 to 40,000 years). The age of the unfaulted sediments is similar to the age of the Kenney (2012) SMBFZ faults previously investigated at the Westfield site (Geocon, 2013) where the minimum age of unfaulted sediments were estimated to be approximately 34,000 years.

Two possible faults, designated Fault A' (adjacent to Fault A) and Fault B' (adjacent to Fault B) may be present at a depth greater than 60 feet beneath the existing ground surface (Figure 12). Both of these faults are confined to channel deposits of variable thickness within the Lakewood Formation (>55,000 years old), near the base of the stratigraphic section explored by the borings. The difference in thickness of the channel deposits could be related to natural depositional processes or faulting but cannot be evaluated without deeper stratigraphic information. These faults, if they exist, would not be active and may connect at depth to adjacent faults.

The locations of the interpreted faults along Transect A are shown on Figures 12 and 14.

11.4 Transect B

Nine CPTs and five continuous-core borings are located along Transect B within the Wilshire Boulevard right-of-way at the northern boundary of the Site. The CPTs were performed prior to the borings as a screening tool to identify areas of deformation or anomalies that would require subsequent exploration with borings. Our interpretation of CPT data strongly suggests that the stratigraphic section east of C4 is laterally continuous, undeformed and not disrupted by faulting. However, anomalies are clearly present west of C4. Our borings were placed west of C6 to confirm the lateral continuity of sediments between C4 and C6 and to evaluate the anomalies observed west of C4.

The distinct primary stratigraphic units observed in the borings along Transect B are similar to those observed in Transect A and described in the previous section. Also, as in Transect A, well-developed argillic soil horizons are interpreted to present along the length of Transect B and can be correlated between the borings to evaluate the continuity of the sediments. Figure 13 depicts the subsurface conditions encountered in explorations along Transect B and separately illustrates the correlation of primary stratigraphy and correlation of buried soils. Comparison of the two cross sections demonstrates our interpretations of fault locations and apparent offset of geologic units are very similar considering either stratigraphic or buried soils data.

We interpret a zone of five closely spaced faults along Transect B, west of C4 where the previously discussed distinct stratigraphic contacts were clearly offset. The faults identified along Transect B are designated Fault F, G, H, I and J (from west to east). As depicted on Figure 13, groundwater levels are similarly affected in the areas of interpreted faults, similar to Transect A, evidenced by differences in elevation on either side of the interpreted fault.

The faults depicted on Figure 13 are generally located between borings. However, an exception is Fault I where the upper 20 feet of B3-B cannot be correlated with corresponding sediments in Boring B-2B and are interpreted to be faulted. Below a depth of 20 feet, the stratigraphic units are clearly not faulted between these borings (based on correlation of key stratigraphic units). This condition suggests that Fault I projects through boring B3-B, though faults were not observed in the core samples from this boring. Fault I is not interpreted to project east of C4 because the upper stratigraphy in boring B2-B can be correlated with the stratigraphy interpreted in C4 which indicates these geologic units are not faulted.

The locations of the interpreted faults along Transect B relative to the Site are shown on Figures 13 and 14.

11.5 Age of Faulting

11.5.1 On-site Faults (Faults A Through E)

The Young Alluvial Deposits, Older Fan Deposits and upper Older Terrace Deposits are relatively undeformed and laterally continuous across the Site. There is positive evidence, based on continuity of the exposed well-defined sediments, that faulting is not present within the exploratory trenches. The sediments in the trenches are an estimated minimum age of 20,000 to 35,000 years (Appendix E). Faults, if present beneath the trenches, would not be considered active.

Along Transect A, five faults were interpreted to offset the Lakewood Formation and the overlying marker laminated sand unit. These faults, designated Faults A through E, are a minimum age of 27,000 to 40,000 years old, based on estimated ages of the oldest unfaulted geologic units across these faults, and, therefore, are not active.

Faults A through E may be part of the previously described (Kenney, 2012) SMBFZ recently investigated by Geocon (2013) at the Westfield Century City Mall site, interpreted as inactive secondary upper plate faults to the deeper SMFZ. This relationship cannot be absolutely confirmed. However, the age of faulting interpreted at the Westfield Century City Mall site is estimated to be a minimum age of 34,000 years which is generally consistent with this investigation where the minimum age of unfaulted units is 27,000 to 40,000 years.

11.5.2 Off-site Faults (Faults F through J)

Off-site, along Transect B, Faults G, H, and I are interpreted to be active based on minimum estimated ages of faulted sediments (4,000 to 12,000 years) (Appendix E). Fault J is inactive as it offsets the Lakewood Formation sediments but not the overlying Older Terrace Deposits. Fault F appears to offset Holocene sediments but the age of faulting cannot be determined based on the lack of specific boring data west of this fault. Other faults may exist west of Fault F but were not investigated by this study which focused on the 9900 Wilshire Site.

11.6 Fault Trend, Geometry, and Apparent Displacement

11.6.1 Fault Trend

Fault locations are limited between borings and CPTs. While the fault trend along Transect A could not be defined, further exploration is not warranted because these faults are not active and therefore will not impact future development.

Similarly, we were not able to define the trend of faults interpreted along Transect B. Considering the limitations of off-site exploration and locations of existing utilities and, after consultation with COBH representatives, it was determined impractical to trench this area. Accordingly, we advanced nine CPTs and drilled five continuous core borings along a transect that would intersect reasonable projections of the SMFZ across the western property line. Although uncertainty is inherent in all fault investigations, our site-specific data indicate that active faults do not directly impact the proposed development (Figure 15).

11.6.2 Fault Geometry

Based on the spacing of the borings and CPTs, fault dip could vary from approximately 35 degrees to near vertical. Fault geometry (i. e. branching or flower structure) therefore cannot be determined, but we have depicted the faults as dipping to the north for they are reasonably associated with the SMFZ (Figures 12 and 13).

The GeoVision (2012) preliminary interpretation (Appendix B) depicts the faults as flower structures, branching out they project toward the surface. Based on the GeoVision (2012) analysis, many of the faults may connect at depth; however, our data are insufficient to confirm this.

11.6.3 Fault Displacement

We interpret the primary displacement along Faults A through E to be strike-slip based on thickening and thinning of stratigraphic units across interpreted faults. Also, mainly apparent vertical displacement across these faults exhibit both normal and reverse offset that suggests the primary movement is predominantly strike-slip. Our data are insufficient to warrant estimates of slip

direction, magnitude, or offset per seismic event. We therefore limit our fundamental conclusions to activity of the various faults and their impact on the proposed development.

Apparent relative displacement of stratigraphic units across Faults F, G, H and J is interpreted as primarily reverse. It is likely that strike-slip movement has also occurred evidenced by some thickening and thinning of units across the faults, but to lesser degree than the faults identified along Transect A. Fault I is interpreted to branch into at least two fault strands as it projects to the surface. The apparent relative displacement is both normal and reverse which suggests there is strike-slip motion as well.

A summary of fault characteristics including age and relative displacement is presented Table 4.

Table 4: SUMMARY OF FAULT CHARACTERISTICS

Transect A					
Fault	**A and Aô**	**B and Bô**	**C**	**D**	**E**
Relative Displacement	**North and South Sides Down**	**North and South Sides Down**	**North and South Sides Down**	**North and South Sides Down**	**North and South Sides Down**
Apparent Vertical Displacement (feet)	**1 to 7**	**2 to 7**	**3**	**1 to 4**	**2 to 6**
Minimum Age of Faulting (ka)*	**>27**	**>27**	**>39**	**>40**	**>35**
State Classification	**Inactive**	**Inactive**	**Inactive**	**Inactive**	**Inactive**
Transect B					
Fault	**F**	**G**	**H**	**I**	**J**
Relative Displacement	**East Side Down**	**East Side Down**	**East Side Down**	**West and East Sides Down**	**East Side Down**
Apparent Vertical Displacement (feet)	**2+**	**3 to 5**	**3 to 10**	**6 to 14**	**1 to 2**
Minimum Age of Faulting (ka)*	**Uncertain**	**<11**	**<11**	**<11**	**>44**
State Classification	**Unknown**	**Active**	**Active**	**Active**	**Inactive**

*ka = thousand years before present

12. CONCLUSIONS AND RECOMMENDATIONS

We previously submitted a Phase I report to the COBH that provided the regional geologic setting and information regarding specific faults that were previously inferred to project on or toward the Site and, therefore, potentially impact the proposed development (Geocon, 2013). Now, in accordance with current geologic standards-of-practice, we have completed our Phase II site-specific investigation for evaluation of potential surface fault rupture. The fundamental conclusions of our Phase II investigation are:

1. With a high degree of certainty, active faults (as defined by the State of California [Bryant and Hart, 2007]) do not directly impact the proposed 9900 Wilshire Boulevard development.

2. The previously inferred splays of the Newport-Inglewood Fault Zone (also called the West Beverly Hills Lineament) and the Santa Monica Fault Zone, that were inferred to project toward or into the Site, have been investigated on-site and are now shown to be demonstrably covered by unbroken sediments at least 27,000 to 40,000 years old and therefore, not active.

3. Active northwest-trending splays of the Santa Monica Fault Zone are located off-site to the north and west of the 9900 Wilshire Site. Because of the proximity of these faults to the Site and because of uncertainties in projection between subsurface borings and cone penetration tests, we recommend a 50-foot wide, structural setback zone be established from the northwestern property line, north of boring B13-A along the common boundary between the 9900 Wilshire Site and the adjacent service station property (see Figure 15).

We have now identified five on-site faults, the last surface movement of which took place prior to approximately 27,000 years ago. These faults, in the central and southern portion of the Site, are not active based on the current State of California definition (Bryant and Hart, 2007). Our trenches, intended to explore the GeoVision (2012) and Parsons (2011) inferred faults, expose laterally continuous and unbroken sediments that are at least 20,000 to 35,000 years old. Accordingly, these faults are not active or do not exist.

We have also identified a zone of active faulting, part of the Santa Monica Fault Zone, within approximately 50 feet of the north and west Site boundary. Based on our interpretation, we are confident that these off-site faults do not traverse the 9900 Wilshire Site.

Nevertheless, because of the proximity of active faults and the limitations on constraining the trend of these faults, we recommend a 50-foot structural set-back (no build zone) from the northwestern property line along the common boundary between the 9900 Wilshire Site and the adjacent service station property (9988 Wilshire) as shown on Figure 15. Owing to the lack of detailed stratigraphic data west of the property line and the uncertainty with respect to fault locations west of borings B13-A and C4, we assume active faults could be located immediately adjacent off-site. The recommended set-back zone is considered an appropriate mitigation measure to account for the inherent uncertainties of possible rupture along any of the nearby off-site faults outside the area we investigated.

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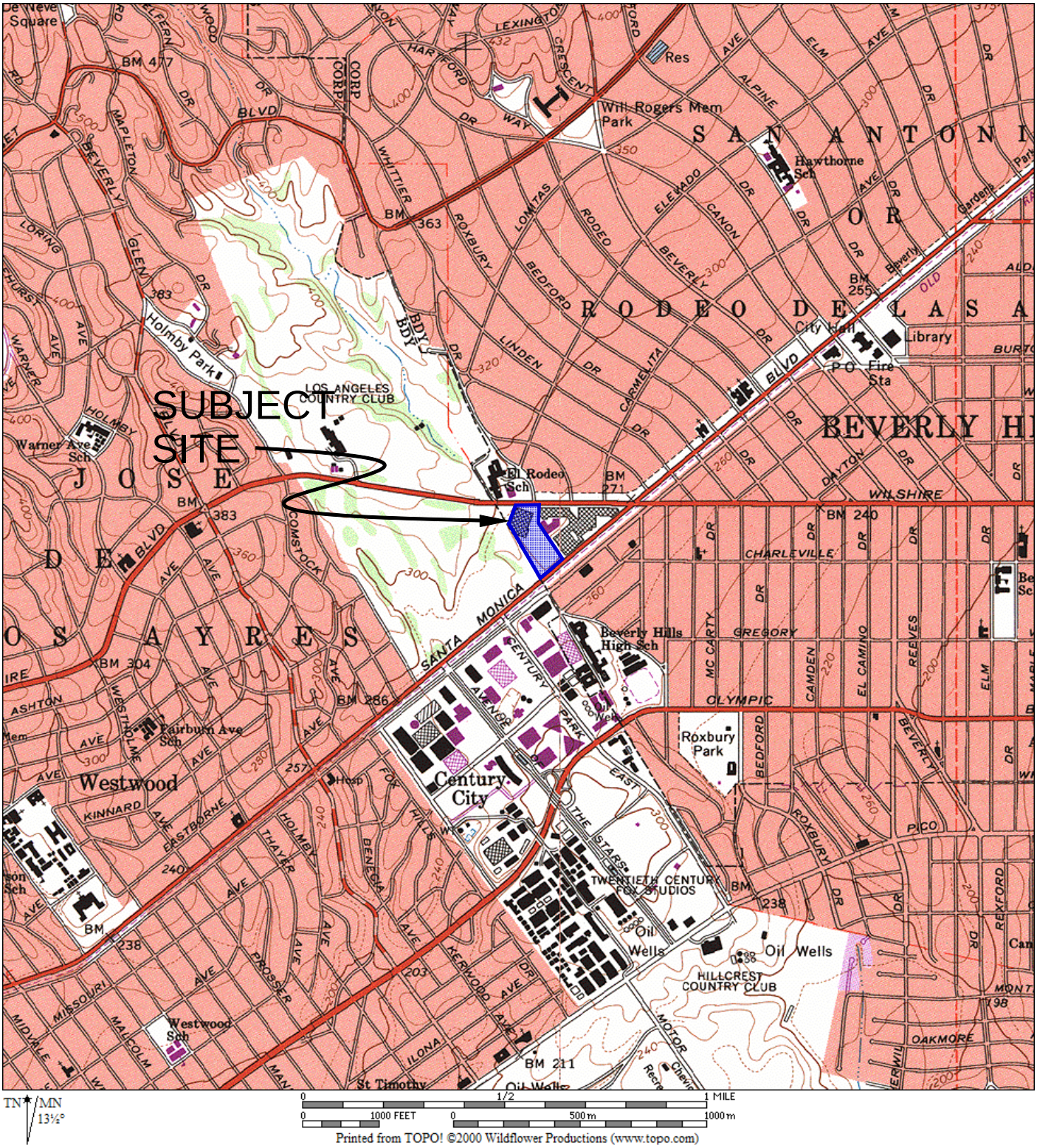

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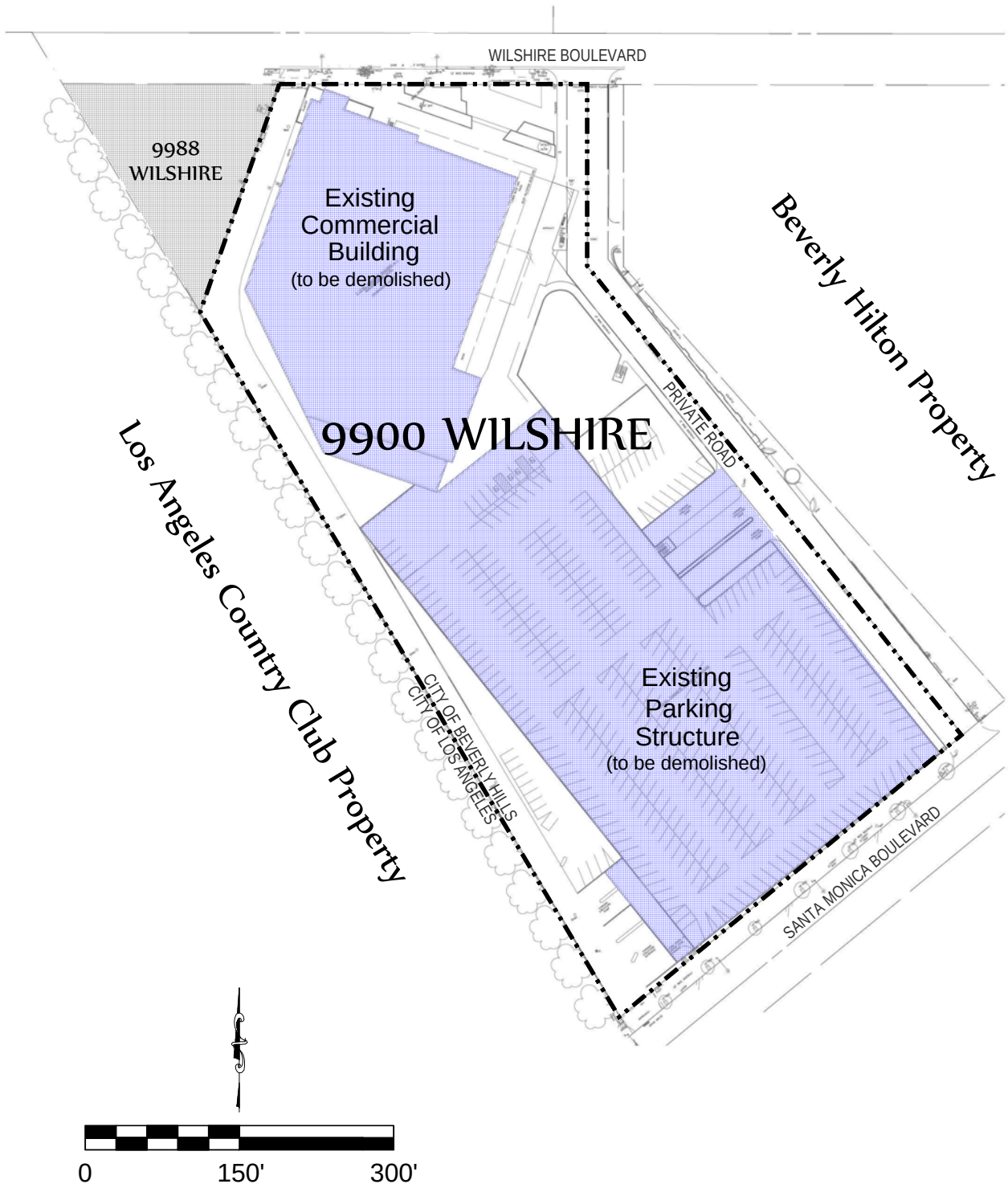
VICINITY MAP

FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 1



BASE MAP: Modified after Psomas, 2013, "Borehole Exhibit". Job No. 1BHW010100, Sheet 1 of 1

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SITE PLAN

FAULT RUPTURE HAZARD INVESTIGATION

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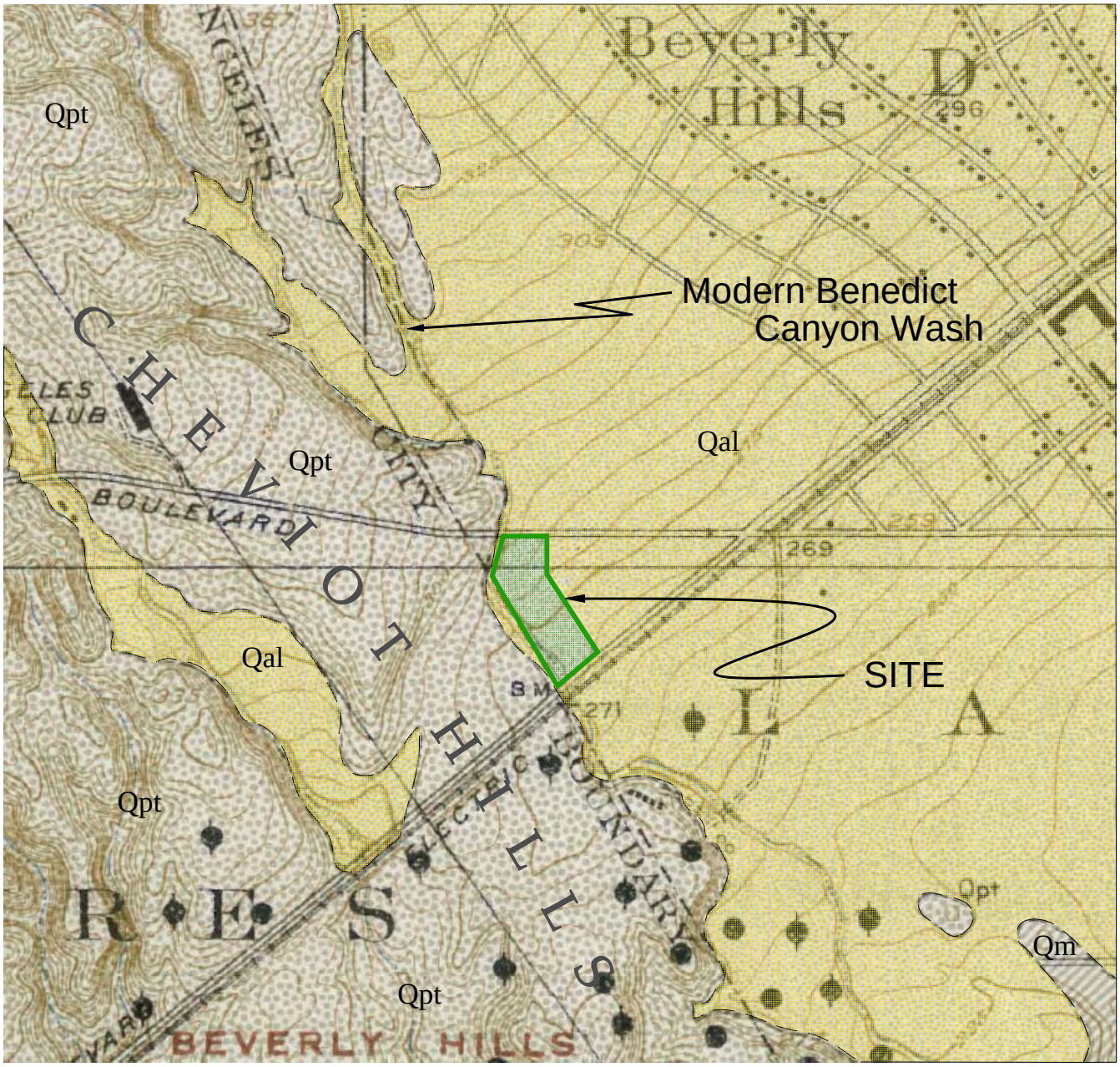
MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 2

REFERENCE: Modified after Hoots, H. W., 1930, Geology of the Eastern Part of the Santa Monica Mountains, Los Angeles Basin, in Shorter Contributions to General Geology, U.S. Geological Survey Professional Paper 165 - C. "Base from Surveys Made in 1923-1925 by US Geological Survey in Cooperation with Los Angeles County".



LEGEND

Qal - Alluvium: Coarse unconsolidated deposits in valleys and present stream channels

Qpt - Alluvial plain, stream, and marine terrace deposits

Qm - Marine Deposits: Marine sandstone, conglomerate, and clay shale

0 1000' 2000'

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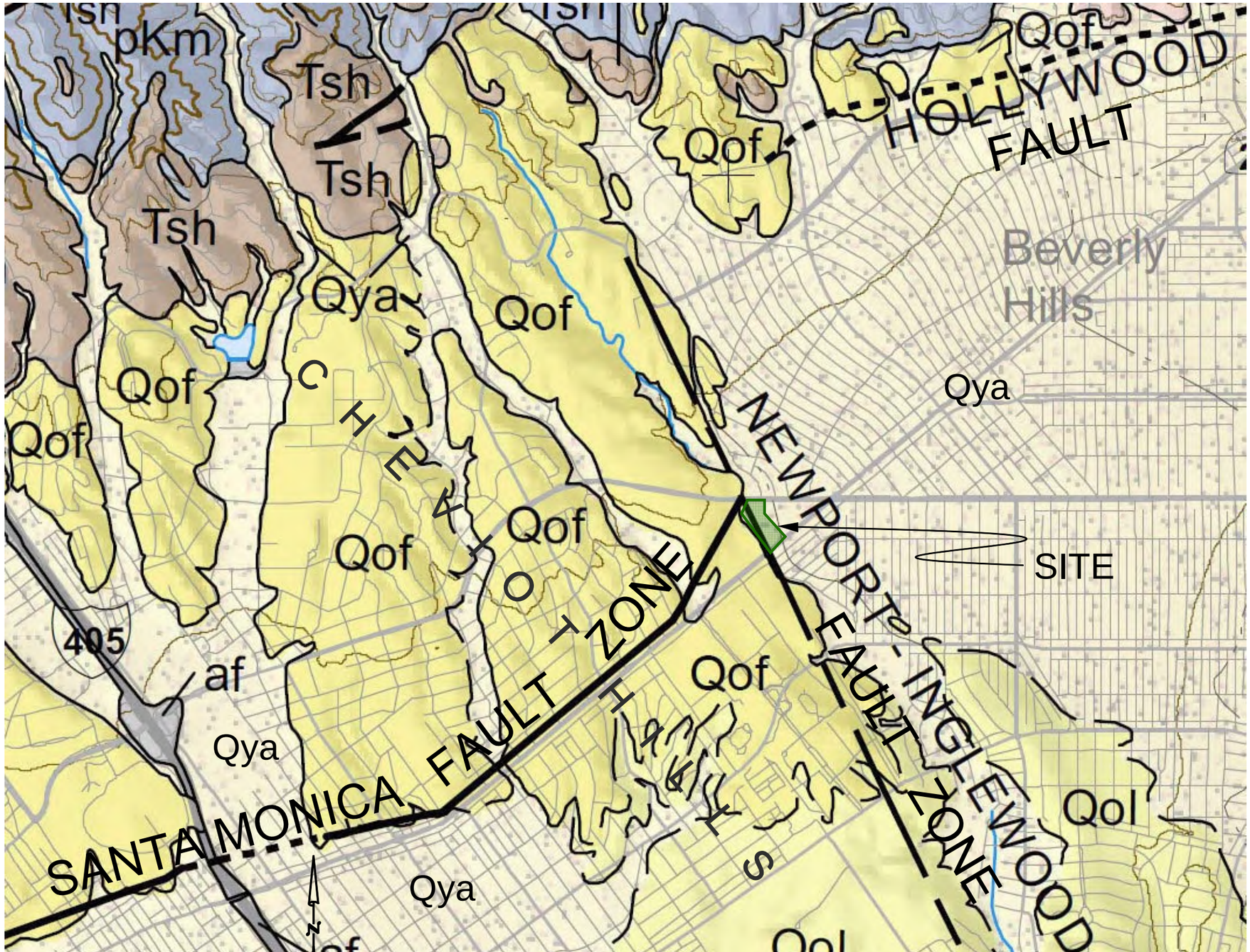
HISTORIC TOPOGRAPHIC AND GEOLOGIC MAP

FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 3



MAP UNITS

Late Holocene (Surficial Deposits)

af — Artificial Fill - deposits of fill resulting from human construction, mining, or quarrying activities: includes engineered fill for buildings, roads, dams, airport runways, harbor facilities, and waste landfills

Holocene to Late Pleistocene (Surficial Deposits)

Qya — Young Alluvial Valley Deposits - unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats or larger rivers

Late to Middle Pleistocene (Surficial Deposits)

Qof — Old Alluvial Fan Deposits - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qol — Old Lacustrine, Playa, and Estuarine (Paralic) Deposits - slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types

Tertiary (Bedrock)

Tsh — Fine-grained Tertiary age formations - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments

Mesozoic and Older (Bedrock)

pKm — Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin

REFERENCE: Modified after California Geological Survey, 2010, "Geologic Compilation of Quaternary Surficial Deposits in Southern California, Los Angeles 30' X 60' Quadrangle". A Project for the Department of Water Resources by the California Geological Survey, Compiled from Existing Sources by Trinda L. Bedrossian, CEG and Peter D. Roffers. Digital Preparation by Solomon McCrea and Barbara Wanish. July 2010, CGS Special Report 217, Plate 9.

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CGS 2010 COMPILATION GEOLOGIC MAP

FAULT RUPTURE HAZARD INVESTIGATION

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BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 4

LEGEND

- Parsons (2011) Interpreted Faults
- Santa Monica Fault (CGS, 2010)
- Groundwater Barrier (TRC, 2009; Antea Group, 2014)
- Santa Monica Fault Zone Geomorphic Scarp (Dolan et al., 2000)

N

0 400' 800'

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PARSONS (2011) INTERPRETED FAULTS

FAULT RUPTURE HAZARD INVESTIGATION
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BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 5

LEGEND

- Parsons (2011) Interpreted Faults
- Santa Monica Fault (CGS, 2010)
- Groundwater Barrier (TRC, 2009; Antea Group, 2014)
- Santa Monica Fault Zone Geomorphic Scarp (Dolan et al., 2000)

N

0 400' 800'

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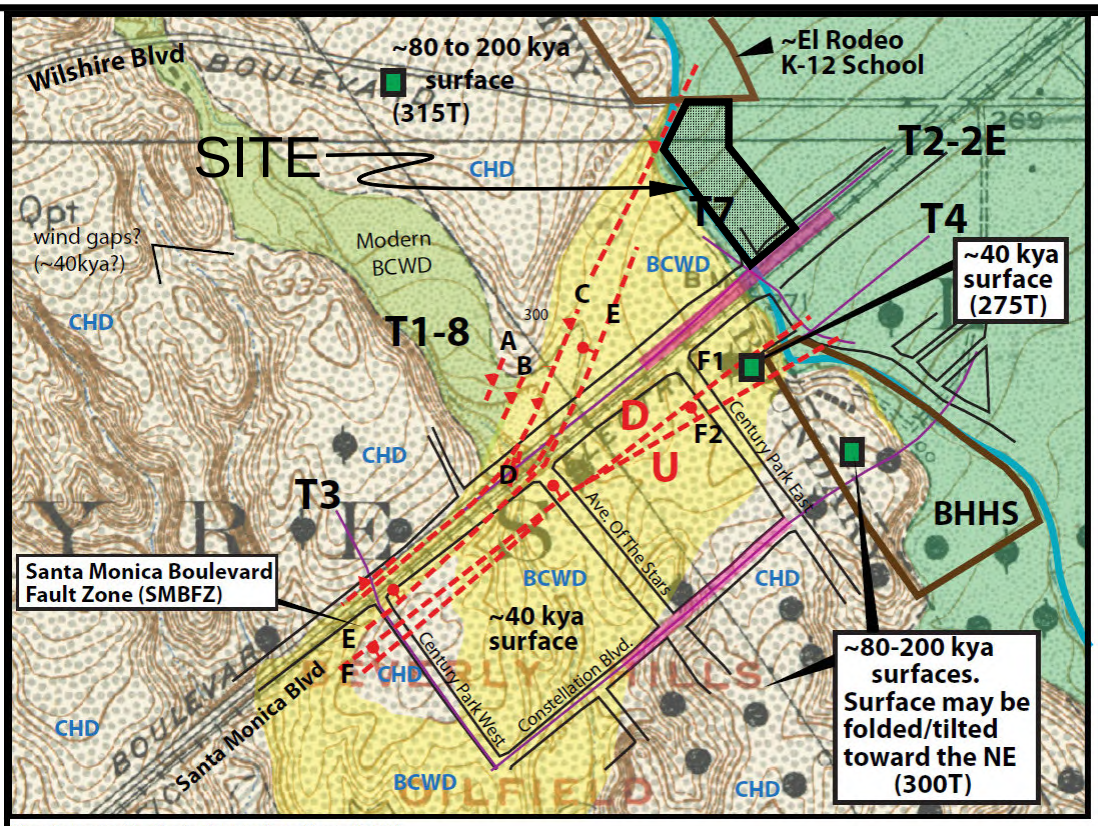
INTERPRETED FAULTS - REQUIRE FURTHER INVESTIGATION

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 6



Base topographic-Geologic map from Hoots (1931).

SYMBOL DESCRIPTIONS

Approximate limits of younger Benedict Canyon Wash Deposits (<~40,000 years old).

BCWD — Approximate limits of older Benedict Canyon Wash Deposits. Upper-most sediments are a minimum of ~40,000 years old.

CHD — Approximate limits of Cheviot Hills Deposits. Upper fan-terrace surfaces (315T and 300T, see notes) are 150,000 to 200,000 years old.

D/U — Approximate surface projection location of faults identified during this study. Balls and barbs for normal and reverse apparent displacement faults. D - down, U - Up sides.

T7 — Approximate location of geologic transect by Parsons (2012).

BHHS — Beverly Hills High School

Approximate location of soil with estimated age.

Proposed Metro Stations on Santa Monica Blvd, and Constellation Blvd.

Notes:

Based on the existing soil age data, nearly all of the sediments exposed at the surface within the Cheviot Hills are 40,000 to 200,000 years old.

The 300T and 315T fan-terraces are shown on Plate ES-4 and represent average elevations of the preserved surfaces.

0 scale 1000 feet

REFERENCE: Modified after Kenney, 2012, "Geomorphic, structural, and stratigraphic evaluation of the eastern Santa Monica Fault Zone, and West Beverly Hills Lineament, Century City/Cheviot Hills, California", Plate 1a, "Surface Geology and Fault Map of the Century City Area".

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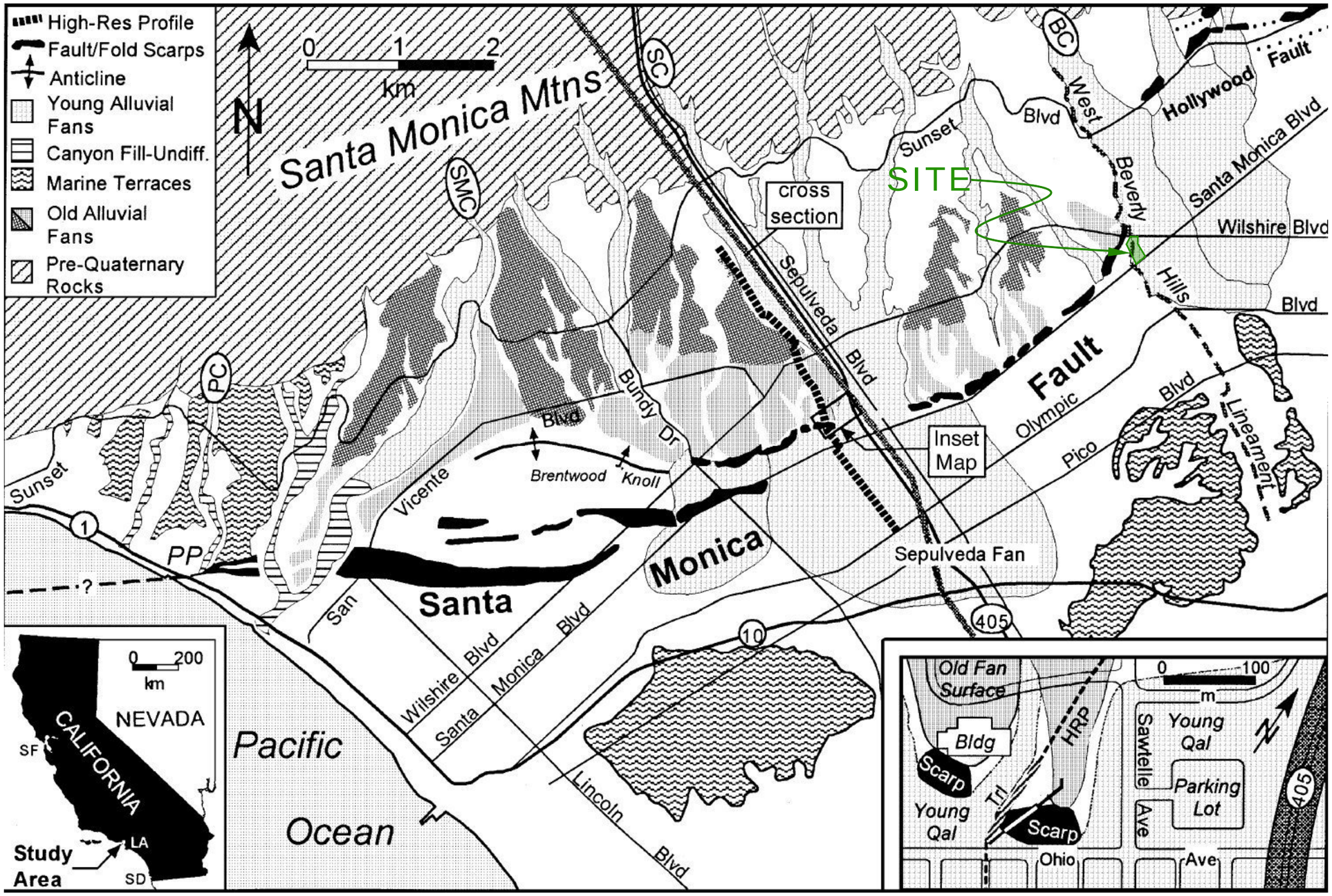
KENNEY (2013) PRELIMINARY FAULT MAP WITH NATURAL TOPOGRAPHY

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

AL		8000
MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 7



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SANTA MONICA FAULT ZONE - GEOMORPHIC MAP

FAULT RUPTURE HAZARD INVESTIGATION
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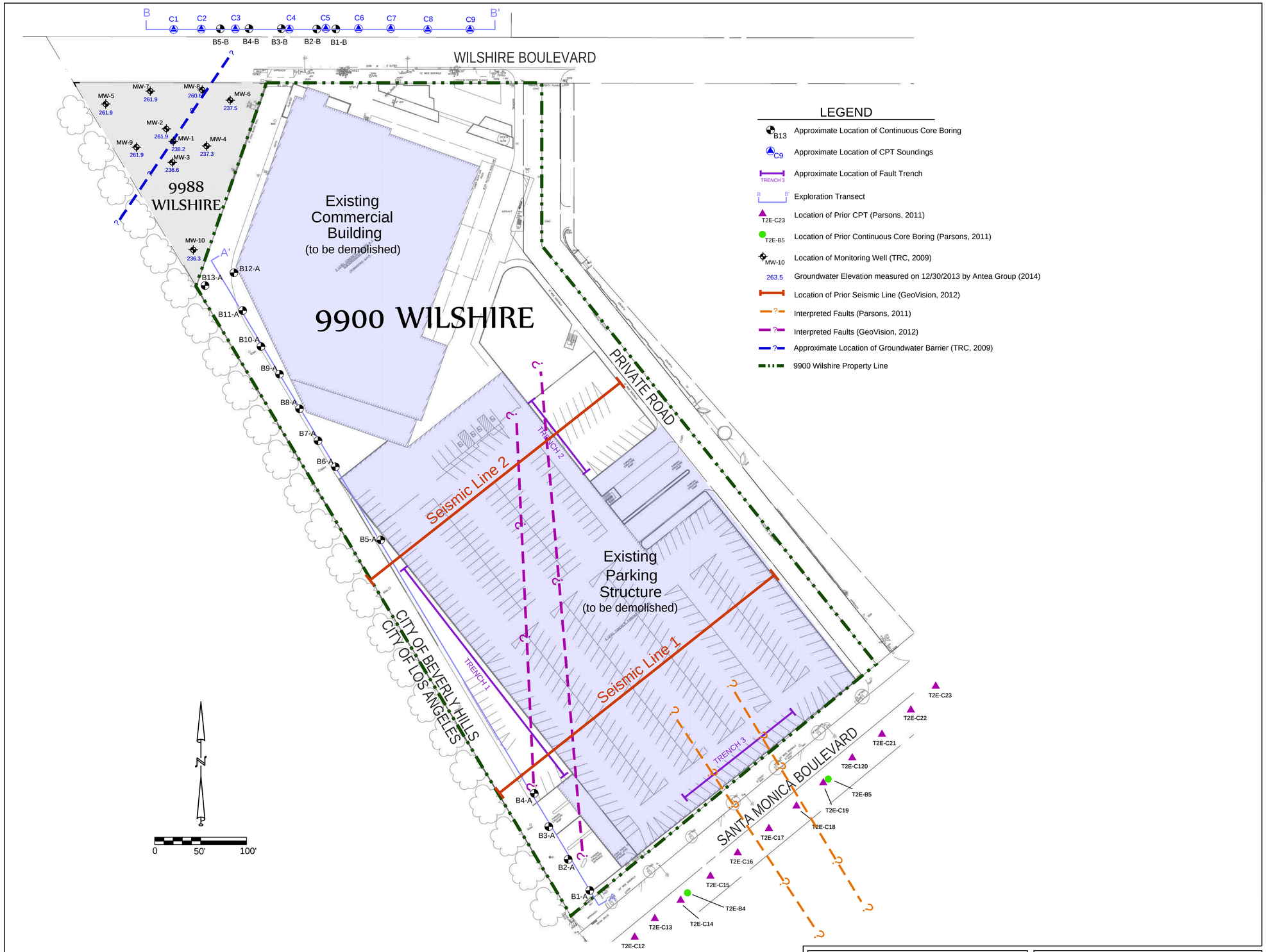
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 8



BASE MAP: Modified after Psomas, 2013, "Borehole Exhibit". Job No. 1BHW010100, Sheet 1 of 1

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EXPLORATION PLAN

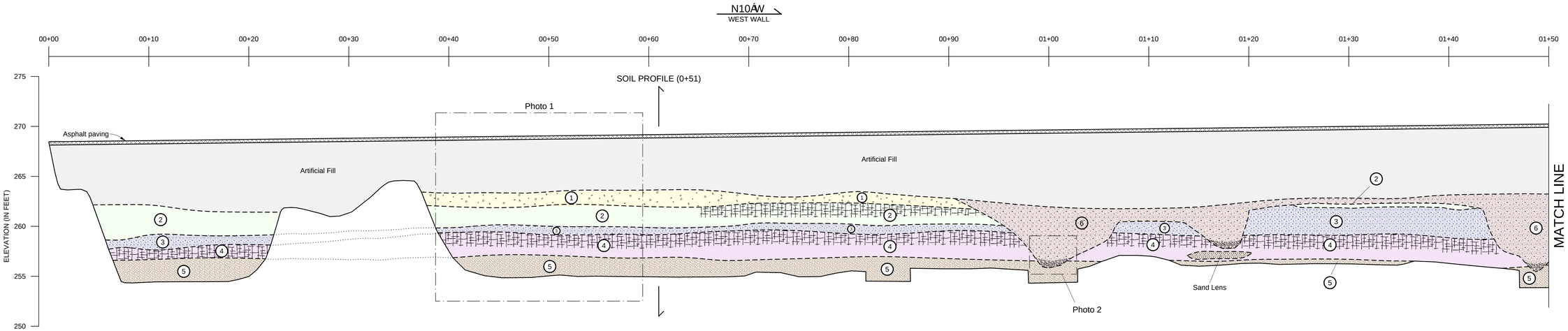
FAULT RUPTURE HAZARD INVESTIGATION

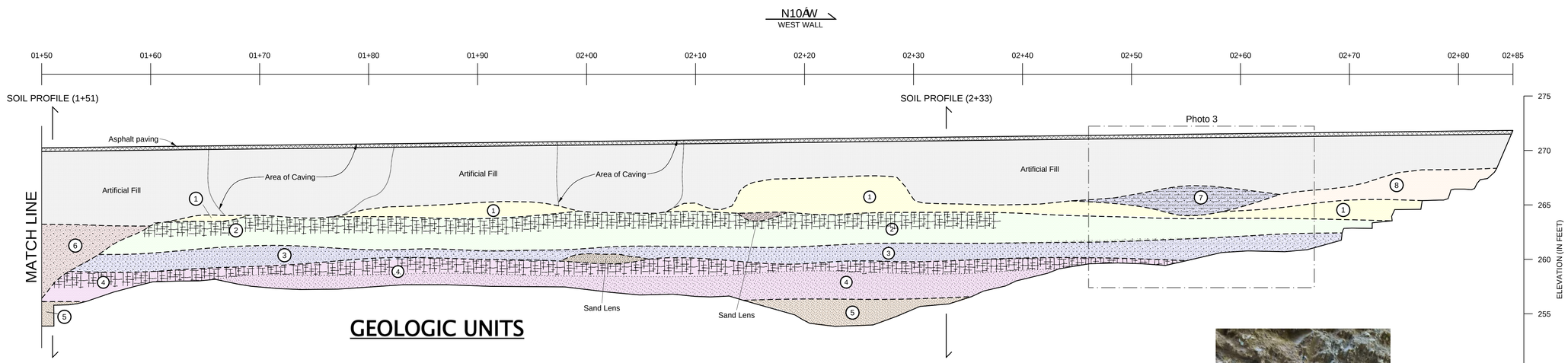
9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 9

TRENCH 1





GEOLOGIC UNITS

Unit 1
Alluvial Deposits – Silt, brown (10YR 4/3 to 10YR 4/4), trace to minor clay, and trace to minor disseminated gravel (to 1 inch), massive. Locally sandy, very fine-grained. Well-developed ped structure, partially gleyed. Gravel predominantly slate and some diatomaceous siltstone, subrounded to subangular. Lower contact narrowly gradational to abrupt.

Unit 2
Alluvial Deposits – Silt, brown (10YR 4/3 to 10YR 4/4), trace to with disseminated gravel (to ½ inch), minor clay, massive. Well-developed argillic horizon at top of unit, plugged with clay (except where abundant gravel), grading sandier with depth. Increase in gravel content north of Station 2+40. Well developed ped structure at top of unit except south of Station 0+65 and north of Station 2+40 where top of unit is gravelly. Lower contact narrowly gradational.

Unit 3
Debris Flow –Silt with Sand to Silty Sand with Gravel, brown (10YR 4/3) to dark brown (10YR 3/3), very fine-grained, plugged with clay, massive. Gravel disseminated throughout unit (10% to 50%), typically matrix-supported, locally clast-supported; Predominantly slate gravel with some diatomaceous siltstone gravel (to 2 inches; typically 1 inch or less in size), subrounded to subangular. Weakly to moderately developed ped structure (more developed where gravel content is less than 10%), secondary clay films, partially gleyed. Lower contact abrupt.

Unit 4
Alluvial Deposits – Silty Sand to Silt with Sand, brown (10YR 5/3), fine-grained, plugged with clay, trace disseminated gravel (¼ inch or less), massive. Moderate ped structure at upper contact decreasing to weak or no ped structure with depth. Some secondary clay films, partially gleyed, localized manganese stringers and staining. Lower portion of unit grades to fine-grained Silty Sand with dark yellowish brown (10YR 4/4) mottles. Lower contact abrupt to narrowly gradational.

Unit 5
Alluvial Deposits – Silty Sand to Sand with Silt, dark yellowish brown (10YR 4/4), fine-grained, generally massive with some internal sand lenses. Silt content increases with depth. Sand content increases and some gravel-rich lenses common south of Station 0+90.

Unit 6
Channel Deposits – Silty Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace disseminated gravel, porous, massive. Gravel concentrated at bottom of unit (½ to 2 inches, few smaller in size), typically matrix-supported; clast-supported near base. Weak ped structure, some secondary clay films, localized manganese staining. Lateral contacts are narrowly gradational and basal contact is abrupt.

Unit 7
Channel Deposits – Sand to Gravelly Sand, light grayish brown (10YR 5/2 to 10YR 6/2), fine- to medium-grained, matrix supported, weakly bedded to well bedded. Gravel subangular to subrounded (typically less than ½-inch but locally up to 1½ – 2 inches, few to 3 inches). Some internal gravel beds (matrix-supported). Lateral and lower contacts abrupt.

Unit 8
Alluvial Deposits – Clayey Silt, dark yellowish brown (10YR 4/4) trace disseminated gravel (to ¾ inch), moderately to slightly porous, massive. Lower contact narrowly gradational.

Photo 1

Photo 2

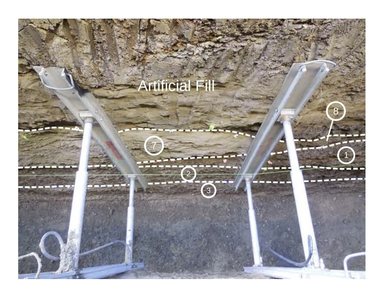


Photo 3

Note: Geologic units not correlated between trenches. For descriptive purposes only.

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LOG OF TRENCH 1
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014 | PROJECT NO. A9009-06-01A | FIGURE 10

TRENCH 2

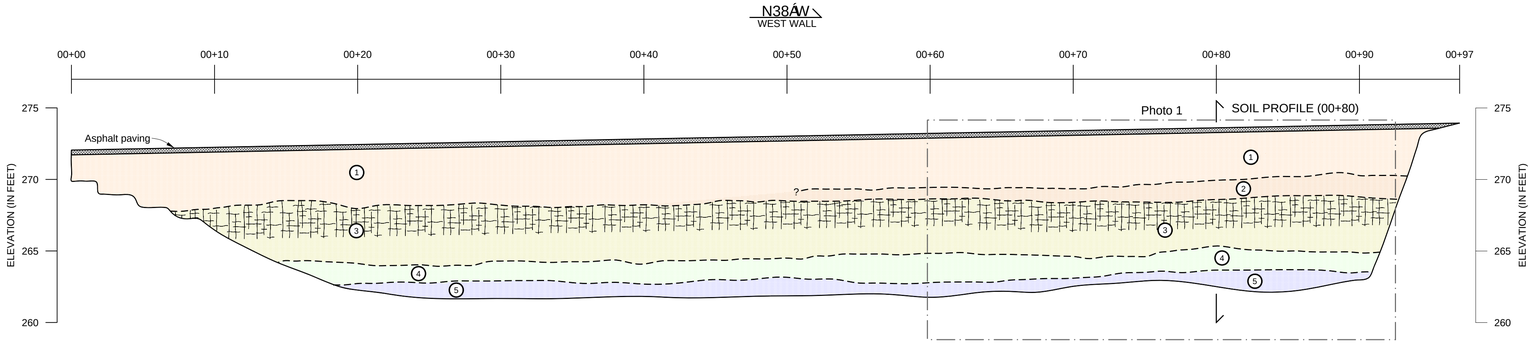
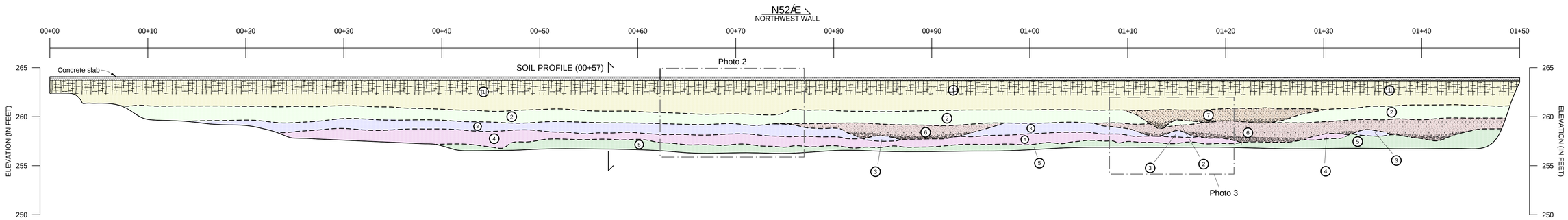


Photo 1

TRENCH 3



GEOLOGIC UNITS

TRENCH 2

Unit 1
Alluvial Deposits – Silty Sand to Silt with Sand, brown (10YR 4/3), fine-grained, minor disseminated gravel (to 3 inches, most less than 1 inch), porous, massive. Some roots in upper portion of unit, increase in gravel content at base of unit. Lower contact narrowly gradational.

Unit 2
Alluvial Deposits – Silty Sand to Sand with Silt, brown (10YR 4/3 to 10YR 4/4), very, fine-grained, some medium to coarse, trace to minor disseminated gravel (to 2 inches, typically less than 1 inch), massive. Gravel subangular to subrounded, mostly slate, some diatomaceous siltstone. Sand content greater than unit above. South of Station 0+50, not readily distinguishable from Unit 1 above. Lower contact narrowly gradational.

Unit 3
Alluvial Deposits – Silt with Sand, brown (10YR 4/3), trace to minor disseminated gravel (typically to ½ inch, few to 1½ inch), trace clay, porous, massive. Well developed ped structure, some secondary clay film, partially gleyed. Gravel subrounded to subangular, predominantly slate, some diatomaceous siltstone. Some fine roots. Lower contact narrowly gradational.

Unit 4
Alluvial Deposits – Silty Sand to Sand with Silt, yellowish brown (10YR 5/4), very fine-grained, minor disseminated gravel (to 1 inch), locally with gravel, friable, massive, porous. Gravel subrounded to subangular, locally gravel in beds or pockets. Lower contact narrowly gradational.

Unit 5
Alluvial Deposits – Silt with Sand, dark yellowish brown (10YR 3/4), very fine-grained, trace gravel (to 1 inch), massive. Laterally grades more sandy. Moderately cemented.

TRENCH 3

Unit 1
Alluvial Deposits – Clayey Silt, dark grayish brown (10YR 4/2) to brown (10YR 4/3), trace to minor gravel, slightly to moderately porous, massive. Well developed ped structure with secondary clay films. Gravel predominantly slate and diatomaceous siltstone (to ¾ inches, few to 1½ inches), gravel size increases toward the east. Lower contact narrowly gradational.

Unit 2
Alluvial Deposits – Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/4), trace to with disseminated gravel (to 1 inch, typically to ½ inch), moderately porous, massive. Gravel predominantly slate and few diatomaceous siltstone clasts; matrix-supported, locally clast-supported at base. Lower contact narrowly gradational to abrupt.

Unit 3
Alluvial Deposits – Silty Sand, yellowish brown (10YR 5/4), fine- to medium-grained, trace to minor disseminated gravel (typically ½ inch, few to 1½ inch), slightly friable, massive. Gravel predominantly slate, few diatomaceous siltstone clasts; matrix-supported. Lower contact narrowly gradational.

Unit 4
Alluvial Deposits – Sand with Silt to Silty Sand, dark yellowish brown (10YR 4/4 to 10YR 4/6), minor to with gravel (laterally variable in volume), slightly friable, massive. Becomes more friable and sandier toward the east. Gravel subrounded to subangular (typically less than ½ inch, some to 2 ½ inches). Lower contact abrupt to narrowly gradational.

Unit 5
Alluvial Deposits – Silt with Sand, dark yellowish brown (10YR 3/6), fine-grained, some medium, trace to minor disseminated slate gravel (to ¼ inch, few to 1 inch), moderately porous, massive. Trace rootlet voids.

Unit 6
Channel Deposits – Sand with Gravel, dark yellowish brown (10YR 4/4), fine- to medium-grained, some coarse, friable, massive to locally bedded. Gravel (¼ inch to 2½ inches), predominantly slate, some diatomaceous siltstone, subrounded, typically larger at base. Gravel concentrated (up to 40%) and clast-supported at channel center between approximately Station 0+80 and 0+85. Lateral and lower contacts abrupt.

Unit 7
Channel Deposits – Sand with Gravel, dark yellowish brown (10YR 3/4 to 10YR 3/6), minor silt, weakly friable to moderately cemented, massive to weakly bedded. Gravel disseminated throughout unit (typically less than 1 inch; few to 3 inches), increasing in size with depth; locally concentrated in pockets or beds at base of unit. Gravel predominantly slate, few diatomaceous siltstone clasts; generally matrix-supported, locally clast-supported. Lateral and lower contracts abrupt.

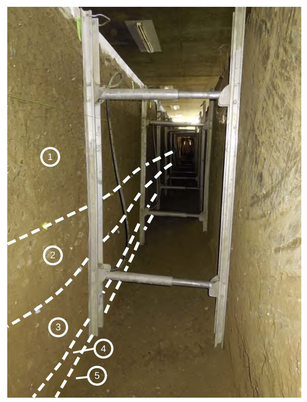


Photo 2

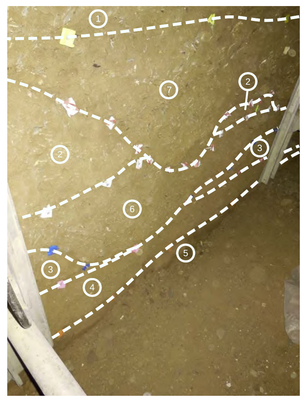


Photo 3

Note: Geologic units not correlated between trenches. For descriptive purposes only.

