PHASE II SITE-SPECIFIC FAULT RUPTURE INVESTIGATION

9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

GEOCON
WEST, INC.

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

ALLEN MATKINS LECK
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LOS ANGELES, CALIFORNIA

PROJECT NO. A9009-06-01A

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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,

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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**	**Lakewood Formation[2,3]** 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 – 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 A'**	**B and B'**	**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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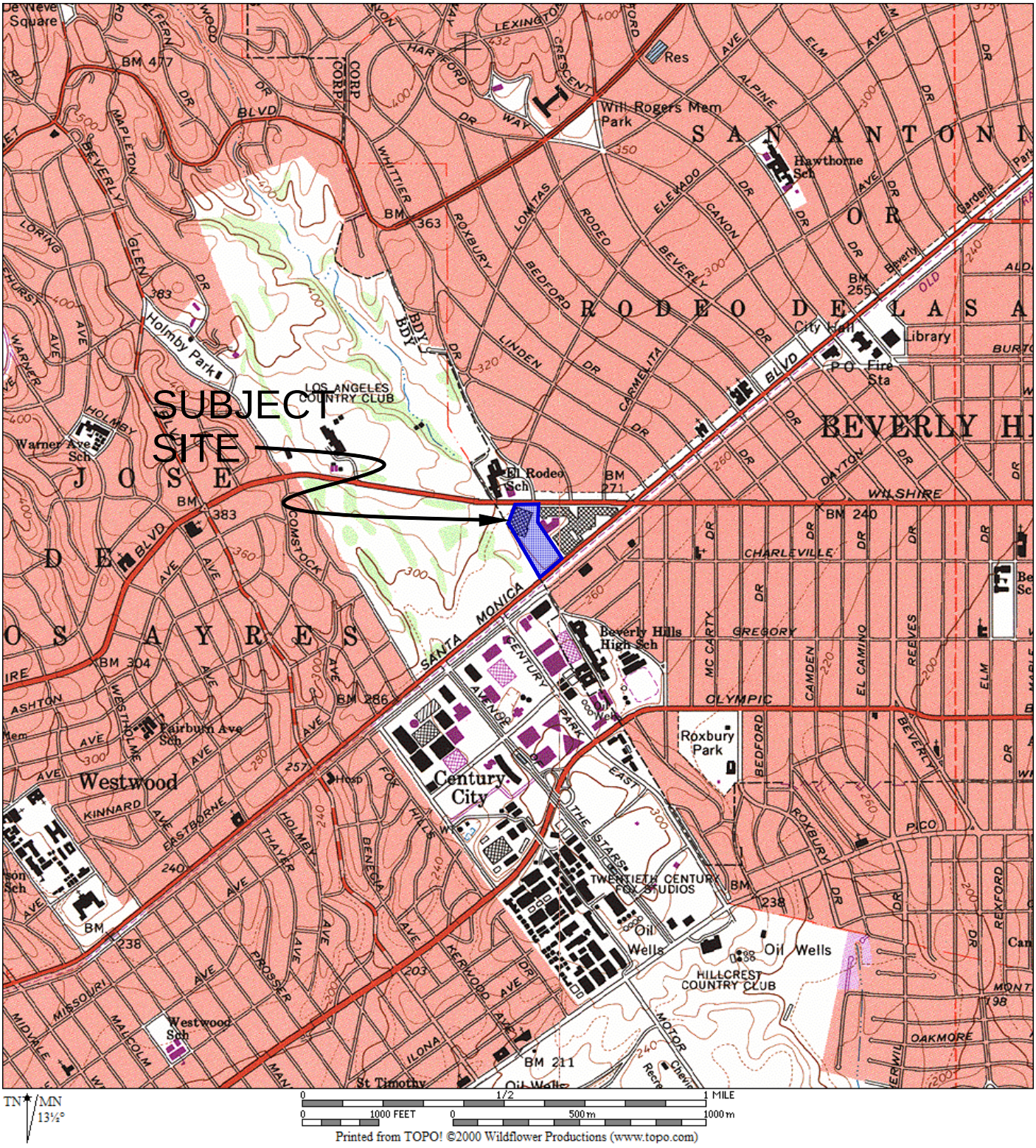

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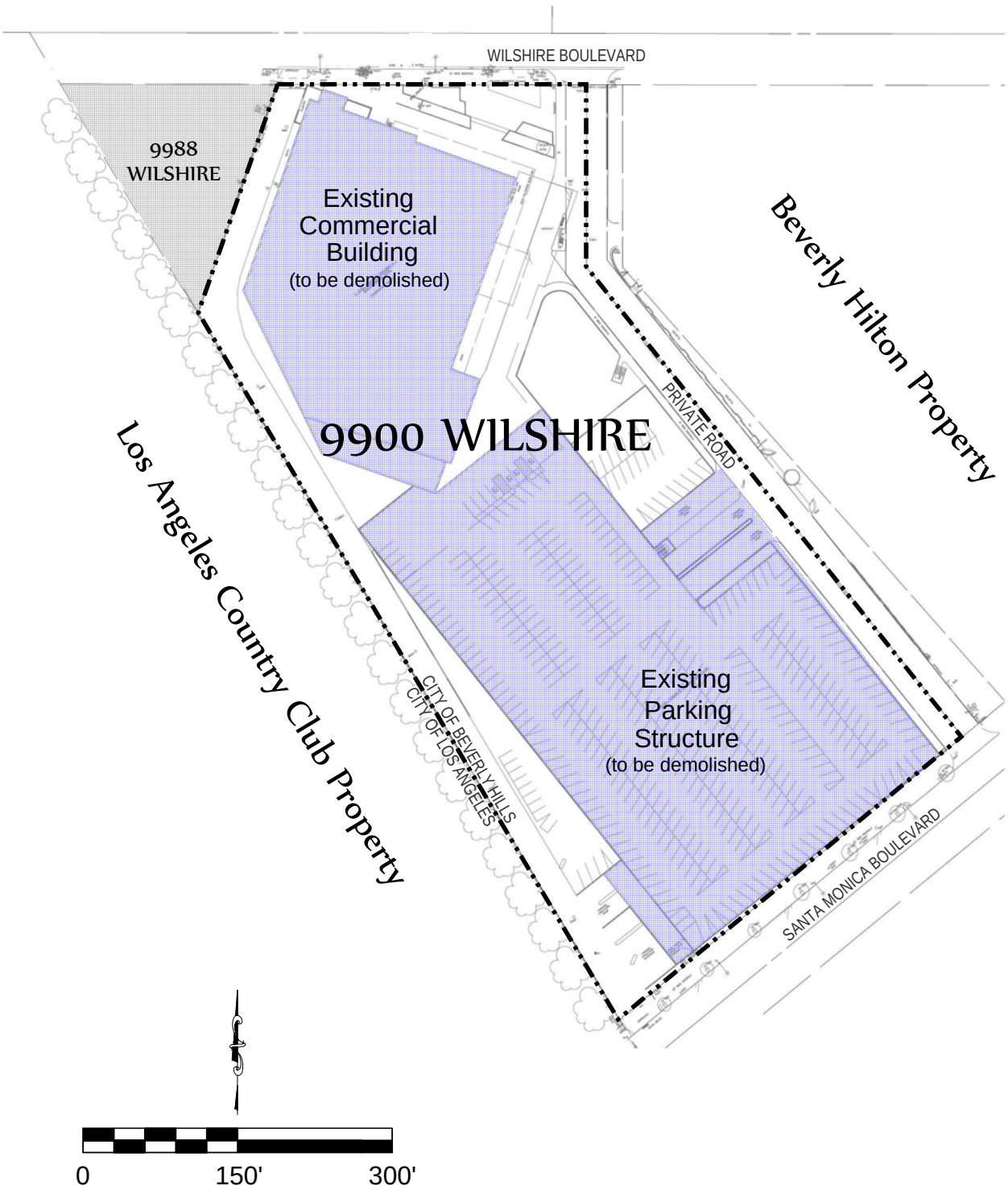
VICINITY MAP

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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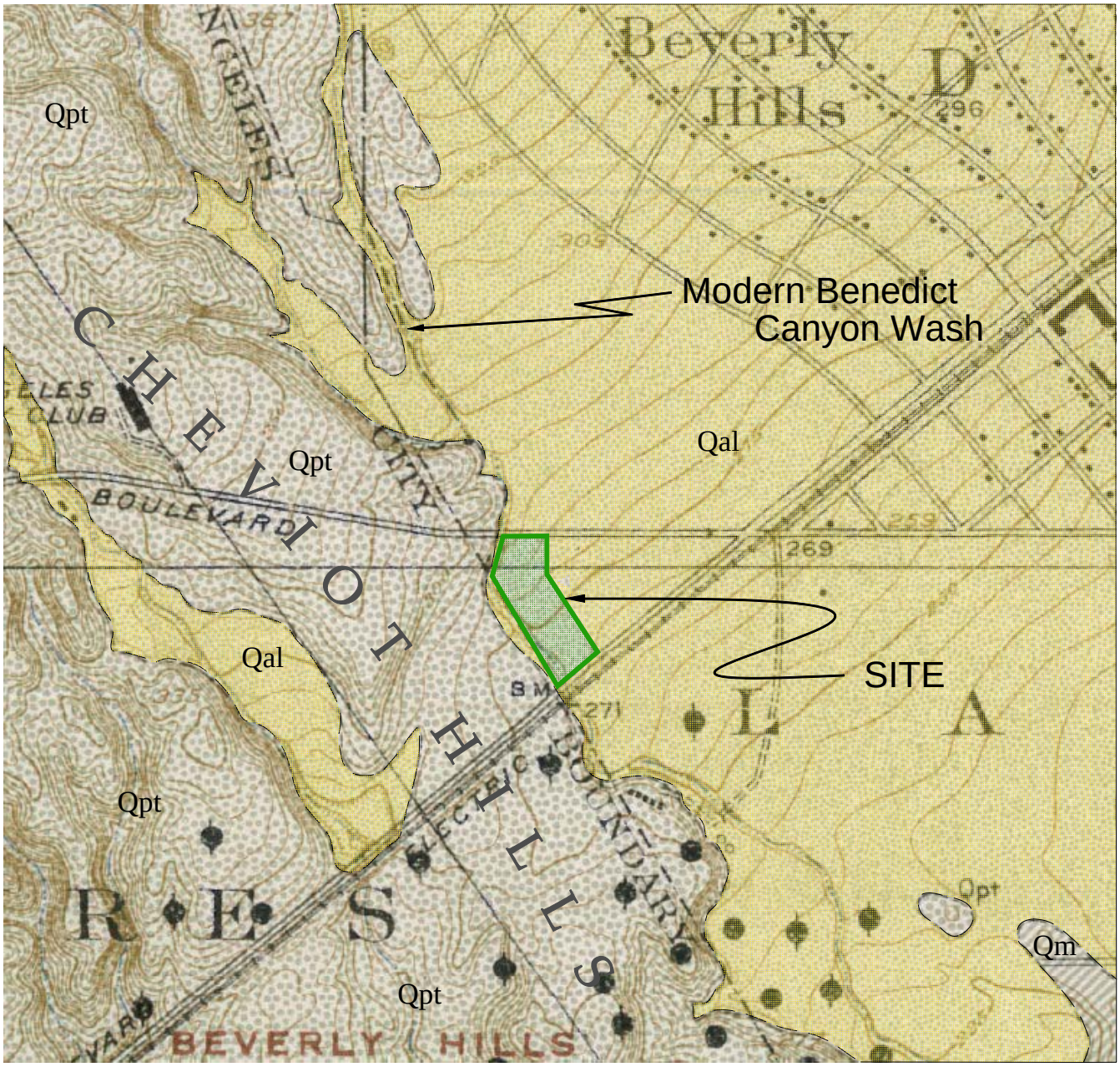
BEVERLY HILLS, CALIFORNIA

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

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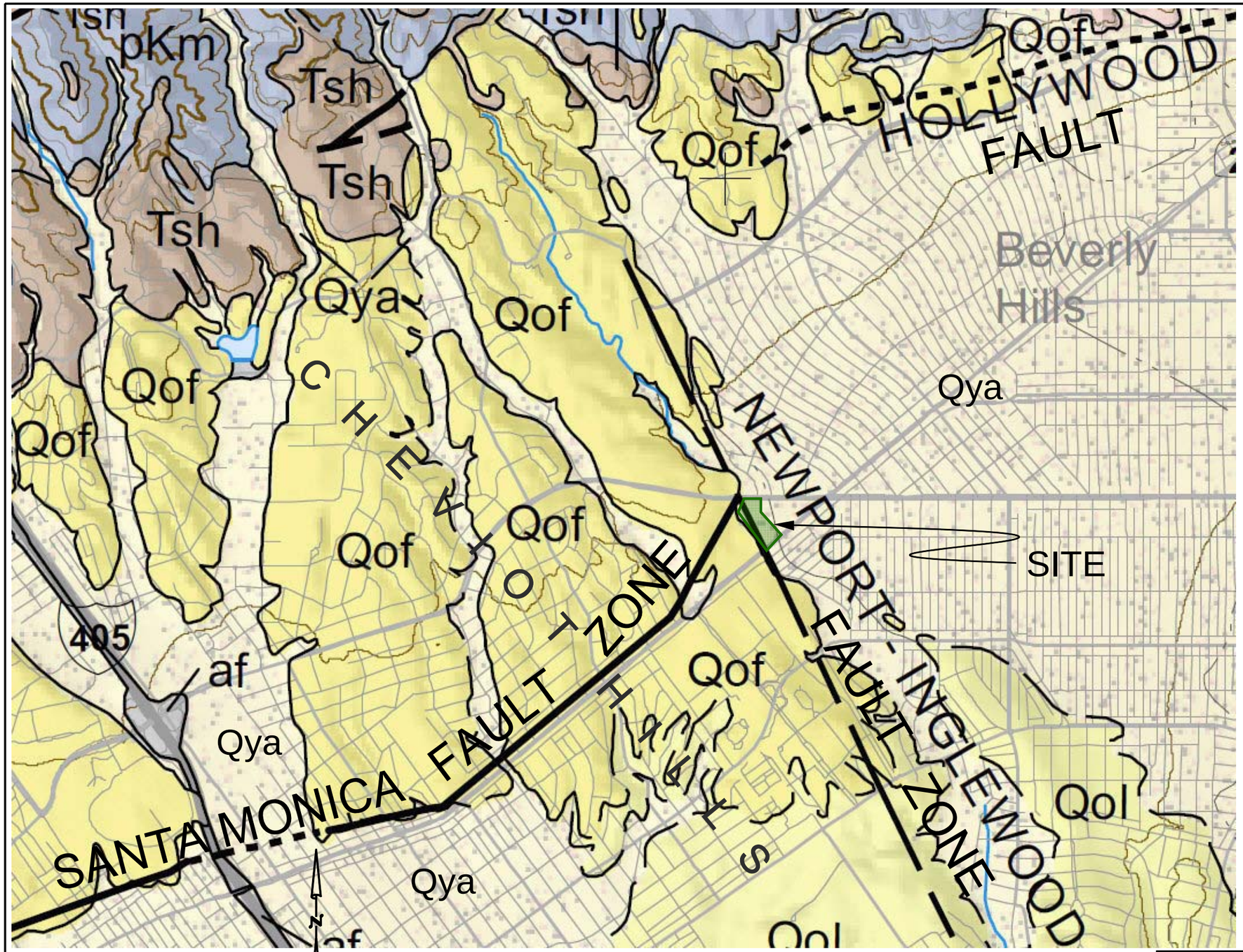
BEVERLY HILLS, CALIFORNIA