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PHONE (818) 841-8388 - FAX (818) 841-1704

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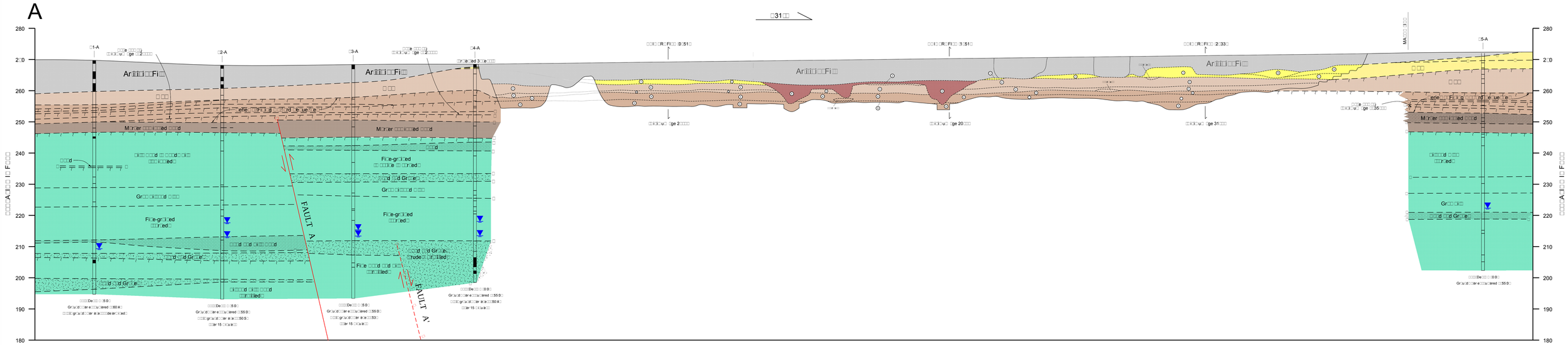
LOG OF TRENCH 2 & 3

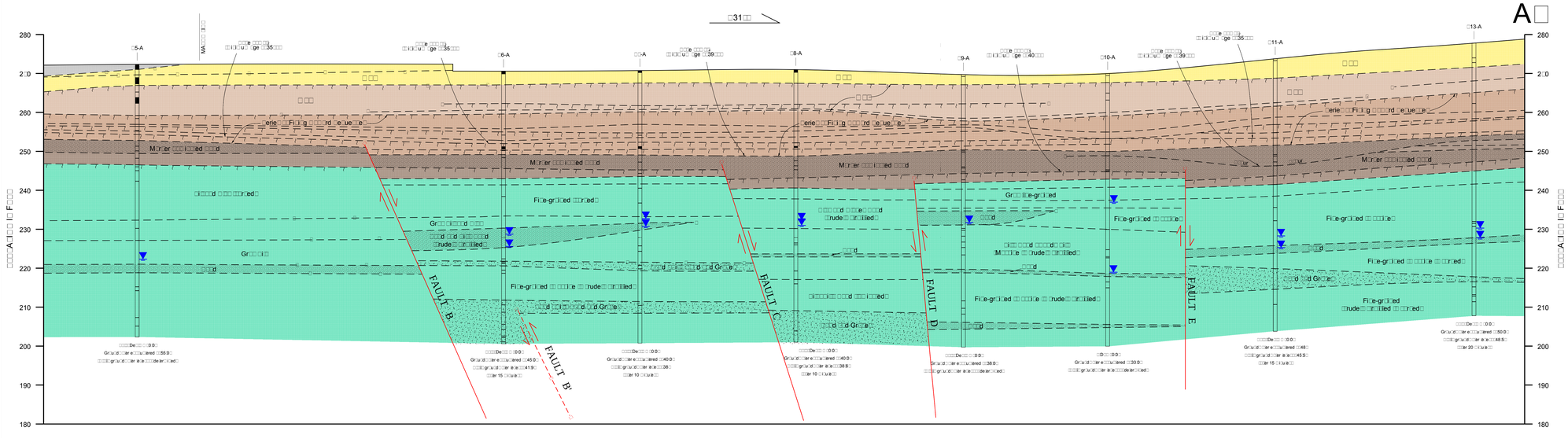
FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014 | PROJECT NO. A9009-06-01A | FIGURE 11





CROSS SECTION A-A'

LEGEND

Younger Alluvial Deposits (Holocene)

🟨 - Stream Terrace and Fluvial Deposits

Older Fan Deposits (Pleistocene)

🟫 - Gravel-Rich Debris Flows

Older Terrace Deposits (Pleistocene)

🟫 - Series of Fining Upward Sequences

🟫 - Marker Oxidized Sand

🟩 Lakewood Formation (Pleistocene)

— — ? — Geologic Contact, Queried Where Uncertain

Argillic Soil Horizon

—— ? Inferred Fault, Queried Where Uncertain

▼ Groundwater Level Encountered in Boring

SCALE: 1" = 10'
1:1 HORIZONTAL AND VERTICAL SCALE

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CROSS SECTION A

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 12

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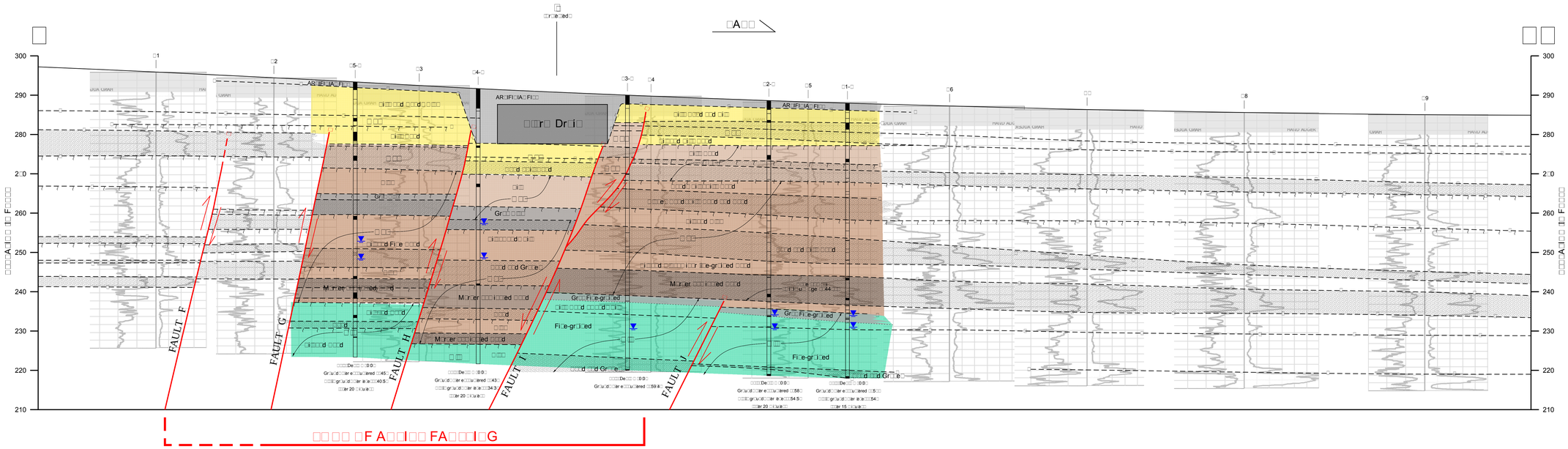
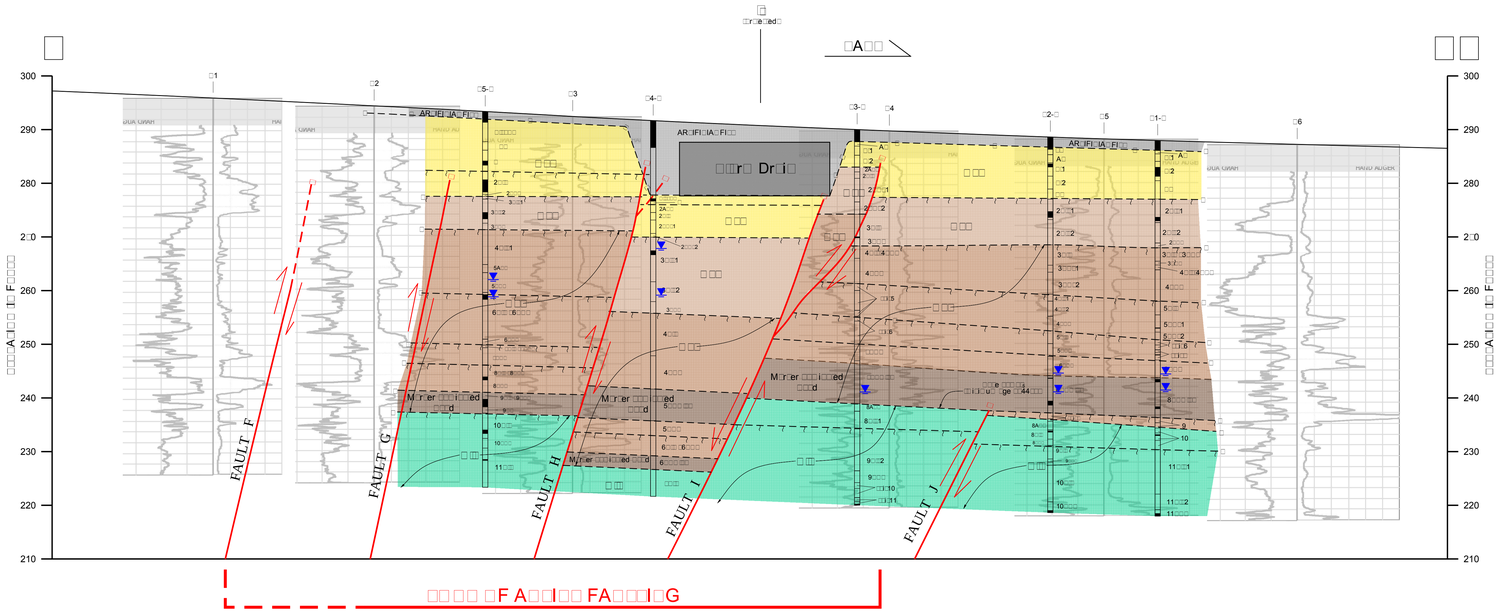


□□RR□□A□I□□ □F □□RI□D □□I□□



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W E S T, I N C.

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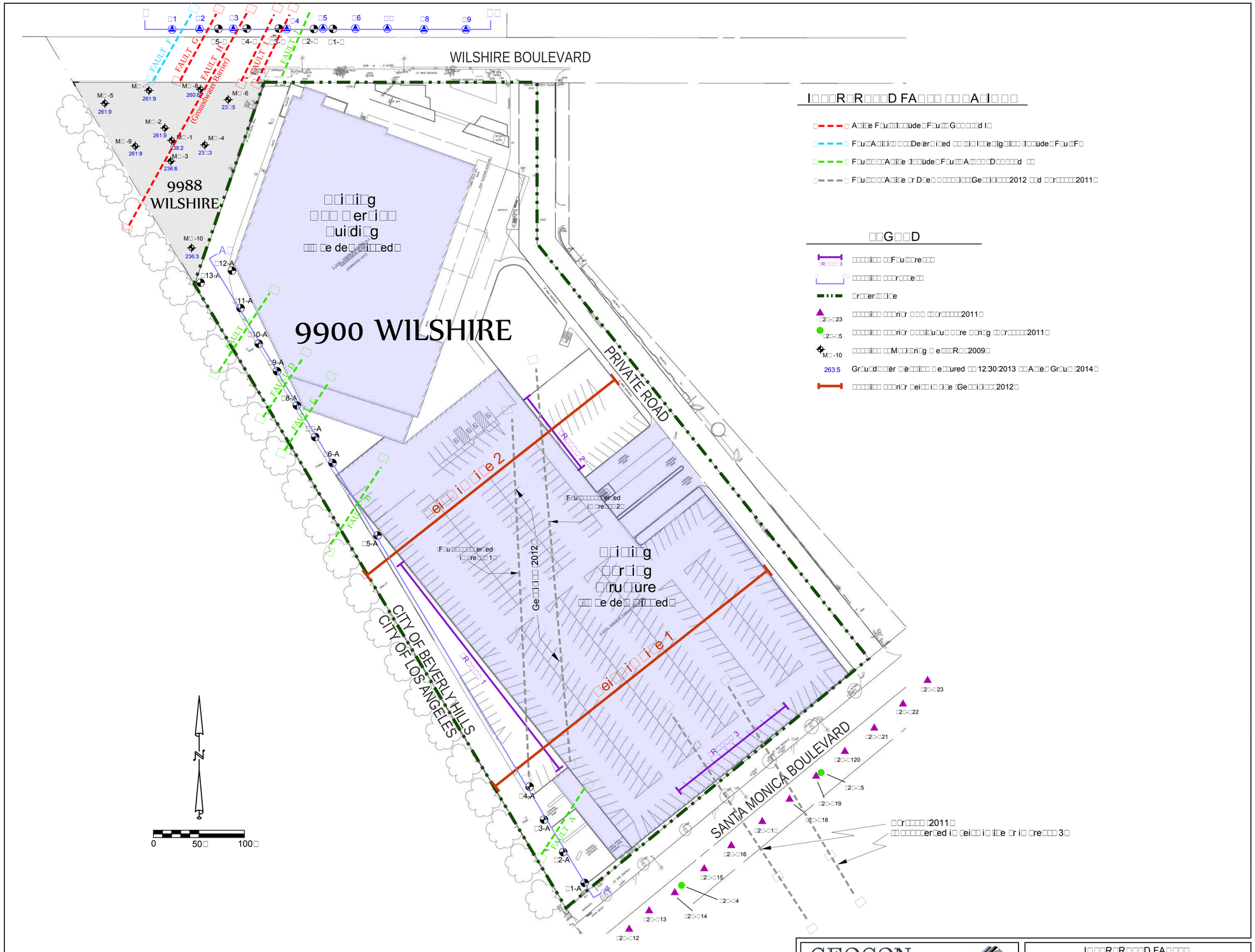
MA□ 2014 | □R□□□□ □□□A9009-06-01A | FIG□R□ 13



INTERPRETED FAULT LOCATIONS

- Active Fault Includes Fault G and H
- Fault Activity Not Determined (No Soil Investigation) Includes Fault F
- Fault Not Active Includes Fault A through D and [illegible]
- Fault Not Active or Does Not Exist (from Geotechnologies 2012 and Kleinfelder 2011)

LEGEND

Trench 3	Location of Fault Trench
	Location of Cross Section
	Property Line
CPT-23	Location of Prior CPT by Kleinfelder (2011)
CPT-5	Location of Prior Continuous Core Boring by Kleinfelder (2011)
MW-10	Location of Monitoring Well (URS, 2009)
263.5	Groundwater Elevation Measured on 12/30/2013 by [illegible] Group (2014)
	Location of Prior Seismic Line (Geotechnologies 2012)

BASE MAP: Modified after [illegible] 2013 [illegible] 010100 [illegible] 1 of 1

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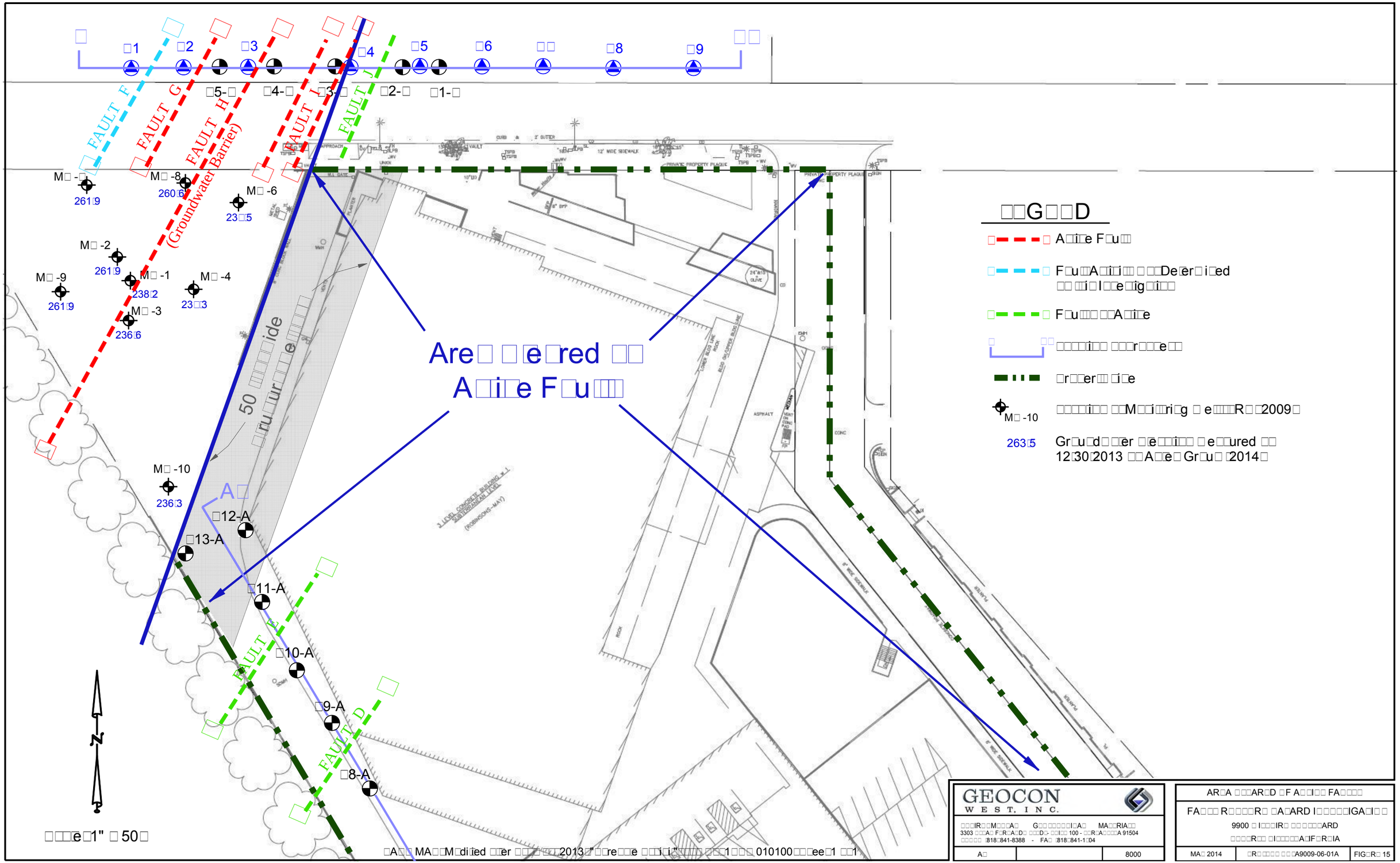
A[illegible]		8000

INTERPRETED FAULTS

FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 14


FAULT F
FAULT G
FAULT H
(Groundwater Barrier)
FAULT I
FAULT J
FAULT E
FAULT D
1
2
3
4
5
6
8
9
5-
4-
3-
2-
1-
M -
261.9
M -8
260.6
M -6
23.5
M -2
261.9
M -9
261.9
M -1
238.2
M -4
23.3
M -3
236.6
M -10
236.3
50 feet outside
structure
Area covered by
Active Fault
A
12-A
13-A
11-A
10-A
9-A
8-A
GEOCON
WEST, INC.
3303 ... A ... 100 - ... A 91504
818.841-8388 - FAX 818.841-1...04
A
8000
9900 ... ARD
A9009-06-01A
FIG. 15

APPENDIX A

INVESTIGATION PHOTOS

Photo 1: Trench 1 – Looking Southeast

GEOCON

SITE PHOTO 1		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A1

Photo 2: Trench 1 – Paleochannel incised into older terrace deposits (Station 1+00)

GEOCON

SITE PHOTO 2		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A2

Photo 3: Trench 1 – Looking southeast from Station 0+50

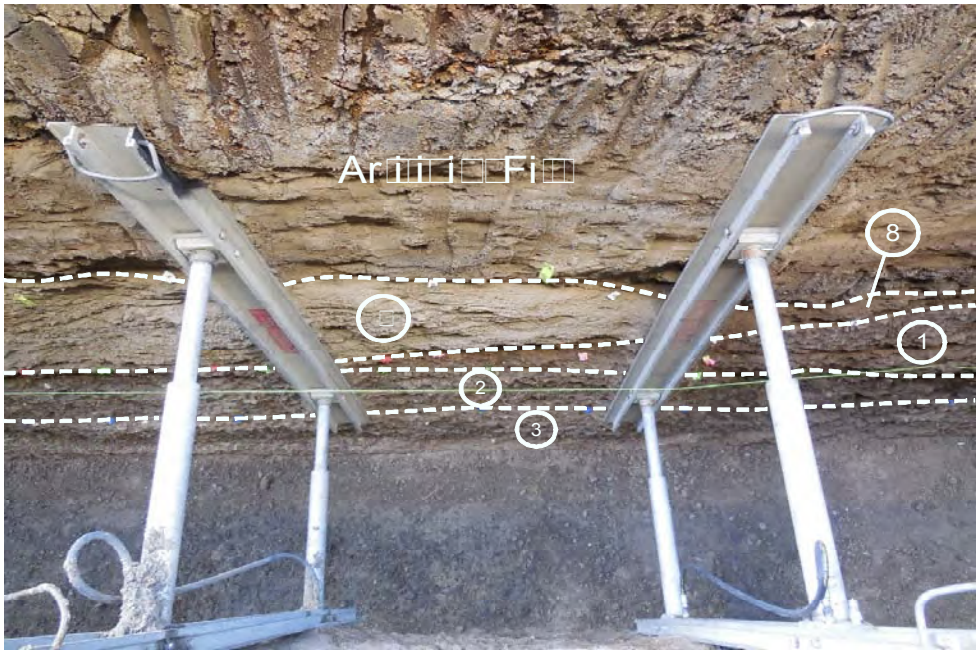


Photo 4: Trench 1 – Young alluvial deposits, channel deposits, and underlying older fan deposits (Station 2+75)

GEOCON

SITE PHOTOS 3 & 4		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A3

Photo 5: Trench 2 – Looking southeast

Photo 6: Trench 2 – Looking northwest from Station 1+10

GEOCON

SITE PHOTOS 5 & 6		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A4

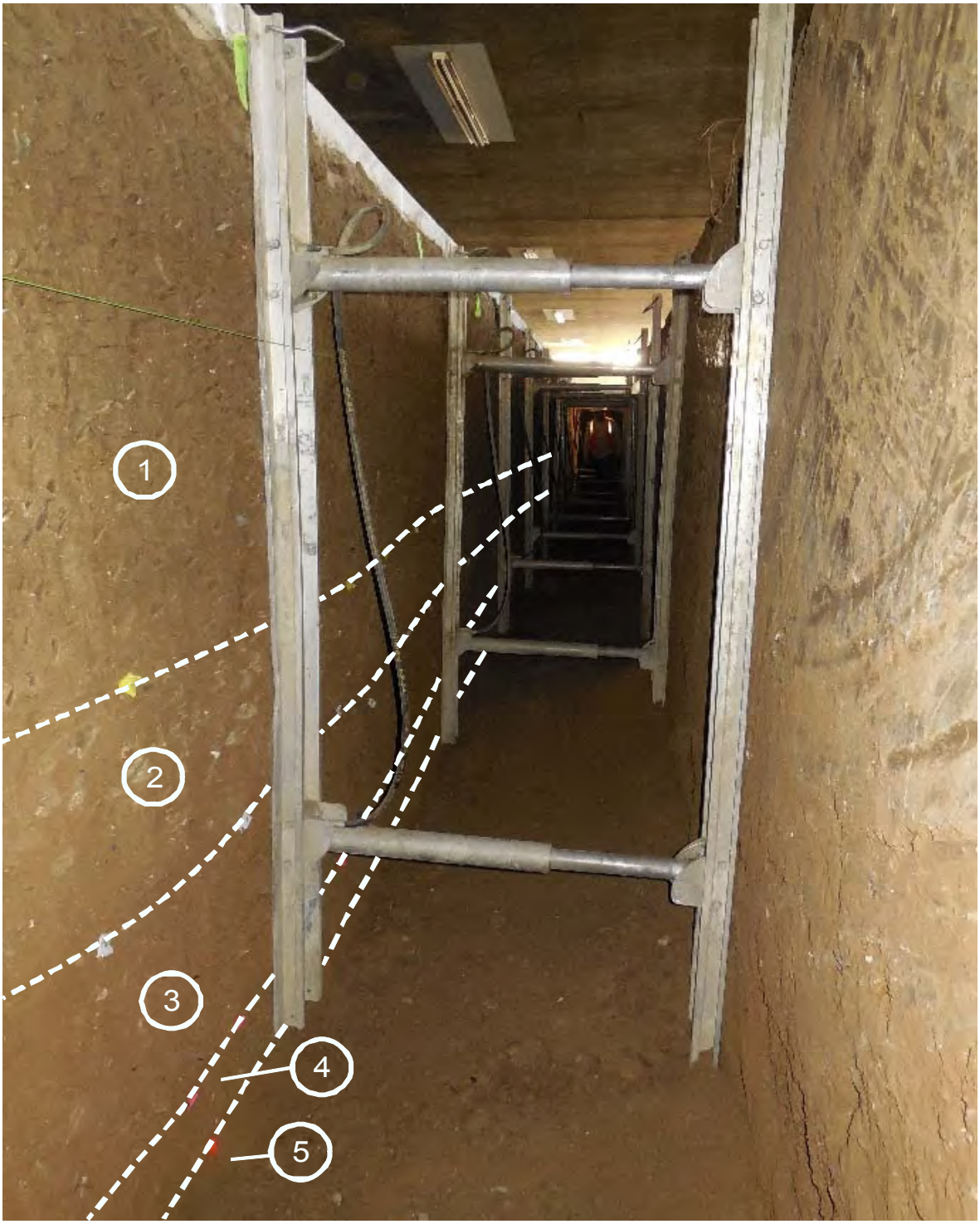


Photo 7: Trench 3 – Looking east from Station 0+60

GEOCON

SITE PHOTO 7		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A5

Photo 8: Trench 3 – Older fan unit with blocky structure

SITE PHOTO 8		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A6

Photo 9: Drilling operation boring B12-A

Photo 10: Core barrel retrieval

GEOCON

SITE PHOTOS 9 & 10		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A7

Photo 11: Removing core sample from core barrel

Photo 12: Core sample placement into core box

GEOCON

SITE PHOTOS 11 & 12		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A8

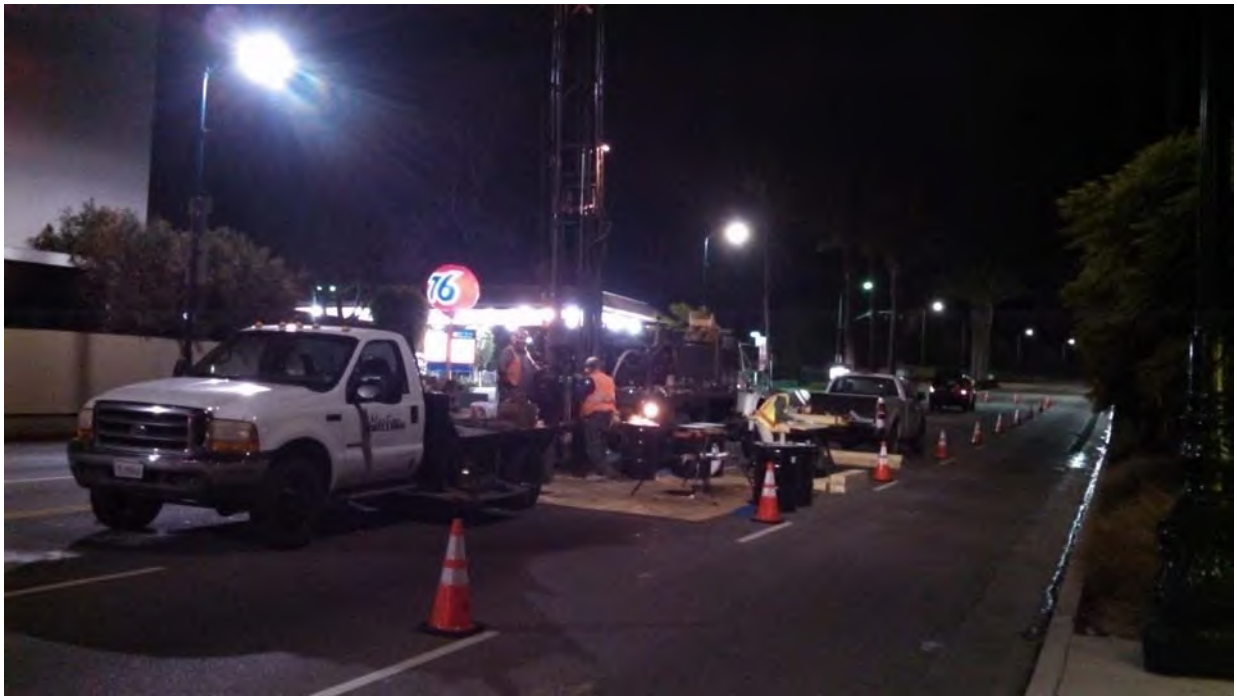


Photo 13: Drilling operation boring B4-B

Photo 14: Core sample review

GEOCON

SITE PHOTOS 13 & 14		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A9

Photo 15: Core sample – boring B13-A at 20 to 30 feet

Photo 16: Core sample – boring B4-B at 20 to 30 feet

GEOCON

SITE PHOTOS 15 & 16		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A10

Photo 17: Core sample boring B4-A at 30 to 40 feet

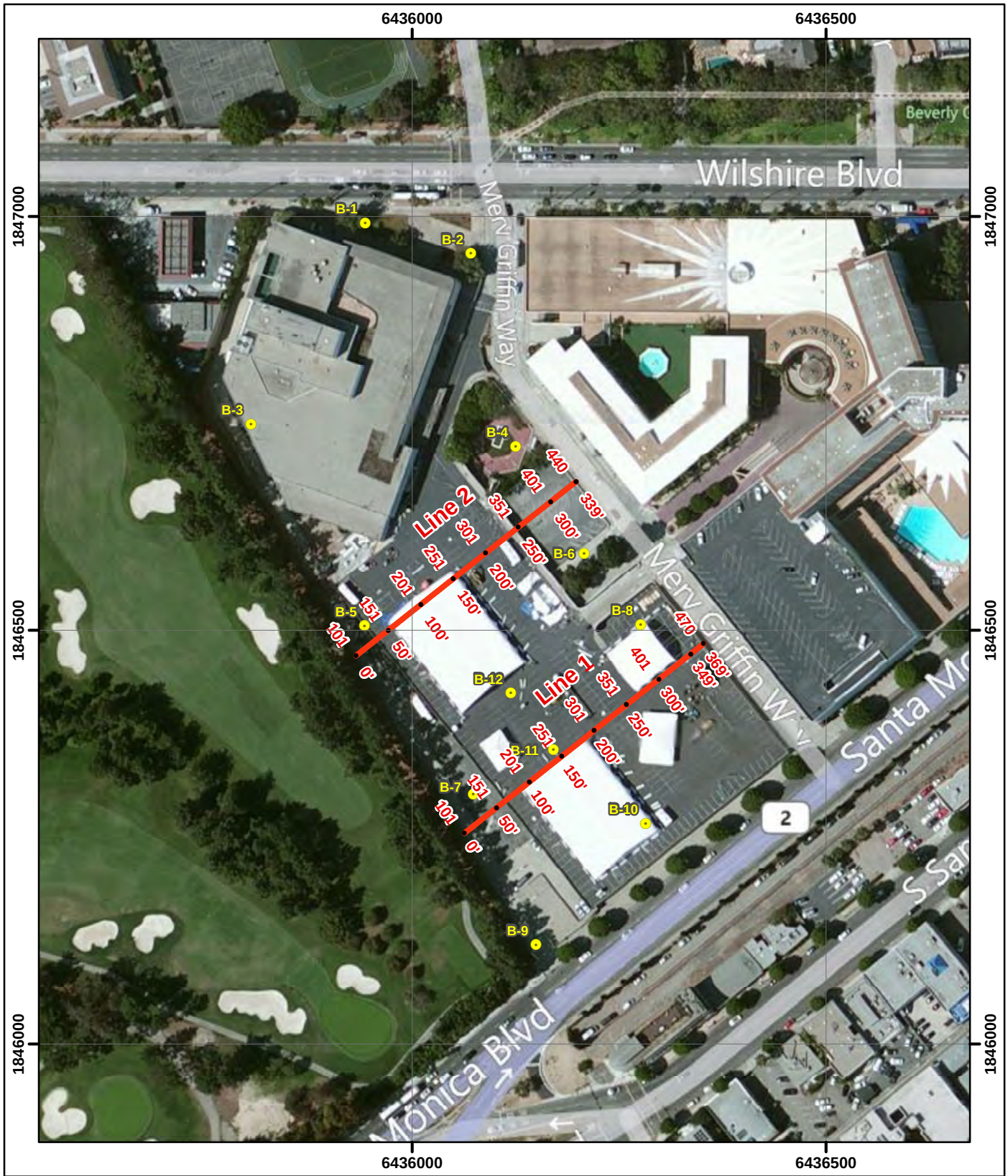
Photo 18: Core sample boring B4-A at 50 to 60 feet

GEOCON

SITE PHOTOS 17 & 18		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A11

APPENDIX B

GEOVISION PRELIMINARY FAULT INTERPRETATIONS



Legend

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GEOVision geophysical services	FIGURE 1 SITE MAP
D□e□ 1□5□2012	SITE LOCATED AT 9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
G□ □r□e□□□ 11409	
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Dr□□□ □□□□□ R□drigue□	PREPARED FOR AMEC, INC.
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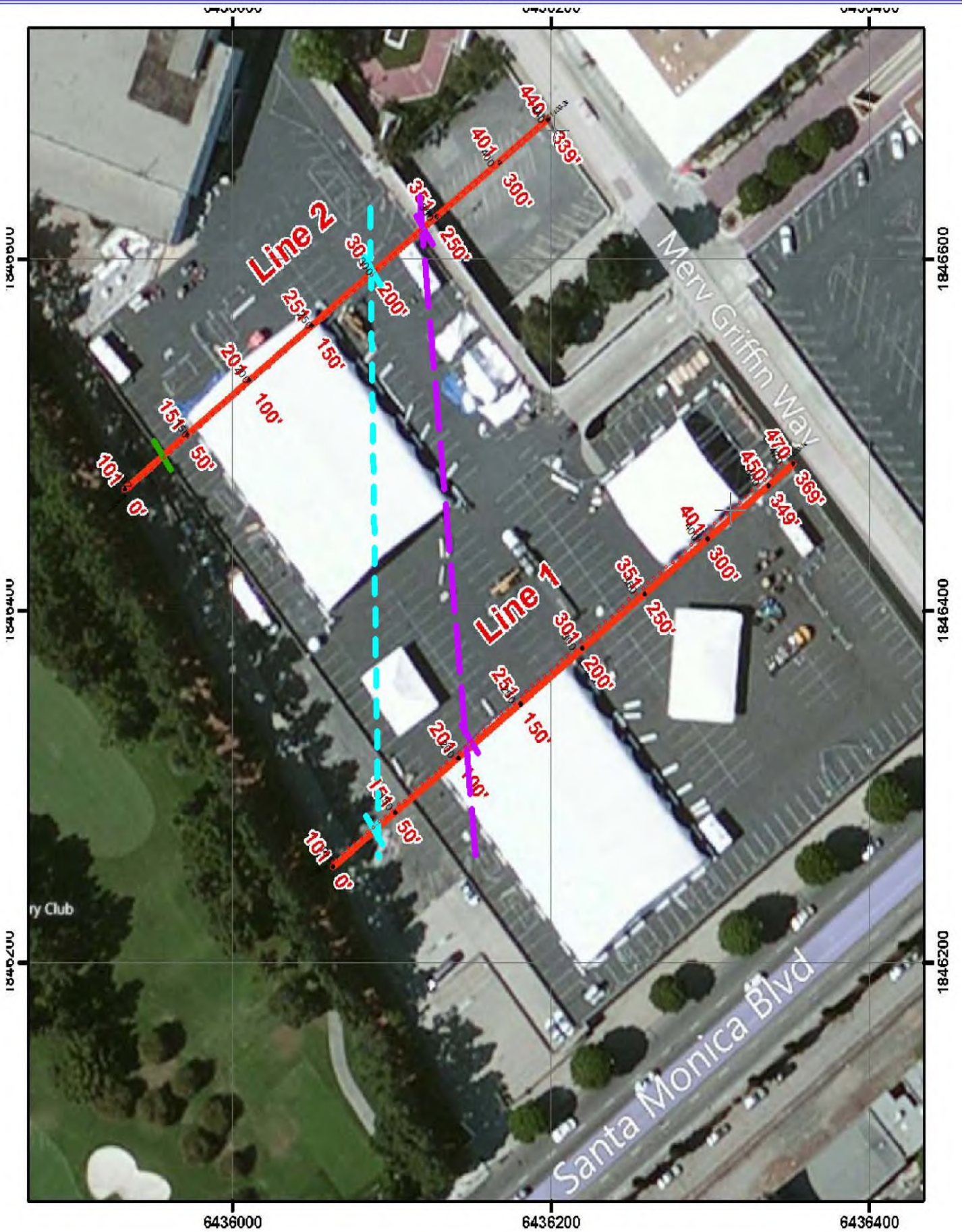
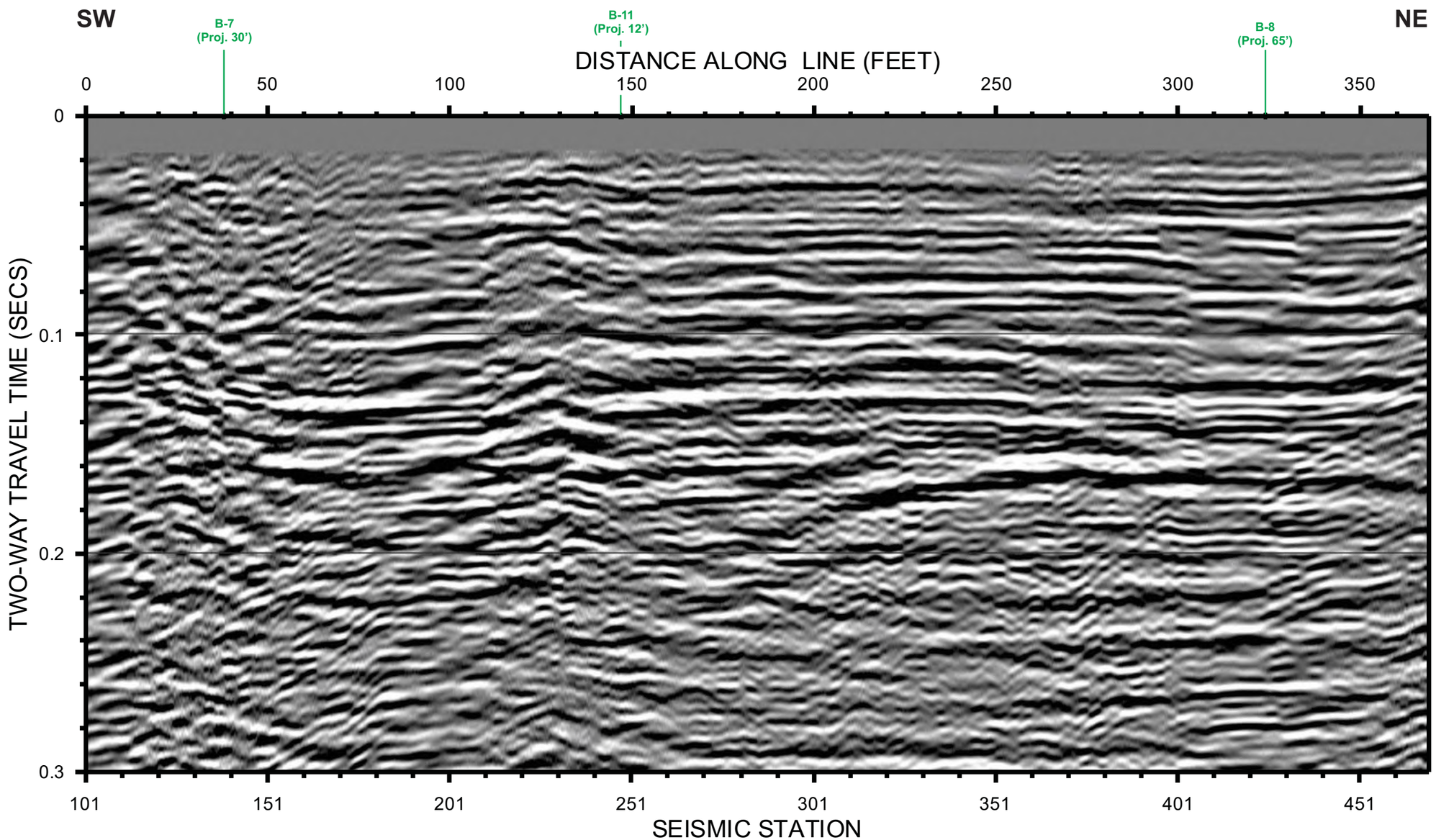

Line 2
Line 1
Merv Griffin Way
Santa Monica Blvd
ry Club
0'
50'
100'
150'
200'
250'
300'
339'
349'
369'
1846600
1846400
1846200
6436000
6436200
6436400



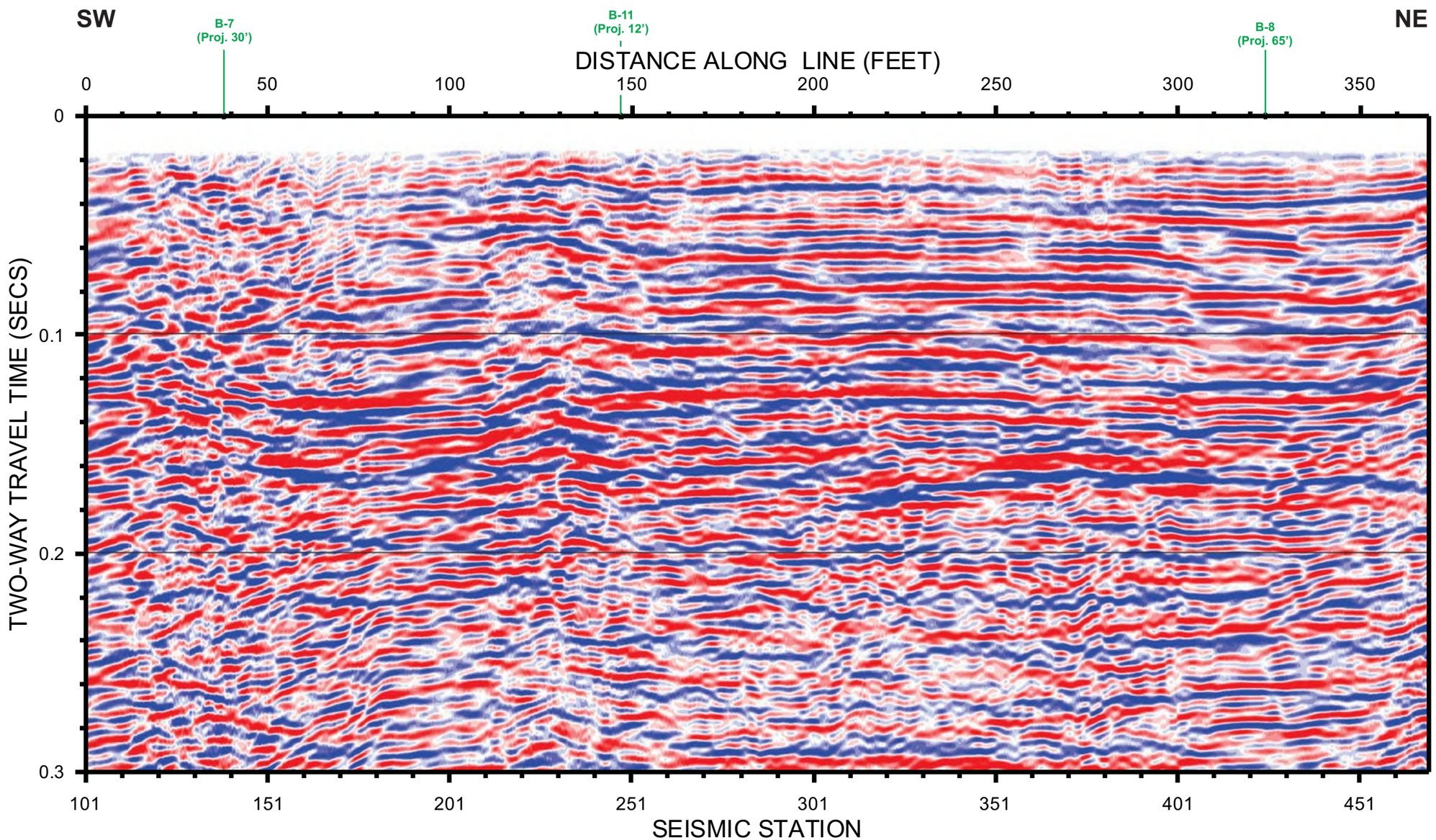
LEGEND

B-7 (Proj. 30') — Borehole Location

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services

Project No. 11409	PRELIMINARY FIGURE 4 LINE 1 - S-WAVE SEISMIC SECTION WITHOUT INTERPRETATION
Date: JUL 03, 2013	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Drawn By: DALRYMPLE	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
File C:\GVPROJECTS\11409\F4.cdr	

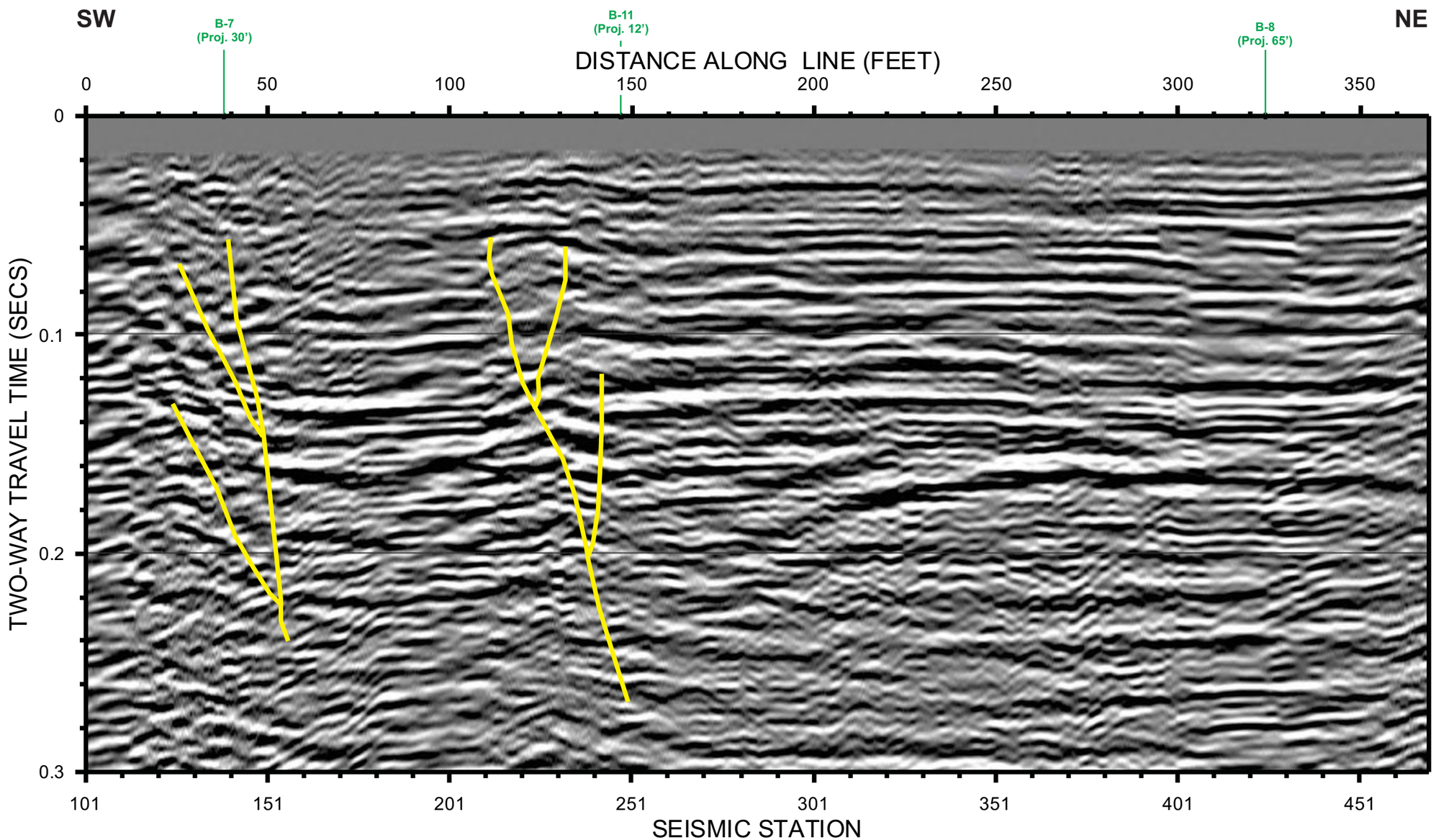


LEGEND

B-7 (Proj. 30') — Borehole Location

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services	PRELIMINARY FIGURE 5 LINE 1 - S-WAVE COLOR SEISMIC SECTION WITHOUT INTERPRETATION
Project No. 11409	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Date: JUL 03, 2013	
Drawn By: DALRYMPLE	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
File C:\GVPROJECTS\11409\F5.cdr	



LEGEND

B-7 (Proj. 30') — Borehole Location

Preliminary Interpreted Anomaly

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services

Project No. 11409

Date: JUL 03, 2013

Drawn By: DALRYMPLE

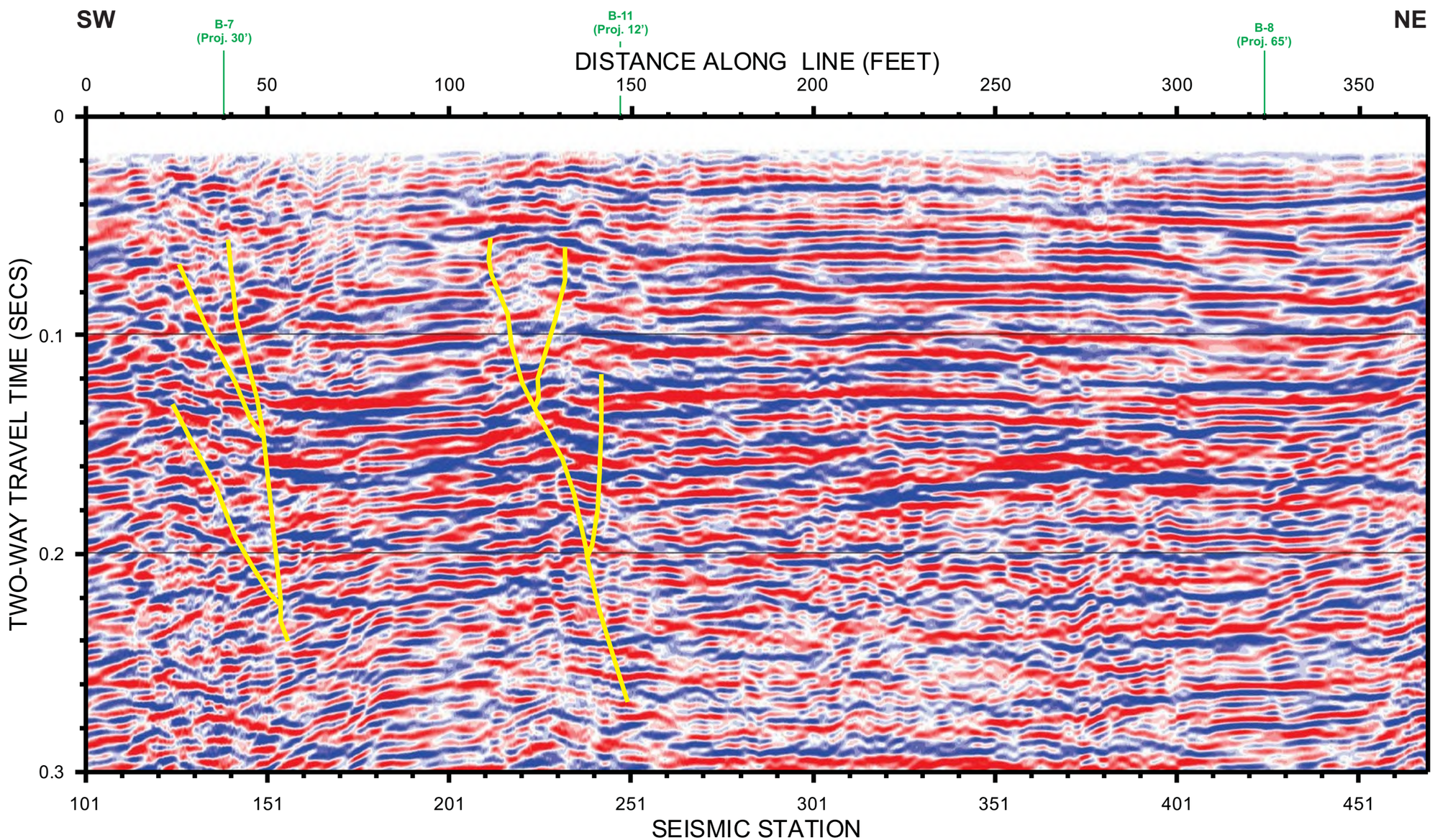
Approved By:

File C:\GVPROJECTS\11409\F6.cdr

PRELIMINARY FIGURE 6
LINE 1 - S-WAVE SEISMIC
SECTION WITH INTERPRETATION

9900 WILSHIRE BLVD
SANTA MONICA, CALIFORNIA

PREPARED FOR
AMEC ENVIRONMENT AND INFRASTRUCTURE



LEGEND

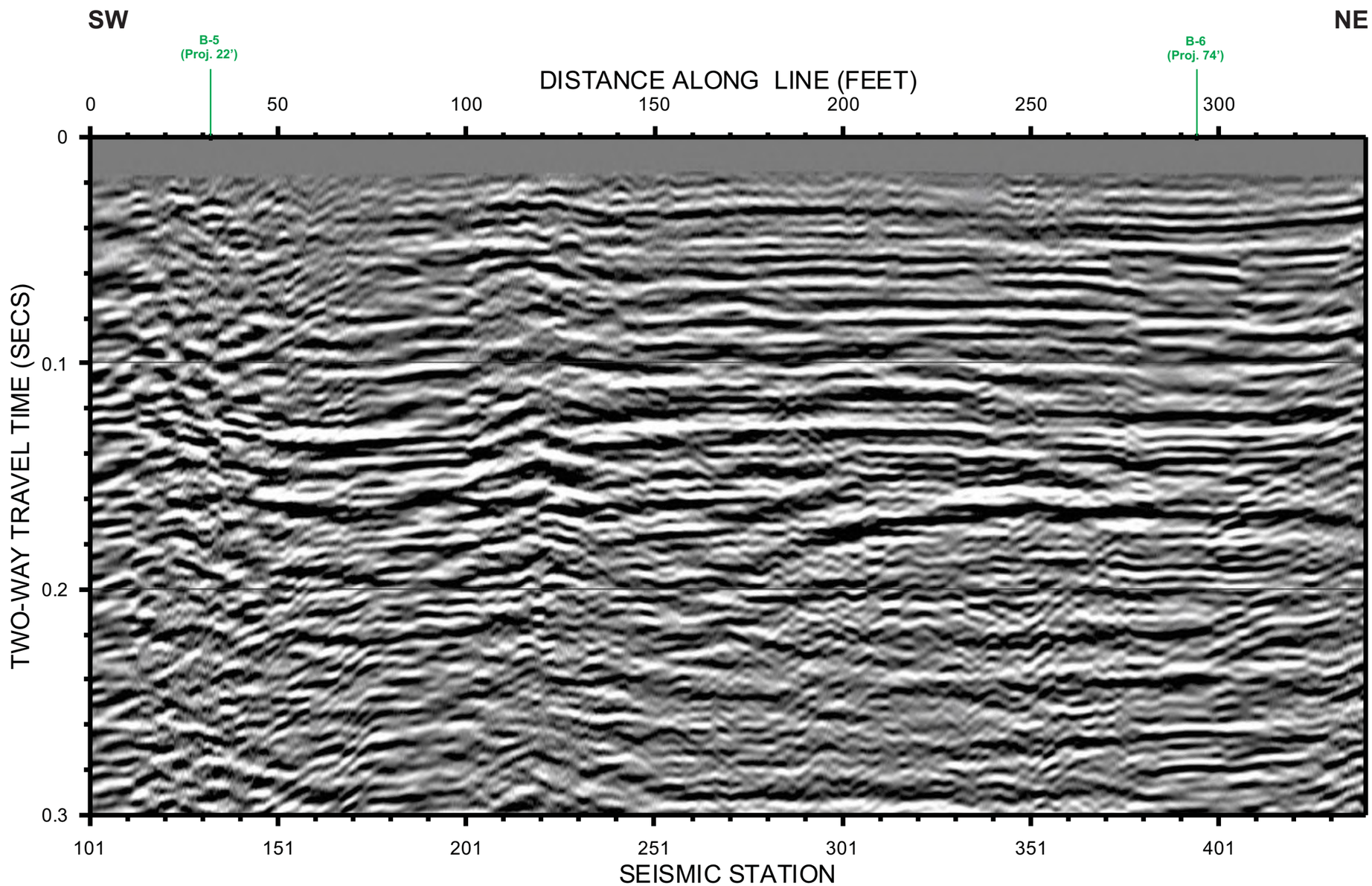
B-7 (Proj. 30') — Borehole Location

Preliminary Interpreted Anomaly

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services

Project No. 11409	PRELIMINARY FIGURE 7 LINE 1 - S-WAVE COLOR SEISMIC SECTION WITH INTERPRETATION
Date: JUL 03, 2013	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Drawn By: DALRYMPLE	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
File C:\GVPROJECTS\11409\F7.cdr	

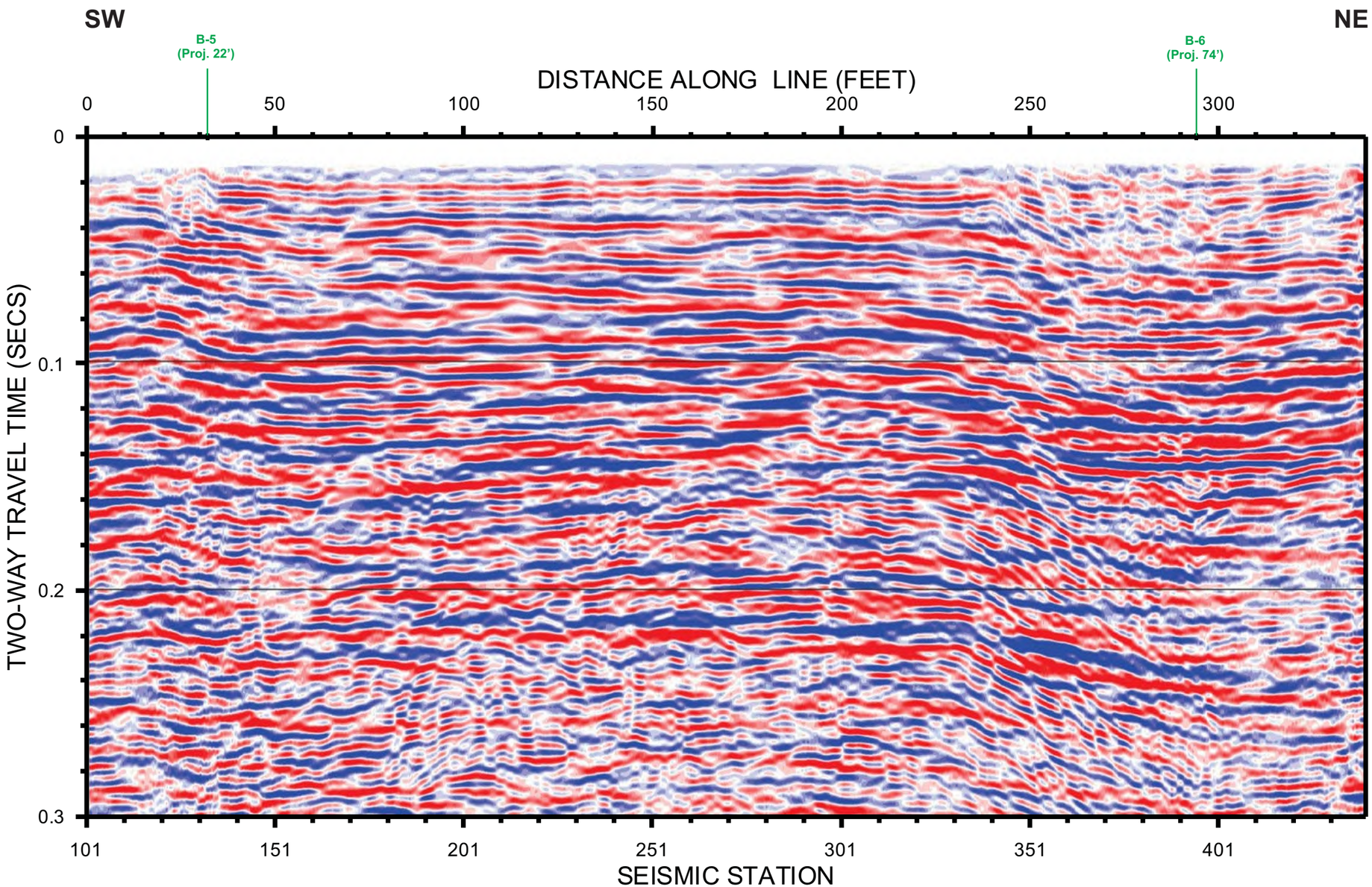


LEGEND

B-6 (Proj. 74') — Borehole Location

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services	PRELIMINARY FIGURE 8 LINE 2 - S-WAVE SEISMIC SECTION WITHOUT INTERPRETATION
Project No. 11409	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Date: JUL 03, 2013	
Drawn By: DALRYMPLE	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
Approved By:	
File C:\GVPROJECTS\11409\F8.cdr	



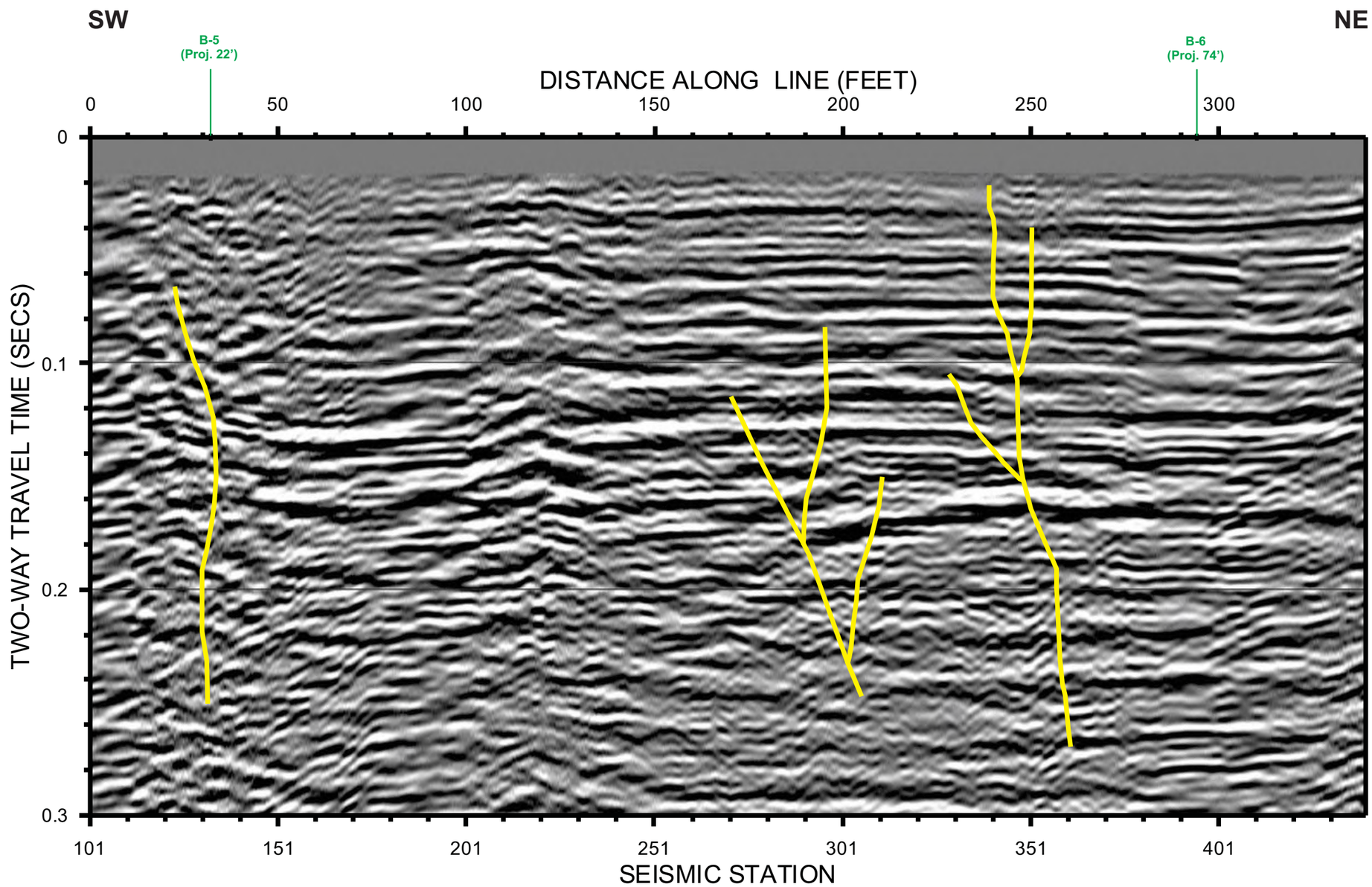
LEGEND

B-6 (Proj. 74') — Borehole Location

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services

Project No. 11409	PRELIMINARY FIGURE 9 LINE 2 - S-WAVE COLOR SEISMIC SECTION WITHOUT INTERPRETATION
Date: JUL 03, 2013	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Drawn By: DALRYMPLE	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
File C:\GVPROJECTS\11409\F9.cdr	



LEGEND

B-6 (Proj. 74') — Borehole Location

Preliminary Interpreted Anomaly

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services

Project No. 11409

Date: JUL 03, 2013

Drawn By: DALRYMPLE

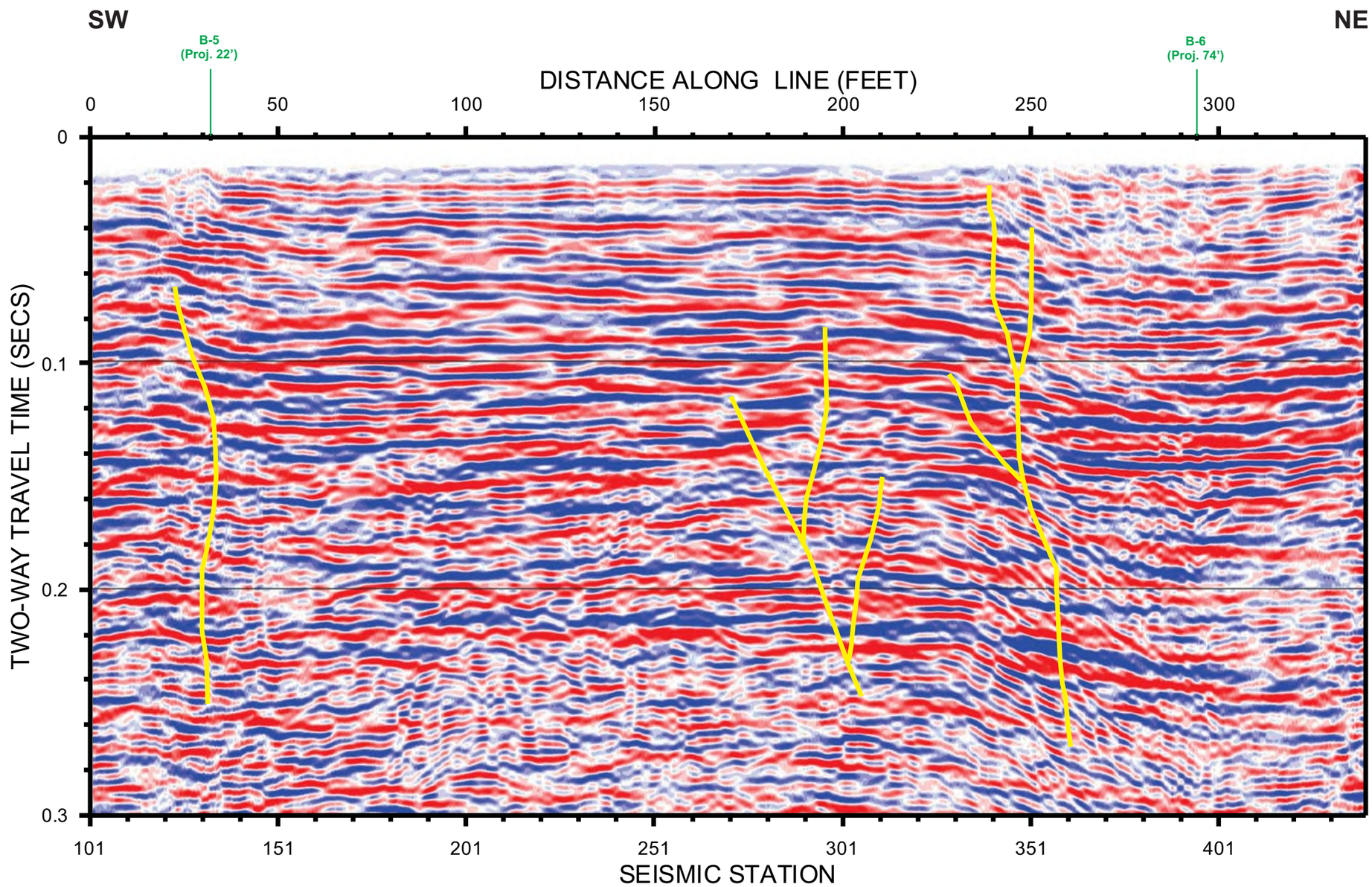
Approved By:

File C:\GVPROJECTS\11409\F10.cdr

PRELIMINARY FIGURE 10
LINE 2 - S-WAVE SEISMIC
SECTION WITH INTERPRETATION

9900 WILSHIRE BLVD
SANTA MONICA, CALIFORNIA

PREPARED FOR
AMEC ENVIRONMENT AND INFRASTRUCTURE



LEGEND

B-6 (Proj. 74') — Borehole Location

Preliminary Interpreted Anomaly

Note:
1. Borehole locations included if projected less than 75' from the line.

GEOVision geophysical services

Project No. 11409	PRELIMINARY FIGURE 11 LINE 2 - S-WAVE COLOR SEISMIC SECTION WITH INTERPRETATION
Date: JUL 03, 2013	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Drawn By: DALRYMPLE	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
File C:\GVPROJECTS\11409\F11.cdr	

APPENDIX C

BORING LOGS

□□RI□G □1-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3 and 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	65	■	0		Started sampling at 1'
						ARTIFICIAL FILL (af)
			■	1		Silty Sand, medium dense, dark yellowish brown (10YR 3/4), fine- to medium-grained, some gravel. gravel (to 1"), trace clay, some debris.
				2		
				3		
				4		3.6' - 5' - No Recovery
			■	5		5' - 5.85' - No Recovery
1	2	30	■	6		6' - some concrete fragments and gravels (to 1½")
				7		7.35' - 10' - No Recovery
			■	8		
			■	9		
			■	10		
2	3	100		11		**OLDER ALLUVIUM (Qoal)**
					SM/ML	10.1'-Silty Sand and Sandy Silt, brown (7.5YR 4/4), fine-grained, some medium-grained, minor fine gravel.
				12		
				13		
				14		
					SW	14.2'- Sand with Gravel, brown (7.5YR 4/4), fine- to medium-grained, some coarse, gravel (typically less than 1/2"; few to 2").
				15		
					SM	15.2'- Silty Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), fine-grained, trace gravel (to ¼").
				16		
					SW	16.1' - Sand with Gravel, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace subangular gravel (to 1").
2	4	100		17		
					ML/SM	16.7'- Sandy Silt, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), very fine- to fine-grained, trace medium, trace clay.
				18		
					SP-SM	17.9'- Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, minor gravel (to ¼")
				19		19.8- Alternating layers of Silty Sand and Sandy Silt, dark yellowish brown (10YR 3/6) and dark gray (7.5YR 4/1), very fine- to fine-grained, trace gravel (to 1/4"), trace manganese nodules, weakly laminated.
					SM/ML	
				20		

Figure C-1a

□□RI□G □1-A □□□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3 and 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
				21		21.1 to 21.7'- gravel content increases, brown (7.5YR 4/4) and dark gray (7.5YR 4/1),
				22		21.7' -to 23.1' - faint varves
3	5	80		23		
					ML	**LAKEWOOD FORMATION (Qlw)**
				24		23.1'- Silt with Sand to Silt, brown (7.5YR 4/4), minor clay, fine-grained, laminated.
			■	25		24.5' - 25' - No Recovery
				26		
				27		
3	6	100		28		
				29		
				30		30.3' - increase in Clay content
				31		
				32		
4	7	100		33		
				34	SP	33.9'- Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace coarse-grained, some trace to minor gravel (to 3/4").
				35	ML/SM	34.4'- Sandy Silt to Silty Sand, brown (7.5YR 4.4) and dark gray (7.5YR 4/1), very fine- to fine-grained, trace to minor gravel (3/4"),faint oxidation striping, laminated.
				36	ML	35.5'- Silt, dark gray (7.5YR 4/1) with brown (7.5YR 4.4) mottles , some fine-grained sand, oxidation oxidized.
				37		36.7' - increase in Sand content
4	8	100		38	ML/CL	37.4'- Silt with Sand to Clay with Sand, dark yellowish brown (10YR 4/4), fine-grained, trace gravel (to 1/4"), trace manganese nodules, massive.
				39		
				40	SM/ML	39.5'- Silty Sand and Sandy Silt, dark yellowish brown (10YR 4/4), very fine- to fine-grained, trace trace medium-grained at base of unit, some gravel (to ¼").

Figure C-1b

□□RI□G □1-A □□□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3 and 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL

Box	Run #	% Rec	REC	Depth (feet)	USCS Class.	Description
				40		40' - incrase in Sand content, fine- to medium-grained, trace coarse.
				41	**ML**	40.8'- Silt with Sand, dark gray (7.5YR 4/1), very fine-grained,trace clay, faint oxidation staining and brown (7.5YR 4/2) mottles.
				42		42' - trace to minor secondary clay
5	9	100		**43**		
				44		
				45		
						45.4'- becomes dark gray (7.5YR 4/1), fine-grained
				46		
				47		
5	10	100			**ML**	47.1'-Silt with Sand, dark brown (7.5YR 3/4), fine-grained, minor clay,
				48		fine grained, some manganese staining, trace gravel (to 1/2"), crudely stratified to laminated.
						Few layers of fine Silty Sand.
				49		
						49.2' -to 49.7'- gravel layer
				50		
				51		50.9' to 51.7' - gravel layer
				52		52.7' - trace manganese nodules
6	11	100				53.5' to 53.7' - manganese staining
				53		53.9' - increase in sand content
				54		
				55		
				56		
				57		
6	12	100				
				58	**SM**	57.6'- Silty Sand, dark yellowish brown (10YR 3/4) with dark gray (10YR 4/1) mottles, fine-grained, grained, massive.
				59		
				60		

Figure C-1c

□□RI□G □1-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3 and 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
7	13	80		60	ML	60.0'- Silt with Sand, trace gravel (to 1/4"), fine-grained, massive.
				61		
				62	SW	61.9'- Sand and Gravel, brown (10YR 4/3), fine- to coarse grained, gravel (to ¼ "; few to 3"), subangular to subrounded, massive.
				63	SC	63.4'- Sandy Clay, dark yellowish brown (10YR 3/4) with dark gray (10YR 4/1) mottles, fine-grained, trace fine gravel, massive to varved.
				64		64' - 65' - No Recovery
7	14	100		65		
				66		
				67		
				68		
				69		
				70	SW	70.0'- Sand and Gravel, dark yellowish brown (10YR 3/6) with dark gray (10YR4/1) mottles, fine- to coarse-grained, gravel subangular to subrounded (to 1").
8	15	100		71		
				72		
				73		
				74	SP-SM	73.4'- Sand with Silt, dark yellowish brown (10YR 3/6) and dark gray (10YR4/1), fine-grained, some medium- to coarse-grained, thickly laminated.
				75		Total depth of boring: 75 feet.
				76		Fill to 10.0 feet.
				77		Groundwater encountered during drilling at 60.4 feet; static groundwater level not determined.
				78		Backfilled with soil cuttings and tamped.
				79		Concrete patched.
				80		

Figure C-1d

□□RI□G □2-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.1 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	70		0		Started sampling at 1'
						ARTIFICIAL FILL (af)
				1		Silty Sand, medium dense, slightly moist, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace clay, trace concrete fragments and gravel (to 1").
				2		
				3		2.6' - 2.8' - gravel layer
				4		3.8' - 5.0' - No Recovery
1	2	76		5		
				6		6.2' - 7.4' - No Recovery; rock in core
				7		
						OLDER ALLUVIUM (Qoal)
				8	**CL/SC**	7.4'- Clay with Sand to Clayey Sand with Gravel, dark brown (7.5YR 3/4) to dark yellowish brown (10YR 3/4), fine- to medium-grained, gravel subangular (to 1/8"; few to 1"), some oxidation mottling, increase in sand content with depth.
				9		
2	3	100		10	**CL/ML**	9.6'- Clay with Sand to Silt with Sand, dark brown (7.5YR 3/4), fine-grained, minor gravel (to 1/8"),subangular, slightly porous.
				11	**SP-SM**	11.1'- Sand with Silt to Silty Sand, dark yellowish brown (10YR 3/4) fine-grained, trace gravel (to 1/8"), subangular.
				12	**SC/CL**	11.5'- Clayey Sand to Sandy Clay, brown, very fine-grained, massive. 12.45' - 12.6 - abundant gravel
				13	**SP-SM**	12.6'- Sand with Silt to Silty Sand, dark brown (7.5YR 3/4) to dark yellowish brown (10YR 3/4), fine-grained.
				14	**SC/CL**	13.55'- Clayey Sand to Sandy Clay, dark yellowish brown (10YR 4/4), very fine-grained.
				15		
2	4	100		16	**SP**	15.25'- Sand, dark yellowish brown (10YR 4/4), very fine-grained, some gravel (to ½"). trace silt.
				17	**SC/CL**	16.4'- Clayey Sand to Clay with Sand, brown (7.5YR 4/4), slightly moist.
				18		
				19	**SP**	18.4'- Sand, dark yellowish brown (10YR 4/4), fine-grained, trace medium and coarse, minor gravel (to ½"), massive to weakly laminated.
				20		

Figure C-2a

□□RI□G □2-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.1 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20	SM/ML	20.0'- Silty Sand to Sandy Silt, dark yellowish brown (10YR 4/4) with dark gray (7.5YR 4/1) mottles, very fine- to fine-grained, weakly laminated, trace to minor clay.
				21		
				22	ML	21.6'- Silt with Sand , dark yellowish brown (10YR 3/4), very fine-grained, thickly laminated.
3	5	100		23		
				24	CL	24.2'- Clay with Sand, dark yellowish brown (10YR 4/4) with dark gray (7.5YR 4/1) mottles, fine-grained, trace organics, faint oxidation striping, varved.
				25		25.3' - grades to Clayey Sand
				26		26.8' to 27.5 - trace calcium carbonate nodules
3	6	100		27		
				28	ML	**LAKEWOOD FORMATION (Qlw)** 27.5'- Silt with Sand, brown (7.5YR 4/4) and dark gray (7.5YR 4/1), very fine-grained, trace Clay, faint oxidation striping, weakly laminated.
				29		
				30	ML	30.0'- Silt with Sand, dark yellowish brown, minor clay, faint oxidation striping.
				31		
				32		
4	7	100		33		32.6'- manganese staining, few manganese nodules
				34		
				35		
				36		
				37		
4	8	100		38		
				39	SM	38.3'- Silty Sand, brown (7.5YR 4/4) with dark gray (7.5YR 4/1) mottles, fine-grained, trace slate gravel (to 1/2"; few to 3/4"), subrounded to subangular.
				40	CL	Silty Clay, dark gray (7.5YR 4/1), trace sand, fine-grained, faint oxidation mottling.

Figure C-2b

□□RI□G □2-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.1 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
				41	SM/ML	40.3'- Interbedded Silty Sand and Silt, dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4), fine-grained, oxidation mottling, crudely stratified.
5	9	100		42, 43, 44, 45	ML	41.4' - Silt with Sand to Sandy Silt, dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/2), minor clay, massive. 44.8' - oxidized, varved.
5	10	100		46, 47, 48		
6	11	100		49, 50, 51, 52, 53, 54, 55	ML	48.3'- Sandy Silt, trace gravel (less than 1/4' in size), fine-grained, faint oxidtion striping, varved. 53.8' - no oxidation striping
6	12	100		56	SP	55.0'- Sand with Gravel, brown (7.5YR 4/4), minor silt, fine- to medium-grained, gravel subangular (to 1").
				57, 58	ML/SM	56.1'- Silt with Sand to Silty Sand, dark yellowish brown (10YR 3/4), minor clay, trace to minor gravel (to 1"). Sandy Silt, dark yellowish brown (10YR 3/4), some clay.
				59	SM	58.3'- Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, trace to minor clay, trace gravel (to ½").
				60	ML	59.4' Silt with Sand, dark yellowish brown (10YR 3/4) with dark gray (7.5YR 4/1) mottles, minor clay, very fine-grained, massive.

Figure C-2c

□□RI□G □2-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 3, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.1 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
					SW	60.7' - Sand and Gravel, brown (10YR 4/3), fine- to coarse-grained, gravel predominantly slate (to 1/2'; few to 3 inches), subangular to surounded.
				61		
				62		
7	13	100		63	ML/SM	62.9' - Sandy Silt to Silty Sand, dark yellowish brown (10YR 3/6) and dark gray (10YR 4/1), some manganese nodules, trace gravel (to 1/2"), laminated, weak oxidation mottling.
				64		
				65		
				66		
				67		
7	14	100		68		
						68.6' - 69.5' - increase in sand and gravel content
				69		69.4' - grades to dark gray (10YR 4/1)
				70		70' - well stratified
				71		
				72		
8	15	100		73		
				74		
				75		
						Total depth of boring: 75 feet.
				76		Fill to 7.4 feet.
						Groundwater encountered during drilling at 55 feet; static groundwater level at 50.5 feet
				77		(after 15 minutes).
						Backfilled with soil cuttings and tamped.
				78		Concrete patched.
				79		
				80		

Figure C-2d

□□RI□G □3-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.4 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0 1 2 3 4 5		Started sampling at 1.4' **ARTIFICIAL FILL (af)** Silty Sand, brown (7.5YR 4/4), fine-grained, some medium-grained, minor gravel (to ½"), few concrete fragments (to ½").
1	2	100		6 7 8 9 10	SM	**OLDER ALLUVIUM (Qoal)** 5.8' - Silty Sand, brown (7.5YR 4/4), fine-grained, some medium-grained, trace to minor gravel (to ½"; few to 1-1/2"), massive. 7.0' - trace clay
2	3	100		11 12 13 14 15	SC SM SP SP-SM SP	10.5'- Clayey Sand, dark yellowish brown (10YR 3/6), fine-grained, trace organics. 11.1'- Silty Sand, dark yellowish brown (10YR 3/6), trace clay and gravel (to 1/4"), friable, slightly porous. 12.7'- Sand with gravel, dark yellowish brown (10YR 3/6), minor silt, fine- to medium-grained. Gravel predominantly slate (1/4 to 1/2"). 13.6'- Sand with Silt, dark yellowish brown (10YR 4/4), very fine-grained. 15.4'- Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, some coarse-grained, minor gravel, predominantly silt (to ¼").
2	4	100		16 17 18 19 20	SM ML SP-SM SP	16.0'- Silty Sand, dark yellowish brown (10YR 3/6), very fine-grained,trace to minor gravel. 17.0'- Silt- dark yellowish brown (10YR 4/4) with gray (10YR 4/1) mottles, minor sand, very fine-grained, some caliche stringers. 17.8'- Sand with Silt, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace slate gravel (to 1"), massive. 18.5'- Sand with Gravel, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), very fine-grained, trace gravel, predominantly slate (1/8 to 1"), crudely stratified.

Figure C-3a

□□RI□G □3-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.4 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
				21		
				22		
3	5	100		23		22.6' - increase in sand content, dark gray (7.5YR 4/1)
					CL/ML	**LAKEWOOD FORMATION (Qlw)**
				24		23.3' - Silty Clay to Clayey Silt, dark gray (7.5YR 4/1), trace to minor sand, very fine-grained, trace manganese nodules, varved.
				25		
				26		26'-increase in sand content, trace calcium carbonate nodules, trace gravel (to 1/2").
3	6	100		27		
				28	ML	27.5'- Silt with Sand, dark brown (7.5YR 3/4) and dark gray (7.5YR 4/1), fine-grained, trace to minor clay, faint oxidation mottling and striping, trace manganese nodules, trace gravel (to ½"), varved.
				29		
				30		
				31		31.0'- increase in sand content
					CL/SC	31.4'- Clay with Sand to Clayey Sand, dark brown (7.5YR 3/4), trace gravel (10 1/4"), varved.
				32		
4	7	100		33		33.4 to 33.6'- increase in sand content
				34		
				35		
					SP	35.0'- Sand, dark yellowish brown (10YR 4/4), fine-grained, trace to minor gravel (to 1/4").
				36		35.9'- very fine-grained, trace to minor silt, trace to no gravel.
						36.4' - with clay
				37		
4	8	100		38	ML/CL	37.7'- Clayey Silt to Silty Clay, gray (7.5YR 5/1), trace to minor sand, very fine-grained, varved, weak oxidation striping.
				39		Below 39.6'- increase in sand content, trace gravel (to 1/4").
				40		

Figure C-3b

□□RI□G □3-A □□□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.4 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as previous
				41	ML	41.2'- Silt with Sand, gray (7.5YR 5/1), fine grained.
5	9	100		42	SM/ML	42.2'- Sandy Silt to Silt with Sand, brown (7.5YR 4/2) to dark grayish brown (10YR 4/2), very fine-grained, weakly laminated.
				43		
				44	CL/ML	43.3'- Clay with Sand to Silt with Sand, brown (7.5YR 4/2) to dark grayish brown (10YR 4/2), very fine-grained, trace gravel (to 1/2"), varved.
				45		
				46	SM/ML	46.3'- Silty Sand to Sand Silt, brown (7.5YR 4/4), very fine-grained, trace gravel (less than 1/8").
5	10	100		47	CL/ML	46.8'- Clay with Sand to Silt with Sand,dark brown (7.5YR 3/3), massive to weakly varved.
				48		
				49		
				50	ML	50'- Silt with Sand, brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4), minor clay, very fine-grained, locally massive to weakly laminated.
6	11	100		51		
				52		
				53		
				54		
				55		
				56		55.8' - minor gravel (to 3/4")
				57	ML/SM	57.0' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/6), fine- to medium-grained, minor gravel (to 1/2"), crudely stratified.
6	12	100		58		
				59		58.7' - dark yellowish brown (10YR 3/4)
				60		

Figure C-3c

□□RI□G □3-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 4, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.4 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
				61		
7	13	100		62	ML	61.1'- Silt with Sand, dark yellowish brown (10YR 3/4) and dark gray (10YR 4/1) , minor clay, fine-grained, trace mangenese staining, laminated.
				63		
				64	SP	63.6'- Sand with Gravel, dark grayish brown (10YR 4/2), fine- to medium-grained, trace clay, gravel predominantly slate (to 1/2"; few to 1-1/2").
				65	ML	65.0'- Sandy Silt, brown (7.5YR 4/4) and dark gray (7.5YR 4/1), very fine-grained to fine-grained, weakly laminated, oxidation striping.
				66		
				67		67.7'- grades to silty sand, trace gravel (to 1/4")
7	14	100		68		
				69		69.0'- grades to Silt with Sand, trace manganese staining, few manganese nodules
				70		
				71		
				72		
8	15	100		73		
				74		
				75		
				76		Total depth of boring: 75 feet. Fill to 5.8 feet. Groundwater encountered at during drilling at 55 feet; static groundwater level at 53 feet (after 15 minutes). Backfilled with soil cuttings and tamped. Concrete patched.
				77		
				78		
				79		
				80		

Figure C-3d

□□RI□G □4-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.5 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 1'
						ALLUVIUM (Qal)
				1	SP	Sand, very dark grayish brown (10YR 3/2), some silt, medium to coarse-grained, massive.
					ML	**OLDER ALLUVIUM (Qoal)**
				2	SM	1.1' - Clayey Silt to Silty Clay, very dark grayish brown (10YR 3/2), manganese staining.
						1.4' - Silty Sand, very dark grayish brown (10YR 3/2), trace gravel (to ¼"), fine-grained, plugged with clay.
				3	SM/ML	2.4' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/4), fine-grained, faint laminations, manganese staining.
				4	SM	3.1' - Silty Sand with Clay, dark yellowish brown (10YR 4/4), trace to minor gravel (to 1"; predominantly ⅛" or less), fine-grained, oxidized.
1	2	100		5		
				6		
				7		
				8		
				9	ML	8.3' - Silt with Sand, brown (7.5YR 4/4), trace gravel (to ½") ; slate and diatomaceous siltstone clasts, subangular-subrounded.
				10	SM	10' -Sand with Silt, brown (7.5YR 4/4), fine-grained.
2	3	100		11	SM/ML	10.3' - Silty Sand to Silt with Sand, brown (7.5YR 4/4), trace to minor gravel, trace clay, fine- to medium-grained, massive.
				12	SP-SM	11.3' - Sand with Silt, brown (7.5YR 4/4), trace to with gravel, medium-grained, massive.
					ML	11.8' - Silt with Sand, brown (7.5YR 4/4), fine-grained, faint laminations.
				13		
				14	SM	13.5' - Silty Sand, brown (7.5YR 4/4), fine- to medium-grained, massive.
				15	ML	14' - Silt with Sand, brown (7.5YR 4/4), trace to minor clay, fine-grained, faint laminations.
2	4	100		16	SM	15.2' - Silty Sand with clay, dark yellowish brown (10YR 3/4), fine-grained, massive.
				17	ML	16.3' - Silt with Sand, dark yellowish brown (10YR 3/6), minor clay, fine-grained, teace manganese staining, faint laminations.
				18		
				19	SM	18.5' - Silty Sand, brown (7.5YR 4/4) with dark gray (7.5YR 4/1) mottles, very fine- to fine-grained, massive.
				20	SP-SM	19.8' - Sand to Sand with Silt, dark yellowish brown (10YR 4/4), minor gravel (to 2"), fine-grained, massive to crudely stratified.

Figure C-4a

□□RI□G □4-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.5 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
3	5	100		20	SP/SW	20.3' - fine- to medium-grained, some coarse, gravel predominantly slate (to 1/4"), crudely stratified.
				21		
				22		
				23		
				24	ML	**LAKEWOOD FORMATION (Qlw)** 23.8' - Silt, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), minor clay, very fine-grained, oxidation mottling, varved.
				25		
3	6	100		26	ML/SM	25.0' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/4), trace gravel (to 1/4"), fine-grained, weakly laminated, manganese staining.
				27		
				28	ML	27.8' - Silt with Sand, brown (7.5YR 4/4), very fine-grained, weakly laminated
				29	ML/SM	28.8' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/4), trace gravel (to 1/4"), fine-grained, weakly laminated, manganese staining.
4	7	100		30		
				31	CL/ML	29.4' - Clay to Silty Clay, brown (7.5YR 4/4) and dark gray (7.5YR 4/1), trace sand, very fine-grained, trace gravel (to 1/4"), varved.
				32		31.0' - increase in sand content, distinct banded pattern.
				33		
				34		
				35	SP	35.1' - Sand with Gravel, dark yellowish brown (10YR 4/4), fine- to coarse-grained, gravel surounded and subangular (to 1").
4	8	100		36		
				37		37' - dark yellowish brown (10YR 3/6)
				38	ML	37.6' - Alternating beds of Silt with Sand and Silty Sand, dark grayish brown (10YR 4/2) with dark brown (10YR 3/3) mottles, minor clay, very fine-grained, clay content decreases with depth.
				39		39.25' to 39.5' - Increase in sand content
				40	ML	39.5' - Silt, dark grayish brown (10YR 4/2), trace clay, massive.

Figure C-4b

□□RI□G □4-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.5 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		40.0' - Minor sand, distint oxidation striping
5	9	100		41	ML	40.5' - Silt, dark gray (7.5YR 4/1) and dark yellowish brown (10YR 4/4), trace to minor sand, very fine-grained, trace calcium carbonate nodules or shell fragments, distinct oxidation striping, laminated.
				42	ML/CL	42.0' - Clayey Silt, to Clay with Silt, dark grayish-brown (10YR 4/2), trace sand, very fine-grained.
				43	ML/SM	43.0' - Alternating beds of Silt and Silty Sand, dark brown (7.5YR 3/3), minor clay, fine-grained, trace gravel (to 1/2"), subrounded to subangular, thickly laminated.
				44		
5	10	100		45		43.8' to 45.7' - with alternating dark gray (7.5YR 4/1) and (7.5YR 3/3) beds
				46		
				47		47.1" - increase in sand content, dark brown (7.5YR 3/4)
				48	ML/CL	48.0 - Clayey Silt and Silty Clay, dark brown (7.5YR 3/4), trace sand, fine-grained, few fine-grained sand beds, beds , crudely stratified. Trace gravel (to 1/4").
				49		
6	11	100		50		
				51		
				52		
				53		
				54		
				55		
6	12	100		56		56.4' to 56.7' - with gravel (to 1-1/2")
				57	SW	56.7' - Sand and Gravel, dark yellowish brown (10YR 3/4), fine- to coarse-grained, gravel predominantly slate (to 1/2"; few to 1"), trace to minor secondary clay, crudely stratified.
				58		
				59		
				60		

Figure C-4c

□□RI□G □4-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9048-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 1818 N. Cherokee Avenue Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 268.5 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		
				61		
				62		
7	13	40		63		62.0' to 65.0' - No Recovery
				64		
				65		
7	14A	50		66		66.25' to 67.5 - No Recovery
				67		
				68	SC	67.5' - Clayey Sand with Gravel, brown (7.5YR 4/4) and dark gray (7.5YR 4/1), fine-fine-grained, some medium, gravel subrounded to subangular (to 1/2").
7	14B	100		69		
				70		
				71		Total depth of boring: 70 feet. Depth of fill not determined. Groundwater encountered during drilling at 55 feet; static groundwater level at 50.4 feet (after 15 minutes). Backfilled with soil cuttings and tamped. Asphalt patched.
				72		
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-4d

□□RI□G □5-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 272.3 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	57		0		Started sampling at 1.3'
				1	SM	**ALLUVIUM (Qal)** Silty Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace to minor gravel (to 1/4"), massive.
				2		
				3	SP	2.7' - Sand with Gravel, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), fine- to medium-grained, trace coarse, uncemented. Gravel predominantly slate (to 1/4"), crudely stratified.
				4		3.4' - 5' - No Recovery
				5		
1	2	70		6	SM	**OLDER ALLUVIUM (Qoal)** 5.4' - Silty Sand, brown (7.5YR 4/4), plugged with clay, trace gravel (to ¼"; predominantly⅛").
				7		
				8	SM	7.1' - Silty Sand with Clay and Gravel, brown (7.5YR 4/4), fine-grained, massive, oxidized, minor secondary clay.
				9		8.5' - 10' - No Recovery
				10		
2	3	100		11	SM	10' - Silty Sand, brown (7.5YR 4/4), minor to with gravel (to 1/4") and secondary clay, massive.
				12		
				13	ML	13.1' - Silt with Sand, brown (7.5YR 4/4), very fine-grained, trace to minor clay, massive.
				14	SM	13.9' - Silthy Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), minor to with gravel (to 1/4"), massive.
				15		15.0' - decrease in gravel content, increase in sand content
2	4	100			SP-SM	15.4' - Sand with Silt, dark brown (7.5YR 3/4), fine-grained, trace clay, massive.
				16	SM/ML	15.9' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4), fine-grained, trace clay, massive.
				17	SM	16.3' - Silty Sand, dark brown (7.5YR 3/4) to dark yellowish brown (10YR 3/4), fine-grained, massive.
				18	SM/ML	17.7' - Silty Sand to Silt with Sand, dark brown (10YR 3/3), very fine-grained, trace clay, massive.
				19	SP-SM	18.1' - Silty Sand to Sand, dark brown (7.5YR 3/3), fine-grained, massive.
				20		19.5' -Sand with Silt, dark brown (7.5YR 3/3),fine-grained, some medium and coarse, with gravel (to 1/2'), thickly laminated.

Figure C-5a

□□RI□G □5-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 272.3 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
				21		
				22	SP	22.2' - Sand, dark yellowish brown (10YR 3/4), very fine-grained, weakly laminated.
3	5	100			ML	22.5' - Silt with Sand, dark yellowish brown (10YR 4/4) and dark gray (7.5YR 4/1), thickly laminated.
				23		
				24	Ml/SM	22.9' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/4) and dark gray (7.5YR 4/1), very fine-grained, well stratified to laminated.
				25		24.1' - Increase in sand content
						LAKEWOOD FORMATION (Qlw)
				26	ML/SM	25.8' - Silt with Sand, dark brown (7.5YR 4/4) and dark gray (7.5YR 4/1), very fine-grained, trace to minor clay, massive to weakly laminated.
				27		26.3' - increase in sand content, massive
3	6	100				27.3' - Silt, dark brown (7.5YR 4/4) and dark gray (7.5YR 4/1), minor clay, varved.
				28	ML	
				29		
				30	SM	30' - Silty Sand with Clay, dark brown (7.5YR 4/4)with dark gray (7.5YR 4/1) mottling, moderate oxidation, laminated.
				31	SM/ML	30.8 ' - Silty Sand to Silt with Sand, dark brown (7.5YR 4/4) and dark gray (7.5YR 4/1), very fine-grained, trace clay and gravel (to ¼"), massive to laminated, variable oxidation along laminae.
				32		
4	7	100		33		
				34		
				35		
				36		
				37		
4	8	100		38		
				39		
				40		

Figure C-5b

□□RI□G □5-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 272.3 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		40' - increase in sand content; gravel (to 1½"), crudely stratified.
				41		
				42		
5	9	100		43	ML	42.1' - Silt with Sand, dark yellowish brown (10YR 4/6) and dark gray (7.5YR 5/1), trace to minor clay, massive to crudely stratified.
				44		
				45		45' - 45.2' - Increase in sand content
				46	ML	45.2' - Silt, dark gray (10YR 4/1) with dark yellowish brown (10YR 4/6) mottles, trace to minor minor clay, massive, oxidized. 46.5' - trace gravel (to ¼")
5	10	100		47		
				48		
				49		
				50		
				51	SP-SM	51.5' - Sand with Silt and Gravel, dark yellowish brown (10YR 4/4), massive, oxidized.
				52	ML	51.9' - Silt, dark yellowish brown (10YR 3/4) and dark gray (10YR 4/1), trace clay, massive, oxidized.
6	11	100		53	SP	52.7' - Sand with Gravel, brown (10YR 4/3), fine- to medium-grained, massive.
				54	ML	53.5' - Silt, dark brown (10YR 3/3) and dark gray (10YR 4/1), massive.
				55		55.5' - with sand, trace clay, crudely stratified, oxidized
				56		
				57		
6	12	100		58	ML	57.1' - Silt with Sand, brown (7.5YR 4/4) and dark gray (10YR 4/1), minor clay, oxidation mottling.
				59	ML	58.1' - Silt to Silt with Sand, brown (7.5YR 4/4) and dark gray (10YR 4/1), oxidized.
				60		

Figure C-5c

□□RI□G □5-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 7, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 272.3 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
7	13	100		60		Same as Previous
				61		
				62		
				63		
				64		
				65		65' to 67.2' - with gravel (to 1/2")
7	14	100		66		
				67		
				68		
				69		
				70		
				71		Total depth of boring: 70 feet. Depth of fill not determined. Groundwater encountered during drilling at 55 feet; static groundwater level not determined. Backfilled with soil cuttings and tamped. Asphalt patched.
				72		
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-5d

□□RI□G □6-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 0.7' **ALLUVIUM (Qal)** Silt with Sand and Clay, dark brown (10YR 3/3), very fine- to fine-grained, trace gravel (to 1/4"), massive.
				1		
				2		
				3	ML/SM	**OLDER ALLUVIUM (Qoal)** 3.5' - Sandy Silt to Silty Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), very fine-grained, minor to with gravel (to 1"), subrounded to subangular, massive. Gravel volume increases with depth.
				4		
1	2	100		5		5' to 6.2' - Increase in sand content
				6		6.6' to 8.3' - weakly laminated
				7		
				8	ML	8.3' - Clayey Silt, dark yellowish brown (10YR 3/4), trace gravel (to 1/2"), subrounded to subangular, massive to varved.
				9		
				10	SM/ML	10' - Silty Sand to Sandy Silt with Gravel, dark yellowish brown (10YR 4/4). Gravel predominantly 'slate (to ¾"), subrounded to subangular.
2	3	100		11	SM	11' - Silty Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), massive. 12.5 ' to 13' - gravel layer (to ½")
				12		
				13		
				14		
				15	SP-SM	14.8' - Sand and Gravel, dark brown (10YR 3/3), fine- to medium-grained, gravel subangular (to 1/2").
		,		16	ML	15.6' - Silt with Sand, dark brown (10YR 3/3), very fine-grained, trace to minor clay, massive.
				17	SM/ML	16.4' - Silty Sand to Silt with Sand and Gravel, dark brown (10YR 3/3). Gravel predominantly slate (to 1/4"), subangular, massive.
2	4	86		18	ML	18.5' - Silt, dark yellowish brown (10YR 3/4), trace to minor sand, very fine-grained, trace fine gravel (10 1/4"), massive.
				19		
				20		19.4' - 20' - No Recovery

Figure C-6a

□□RI□G □6-A □□□□i□ued□

GEOCON
WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20	SP-SM	20' - Sand to Sand with Silt, dark yellowish brown (10YR 3/4), fine- to medium-grained, some coarse, massive.
				21	ML	20.4' - Silt to Silt with Sand, dark brown (7.5YR 3/3), trace sand, fine-grained, caliche stringers, massive. Increase of sand content with depth.
3	5	100		22	SM	22' - Silty Sand, dark brown (7.5YR 3/3), fine-grained, laminated.
				23		
				24		
				25	SM	25' - Silty Sand, dark brown (10YR 3/3) and dark gray (7.5YR 4/1), trace clay, oxidation mottling, massive. Grades sandier with depth.
3	6	100		26		
				27		
						LAKEWOOD FORMATION (Qlw)
				28	ML	27.6' - Sandy Silt , dark brown (7.5YR 3/2) and dark gray (7.5YR 4/1), minor clay, trace manganese stringers, massive to varved.
				29		29.2' - Increase in clay content
				30		30' - varved
				31		
4	7	100		32	CL/ML	32.2' - Clay with Silt, dark brown (7.5YR 3/2) and dark gray (7.5YR 4/1), trace to minor sand, fine-grained, varved. Some manganese staining along beds. Increase in sand content with depth.
				33		
				34		
				35		
				36		
				37		
4	8	100		38		37.2' - grades to dark gray (7.5YR 4/1), oxidation along bedding, trace calcium carbonate nodules
				39		
				40		

Figure C-6b

□□RI□G □6-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		
5	9	100		41 42 43 44	SP-SM	40.3' - Sand with Silt, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), fine-grained, massive to crudely stratified. 42.9' to 44' - silt interbeds
5	10	100		45 46 47 48	ML	45.3' - Silt, dark gray (10YR 4/1), weakly laminated.
				49		48.2' - Sand with Silt , brown (10YR 4/3), minor gravel (to 1"), subangular, massive.
				50	SM	49' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, trace gravel (to 1"), massive.
6	11	100		51 52 53 54	ML SP ML SP	50' - Silt, dark gray (10YR 4/1), some oxidation stringers, few calcium carbonate nodules, massive. 51.1' - Sand, dark yellowish brown (10YR 4/4), fine-grained, trace coarse, trace subrounded gravel (to 1/2"), crudely stratified. 51.9' - Silt, dark gray (10YR 4/1), massive, some oxidation stringers, trace calcium carbonate nodules, massive. 52.6' - Sand, dark yellowish brown (10YR 4/4), fine-grained, trace coarse, minor to with gravel (to 1/2"), subrounded, massive to crudely statified.
6	12	100		55 56 57 58 59	ML SM/ML	53.1' - Silt with Sand, dark grayish brown (10YR 4/2), fine-grained, trace to some gravel (to 1"), subrounded to subangular, crudely stratified. 53.7' to 53.9' and 56.7' to 56.9' - gravel beds 54' to 58' - oxidation mottling ,, 58' - increase in gravel 58.8' - Silty Sand with Gravel to Silt with Sand, dark brown (10YR 3/3). Gravel subangular (to 1"), massive. Increasing sand with depth.
				60		

Figure C-6c

□□RI□G □6-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60	SP-SM	60' - Sand with Silt, brown (10YR 4/3), fine-grained, massive. 61' - with gravel (to 1"), subangular
				61		
				62		
7	13	36		63		61.9' - 65 - No Recovery
				64		
				65		
				66	SM/ML	65' - Silty Sand to Silt with Sand, dark brown (10YR 3/3) minor clay, minor to with gravel (to 1/4"), subrounded to subangular, massive.
				67	SP-SM	66.3' - Sand with Silt and Gravel, dark brown (10YR 3/3), massive. Gravel subrounded. to subangular (to 1/2"; few to 1¼"), crudely stratified.
7	14	100		68	SM	68' - Silty Sand, dark brown (10YR 3/3), massive.
				69	SP-SM	68.4' - Sand with Silt and Gravel, dark brown (10YR 3/3), massive. Gravel subrounded (to 1½").
				70	SM	69.5' - Silty Sand, dark brown (10YR 3/3), massive.
				71		Total depth of boring: 70 feet. Depth of fill not determined.
				72		Groundwater encountered during drilling at 45 feet; static groundwater level at 41.9 feet (after 15 minutes).
				73		Backfilled with soil cuttings and tamped. Asphalt patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-6d

□□RI□G □□-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100	■	0	SM	Started sampling at 0.5' **ALLUVIUM (Qal)** Silty Sand, dark brown (10YR 3/3), very fine-grained, trace to some clay. Sand content increases with depth.
				1		
				2		
				3	ML	**OLDER ALLUVIUM (Qoal)** 3.2' - Silt with Sand and Gravel, dark yellowish brown (10YR 3/4), very fine-grained, oxidation mottling.
				4		
				5		
1	2	100		6		
				7		
				8		8.0' - decrease in gravel content, weakly laminated; subhorizontal
				9	ML	9' - Silt, dark yellowish brown (10YR 4/4), some clay, massive, trace gravel.
				10	SM	10' - Silty Sand with Clay, dark yellowish brown (10YR 4/4), massive.
				11	SM/ML	10.6' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/4), fine-grained, trace gravel (to 1/4"), massive.
2	3	100		12		
				13		
				14	SP-SM	13.8' - Sand with Silt, dark yellowish brown (10YR 3/4), fine-grained, massive to crudely stratified. Sand content increases with depth.
				15		15.5' - 16' - with gravel (to ¾), subangular to subrounded
				16	ML	16' - Silt, dark yellowish brown (10YR 4/4), massive, trace caliche stringers.
				17	SP/SW	16.6' - Sand and Gravel with Silt, dark yellowish brown (10YR 3/4), medium- to coarse-grained, gravel subangular to subrounded (to ½"), crudely stratified. Increase in gravel content with depth.
2	4	90		18	ML	18.4' - Silt, dark yellowish brown (10YR 3/4), minor sand, fine-grained, trace gravel (to 1/4"), subangular. Increase in sand and gravel content with depth.
				19	SP	19.4' - Sand, dark yellowish brown (10YR 3/4), fine-grained, minor gravel (to 1/4"), massive
			■	20		19.5' to 20' - No Recovery

Figure C-7a

□□RI□G □□-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
					M/SM	20.3' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, massive.
				21		
				22		
3	5	100			SP-SM	22' - Sand with Silt, dark yellowish brown (10YR 3/4), fine-grained, massive.
				23		
				24	SP/SM	23.5' - Sand with Silt to Silty Sand, dark brown (10YR 3/3), laminated.
				25		
					SM	25.5' - Silty Sand, dark brown (10YR 3/3), massive, trace to some caliche stringers, weakly laminated.
				26		
					SP	26.4' - Sand, dark yellowish brown (10YR 4/4), fine-grained, trace silt, crudely stratified.
				27		
3	6	100			ML	**LAKEWOOD FORMATION (Qlw)**
				28		27.2' - Sandy Silt, dark yellowish brown (10YR 3/4), trace clay, weakly laminated to massive. Clay content increases with depth.
				29		29' to 34.1' - minor secondary clay, crudely stratified to laminated
				30		30' - trace gravel (to ¼")
				31		
				32		
4	7	100				
				33		
				34		
					CL	34.1' - Clay, dark yellowish brown (10YR 3/4), trace gravel, varved.
				35		
				36		
				37		37.5' - grades to dark gray (7.5YR 4/1), oxidation along bedding, trace calcium carbonate nodules
4	8	100				
				38		
				39		
					SP-SM	39.2' - Sand with Silt, dark yellowish brown (10YR 4/4), trace gravel (to1/4"), massive, trace calcium carbonate nodules.
				40		

Figure C-7b

□□RI□G □□-A □□□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
				41	ML/CL	41' - Clayey Silt to Silty Clay, dark brown (7.5YR 3/3), trace sand, very fine-grained, massive.
5	9	100		42		42.5' to 42.7'; 42.9' to 43.6' - sandy silt beds
				43		
				44	SM/ML	43.6' - Silty Sand to Silt with Sand,dark yellowish brown (10YR 3/4), very fine-grained, trace clay, massive, some oxidation mottling, trace manganese staining.
				45	SM	45' - Silty Sand, dark yellowish brown (10YR 3/4), very fine-grained, massive.
5	10	28	■	46		46.4' to 50' - No Recovery
				47		
				48		
				49		
				50	SP-SM	50' - Sand with Silt and Gravel, dark brown (10YR 3/3), fine-grained, massive. Gravel predominantly slate (to ½).
				51	ML	51.4' - Sandy Silt, trace to some clay, dark gray (10YR 4/1), mostly massive, some oxidation mottling.
6	11	100		52		
				53	CL	53.4' - Clay, dark brown (7.5YR 3/3), trace sand, fine-grained, trace gravel (to 1/4"), massive.
				54		54.9' - 55.7' - slate gravel (to 1"); subangular
				55		55.7' - grades to brown (10YR 4/3)
				56		
				57		
6	12	100		58		58' - crudely stratifeid, some manganese staining along beds, trace gravel (to 1/8").
				59		
				60	SP-SM	59.3' - Gravelly Sand with Silt, dark yellowish brown (10YR 3/4), fine- to medium-grained, gravel predominantly slate (to-½"), thickly laminated.