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

9900 WILSHIRE BOULEVARD

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

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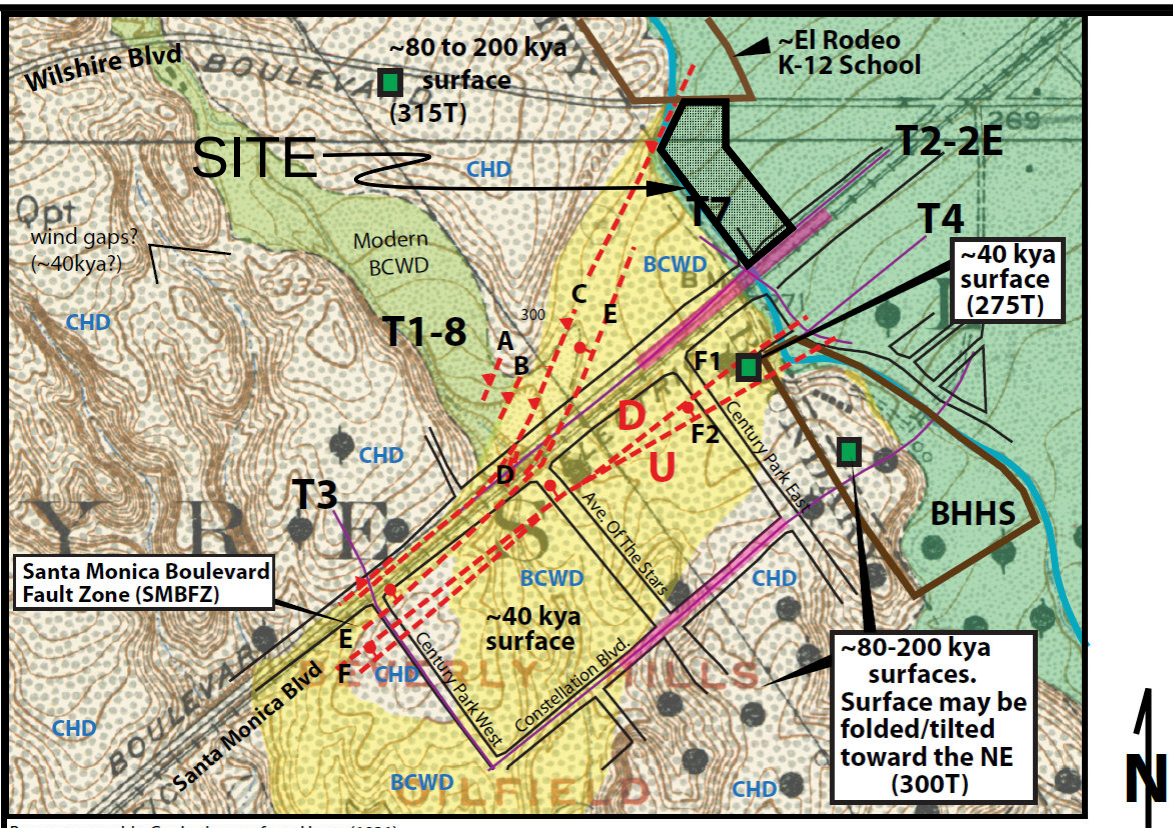
BEVERLY HILLS, CALIFORNIA

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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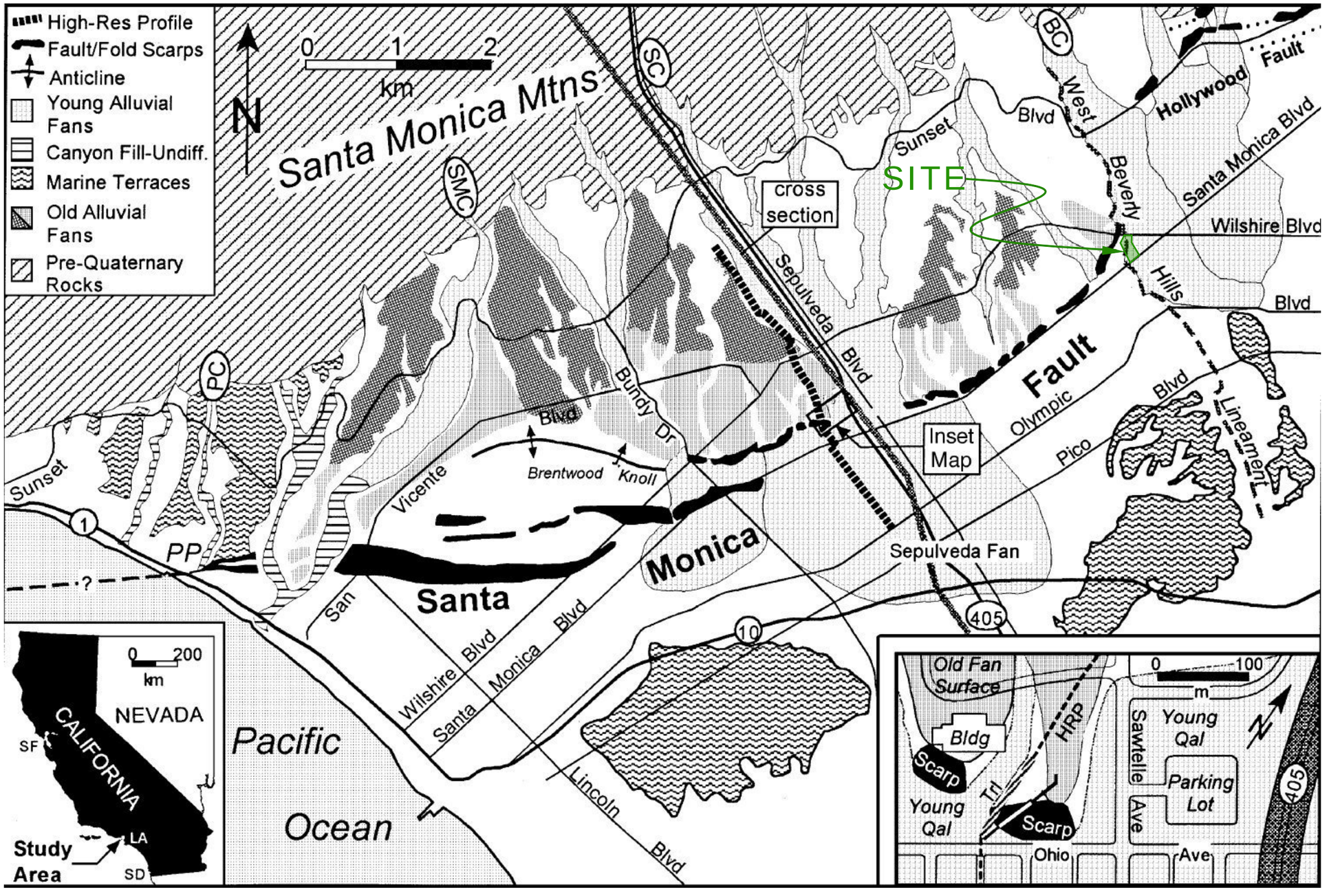
KENNEY (2013) PRELIMINARY FAULT MAP WITH NATURAL TOPOGRAPHY

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

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



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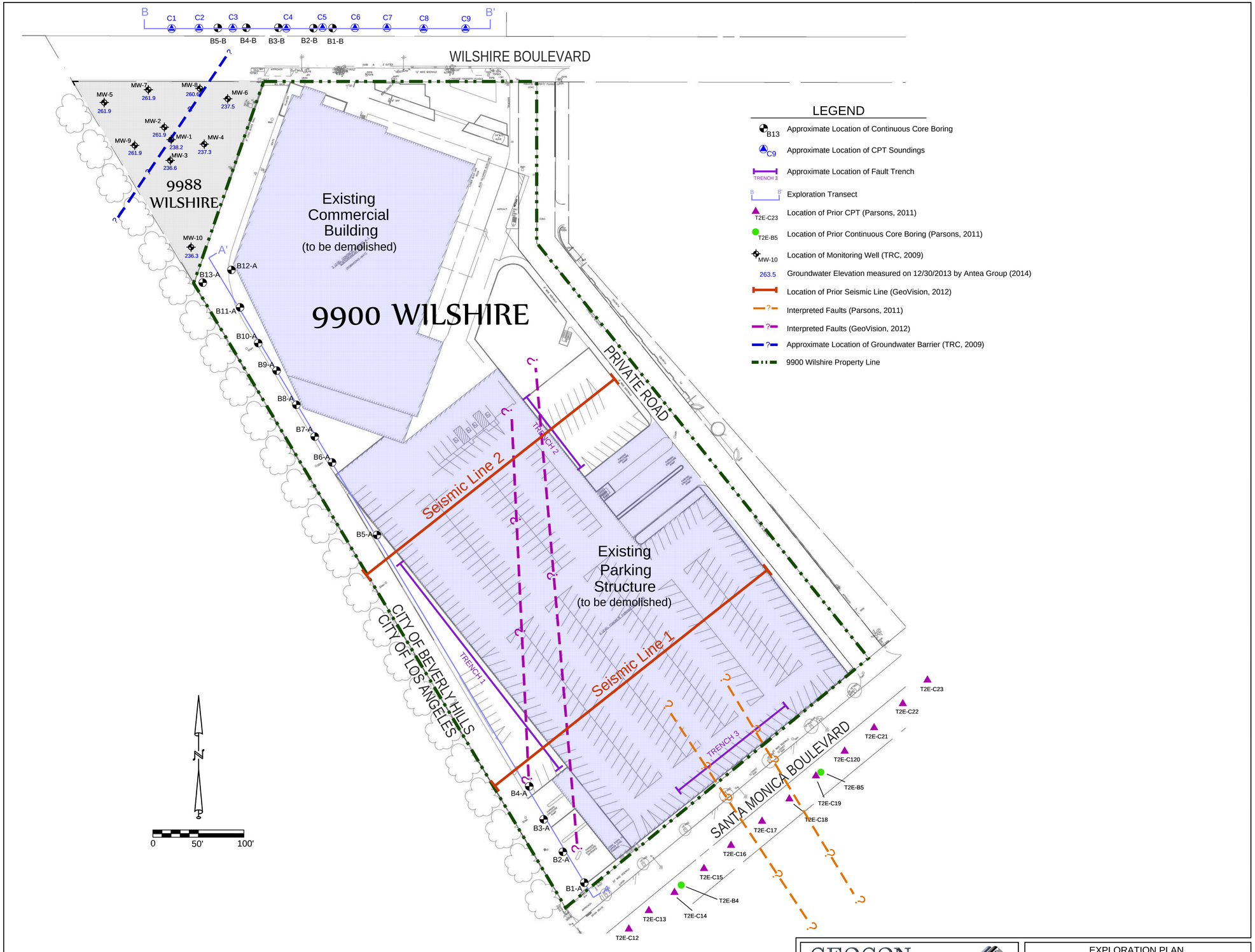
SANTA MONICA FAULT ZONE - GEOMORPHIC MAP

FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

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



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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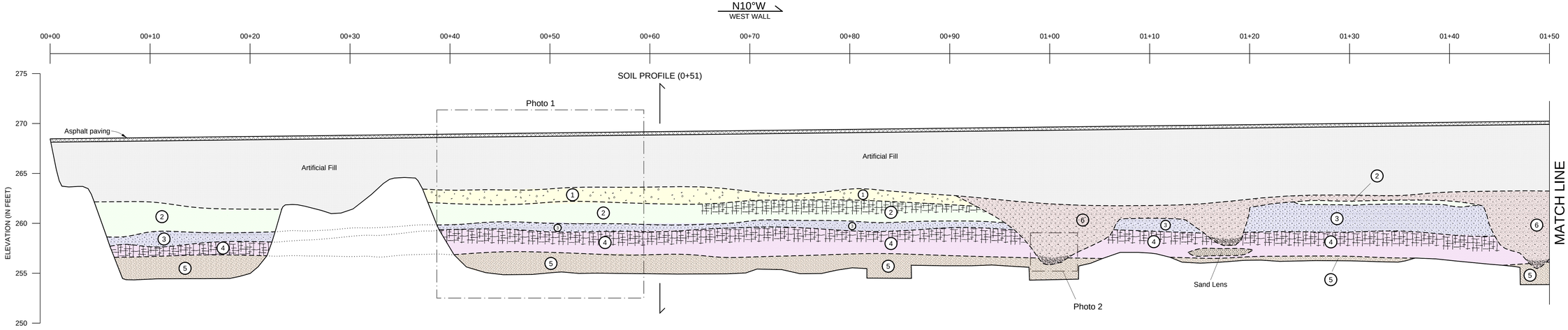
EXPLORATION PLAN

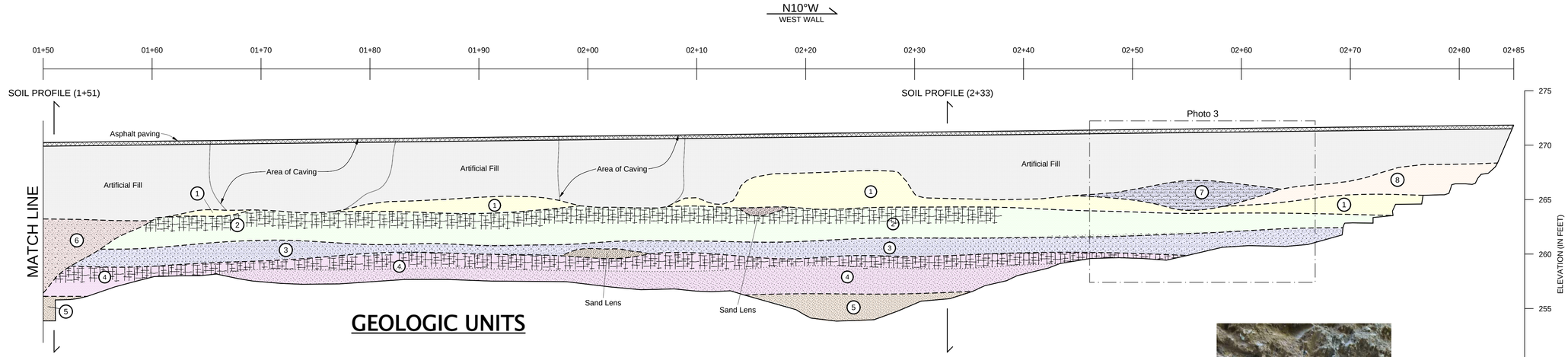
FAULT RUPTURE HAZARD INVESTIGATION

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.

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

Photo 1

Photo 2

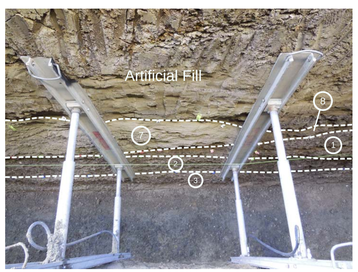


Photo 3

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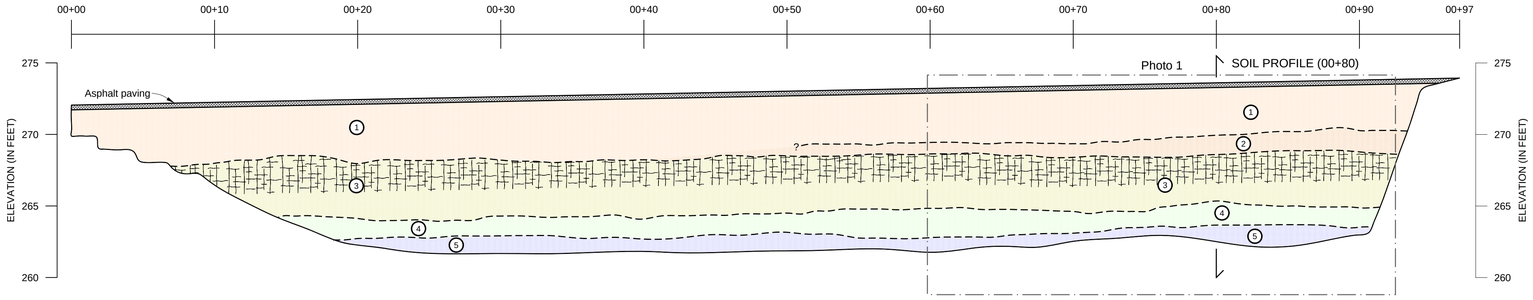
LOG OF TRENCH 1
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

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

TRENCH 2



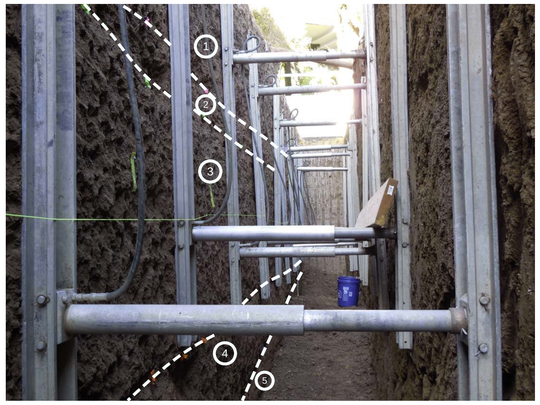
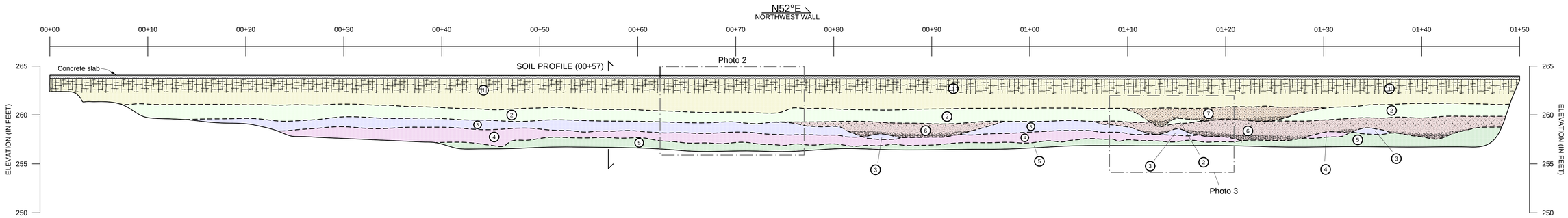


Photo 1

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.

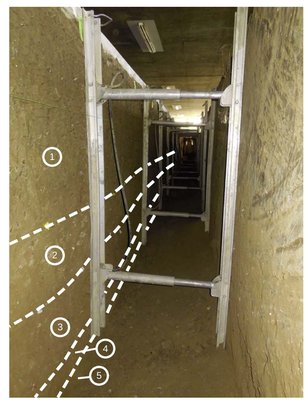


Photo 2

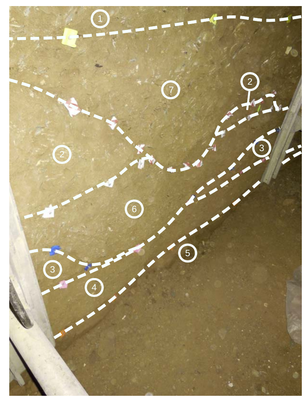


Photo 3

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

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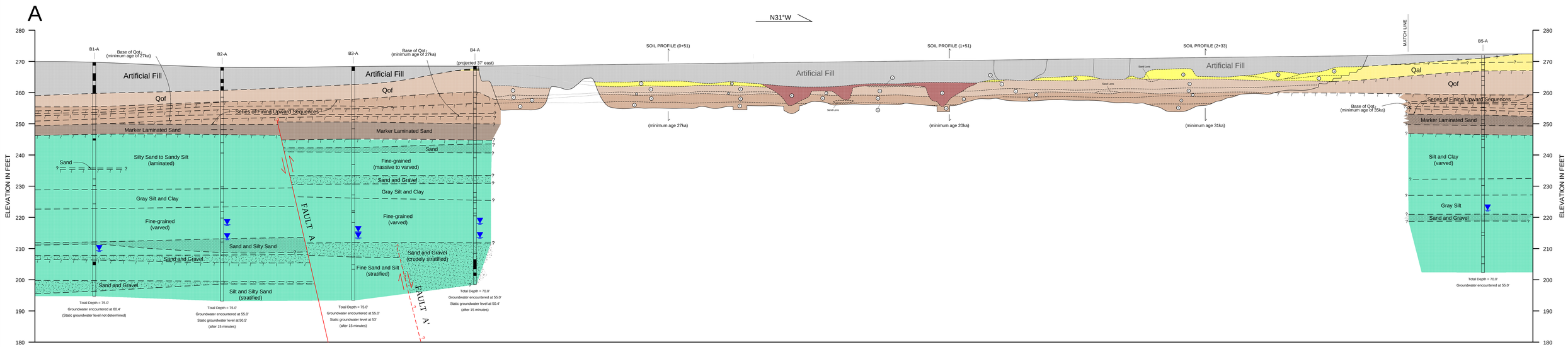
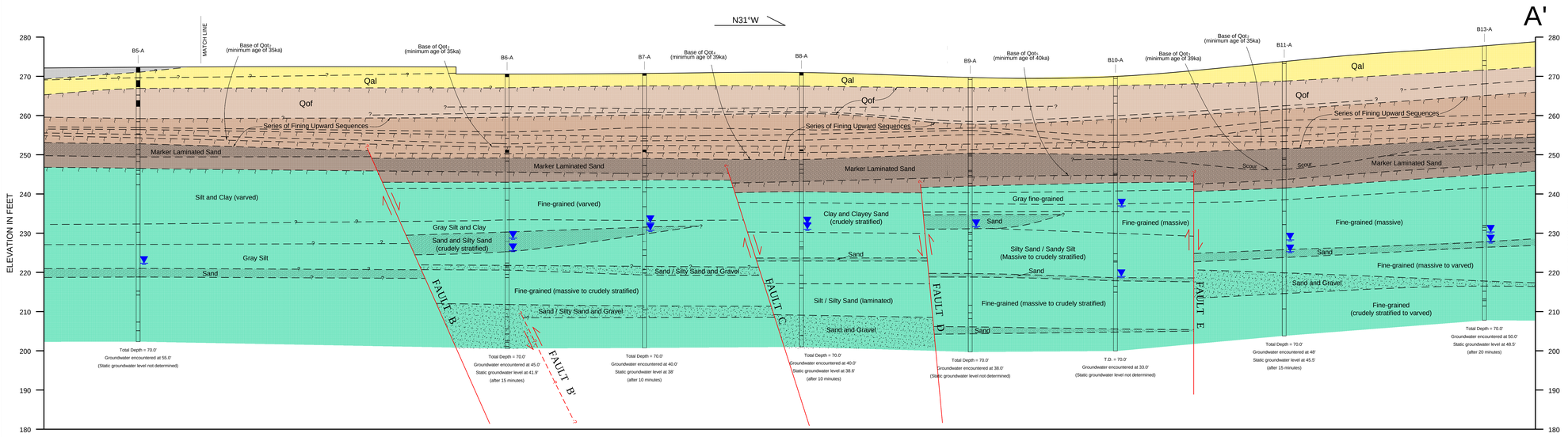
LOG OF TRENCH 2 & 3
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

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

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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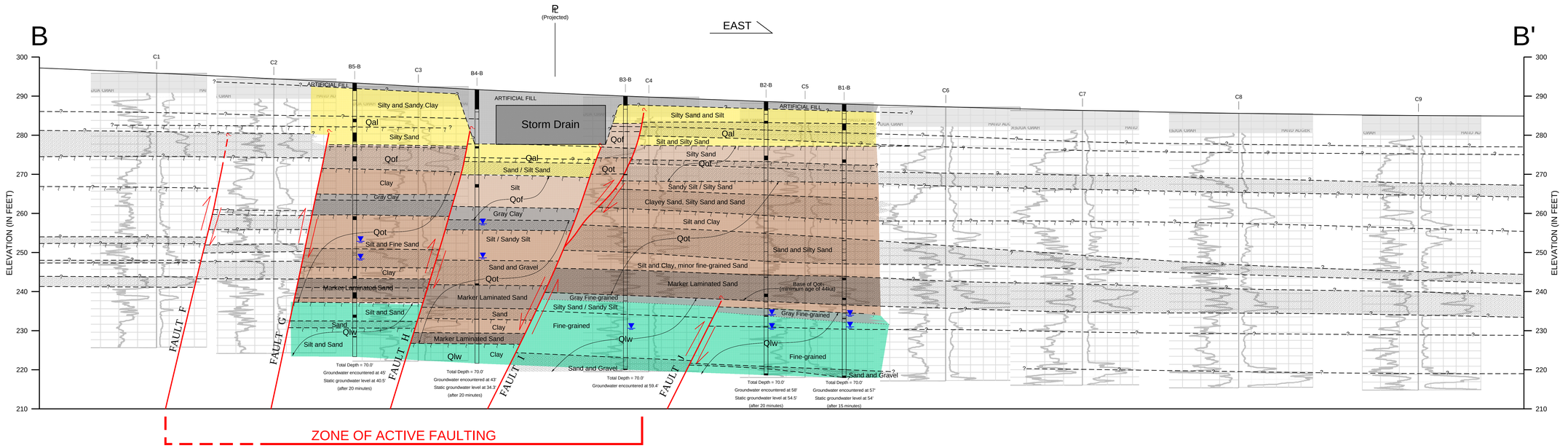
TRANSECT A
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

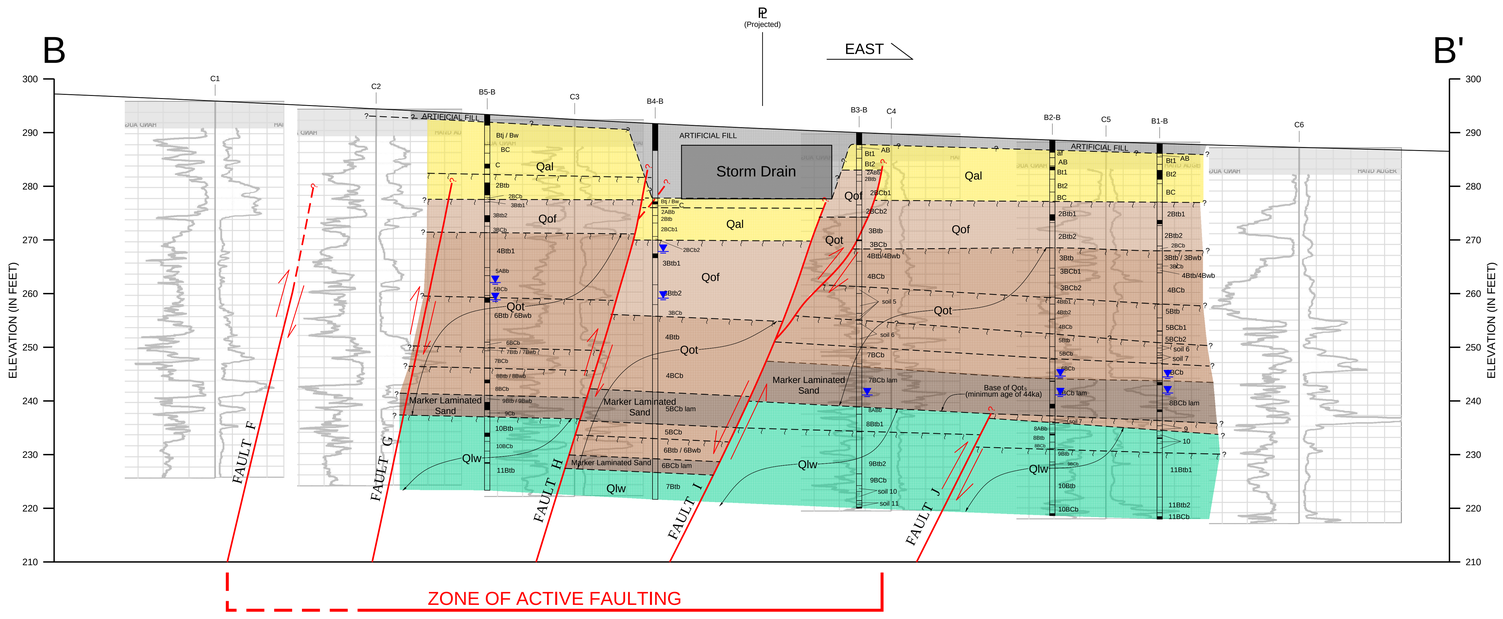
MAY 2014 | PROJECT NO. A9009-06-01A | FIGURE 12

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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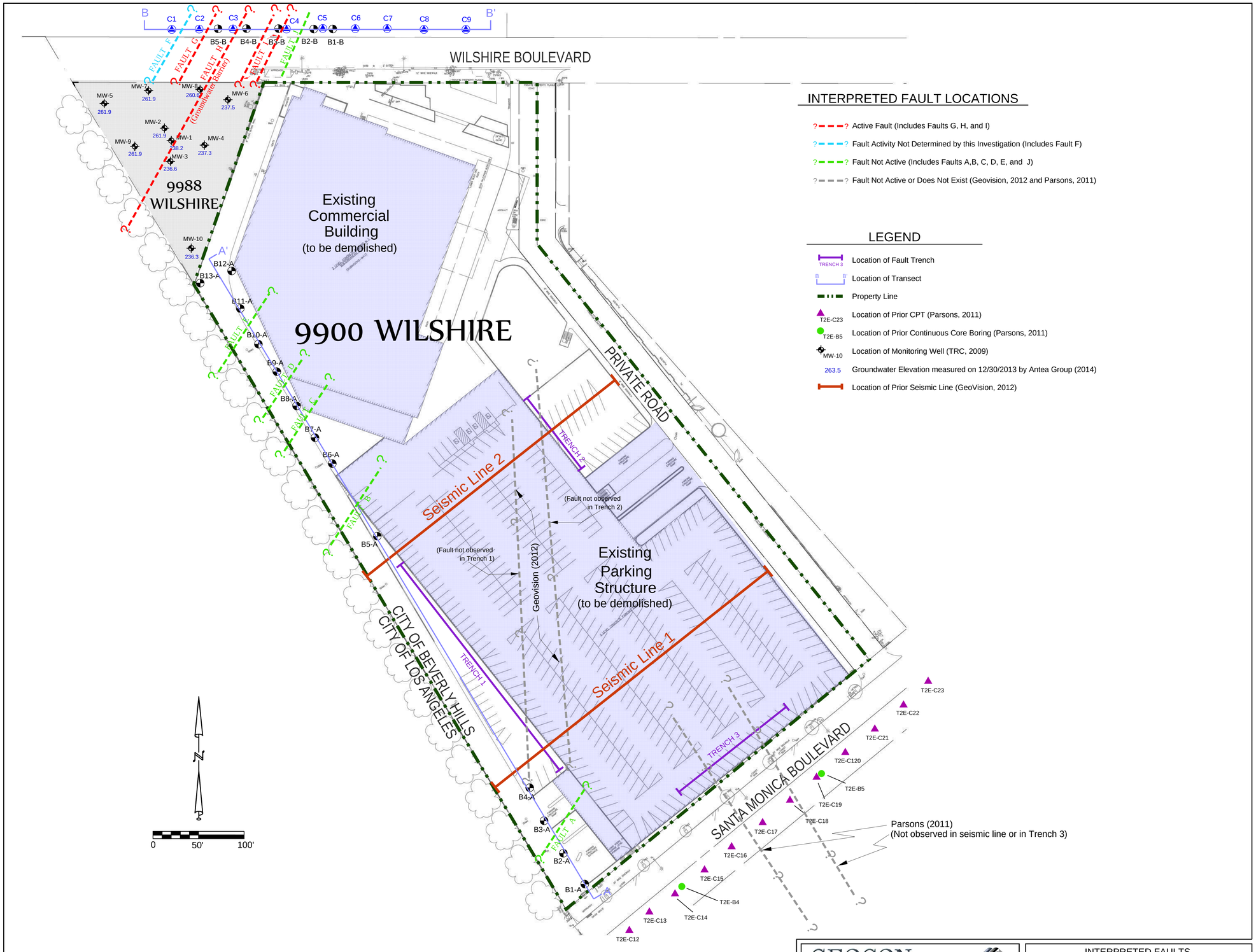
TRANSECT B
FAULT RUPTURE HAZARD INVESTIGATION
9900 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