Figure C-7c

□□RI□G □□-A □□□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 8, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
				61	SM/ML	60.3' - Silty Sand to Silt with Sand, dark brown (10YR 3/3), fine- to medium-grained, massive to crudely stratified.
7	13	96		62, 63, 64	ML	63.2' - Silt with Sand, dark brown (10YR 3/3), minor clay, massive to crudely stratified, some manganese nodules.
7	14	100	■	65		64.8' - 65' - No Recovery
				66, 67, 68		
				69		69.5' - trace gravel (to 1"), predominantly slate; subangular
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
				72		Groundwater encountered during drilling at 40 feet; static groundwater level at 38 feet (after 10 minutes).
				73		Backfilled with soil cuttings and tamped. Asphalt patched.
				74, 75, 76, 77, 78, 79, 80		

Figure C-7d

□□RI□G □8-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 271.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 1.0'
						ALLUVIUM (Qal)
				1		Sandy Clay to Clay with Sand, dark brown (10YR 3/3), fine- to medium-grained, massive.
				2		
				3		
				4	CL	**OLDER ALLUVIUM (Qoal)**
						3.5' - Clay with Sand, dark brown (10YR 3/3 to 7YR 3/3), fine-grained, trace to with gravel (1/2" to 2-1/2") oxidized. Increase in sand content with depth.
						3.5' - 5.3' - trace gravel
1	2	100		5		5.3' - 8.9' - with gravel
				6		
				7		
				8		
				9	ML	8.9' - Silt, brown (7.5YR 4/4), trace to minor sand, fine-grained, some oxidation mottling.
				10	SM	10' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, massive.
				11	ML/SM	10.4' - Silt to Silt with Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), very fine-grained, massive.
2	3	100		12		
				13		
				14		
				15		14,6' - grades to silty sand
				16	ML	16' - Silt, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), trace clay, massive.
				17		
2	4	94		18	SM	17.3' - Silty Sand with Gravel, dark yellowish brown (10YR 3/4), fine- to medium-grained, gravel predominantly slate (to 1"), crudely stratified.
				19	CL	18.8' - Clay, dark brown (7.5YR 3/3), fine-grained, massive. Coarsens downward to Silt with Sand
				20		19.7' - 20' - No Recovery

Figure C-8a

□□RI□G □8-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 271.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20	SM	20' - Silty Sand, dark brown (7.5YR 3/4), trace calcium carbonate nodules, massive.
				21	ML/SM	20.4' - Silt with Sand, dark brown (7.5YR 3/4), fine-grained, massive.
				22		
3	5	100				22.3' - grades to Sand with Silt
				23		
					ML	23.4' - Silt, dark yellowish brown (10YR 3/4) with dark gray (7.5YR 4/1) mottles, laminated. Minor caliche concentrated along bedding.
				24		
				25	SP-SM	24.7' - Sand with Silt, dark yellowish brown (10YR 3/6), very fine-grained, laminated.
				26	ML	25.7' - Silt with Sand, dark yelllowish brown (10YR 3/4), weakly laminated.
				27	ML	26.8' - Silt, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), fine-grained, varved.
3	6	100		28		28' - Silty Sand, dark gray (7.5YR 4/1), fine-grained, massive.
				29		
						30' - with sand, fine-grained
				30		
					CL	**LAKEWOOD FORMATION (Qlw)**
				31		30.4' - Silty Clay, dark grayish brown (10YR 4/2) and dark gray (7.5YR 4/1), trace sand, fine-grained, massive.
				32		31.7' - varved
4	7	100				
				33		
					CL/SC	33.2' -Clay with Sand to Clayey Sand, brown (10YR 4/3), fine-grained, trace gravel (to 1/4"), crudely stratified.
				34		
				35		
				36		
				37		
4	8	100		38		
				39		
				40		

Figure C-8b

□□RI□G □8-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 271.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
5	9	90		41	SM	40.8' - Silty Sand, dark brown (10YR 3/3), fine-grained, trace clay and gravel (to 1/4"), massive.
				42		42' - some manganese nodules
				43		43.2' - minor clay
				44		44.4'- wet
			■	45		44.5' - 45' - No Recovery
5	10	100		46		
				47		
				48	SP	47.2' - - Sand , dark brown (10YR 3/3), fine- to medium grained, massive.
				49	SC	48.2' - Clayey Sand, dark gray (7.5YR 4/1), very fine-grained, oxidation mottling, massive.
6	11	100		50		
				51	CL	50.4' - Clay with Sand, brown (10YR 4/3),fine-grained, trace gravel (to 1/8"), massive.
				52		51.7' - dark gray (7.5YR 4/1), some oxidation mottling
				53		
				54	ML	53.9' - Silt with Sand, dark brown (10YR 3/3), fine-grained, trace to some gravel (to ¼"), thickly laminated.
6	12	100		55	SM	55' - Silty Sand, dark brown (10YR 3/3), fine- to medium-grained, minor gravel (to 1/2"), crudely stratified to thickly laminated.
				56		
				57		57' - some disseminated manganese nodules along bedding
				58		
				59		
				60		

Figure C-8c

□□RI□G □8-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 271.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
				61		
				62		
7	13	100		**63**	**SP**	62' - Silty Sand with Gravel, dark brown (10YR 3/3), fine- to medium-grained, trace coarse, gravel predominantly slate (to 1"), massive.
				64		
				65		65' -dark grayish brown (10YR 4/2), with gravel
				66		66' - gravel content increases with depth
				67		
7	14	42		**68**		67.1' - 70' - No Recovery
				69		
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
				72		Groundwater encountered during drilling at 40 feet; static groundwater level at 38.6 feet (after 10 minutes).
				73		Backfilled with soil cuttings and tamped. Asphalt patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-8d

□□RI□G □9-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0	SM/ML	Started sampling at 0.5' **ALLUVIUM (Qal)** Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace to minor clay, massive, porous.
				1		
				2		
				3	SC/CL	**OLDER ALLUVIUM (Qoal)** 2.6' - Clayey Sand to Sandy Clay with Gravel, dark brown (7.5YR 3/3). Gravel predominantly slate (to ½"; few to 1"), massive.
				4		
1	2	100		5		
				6		
				7		7'- gravel to 2"
				8	SM/ML	7.5' - Silty Sand to Sandy Silt, dark yellowish brown (10YR 3/4), trace to minor clay and gravel (to 1/2"), massive.
				9		
2	3	100		10		
				11	SP-SM	11.2' - Sand with Silt, brown (7.5YR 4/4), fine- to medium-grained, trace gravel (to 1"), massive.
				12	CL	11.8' - Sandy Clay, dark yellowish brown (10YR 3/4 to 7.5YR 3/4), very fine-grained, massive.
				13	SP-SM	12.9' - Sand with Silt and Gravel, dark brown (7.5YR 3/4), fine- to medium-grained, trace coarse coarse, crudely stratified.
				14	CL	13.4' - Sandy Clay, dark yellowish brown (10YR 3/4), fine-grained, trace gravel (to ½"), massive.
2	4	91		15	SM	14.6' - Silty Sand with Gravel, dark brown (7.5YR 3/4), fine- to medium-grained, gravel to ¾", crudely stratified.
				16	SP-SM	15.0' - Sand with Silt, dark yellowish brown (10YR 3/6), medium-grained, trace coarse, minor to with gravel (to 1") at base, crudely stratified.
				17	ML	16.6' - Silt, dark yellowish brown (10YR 3/6) with dark gray (7.5YR 4/1) mottles, weakly varved to massive.
				18	SM	18.1' - Silty Sand, dark yellowish brown (10YR 3/6), fine-grained, massive.
				19	ML	19.3' - Silt, dark yellowish brown (10YR 4/4), trace to minor sand, very fine-grained, trace gravel (to 1/4"), laminated.
				20		19.6' to 20' - No Recovery

Figure C-9a

□□RI□G □9 □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20	SP	20' - Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace coarse, trace gravel (to ½"), laminated.
				21		
				22		
3	5	74			SM/ML	22.4' - Alternating layers of Silty Sand and Silt with Sand, brown (10YR 4/3),fine-grained, laminated.
				23		
				24		23.7' - 25' - No Recovery
				25		
				26	SM	25.5' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, trace to minor clay, massive. 26.7' - grades to sand, trace silt
				27		
3	6	100		28	CL	**LAKEWOOD FORMATION (Qlw)** 27.7' - Silty Clay, dark brown (7.5YR 3/4) and dark gray (7.5YR 4/1), trace to minor sand, very fine-grained, massive.
				29		29.4' - color change to dark gray (7.5YR 4/1)
				30		
				31		30.2' - increase in clay content, manganese staining, varved
				32		
4	7	100		33	ML	32.4' - Silt, dark brown (10YR 3/3) and some dark gray (7.5YR 4/1), faint oxidation mottling, laminated.
				34	SC/CL	34.3' - Clayey Sand to Sandy Clay, dark yellowish brown (10YR 4/4) and dark gray (7.5YR 4/1), massive to weakly laminated.
				35	SP-SM	34.7' - increase in sand content 35.0' - Sand with Silt, dark brown (7.5YR 3/4), trace gravel (to 1/4"), massive.
				36		35.5' - with gravel (to 1"), predominantly slate, subangular-subrounded.
				37		
4	8	100		38		
				39	SM	38.6' - Silty Sand, dark brown (7.5YR 3/4) with dark gray (7.5YR 4/1) mottles, trace gravel (to ½"), massive.
				40	SM/ML	39.5' - Silty Sand to Silt with Sand and Gravel, dark brown (7.5YR 3/4), gravel predominantly subangular slate clasts (to 1"). 39.8' - decrease in gravel content

Figure C-9b

□□RI□G □9-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC	Depth (feet)	USCS Class.	Description
				40	SP-SM	40' - Sand with Silt, dark brown (7.5YR 3/4), fine-grained, trace gravel (to 1/4"), massive.
				41		
				42	SM	41.5' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, massive.
5	9	100		43	SM/ML	43.0' - Alternating layers of Silty Sand and Silt with Sand, dark yellowish brown (10YR 3/4), fine-grained, crudely stratified.
				44		44.4' - dark yellowish brown (10YR 4/4) and dark gray (7.5YR 4/1), weakly laminated, manganese nodules concetrated along bedding.
				45		
				46		46.3' -Increase in sand content, trace clay, some oxidation mottling
5	10	100		47		
				48		48.0' - minor gravel (to 1¼")
				49		
				50	SP-SM	50' - Sand with Silt to Silty Sand with Gravel, dark yellowish brown (10YR 3/4), gravel predominantly slate (to ⅛", few to 1½"),massive.
				51	ML/CL	50.9' - Silt with Clay, dark gray (7.5YR 4/1), trace sand, very fine-grained, oxidation mottling, varved.
				52		52.6' - oxidation staining in distinct banded pattern
6	11	100		53		53.2' - increase in clay content, minor gravel (to 1/4"), oxidized
				54		
				55		55.8' - 57.2' - increase in sand content
				56		
				57		57.2' - trace to minor manganese nodules, trace gravel (to 1/16")
6	12	100		58	CL	58.1' - Sandy Clay, dark brown (7.5YR 3/3) and dark gray (7.5YR 4/1), fine-grained, trace gravel (to 1/4"), massive.
				59		
				60		

Figure C-9c

□□RI□G □9-A □□□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 9, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 269.7 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC	Depth (feet)	USCS Class.	Description
				60		60' - no gravel, trace manganese nodules
				61		
				62	ML/SM	61.5' - Silt with Sand, brown (10YR 4/3), fine- to medium-grained, trace to minor clay, thickly laminated.
7	13	100		63		63.6' - with gravel (to 1/2"), increase in sand content, dark yellowish brown (10YR 3/4),
				64		
				65		
				66	SP	65.7' - Sand, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace coarse, thickly laminated.
				67	ML	66.2' - Silt with Sand, dark yellowish brown (10YR 3/4), very fine-grained, minor gravel, (to ½"), trace clay and manganese nodules, massive, oxidized.
7	14	100		68		
				69		
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
				72		Groundwater encountered during drilling at 38 feet; static groundwater level not determined.
				73		Backfilled with soil cuttings and tamped. Concrete patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-9d

□□RI□G □10-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 11, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 0.5'
						ALLUVIUM (Qal)
				1	ML	Clayey Silt, dark brown (7.5YR 3/4), trace to some very fine-grained sand, sandy clay films, trace gravel (to ¼").
				2	ML/SM	**OLDER ALLUVIUM (Qoal)**
				3		2.3' - Silt with Sand to Silty Sand with Gravel, dark brown (7.5YR 3/4), minor secondary clay. Gravel predominantly subangular slate clasts (to 1/2"), gravel increases with depth.
				4		
1	2	100		5	SM	5.0' - Silty Sand, dark yellowish brown (10YR 4/4), fine-grained, minor to with gravel (to 1/2"), minor clay, massive.
				6		6.8' - increase in sand content; decrease in clay content
				7		
				8		
				9	SM	9.1' - Silty Sand with Clay, dark yellowish brown (10YR 3/4), trace gravel (to 1/4"), massive.
2	3	100		10	SP-SM	10.2' - Sand with Silt, dark yellowish brown (10YR 4/4), trace gravel (to 1/2"), massive.
				11	SC/SM	11.1' - Clayey Sand to Silty Sand, dark brown (7.5YR 3/4), trace gravel (to ½"), massive.
				12		
				13		
				14		
2	4	90		15	SM	15.0' - Silty Sand with Gravel, dark yellowish brown (10YR 3/4), fine-grained, trace, clay, massive to crudely stratified.
				16		
				17	SM/ML	16.7' - Silty Sand to Silt with Sand, dark brown (10YR 3/3), fine-grained, trace to minor clay, trace gravel '(to ½"), massive.
				18		18.1' to 18.3' - increase in sand content
				19		
				20		19.5' - 20' - No Recovery

Figure C-10a

□□RI□G □10-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 11, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20	SP-SM	20' - Sand with Silt and Gravel, (dark yellowish brown (10YR 3/4), fine- to medium-grained, gravel predominantly slate and diatomaceous siltstone clasts (to 1-1/2"), subangular to subangular, crudely stratified.
				21	SM	21.1' - Silty Sand, dark yellowish brown (10YR 4/4), very fine-grained, trace clay and gravel (to ¼"), massive.
3	5	93		22		22.4' - increase in sand content
				23		
				24		23.4' to 25.2' - laminated
				25		24.7' - 25' - No recovery
					SM/ML	25.2' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), fine-grained, minor clay, trace gravel (to 1/2"), massive.
				26		26.6' - 27.1' - increase in sand content,
				27	SC	**LAKEWOOD FORMATION (Qlw)**
3	6	100		28		27.1' - Clayey Sand, dark brown (7.5YR 3/4) and dark gray (7.5YR 4/1), very fine-grained, massive.
				29		29.2' - Increase in sand content, dark gray (7.5YR 4/1), faint iron oxide mottling
				30		30.5' - 32.5' - increase in silt content, distinct oxidation mottling
				31		
				32		
4	7	100		33	SM	32.5' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, faint oxidation striping, massive to crudely stratified.
				34		
				35	CL/SC	34.2' - Clay with Sand to Clayey Sand, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), very fine-grained, faint oxidation striping, trace gravel (to 1/2"), massive.
				36		
				37		
4	8	100		38		
				39		
				40		

Figure C-10b

□□RI□G □10-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 11, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40	SM	40' - Silty Sand with Gravel, dark yellowish brown (10YR 3/4), trace clay, very moist. Gravel predominantly slate (to 1/2", few to 3/4").
5	9	100		41	ML/SM	40.5' - Silt with Sand to Sitly Sand, dark yellowish brown (10YR 3/4), minor gravel (to 3/4", few to 1-1/4"), subangular to surounded, massive.
				42		
				43		
				44		
				45	ML	45.2' - Silt, dark yellowish brown (10YR 3/4), trace sand, very fine-grained, trace to with gravel (to 1/2"), massive.
5	10	100		46		
				47	SM	47.0' - Silty Sand with Gravel, dark yellowish brown (10YR 3/4). Gravel predominantly diatomaceous siltstone and slate (to 3/4", few to 1¼"); subangular to subrounded, massive.
				48	ML	47.3' - Silt, dark yellowish brown (10YR 3/4), trace sand, very fine-grained, trace to with gravel (to 1/2"), massive.
				49		47.9' to 48.2' - silty sand with gravel
				50		
				51	SP	51.1' - Sand, brown (10YR 4/3), some silt, trace gravel (to ¾"), massive.
6	11	100		52	ML	52.1' - Silt with Sand, dark grayish brown (10YR 4/2), very fine-grained, faint oxidation mottling.
				53		53.5' - increase in clay content, oxidized
				54		54.2' - trace gravel (to 1/4")
				55		55.0' - oxidation mottling becomes more prominent, crudely stratified
				56		56.5' - with gravel (to 2")
6	12	100		57		
				58	ML/SM	58.1' -Silt with Sand to Silty Sand, dark grayish brown (10YR 3/4) and dark gray (7.5YR 4/1), very fine-grained, minor secondary clay, trace gravel (to 1/2"), oxidation mottling and manganese staining, massive.
				59		
				60		

Figure C-10c

□□RI□G □10-A □□□□i□ued□

GEOCON
WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 11, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 270.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
7	13	100		60		
				61		61.0' - increase in sand content
				62		
				63		
				64		
7	14	23		65	SC	64.4' - Clayey Sand with Gravel, dark brown (10YR 3/3), fine-grained, gravel predominantly slate clasts (to 3/4"), massive.
				66		
				67		65.2' - 70' - No Recovery
				68		
				69		
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
				72		Groundwater encountered during drilling at 33 feet; static groundwater level not determined.
				73		Backfilled with soil cuttings and tamped. Concrete patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-10d

□□RI□G □11-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 273.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 0.5'
						ALLUVIUM (Qal)
				1	SM/ML	Silty Sand with Clay to Clayey Silt with Sand, dark yellowish brown (10YR 3/4), very fine- to medium-grained, trace gravel (to ½"), massive.
				2		
				3		
				4		
				5		
1	2	100		6	ML	**OLDER ALLUVIUM (Qoal)**
						5.5' - Silt to Silt with Sand, brown (7.5YR 4/4), minor to with clay, minor gravel (to 1/4"), fine-grained, massive.
				7		
				8		8.6' to 10.3' - laminated
				9		
2	3	100		10		10.3' - increase in sand content
				11	SM	11.3' - Silty Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, massive.
				12	SM/ML	12.2' - Silty Sand to Sandy Silt, dark yellowish brown (10YR 3/4), some clay films, trace gravel (to ¼"), massive.
				13		
				14		
2	4	100		15		15.0' - trace clay, increase in sand and gravel to ¾" (diatomaceous slate and shale)
				16		
				17	ML	17.0' - Silt with Sand, dark brown (7.5YR 3/4), trace to minor clay, trace gravel (to 1/2"), massive. massive.
				18		
				19	SM	19.0' - Silty Sand with Gravel, dark yellowish brown (10YR 3/6), fine- to medium-grained, trace coarse, subangular gravel (to 2"), crudely stratified.
				20		

Figure C-11a

□□RI□G □11-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 273.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
				21	SM	20.4' - Silty Sand with Clay, dark brown (10YR 3/3), fine-grained, some caliche stringers.
3	5	92		22	SP-SM	22.2' - Sand to Sand with Silt, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace coarse, crudely stratified.
				23		23.2' - 24.6' - gravel-rich zone
				24		
			■	25		24.6' - 25.0' - No Recovery
3	6A	60		26		25.7' - 26.3' - gravel-rich zone
			■	27		26.5' - 27.5' - No Recovery
3	6B	100	■	28	SM	27.5' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, minor clay, trace gravel (to ½"), laminated.
				29		
				30		
4	7	100		31	SM/ML	30.1' - Silty Sand to Silt, dark yellowish brown (10YR 4/1), fine-grained, trace to minor clay, oxidation mottling, massive to weakly laminated.
				32		
				33	ML	**LAKEWOOD FORMATION (Qlw)** 32.3' - Clayey Silt, dark grayish brown (10YR 4/2), trace sand, fine-grained, massive.
				34		34.5' - increase in clay content, oxidation mottling
4	8	100		35		35.0' - trace gravel (to ¼"), oxidized
				36		
				37		
				38		38.2' - becomes dark brown (7.5YR 3/4) and dark gray (7.5YR 4/1)
				39		
				40		

Figure C-11b

□□RI□G □11-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 273.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		40' - trace gravel (to 2")
				41		41.6' - becomes dark brown (7.5YR 3/2) with some dark gray (7.5YR 4/1)
5	9	100		42		
				43		
				44		
				45		
				46		
				47		
5	10	100		48	SP-SM	48.2' - Sand with Silt, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace coarse, trace gravel (to ¼"), massive.
				49		
				50	ML	50.2' - Clayey Silt, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), trace sand, fine-grained, trace gravel (to ½"), faint oxidation mottling, massive.
				51		
				52		
6	11	100		53		
				54	SP	53.9' - Sand with Gravel, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), fine-grained, trace to minor silt, trace gravel to 3/4", few to 1-1/2"), massive.
				55		55.0' to 56.8' - sand with gravel (to 1-1/2")
				56		
				57		
6	12	92		58		
				59	SM/ML	59.2' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), minor to with clay, trace gravel (to ¼"), massive.
			■	60		59.7' - 60' - No Recovery

Figure C-11c

□□RI□G □11-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 273.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
				61		
				62		62.0' - increase in sand and gravel content
7	13	80		**63**		
					ML	63.1' - Clayey Silt, brown (7.5YR 4/4), trace sand, very fine-grained, trace gravel (to ¼")
				64		faint oxidation mottling, massive to crudely stratified.
				65		64.0' - oxidized
						65.0' - grades to dark yellowish brown (10YR 4/4)
				66		
				67		
7	14	100		**68**		68.2' - manganese nodules concentrated along beds
				69		
				70		
						Total depth of boring: 70 feet.
				71		Depth of fill not determined.
						Groundwater encountered during drilling at 48 feet; static groundwater level at 45.5 feet
				72		(after 15 minutes).
						Backfilled with soil cuttings and tamped.
				73		Asphalt patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-11d

□□RI□G □12-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.9 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 1.4'
						ALLUVIUM (Qal)
				1	SM	Silty Sand, dark yellowish brown (10YR 4/4), very fine-grained, trace gravel (to ¼") trace caliche stringers, massive.
				2	SM	2.1' - Silty Sand with Gravel, dark yellowish brown (10YR 4/4), slightly porous, gravel to 1/2".
				3		2.1' - 2.8'- gravel to 1½" (predominantly ¼" or less)
				4		2.8' - trace clay
1	2	100		5	ML	4.8' - Silt to Silt with Sand, brown (7.5YR 4/4), fine-grained, trace gravel (to 1/4", few 1/2"), massive.
				6		
				7		
				8		
				9		
2	3	100		10	SM	**OLDER ALLUVIUM (Qoal)** 10.0' - Silty Sand with Gravel, brown (7.5YR 4/4), fine-grained, fine-grained, trace clay, Gravel predominantly siltstone and slate clasts (to 1½"), massive.
				11		
				12		
				13		
				14	ML	14.7' - Silt with Sand, dark yellowish brown (10YR 4/4) with dark gray (10YR 4/1) mottles, trace to minor clay, massive.
2	4	100		15		15.0' - oxidized 15.5' - increase in sand content, trace gravel (to ¼")
				16		
				17	ML	17.2' - Silt with Sand, dark yellowish brown (10YR 4/4) and dark gray (10YR 4/1) , fine-grained trace to minor clay, trace gravel (to 1/4"), massive.
				18		
				19		19.3' - with gravel (to 1¼")
				20	SM	19.6' - Silty Sand with Gravel, fine- to medium-grained, gravel predominantly slate (to 1-1/4"), crudely stratified.

Figure C-12a

□□RI□G □12-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.9 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
				21		
				22	ML	21.9' - Silt with Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4) and dark gray (7.5YR 4/1), trace clay and gravel (to 1/4"), oxidation mottling, massive.
3	5	100		23		
				24	SP-SM	23.5' - Sand with Silt/Silty Sand with Gravel, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace coarse.
				25		25.3' - trace to minor gravel (to 1/2")
				26		
				27	SM/ML	26.6' - Silty Sand to Silt with Sand, dark brown (10YR 3/3), fine-grained, oxidized, crudely stratified to massive.
3	6	100		28		28.1' - increase in sand content, fine- to medium-grained, with gravel (to 1¼"), crudely stratified
				29		
				30	SP	29.2' - Sand, dark yellowish brown (10YR 4/4), trace to with silt, trace gravel (to 1/2"), laminated to crudely stratified. 30.5' to 31.4'; 33.0' to 33.5' - with gravel
				31		
				32		
4	7	100		33		
				34	SM/ML	33.5' - Silty Sand to Silt with Sand, brown (10YR 4/3), very fine-grained, trace clay, massive. 34.5' - 34.7' - caliche stringers
				35		
				36	ML	**LAKEWOOD FORMATION (Qlw)**
				37		36.2' - Silt, dark gray (7.5YR 4/1), trace clay and sand, very fine-grained, massive.
4	8	100		38		
				39	SM/SC	38.5' - Silty Sand and Clayey Sand, dark brown (7.5YR 3/4) and dark gray (7.5YR 4/1), fine-grained, trace gravel (to 1/8"), oxidized, massive.
				40		

Figure C-12b

□□RI□G □12-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.9 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
5	9	100		41, 42, 43, 44		
5	10	100		45, 46, 47, 48, 49		
6	11	100		50, 51, 52, 53, 54		51.5' - increase in silt content, very fine-grained 53' to 54.7' - weakly laminated
6	12	100		55, 56, 57, 58, 59	SM/ML	54.7' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4), very fine-grained, trace gravel (to 1/4"), massive.
					ML	56.3' - Silt with Sand, dark yellowish brown (10YR 3/4) fine-grained, trace clay and gravel (to 1/4"), minor oxidation mottling, massive.
				60	SP	59.8' - Sand with Gravel, brown (10YR 4/3), fine-grained, gravel predominantly slate (to 1-1/2"), masssive.

Figure C-12c

□□RI□G □12-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: October 10, 2013
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.9 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
				61		
7	13	100		62	ML	61.4' - Silt with Sand, dark grayish brown (10YR 4/2), fine-grained, trace clay and gravel (to 1/4"), massive.
				63		63.0' - minor gravel (to 1/2")
				64		
				65		
7	14	100		66		
				67		67.8' - grades to clayey sand
				68		
				69		
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
						Groundwater encountered during drilling at 50 feet; static groundwater level not determined.
				72		Backfilled with soil cuttings and tamped.
						Asphalt patched.
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-12d

□□RI□G □13-A

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: January 24, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
1	1	100		0		Started sampling at 1.2'
				1	SM	**ALLUVIUM (Qal)** Silty Sand with disseminated gravel, (10YR 4/6), fine-grained. Gravel predominantly slate (to 1/8"), few diatomaceous siltstone clasts, massive.
				2		
				3		
				4	SM/SC	3.8' - Silty Sand to Clayey Sand, dark yellowish brown (10YR 4/6), fine-grained, trace to minor clay, trace gravel (to 1/8"), predominatly slate, few diatomaceous siltstone clasts, fine-grained, massive, porous.
1	2	100		5	SM	5.0' - Silty Sand with disseminated gravel, dark yellowish brown (10YR 4/6), fine-grained, gravel predominantly slate (to 1/8"), few roots near base of unit.
				6	SM	6.2' - Silty Sand, dark yellowish brown (10YR 4/6) to brown (7.5 YR 4/4), trace clay, very fine-grained, trace to minor gravel (to 1/2"), weakly laminated, some secondary clay films. 7.8' to 8.1' - Increase in sand and gravel content; gravel to 3/4"
				7		
				8	SM/ML	8.1' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/6), minor clay, laminated. 8.9' - Increase in sand content 9.5' - minor manganese staining
				9		
2	3	100		10	SP-SM	9.7' - Sand with Silt, yellowish brown (10YR 5/6), minor clay, fine- to medium-grained, massive.
				11	SM/ML	11.5' - Silty Sand to Silt with Sand, yellowish brown (10YR 5/4), fine- to medium grained, trace gravel (to 1/8"), weakly laminated.
				12	SM	12.2' - Silty Sand, dark yellowish brown (10YR 4/6), fine-grained, trace medium, massive.
				13	SM	**OLDER ALLUVIUM (Qoal)** 12.7' - Silty Sand, yellowish brown (10YR 5/6), very fine-grained, trace to minor gravel (to 1/4"), trace clay, weakly laminated. Sand becomes medium-grained at depth.
				14		
2	4	96		15		15.0' - massive
				16	SP-SM	15.5' - Sand with Silt, dark yellowish brown (10YR 4/6), minor to with gravel (to 3/4"), fine- to medium-grained, massive.
				17		
				18	SM	17.6' - Silty Sand dark yellowish brown (10YR 4/6), fine-grained, trace gravel (to 3/4"), massive.
				19	SP-SM	18.6' - Sand with Silt, dark yellowish brown (10YR 4/6), fine-grained, minor to with gravel (to 3/4"), massive.
				20	SM/ML	19.4; - Silty Sand to Silt, dark yellowish brown (10YR 4/4 to 10YR 4/6), trace to minor clay. 19.8' - 20' - No Recovery

Figure C-13a

□□RI□G □13-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: January 24, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		
					SP-SM	20.0' - Sand with Silt, yellowish brown (10YR 5/4), medium- to coarse-grained, minor gravel (to 1/4", few to 3/4"), massive.
				21		
				22		22.4' - with gravel (40% to 60%)
3	5	89		23	SP-SM	22.7' - Sand with Silt, brown (7.5YR 5/4), minor clay, trace to with gravel (to 1"), subangular; gravel content increasing with depth, massive.
				24	SM	23.7' - Silty Sand with Gravel, dark yellowish brown (10YR 4/6), fine- to medium-grained, gravel (to 1"), crudely stratified.
				25		24.5' - 25' - No Recovery
					SP/SM	25.0' - Silty Sand to Sand with Silt, dark yellowish brown (10YR 4/6), fine-grained, minor clay, trace gravel (to 1/8"), trace manganese nodules, weakly laminated.
				26		26.6' - increase in sand and gravel content; gravel (to 1/2"), subangular to subrounded, fine-grained.
				27		to medium-grained, crudely stratified.
3	6	100				27.3' - weakly laminated
				28		
				29		
				30		
				31	ML	30.5' - Silt with Sand, dark yellowish brown (10YR 4/4), fine-grained, minor clay, trace angular gravel (to1/4"), manganese staining, varved.
				32		
4	7	100			CL	**LAKEWOOD FORMATION (Qlw)**
				33		32.1' - Clay with Sand, dark gray (10YR 4/1), very fine-grained, varved.
				34		33.7' to 34.4' - dark gray (7.5YR 4/1) and brown (7.5YR 4/4) in distinct banded pattern
						34.4' to 35.2' - dark gray (7.5YR 4/1)
				35		35.2' to 35.6' - mottled stong brown (7.5YR 5/6) and dark gray (10YR 4/1)
				36		
					SC	36.2' - Clayey Sand, dark brown (7.5YR 3/4), fine-grained, minor gravel (to 3/4"), oxidized, weakly laminated.
				37		
4	8	100		38		
				39		
				40		40.0' to 41.2' - increase in sand content

Figure C-13b

□□RI□G □13-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: January 24, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
				41		
					CL	41.2' - Clay with Sand, yellowish brown (10YR 5/4), very fine-grained, massive.
5	9	100		42		
				43		
				44		
				45		
				46	ML/SM	45.8' - Silt with Sand to Sandy Silt, dark yellowish brown (10YR 3/4) with dark gray (7.5YR 4/1) mottles, trace clay, fine-grained.grained.
				47		46.3' to 47.1' - increase in Sand content , trace gravel (to 1/4")
5	10	95			SM	47.1' - Silty Sand, dark yellowish brown (10YR 3/4), very fine-grained, trace to minor clay, oxidation staining in distinct banded pattern.
				48		
				49		
			■			49.6' - 50' - No Recovery
				50		
					SP-SM	50.0' - Sand with Silt, dark yellowish brown (10YR 3/4), trace to minor clay, fine-grained, laminated.
				51		
					ML	51.3' - Silt with Sand, dark brown (10YR 3/3), fine-grained, trace clay, laminated, few manganese-rich layers.
6	11	90		52		
				53		52.6' - increase in clay content
				54		
			■		ML/CL	**LAKEWOOD FORMATION (Qlw)**
				55		53.6' - Clayey Silt to Silty Clay, dark yellowish brown (10YR 3/6), trace to minor disseminated gravel (to 1/4"), trace sand, very fine-grained, massive.
				56		54.6' - 55' - No Recovery
						55.8' - very fine- to fine-grained
				57		
6	12	97				57.9' - varved
				58		
				59	CL	58.4' - Clay with Sand, dark yellowish brown (10YR 4/6) with light gray (10YR 7/1) mottles, fine-grained, trace to minor disseminated gravel (to 1/8", few to 1/2"), massive.
			■	60		59.8' - 60' - No Recovery

Figure C-13c

□□RI□G □13-A □□□□i□ued□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: January 24, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 277.8 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60	SM/SP	60.0' - Silty Sand to Sand with Gravel, dark yellowish brown (10YR 3/6), medium-grained, trace coarse, gravel subangular to subrounded (to 1-1/2"), massive.
				61	SM	61.3' - Silty Sand with Clay, dark brown (10YR 3/3), fine-grained, trace medium, trace gravel (3/4"), minor secondary clay, mottled appearance.
7	13	90		62		
				63	ML/SM	62.6' - Silt with Sand to Sandy Silt, dark yellowish brown (10YR 3/4), minor clay, laminated.
				64		64.5' to 65.0' - No Recovery
				65	SP/SM	65' - Sand and Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, massive.
				66		
7	14	100		67	ML	66.5' - Silt to Silt with Sand, dark yellowish brown (10YR 3/4), minor clay, fine-grained, weakly laminated.
				68		
				69		
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
				72		Groundwater seepage encountered during drilling at 50 feet; static groundwater level at 48.5 feet (after 20 minutes).
				73		Backfilled with soil cuttings and tamped. Concrete patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-13d

□□RI□G □1-□

GEOCON WEST, INC.

Project No.: A9009-06-01A
Client: Beverly Hills Wilshire International, LLC
Location: 9900 Wilshire Blvd Los Angeles, CA

Excavation Date: January 19, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 288.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				0		Started sampling at 1.8'
				1	SM	**ALLUVIUM (Qal)** Silty Sand, dark yellowish brown (10YR 4/4), very fine-grained, trace clay, massive.
1	1	100		2	ML	2.4' - Silt with Sand, dark yellowish brown (10YR 4/2), very fine- to fine-grained, trace clay and caliche stringers,massive, porous.
				3		
				4	SM	3.9' - Silty Sand, dark yellowish brown (10YR 4/2), fine-grained, trace clay and gravel (to 1/4"), predominantly slate, massive.
				5		5.0 to 6.7' - No Recovery
				6		
				7	SP-SM	7.1' - Sand with Silt, dark yellowish brown (10YR 4/2), very fine- to fine-grained, trace gravel (to 1/2", few to 1-1/2").
1	2	66		8		
				9		
				10	ML/SM	10' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/2), fine-grained, trace gravel (to 1/2").
				11	SM	**OLDER ALLUVIUM (Qoal)** 10.8' - Silty Sand, dark yellowish brown (10YR 4/4), minor clay and gravel (to 1").
				12		
2	3	86		13		
				14		14.2 to 15' - No Recovery
				15		
				16	SP-SM	15.5' - Sand with Silt, dark yellowish brown (10YR 4/6), trace to minor gravel (to 1/2"), subrounded to subangular, predominantly slate, few diatomaceous siltstone clasts.
				17		17.0' - increase in sand, descrease in silt
2	4	100		18		18.9 - 19.1' - gravel bed, predominantly slate, few diatmomaceous siltstone clasts (to 1/2").
				19	ML	19.1' - Silt with Sand, dark yellowish brown (10YR 3/4), fine- to coarse-grained, trace gravel (to 1/2").
				20		

Figure C-14a

Wood Environment & Infrastructure Solutions, Inc.
6001 Rickenbacker Road
Los Angeles, CA 90040-3031
USA

T: +1 323.889.5300

www.woodplc.com

October 2, 2018
Revised October 4, 2018
Project 4953-18-0991

Mr. Ted Kahan
Oasis West Realty, LLC
1800 Century Park East, Suite 500
Los Angeles, California 90067

Subject: **Report of Geotechnical Consultation**
Beverly Hilton Specific Plan Amendment
Beverly Hills, California

Dear Mr. Kahan:

In accordance with your request, we, Wood Environment & Infrastructure Solutions, Inc. (Wood), have prepared this geotechnical consultation regarding the proposed Beverly Hilton Specific Plan Amendment. Our legacy companies, MACTEC Engineering and Consulting, Inc. (MACTEC) and AMEC Environment & Infrastructure, Inc. (AMEC), previously performed a geotechnical investigation for the site and presented recommendations for the proposed project.

1.0 Project Background

Under the name of our legacy company of MACTEC, we previously performed an investigation at the site of the proposed Renovation of the Beverly Hilton. The geotechnical information from the prior investigation, presented in a report dated November 2, 2006 and subsequent supplemental letter dated June 1, 2011 (MACTEC Project No. 4953-06-0771) were used to develop the recommendations for the revised project addressed in our subsequent May 24, 2012 report (AMEC Project No. 4953-12-0141.) Part of the Renovation (the Waldorf Astoria Hotel) has been constructed, however, two originally proposed residential buildings on the western portion of the site were not constructed. Our May 24, 2012 report was used to support the entitlement documents for the proposed project.

Based on the Beverly Hilton Specific Plan Amendment Initial Study dated May 2018 received from you on September 26, 2018, it is our understanding that instead of the two originally planned towers the current proposed project will include one 23-story tower in the southwest side of the property and landscaped gardens and pedestrian amenities in the northwest side.

2.0 Update Review

In our May 24, 2012 report we had found that, as of that date, the site was not within an Alquist-Priolo Earthquake Fault Zone (AP Zone) for surface rupture hazard (California Division of Mines and Geology, 1986).

The closest AP Zone to the site was for the Newport Inglewood fault zone approximately 3.1 miles south-southeast. In the vicinity of the site, the closest mapped fault thought to have the potential for surface rupture hazard was the West Beverly Hills Lineament, considered to be the northern extension of the Newport Inglewood fault (Bryant, 2005; USGS, 2005).

Since our 2012 report, a substantial number of geologic fault investigations have been performed by numerous geologic consultants in the vicinity of the site, including the adjacent site to the west (GeoCon West, 2014). The mapped northern extension of the Newport Inglewood fault has been shifted to approximately 430 feet to the east of the site (California Geological Survey, 2018a). A southern branch of the Santa Monica fault zone has been identified, located approximately 500 feet south of the site (California Geological Survey, 2018b). An AP Zone has been established for the Santa Monica fault, located approximately 100 feet south of the site (California Geological Survey, 2018b).

None of the previous or recent investigations or maps have identified faults at the site and the site is not in the current AP Zone for the Beverly Hills Quadrangle (California Geological Survey, 2018b).

From a geotechnical perspective, the increased height of the revised proposed tower will not increase the seismic risk to the project provided the project is designed and constructed in conformance with current building codes and engineering practices.

It has been a pleasure to be of professional service. Please contact us if there are any questions regarding this letter report.

Sincerely,

Wood Environment & Infrastructure Solutions, Inc.

Reviewed by:

Rosalind Munro
Principal Geologist

Marshall Lew, Ph.D.
Principal Geotechnical Engineer

P:\4953 Geotech\2018-proj\180991 Beverly Hilton\4.0 Project Deliverables\4.1 Reports\Final Report\4953-18-0991L01r1.doc
(submitted electronically)

Attachment: References

REFERENCES

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MACTEC, 2006, Report of Geotechnical Investigation, Proposed Renovations of Beverly Hilton, 9876 Wilshire Boulevard, Beverly Hills, California," Project No. 4953-06-0771, dated November 2, 2006.

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Fault Rupture Hazard Investigation
9988 Wilshire Boulevard
Beverly Hills, California

Prepared for:

BH Luxury Residences, LLC
1800 Century Park East, Suite 500
Los Angeles, California 90067

Prepared by:

Lettis Consultants International, Inc.
27441 Tourney Road, Suite 220
Valencia, California 91355

November 16, 2020

Lettis Consultants International, Inc.
27441 Tourney Road, Suite 220
Valencia, CA 91355
(661) 287-9900; fax (661) 287-9990

EARTH SCIENCE CONSULTANTS

November 16, 2020

Mr. David Nelson
BH Luxury Residences, LLC
1800 Century Park East, Suite 500
Los Angeles, California 90067

SUBJECT: **Fault Rupture Hazard Investigation**
9988 Wilshire Boulevard, Beverly Hills
LCI Project No. 1980.001

Dear Mr. Nelson:

Lettis Consultants International, Inc. (LCI) submits this report describing a fault rupture hazard investigation for the property located at 9988 Wilshire Boulevard in Los Angeles.

The 9988 Wilshire site is situated among adjacent properties for which extensive fault investigations have been conducted. Each of these fault investigations confirmed the absence of active faults within their respective sites, and the most recent study demonstrated the absence of active faults within Wilshire Boulevard, directly north of the 9988 Wilshire site. LCI's current investigation uses the information obtained from those previous investigations. LCI's investigation confirms that **no active faults traverse the 9988 Wilshire site**. In our professional opinion, given the results from previous fault investigations at nearby and adjacent properties, we can preclude the presence of active faults within the 9988 Wilshire site.

Please do not hesitate to contact us with any questions, comments, or concerns that you may have regarding this report. You may contact us directly at (661) 287-9900.

Respectfully,
Lettis Consultants International, Inc.

Scott Lindvall, C.E.G. 1711, Senior Principal Geologist
lindvall@lettisci.com

CERTIFIED ENGINEERING GEOLOGIST
SCOTT C. LINDVALL
NO. 1711
STATE OF CALIFORNIA

Ross Hartleb, C.E.G. 2711, Principal Geologist
hartleb@lettisci.com

CERTIFIED ENGINEERING GEOLOGIST
ROSS HARTLEB
NO. 2711
STATE OF CALIFORNIA

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APPENDICES

1.0 INTRODUCTION

This report details our fault rupture hazard investigation for the property located at 9988 Wilshire Boulevard, referred to herein as “the site” (Figure 1). This fault investigation is limited to the 9988 Wilshire Boulevard site, which is part of the larger One Beverly Hills development, a 17.4-acre project site located west of the intersection of Wilshire Boulevard and Santa Monica Boulevard at the western edge of the City of Beverly Hills. A gas station, auto care center, and convenience store, occupy the triangular-shaped 9988 Wilshire Boulevard site located on the south side of Wilshire Boulevard.

The site is located north of the Alquist-Priolo Earthquake Fault Zone (APEFZ) defined by the California Geological Survey (CGS) for the Santa Monica fault zone in the Beverly Hills 7.5-minute quadrangle (CGS, 2018) (Figure 1). The City of Beverly Hills requires that fault investigations be performed for all proposed human-occupied structures within the City and not only those located within the APEFZ (City of Beverly Hills, 2019).

The 9988 Wilshire site is located between adjacent properties that have conducted fault investigations. Each of these fault investigations has confirmed the absence of active faults within their respective sites (Figures 2 and 3) and the most recent study demonstrated the absence of active faults within Wilshire Boulevard, directly north of the 9988 Wilshire site. Our current investigation uses the information obtained from those previous investigations, including those that were approved by the City of Beverly Hills and the California Geological Survey (CGS), to conclude that no active faults traverse the 9988 Wilshire site.

This report includes three appendices that present key maps, cross-sections, and trench logs from previous studies. We have reproduced these figures and plates to aid in describing the subsurface conditions and evidence establishing the absence of active faults at the site. Figure call-outs in the text of this report use a letter and number, for example Figure A-1 refers to the first figure in Appendix A. Appendix A includes figures from the investigation of 9900 Wilshire by Geocon West, Inc. (Geocon West, 2014). Appendix B includes figures from the investigation of El Rodeo School by Leighton Consulting, Inc. (Leighton, 2016). Appendix C includes figures from the environmental investigation of the 9988 Wilshire site by Antea Group (2015).

2.0 SCOPE OF INVESTIGATION

We reviewed consultant reports from surrounding sites, scientific literature, and geologic maps, to assess the presence or absence of active faulting within the site. While site-specific subsurface investigations are generally completed to demonstrate the absence of active faulting, in our professional opinion the abundance of high quality exploration, soil stratigraphic age estimates, analysis, and interpretation of subsurface data that exist adjacent to this site allow us to make this evaluation without the need for exploration within the 9988 Wilshire site. The offsite, standard-of-practice investigations on which we have relied in this investigation have been reviewed and approved by either the CGS or the City of Beverly Hills.

3.0 SITE LOCATION AND GEOLOGIC SETTING

The site is located within the Los Angeles Basin south of the mouth Benedict Canyon and directly east of a series of low hills known as the Cheviot Hills (Figure 4). The site is relatively flat and lies at an elevation of approximately 295 ft above mean sea level. The triangular-shaped site is bounded on the north by Wilshire Boulevard, on the west by the Los Angles Country Club, and on the east/southeast by 9900 Wilshire Boulevard. Moreno Creek is currently relocated to a storm drain but its former course runs south across the site, as is evident in historical topographic maps (Figure 5).

A compilation of geologic mapping at 1:100,000 scale by Bedrossian et al. (2012) shows that most of the site is located on young alluvial valley deposits of Holocene to late Pleistocene age (map unit Qya) that blanket the Benedict Canyon drainage (Figure 4). Old alluvial fan deposits of late to middle Pleistocene age (map unit Qof) are mapped at the surface in the northwest corner of the site and in the hills directly west of the site (Bedrossian et al., 2012) (Figure 4). Kenney GeoScience (2014) maps the surface geology at the site entirely as older Benedict Canyon Wash deposits (map unit BCWD2), with an estimated middle Pleistocene age of 340,000–500,000 years old. The BCWD2 deposits consist of alluvial fan sediments that were deposited along the southern margin of the Santa Monica Mountains prior to the uplift of the Cheviot Hills.

3.1 GEOMORPHIC SETTING

The site is located approximately 2.5 km south of the Santa Monica Mountains on a broad alluvial plain that extends southward from the mountain front. Uplift of the Santa Monica Mountains has driven multiple phases of aggradation and incision in alluvial deposits along the range front. Much of the mountain front is flanked to the south by a broad expanse of late to middle Pleistocene alluvial fan deposits, which have been locally incised and are now floored by younger Holocene alluvial valley deposits. To the west of the site are the Cheviot Hills, which are made up of uplifted and deeply dissected, older alluvial fan deposits. To the east of the site is the topographically lower, more gently sloping, less dissected, and younger alluvial fan surface that emanates from Benedict Canyon.

Previous studies have identified an alignment of south-facing topographic escarpments that are interpreted as the most recently active traces of the Santa Monica fault (Dolan and Sieh, 1992; Pratt et al., 1998; Dolan et al., 2000). Near the site, one northeast-trending, approximately 10-m-high scarp crosses the Los Angeles Country Club golf course. This scarp is very near or possibly crosses the northwestern-most corner of the site and continues northeast onto El Rodeo School campus (Figures 5, 6, and 7).

In the vicinity of the site, the east-facing slope that separates the older uplifted deposits of the Cheviot Hills from the younger alluvial fan surface is a meandering feature that trends approximately north-northwest and is associated with Moreno Creek. At the site, Olson (2018) notes a deflection in Moreno Creek, which appears to be deflected by about 200 m in a right-lateral sense (Figure 7). This deflection is likely not the direct result of surface fault displacement

because the principal component of slip on the Santa Monica fault is primarily left-lateral strike-slip.

3.2 History of Fault Interpretations in Beverly Hills

The City of Beverly Hills is located near the intersection of northeast-striking faults mapped as part of the Santa Monica fault and northwest-striking faults mapped as part of the Newport-Inglewood fault zone (Figure 6). Within the past several years, considerable study has been performed to better understand the relatively complex faulting and possible interactions between the Santa Monica, Hollywood, and Newport-Inglewood faults (Figure 6).

Historical seismicity and paleoseismic data indicate that these three faults are active. The Santa Monica and Hollywood faults strike approximately northeast-southwest and are generally characterized as left-lateral strike-slip structures with subordinate components of north-side-up reverse slip (e.g., Dolan et al., 1997; 2000; Dawson and Weldon, 2013). Based on geomorphic observations in the vicinity of the site, the Santa Monica and Hollywood faults appear to be separated by a possible ~1-km-wide left (extensional) stepover (e.g., Dolan et al., 1997). Some ruptures on the Santa Monica fault may cascade onto the Hollywood and Raymond faults to the east and onto the Malibu Coast or Anacapa-Dume faults to the west, resulting in the potential for very large-magnitude earthquakes.

The Newport-Inglewood fault is a northwest-striking series of faults and folds that forms an alignment of prominent hills and mesas extending for approximately 30 km from Newport Beach to Cheviot Hills. At Newport Beach, the Newport Inglewood fault extends southeastward into the Pacific Ocean, where it is known as the Rose Canyon fault. The northernmost traces of the Newport-Inglewood fault align with the West Beverly Hills lineament, a north-northwest trending series of relatively continuous, east-facing scarps separating elevated older alluvium to the west and a younger alluvial plain to the east (Figures 4 and 6). The West Beverly Hills lineament projects close to the site (Figure 6), but it remains unclear whether the lineament is related to faulting or some other surficial geologic processes.

Interpretations of how or whether the Santa Monica and Hollywood faults connect have changed significantly over time. Initially, the area between these two fault zones had been characterized as a structurally complex zone, including a number of west-northwest- and east-northeast-striking reverse faults, anticlines, and strike-slip faults (e.g., Lang and Dreessen, 1975; Wright, 1991; Lang, 1994). These interpretations were based largely on subsurface oil well data from Beverly Hills and West Los Angeles, and mostly focused on deeper and older (i.e., pre-Quaternary, >2.6 million years old) strata and geologic structure of the region. Wright (1991) depicts the Santa Monica fault bifurcating eastward into a north branch that continues into the Hollywood fault, and a south branch that potentially connects to the Las Cienegas fault. Between these two branches, the San Vicente and North Salt Lake faults also follow the general east-northeast trend of the Santa Monica fault. The North Salt Lake may represent the eastern continuation of the Santa Monica fault, which may merge with or step to the Hollywood fault near the Los Angeles River. It should be noted that some faults, such as the La Cienegas and Rancho faults, are not thought to

be active in the current tectonic regime. Other faults, such as the San Vicente and North Salt Lake faults are considered active, but at very low rates, and modeled as blind faults not capable of surface rupture (Dawson and Weldon, 2013; Field et al., 2013).

In the early 1990s, an alternative interpretation emerged in the scientific literature suggesting that the Santa Monica fault may be truncated on the east by the West Beverly Hills lineament, which Dolan and Sieh (1992) postulated as the northern extension of the Newport-Inglewood fault. In this interpretation, both the Santa Monica and Hollywood faults are truncated by the Newport-Inglewood fault, which acts as an accommodation structure connecting both fault zones across a ~1-km-wide left step. Although subsurface data were not available to confirm this hypothesis, this interpretation was adopted in subsequent structural analyses of the region (e.g., Tsutsumi et al., 2001), and is reflected in recent Quaternary geologic maps published by the CGS (Figure A-2).

However, more recently published fault mapping (CGS, 2018) and the Fault Evaluation Report for the Santa Monica fault in the Beverly Hills quadrangle (FER 259; Olson, 2018) depict the Santa Monica fault extending east of the Cheviot Hills and south of the site on the basis of several site-specific studies in the Century City and west Beverly Hills area. These recent studies have demonstrated that: (1) the West Beverly Hills lineament is likely not associated with the Newport-Inglewood fault or any active faulting at the latitude of the Santa Monica fault; and (2) the Santa Monica fault extends east of the West Beverly Hills lineament and south of the site (Figures 4 and 5). Sections 4.0 and 5.0 below summarize the results of several geotechnical and fault investigations at and in the vicinity of the site that provide strong evidence for the lack of active faulting at the site.

4.0 SITE CONDITIONS

The roughly triangular-shaped site is developed as a gas station with a canopy over the fueling area in the northern portion and an auto service and convenience store building in the southern portion (Figure 1 inset). The gas station was originally constructed in 1938 and several renovations have been performed through the years (AECOM, 2019).

Based on historical topography (Figure 5) and geologic maps (Figures 4 and A-1), the site is located on uplifted and dissected Pleistocene alluvial deposits of the Cheviot Hills near the contact with younger alluvial deposits of Benedict Canyon Wash. The Bedrossian et al. (2012) geologic map designates these two units as old fan deposits of late to middle Pleistocene age (Qof) and young alluvial valley deposits of Holocene to late Pleistocene age (Qya) (Figure 4).

No fault studies have been performed directly on the site, but several monitoring wells have been installed and environmental and monitoring studies have been performed at the site (e.g., TRC, 2009; Delta Consultants, 2010; Antea Group, 2015; AECOM, 2019). Nine groundwater monitoring wells were installed at the site by TRC between 2005 and 2008 (MW-1 through MW-9) and an additional well (MW-10) was installed by Delta Consultants in 2010 near the southern margin of the site (Figure 8).

Groundwater elevation contour maps indicate there is a groundwater barrier beneath the site. For example, based on the groundwater level data measured in monitoring wells in June 2009, TRC (2009) interprets a northeasterly trending groundwater barrier that exhibits a down-to-the-southeast step in the water surface of about 25 ft.

Slight variations in the interpretation of the groundwater barrier across the site are depicted on Figure 8. Geologic cross-sections from Antea Group (2015) were reproduced in the AECOM (2019) report and are included in Appendix C. The locations of cross-sections are shown on Figure C-1.

Given the relative wide spacing and 5-ft sampling intervals of these environmental wells, the level of geologic detail provided in the borehole logs and cross-sections is not sufficient for evaluating the presence or absence of active faulting beneath the site. The environmental boreholes explored to depths ranging between 45 and 78 ft. Alluvial materials were encountered beneath the site and are interpreted in cross-sections by Antea Group (2015) as belonging to three general packages that consist predominantly of gravel, fine sand, and silt or clay (Figures C-2, C-3, and C-4).