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



INTERPRETED FAULT LOCATIONS

- ?– – –? Active Fault (Includes Faults G, H, and I)
- ?– – –? Fault Activity Not Determined by this Investigation (Includes Fault F)
- ?– – –? Fault Not Active (Includes Faults A,B, C, D, E, and J)
- ?– – –? Fault Not Active or Does Not Exist (Geovision, 2012 and Parsons, 2011)

LEGEND

- TRENCH 3 — Location of Fault Trench
- B B' — Location of Transect
- Property Line
- 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)

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

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

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

B
C1
C2
C3
C4
C5
C6
C7
C8
C9
B'
B5-B
B4-B
B3-B
B2-B
B1-B
FAULT F
FAULT G
FAULT H
(Groundwater Barrier)
FAULT I
FAULT J
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
50 foot wide
Structural Setback
Area Cleared of
Active Faults
MW-10
236.3
A'
B12-A
B13-A
B11-A
FAULT E
B10-A
B9-A
FAULT D
B8-A
N
Scale: 1" = 50'

LEGEND

- Active Fault
- Fault Activity Not Determined by this Investigation
- Fault Not Active
- B — B' Location of Transect
- Property Line
- MW-10 Location of Monitoring Well (TRC, 2009)
- 263.5 Groundwater Elevation measured on 12/30/2013 by Antea Group (2014)

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

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AREA CLEARED OF ACTIVE FAULTS

FAULT RUPTURE HAZARD INVESTIGATION

9900 WILSHIRE BOULEVARD

BEVERLY HILLS, CALIFORNIA

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

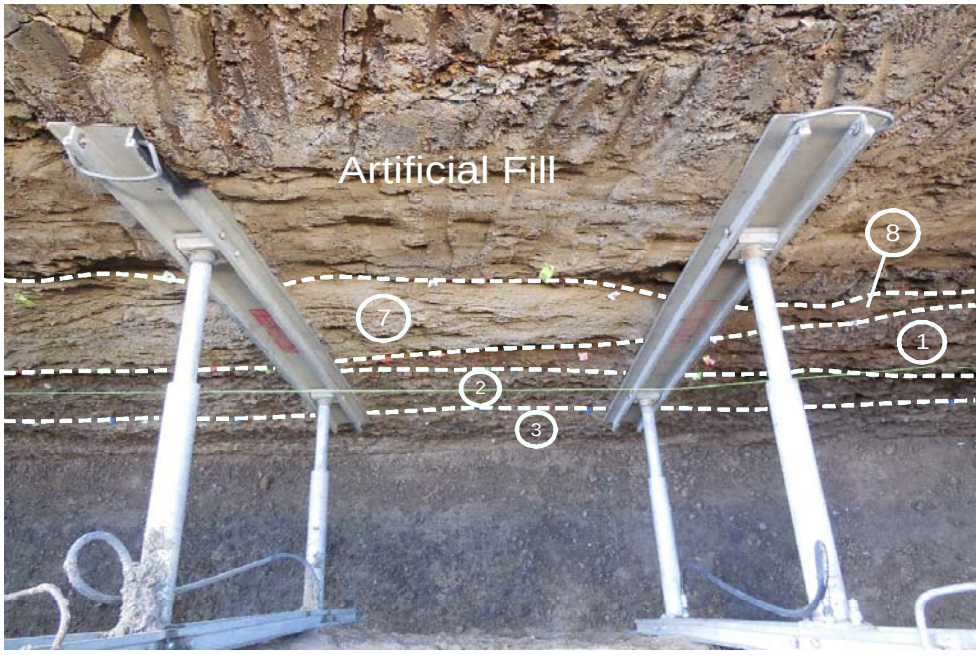

Photo 4: Trench 1 – Young alluvial deposits, channel deposits, and underlying older fan deposits (Station 2+75)

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

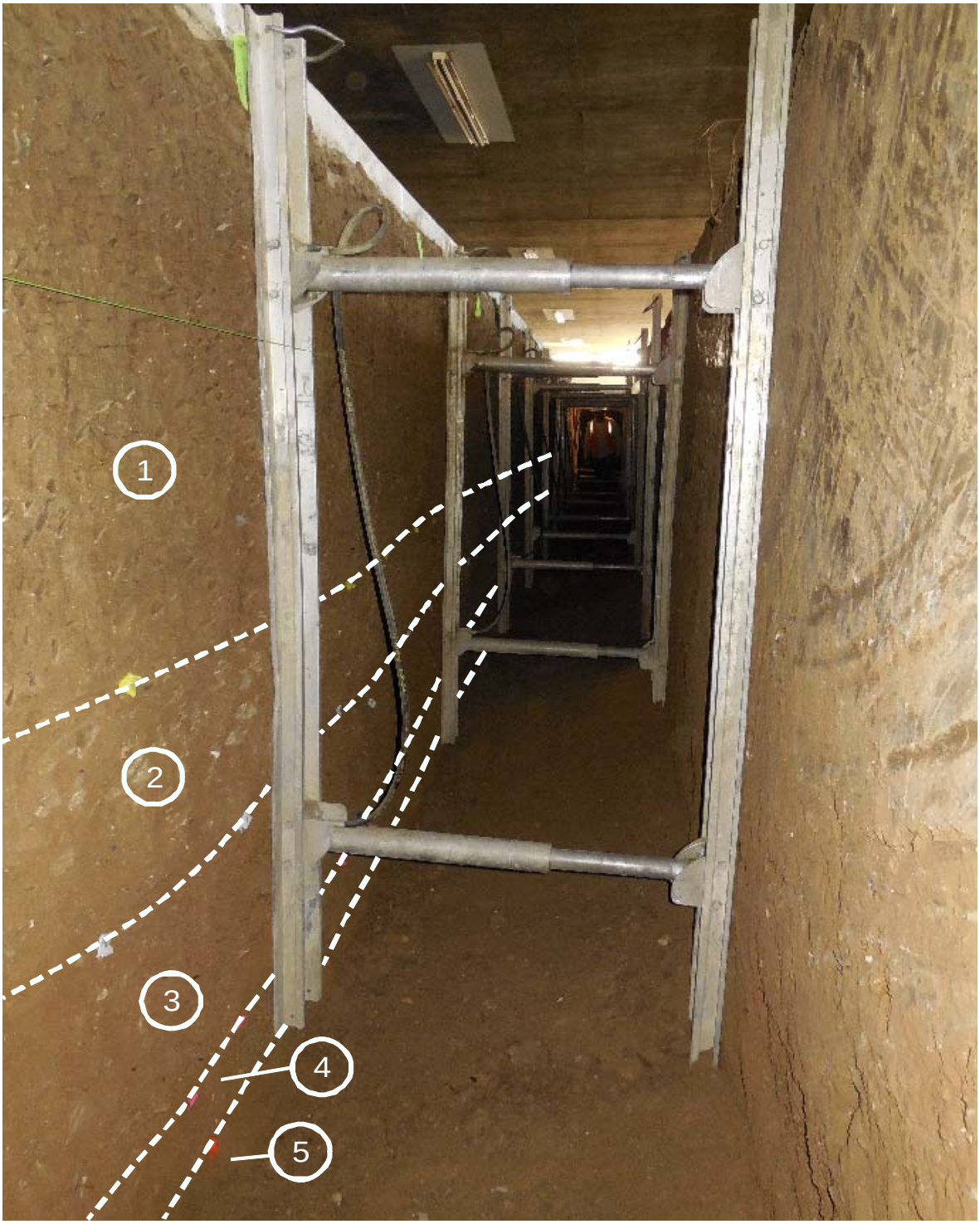

Photo 7: Trench 3 – Looking east from Station 0+60

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

GEOCON

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

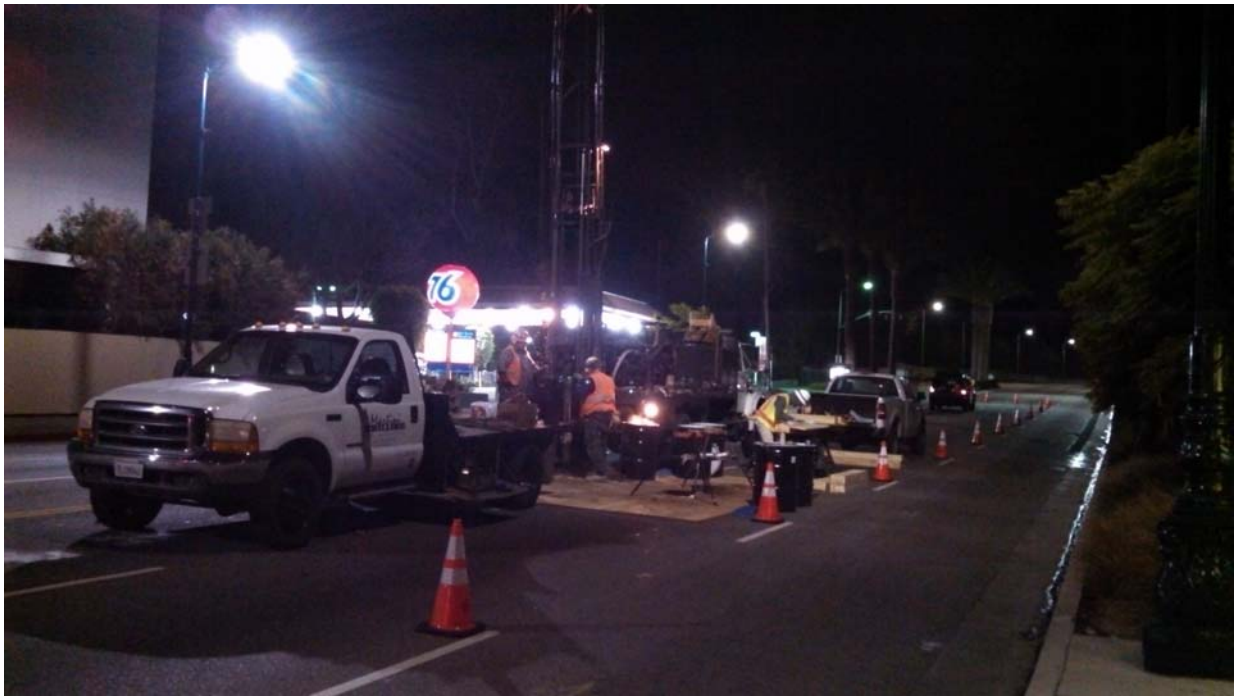

Photo 13: Drilling operation boring B4-B

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

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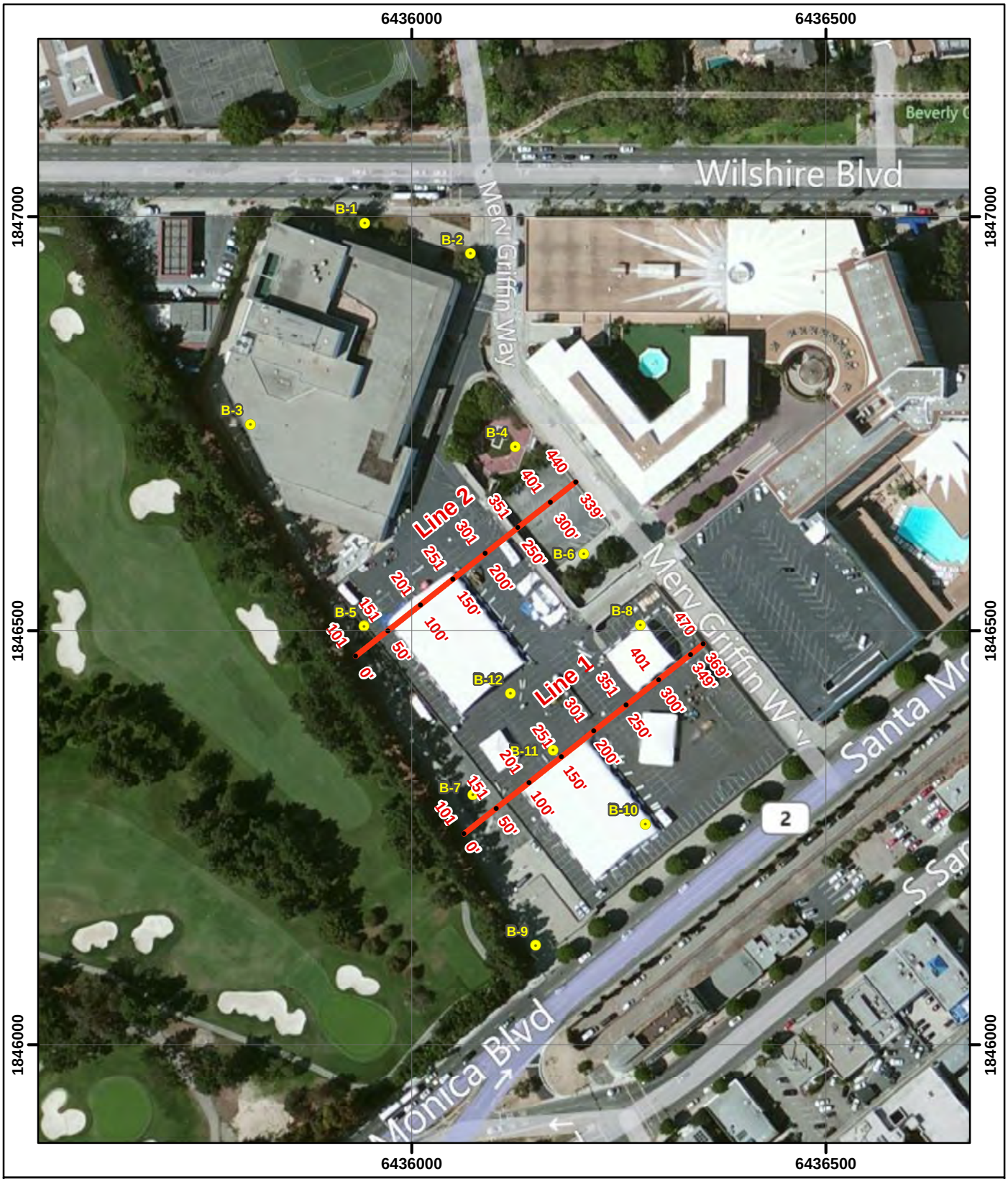
SITE PHOTOS 17 & 18		
FAULT RUPTURE HAZARD INVESTIGATION 9900 WILSHIRE BOULEVARD BEVERLY HILLS, CA		
A9009-06-01A	May 2014	Figure A11