Directly north of the site and within Wilshire Boulevard, a more detailed investigation of subsurface alluvial stratigraphy was performed by Leighton (2016) in a transect of continuous cores and cone penetrometer tests (CPTs). Cross-section A-A' within Wilshire Boulevard (Figure B-3) illustrates four different packages of alluvium (Qal, BCW1, BCW2, and CHD) overlying the Quaternary San Pedro Formation to a maximum depth explored of 175 ft.

The Qal, BCW1, and BCW2 units are all deposits associated with Benedict Canyon Wash and range from Holocene and Pleistocene age (Qal) to Pleistocene age (BCW1 and BCW2). These channelized deposits include predominantly sand with silt and clay and typically coarsen with depth to sand and gravel. The Cheviot Hills Deposits (CHD) represent older Pleistocene alluvium that comprises the uplifted Cheviot Hills. The deepest unit encountered is the San Pedro Formation that represents a transitional terrestrial to marine unit of sand with scattered gravel with a few silty to clayey laminations. See Figure B-3 for more detailed unit descriptions.

5.0 EVIDENCE SUPPORTING THE ABSENCE OF ACTIVE FAULTS

Extensive subsurface explorations for fault investigations have been performed in the vicinity of and immediately adjacent to the 9988 Wilshire site. These include investigation on the 9900 Wilshire property (old Robinsons May site) and the Waldorf Astoria Hotel, located east of the Beverly Hilton Hotel (Figures 2 and 3). In addition, investigations have been performed for El Rodeo School located directly north of the 9988 Wilshire site and several others on the south side of Santa Monica Boulevard (Figures A-2 and A-3).

The Waldorf Astoria Hotel (AMEC, 2014), 9900 Wilshire (Geocon West, 2014), and El Rodeo School investigations have demonstrated the absence of active faulting. These investigations have been approved by either the City of Beverly Hills or the CGS.

This section describes the evidence confirming the absence of active faults at the 9900 Wilshire (Geocon West, 2014) and El Rodeo School (Leighton, 2016) properties. It also describes how these data and interpretations directly bear on the evidence for the absence of active faulting on the 9988 Wilshire site. Table 1 provides a summary of selected geologic reports for the 9988 Wilshire site and geotechnical and fault investigation reports for other nearby properties.

5.1 9900 WILSHIRE

The 9900 Wilshire Boulevard property lies directly southeast and south of the 9988 Wilshire site (gasoline station), extends from Wilshire Boulevard on the north to Santa Monica Boulevard on the south, and is bounded by Merv Griffin Way on the east. The 9900 Wilshire property is currently vacant, but was the site of the former Robinsons May department store and parking structure.

During 2013–2014, fault investigations were performed by Geocon West at 9900 Wilshire and reviewed by Dr. Roy Shlemon, the independent geologic peer reviewer for the City of Beverly Hills. A Geocon West (2013) report presented a literature review and compilation of data in the site vicinity. Based on Dr. Shlemon's review on behalf of the City, a second phase of investigation, involving subsurface exploration, was performed by Geocon West (2014) that cleared the site of active faults. This report was approved by the City in an acceptance letter dated May 19, 2014 (City of Beverly Hills, 2014).

Three sets of faults that had been mapped or inferred adjacent to or projecting through the 9900 Wilshire property were the focus of the investigation.

- Inferred northwest-trending faults, associated with the Newport-Inglewood fault / West Beverly Hills lineament from Parsons Brinkerhoff (2011) transect of borings and CPTs within Santa Monica Boulevard to project onto the southern portion of the 9900 Wilshire property.

- Inferred north-trending faults, associated with the Newport-Inglewood fault / West Beverly Hills lineament inferred by GeoVision (2012) based on their interpretation of two seismic reflection profiles in the southern half of the property during earlier studies.

- Inferred northeast-trending splays of the Santa Monica fault projected by Dolan et al. (2000), TRC (2009), CGS (2010), and Antea Group (2015) near the northwest portion of the 9900 Wilshire property.

In addition to data interpretation and analyses, the following subsurface explorations were performed as part of the Geocon West (2014) study (Figure A-12):

- Excavation and logging of three exploratory trenches (total 532 linear feet).

- Drilling and logging of 18 continuous-core hollow-stem auger borings.

- Advancing nine CPTs along the northern property boundary, in the Wilshire Boulevard right-of-way. Five of the 18 core borings were located along the Wilshire transect.

The explorations and faults are shown in Figure 3 and Figures A-7 and A-12.

5.1.1 Stratigraphy and Age of Deposits Encountered

The geologic units encountered in Geocon West's (2014) explorations for the 9900 Wilshire property were divided by age and distinct stratigraphic characteristics. These units included, from youngest to oldest, the following:

- Artificial fill of varying composition and locally containing concrete, asphalt, and other debris.

- Young alluvial deposits of Holocene age, primarily fine- to medium-grained, massive to laminated sand and silty sand, with minor silt and clay and variable amounts of fine gravel.

- Older fan deposits and older terrace deposits of Pleistocene age. The older fan deposits primarily consisted of massive silt, silty sand, and sand and gravel. The older terrace deposits primarily consisted of sand, silt, and clay with variable amounts of gravel. Laminated sands characterized the base of this unit.

- Lakewood Formation of late Pleistocene age (approximately 55,000–150,000 years old). Sediments of the Lakewood Formation primarily consisted of interbedded, fine-grained sand, silt, and clay with some sand and gravel zones and common laminated or varved sequences.

In the absence of detrital charcoal or other carbon-rich material suitable for radiocarbon dating encountered in the trenches and cores samples, age control for the sediments encountered in Geocon West's (2014) subsurface explorations was based on the degree of soil development. A total of seven representative soil profiles were described from core samples from borings along transects A and B, and a total of five representative profiles were described from trench 1, 2, and 3 exposures. Soil descriptions from each profile were used to develop various soil development indices, and these index values were compared to the values from similar described soils with known ages to estimate minimum age ranges for the soils at 9900 Wilshire.

According to Geocon West (2014), the soils observed across the 9900 Wilshire property are Holocene to Pleistocene in age. Age estimates range from 4,000 to 12,000 years for the young and thin surficial alluvial stream terrace deposits found along the northern portion of the property. An older and thick alluvial fan deposit that underlies the entire property is estimated to have a minimum age ranging from 15,000 to 27,000 years.

5.1.2 Significant Findings

As reported by Geocon West (2014), their significant findings include the following:

- *"With a high degree of certainty, active faults (as defined by the State of California [Bryant and Hart, 2007]) do not directly impact the proposed 9900 Wilshire Boulevard development."*

- *"The previously inferred splays of the Newport-Inglewood Fault Zone (also called the West Beverly Hills Lineament) and the Santa Monica Fault Zone, that were inferred to project toward or into the Site, have been investigated on-site and are now shown to be demonstrably covered by unbroken sediments at least 27,000 to 40,000 years old and, therefore, not active."*

- *"Active northwest-trending splays of the Santa Monica Fault Zone are located off-site to the north and west of the 9900 Wilshire Site. Because of the proximity of these faults to the Site and because of uncertainties in projection between subsurface borings and cone penetration tests, we recommend a 50-foot wide, structural setback zone be established from the northwestern property line, north of boring B13-A along the common boundary between the 9900 Wilshire Site and the adjacent service station property."*

5.1.3 Implications for 9988 Wilshire Site

The most important implication of the Geocon West (2014) study for the 9988 Wilshire site is that the 9900 Wilshire site was cleared of active faulting (Figure A-13). Previously interpreted faults were shown to be pre-Holocene in age (i.e., not active). This includes faults projected north into the 9900 Wilshire site from Santa Monica Boulevard (Parsons Brinkerhoff, 2011), faults initially interpreted in the seismic reflection profiles (GeoVision, 2012), and faults interpreted at depth based on apparent mis-matches in stratigraphy (Figure A-10).

The Geocon West (2014) study also interpreted a zone of active faulting in Geocon West's Transect B-B' within Wilshire Boulevard (Figure A-11, Transect B-B). A subsequent study by Leighton (2016) demonstrated that this interpretation is incorrect.

5.2 El Rodeo School (605 Whittier Drive)

The El Rodeo School campus lies directly north and across Wilshire Boulevard from the gas station at 9988 Wilshire (Figure 2). The campus is bounded on the south by Wilshire Boulevard, on the east by Whittier Drive, and on the west and north by the Los Angeles Country Club golf course.

A series of investigations has been performed by Leighton on the El Rodeo School campus (Leighton, 2012c; 2015a; 2015b; 2016) and within Wilshire Boulevard directly north of the 9988 Wilshire site. Reviews of these studies were performed by geologists at the California Geological Survey (CGS), the agency responsible for performing geologic hazard reviews for California schools.

CGS's Engineering Geology and Seismology Review for the El Rodeo School reviewed both the fault investigation report (Leighton, 2015a) and geohazard report (Leighton, 2015b). CGS

concluded that the engineering geology and seismology issues were not adequately addressed and requested additional investigations. In response to CGS review, Leighton performed new explorations, which included seven boreholes at the school and in Wilshire Boulevard, and three new trenches at the school. Leighton (2016) also reinterpreted stratigraphic relationships beneath the site and concluded that there is direct geologic evidence to preclude faulting at El Rodeo School for at least 22,000 years and likely over 200,000 years. Leighton's (2016) updated fault investigation report and its conclusions regarding the absence of active faulting was approved by CGS review letter dated February 29, 2016 (CGS, 2016).

The fault investigations at El Rodeo School focused on previously mapped faults projecting through or towards the campus. Three sets of faults that had been mapped or inferred adjacent to or projecting through the 9900 Wilshire property were the focus of the investigations at El Rodeo School:

- Geologic maps contained in published papers (e.g., Dolan et al., 2000) depict northeast-trending topographic escarpments, inferred to be related to the Santa Monica fault zone, that terminate near the school site (Figures 6 and 7).

- Studies for the Metro Transit Authority (MTA) along Santa Monica Boulevard by Parsons Brinkerhoff (2011) interpreted both northeast-striking faults associated with the Santa Monica fault and northwest-striking faults associated with the Newport-Inglewood fault / West Beverly Hills lineament that project toward the school.

- Geocon West (2014) interpreted active faults within Wilshire Boulevard and inferred they project northeast into the school campus.

In addition to review of aerial photographs, data interpretation, and analyses, the following subsurface explorations were performed as part of Leighton's investigations of El Rodeo School:

- The Leighton (2012c) study included six continuous core borings.

- The Leighton (2015) study included ten continuous core borings and two fault trenches.

- In response to CGS review comments, the Leighton (2016) study included eight new borings and approximately 240 ft of additional trench length. The total explorations from all studies include 23 continuously sampled core borings on campus and within Wilshire Boulevard and four fault trenches.

The explorations and faults are shown in Figures 2 and 3 and Figure B-1. Explorations in Wilshire Boulevard supplemented the earlier transect of Geocon West (2014).

5.2.1 Stratigraphy and Age of Deposits Encountered

Trench exposures and continuous core borings within the school campus as well as continuous core borings within Wilshire Boulevard were used by Leighton (2016) to develop a stratigraphic

model and age estimates. Within the transect in Wilshire Boulevard (Figure B-3), the native deposits identified are predominately Pleistocene in age and represent fluvial, alluvial fan, and mudflow deposits sourced from Benedict Canyon Wash. The youngest unit, Qal, ranges in age from Holocene to Pleistocene, but the majority of the deposit is likely tens of thousands of years old based on soil age estimates. Soil age estimates and oxygen isotope stages (associated with major incisions) were used to estimate the underlying units. BCW1 deposits are estimated to be 200,000 to 330,000 years old. The underlying BCW2 deposits are estimated to be on the order of 400,000 to 500,000 years old. The Cheviot Hills Deposits (unit CHD) are estimated to range in age from 500,000 to more than 1 million years old (Leighton, 2016).

Three faults are interpreted in the deeper portions of the Leighton (2016) cross sections (Figures B-3, B-4, and B-5). All three faults are capped by unfaulted BCW2 deposits and are, therefore, not active.

5.2.2 Significant Findings

Significant findings of the Leighton (2016) investigation of El Rodeo School are reproduced below.

- *"We find direct geologic evidence that there has been no faulting at El Rodeo K8 School for at least 22,000 years (soil at Section 0+10 in fault trench FT-4) and more likely more than 200,000 years."*

- *"The continuous soil borings extended into undeformed Pleistocene-age sediments that are many hundreds of thousands of years old."*

- *"The fault trenches and utility trench excavations consistently exposed Pleistocene age sediments that are gently dipping to nearly horizontal and unbroken across the trench exposures."*

- *"We find direct geologic evidence to conclude that the northeast-trending faults mapped by GWI* [Geocon West] *immediately to the northwest of the 9900 Wilshire Boulevard site, if present at all, are not active. Fault trenches specifically excavated across the surface trace of some of these inferred faults did not encounter evidence of faulting in sediments that are a minimum of 48,000 thousand years old (soil at Section 1+05 in fault trench FT-3), and more likely 150,000 to 200,000 years old."*

- *"We have interpreted several potential faults at depth (Santa Monica Blvd-North Fault, GWI Fault F and Fault I), however, side-by-side core boring correlations, combined with the unbroken stratigraphy revealed in the trenches, we conclude that activity along these potential faults ceased more than 500,000 years ago."*

- *"Based on the findings presented above, we conclude that no fault-related structural setbacks are required for El Rodeo K8 School."*

- *"In addition to failing to find the previously inferred active faults through the El Rodeo K8 School, it is also important to mention that we have found no geologic evidence of deformation that would be consistent with a major fault intersection and step-over structure, even in sediments that date back hundreds of thousands of years. These findings call into doubt the entire structural geologic paradigm for the Newport- Inglewood, West Beverly Hills Lineament, Santa Monica and Hollywood fault interactions. More than doubt, they totally refute the published model."*

The findings of the Leighton (2016) study provide evidence for the absence of any active faults or active tectonic deformation within El Rodeo School as well as the Wilshire Boulevard transect (Figure B-3). The Wilshire Boulevard transect provides direct geologic evidence to conclude that the northeast-striking active faults mapped by Geocon West in Wilshire Boulevard (Figure A-13), if present at all, are not active.

5.2.3 Implications for 9988 Wilshire Site

The most important implication of the Leighton (2016) study for the 9988 Wilshire site is that the transect of continuous core borings and CPTs within the Wilshire Boulevard right-of-way and immediately north of the site demonstrates the absence of active faulting. This Wilshire Boulevard transect combines explorations of both Geocon West (2014) and Leighton (2016) to resolve questions on: (1) the groundwater barrier assumed to represent a fault through the 9988 Wilshire site; and (2) the additional active faults initially interpreted by Geocon West (2014).

The Leighton (2016) cross-section of the Wilshire Boulevard transect is located approximately 50 ft north of the 9988 Wilshire site and extends both east and west of the site (Figures 2, 3, and 9). The absence of any active faults within this cross-section directly north of the site along Wilshire Boulevard precludes any active faults with strikes ranging between ~N32°W to ~N46°E (green dashed lines in Figure 9) from traversing the 9988 Wilshire site. Offsite data have not been interpreted to infer or indicate the presence of a fault following a different strike angle (e.g., east-west strike).

The groundwater barrier at the 9988 Wilshire site has been interpreted from environmental studies (TRC, 2009; Antea Group, 2015) and continues to be presented in more recent environmental reports (e.g., AECOM, 2019). The groundwater barrier was interpreted as a potentially active fault strand in the Geocon West (2014) report approved by the City (Shlemon, 2014).

The work by Leighton (2016), however, indicates a different interpretation of the groundwater observations. First, they document several zones of perched groundwater from borings in Wilshire Boulevard and suggest that this could lead to the mis-characterization of a step in the groundwater surface. Second, they document the axis of the buried historical Moreno Creek channel to be nearly coincident with the groundwater barrier (Figure B-1) and interpret that permeability differences between the channel wall and the buttressed younger sediments likely explain this groundwater barrier.

Geocon West (2014) interpreted active faults (faults F, G, H, and I) within the Wilshire Boulevard transect (Transect B-B'; Figures A-11 and A-12). The additional borings, refined stratigraphic model, and efforts to refine the soil stratigraphic age estimates by Leighton (2016) revised the mapping along this transect to interpret an absence of active faults. The Leighton cross-sections for this transect in Wilshire Boulevard (Transect A-A'; Figure B-3) and a subparallel transect to the north (Transect C-C'; Figure B-5) interpret only three faults, which are capped by unfaulted alluvium belonging to the BCW2 package of alluvium, the oldest Pleistocene Benedict Canyon Wash deposit encountered in this vicinity.

6.0 CONCLUSIONS AND RECOMMENDATIONS

In our professional opinion, given the previous fault investigations for the El Rodeo School campus and the 9900 Wilshire property, we can preclude the presence of active faults within the 9988 Wilshire site. This conclusion is based on the following rationale.

- The transect of borings and CPTs within Wilshire Boulevard (located 50 ft north of the site) demonstrates the continuity of unfaulted Pleistocene strata and the absence of active faults (Leighton, 2016). Additional boring transects and trenches within the school campus further demonstrate the absence of a surface rupture hazard.

- The transect of borings and CPTs within Wilshire Boulevard extends from slightly west of the site to significantly east of the site (Figure 9) and sufficiently shadows the site to preclude any potential faults traversing the gas station property that may strike between ~N32°W, (line drawn between southern corner of site to westernmost boring CB-19) to ~N46°E (line drawn from southern corner of site to the westernmost boring (CB-16).

The previously recommended fault setback zone for the 9900 Wilshire property (Figure A-13) is no longer required given Leighton's (2016) subsequent work that demonstrates the absence of active faults within the Wilshire Boulevard transect.

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Table 1. Summary of Selected Reports for the Site and Nearby Properties

Report(s)	Notes
9988 Wilshire Boulevard:	
TRC (2009), Delta Consultants (2010), Antea Group (2015)	A groundwater monitoring program was initiated at 9988 Wilshire Boulevard in 2005. Based on measurements from monitoring wells, multiple consultants have noted a ~25-ft down-to-the-southeast step in groundwater elevation that trends northeasterly across the site, and have speculated that the two groundwater-bearing zones may be separated by a fault beneath the site. *We do not have the Antea Group (2015) report, information is summarized from Geocon West (2014) and Leighton (2015a, 2016).*
AECOM (2015)	A soil boring was drilled and logged to a depth of 70 ft in the eastern portion of the site to assess the extent of groundwater contamination. Soil samples were not collected from the borehole.
AECOM (2019)	This Phase 1 Environmental Site Assessment summarizes soil conditions beneath the site. Based on review of data from previous subsurface investigations, sandy silt and clayey silt extend from approximately 0–15 ft, silty sand from 15–35 ft, and sandy clay and silty clay with interbedded layers of sand and clayey sand from 35–70 ft.
9900 Wilshire Boulevard:	
GeoVision (2012)	Under the direction of AMEC, GeoVision performed two, ~350-ft-long seismic reflection surveys oriented northeast across the central and southern portions of the 9900 Wilshire Boulevard site. They interpret that two faults may traverse the site and, given their northerly strikes, these faults could be related to the West Beverly Hills lineament or the northern Newport-Inglewood fault. *We do not have this report, information is summarized from Geocon West (2014).*
Geocon West (2013)	This Phase 1 preliminary fault investigation included reviews of literature, data generated from local fault investigations, borehole data from previous geotechnical investigations at the 9900 Wilshire site, and reinterpretation of Parsons Brinkerhoff's (2011) CPT and borehole data pertinent to the 9900 site. Geocon West (2013) concluded that no active faults are present beneath the 9900 Wilshire site, which is consistent with the conclusions of GeoDesign (2011), Leighton (2012a), Geocon-Feffer (2012), and Kenney Geoscience (2012) that indicate the West Beverly Hills lineament faults identified by Parsons Brinkerhoff (2011) either do not exist or are not active.
Geocon West (2014)	This Phase 2 fault investigation included literature review, review of preliminary results of GeoVision's (2012) seismic reflection survey, excavation and logging of three exploratory trenches (total 532 ft), drilling and logging of 18 continuous-core hollow-stem auger boreholes to 70–75 ft, advancing nine CPTs along the northern site boundary to 70-ft depth in the Wilshire Boulevard right-of-way, stratigraphic analysis and correlation of primary stratigraphic units in recovered core samples, and estimating the relative age of buried soils in seven recovered cores and three exploratory trenches. Geocon West (2014) concluded that active faults do not impact the proposed site development, but suggested that active faults may exist beneath the adjacent 9988 Wilshire site.
Shlemon (2014)	City of Beverly Hills technical peer reviewer Dr. Roy Shlemon concluded that the Geocon West (2013, 2014) reports meet current standards of practice and warrant acceptance by the City of Beverly Hills.
City of Beverly Hills (2014)	City of Beverly Hills issues letter that formally accepts the peer-reviewed recommendation of Dr. Roy Shlemon.
El Rodeo School (605 Whittier Drive):	
Leighton (2015a)	This fault investigation report documents review of geologic maps and other local fault investigations, continuous-core boreholes to 75–195 ft depth on the campus and on Wilshire Boulevard, and excavated two exploratory trenches (total 235 ft). Leighton (2015a) concluded that no active faults are present at El Rodeo School campus and documented direct evidence to refute the activity of the northeast-striking faults mapped by Geocon West (2014) that project to the 9988 Wilshire site.

Report(s)	Notes
Leighton (2015b)	This geohazards report documents review of geologic reports for the site vicinity, review of aerial photos, and subsurface data from the site. Leighton (2015b) concluded that there is no evidence of active faulting at El Rodeo School campus.
CGS (2015)	CGS's Engineering Geology and Seismology Review for El Rodeo School reviewed both the fault investigation report (Leighton, 2015a) and geohazard report (Leighton, 2015b). CGS concluded that the engineering geology and seismology issues are not adequately addressed and requested additional investigations.
Leighton (2016)	In response to CGS review, new explorations included seven boreholes at the school and in Wilshire Boulevard, and three new trenches at the school. Leighton (2016) also reinterpreted stratigraphic relationships beneath the site and concluded there is direct geologic evidence to preclude faulting at El Rodeo School for at least 22,000 years and likely over 200,000 years. Also concluded that the northeast-striking faults mapped by Geocon West (2014) that project through the 9988 Wilshire site, if present at all, are inactive.
CGS (2016)	CGS reviewed Leighton (2016) and concluded that the engineering geology and seismology hazards at the site were adequately addressed and no additional information was requested.

site location

0 2,000 ft

0 600 m

N

Alquist-Priolo Fault Trace (CGS, 2018)

solid where certain, long dash where approximately located, short dash where inferred

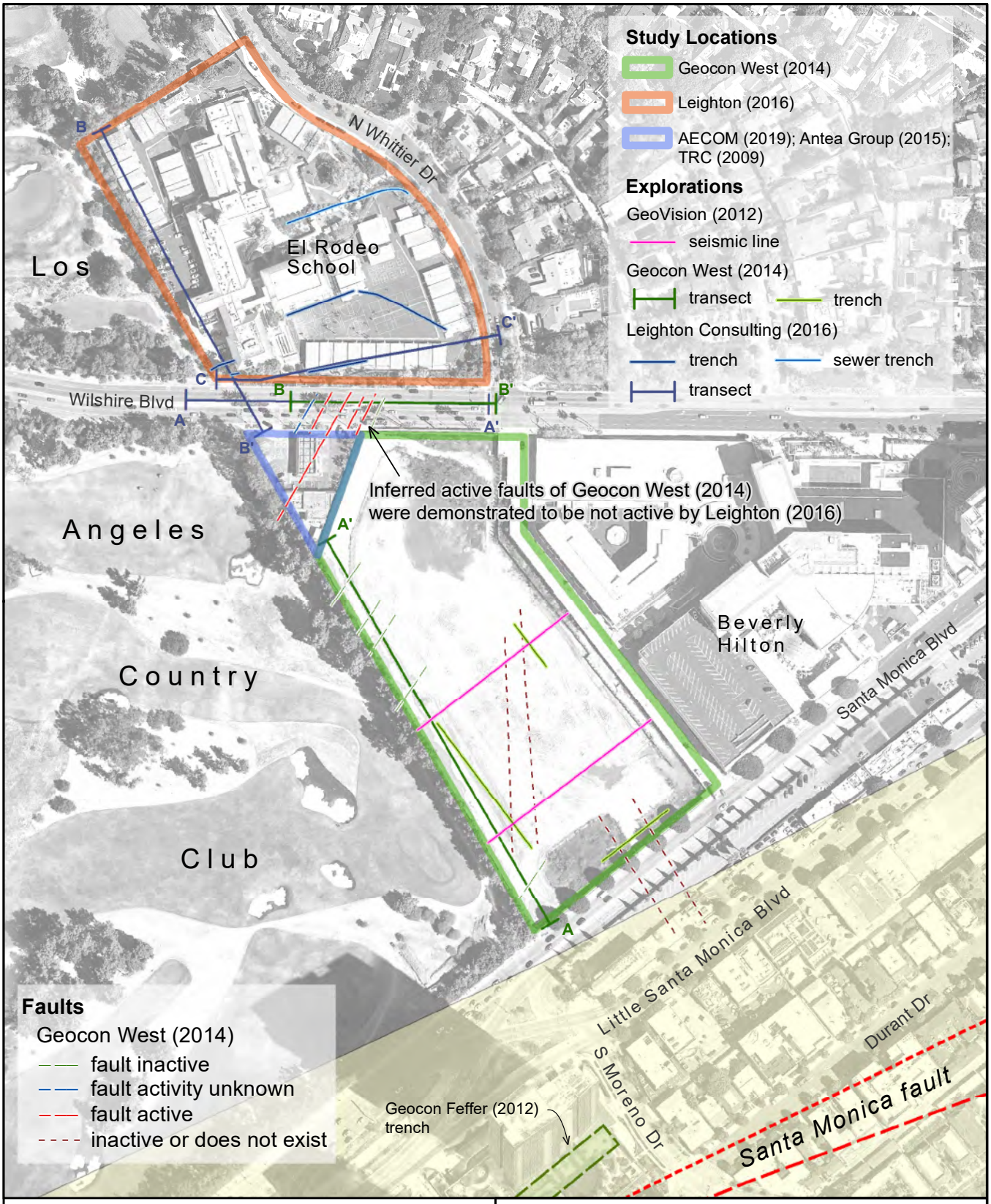
base map: USGS 7.5' 1:24,000 quad.
base image: NAIP 2016 ortho, USGS 10m hillshade

Site Location

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure 1



N

0 300 ft

0 60 m

Alquist-Priolo Fault Trace (CGS, 2018)
long dash where approximate, short dash where location inferred

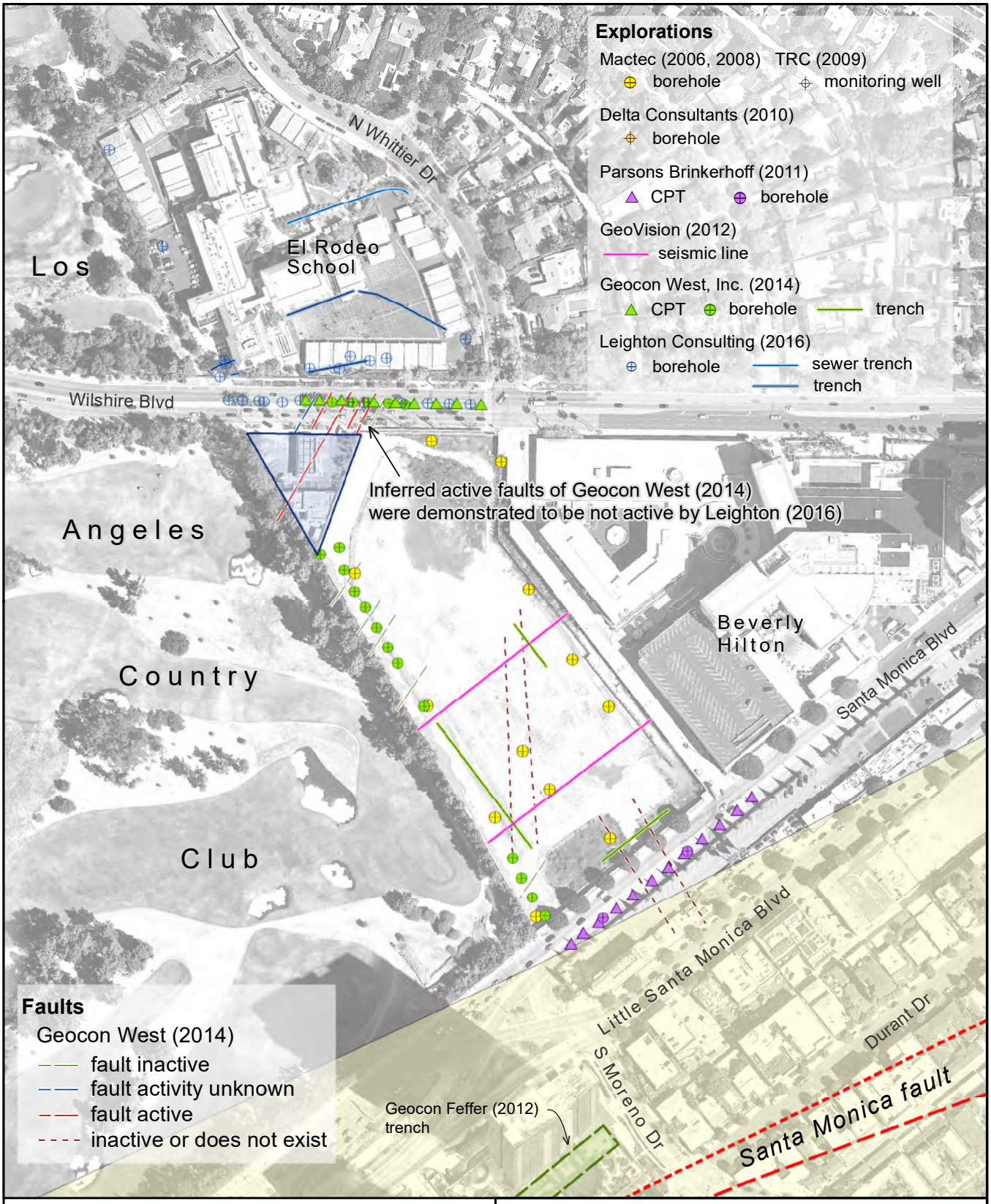
base image: Google Earth (March 2018)

Map of Site and Transects, Trenches and Fault Studies

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **2**



site boundary

N

0 300 ft

0 60 m

Alquist-Priolo Fault Trace (CGS, 2018)
long dash where approximate, short dash where location inferred

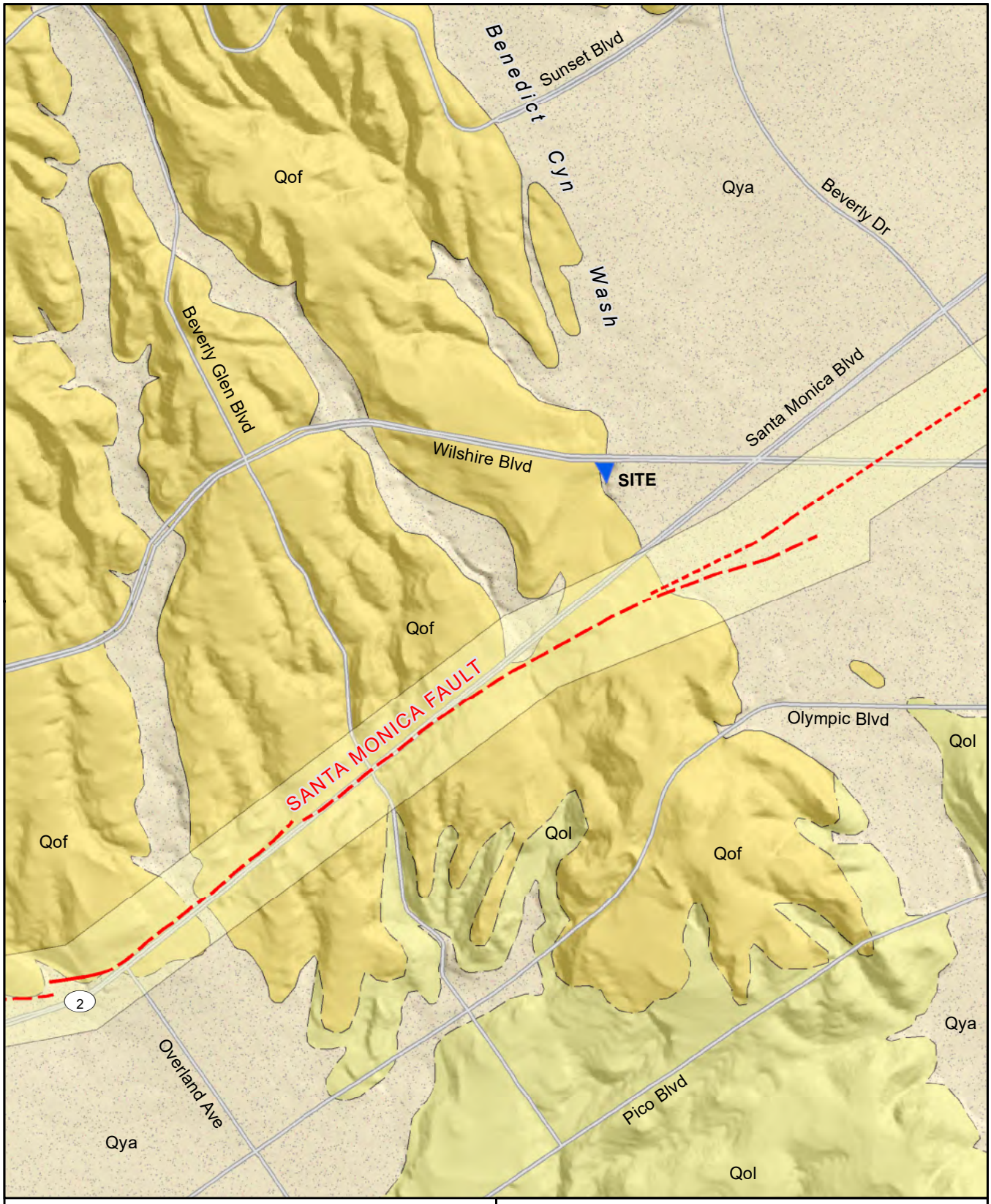
base image: Google Earth (March 2018)

Map of Site and Explorations

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **3**



Geologic Units

Holocene to Late Pleistocene

Qya - Young alluvial valley deposits

Late to Middle Pleistocene

Qof - Old alluvial fan deposits

Qol - Old lacustrine, playa, and estuarine deposits

Alquist-Priolo Fault Trace (CGS, 2018)

long dash where approximate, short dash where location inferred

N

0 1,000 ft

0 300 m

base map: Bedrossian et al. (2012) CGS SR-217, 1:100,000
base image: Hollywood 1926 and Sawtelle 1934 '6 topo

Geologic Map of Bedrossian et al. (2012)

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **4**

site location

contour (5 ft interval)

Alquist-Priolo Fault Trace (CGS, 2018)
solid where certain, long dash where approximately located, short dash where inferred

N

0 1,000 2,000 ft
0 300 600 m

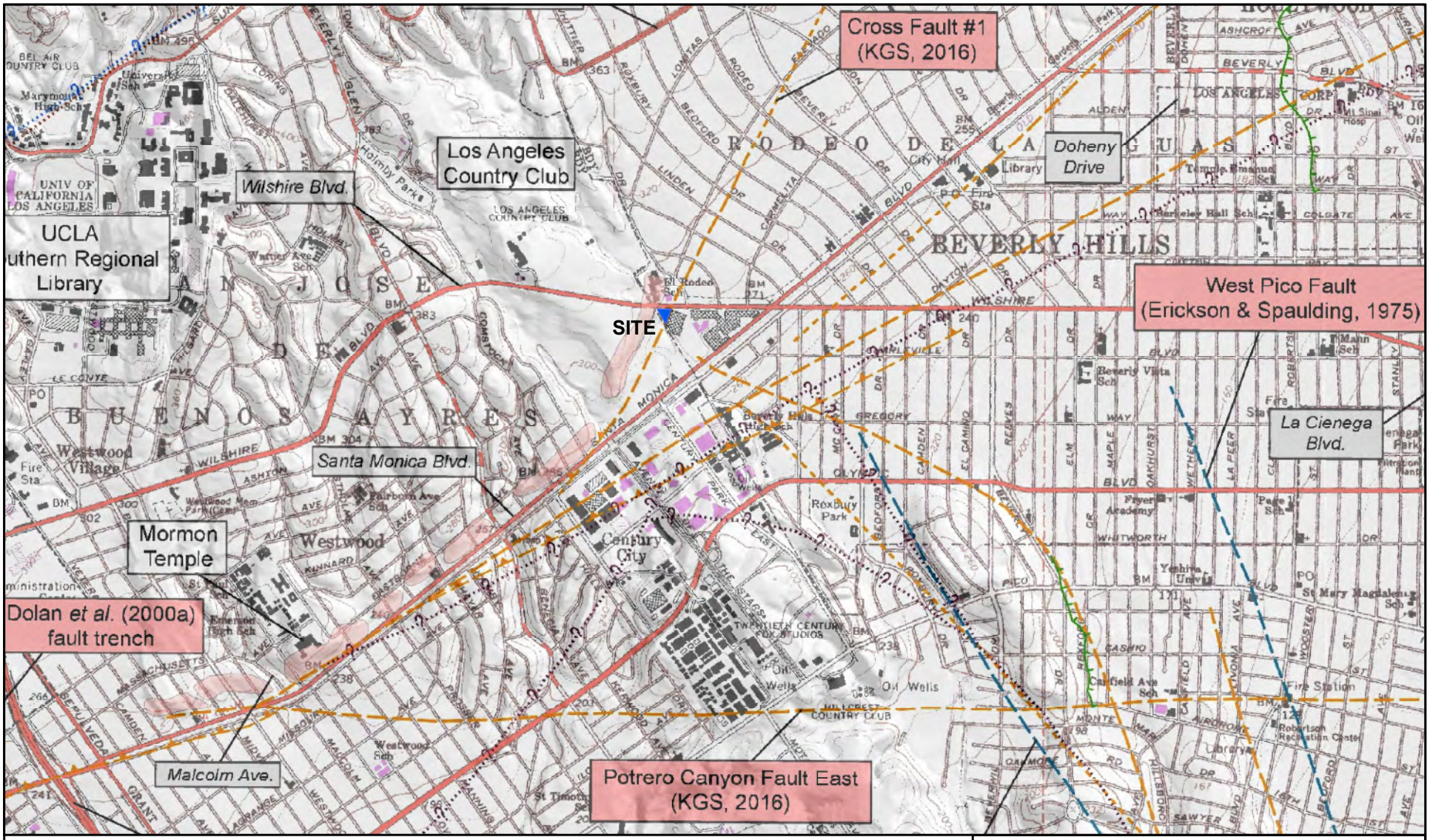
base image: Hollywood 1926 and Sawtelle 1934 hillshade

Historical Topography from 1926 Hollywood and 1934 Sawtelle 6-minute Quadrangles

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **5**



Faults

- concealed (Castle, 1960)
- approximately located (Erickson and Spaulding, 1975)
- concealed (Hill et al., 1979)
- approximately located (Bryant, 1985)
- approximately located (Kenney, 2015)
- Scarp (Castle, 1960)

N

0 2,000 ft

0 500 m

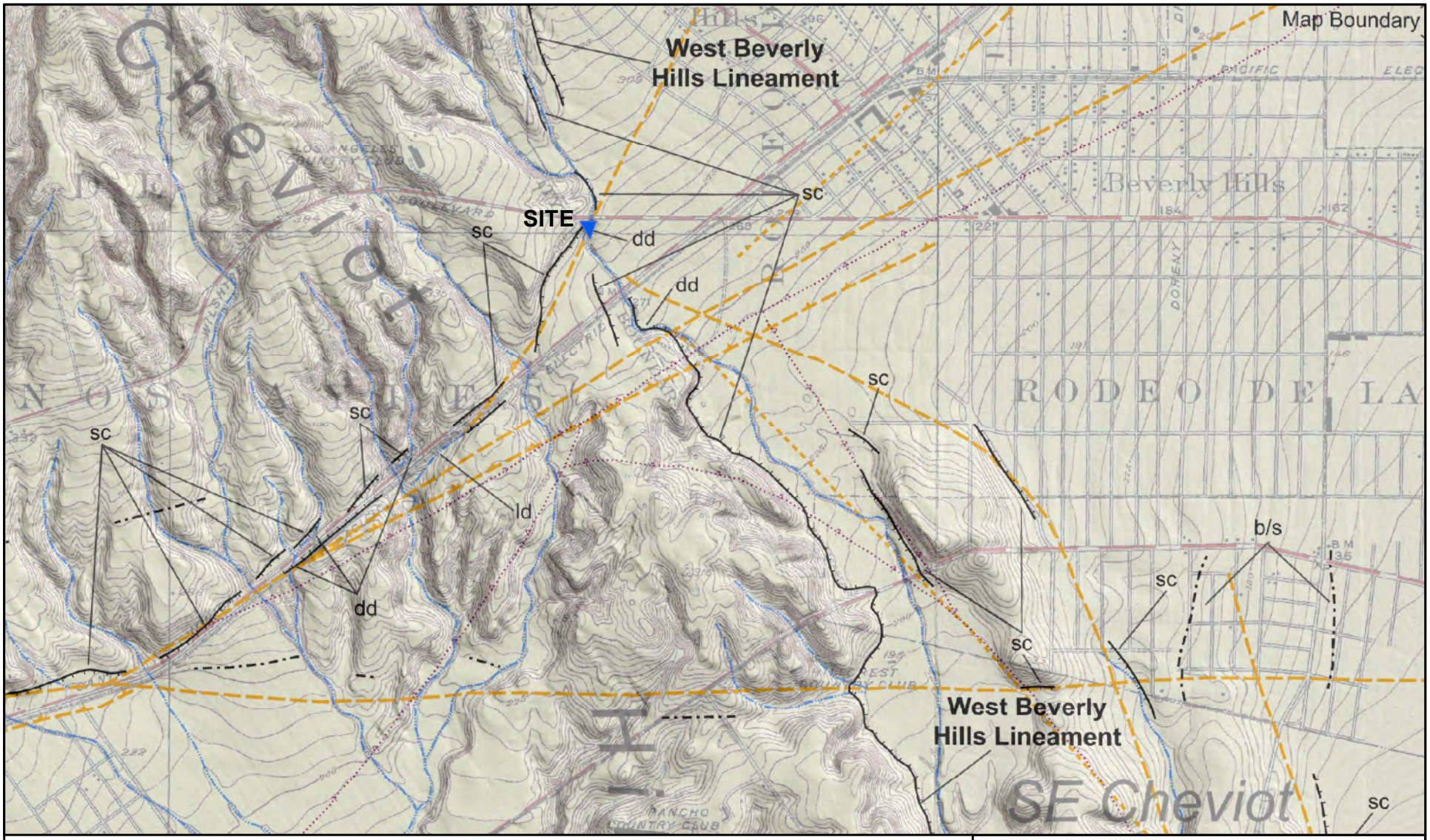
base map: FER-259 Plate 1
base image: Hollywood 1926 and Sawtelle 1934 hillshade

Fault Mapping Compilation
(FER-259 Plate 1)

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **6**



Geomorphic Interpretations of Olson (2018)

- scarp, weak
- scarp, strong
- slope break

b/s = break in slope
dd = deflected drainage
sc = scarp

Faults

- concealed (Hill et al., 1979)
- approximately located (Kenney, 2015)

N

0 2,000 ft

0 500 m

base map: FER-259 Plate 2
base image: Hollywood 1926 and Sawtelle 1934 hillshade

Geomorphic Map
(FER-259 Plate 2)

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **7**

site boundary

groundwater monitoring well
Antea Group (2015)

N

0 50 ft

0 12 m

Groundwater Barrier Interpretations

TRC (2009)

Leighton (2016)

Antea Group (2015)

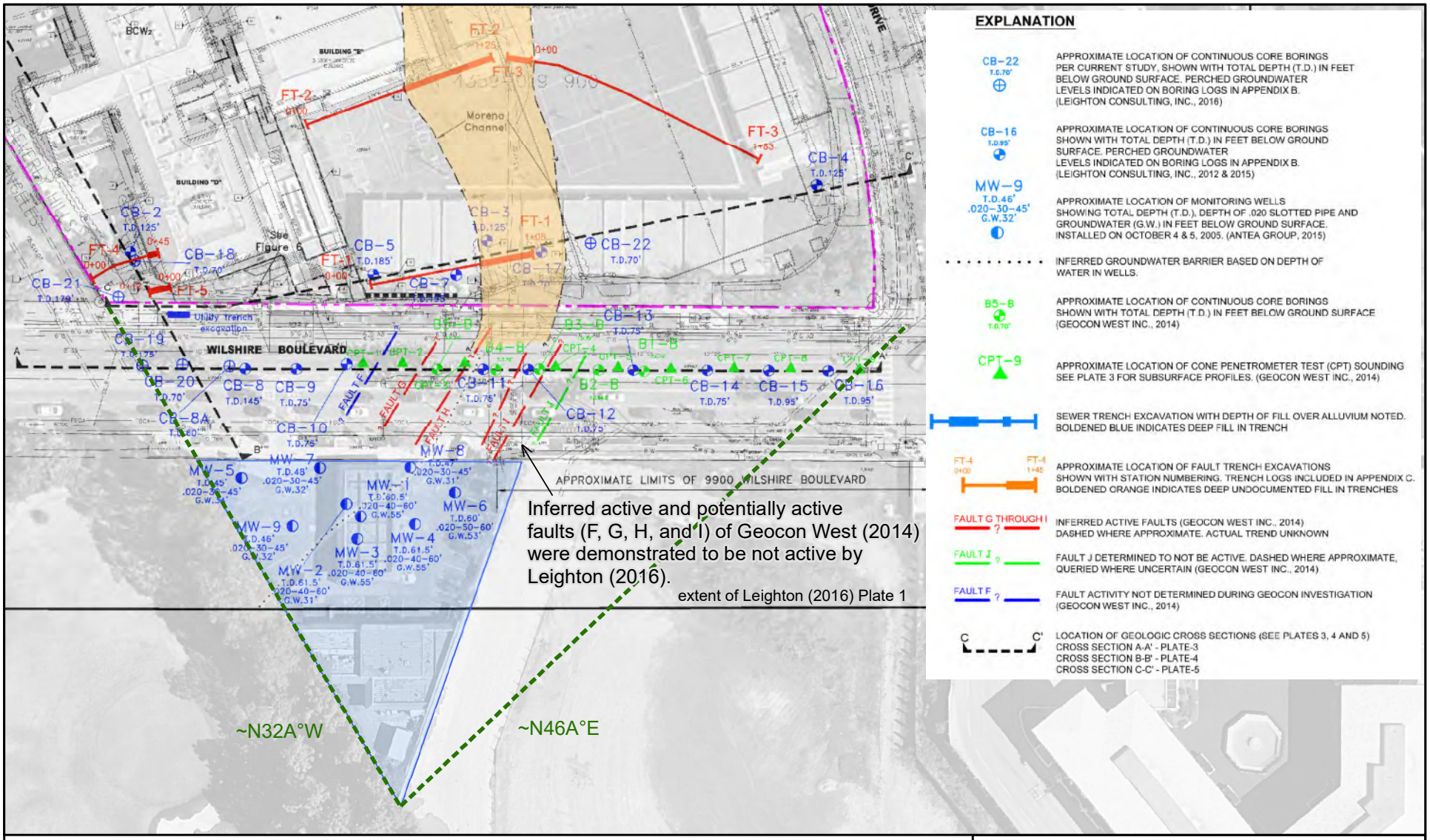
base image: Google Earth (March 2018)

Groundwater Barrier Interpretation

FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc.

Figure **8**



site boundary

Moreno Creek

N 0 100 ft 0 30 m

base map: Leighton (2016) Plate 1
base image: Google Earth (March 2018)

Leighton (2016) Plate 1

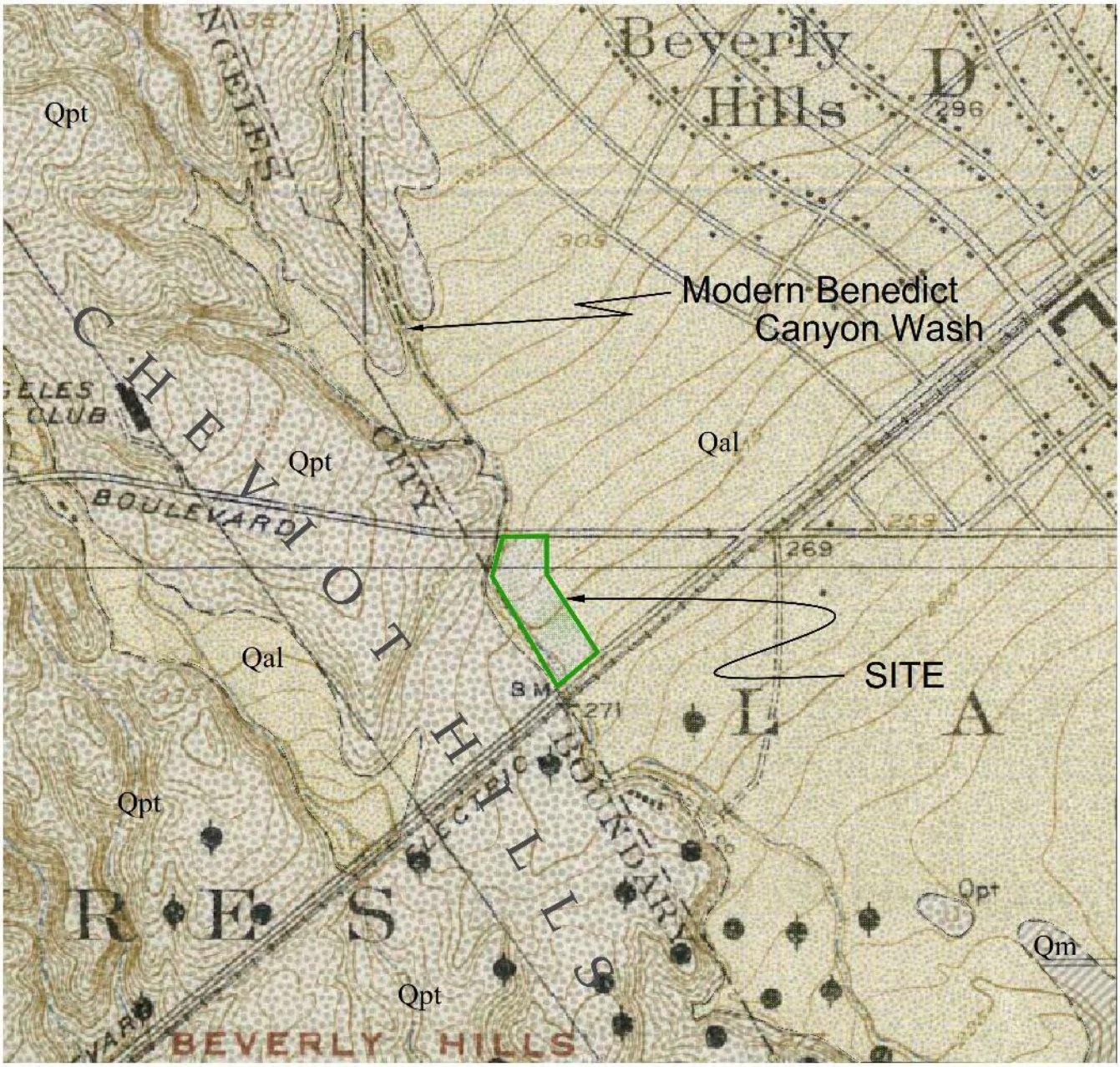
FAULT INVESTIGATION FOR 9988 WILSHIRE BLVD

Lettis Consultants International, Inc. | Figure 9

Appendix A

Key Figures from Geocon West (2014) Fault Study of the 9900 Wilshire Site

REFERENCE: Modified after Hoots, H. W., 1930, Geology of the Eastern Part of the Santa Monica Mountains, Los Angeles Basin, in Shorter Contributions to General Geology, U.S. Geological Survey Professional Paper 165 - C. "Base from Surveys Made in 1923-1925 by US Geological Survey in Cooperation with Los Angeles County".



LEGEND

Qal - Alluvium: Coarse unconsolidated deposits in valleys and present stream channels

Qpt - Alluvial plain, stream, and marine terrace deposits

Qm - Marine Deposits: Marine sandstone, conglomerate, and clay shale

0 1000' 2000'

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AL		8000

HISTORIC TOPOGRAPHIC AND GEOLOGIC MAP

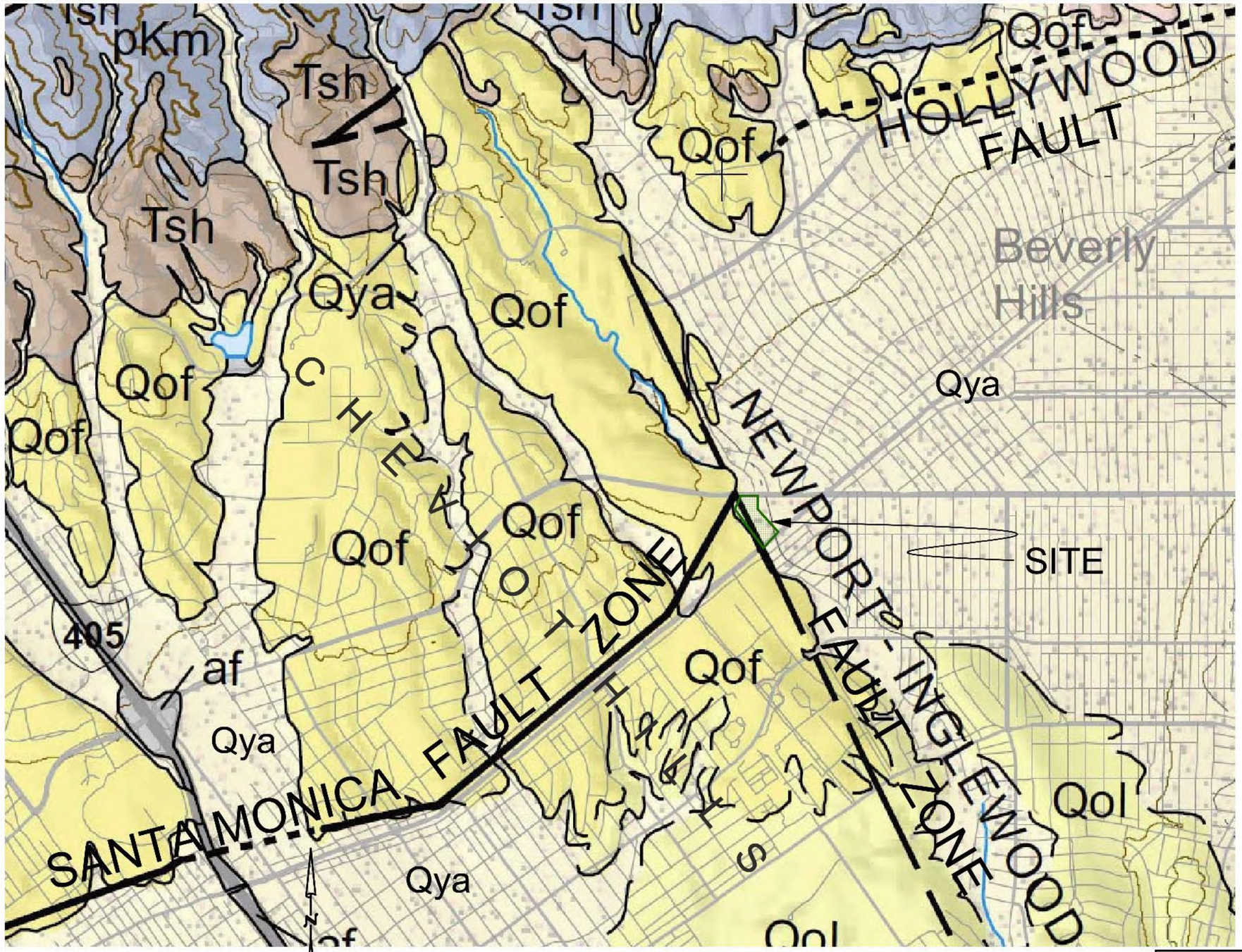
FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 3

Figure A-1



MAP UNITS

Late Holocene (Surficial Deposits)

af — Artificial Fill - deposits of fill resulting from human construction, mining, or quarrying activities: includes engineered fill for buildings, roads, dams, airport runways, harbor facilities, and waste landfills

Holocene to Late Pleistocene (Surficial Deposits)

Qya — Young Alluvial Valley Deposits - unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats or larger rivers

Late to Middle Pleistocene (Surficial Deposits)

Qof — Old Alluvial Fan Deposits - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qol — Old Lacustrine, Playa, and Estuarine (Paralic) Deposits - slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types

Tertiary (Bedrock)

Tsh — Fine-grained Tertiary age formations - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments

Mesozoic and Older (Bedrock)

pKm — Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin

REFERENCE: Modified after California Geological Survey, 2010, "Geologic Compilation of Quaternary Surficial Deposits in Southern California, Los Angeles 30' X 60' Quadrangle". A Project for the Department of Water Resources by the California Geological Survey, Compiled from Existing Sources by Trinda L. Bedrossian, CEG and Peter D. Roffers. Digital Preparation by Solomon McCrea and Barbara Wanish. July 2010, CGS Special Report 217, Plate 9.