APPENDIX B

GEOVISION PRELIMINARY FAULT INTERPRETATIONS



Legend

- S-Wave Seismic Reflection Line with Stations and Distances
- Approximate Estimated Borehole Locations

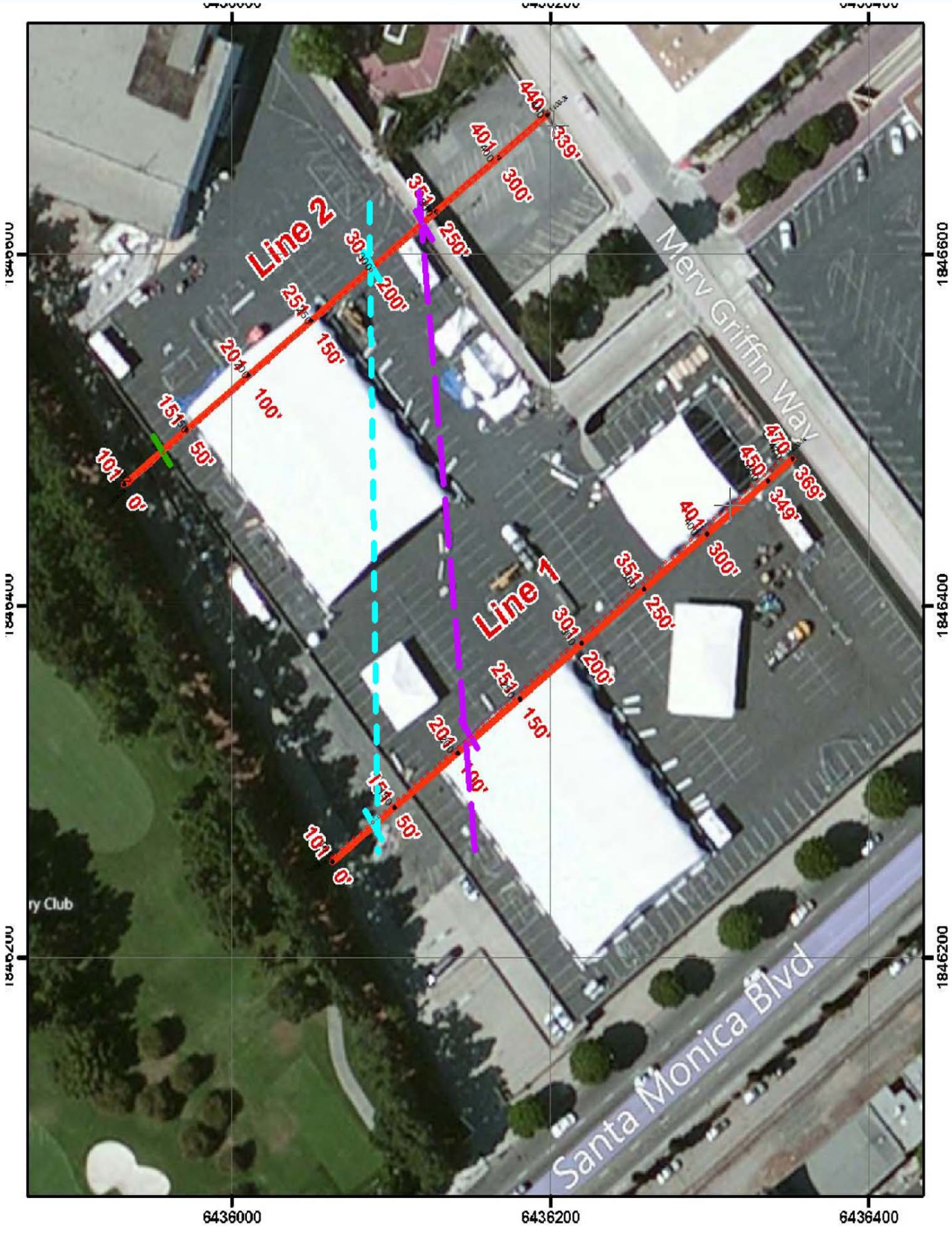
0 50 100 150
Feet

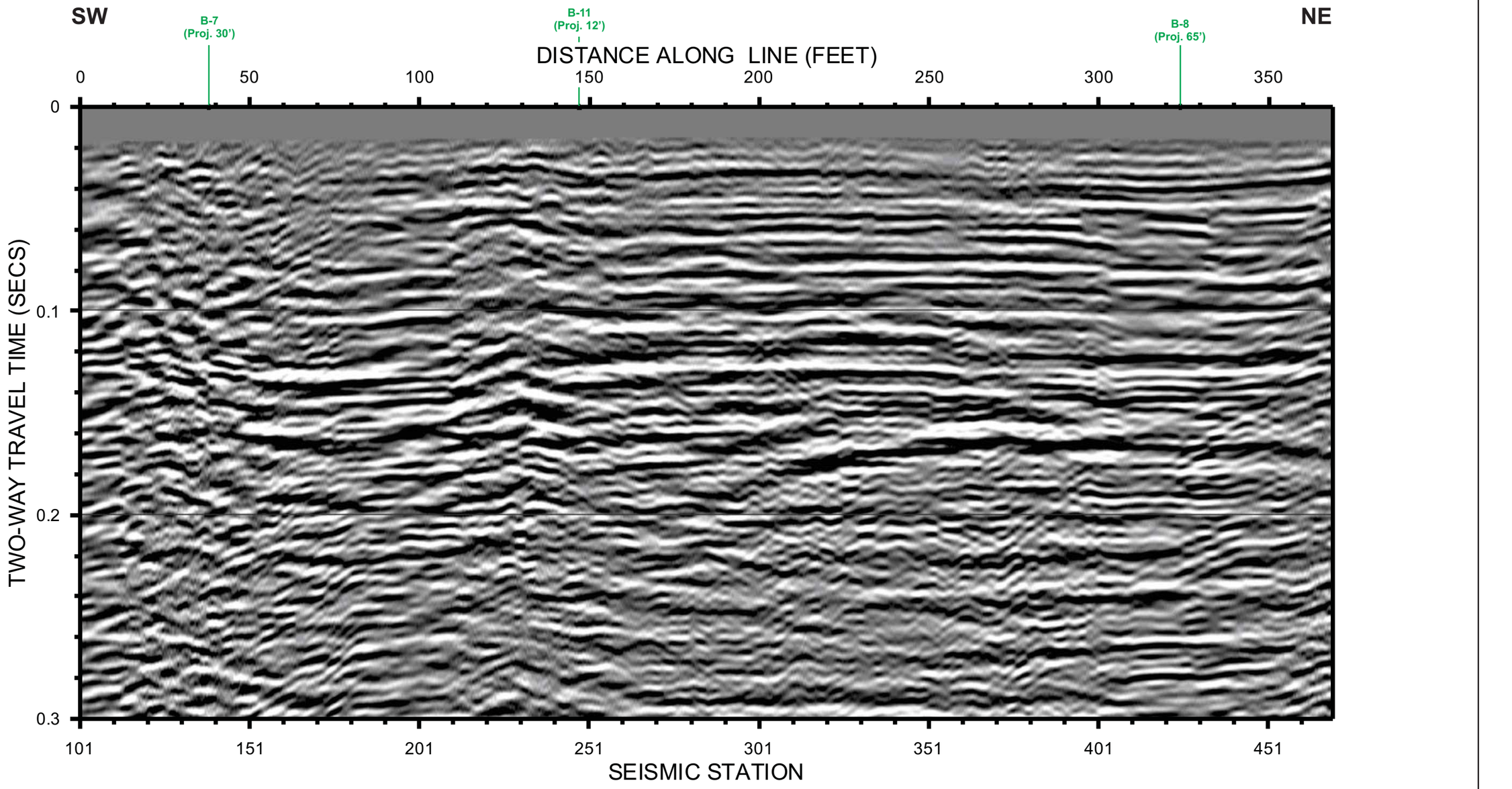
N

NOTES:
1. California Station Plane Coordinate System, NAD 83 Zone V (0405), US Feet
2. Image Source: (c) Microsoft Corporation and its data suppliers

GEOVision geophysical services

Date: 1/5/2012	**FIGURE 1** **SITE MAP**
GV Project: 11409	**SITE LOCATED AT** **9900 WILSHIRE BLVD** **SANTA MONICA, CALIFORNIA**
Developed by: D Carpenter	
Drawn by: T Rodriguez	**PREPARED FOR** **AMEC, INC.**
Approved by: W Dalrymple	
File Name: GV_11409-1	


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.

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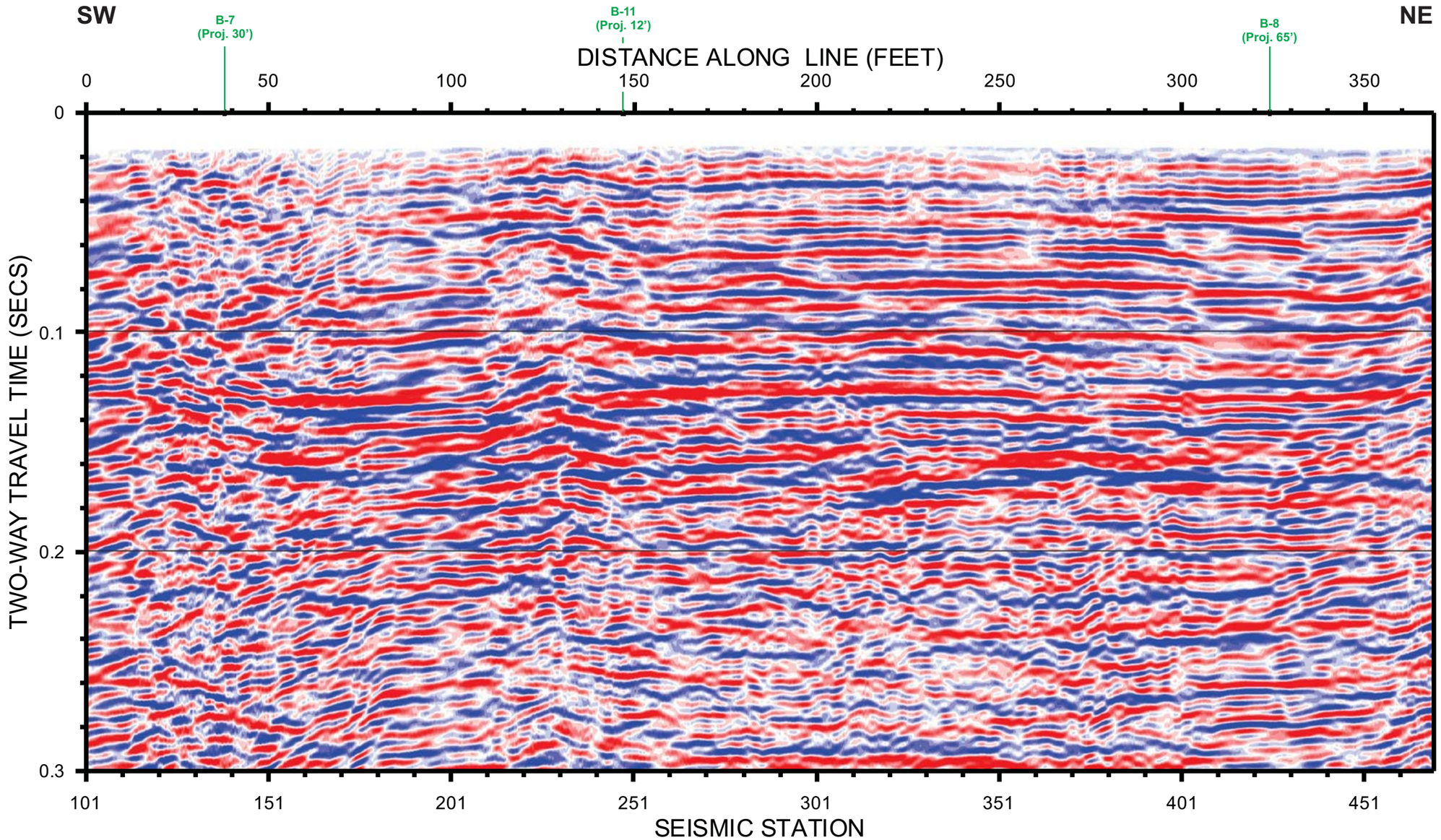
Project No. 11409	PRELIMINARY FIGURE 4 LINE 1 - S-WAVE SEISMIC SECTION WITHOUT INTERPRETATION
Date: JUL 03, 2013	9900 WILSHIRE BLVD SANTA MONICA, CALIFORNIA
Drawn By: DALRYMPLE	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
File C:\GVPROJECTS\11409\F4.cdr	



LEGEND

B-7 (Proj. 30') — Borehole Location

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

GEOVision geophysical services

Project No. 11409	PRELIMINARY FIGURE 5 LINE 1 - 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
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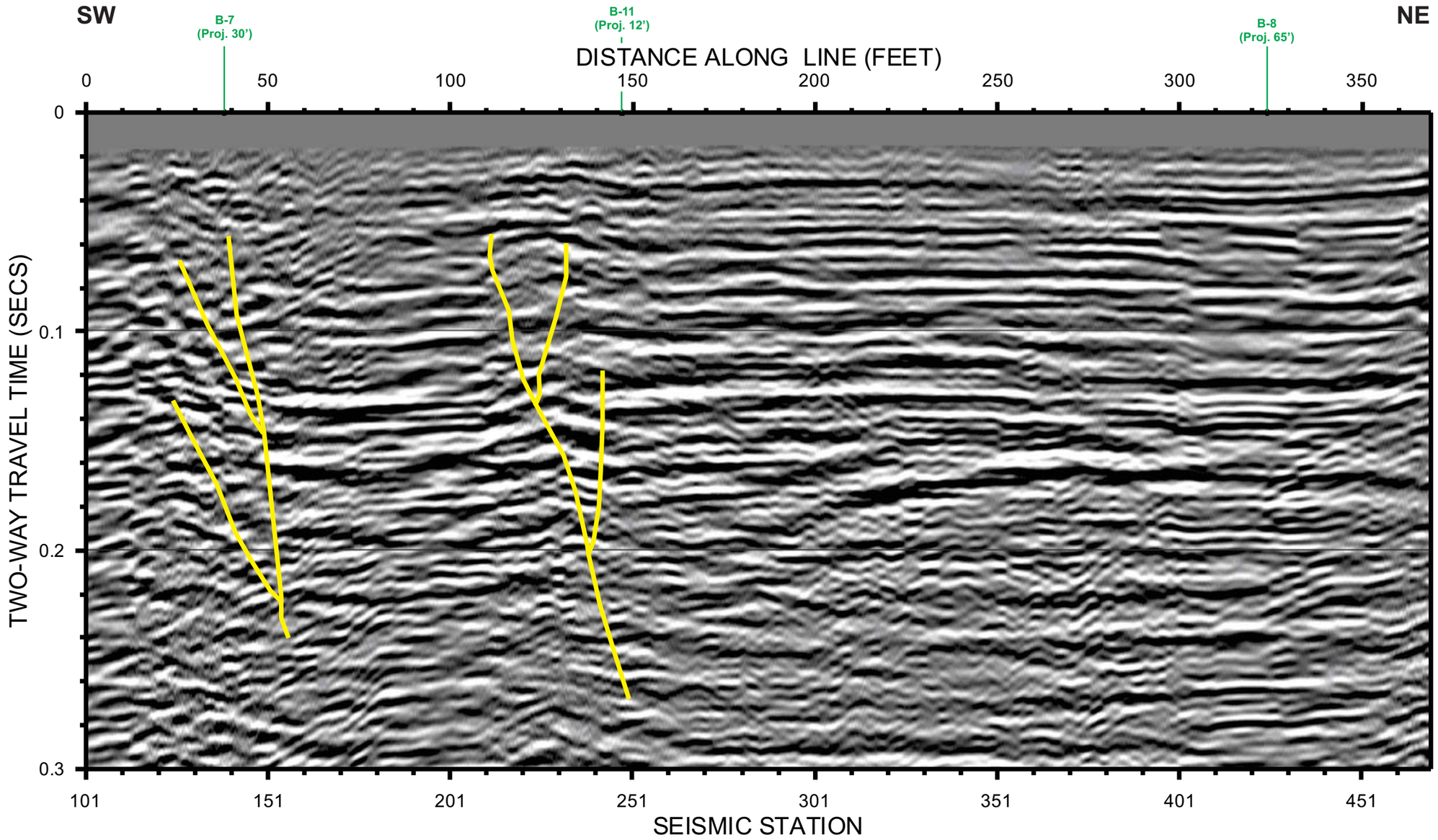


LEGEND

B-7 (Proj. 30') — Borehole Location

Preliminary Interpreted Anomaly

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

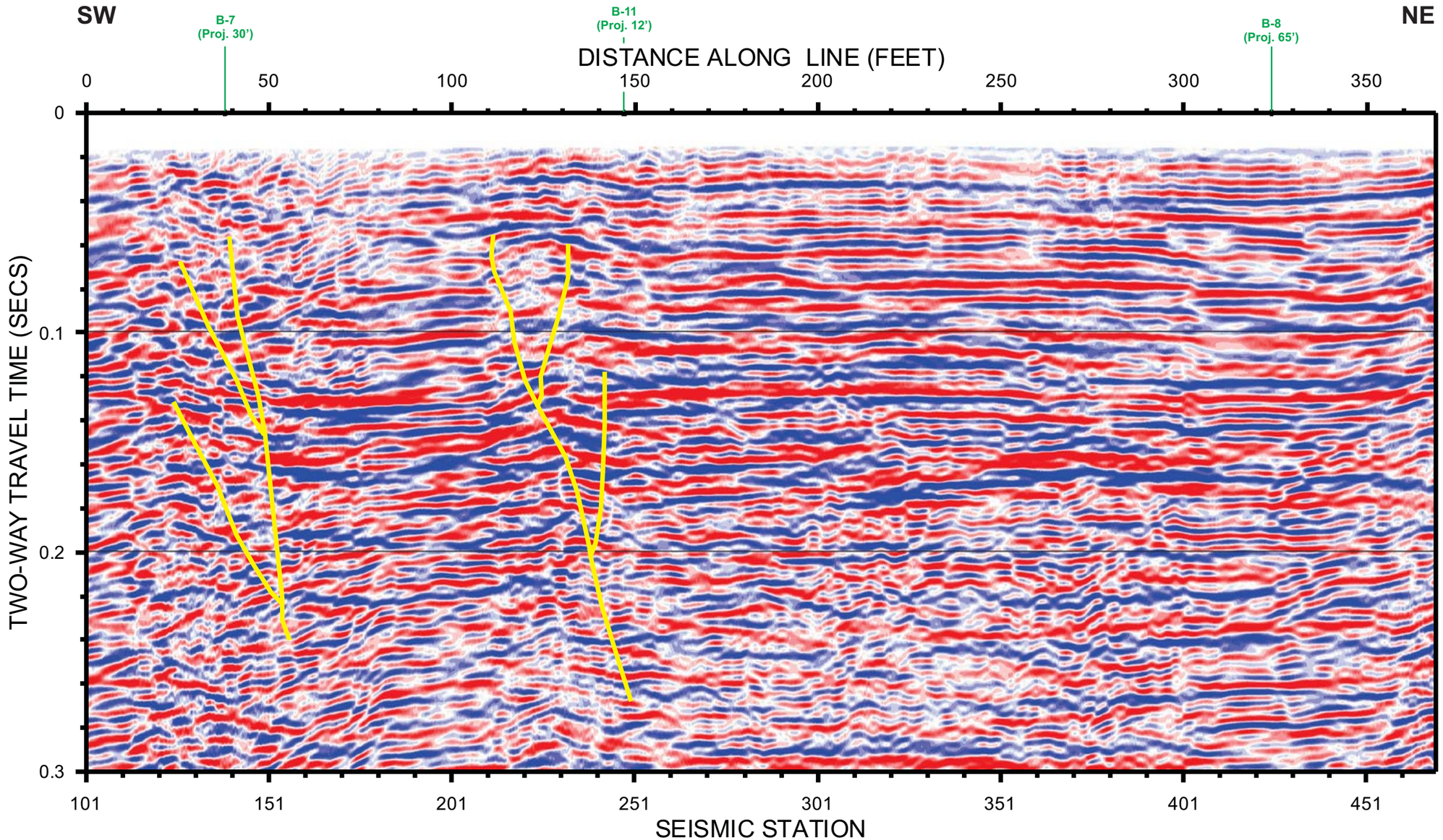
GEOVision geophysical services

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

Project No. 11409
Date: JUL 03, 2013
Drawn By: DALRYMPLE
Approved By:
File C:\GVPROJECTS\11409\F6.cdr

9900 WILSHIRE BLVD
SANTA MONICA, CALIFORNIA

PREPARED FOR
AMEC ENVIRONMENT AND INFRASTRUCTURE



LEGEND

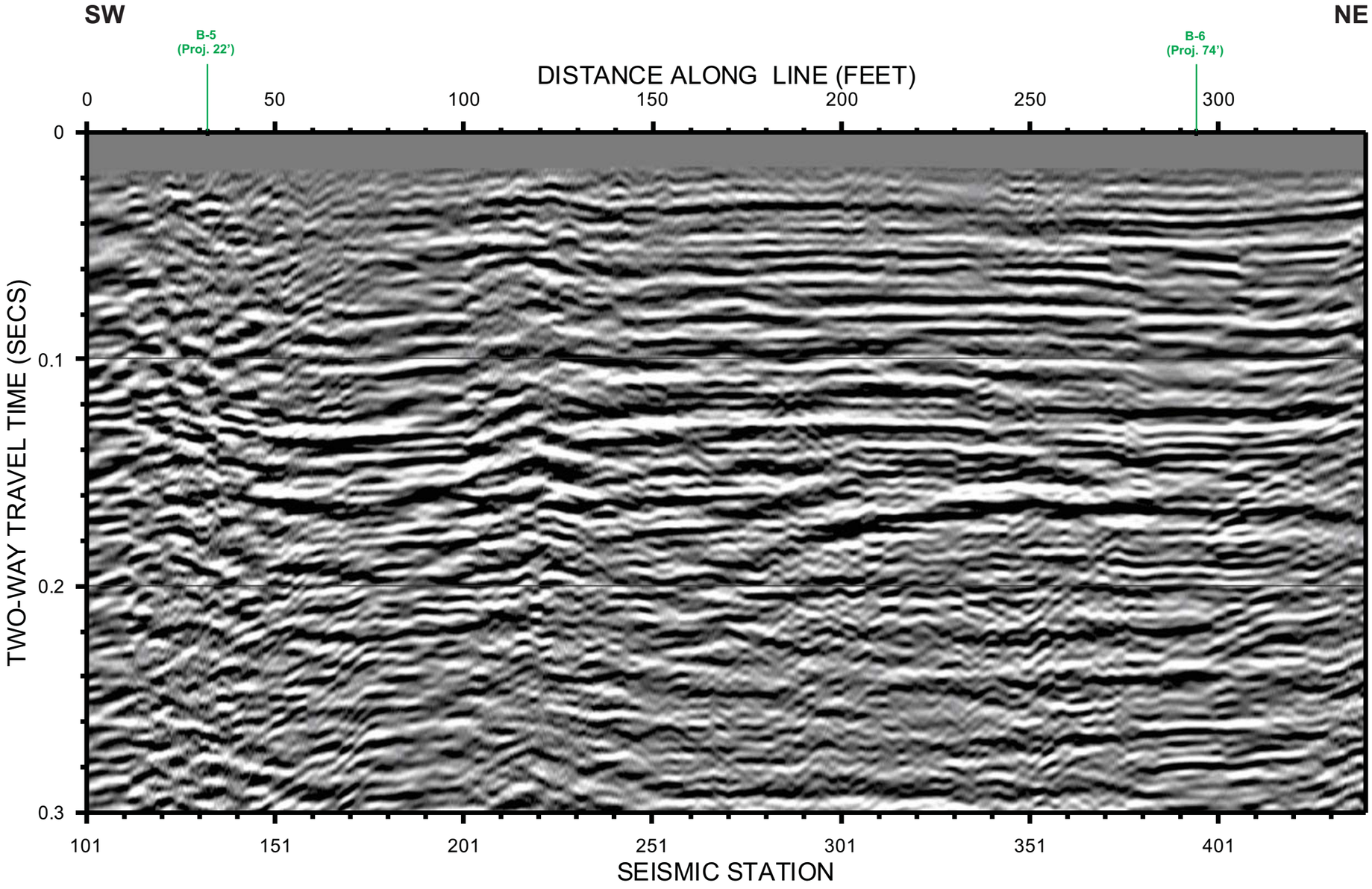
B-7 (Proj. 30') — Borehole Location

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	

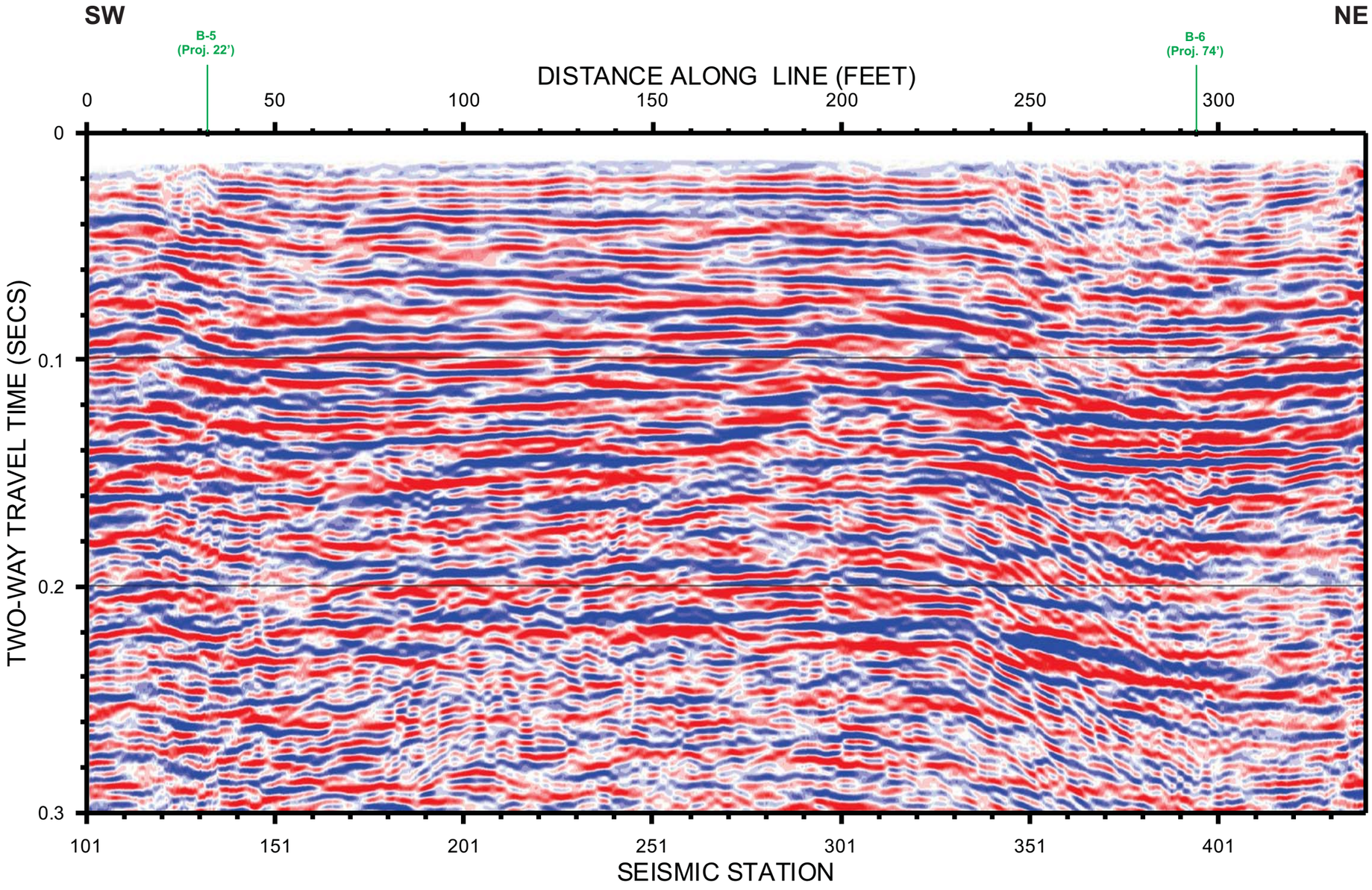


LEGEND

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	
Approved By:	PREPARED FOR AMEC ENVIRONMENT AND INFRASTRUCTURE
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.