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CGS 2010 COMPILATION GEOLOGIC MAP

FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 4

Figure A-2

LEGEND

- Parsons (2011) Interpreted Faults
- Santa Monica Fault (CGS, 2010)
- Groundwater Barrier (TRC, 2009; Antea Group, 2014)
- Santa Monica Fault Zone Geomorphic Scarp (Dolan et al., 2000)

N

0 400' 800'

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PARSONS (2011) INTERPRETED FAULTS

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 5

Figure A-3

LEGEND

- Parsons (2011) Interpreted Faults
- Santa Monica Fault (CGS, 2010)
- Groundwater Barrier (TRC, 2009; Antea Group, 2014)
- Santa Monica Fault Zone Geomorphic Scarp (Dolan et al., 2000)

N

0 400' 800'

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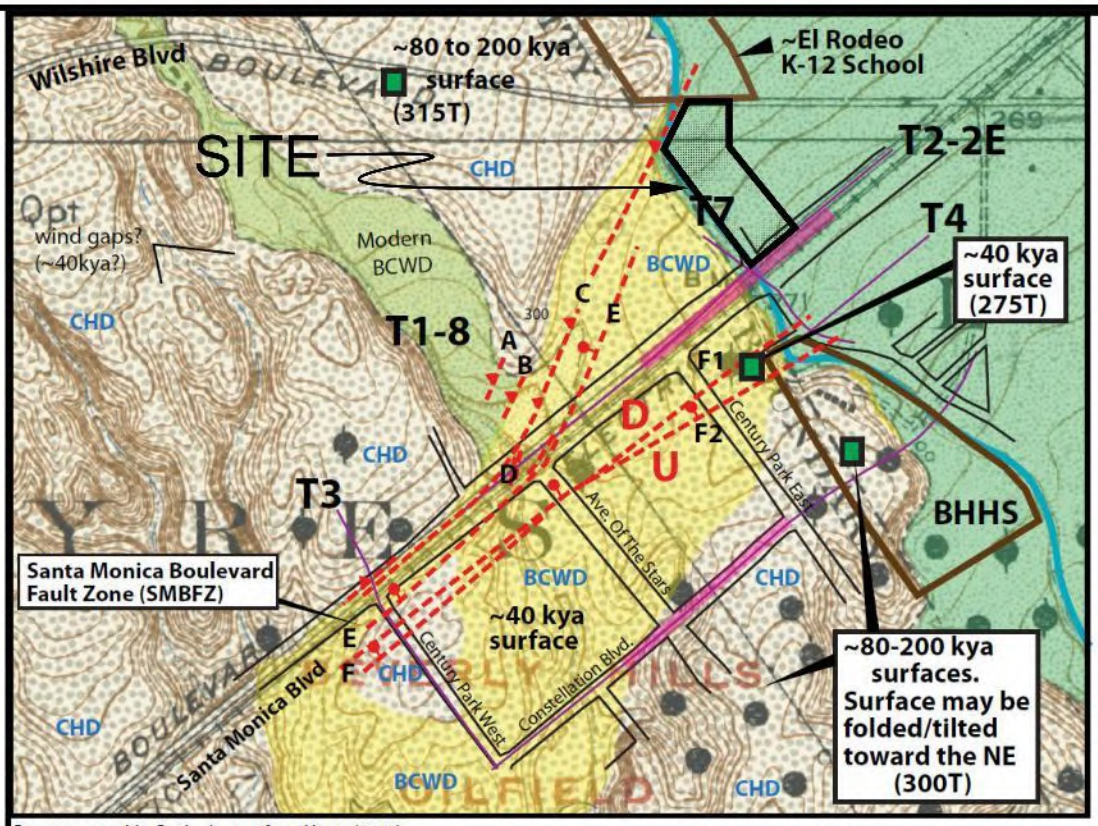
INTERPRETED FAULTS - REQUIRE FURTHER INVESTIGATION

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 6

Figure A-4



Base topographic-Geologic map from Hoots (1931).

SYMBOL DESCRIPTIONS

Approximate limits of younger Benedict Canyon Wash Deposits (<~40,000 years old).

BCWD — Approximate limits of older Benedict Canyon Wash Deposits. Upper-most sediments are a minimum of ~40,000 years old.

CHD — Approximate limits of Cheviot Hills Deposits. Upper fan-terrace surfaces (315T and 300T, see notes) are 150,000 to 200,000 years old.

D / U — Approximate surface projection location of faults identified during this study. Balls and barbs for normal and reverse apparent displacement faults. D - down, U - Up sides.

T7 — Approximate location of geologic transect by Parsons (2012).

BHHS — Beverly Hills High School

Approximate location of soil with estimated age.

Proposed Metro Stations on Santa Monica Blvd, and Constellation Blvd.

Notes:

Based on the existing soil age data, nearly all of the sediments exposed at the surface within the Cheviot Hills are 40,000 to 200,000 years old.

The 300T and 315T fan-terraces are shown on Plate ES-4 and represent average elevations of the preserved surfaces.

0 scale 1000 feet

REFERENCE: Modified after Kenney, 2012, "Geomorphic, structural, and stratigraphic evaluation of the eastern Santa Monica Fault Zone, and West Beverly Hills Lineament, Century City/Cheviot Hills, California", Plate 1a, "Surface Geology and Fault Map of the Century City Area".

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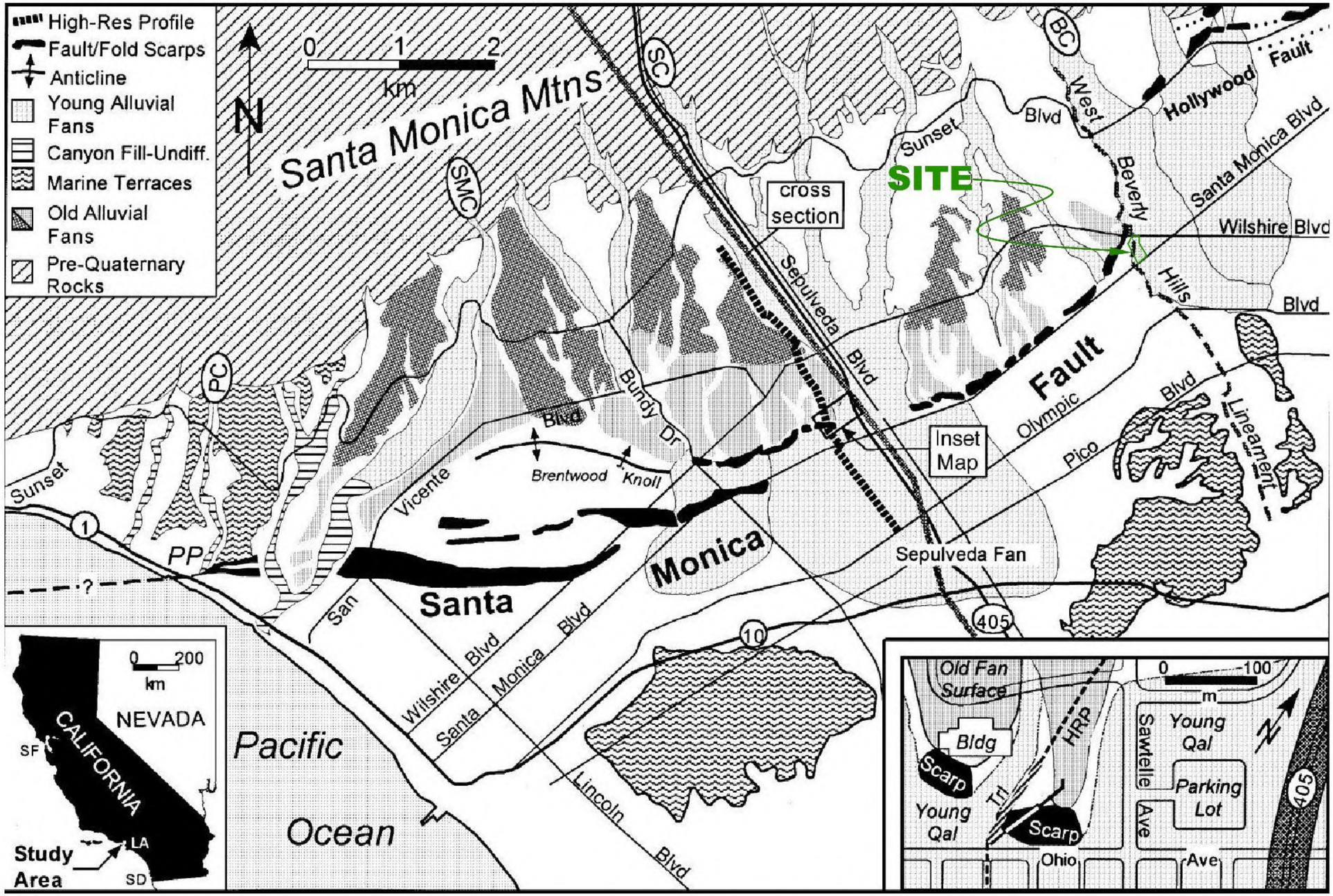
KENNEY (2013) PRELIMINARY FAULT MAP WITH NATURAL TOPOGRAPHY

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

AL		8000	MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 7

Figure A-5



REFERENCE: Modified after Pratt, T.L., et. al., 1998, Multiscale Seismic Imaging of Active Fault Zones for Hazard Assessment: A Case Study of the Santa Monica Fault Zone, Los Angeles, California", Geophysics, Volume 63, No. 2 (March-April 1998); pages 479-489, Figure 1.

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AL		8000

SANTA MONICA FAULT ZONE - GEOMORPHIC MAP

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 8

Figure A-6

LEGEND

- B13 — Approximate Location of Continuous Core Boring
- C9 — Approximate Location of CPT Soundings
- TRENCH 3 — Approximate Location of Fault Trench
- B B' — Exploration Transect
- T2E-C23 — Location of Prior CPT (Parsons, 2011)
- T2E-B5 — Location of Prior Continuous Core Boring (Parsons, 2011)
- MW-10 — Location of Monitoring Well (TRC, 2009)
- 263.5 — Groundwater Elevation measured on 12/30/2013 by Antea Group (2014)
- Location of Prior Seismic Line (GeoVision, 2012)
- Interpreted Faults (Parsons, 2011)
- Interpreted Faults (GeoVision, 2012)
- Approximate Location of Groundwater Barrier (TRC, 2009)
- 9900 Wilshire Property Line

BASE MAP: Modified after Psomas, 2013, "Borehole Exhibit". Job No. 1BHW010100, Sheet 1 of 1

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AL/CHL		8000

EXPLORATION PLAN

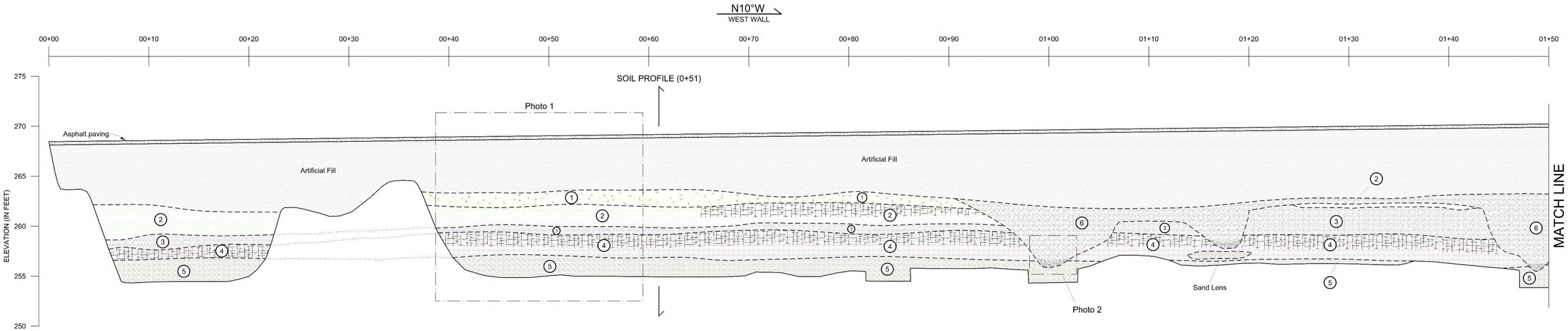
FAULT RUPTURE HAZARD INVESTIGATION

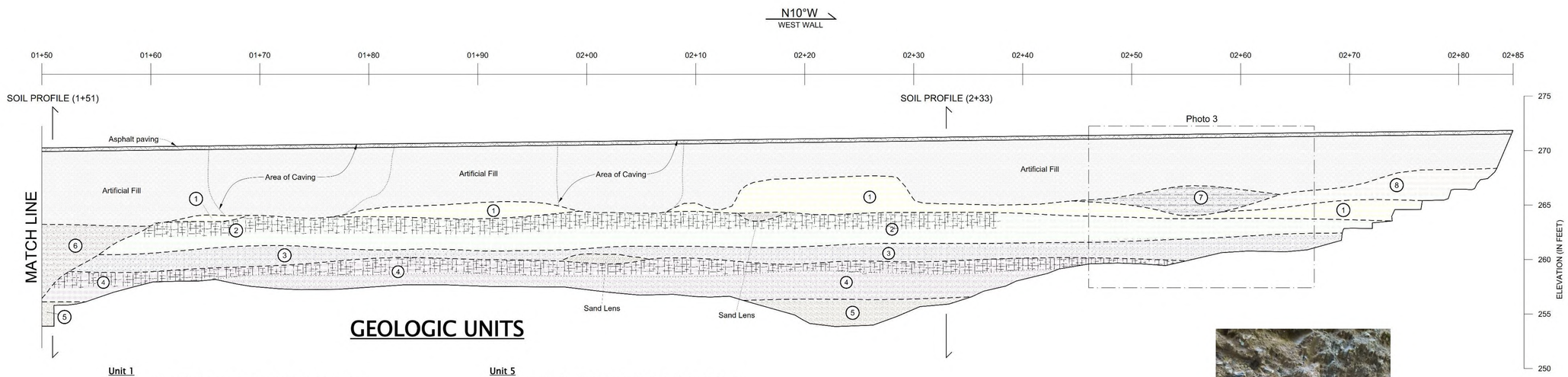
9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 9

TRENCH 1





GEOLOGIC UNITS

Unit 1
Alluvial Deposits – Silt, brown (10YR 4/3 to 10YR 4/4), trace to minor clay, and trace to minor disseminated gravel (to 1 inch), massive. Locally sandy, very fine-grained. Well-developed ped structure, partially gleyed. Gravel predominantly slate and some diatomaceous siltstone, subrounded to subangular. Lower contact narrowly gradational to abrupt.

Unit 2
Alluvial Deposits – Silt, brown (10YR 4/3 to 10YR 4/4), trace to with disseminated gravel (to ½ inch), minor clay, massive. Well-developed argillic horizon at top of unit, plugged with clay (except where abundant gravel), grading sandier with depth. Increase in gravel content north of Station 2+40. Well developed ped structure at top of unit except south of Station 0+65 and north of Station 2+40 where top of unit is gravelly. Lower contact narrowly gradational.

Unit 3
Debris Flow –Silt with Sand to Silty Sand with Gravel, brown (10YR 4/3) to dark brown (10YR 3/3), very fine-grained, plugged with clay, massive. Gravel disseminated throughout unit (10% to 50%), typically matrix-supported, locally clast-supported; Predominantly slate gravel with some diatomaceous siltstone gravel (to 2 inches; typically 1 inch or less in size), subrounded to subangular. Weakly to moderately developed ped structure (more developed where gravel content is less than 10%), secondary clay films, partially gleyed. Lower contact abrupt.

Unit 4
Alluvial Deposits – Silty Sand to Silt with Sand, brown (10YR 5/3), fine-grained, plugged with clay, trace disseminated gravel (¼ inch or less), massive. Moderate ped structure at upper contact decreasing to weak or no ped structure with depth. Some secondary clay films, partially gleyed, localized manganese stringers and staining. Lower portion of unit grades to fine-grained Silty Sand with dark yellowish brown (10YR 4/4) mottles. Lower contact abrupt to narrowly gradational.

Unit 5
Alluvial Deposits – Silty Sand to Sand with Silt, dark yellowish brown (10YR 4/4), fine-grained, generally massive with some internal sand lenses. Silt content increases with depth. Sand content increases and some gravel-rich lenses common south of Station 0+90.

Unit 6
Channel Deposits – Silty Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace disseminated gravel, porous, massive. Gravel concentrated at bottom of unit (½ to 2 inches, few smaller in size), typically matrix-supported; clast-supported near base. Weak ped structure, some secondary clay films, localized manganese staining. Lateral contacts are narrowly gradational and basal contact is abrupt.

Unit 7
Channel Deposits – Sand to Gravelly Sand, light grayish brown (10YR 5/2 to 10YR 6/2), fine- to medium-grained, matrix supported, weakly bedded to well bedded. Gravel subangular to subrounded (typically less than ½-inch but locally up to 1½ – 2 inches, few to 3 inches). Some internal gravel beds (matrix-supported). Lateral and lower contacts abrupt.

Unit 8
Alluvial Deposits – Clayey Silt, dark yellowish brown (10YR 4/4) trace disseminated gravel (to ¾ inch), moderately to slightly porous, massive. Lower contact narrowly gradational.

Photo 1

Photo 2

Photo 3

Note: Geologic units not correlated between trenches. For descriptive purposes only.

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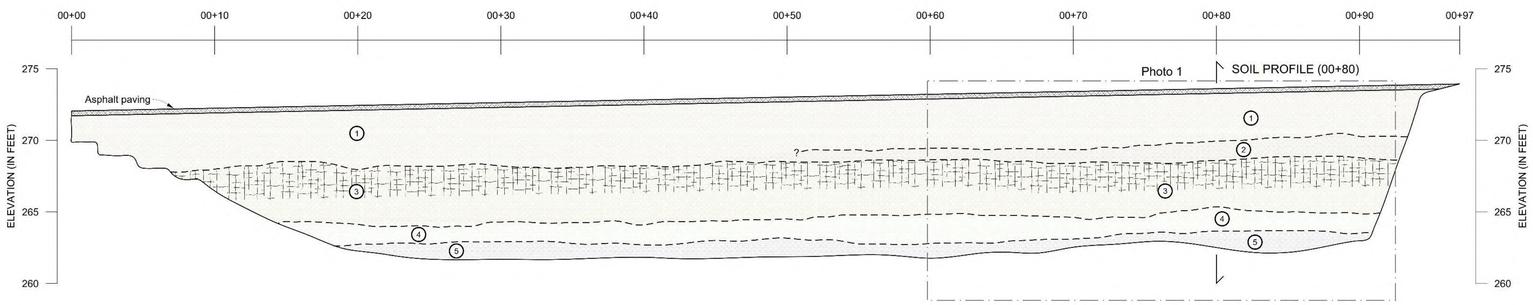
LOG OF TRENCH 1
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 10

Figure A-8

TRENCH 2



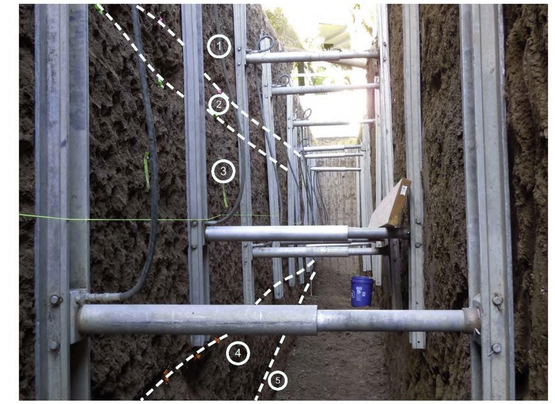
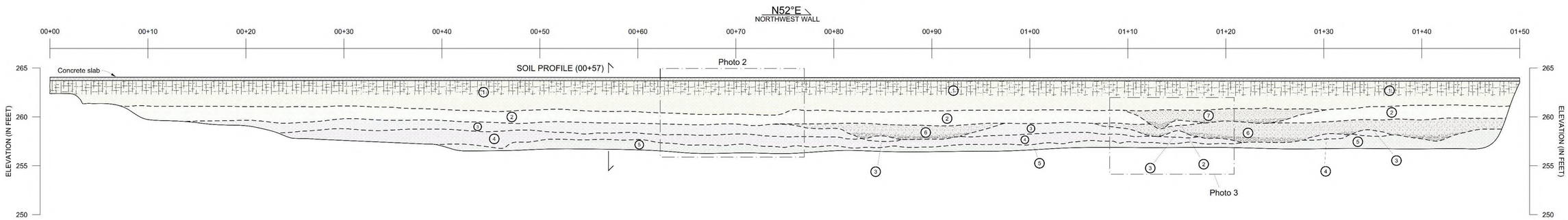


Photo 1

TRENCH 3



GEOLOGIC UNITS

TRENCH 2

Unit 1
Alluvial Deposits – Silty Sand to Silt with Sand, brown (10YR 4/3), fine-grained, minor disseminated gravel (to 3 inches, most less than 1 inch), porous, massive. Some roots in upper portion of unit, increase in gravel content at base of unit. Lower contact narrowly gradational.

Unit 2
Alluvial Deposits – Silty Sand to Sand with Silt, brown (10YR 4/3 to 10YR 4/4), very, fine-grained, some medium to coarse, trace to minor disseminated gravel (to 2 inches, typically less than 1 inch), massive. Gravel subangular to subrounded, mostly slate, some diatomaceous siltstone. Sand content greater than unit above. South of Station 0+50, not readily distinguishable from Unit 1 above. Lower contact narrowly gradational.

Unit 3
Alluvial Deposits – Silt with Sand, brown (10YR 4/3), trace to minor disseminated gravel (typically to ½ inch, few to 1½ inch), trace clay, porous, massive. Well developed ped structure, some secondary clay film, partially gleyed. Gravel subrounded to subangular, predominantly slate, some diatomaceous siltstone. Some fine roots. Lower contact narrowly gradational.

Unit 4
Alluvial Deposits – Silty Sand to Sand with Silt, yellowish brown (10YR 5/4), very fine-grained, minor disseminated gravel (to 1 inch), locally with gravel, friable, massive, porous. Gravel subrounded to subangular, locally gravel in beds or pockets. Lower contact narrowly gradational.

Unit 5
Alluvial Deposits – Silt with Sand, dark yellowish brown (10YR 3/4), very fine-grained, trace gravel (to 1 inch), massive. Laterally grades more sandy. Moderately cemented.

TRENCH 3

Unit 1
Alluvial Deposits – Clayey Silt, dark grayish brown (10YR 4/2) to brown (10YR 4/3), trace to minor gravel, slightly to moderately porous, massive. Well developed ped structure with secondary clay films. Gravel predominantly slate and diatomaceous siltstone (to ¾ inches, few to 1½ inches), gravel size increases toward the east. Lower contact narrowly gradational.

Unit 2
Alluvial Deposits – Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/4), trace to with disseminated gravel (to 1 inch, typically to ½ inch), moderately porous, massive. Gravel predominantly slate and few diatomaceous siltstone clasts; matrix-supported, locally clast-supported at base. Lower contact narrowly gradational to abrupt.

Unit 3
Alluvial Deposits – Silty Sand, yellowish brown (10YR 5/4), fine- to medium-grained, trace to minor disseminated gravel (typically ½ inch, few to 1½ inch), slightly friable, massive. Gravel predominantly slate, few diatomaceous siltstone clasts; matrix-supported. Lower contact narrowly gradational.

Unit 4
Alluvial Deposits – Sand with Silt to Silty Sand, dark yellowish brown (10YR 4/4 to 10YR 4/6), minor to with gravel (laterally variable in volume), slightly friable, massive. Becomes more friable and sandier toward the east. Gravel subrounded to subangular (typically less than ½ inch, some to 2 ½ inches). Lower contact abrupt to narrowly gradational.

Unit 5
Alluvial Deposits – Silt with Sand, dark yellowish brown (10YR 3/6), fine-grained, some medium, trace to minor disseminated slate gravel (to ¼ inch, few to 1 inch), moderately porous, massive. Trace rootlet voids.

Unit 6
Channel Deposits – Sand with Gravel, dark yellowish brown (10YR 4/4), fine- to medium-grained, some coarse, friable, massive to locally bedded. Gravel (¼ inch to 2½ inches), predominantly slate, some diatomaceous siltstone, subrounded, typically larger at base. Gravel concentrated (up to 40%) and clast-supported at channel center between approximately Station 0+80 and 0+85. Lateral and lower contacts abrupt.

Unit 7
Channel Deposits – Sand with Gravel, dark yellowish brown (10YR 3/4 to 10YR 3/6), minor silt, weakly friable to moderately cemented, massive to weakly bedded. Gravel disseminated throughout unit (typically less than 1 inch; few to 3 inches), increasing in size with depth; locally concentrated in pockets or beds at base of unit. Gravel predominantly slate, few diatomaceous siltstone clasts; generally matrix-supported, locally clast-supported. Lateral and lower contracts abrupt.

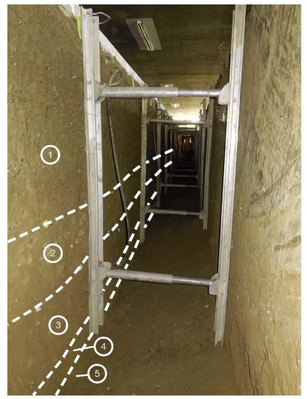


Photo 2

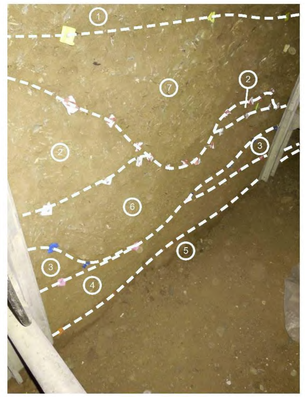


Photo 3

Note: Geologic units not correlated between trenches. For descriptive purposes only.

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LOG OF TRENCH 2 & 3

FAULT RUPTURE HAZARD INVESTIGATION

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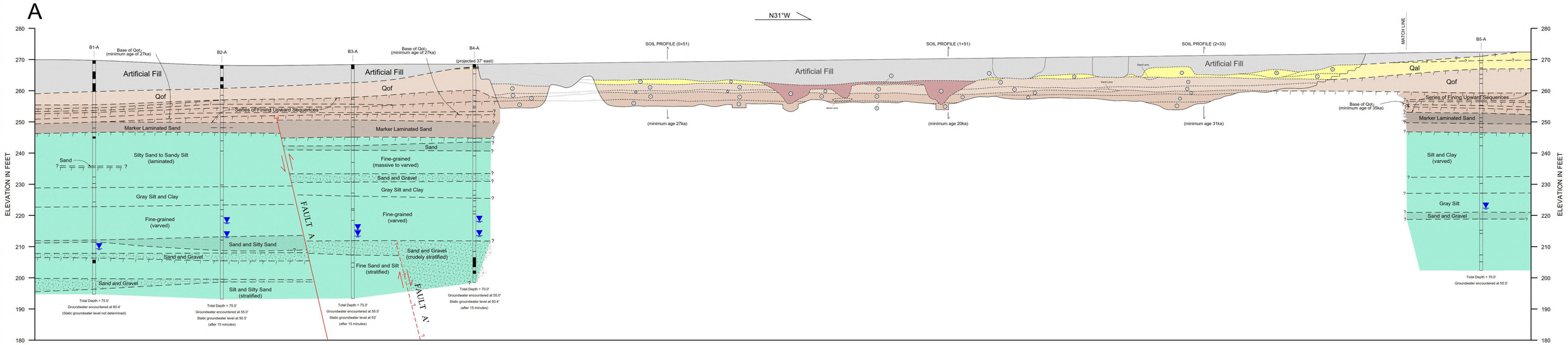
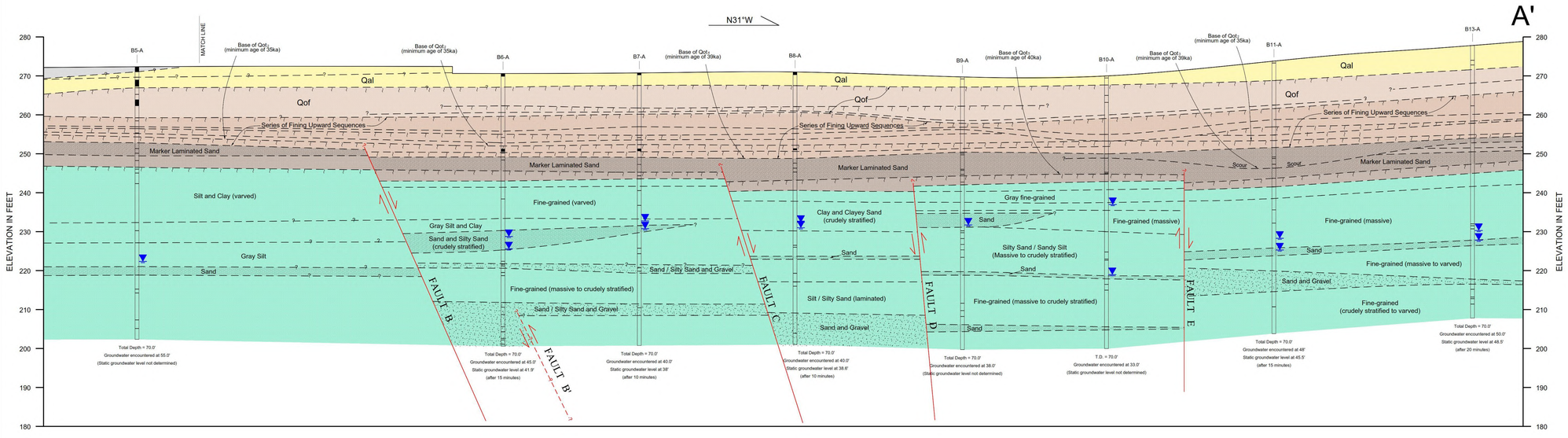
MAY 2014 | PROJECT NO. A9009-06-01A | FIGURE 11

Figure A-9

TRANSECT A





LEGEND

- Younger Alluvial Deposits (Qal)
  - Stream Terrace and Fluvial Deposits
- Older Fan Deposits (Qof)
  - Gravel-Rich Debris Flow
- Older Terrace Deposits (Qot)
  - Series of Fining Upward Sequences
  - Marker Laminated Sand
- Lakewood Formation (Qlw)
- Geologic Contact (Queried where uncertain)
- Argillic Soil Horizon
- Inferred Fault (Queried where uncertain)
- Groundwater Level Encountered in Boring

SCALE 1" = 10'
1:1 HORIZONTAL AND VERTICAL SCALE

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TRANSECT A
FAULT RUPTURE HAZARD INVESTIGATION
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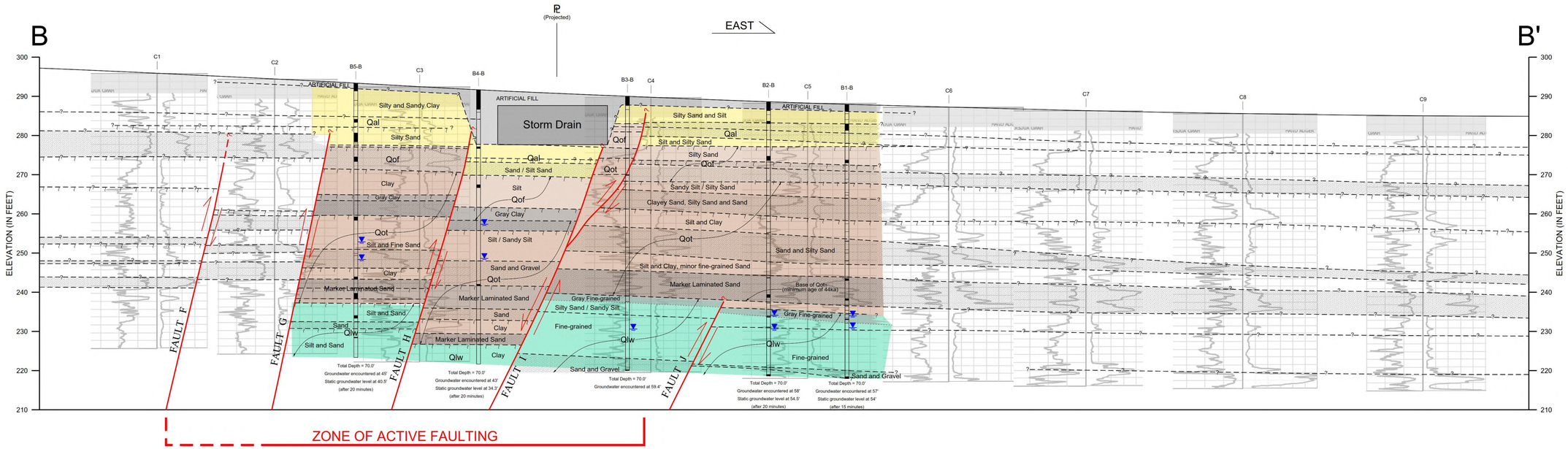
BEVERLY HILLS, CALIFORNIA

MAY 2014 | PROJECT NO. A9009-06-01A | FIGURE 12

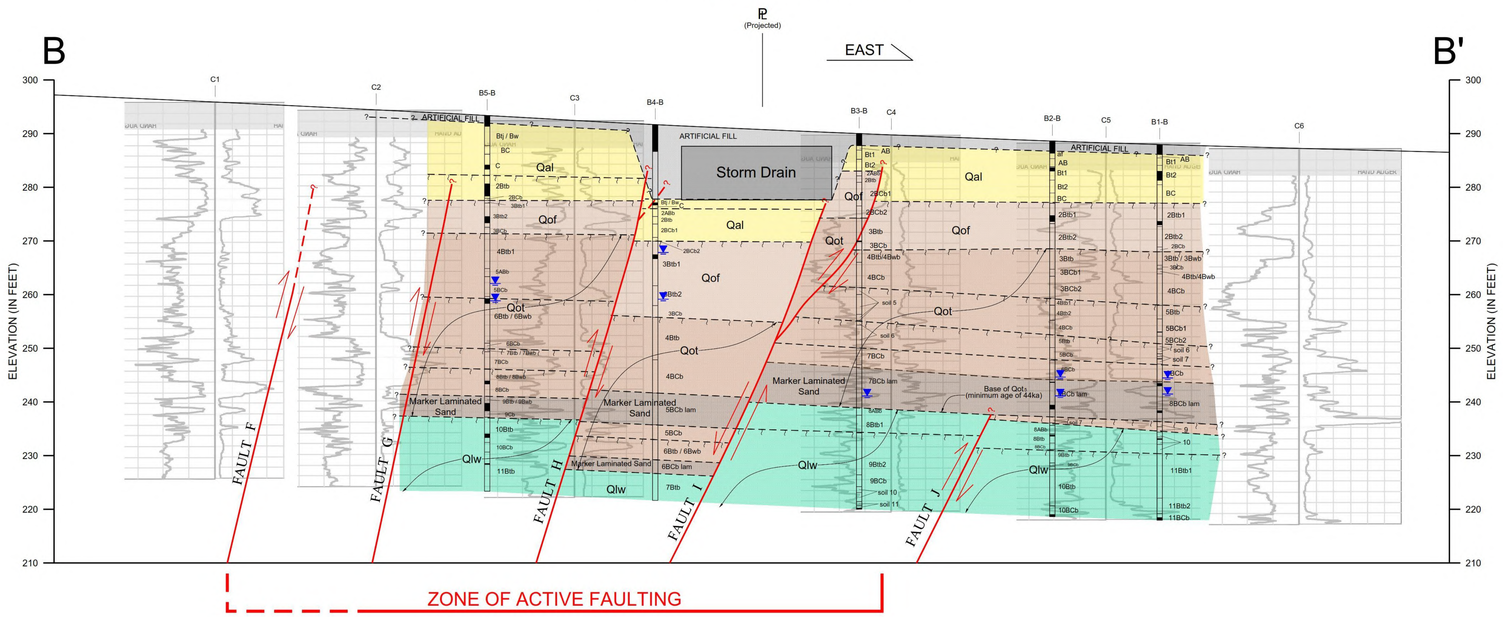
Figure A-10

TRANSECT B

CORRELATION OF PRIMARY STRATIGRAPHY



CORRELATION OF BURIED SOILS



LEGEND

- Younger Alluvial Deposits (Qal)
  - Stream Terrace and Fluvial Deposits
- Older Fan Deposits (Qof)
  - Gravel-Rich Debris Flow
- Older Terrace Deposits (Qot)
  - Series of Fining Upward Sequences
  - Marker Laminated Sand
- Lakewood Formation (Qlw)
- Geologic Contact (Queried where uncertain)
- Argillic Soil Horizon
- Inferred Fault (Queried where uncertain)
- Groundwater Level Encountered in Boring

SCALE 1" = 10'
1:1 HORIZONTAL AND VERTICAL SCALE

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TRANSECT B
FAULT RUPTURE HAZARD INVESTIGATION
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BEVERLY HILLS, CALIFORNIA

MAY 2014 | PROJECT NO. A9009-06-01A | FIGURE 13

BASE MAP: Modified after Psomas, 2013, "Borehole Exhibit". Job No. 1BHW010100, Sheet 1 of 1

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INTERPRETED FAULTS

FAULT RUPTURE HAZARD INVESTIGATION
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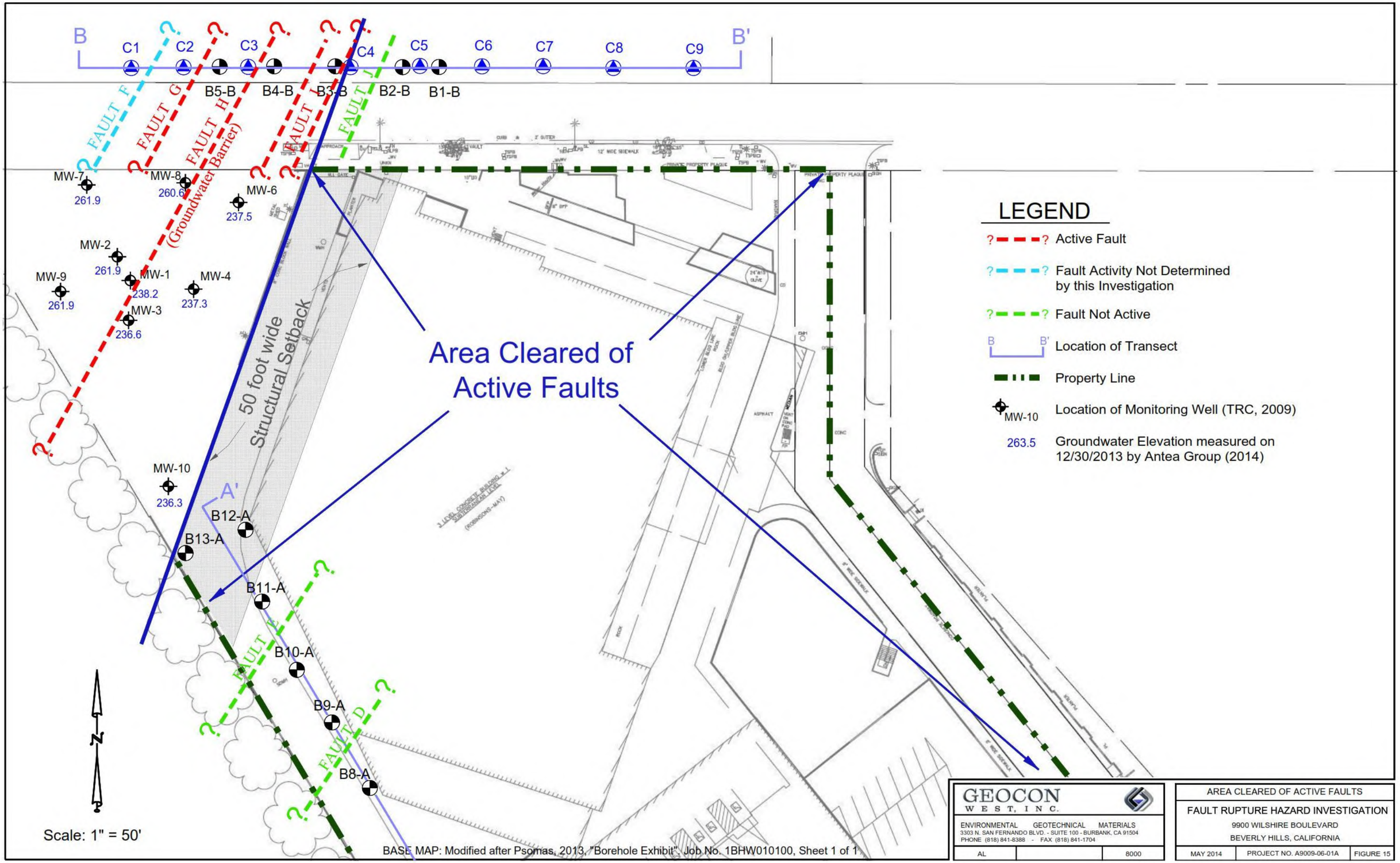
BEVERLY HILLS, CALIFORNIA

MAY 2014	PROJECT NO. A9009-06-01A	FIGURE 14

Figure A-12


B
B'
C1
C2
C3
C4
C5
C6
C7
C8
C9
B5-B
B4-B
B3-B
B2-B
B1-B
FAULT F
FAULT G
FAULT H
(Groundwater Barrier)
FAULT I
FAULT E
FAULT D
MW-7
261.9
MW-8
260.6
MW-6
237.5
MW-2
261.9
MW-9
261.9
MW-1
238.2
MW-4
237.3
MW-3
236.6
MW-10
236.3
A'
B12-A
B13-A
B11-A
B10-A
B9-A
B8-A
50 foot wide Structural Setback
Area Cleared of Active Faults
LEGEND
Active Fault
Fault Activity Not Determined by this Investigation
Fault Not Active
Location of Transect
Property Line
Location of Monitoring Well (TRC, 2009)
Groundwater Elevation measured on 12/30/2013 by Antea Group (2014)
Scale: 1" = 50'
BASE MAP: Modified after Psomas, 2013, "Borehole Exhibit", Job No. 1BHW010100, Sheet 1 of 1
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AL
8000
AREA CLEARED OF ACTIVE FAULTS
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA
MAY 2014
PROJECT NO. A9009-06-01A
FIGURE 15

Figure A-13

Appendix B

Key Figures from Leighton (2016) Fault Study of the El Rodeo School Site

EXPLORATION MAP

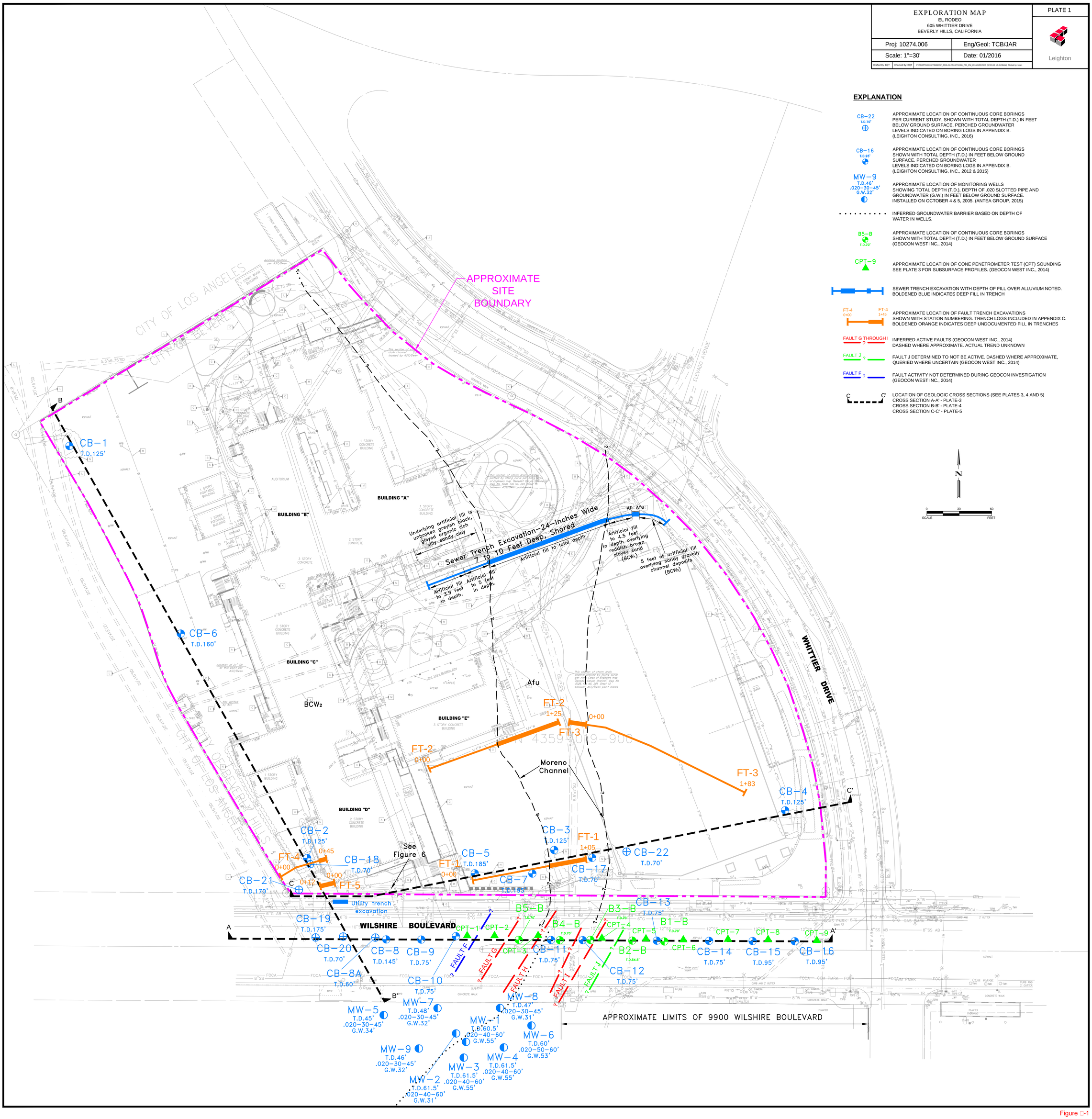
EL RODEO
605 WHITTIER DRIVE
BEVERLY HILLS, CALIFORNIA

PLATE 1

Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=30'	Date: 01/2016

Drafted By: BQT | Checked By: BQT | P:\DRAFTING\10274\006\CP_2016-01-01\10274-006_P01_EN_20160120.DWG 02-03-16 10:40:36AM; Plotted by: brian

Leighton



EXPLANATION

CB-22 T.D.70' — APPROXIMATE LOCATION OF CONTINUOUS CORE BORINGS PER CURRENT STUDY, SHOWN WITH TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE. PERCHED GROUNDWATER LEVELS INDICATED ON BORING LOGS IN APPENDIX B. (LEIGHTON CONSULTING, INC., 2016)

CB-16 T.D.95' — APPROXIMATE LOCATION OF CONTINUOUS CORE BORINGS SHOWN WITH TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE. PERCHED GROUNDWATER LEVELS INDICATED ON BORING LOGS IN APPENDIX B. (LEIGHTON CONSULTING, INC., 2012 & 2015)

MW-9 T.D.46' .020-30-45' G.W.32' — APPROXIMATE LOCATION OF MONITORING WELLS SHOWING TOTAL DEPTH (T.D.), DEPTH OF .020 SLOTTED PIPE AND GROUNDWATER (G.W.) IN FEET BELOW GROUND SURFACE. INSTALLED ON OCTOBER 4 & 5, 2005. (ANTEA GROUP, 2015)

INFERRED GROUNDWATER BARRIER BASED ON DEPTH OF WATER IN WELLS.

B5-B T.D.70' — APPROXIMATE LOCATION OF CONTINUOUS CORE BORINGS SHOWN WITH TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE (GEOCON WEST INC., 2014)

CPT-9 — APPROXIMATE LOCATION OF CONE PENETROMETER TEST (CPT) SOUNDING SEE PLATE 3 FOR SUBSURFACE PROFILES. (GEOCON WEST INC., 2014)

SEWER TRENCH EXCAVATION WITH DEPTH OF FILL OVER ALLUVIUM NOTED. BOLDENED BLUE INDICATES DEEP FILL IN TRENCH

FT-4 0+00 — FT-4 1+45: APPROXIMATE LOCATION OF FAULT TRENCH EXCAVATIONS SHOWN WITH STATION NUMBERING. TRENCH LOGS INCLUDED IN APPENDIX C. BOLDENED ORANGE INDICATES DEEP UNDOCUMENTED FILL IN TRENCHES

FAULT G THROUGH I — INFERRED ACTIVE FAULTS (GEOCON WEST INC., 2014) DASHED WHERE APPROXIMATE. ACTUAL TREND UNKNOWN

FAULT J — FAULT J DETERMINED TO NOT BE ACTIVE. DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN (GEOCON WEST INC., 2014)

FAULT F — FAULT ACTIVITY NOT DETERMINED DURING GEOCON INVESTIGATION (GEOCON WEST INC., 2014)

C — C' : LOCATION OF GEOLOGIC CROSS SECTIONS (SEE PLATES 3, 4 AND 5)
CROSS SECTION A-A' - PLATE-3
CROSS SECTION B-B' - PLATE-4
CROSS SECTION C-C' - PLATE-5

Figure 1

TOPOGRAPHIC MAP

EL RODEO
605 WHITTIER DRIVE
BEVERLY HILLS, CALIFORNIA

PLATE 2

Leighton

Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=30'	Date: 01/2016

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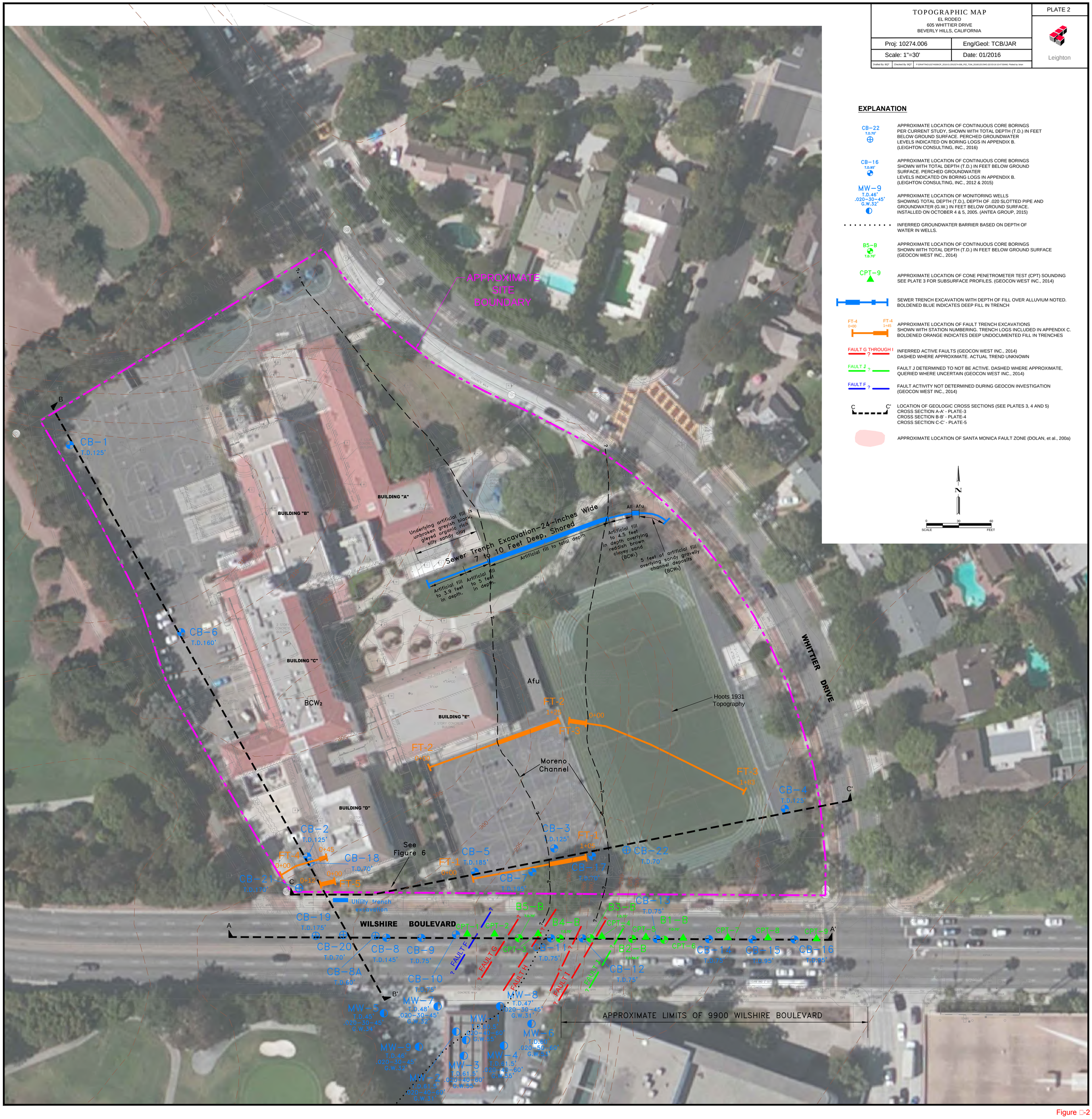


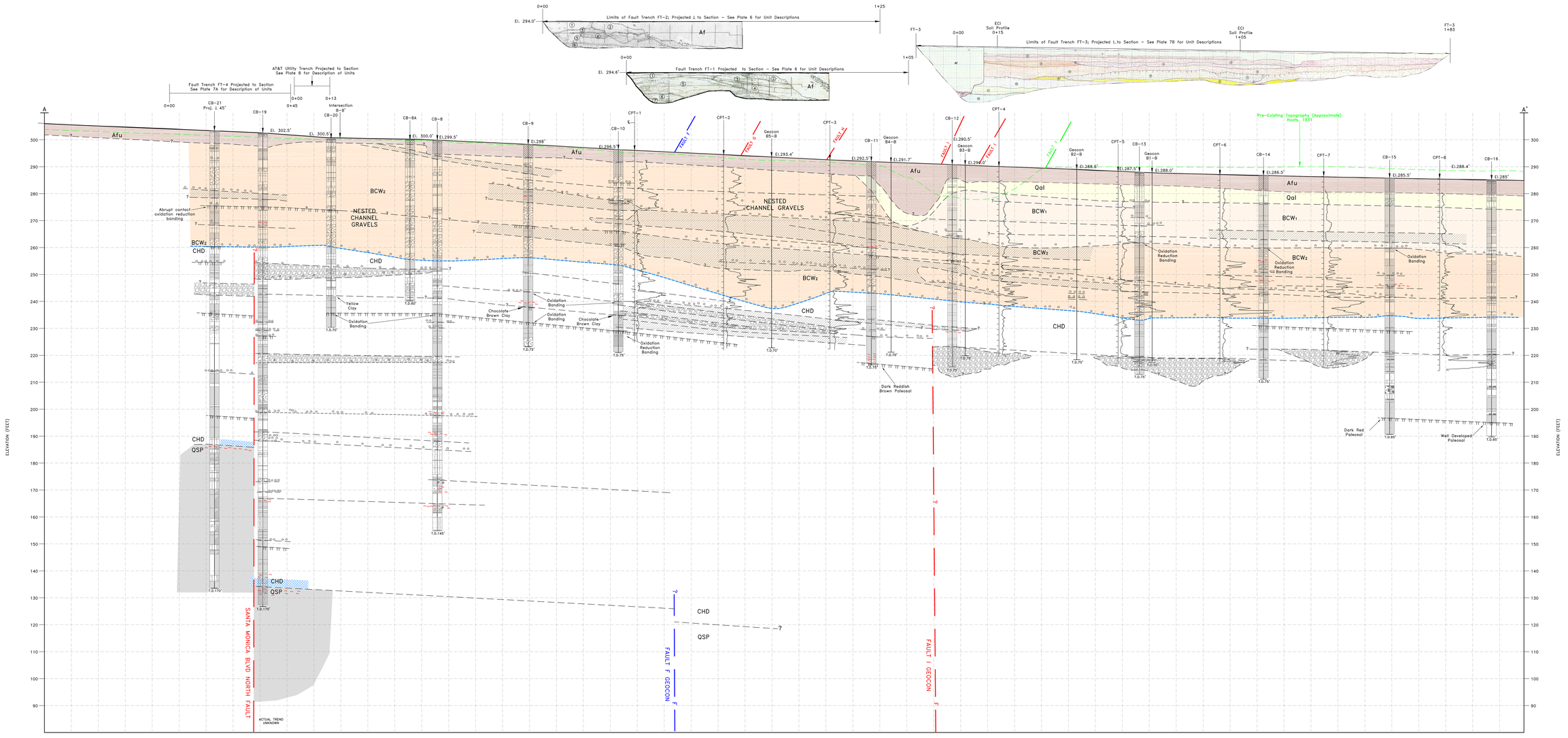
EXPLANATION

CB-22 T.D.70'	APPROXIMATE LOCATION OF CONTINUOUS CORE BORINGS PER CURRENT STUDY. SHOWN WITH TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE. PERCHED GROUNDWATER LEVELS INDICATED ON BORING LOGS IN APPENDIX B. (LEIGHTON CONSULTING, INC., 2016)
CB-16 T.D.95'	APPROXIMATE LOCATION OF CONTINUOUS CORE BORINGS SHOWN WITH TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE. PERCHED GROUNDWATER LEVELS INDICATED ON BORING LOGS IN APPENDIX B. (LEIGHTON CONSULTING, INC., 2012 & 2015)
MW-9 T.D.46' .020-30-45' G.W.32'	APPROXIMATE LOCATION OF MONITORING WELLS SHOWING TOTAL DEPTH (T.D.), DEPTH OF .020 SLOTTED PIPE AND GROUNDWATER (G.W.) IN FEET BELOW GROUND SURFACE. INSTALLED ON OCTOBER 4 & 5, 2005. (ANTEA GROUP, 2015)
. . . . .	INFERRED GROUNDWATER BARRIER BASED ON DEPTH OF WATER IN WELLS.
B5-B T.D.70'	APPROXIMATE LOCATION OF CONTINUOUS CORE BORINGS SHOWN WITH TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE (GEOCON WEST INC., 2014)
CPT-9	APPROXIMATE LOCATION OF CONE PENETROMETER TEST (CPT) SOUNDING SEE PLATE 3 FOR SUBSURFACE PROFILES. (GEOCON WEST INC., 2014)
	SEWER TRENCH EXCAVATION WITH DEPTH OF FILL OVER ALLUVIUM NOTED. BOLDENED BLUE INDICATES DEEP FILL IN TRENCH
FT-4 0+00 / FT-4 1+45	APPROXIMATE LOCATION OF FAULT TRENCH EXCAVATIONS SHOWN WITH STATION NUMBERING. TRENCH LOGS INCLUDED IN APPENDIX C. BOLDENED ORANGE INDICATES DEEP UNDOCUMENTED FILL IN TRENCHES
FAULT G THROUGH I ?	INFERRED ACTIVE FAULTS (GEOCON WEST INC., 2014) DASHED WHERE APPROXIMATE. ACTUAL TREND UNKNOWN
FAULT J ?	FAULT J DETERMINED TO NOT BE ACTIVE. DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN (GEOCON WEST INC., 2014)
FAULT F ?	FAULT ACTIVITY NOT DETERMINED DURING GEOCON INVESTIGATION (GEOCON WEST INC., 2014)
C C'	LOCATION OF GEOLOGIC CROSS SECTIONS (SEE PLATES 3, 4 AND 5) CROSS SECTION A-A' - PLATE-3 CROSS SECTION B-B' - PLATE-4 CROSS SECTION C-C' - PLATE-5
	APPROXIMATE LOCATION OF SANTA MONICA FAULT ZONE (DOLAN, et al., 200a)

N

0 30 60
SCALE FEET

Figure 2



UNIT DESCRIPTIONS:

Artificial Fill, Undocumented (Afu): Locally derived sandy silt and silty sand, locally with clay and varying amounts of gravel and man-made debris. Abundant concrete rubble, in places exceeding 24-inches in diameter, observed in the backfill of Moreno Creek drainage in trenches FT-1 and FT-2. Localized seepage along root traces observed in backfill along southern sidewall of trench FT-1 and near storm drain inlet of trench FT-2. In Cross-Sections A-A' and B-B', this unit includes the section not logged from the auger spoils and the hand-augered section at the top of the CPTs.

Modern and Holocene Alluvium in Historical Channel of Moreno Creek (Qa): Silty sand to clayey sand grading to sand at depth, with minor gravel and thin gravel beds; light yellowish brown, brown to dark reddish brown; massive to crudely stratified; small fragments of asphalt observed locally in CB-3.

Holocene and Pleistocene Alluvium of Benedict Canyon Wash (Qal): Sandy clay to clayey sand grading laterally to silty sand to sand with silt; coarsening downward near the thalweg of the channel to sand with gravel, sandy gravel or gravelly sand; brown, dark yellowish brown, dark brown to reddish brown; locally laminated; gravel consist of fine- to coarse-grained subangular to subrounded fragments of siltstone and slate; few to common manganese oxide and iron oxide stains; few roots.

Pleistocene Alluvium of Benedict Canyon Wash (BCW1): Sandy clay, clayey sand, sand with clay, and silty sand with clay, grading laterally to silty sand and sand with silt; near the channel centerline, deposit coarsens downward to gravelly sand to clayey sand with gravel; dark yellowish brown, brown, dark brown to reddish brown; mottled; locally gleyed; slightly moist to moist; massive to thinly laminated; few to many scattered gravel that consist of subangular to subrounded and tabular fragments of siltstone, slate and weathered basalt. Terrestrial deposit consisting of fluvial, alluvial fan, and mudflow sediments emanating from the Santa Monica Mountains via Benedict Canyon Wash and its tributaries.

Pleistocene Alluvium of Benedict Canyon Wash (BCW2): Sandy clay, clayey sand and silty clay grading laterally to silty sand to sand with silt; with lenses and interbeds of sandy gravel, coarsening downwards to a basal channel deposit of sand, gravelly sand and gravel; dark grayish brown, reddish brown, very dark brown, and dark yellowish brown; locally mottled and/or gleyed; oxidation-reduction banding; iron oxide and manganese oxide stains common on rock clasts and along basal channel contact; gravel consist of fine- to medium-grained subrounded to subangular fragments of siltstone, slate, basalt and quartz. Unit is characterized by moderate to well-developed paleosols with many moderately thick to thick clay films on ped faces and moderate to strong angular blocky soil structure. Distinctive erosional contact with underlying Cheviot Hills deposits.

Pleistocene Cheviot Hills Deposits (CHD): Sandy clay, clayey sand, and silty clay; with thin silty sand and gravel layers and beds; brown, reddish brown, brown, and grayish brown; locally gleyed; moist to wet along sand beds; manganese oxide stains, streaks and nodules; iron oxide stains on rock fragments, and forming oxidation-reduction banding; gravel consist of subrounded to subangular fragments of siltstone and slate. At depth, unit includes abundant calcium carbonate in the form of specks, filaments, horizontal layers, and coatings on ped faces; color changes to grayish brown, gray, and blue green reminiscent of the Lomita Marl; iron oxide staining along layers and locally on ped faces. Unit has been modified by soil-forming processes, with pedogenic characteristics, including clay films on ped faces and moderate to strong angular blocky soil structure, observed at several intervals, including directly at or below its contact with the overlying Benedict Canyon Wash deposits. Terrestrial deposit consisting of fluvial and alluvial sediments derived from the San Pedro Formation deposited over a long period of time, with depositional features that allowed for soil development. This unit was exposed at the surface for thousands of years before it was buried by the Pleistocene alluvium of Benedict Canyon Wash.

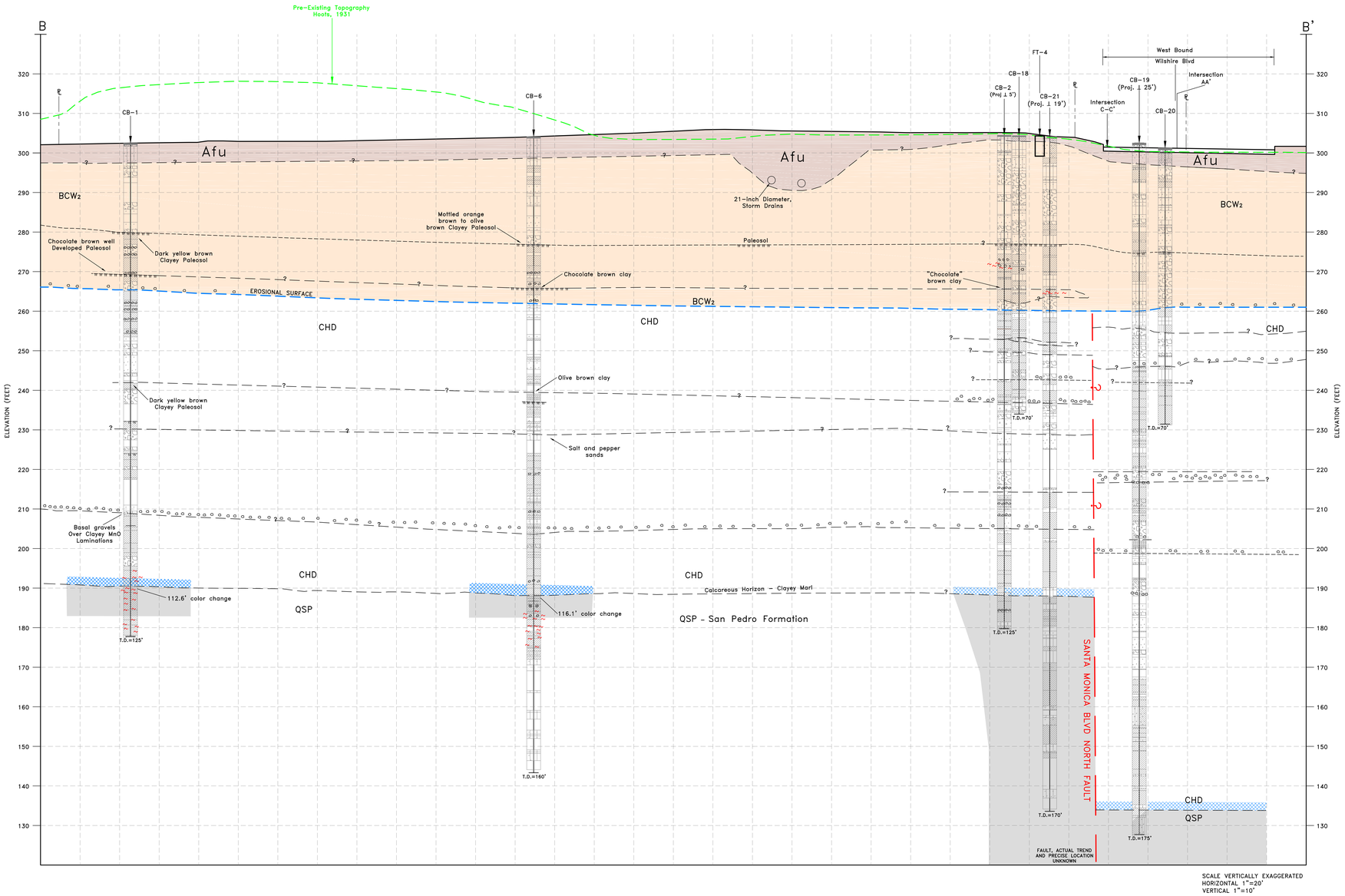
Quaternary San Pedro Formation (QSP): Sand with scattered gravel; few silty to clayey laminations; yellow, olive brown to reddish orange brown; loose to hard; dry near upper contact, becoming moist to wet at depth; sand fraction consists of fine to coarse, well-rounded quartz grains; scattered bi-valve shell fragments. Transitional terrestrial to marine unit deposited in a wave-dominated (beach) environment.

EXPLANATION

- Basal gravel, abrupt erosive contact
- $CaCO_3$ stringers and along soil faces as vertical deposits
- $CaCO_3$ nodules
- Denotes poor to well developed soil structure
- Geologic contact, dashed where approximate, queried where uncertain
- Rock Clasts
- Fault contact, dashed where approximate, queried where uncertain. Trend unknown
- CLAY with proportional amounts of silt and/or sand (CL, CL-ML)
- Clayey SAND (SC)
- SILT with proportional amounts of clay and sand (ML, ML-CL)
- Silty SAND (SM)
- SAND (SP)
- GRAVEL with varying proportions of silt and sand (GP-GM)
- GRAVEL with CLAY (GC)
- NO RECOVERY

REVISED GEOLOGIC CROSS SECTION A-A'	PLATE 3
EL RODEO 605 WHITTIER DRIVE BEVERLY HILLS, CALIFORNIA	Leighton
Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 02/2016

Figure 3



EXPLANATION

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- $CaCO_3$ stringers and along soil faces as vertical deposits
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- Denotes poor to well developed soil structure
- Geologic contact, dashed where approximate, querried where uncertain
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- CLAY with proportional amounts of silt and/or sand (CL, CL-ML)
- CLAYEY SAND (SC)
- SILT with proportional amounts of clay and sand (ML, ML-CL)
- Silty SAND (SM)
- SAND (SP)
- GRAVEL with varying proportions of silt and sand (GP-GM)
- GRAVEL with CLAY (GC)
- No Recovery (N/R)

UNIT DESCRIPTIONS:

Artificial Fill, Undocumented (Afu): Locally derived sandy silt and silty sand, locally with clay and varying amounts of gravel and man-made debris. Abundant concrete rubble, in places exceeding 24-inches in diameter, observed in the backfill of Moreno Creek drainage in trenches FT-1 and FT-2. Localized seepage along root traces observed in backfill along southern sidewall of trench FT-1 and near storm drain inlet of trench FT-2. In Cross-Sections A-A' and B-B', this unit includes the section not logged from the auger spoils and the hand-augered section at the top of the CPTs.

Modern and Holocene Alluvium in Historical Channel of Moreno Creek (Qw): Silty sand to clayey sand grading to sand at depth, with minor gravel and thin gravel beds; light yellowish brown, brown to dark reddish brown; massive to crudely stratified; small fragments of asphalt observed locally in CB-3.

Holocene and Pleistocene Alluvium of Benedict Canyon Wash (Qal): Sandy clay to clayey sand grading laterally to silty sand to sand with silt; coarsening downward near the thalweg of the channel to sand with gravel, sandy gravel or gravelly sand; brown, dark yellowish brown, dark brown to reddish brown; locally laminated; gravel consist of fine- to coarse-grained subangular to subrounded fragments of siltstone and slate; few to common manganese oxide and iron oxide stains; few roots.

Pleistocene Alluvium of Benedict Canyon Wash (BCW1): Sandy clay, clayey sand, sand with clay, and silty sand with clay, grading laterally to silty sand and sand with silt; near the channel centerline, deposit coarsens downward to gravelly sand to clayey sand with gravel; dark yellowish brown, brown, dark brown to reddish brown; mottled; locally gleyed; slightly moist to moist; massive to thinly laminated; few to many scattered gravel that consist of subangular to subrounded and tabular fragments of siltstone, slate and weathered basalt. Terrestrial deposit consisting of fluvial, alluvial fan, and mudflow sediments emanating from the Santa Monica Mountains via Benedict Canyon Wash and its tributaries.

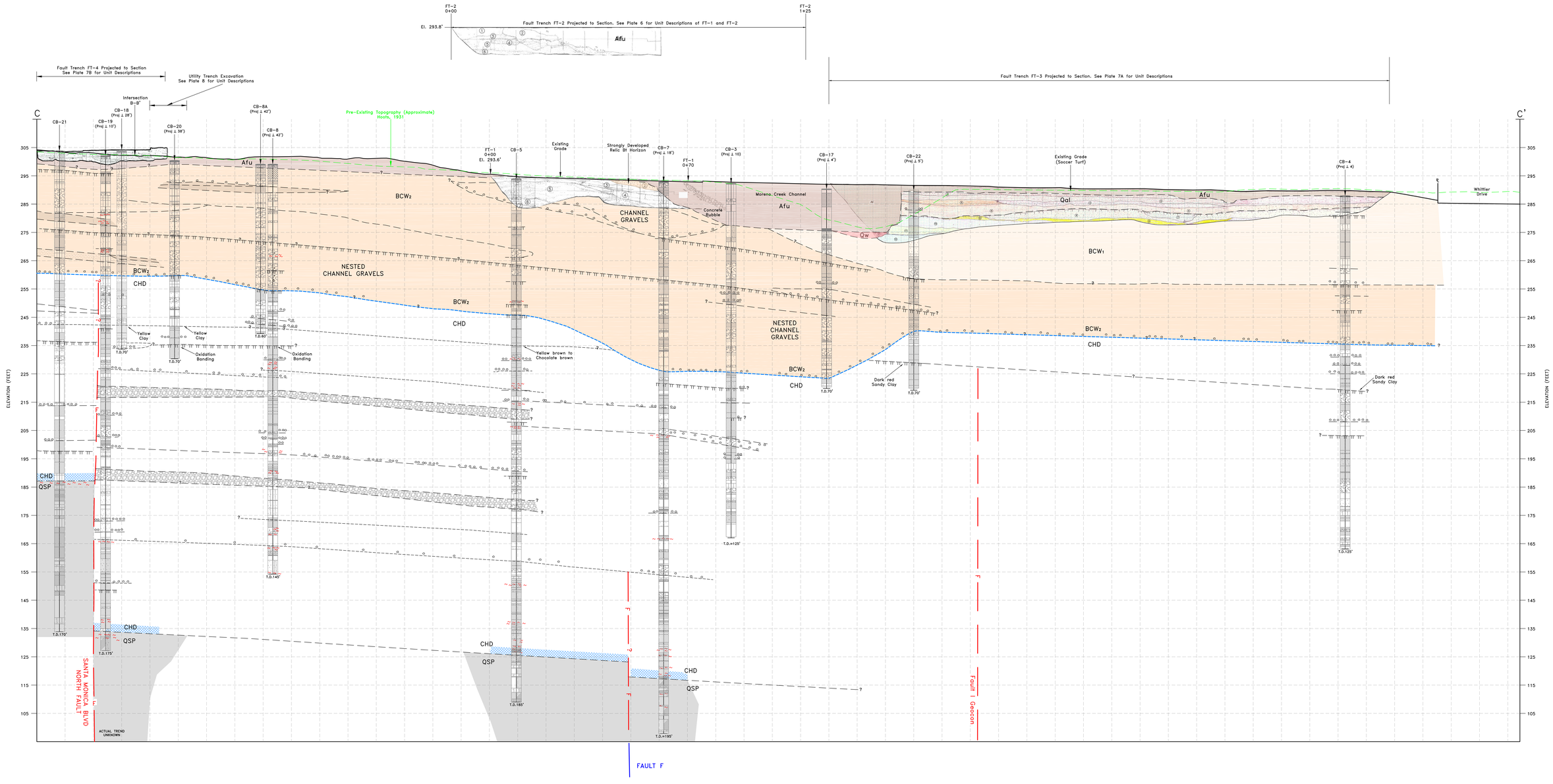
Pleistocene Alluvium of Benedict Canyon Wash (BCW2): Sandy clay, clayey sand and silty clay grading laterally to silty sand to sand with silt; with lenses and interbeds of sandy gravel; coarsening downwards to a basal channel deposit of sand, gravelly sand and gravel; dark grayish brown, reddish brown, very dark brown, and dark yellowish brown; locally mottled and/or gleyed; oxidation-reduction banding; iron oxide and manganese oxide stains common on rock clasts and along basal channel contact; gravel consist of fine- to medium-grained subrounded to subangular fragments of siltstone, slate, basalt and quartz. Unit is characterized by moderate to well-developed paleosols with many moderately thick to thick clay films on ped faces and moderate to strong angular blocky soil structure. Distinctive erosional contact with underlying Cheviot Hills deposits.

Pleistocene Cheviot Hills Deposits (CHD): Sandy clay, clayey sand, and silty clay; with thin silty sand and gravel layers and beds; brown, reddish brown, brown, and grayish brown; locally gleyed; moist to wet along sand beds; manganese oxide stains, streaks and nodules; iron oxide stains on rock fragments, and forming oxidation-reduction banding; gravel consist of subrounded to subangular fragments of siltstone and slate. At depth, unit includes abundant calcium carbonate in the form of specks, filaments, horizontal layers, and coatings on ped faces; color changes to grayish brown, gray, and blue green reminiscent of the Lomita Marl; iron oxide staining along layers and locally on ped faces. Unit has been modified by soil-forming processes, with pedogenic characteristics, including clay films on ped faces and moderate to strong angular blocky soil structure, observed at several intervals, including directly at or below its contact with the overlying Benedict Canyon Wash deposits. Terrestrial deposit consisting of fluvial and alluvial sediments derived from the San Pedro Formation deposited over a long period of time, with depositional hiatuses that allowed for soil development. This unit was exposed at the surface for thousands of years before it was buried by the Pleistocene alluvium of Benedict Canyon Wash.

Quaternary San Pedro Formation (Qsp): Sand with scattered gravel; few silty to clayey laminations; yellow, olive brown to reddish orange brown; loose to hard; dry near upper contact, becoming moist to wet at depth; sand fraction consists of fine to coarse, well-rounded quartz grains; scattered bi-valve shell fragments. Transitional terrestrial to marine unit deposited in a wave-dominated (beach) environment.

0 20 40
SCALE FEET

PLATE 4	REVISED GEOLOGIC CROSS-SECTION B-B'
Leighton	EL RODEO 605 WHITTIER DRIVE BEVERLY HILLS, CALIFORNIA
	Proj: 10274.006 / Eng/Geol: TCB/JAR
	Scale: Vertical: 1"=10' Horizontal: 1"=20' / Date: 02/2016
Drafted By: MAM	Checked By:



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Pleistocene Alluvium of Benedict Canyon Wash (BCW1): Sandy clay, clayey sand, sand with clay, and silty sand with clay, grading laterally to silty sand and sand with silt; near the channel centerline, deposit coarsens downward to gravelly sand to clayey sand with gravel; dark yellowish brown, brown, dark brown to reddish brown; mottled; locally gleyed; slightly moist to moist; massive to thinly laminated; few to many scattered gravel that consist of subangular to subrounded and tabular fragments of siltstone, slate and weathered basalt. Terrestrial deposit consisting of fluvial, alluvial fan, and mudflow sediments emanating from the Santa Monica Mountains via Benedict Canyon Wash and its tributaries.

Pleistocene Alluvium of Benedict Canyon Wash (BCW2): Sandy clay, clayey sand and silty clay grading laterally to silty sand to sand with silt; with lenses and interbeds of sandy gravel; coarsening downwards to a basal channel deposit of sand, gravelly sand and gravel; dark grayish brown, reddish brown, very dark brown, and dark yellowish brown; locally mottled and/or gleyed; oxidation-reduction banding; iron oxide and manganese oxide stains common on rock clasts and along basal channel contact; gravel consist of fine- to medium-grained subrounded to subangular fragments of siltstone, slate, basalt and quartz. Unit is characterized by moderate to well-developed paleosols with many moderately thick to thick clay films on ped faces and moderate to strong angular blocky soil structure. Distinctive erosional contact with underlying Chevot Hills deposits.

Pleistocene Chevot Hills Deposits (CHD): Sandy clay, clayey sand, and silty clay; with thin silty sand and gravel layers and beds; brown, reddish brown, brown, and grayish brown; locally gleyed; moist to wet along sand beds; manganese oxide stains, streaks and nodules; iron oxide stains on rock fragments, and forming oxidation-reduction banding; gravel consist of subrounded to subangular fragments of siltstone and slate. At depth, unit includes abundant calcium carbonate in the form of specks, filaments, horizontal layers, and coatings on ped faces; color changes to grayish brown, gray, and blue green reminiscent of the Lomita Marl; iron oxide staining along layers and locally on ped faces. Unit has been modified by soil-forming processes, with pedogenic characteristics, including clay films on ped faces and moderate to strong angular blocky soil structure, observed at several intervals, including directly at or below its contact with the overlying Benedict Canyon Wash deposits. Terrestrial deposit consisting of fluvial and alluvial sediments derived from the San Pedro Formation deposited over a long period of time, with depositional hiatuses that allowed for soil development. This unit was exposed at the surface for thousands of years before it was buried by the Pleistocene alluvium of Benedict Canyon Wash.

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EXPLANATION

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- $CaCO_3$ nodules
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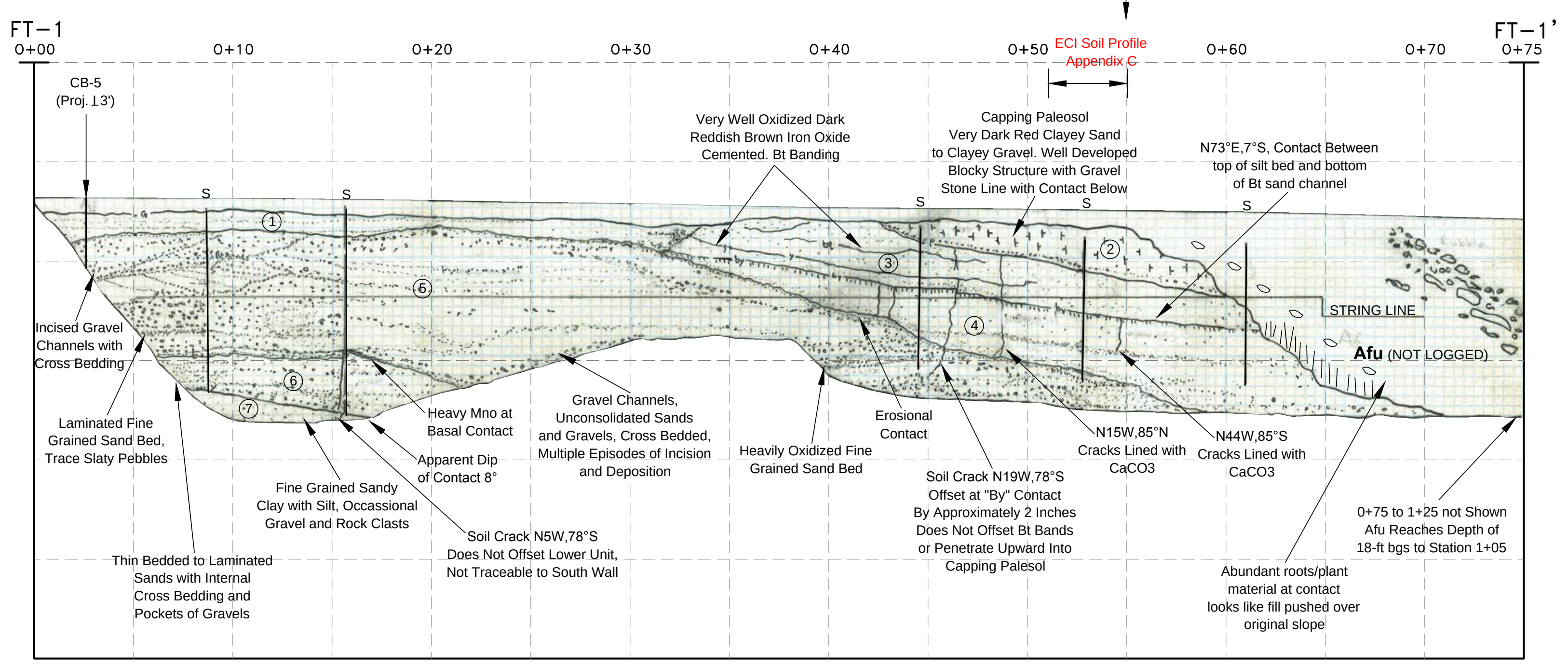
- Rock Clasts
- Fault contact, dashed where approximate, queried where uncertain. Trend unknown
- CLAY with proportional amounts of silt and/or sand (CL, CL-ML)
- Clayey SAND (SC)
- SILT with proportional amounts of clay and sand (ML, ML-CL)
- Silty SAND (SM)
- SAND (SP)
- GRAVEL with varying proportions of silt and sand (GP-GM)
- GRAVEL with CLAY (GC)
- NO RECOVERY

0 10 20
SCALE FEET

GEOLOGIC CROSS SECTION C-C'	PLATE 5
EL RODEO 605 WHITTIER DRIVE BEVERLY HILLS, CALIFORNIA	Leighton
Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 01/2016

FORM NO. 321 | PROJECT NO. 10274 | FILENAME=NAUGHTONBCH_2016-01-05RTP10-06_PL-CC-C'.DWG,DWG,DWG,DWG,DWG,DWG,DWG,DWG,DWG,DWG

Figure □-5



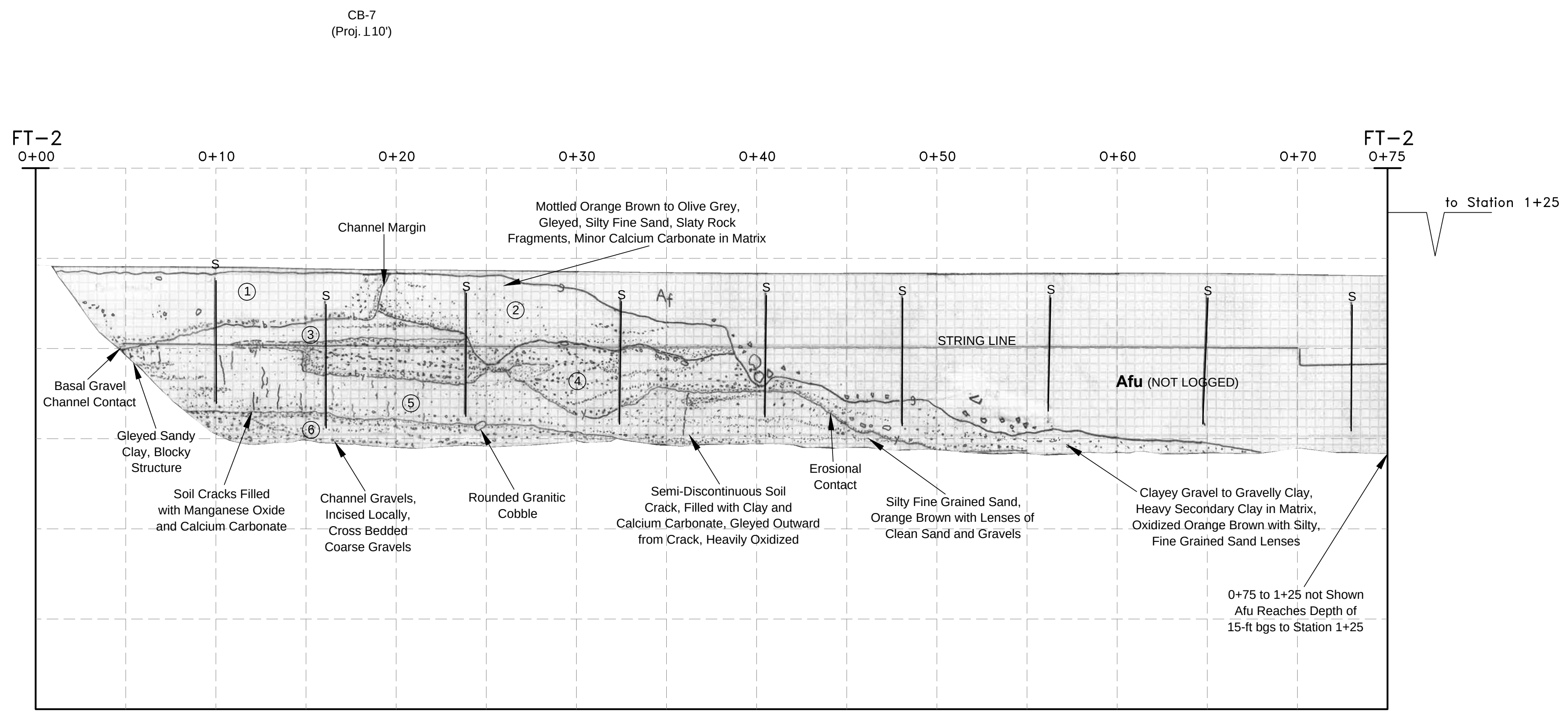
S = Shoring

See Photos In Appendix B:
- B = Blue Flag
- G = Green Flagging-Artificial Fill Contact
- Y = Yellow Flag
- BY = Blue/Yellow Flag
- P = Pink Flag

BT = BT Bands within Sandy Unit

┤├ Indicates Well Developed Blocky Soil Structure

▥ Soil Horizon (Bt)



S = Shoring

See Photos In Appendix B:
- B = Blue Flag
- G = Green Flagging-Artificial Fill Contact
- Y = Yellow Flag
- BY = Blue/Yellow Flag
- P = Pink Flag

BT = BT Bands within Sandy Unit

Earth Units-FT-1: Pleistocene Alluvium of Benedict Canyon Wash (BCW $_1$)

Unit 1-Silty SAND (SM) with clay, 10YR 4/4, dark yellowish brown, thinly bedded fine gravel to massive sandy matrix, predominately fine grained subangular frosted quartz sand grains, slaty fine pebbly gravel with oxidation rimming of flattened, tabular slate fragments.

Unit 2-Sandy CLAY to Clayey SAND (CL-SC), 7.5YR 4/3 to 10YR 3/4, brown to dark brown, very fine grained sand with slaty rock fragments, well developed ped faces, blocky structure, oxidized quartz sand grains and clay development along ped faces and in pores. Basal fine gravel line in sandy clay matrix. Calculated minimum age of 34k (ECI Appendix C), but estimated to be >100ka.

Unit 3-Silty SAND to SAND (SM-SP), 10YR 4/6, dark yellowish brown, fine grained subangular to subrounded quartz and slaty sand grains. Contains interbedded and oxidized sandy laminations cemented with iron oxide. Most quartz grains display frosted or oxidized surface, minor clear quartz sand size grains included.

Unit 4-Sandy SILT to Silty SAND with Clay (ML-SM),10YR 5/4, yellowish brown to brown, windblown silt in upper portion, very fine grained massive subangular sand with secondary clay to fine gravely interbeds, iron oxide coating of quartz and grains and pores, lower portion becomes Gravelly SAND to Sandy GRAVEL (SP-GP), 10YR 3/4 to 10YR 5/4, dark yellowish brown to brown, fine to coarse grained, frosted to clear, subangular to subrounded quartz sand grains, fine to coarse weathered, flattened and tabular slaty gravels with highly weathered manganese oxide stained siltstone rock clasts.

Unit 5-Silty GRAVEL to Sandy GRAVEL (GM-GP), 10YR 5/3 to 5/4, brown to yellowish brown, main channel deposit, interbedded gravel and sand, cross bedded to very fine laminations, fine to coarse grained clear to frosted quartz sand grains, fine to coarse flattened, tabular slaty and siltstone gravels, severely weathered basalt fragments, patchy manganese oxide rimming of siltstone rock fragments. Heavy manganese oxide development at basal contact with lower unit No. 6.

Unit 6-Silty SAND (SM) with clay, 10YR 4/3 to 7.5YR 4/3, brown to dark brown, very fine grained subangular to subrounded quartz sand grains and occasional slaty gravel, gleyed.

Unit 7-Sandy CLAY with Silt (CL-ML), 10YR 5/2, dark greyish brown to brown, fine grained subrounded to subangular quartz sand grains, occasional gravel and severely weathered slaty and siltstone rock clasts.

Earth Units-FT-2: Pleistocene Alluvium of Benedict Canyon Wash (BCW $_2$)

Unit 1-Sandy Silty GRAVEL (GP-GM), 10YR 4/1 to 10YR 4/5, grey to dark grey, fine to coarse grained, subrounded to subangular, heavily oxidized quartz sand grains, weathered slaty rock fragments, dull grey on weathered surface to dark greyish black on fresh, severely weathered siltstone displaying oxidation along interior laminations with oxide rimming of outer clast surfaces. Abundant secondary clay, gleying in matrix.

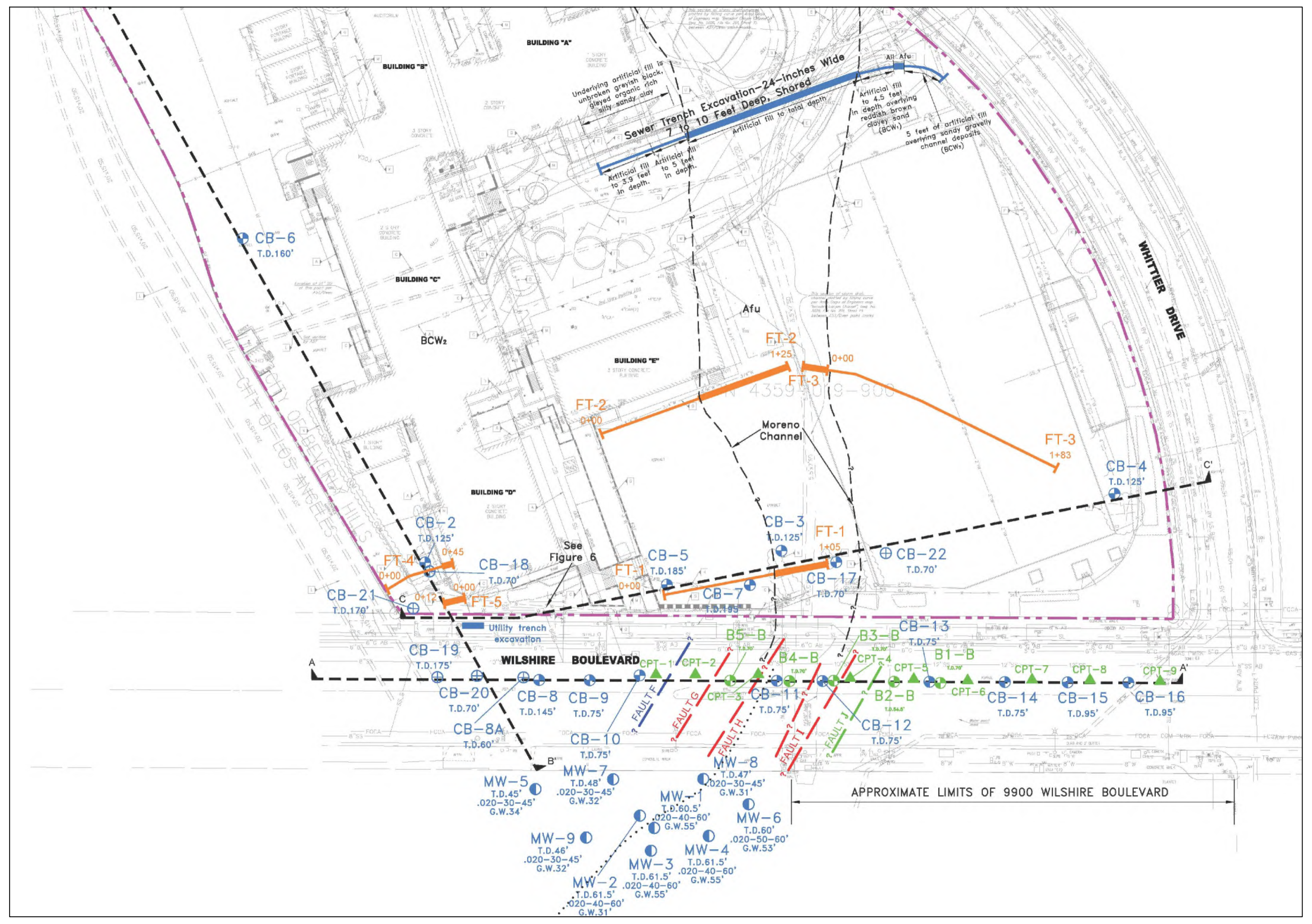
Unit 2-Sandy SILT with Clay (ML-CL), 2.5YR 5/3, olive brown, upper unit, very fine grained subangular to subrounded sand grains, gleying of matrix, lower unit becomes Silty SAND (SM), 10YR 5/6, dark yellowish brown, fine grained subrounded quartz sand, flattened and weathered siltstone and slaty sand grains, iron oxide coating of fine gravel sized siltstone clasts, trace of severely weathered and oxidized sand size basalt fragments.

Unit 3-Silty CLAY (CL), 10YR 5/3, brown, very fine grained sand, porous, 1-2mm voids with CaCO3 lined pores, gleyed along ped faces.

Unit 4- Sandy GRAVEL (GP-GM), 10YR 5/6 to 10YR 3/3, yellowish brown to dark brown, fine to coarse subrounded to subangular sandy matrix supporting subangular to subrounded fine to coarse gravels, severely weathered equigranular granitic clasts, oxidized and decomposing basalt fragments with silica veined slaty rock fragments in well defined channel. Contains small cobbles. Becomes clayey gravel to gravelly clay with increasing distance from main channel.

Unit 5-Sandy SILT with Clay (ML) to Sandy CLAY (CL), 10YR 3/3 to 5YR 3/4, dark brown sandy silt to dark reddish brown sandy clay, very fine grained, gleyed with subangular clear and oxidized quartz sand grains. Porous with manganese oxide lining of 1 to 3 mm pores and 80:1 Cracks.

Unit 6-Sandy GRAVEL with Clay (GC), 10YR 4/4, dark brown to dark yellowish brown, fine to medium grained subrounded siltstone and oxidized quartz sand grains, fine to coarse slaty, tabular gravels. Locally incised with cross bedded coarse gravels



INDEX MAP

FAULT TRENCH LOG FT-1 AND FT2
El Rodeo
605 Whittier Drive
Beverly Hills, California

PLATE 6

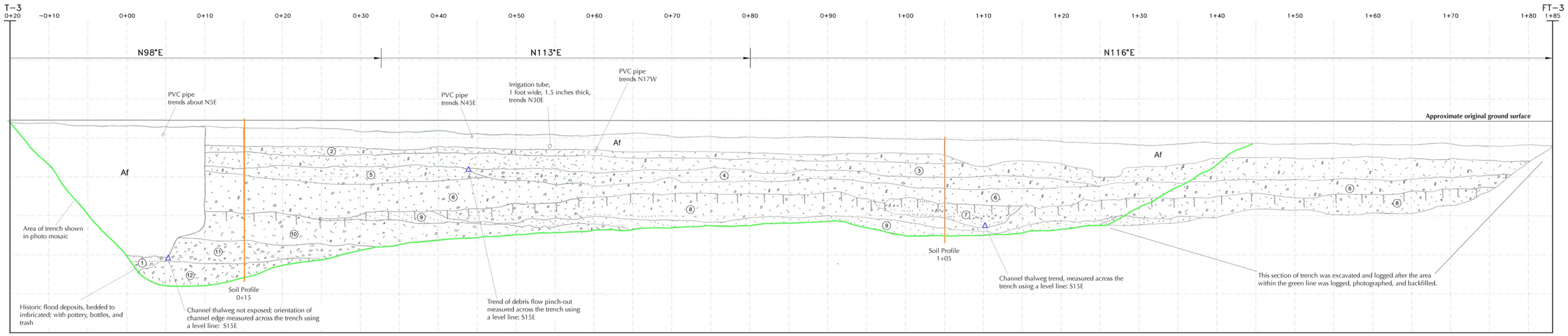
Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=5'	Date: 01/2016

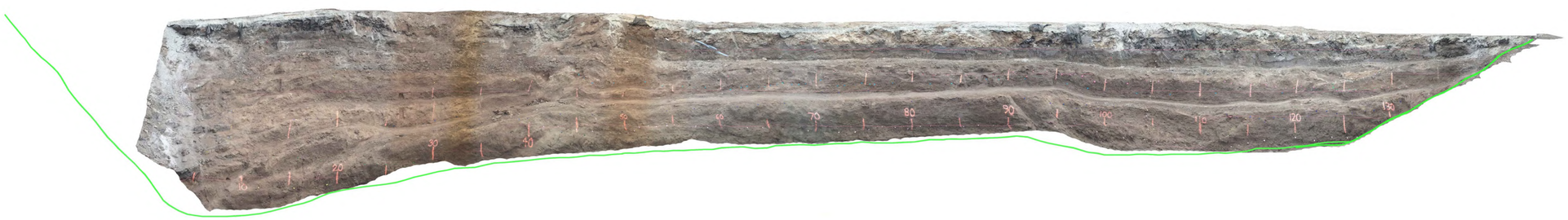
Drafted By: BQT
Checked By: BQT
P:\DRAFTING\10274\006\OF_2016-01-20\10274-006_P06_FT1-2_20160120.DWG (01-29-16 1:30:03PM) Plotted by: btran

Leighton

Figure □-6

North to Northeast Wall





Photos of sufficient quality to prepare a mosaic of the trench extension were not available.

Geologic Descriptions of Units

Unit 1: Orange brown to dark brown sand, gravelly sand and silty sand; bedded, with fining upward sequences, locally imbricated; scattered fragments of glass, pottery and metal indicate this is a historical deposit. (Historic Moreno Creek Flood Deposit)

Unit 2: Very dark brown to dark grayish brown silty clay; massive; few scattered gravel-sized chips of Monterey siltstone and Santa Monica slate. (Debris Flow Deposit)

Unit 3: Brown to very dark grayish brown sandy clay to silty clay; massive; scattered subangular gravel generally less than 1-inch in diameter consisting predominately of Santa Monica slate; scattered roots, rootlets, and root casts; erosional contact with unit below. (Debris Flow Deposit)

Unit 4: Brown to dark brown sandy clay to clayey sand; massive; with coarse sand and fine subangular, disc shaped gravel up to ¾-inch in diameter consisting of Santa Monica slate and Monterey siltstone; gravel scattered throughout the unit; present only on east side of trench, from about Station 0+44 onward; erosional contact with unit below. (Debris Flow Deposit)

Unit 5: Brown to orange brown clayey sand to sandy clay; massive; scattered fine gravel-sized clasts of Santa Monica slate and Monterey siltstone; abundant pinhole-sized pores, locally extensively bioturbated; incised into and removed to the east by Unit 4. (Debris Flow Deposit)

Unit 6: Brown to dark brown clayey sand to gravelly clayey sand; massive; many gravels to 1-inch in diameter and few gravels to pebbles to 3-inches in diameter consisting of Santa Monica slate and Monterey siltstone; base of unit locally contains pockets of indurated silt; unit thins eastward where it is incised into by Unit 4; erosional contact with units below. (Debris Flow Deposit)

Unit 7: Brown to dark brown grading down to yellowish brown to reddish brown, gravelly silty to clayey sand and sandy gravel; generally massive with pockets or lenses of gravel at the top, bedded at the bottom; gravels are subrounded to rounded and consist predominantly of Santa Monica slate; slightly pedogenically altered at the top; erosional contact with unit below. (Fluvial Deposit grading upward to possible very fluid Debris Flow Deposit)

Unit 8: Brown to dark brown sandy clay to gravelly sandy clay; massive; with localized pockets of angular to subrounded fine to medium gravel; many pores; pedogenically altered where not incised by Unit 7. (Debris Flow Deposit)

Unit 9: Brown to dark brown gravelly sand; bedded, with fining-upward sequences; gravel consists of 1/4- to 1-inch in diameter clasts predominantly of Santa Monica slate; erosional contact with Unit 10 below. (Fluvial Deposit)

Unit 10: Brown to dark yellowish brown sandy to silty clay grading eastward to clay, locally with many subangular gravel to 1/2-inch in diameter; many pores; gradual contact to Unit 11 below. (Debris Flow Deposit)

Unit 11: Brown to dark brown sandy clay grading down to silty clay; massive to locally weakly bedded; with gravel-sized clasts consisting of weathered Monterey siltstone and Santa Monica slate; significant pinhole-sized pores; clear to gradual contact to Unit 12 below. (Debris Flow Deposit)

Unit 12: Brown to dark yellowish brown sandy to silty clay, locally gravelly; massive; clasts consist predominantly of weathered Monterey siltstone; with randomly oriented vertical fractures, root holes, and surfaces filled in with fine sand; fractures die up and down, suggesting wetting and drying; locally with significant pinhole-sized pores. (Debris Flow Deposit)

Soil Descriptions, Profile at Station 0+15

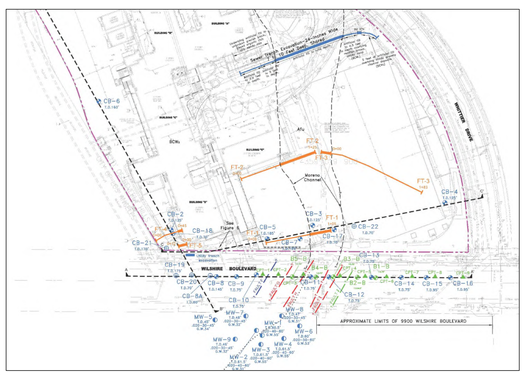
Depth (ft)	Horizon	Description
0 – 1.83	Fill	Not described. Mixture of different soils, with brick and asphalt fragments.
1.83 – 2.62	A/Bt1	SILTY CLAY; very dark brown (10YR 2/2) when damp and moist; moderate medium to coarse angular blocky soil structure; firm when moist, very sticky and very plastic when wet; few thin clay films bridging grains, few thin clay films on clasts; scattered fine gravel consisting predominantly of Santa Monica slate; with organics; abrupt wavy boundary.
2.62 – 3.64	Bt2	SILTY CLAY; brown (10YR 4/3) with dark brown (7.5YR 3/2) clay films when damp, very dark grayish brown (10YR 3/2) with dark brown (7.5YR 3/2) clay films when moist; moderate to strong medium angular blocky soil structure; very friable when moist, very sticky and very plastic when wet; common thin and few moderately thick clay films on ped faces, common moderately thick clay films on clasts, common thin clay films bridging grains; dark organics and/or clay coatings on ped faces; boundary not observed, at bench.
3.64 – 4.26	Bt3	SILTY CLAY LOAM; brown (10YR 4/3) when damp, very dark grayish brown (10YR 3/2) when moist; strong very coarse angular blocky soil structure; firm when moist, sticky and plastic when wet; common thin clay films on ped faces, many thin clay films bridging grains, common thin clay films in pores, common thin clay films on clasts, many moderately thick clay films coating clast pockets; many root casts around clast pockets; abrupt wavy boundary.
4.26 -5.25	2Bt4	Fine SANDY CLAY; brown (10YR 4/3) with brown (7.5YR 4/2) clay films when damp, very dark grayish brown (10YR 3/2) when moist; moderate medium angular blocky soil structure; firm when moist, slightly sticky and plastic when wet; common thin clay films on ped faces, few thin clay films on clasts, common moderately thick clay films coating clast pockets; abrupt to clear wavy boundary.
5.25 -7.48	2BC1	SANDY CLAY LOAM to fine SANDY CLAY; dark brown (10YR 3/3) when damp, very dark grayish brown (10YR 3/2) when moist; massive breaking to weak to moderate medium angular blocky soil structure grading downward to moderate medium angular blocky soil structure; firm when moist, slightly sticky to sticky and plastic when wet; few thin clay films on ped faces, few thin clay films on clasts, few thin clay films coating clast pockets; scattered gravel; many pores; extensively bioturbated at top; clear wavy boundary.
7.48 -8.79	3Bt5	SANDY CLAY LOAM; brown (10YR 4/3) when dry, dark brown (10YR 3/3) when moist; strong medium to coarse angular blocky soil structure; hard when dry, friable when moist, sticky and plastic when wet; few thin clay films on ped faces and bridging grains, common thin clay films coating clast pockets; abrupt to clear wavy boundary.
8.79 – 9.81	3BC2	LOAMY SAND; brown (10YR 5/3) when dry, dark brown (10YR 3/3) when moist; moderate fine to medium angular blocky soil structure; hard and fragic when dry, friable when moist, non-sticky and very slightly plastic when wet; few thin clay films on ped faces; many rounded to subangular gravel and pebbles of Santa Monica slate and Monterey siltstone; abrupt to clear wavy boundary.
9.81-10.43	4AB	LOAMY SAND to fine SANDY LOAM; brown (10YR 5/3) when dry, brown (10YR 4/3) when moist; moderate to strong fine angular blocky soil structure; slightly hard to very hard and fragic when dry, friable to firm when moist, sticky and slightly plastic when wet; very few thin clay films in pores and on clasts; with gravel and pebbles; clay concentrated in zones; clear wavy boundary.
10.43 – 11.09	4Btj	SANDY CLAY LOAM; dark brown (10YR-7.5YR 3/3) when damp and moist; weak fine angular blocky soil structure breaking to single-grained; firm when moist, slightly sticky to sticky and slightly plastic when wet; few thin clay films on ped faces, few thin clay films lining clast pockets; common scattered fine gravel of Santa Monica slate; with clay-rich zones locally; abrupt wavy boundary.
11.09 – 14.14	5Bt6	SILTY CLAY LOAM; brown (10YR 5/3) with brown (7.5YR 5/3) clay films when dry, dark brown (7.5YR 3/3) when moist; strong medium to coarse angular blocky soil structure; firm when moist, sticky to very sticky and slightly plastic to plastic when wet, common thin clay films in pores and on clasts, common thin and few moderately thick clay films lining clast pockets; common subangular gravel up to ½-inches in diameter; many pores; gradual boundary.
14.14 – 15.03	5Bt7	SANDY CLAY LOAM; brown (7.5-10YR 5/3) when dry, brown (7.5YR 4/3) when moist; weak to strong medium to coarse angular blocky soil structure; slightly hard and fragic when dry, firm when moist, sticky and plastic when wet; common thin clay films in pores, few thin clay films on clasts, common thin and few moderately thick clay films coating clast pockets; many pores; abrupt wavy boundary.
15.03 – 16.80	6Bt8	SILTY CLAY; brown (7.5YR 4/3) when dry, dark brown (7.5YR 3/2.5) when moist; strong medium to coarse angular blocky soil structure; hard when dry, friable to firm when moist, very sticky and very plastic when wet; few thin clay films on ped faces and bridging grains, common thin clay films on clasts, common thin to moderately thick clay films lining clast pockets; clasts consist of approximately equal amounts of Santa Monica slate and Monterey siltstone; clear to gradual wavy boundary.
16.80 – 17.98	6BC3	Fine SANDY CLAY LOAM; brown (7.5YR 5/3) with brown (7.5YR 4/3) clay films when dry, brown (7.5YR 4/3) when moist; moderate to strong medium to coarse angular blocky soil structure; hard when dry, firm when moist, sticky and slightly plastic when wet; very few thin clay films on ped faces, common thin clay films coating clast pockets; many pinhole-sized pores; many weathered clasts of Monterey siltstone, few clasts of Santa Monica slate; sand in root casts; abrupt wavy boundary.
17.98 – 18.60	7Bt9	Fine SANDY CLAY LOAM; brown (7.5YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; moderate fine to medium angular blocky soil structure; slightly hard and fragic when dry, firm when moist, slightly sticky and plastic when wet; few thin clay films coating clasts; sand in vertical fractures associated with wetting/drying and roots; clear smooth to wavy boundary.
18.60 – 19.46+	8Btj2	Fine SILTY CLAY; brown (7.5YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; moderate to strong medium angular blocky soil structure; hard when dry, firm when moist, slightly sticky and plastic when wet; very few thin clay films coating clasts; many pinhole-sized pores and roots; common root holes; root holes filled with sand; many weathered clasts of Monterey siltstone; more fine gravel than above; lower boundary not observed.