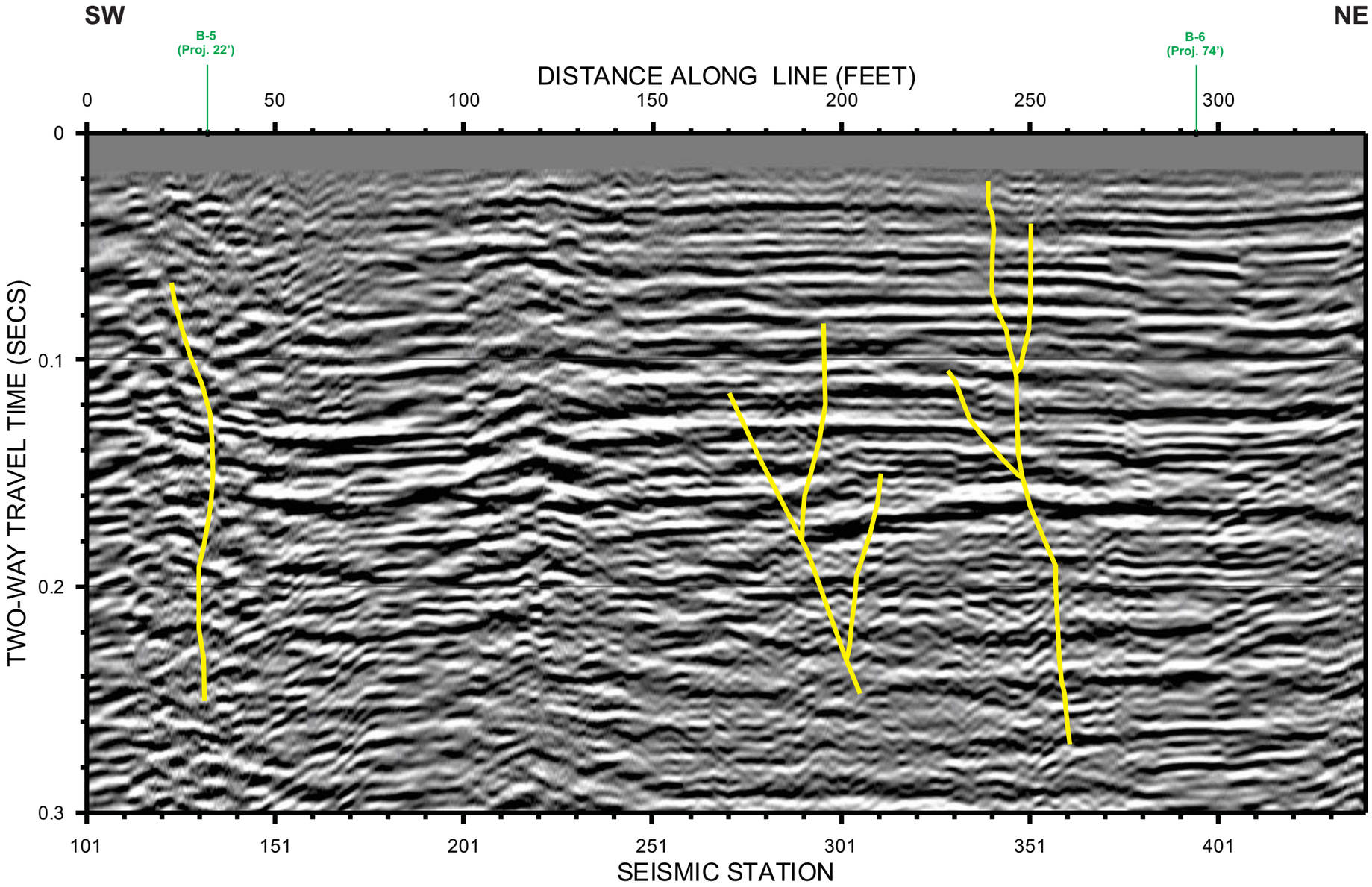
GEOVision geophysical services

PRELIMINARY FIGURE 9
LINE 2 - S-WAVE COLOR SEISMIC
SECTION WITHOUT INTERPRETATION

Project No. 11409
Date: JUL 03, 2013
Drawn By: DALRYMPLE
Approved By:
File C:\GVPROJECTS\11409\F9.cdr

9900 WILSHIRE BLVD
SANTA MONICA, CALIFORNIA

PREPARED FOR
AMEC ENVIRONMENT AND INFRASTRUCTURE



LEGEND

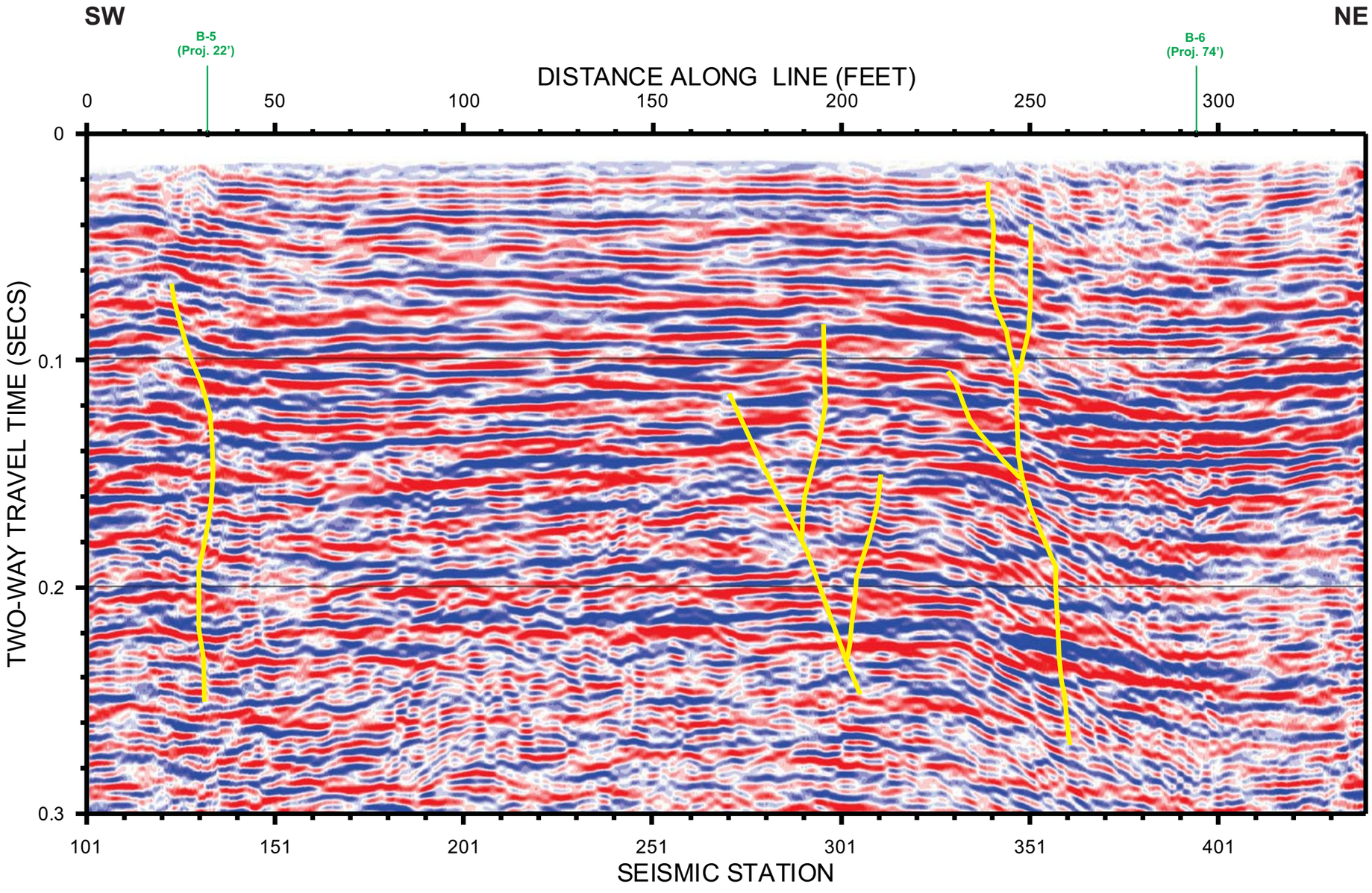
B-6 (Proj. 74') — Borehole Location

Preliminary Interpreted Anomaly

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

GEOVision geophysical services

Project No. 11409	PRELIMINARY FIGURE 10 LINE 2 - S-WAVE 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\F10.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	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

BORING B1-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		
				8		7.35' - 10' - No Recovery
				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").
2	4	100		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").
				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
					SM/ML	nodules, weakly laminated.
				20		

Figure C-1a

BORING B1-A (continued)

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		
				22		21.1 to 21.7'- gravel content increases, brown (7.5YR 4/4) and dark gray (7.5YR 4/1), 21.7' -to 23.1' - faint varves
3	5	80		23		
				24	ML	**LAKEWOOD FORMATION (Qlw)** 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

BORING B1-A (continued)

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

BORING B1-A (continued)

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
				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.
7	13	80		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
				65		
				66		
				67		
7	14	100		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").
				71		
				72		
8	15	100		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

BORING B2-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
				5		
				6		6.2' - 7.4' - No Recovery; rock in core
1	2	76		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		
				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.
2	3	100		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		
					SP	15.25'- Sand, dark yellowish brown (10YR 4/4), very fine-grained, some gravel (to ½"). trace silt.
				16	**SC/CL**	16.4'- Clayey Sand to Clay with Sand, brown (7.5YR 4/4), slightly moist.
2	4	100		17		
				18		
					SP	18.4'- Sand, dark yellowish brown (10YR 4/4), fine-grained, trace medium and coarse, minor gravel (to ½"), massive to weakly laminated.
				19		
				20		

Figure C-2a

BORING B2-A (continued)

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.
3	5	100		22	ML	21.6'- Silt with Sand , dark yellowish brown (10YR 3/4), very fine-grained, thickly laminated.
				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.
3	6	100		25		25.3' - grades to Clayey Sand
				26		26.8' to 27.5 - trace calcium carbonate nodules
				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.
4	7	100		30	ML	30.0'- Silt with Sand, dark yellowish brown, minor clay, faint oxidation striping.
				33		32.6'- manganese staining, few manganese nodules
4	8	100		38	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

BORING B2-A (continued)

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
					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.
				41		
					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.
				42		
5	9	100				
				43		
				44		
						44.8' - oxidized, varved.
				45		
				46		
				47		
5	10	100				
				48		
					ML	48.3'- Sandy Silt, trace gravel (less than 1/4' in size), fine-grained, faint oxidtion striping, varved.
				49		
				50		
				51		
				52		
6	11	100				
				53		53.8' - no oxidation striping
				54		
				55		
					SP	55.0'- Sand with Gravel, brown (7.5YR 4/4), minor silt, fine- to medium-grained, gravel subangular (to 1").
				56		
					ML/SM	56.1'- Silt with Sand to Silty Sand, dark yellowish brown (10YR 3/4), minor clay, trace to minor gravel (to 1").
				57		Sandy Silt, dark yellowish brown (10YR 3/4), some clay.
6	12	100				
				58		
					SM	58.3'- Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, trace to minor clay, trace gravel (to ½").
				59		
				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

BORING B2-A (continued)

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
				61		predominantly slate (to 1/2'; few to 3 inches), subangular to surounded.
				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

BORING B3-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

BORING B3-A (continued)

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").
				-		
				27 --		
3	6	100		-		
				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"),
				29 --		varved.
				-		
				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

BORING B3-A (continued)

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
					ML	41.2'- Silt with Sand, gray (7.5YR 5/1), fine grained.
				41		
				42		
					SM/ML	42.2'- Sandy Silt to Silt with Sand, brown (7.5YR 4/2) to dark grayish brown (10YR 4/2), very
5	9	100		43		fine-grained, weakly laminated.
					CL/ML	43.3'- Clay with Sand to Silt with Sand, brown (7.5YR 4/2) to dark grayish brown (10YR 4/2),
				44		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").
				47		
5	10	100			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,
				51		very fine-grained, locally massive to weakly laminated.
				52		
6	11	100		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,
6	12	100		58		minor gravel (to 1/2"), crudely stratified.
				59		58.7' - dark yellowish brown (10YR 3/4)
				60		

Figure C-3c

BORING B3-A (continued)

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		
				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.
7	13	100		**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

BORING B4-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
				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	1	100				1.4' - Silty Sand, very dark grayish brown (10YR 3/2), trace gravel (to ¼"), fine-grained,
				3	SM/ML	plugged with clay.
						2.4' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/4), fine-grained,
				4		faint laminations, manganese staining.
					SM	3.1' - Silty Sand with Clay, dark yellowish brown (10YR 4/4), trace to minor gravel (to 1";
				5		predominantly ⅛" or less), fine-grained, oxidized.
				6		
				7		
1	2	100				
				8		
					ML	8.3' - Silt with Sand, brown (7.5YR 4/4), trace gravel (to ½") ; slate and diatomaceous siltstone
				9		clasts, subangular-subrounded.
				10		10' -Sand with Silt, brown (7.5YR 4/4), fine-grained.
					SM	
					SM/ML	10.3' - Silty Sand to Silt with Sand, brown (7.5YR 4/4), trace to minor gravel, trace clay,
				11		fine- to medium-grained, massive.
					SP-SM	11.3' - Sand with Silt, brown (7.5YR 4/4), trace to with gravel, medium-grained, massive.
				12	ML	11.8' - Silt with Sand, brown (7.5YR 4/4), fine-grained, faint laminations.
2	3	100				
				13		
				14	SM	13.5' - Silty Sand, brown (7.5YR 4/4), fine- to medium-grained, massive.
					ML	14' - Silt with Sand, brown (7.5YR 4/4), trace to minor clay, fine-grained, faint laminations.
				15		
					SM	15.2' - Silty Sand with clay, dark yellowish brown (10YR 3/4), fine-grained, massive.
				16		
					ML	16.3' - Silt with Sand, dark yellowish brown (10YR 3/6), minor clay, fine-grained,
				17		teace manganese staining, faint laminations.
2	4	100				
				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		19.8' - Sand to Sand with Silt, dark yellowish brown (10YR 4/4), minor gravel (to 2"), fine-grained,
					SP-SM	massive to crudely stratified.

Figure C-4a

BORING B4-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
				20		
					SP/SW	20.3' - fine- to medium-grained, some coarse, gravel predominantly slate (to 1/4"), crudely stratified.
				21		
3	5	100		22		
				23		
						LAKEWOOD FORMATION (Qlw)
				24	ML	23.8' - Silt, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), minor clay, very fine-grained, oxidation mottling, varved.
				25		
					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.
				26		
3	6	100		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.
				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.
4	7	100		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").
				36		
				37		37' - dark yellowish brown (10YR 3/6)
4	8	100		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

BORING B4-A (continued)

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
				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		
5	9	100			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		
				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)
5	10	100				
				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		
				50		
				51		
				52		
6	11	100				
				53		
				54		
				55		
				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.
6	12	100				
				58		
				59		
				60		

Figure C-4c

BORING B4-A (continued)

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
7	13	40		60		62.0' to 65.0' - No Recovery
7	14A	50		65		66.25' to 67.5 - No Recovery
7	14B	100		67.5	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").
				70		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.