Soil Descriptions, Profile at Station 1+05

Depth (ft)	Horizon	Description
0 – 1.97	Fill	Not described. Mixture of imported gravel, imported light yellowish brown to reddish brown clayey soil, with bricks, asphalt fragments, and other debris.
1.97 – 2.99	Bt1	CLAY to SILTY CLAY; very dark grayish brown to dark grayish brown (10YR 3.5/2) with very dark brown to very dark grayish brown (10YR 2.5/2) clay films and few scattered black (10YR 2/1) mottles when dry, very dark brown to very dark grayish brown (10YR 2.5/2) when moist; strong coarse angular blocky soil structure; hard when dry, firm when moist, sticky and very plastic when wet; many moderately thick clay films on ped faces and bridging grains, common thick clay films on ped faces, many thin clay films in pores; many pores, roots and root casts; organic-rich; few scattered gravel-sized chips of Monterey siltstone; locally looks mixed, possibly reworked; abrupt to clear wavy boundary.
2.99 – 3.64	BC_{lam}	CLAY LOAM with CLAY lamellae; brown (10YR 4/3) with very dark grayish brown (10YR 3/2) clay films when dry, very dark grayish brown (10YR 3/2) when moist; strong medium to coarse angular blocky soil structure; soft when dry, friable when moist, sticky and plastic to very plastic when wet; few to common thin clay films on ped faces, many thin clay films bridging grains and in pores; in the lamellae, many thin and common moderately thick clay films on ped faces and many thin clay films in pores; common pinhole-sized pores; clear wavy boundary.
3.64 – 4.66	2Bt2	SANDY CLAY; brown (10-7.5YR 4/3) with brown (7.5YR 4/4) clay films locally when dry, dark brown (7.5YR 3/2) with dark reddish brown (5YR 3/2) mottles when moist; strong coarse to very coarse angular blocky soil structure; soft to slightly hard when dry, friable when moist, very sticky and very plastic when wet; common moderately thick and many thin clay films on ped faces, few to common thin clay films bridging grains, continuous thin clay films in pores; common to many large pores; scattered subangular gravel generally less than 1-inch in diameter consisting predominantly of Santa Monica slate; clear wavy boundary.
4.66 -6.04	2Bt3	SANDY CLAY; brown (10-7.5YR 4/3) with brown (7.5YR 4/3.5) clay films when dry, dark brown (7.5YR 3/2) with dark brown (7.5YR 3/3) clay films when moist; moderate medium to coarse angular blocky soil structure; slightly hard to hard when dry, slightly firm to firm when moist, very sticky and plastic when wet; few to common thin clay films on ped faces, common to many thin and few moderately thick clay films bridging grains, common thin clay films on clasts; more sand, coarser sand and more gravel than horizon above; fewer pores than above ranging in size from pinhole to 3mm in diameter; clear wavy boundary.
6.04 -6.46	3Bt4	SANDY CLAY LOAM; brown (10-7.5YR 4/3) with dark brown (7.5YR 3/2) clay films when dry, dark brown (7.5YR 3/2) with dark brown (7.5YR 3/3) clay films when moist; moderate fine angular blocky soil structure; slightly hard to hard and slightly fragic when dry, friable to slightly firm when moist, slightly sticky and slightly plastic to plastic when wet; many thin and common moderately thick clay films on ped faces, common thin clay films bridging grains and in pores, many thin clay films on clast pockets; many pores ranging in size from pinhole to >3mm in diameter; more sand and more gravel than horizon above; abrupt to clear wavy boundary.
6.46 -7.81	4Btj	SANDY CLAY LOAM grading down to SANDY LOAM; brown and dark yellowish brown (10YR 4/3 and 4/4) when dry, dark brown (7.5YR 3/2) when moist; moderate medium to coarse angular blocky soil structure; soft and slightly fragic when dry, very friable when moist, slightly sticky and very slightly to slightly plastic when wet; common to many thin clay films on ped faces, common thin clay films bridging grains, many thin clay films in pores locally, many thin clay films coating clasts; fining upward with increasing gravel downward; more sand and fine gravel than horizon above; clear to gradual wavy boundary. (Alluvium)
7.81 – 8.53	$4BC_{lam2}$	Gravelly SANDY LOAM with SANDY LOAM lamellae; brown (10YR 4/3) when dry, dark brown (7.5YR 3/2.5) when moist; weak medium subangular blocky soil structure breaking to single-grained, moderate medium subangular blocky soil structure in lamellae; soft to loose when dry, very friable when moist, non-sticky to very slightly sticky and non-plastic when wet; common thin to moderately thick clay films bridging grains, few thin clay films on ped faces, few to common thin clay films on clasts, many thin clay films on clast pockets; fine to medium sand with common coarse sand and subrounded to rounded gravel consisting predominantly of Santa Monica slate; abrupt to clear wavy boundary. (Very fluid debris flow deposit or alluvium, generally massive, locally with lenses.)
8.53-9.71	$5BC_{lam3}$	Gravelly LOAMY SAND with SANDY LOAM lamellae; brown (10YR 4/3) when dry, dark brown (10-7.5YR 3/3) when moist; single-grained; loose when dry and when moist, non-sticky and non-plastic when wet; few pores ranging in size from pinhole to 2 mm in diameter; abrupt wavy to irregular boundary (carves out underlying surface). Lamellae are brown (10-7.5YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; moderate fine to medium subangular blocky soil structure; slightly hard when dry, very friable when moist; non-sticky to very slightly sticky and non-plastic when wet; many thin and common moderately thick clay films bridging grains, few thin clay films on ped faces, common thin clay films in clast pockets; ½- to 1-inch thick, irregularly spaced from ¼- to ½-inch apart at top, to 1-2 inches at bottom. (Alluvium; strata visible.)
9.71 – 10.07	6Bt5	SANDY LOAM to SANDY CLAY LOAM; brown and dark yellowish brown (10YR 4/3 and 4/4) with brown (7.5YR 4/3) clay films when dry, dark brown (10-7.5YR 3/3) with dark brown (7.5YR 3/3) clay films when moist; moderate fine angular blocky soil structure; hard and fragic when dry, friable when moist, slightly sticky to sticky and slightly plastic to plastic when wet; common thin and few moderately thick clay films on ped faces, common thin clay films in pores, many thin clay films bridging grains; many pores ranging in size from pinhole to 2 mm in diameter, loose fine sand in larger pores; few to common subangular to subrounded fine gravel to ½-inch in diameter, consisting predominantly of Santa Monica slate, few Monterey siltstone chips; clear wavy boundary.
10.07 – 11.25	6Bt6	SANDY CLAY LOAM to SANDY CLAY; brown (10YR 4.5/3) with brown (7.5YR 4/3) clay films when dry, dark brown (7.5YR 3/2) when moist; weak to moderate medium angular blocky soil structure; slightly hard to hard and slightly fragic when dry, friable to slightly firm when moist, slightly sticky to sticky and plastic when wet; many thin and few moderately thick clay films on ped faces, many thin to moderately thick clay films bridging grains, common thin clay films in pores; coarser-grained than horizon above, fining-upward sequence with unit above; common pores; clear wavy boundary. (Debris flow deposit)
11.25 – 12.04	$7C_{lam}$	Gravelly SAND with SANDY LOAM lamellae; brown (10YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; single-grained; loose when dry and moist, non-sticky and non-plastic when wet; gravel consists predominately of Santa Monica slate, ¼- to 1-inch in diameter; abrupt wavy to irregular boundary that incises into underlying surface. Lamellae are brown (10-7.5YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; weak fine to medium subangular blocky soil structure; soft when dry, very friable when moist, very slightly sticky and non-plastic to very slightly sticky when wet; ¼- to ½-inch thick, spaced 1 to 2 inches apart. (Fluvial deposit, stratified, with fining-upward sequences.)
12.04 – 12.37+	8Bt7	CLAY; dark yellowish brown to brown (10-7.5YR 4/4) with dark brown (7.5YR 3/3) clay films when dry, dark brown (7.5YR 3/2.5) when moist; strong fine to medium subangular blocky soil structure; extremely hard when dry, firm when moist, very sticky and very plastic when wet; common thin and few moderately thick clay films on ped faces, common thin clay films bridging grains, many thin clay films in pores, many moderately thick clay films on clasts; many pinhole-sized pores; boundary not observed.

Symbols

- Clay
- Silt
- Sand
- Gravel and Pebbles
- Cobbles
- (12) Unit Label
- Sharp contact
- Approximate contact
- Buried Soil Horizon
- Soil development
- Pipe
- Channel Margin Orientation



INDEX MAP

Log of Fault Trench FT-3

El Rodeo K-8 School Fault Study

Leighton
Proj: 10274.006
Eng/Geol: TCB/JAR

Earth Consultants International
Project Number: 3205.09
Date: 2016

Plate 1

Figure □-□

PLATE 7A

FAULT TRENCH LOG FT-3
El Rodeo
605 Whittier Drive
Beverly Hills, California

Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: As Shown	Date: 01/2016

Leighton

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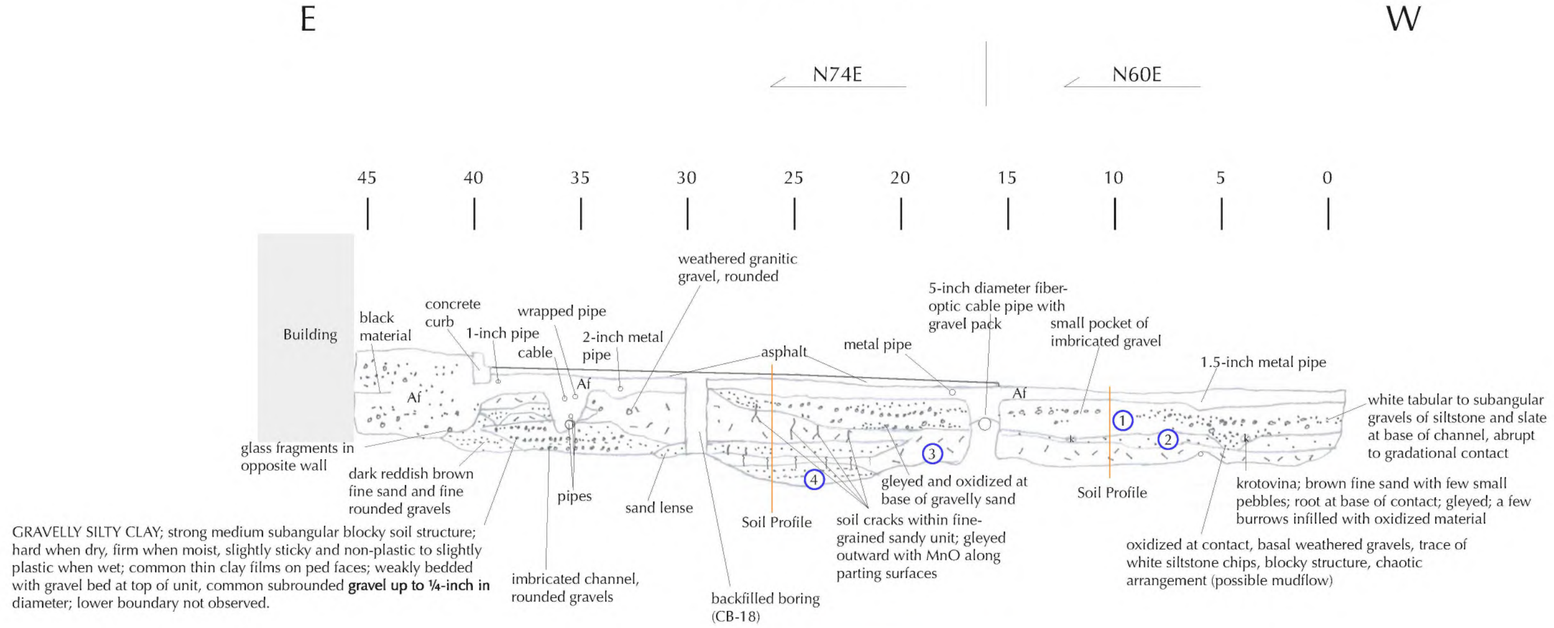
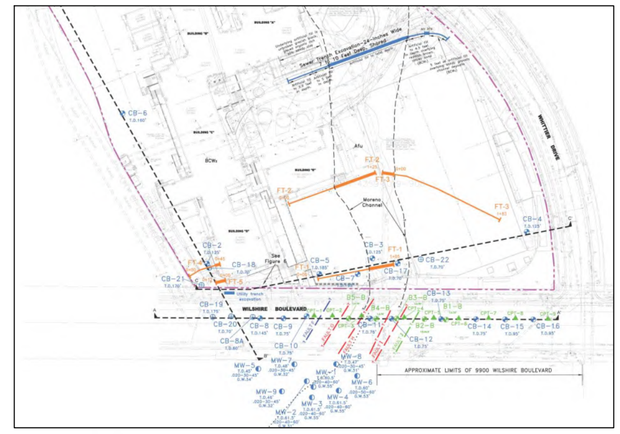
South Wall





INDEX MAP

Scale

0 5

1 inch = 5 feet

No vertical Exaggeration

Logged by EMH and MLH
11/25/2015

Symbols

- Clay
- Silt
- Sand
- Gravel and Pebbles
- Sharp contact
- Approximate contact
- Soil development
- Unit Label
- Pipe
- Animal burrow (krotovina)

Unit Descriptions

Unit 1: Reddish brown; predominately a chaotic assemblage of sand, silt, and clay with a discrete gravel bed at approximately mid unit; clasts consist of fine tabular angular slate and white siltstone with no noticeable imbrication; matrix consists of reddish brown silty sand to sandy silt with fine to coarse subrounded sand grains; exhibits oxidation staining. Mid unit gravel bed appears to be locally continuous and extends throughout the unit until layer pinches out at approximately Station 29; abrupt and erosional contact with unit below. (Debris Flow Deposit)

Unit 2: Light reddish brown sandy silt to silty sand, predominately fine to medium sand with scattered coarse sand; unit contains oxidation staining, gleying, and MnO spotting along with MnO streaks and MnO infilled cracks; thin and non-continuous within the trench, gradational contact with unit below. (Possible Alluvial Deposit)

Unit 3: Laterally gradational deposits consisting of channel gravels, sand lenses, and finer-grained overbank sediments. Channel deposits predominately consist of fine, subrounded, tabular slate and white siltstone gravels with very few scattered subrounded to rounded granitic clasts; sand lenses consist of gray to light brown fine-grained silty sand with weak bedding, friable and soft; overbank deposits consist of fine-grained silty clay to sandy silt, fine sand with scattered medium to coarse sand and fine slaty and siltstone gravels, mostly massive, gleyed, oxidized. Unit as a whole fines to the west, with channel migration moving easterly; interior contacts are abrupt, contact with underlying unit is abrupt and erosional. (Fluvial and Overbank Deposits)

Unit 4: Light grayish brown to tan, silty fine sand; soft, friable; scattered clayey laminations with moderate blocky structure; minor oxidation staining; scattered pinhole pores. (Possible Fluvial Deposit)

El Rodeo FT-4, Profile at Station 26

Depth (ft)	Horizon	Description
0-1	Fill	Asphalt over artificial fill. Not described.
1-1.9	Bt	SANDY CLAY LOAM; yellowish brown to brown (10YR to 7.5YR 5/4) with dark brown (7.5YR 3/2) clay films and medium grayish brown (10YR 5/2) mottles when dry, dark brown (7.5YR 3/3) when moist; moderate medium to fine angular blocky soil structure; very hard when dry, friable to firm when moist, sticky and plastic when wet; common moderately thick clay films on ped faces, few thin clay films on clasts, common thin and few moderately thick clay films lining clast pockets; abundant fine subrounded gravel up to ¼-inch in diameter; clear wavy lower boundary.
1.9-2.4	2Bt2	SILTY CLAY; brown (7.5YR 5/4) with brown (7.5YR 4/4) clay films and pale brown (10YR 6/3) mottles when dry, dark brown (7.5YR 3/3) when moist; strong fine to medium angular blocky soil structure; very hard when dry, firm when moist, sticky and plastic when wet; common thin clay films on ped faces, common moderately thick clay films lining clast pockets, many thin clay films bridging grains; scattered gravel; clear to gradual wavy lower boundary.
2.4-3.2	2Bt3	SANDY CLAY LOAM; brown (10YR 5/3) with brown (7.5YR 5/4) clay films and few brown (10YR 5/3) mottles when dry, dark brown (7.5YR 3/3) when moist; moderate fine to medium angular blocky soil structure; very hard when dry, friable when moist, slightly sticky and slightly plastic when wet; common thin to moderately thick clay films on ped faces, few thin clay films bridging grains; scattered few fine gravel; few; clear wavy lower boundary.
3.2-3.9	3Bt4	SANDY CLAY LOAM; brown (10YR 5/3) with brown to yellowish brown (7.5YR to 10 YR 5/4) clay films and brown (10YR 5/3) mottles when dry, brown (7.5YR 4/3) when moist; moderate fine to medium subangular blocky soil structure; very hard when dry, friable to firm when moist, non- sticky and slightly plastic when wet; very few to few thin clay films on ped faces, few thin clay films lining clast pockets; fine-grained sand with very few scattered fine gravel; clear wavy lower boundary.
3.9-4.2	4Bt5	SILTY CLAY; yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/4) clay films and common light brownish gray (10YR 6/2) and very dark gray (10YR 3/1) mottles when dry, brown (7.5YR 4/3) when moist; strong medium to coarse subangular blocky soil structure; slightly hard to hard when dry, firm when moist, sticky and plastic when wet; many moderately thick clay films on ped faces, few thin clay films lining pores, many thin clay films bridging grains; clear wavy lower boundary.
4.2-5.2	4BC	LOAM to SANDY CLAY LOAM; brown to pale brown (10YR 5.5/3) with light brownish gray (10YR 6/2) mottles when dry, brown (10YR 4/3) when moist; moderate medium subangular blocky soil structure; hard when dry, firm when moist, non- sticky and slightly plastic when wet; few thin clay films on ped faces; fine to very fine sand grains; lower boundary not observed.

El Rodeo FT-4, Profile at Station 10

Depth (ft)	Horizon	Description
0-0.4	Fill	Artificial fill. Not described.
0.4-2.0	Bt	SANDY CLAY; brown to yellowish brown (7.5YR to 10YR 5/4) with brown (7.5YR 4/2.5) clay films and medium grayish brown (10YR 5/2) mottles when dry, dark brown (7.5YR 3/3) when moist; strong fine subangular blocky soil structure; hard to very hard when dry, firm to very firm when moist, sticky and plastic when wet; common thin clay films on ped faces, common moderately thick clay films lining clast pockets, few thin clay films bridging grains; abundant fine subrounded gravel up to ¼-inch in diameter; clear wavy lower boundary.
2.0-2.5	2Bt2	SANDY CLAY LOAM; brown (10YR 4/3) with brown (7.5YR 5/3) clay films and common grayish brown (10YR 5/2) mottles when dry, brown (7.5YR 4/3) with dark brown (7.5YR 3/2) clay films when moist; strong fine to medium angular blocky soil structure; hard when dry, firm when moist, sticky and slightly plastic when wet; common thin clay films bridging grains, many thin and common moderately thick clay on ped faces; fine-grained with few scattered fine gravel; common pores; clear wavy lower boundary.
2.5-3.4+	2Bt3	SILTY CLAY; brown (10YR 5/3) with brown (7.5YR 4/2) clay films and very dark grayish brown and light grayish brown (10YR 3/2 and 10YR 6/2) mottles when dry, dark grayish brown (10YR 4/2) when moist; strong coarse angular blocky soil structure; hard and fragic when dry, firm to very firm when moist, sticky and slightly plastic when wet; many thin and common moderately thick clay films on ped faces, common thin clay films bridging grains; common strong brown (7.5YR 5/6) iron oxide stains; lower boundary not observed.

PLATE 7B

Leighton

FAULT TRENCH LOG FT-4
El Rodeo
605 Whittier Drive
Beverly Hills, California

Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: As Shown	Date: 01/2016

Drafted By: BQT | Checked By: BQT | P:\DRAFTING\10274\006\OF_2016-01-20\10274-006_P07B_FT04_20160120.DWG (01-29-16 1:35:46PM) Plotted by: btran

Leighton

Earth Consultants International

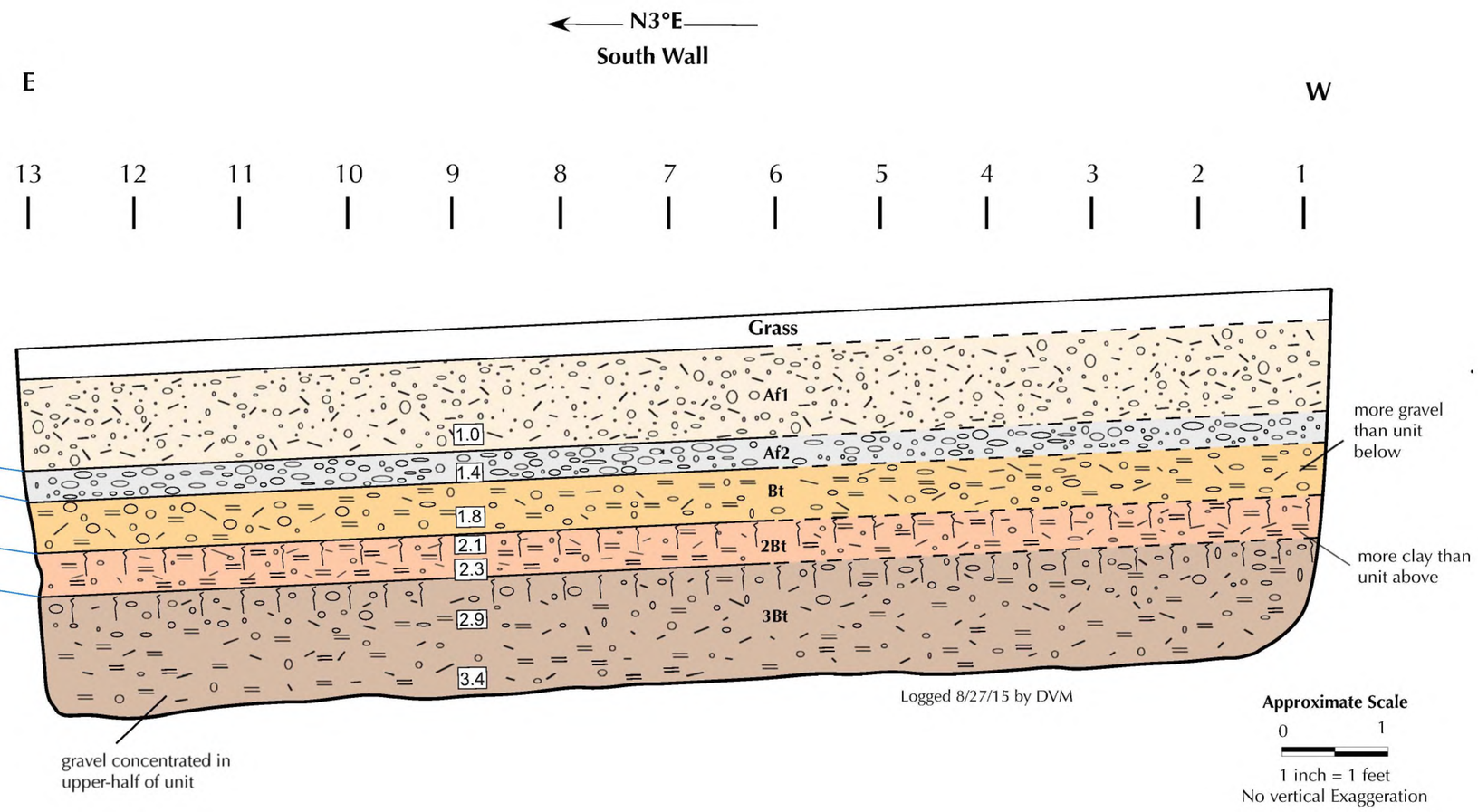
Project Number: 3205.09
Date: 2015

Log of Trench FT-4, South Wall
for El Rodeo K-8 School Fault Studies

Plate

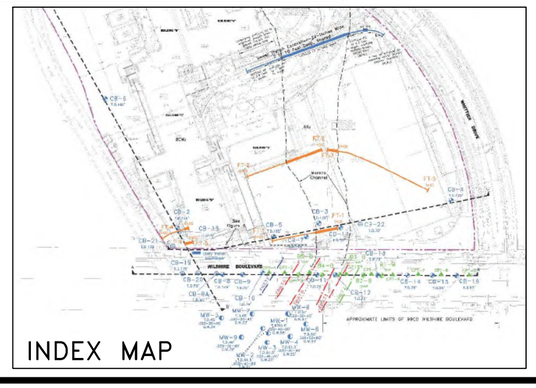
Figure □-8

Stratigraphy and sample locations (pink flags) on the south wall of the Wilshire Boulevard Utility Trench. View to the southwest. Blue lines show the approximate location of contacts denoted on the geologic log to the right of photo.



Symbols

- Clay
- Silt
- Sand
- Gravel and Pebbles
- Sharp contact
- Approximate contact
- Soil development
- 3.4 Sample location for unit descriptions



Soil Descriptions

Sample @1.0' - **Fill (Af1)**: SILTY CLAY LOAM; brown (10YR 4/3) when dry, very dark grayish brown (10YR 3/2) when moist; moderate fine subangular blocky soil structure; hard when dry, slightly firm when moist, sticky and plastic when wet; many fine to medium roots; common gravel and pebbles, many broken pebbles; abrupt smooth lower boundary. [Topped by 0.3' (9 cm) of grass.]

Sample @1.4' - **Fill (Af2)**: Fine to coarse SAND with gravel; gray (2.5Y 5.5/1) when dry, very dark gray (2.5Y 3/1) when moist; single-grained; loose when dry and moist, non-sticky and non-plastic when wet; broken white granitic gravel and cobbles; abrupt smooth lower boundary.

Sample @1.75' - **Bt Soil Horizon**: SANDY CLAY LOAM; dark grayish brown (10YR 4/2) when dry, dark brown (10YR 3/3) when moist; strong fine angular blocky soil structure; hard when dry, firm when moist, sticky and plastic when wet; common thin clay films coating clasts; common to many gravel, few to common pebbles; abrupt to clear wavy lower boundary.

Sample @2.1' - **2Bt2 Soil Horizon**: SILTY CLAY; brown (7.5YR 4/3) with dark gray (7.5YR 4/1) clay films when dry, brown (7.5YR 4/3) when moist; strong coarse angular blocky soil structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; many moderately thick clay films on ped faces, many thin clay films bridging grains, common moderately thick clay films coating clasts, common moderately thick to thick clay films lining clast pockets; common fine gravel; gradual wavy lower boundary.

Sample @2.3' - **2Bt3 Soil Horizon**: SANDY CLAY; brown (7.5YR 4/3) with dark brown (7.5YR 3/2) clay films when dry, brown (7.5YR 4/3) when moist; moderate medium subangular blocky soil structure; very hard when dry, very firm when moist, very sticky and plastic when wet; few moderately thick clay films on ped faces, common moderately thick clay films bridging grains, common thin to moderately thick clay films coating clasts, common moderately thick clay films lining clast pockets; many platy to subrounded gravel; abrupt to clear wavy lower boundary.

Sample @2.9' - **3Bt4 Soil Horizon**: SILTY CLAY LOAM; brown (7.5YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; moderate medium subangular blocky soil structure; hard when dry, firm when moist, sticky and plastic when wet; few thin clay films on ped faces, few moderately thick and common thin clay films coating clasts, common moderately thick clay films lining clast pockets; with pebbles; fewer gravel than above; gradual lower boundary.

Sample @3.4' - **3Bt5 Soil Horizon**: SANDY CLAY LOAM; brown and dark brown (7.5YR 4/3 and 3/2) with brown (7.5YR 4/4) clay films when dry, brown (7.5YR 4/3) when moist; moderate medium subangular blocky soil structure; very hard when dry, friable when moist, very sticky and very plastic when wet; few moderately thick clay films on ped faces, common moderately thick clay films bridging grains, few moderately thick clay films lining clast pockets; lower boundary not observed.

Earth Consultants International

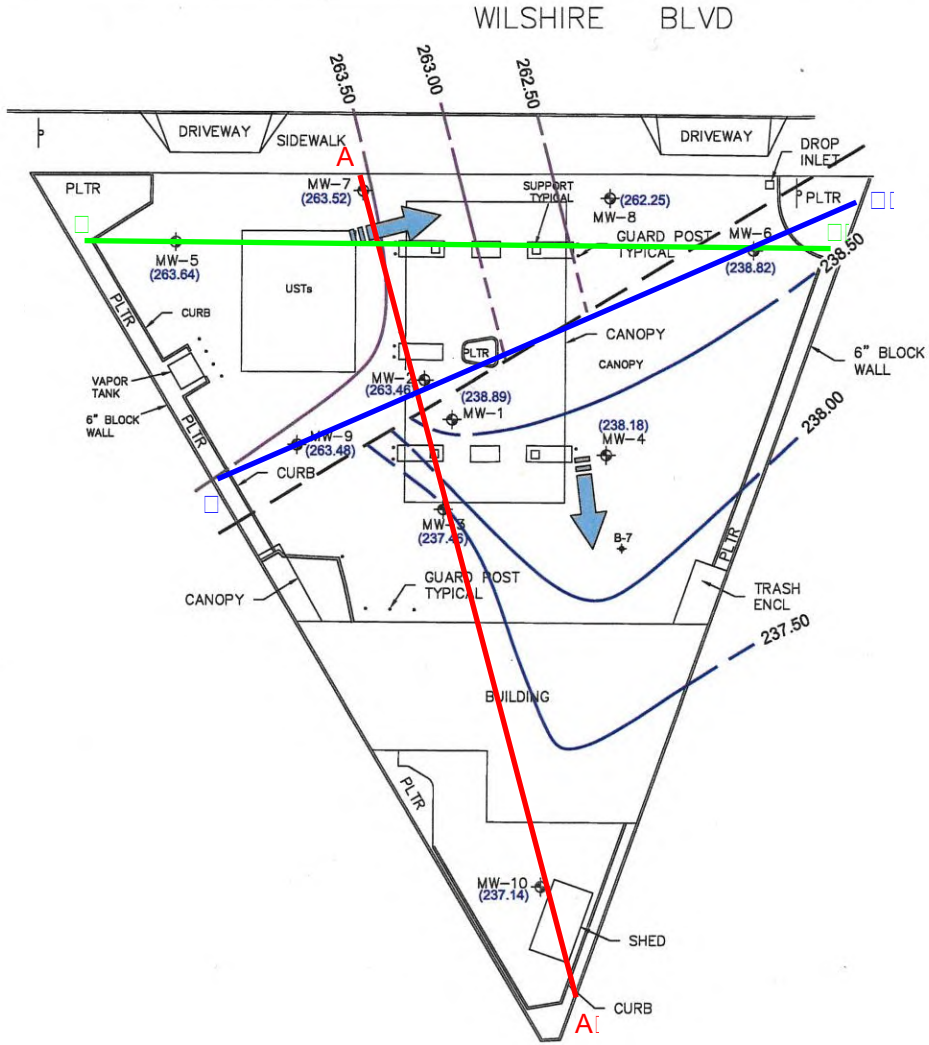
Project Number: 3205.09
Date: November 2015

WISHIRE BOULEVARD UTILITY TRENCH El Rodeo 605 Whittier Drive Beverly Hills, California		PLATE 8
Proj: 10274.006	Eng/Geol: TCB/JAR	Leighton
Scale: As Shown	Date: 01/2016	
Drafted By: BQT	Checked By: BQT	P:\DRAFTING\10274\006\OF_2016-01-20\10274-006_P08_WBUT_20160120.DWG (01-29-16 1:37:24PM) Plotted by: btran

Figure □-9

Appendix C

Key Figures from Antea Group (2015) Environmental Study of the 9988 Wilshire Site



EXPLANATION

MW-8	GROUNDWATER MONITORING WELL LOCATION
B-7	SOIL BORING LOCATION
(237.14)	GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (ft/amsl)
263.50	UPPER GROUNDWATER ZONE CONTOUR LINE; DASHED WHERE INFERRED (CONTOUR INTERVAL: 0.50 ft.)
238.50	LOWER GROUNDWATER ZONE CONTOUR LINE; DASHED WHERE INFERRED (CONTOUR INTERVAL: 0.50 ft.)
	GENERAL DIRECTION OF GROUNDWATER FLOW AND GRADIENT
	PIEZOMETRIC HEAD TRANSITION ZONE

NORTH

SCALE 1"= 30'

NOTES: 1. SITE SURVEYED BY DULIN & BOYNTON ON 10/03/2011.

FIGURE 3
GROUNDWATER ELEVATION CONTOUR MAP
JUNE 1, 2015

76 STATION NO. 250703
9988 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

PROJECT NO. 140250703	DRAWN BY K. MARTIN
FILE NO. 0703-SM2	PREPARED BY M. PADILLA
DATE 09 JUL 15	LAYER B-7 2Q15-Gw

antea group

Figure □-1

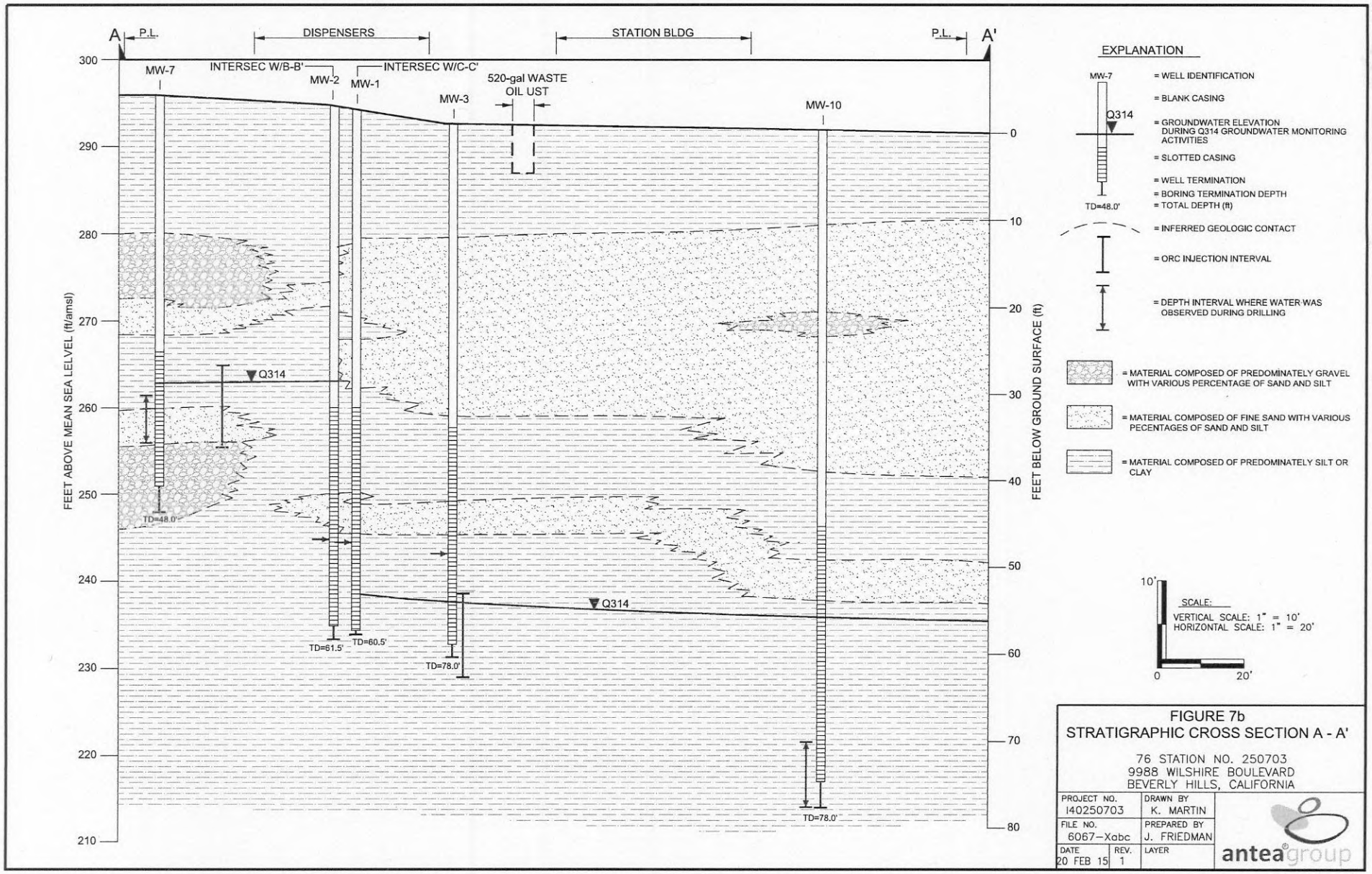
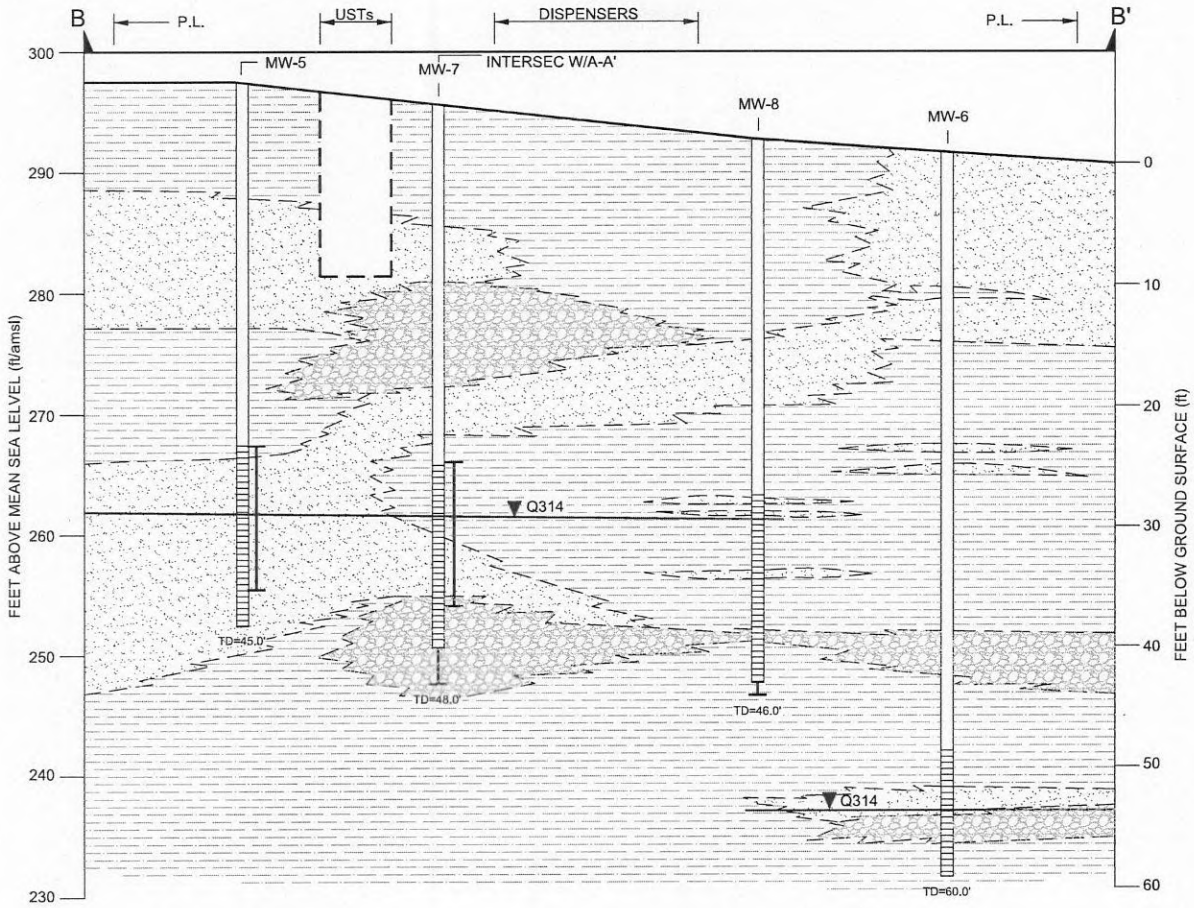

A
P.L.
DISPENSERS
STATION BLDG
P.L.
A'
MW-7
INTERSEC W/B-B'
MW-2
MW-1
INTERSEC W/C-C'
520-gal WASTE OIL UST
MW-3
MW-10
Q314
TD=48.0'
TD=61.5'
TD=60.5'
TD=78.0'
TD=78.0'
FEET ABOVE MEAN SEA LELVEL (ft/amsl)
300
290
280
270
260
250
240
230
220
210
FEET BELOW GROUND SURFACE (ft)
0
10
20
30
40
50
60
70
80
EXPLANATION
MW-7
= WELL IDENTIFICATION
= BLANK CASING
Q314
= GROUNDWATER ELEVATION DURING Q314 GROUNDWATER MONITORING ACTIVITIES
= SLOTTED CASING
= WELL TERMINATION
= BORING TERMINATION DEPTH
TD=48.0'
= TOTAL DEPTH (ft)
= INFERRED GEOLOGIC CONTACT
= ORC INJECTION INTERVAL
= DEPTH INTERVAL WHERE WATER WAS OBSERVED DURING DRILLING
= MATERIAL COMPOSED OF PREDOMINATELY GRAVEL WITH VARIOUS PERCENTAGE OF SAND AND SILT
= MATERIAL COMPOSED OF FINE SAND WITH VARIOUS PECENTAGES OF SAND AND SILT
= MATERIAL COMPOSED OF PREDOMINATELY SILT OR CLAY
10'
SCALE:
VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 20'
0
20'
FIGURE 7b
STRATIGRAPHIC CROSS SECTION A - A'
76 STATION NO. 250703
9988 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA
PROJECT NO. 140250703
DRAWN BY K. MARTIN
FILE NO. 6067-Xabc
PREPARED BY J. FRIEDMAN
DATE 20 FEB 15
REV. 1
LAYER
antea group

Figure □-2



EXPLANATION

MW-7 = WELL IDENTIFICATION

= BLANK CASING

Q314 = GROUNDWATER ELEVATION DURING Q314 GROUNDWATER MONITORING ACTIVITIES

= SLOTTED CASING

= WELL TERMINATION

= BORING TERMINATION DEPTH

TD=48.0' = TOTAL DEPTH (ft)

= INFERRED GEOLOGIC CONTACT

= ORC INJECTION INTERVAL

= DEPTH INTERVAL WHERE WATER WAS OBSERVED DURING DRILLING

= MATERIAL COMPOSED OF PREDOMINATELY GRAVEL WITH VARIOUS PERCENTAGE OF SAND AND SILT

= MATERIAL COMPOSED OF FINE SAND WITH VARIOUS PECENTAGES OF SAND AND SILT

= MATERIAL COMPOSED OF PREDOMINATELY SILT OR CLAY

SCALE:

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 20'

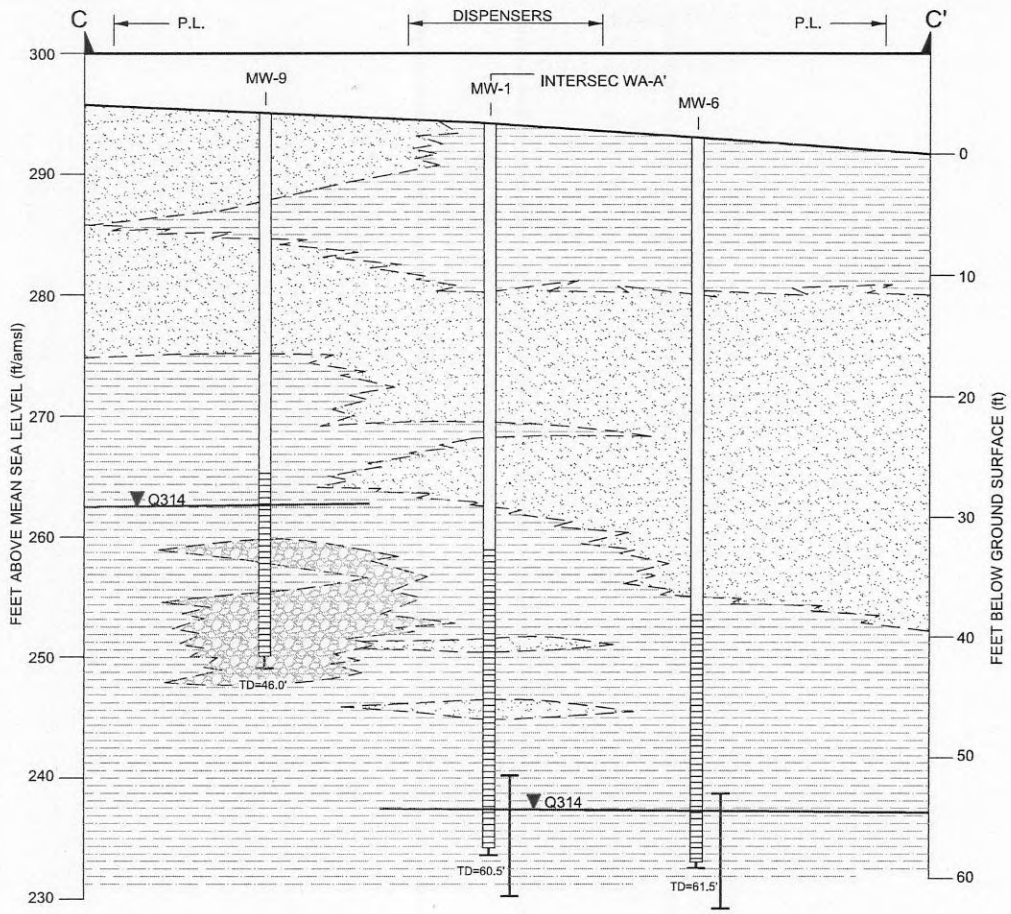
10' 0 20'

FIGURE 7c
STRATIGRAPHIC CROSS SECTION B - B'

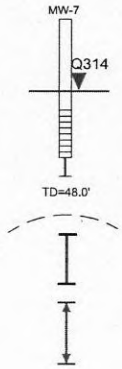
76 STATION NO. 250703
9988 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

PROJECT NO. 140250703	DRAWN BY K. MARTIN	antea group
FILE NO. 6067-Xabc	PREPARED BY J. FRIEDMAN	
DATE 20 FEB 15 / REV. 1	LAYER	

Figure □-3



EXPLANATION



= WELL IDENTIFICATION

= BLANK CASING

= GROUNDWATER ELEVATION DURING Q314 GROUNDWATER MONITORING ACTIVITIES

= SLOTTED CASING

= WELL TERMINATION

= BORING TERMINATION DEPTH

= TOTAL DEPTH (ft)

= INFERRED GEOLOGIC CONTACT

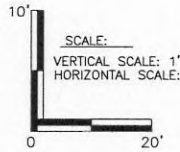
= ORC INJECTION INTERVAL

= DEPTH INTERVAL WHERE WATER WAS OBSERVED DURING DRILLING

= MATERIAL COMPOSED OF PREDOMINATELY GRAVEL WITH VARIOUS PERCENTAGE OF SAND AND SILT

= MATERIAL COMPOSED OF FINE SAND WITH VARIOUS PECENTAGES OF SAND AND SILT

= MATERIAL COMPOSED OF PREDOMINATELY SILT OR CLAY



SCALE:

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 20'

FIGURE 7d
STRATIGRAPHIC CROSS SECTION C - C'

76 STATION NO. 250703
9988 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

PROJECT NO. 140250703	DRAWN BY K. MARTIN	antea group
FILE NO. 6067-Xabc	PREPARED BY J. FRIEDMAN	
DATE 20 FEB 15 / REV. 1	LAYER	

Figure □-4

Roy J. Shlemon & Associates, Inc.
Geologic and Environmental Consultants
P.O. Box 3066, Newport Beach, CA, 92659-0620
Telephone: 949-675-2696
E-mail: rshlemon@jps.net

RECOMMENDATION FOR ACCEPTANCE OF LITERATURE-REVIEW REPORT

"FAULT RUPTURE HAZARD INVESTIGATION"

9988 Wilshire Boulevard, Beverly Hills, California

By Lettis Consultants International

On behalf of BH Luxury Residences, LLC, Los Angeles

This document summarizes technical (peer) reviews for a "fault-rupture hazard investigation" carried out by Lettis Consultants International, Inc. (LCI; Valencia), the Consultants-of-Record, on behalf of the Permit Applicant, BH Luxury Residences, LLC, Los Angeles. The Applicant proposes redevelopment of a triangular-shaped parcel at the western edge of the City of Beverly Hills.

The site, identified as 9988 Wilshire Boulevard, is currently occupied by a service station, an auto-repair center and a convenience store. The site is ~1,000-ft north of the State-defined Santa Monica fault zone, and not on trend or otherwise known to be impacted by other active fault zones; namely, the Hollywood and the Newport-Inglewood/West Pico, that are currently mapped within or project toward the City of Beverly Hills (see LCI Fig. 1 and related pertinent literature-reproduced figures).

LCI emphasizes that their report and professional recommendations are based solely on review of the pertinent literature; and that they did not conduct any site-specific or other "new" investigations to validate their conclusions. This review, therefore, focuses on the LCI literature summary and on their professional assurances to the City that the site is not impacted by active (Holocene) faults.

For context: After summarizing various regional investigations, LCI relies almost exclusively on two adjacent or nearby fault-activity assessments; namely, Geocon West

(2014) for the easterly abutting property at 9900 Wilshire Boulevard; and Leighton Consulting, Inc. (2016) for the El Rodeo School to the north, across Wilshire Boulevard (605 Whittier Drive; LCI Fig. 2). Neither of these previous investigations encountered demonstrable Holocene faults in their respective investigation areas.

For background: LCI points out that the 9988 Wilshire site has never been formally investigated from a fault-activity standpoint. However, several groundwater monitoring wells were previously installed by various consultants and studied since at least 2005 (see LCI Fig. 8 and pertinent literature citations). The resulting groundwater elevation contour maps show a northeast-trending groundwater barrier with about 25-ft vertical displacement. Additionally, onsite and adjacent seismic reflection profile interpretations led various to investigators to therefore similarly conclude that these phenomena were part of an active fault system coincident with the "West Beverly Hills Lineament" and hence a likely northern extension of the active Newport-Inglewood fault system.

For their 9900 Wilshire investigation, Geocon (2014) emplaced trenches, advanced an array of cone penetrometer tests (CPT) and collected continuous cores for potential numeric (radiocarbon) and relative (soil-stratigraphy) assay. Geocon (2014) concluded that previously identified, onsite lineaments were either not faults or, if so, were substantially older than Holocene in age. Nevertheless, based on the literature, and for conservatism, Geocon accepted the potential activity of faults previously projected across the adjacent 9988 Wilshire property. Geocon thus recommended a setback (no build zone) of 50-ft from the nearest "9988 fault," which then extended ~25-ft onto the 9900 Wilshire property. Based on their site-specific investigations, their literature review and their reasonable recommendations, the City accepted the Geocon report on 19 May 2014.

The published literature, coupled with data and interpretations of the Geocon, 9900 Wilshire report, led to the California Geological Survey (CGS) to require site-specific fault investigations at the El Rodeo School, immediately to the north and abutting Wilshire Boulevard (see LCI-literature review maps). The investigations were commissioned by the Beverly Hills Unified School District (BHUSD) and carried out mainly by Leighton Consultants, Inc. and several subcontractors. Neither the City nor the City Reviewer were involved with these investigations.

As pointed out by LCI, Leighton Consultants, using similar investigative techniques as Geocon (2014), concluded that the El Rodeo School was devoid of Holocene faults, that the West Beverly Hills Lineament was not a tectonic feature and, inferentially, that the previously identified groundwater barriers on the 9988 Wilshire fault were either not faults, or, if so, were pre-Holocene in age. These conclusions were ultimately accepted by the CGS (2016).

The fundamental conclusions of the Consultants-of-Record are:

1. That Lettis Consultants International (LCI) reviewed the pertinent literature, specifically focusing on recently completed investigations at the adjacent 9900 Wilshire adjacent to the east, and at the El Rodeo School across Wilshire Boulevard to the north.

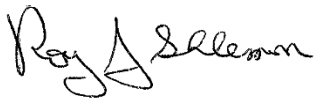
2. That LCI points out that the 9988 site has never been previously investigated from a fault-activity standpoint; and that their conclusions and recommendations have not been validated by any site-specific work, but rather are based solely on literature review and reliance on the conclusions of other investigators.

3. That, nevertheless, LCI assures the City that: "In our professional opinion, given the results from previous fault investigations at nearby and adjacent properties, we can preclude the presence of active faults within the 9988 Wilshire site" (p. ii).

Therefore, based substantially on, and in reliance of the LCI literature review and their professional interpretations and conclusions, the undersigned City Reviewer now recommends acceptance of the Literature-Review Report.

The LCI report focuses solely on the potential for surface or near-surface fault rupture and does not address possible high seismic accelerations, ground deformation or other structural design and geotechnical investigations required by applicable building codes or current professional engineering and geological standards of practice. It is therefore incumbent upon the Permit Applicant (BH Luxury Residences, LLC) through LCI or other consultants, to provide this information to the City of Beverly Hills for review and potential acceptance prior to issuance of building permits.

Recommended for Acceptance



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Roy J. Shlemon, Ph.D.
Technical Reviewer
PG 2867; CPG 1766; CPESC 2167

27 November 2020