Figure C-4d

BORING B5-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
				0		Started sampling at 1.3'
				1		**ALLUVIUM (Qal)**
					SM	Silty Sand, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace to minor gravel (to 1/4"), massive.
1	1	57		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		
				6		**OLDER ALLUVIUM (Qoal)**
					SM	5.4' - Silty Sand, brown (7.5YR 4/4), plugged with clay, trace gravel (to ¼"; predominantly⅛").
1	2	70		7		
					SM	7.1' - Silty Sand with Clay and Gravel, brown (7.5YR 4/4), fine-grained, massive, oxidized, minor secondary clay.
				8		
				9		8.5' - 10' - No Recovery
				10		
					SM	10' - Silty Sand, brown (7.5YR 4/4), minor to with gravel (to 1/4") and secondary clay, massive.
				11		
				12		
2	3	100		13		13.1' - Silt with Sand, brown (7.5YR 4/4), very fine-grained, trace to minor clay, massive.
					ML	
				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
					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.
2	4	100		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

BORING B5-A (continued)

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

BORING B5-A (continued)

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
5	10	100		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")
				47		
				48		
				49		
				50		
				51	SP-SM	51.5' - Sand with Silt and Gravel, dark yellowish brown (10YR 4/4), massive, oxidized.
6	11	100		52	ML	51.9' - Silt, dark yellowish brown (10YR 3/4) and dark gray (10YR 4/1), trace clay, massive, oxidized.
				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
6	12	100		56		
				57		
				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

BORING B5-A (continued)

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
				60		Same as Previous
				61		
				62		
7	13	100		**63**		
				64		
				65		65' to 67.2' - with gravel (to 1/2")
				66		
				67		
7	14	100		**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

BORING B6-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)
				1		Silt with Sand and Clay, dark brown (10YR 3/3), very fine- to fine-grained, trace gravel (to 1/4"), massive.
				2		
				3		**OLDER ALLUVIUM (Qoal)**
					ML/SM	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
				4		increases with depth.
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.
				11		
2	3	100		12	**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")
				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
2	4	86		18		slate (to 1/4"), subangular, massive.
					ML	18.5' - Silt, dark yellowish brown (10YR 3/4), trace to minor sand, very fine-grained, trace
				19		fine gravel (10 1/4"), massive.
				20		19.4' - 20' - No Recovery

Figure C-6a

BORING B6-A (continued)

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.
				22		
3	5	100			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.
				26		
				27		
3	6	100				**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		
				32		32.2' - Clay with Silt, dark brown (7.5YR 3/2) and dark gray (7.5YR 4/1), trace to minor sand,
4	7	100			CL/ML	fine-grained, varved. Some manganese staining along beds. Increase in sand content with depth.
				33		
				34		
				35		
				36		
				37		
4	8	100				37.2' - grades to dark gray (7.5YR 4/1), oxidation along bedding, trace calcium carbonate nodules
				38		
				39		
				40		

Figure C-6b

BORING B6-A (continued)

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		
					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.
				41		
				42		
5	9	100				42.9' to 44' - silt interbeds
				43		
				44		
				45		
					ML	45.3' - Silt, dark gray (10YR 4/1), weakly laminated.
				46		
				47		
5	10	100				
				48		
						48.2' - Sand with Silt , brown (10YR 4/3), minor gravel (to 1"), subangular, massive.
				49		
					SM	49' - Silty Sand, dark yellowish brown (10YR 3/4), fine-grained, trace gravel (to 1"), massive.
				50		
					ML	50' - Silt, dark gray (10YR 4/1), some oxidation stringers, few calcium carbonate nodules, massive.
				51		
					SP	51.1' - Sand, dark yellowish brown (10YR 4/4), fine-grained, trace coarse, trace subrounded gravel (to 1/2"), crudely stratified.
				52		
6	11	100			ML	51.9' - Silt, dark gray (10YR 4/1), massive, some oxidation stringers, trace calcium carbonate nodules, massive.
				53		
					SP	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.
				54		
					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.
				55		53.7' to 53.9' and 56.7' to 56.9' - gravel beds
				56		54' to 58' - oxidation mottling
				57		
6	12	100				,,
				58		58' - increase in gravel
				59	SM/ML	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

BORING B6-A (continued)

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				61.9' - 65 - No Recovery
				63		
				64		
				65		
					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.
				66		
					SP-SM	66.3' - Sand with Silt and Gravel, dark brown (10YR 3/3), massive. Gravel subrounded.
				67		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

BORING B7-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.
				3	ML	**OLDER ALLUVIUM (Qoal)** 3.2' - Silt with Sand and Gravel, dark yellowish brown (10YR 3/4), very fine-grained, oxidation mottling.
1	2	100		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.
2	3	100		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.
				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.
2	4	90		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.
				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

BORING B7-A (continued)

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.
3	6	100		27	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

BORING B7-A (continued)

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.
				46		
5	10	28		47		46.4' to 50' - No Recovery
				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		
6	12	100		57		
				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

BORING B7-A (continued)

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

Figure C-7d

BORING B8-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
				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		
1	1	100		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.
				5		3.5' - 5.3' - trace gravel
						5.3' - 8.9' - with gravel
				6		
				7		
1	2	100		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.
				12		
2	3	100		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			**SM**	17.3' - Silty Sand with Gravel, dark yellowish brown (10YR 3/4), fine- to medium-grained,
				18		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
						19.7' - 20' - No Recovery
				20		

Figure C-8a

BORING B8-A (continued)

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.
3	5	100		22		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.
3	6	100		27	ML	26.8' - Silt, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), fine-grained, varved.
				28		28' - Silty Sand, dark gray (7.5YR 4/1), fine-grained, massive.
				29		30' - with sand, fine-grained
				30		
				31	CL	**LAKEWOOD FORMATION (Qlw)** 30.4' - Silty Clay, dark grayish brown (10YR 4/2) and dark gray (7.5YR 4/1), trace sand, fine-grained, massive.
4	7	100		32		31.7' - varved
				33		
				34	CL/SC	33.2' -Clay with Sand to Clayey Sand, brown (10YR 4/3), fine-grained, trace gravel (to 1/4"), crudely stratified.
				35		
				36		
4	8	100		37		
				38		
				39		
				40		

Figure C-8b

BORING B8-A (continued)

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
				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
5	9	90		43		43.2' - minor clay
				44		44.4'- wet
			■	45		44.5' - 45' - No Recovery
				46		
				47		
5	10	100		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.
				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
6	11	100		53		
				54	ML	53.9' - Silt with Sand, dark brown (10YR 3/3), fine-grained, trace to some gravel (to ¼"), thickly laminated.
				55		
				56	SM	55' - Silty Sand, dark brown (10YR 3/3), fine- to medium-grained, minor gravel (to 1/2"), crudely stratified to thickly laminated.
				57		57' - some disseminated manganese nodules along bedding
6	12	100		58		
				59		
				60		

Figure C-8c

BORING B8-A (continued)

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
7	14	42		67		67.1' - 70' - No Recovery
				68		
				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.
				74		Asphalt patched.
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-8d

BORING B9-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
				0		Started sampling at 0.5'
					SM/ML	**ALLUVIUM (Qal)**
				1		Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace to minor clay, massive, porous.
				2		
1	1	100				
				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		
				5		
				6		
				7		7'- gravel to 2"
1	2	100				
				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		
				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.
2	3	100				
				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.
				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.
2	4	91				
				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.
						19.6' to 20' - No Recovery
				20		

Figure C-9a

BORING B9 (continued)

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		23	SM/ML	22.4' - Alternating layers of Silty Sand and Silt with Sand, brown (10YR 4/3),fine-grained, laminated.
				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.
				27		26.7' - grades to sand, trace silt
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		34.7' - increase in sand content
					SP-SM	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

BORING B9-A (continued)

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,
				45		manganese nodules concetrated along bedding.
				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.
6	11	100		52		52.6' - oxidation staining in distinct banded pattern
				53		53.2' - increase in clay content, minor gravel (to 1/4"), oxidized
				54		
				55		55.8' - 57.2' - increase in sand content
				56		
6	12	100		57		57.2' - trace to minor manganese nodules, trace gravel (to 1/16")
				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

BORING B9-A (continued)

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		
				71		Total depth of boring: 70 feet. Depth of fill not determined. Groundwater encountered during drilling at 38 feet; static groundwater level not determined. Backfilled with soil cuttings and tamped. Concrete patched.
				72		
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-9d

BORING B10-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
				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		
1	1	100			**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		
				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
1	2	100		7		
				8		
				9	**SM**	9.1' - Silty Sand with Clay, dark yellowish brown (10YR 3/4), trace gravel (to 1/4"), massive.
				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.
2	3	100		12		
				13		
				14		
				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.
2	4	90		18		18.1' to 18.3' - increase in sand content
				19		
				20		19.5' - 20' - No Recovery

Figure C-10a

BORING B10-A (continued)

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		
				22	SM	21.1' - Silty Sand, dark yellowish brown (10YR 4/4), very fine-grained, trace clay and gravel (to ¼"), massive.
3	5	93		23		22.4' - increase in sand content
				24		23.4' to 25.2' - laminated
				25		24.7' - 25' - No recovery
				26	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.
				27		26.6' - 27.1' - increase in sand content,
3	6	100		28	SC	**LAKEWOOD FORMATION (Qlw)** 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

BORING B10-A (continued)

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").
				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.
5	9	100		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.
				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.
5	10	100		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.
				52	ML	52.1' - Silt with Sand, dark grayish brown (10YR 4/2), very fine-grained, faint oxidation mottling.
6	11	100		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

BORING B10-A (continued)

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
				60		
				61		61.0' - increase in sand content
				62		
7	13	100		**63**		
				64		
				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
7	14	23		**68**		
				69		
				70		
				71		Total depth of boring: 70 feet. Depth of fill not determined. Groundwater encountered during drilling at 33 feet; static groundwater level not determined. Backfilled with soil cuttings and tamped. Concrete patched.
				72		
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-10d

BORING B11-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		
				10		
						10.3' - increase in sand content
				11		
2	3	100			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		
				15		
						15.0' - trace clay, increase in sand and gravel to ¾" (diatomaceous slate and shale)
				16		
				17		
2	4	100			ML	17.0' - Silt with Sand, dark brown (7.5YR 3/4), trace to minor clay, trace gravel (to 1/2"), massive.
				18		massive.
				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

BORING B11-A (continued)

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

Figure C-11b

BORING B11-A (continued)

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)
				42 --		
5	9	100		-		
				43 --		
				-		
				44 --		
				-		
				45 --		
				-		
				46 --		
				-		
				47 --		
5	10	100		-		
				48 --		48.2' - Sand with Silt, dark yellowish brown (10YR 3/4), fine- to medium-grained, trace coarse,
				-	**SP-SM**	trace gravel (to ¼"), massive.
				49 --		
				-		
				50 --		50.2' - Clayey Silt, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), trace sand,
				-	**ML**	fine-grained, trace gravel (to ½"), faint oxidation mottling, massive.
				51 --		
				-		
				52 --		
6	11	100		-		
				53 --		
				-		
				54 --		53.9' - Sand with Gravel, dark yellowish brown (10YR 3/4) and dark gray (7.5YR 4/1), fine-
				-	**SP**	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 --		59.2' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4) and dark gray
				-	**SM/ML**	(7.5YR 4/1), minor to with clay, trace gravel (to ¼"), massive.
			■	**60** --		59.7' - 60' - No Recovery
				-		

Figure C-11c

BORING B11-A (continued)

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

Figure C-11d

BORING B12-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
				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		
1	1	100			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
				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		
1	2	100				
				8		
				9		
				10		**OLDER ALLUVIUM (Qoal)**
					SM	10.0' - Silty Sand with Gravel, brown (7.5YR 4/4), fine-grained, fine-grained, trace clay,
				11		Gravel predominantly siltstone and slate clasts (to 1½"), massive.
				12		
2	3	100				
				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.
				15		15.0' - oxidized
						15.5' - increase in sand content, trace gravel (to ¼")
				16		
				17		
2	4	100			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

BORING B12-A (continued)

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		
3	5	100		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.
				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")
3	6	100		26		
				27	SM/ML	26.6' - Silty Sand to Silt with Sand, dark brown (10YR 3/3), fine-grained, oxidized, crudely stratified to massive.
				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
4	7	100		31		
				32		
				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		
4	8	100		37	ML	**LAKEWOOD FORMATION (Qlw)** 36.2' - Silt, dark gray (7.5YR 4/1), trace clay and sand, very fine-grained, massive.
				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

BORING B12-A (continued)

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
				41		
				42		
5	9	100		**43**		
				44		
				45		
				46		
				47		
5	10	100		**48**		
				49		
				50		
				51		51.5' - increase in silt content, very fine-grained
				52		
6	11	100		**53**		53' to 54.7' - weakly laminated
				54		
				55	**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.
				56		
				57	**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.
6	12	100		**58**		
				59		
				60	**SP**	59.8' - Sand with Gravel, brown (10YR 4/3), fine-grained, gravel predominantly slate (to 1-1/2"), masssive.

Figure C-12c

BORING B12-A (continued)

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.
				72		Groundwater encountered during drilling at 50 feet; static groundwater level not determined.
				73		Backfilled with soil cuttings and tamped.
				74		Asphalt patched.
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-12d

BORING B13-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
				0		Started sampling at 1.2'
				1		**ALLUVIUM (Qal)**
					SM	Silty Sand with disseminated gravel, (10YR 4/6), fine-grained. Gravel
				2		predominantly slate (to 1/8"), few diatomaceous siltstone clasts, massive.
1	1	100		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,
				5		massive, porous.
					SM	5.0' - Silty Sand with disseminated gravel, dark yellowish brown (10YR 4/6), fine-grained,
				6		gravel predominantly slate (to 1/8"), few roots near base of unit.
					SM	6.2' - Silty Sand, dark yellowish brown (10YR 4/6) to brown (7.5 YR 4/4), trace clay, very fine-
				7		grained, trace to minor gravel (to 1/2"), weakly laminated, some secondary clay films.
1	2	100				7.8' to 8.1' - Increase in sand and gravel content; gravel to 3/4"
				8		
					SM/ML	8.1' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/6), minor clay, laminated.
				9		8.9' - Increase in sand content
						9.5' - minor manganese staining
				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
				12		gravel (to 1/8"), weakly laminated.
2	3	100			**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
				14		(to 1/4"), trace clay, weakly laminated. Sand becomes medium-grained at depth.
				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		
2	4	96		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

BORING B13-A (continued)

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
				21		(to 1/4", few to 3/4"), massive.
				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,
				26		trace gravel (to 1/8"), trace manganese nodules, weakly laminated.
						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,
				37		weakly laminated.
4	8	100				
				38		
				39		
				40		40.0' to 41.2' - increase in sand content

Figure C-13b

BORING B13-A (continued)

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

BORING B13-A (continued)

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	ML/SM	62.6' - Silt with Sand to Sandy Silt, dark yellowish brown (10YR 3/4), minor clay, laminated.
				63		
				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.
				74		Concrete patched.
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-13d

BORING B1-B

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		**ALLUVIUM (Qal)**
					SM	Silty Sand, dark yellowish brown (10YR 4/4), very fine-grained, trace clay, massive.
				2		
1	1	100			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		
1	2	66			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").
				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

BORING B1-B (continued)

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
				20	SM/ML	20'- Silty Sand to Silt with Sand, dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4), very fine- to fine-grained, trace clay, massive.
				21		
				22		
3	5	80				22.5' - grades to sand with silt
				23	ML	23.1'- Silt with Sand, dark yellowish brown (10YR 3/4), fine-grained, trace clay, massive.
				24	SP/SM	24.1' - Sand, mottled dark yellow brown (10YR 4/3, and 10YR 4/6) and gray (10YR 6/1), fine-grained, trace to minor gravel, (to 1/4"), trace silt and clay, massive.
				25		
				26		
				27		
3	6	100				
				28		28' - increase in gravel
				29	SC	29.7' - Clayey Sand, dark yellowish brown (10YR 4/4), very fine grained, trace to minor gravel (to 1/4").
				30		
				31	SM/SC	30.5- Silty Sand, dark yellowish brown (10YR 4/4 to 10YR 4/6), minor clay, fine-grained, trace to minor gravel (to 1/2"), predominantly slate, few diatomaceous siltstone clasts.
				32		
4	7	98				
				33	ML/SM	32.5' - Silt to Silty Sand, dark yellowish brown (10YR 4/6), very fine-grained, generally massive to weakly bedded.
				34		
			■	35		34.9' to 35.0' - No Recovery
				36	SM	35.7' - Silty Sand with Gravel, dark yellowish brown (10YR 4/6), fine-grained, gravel (to 1/2", few to 1"), subangular.
				37		
4	8	98			ML/SM	37.1' - Silt with Sand to Sandy Silt, dark yellowish brown (10YR 4/6), very fine-grained, trace clay, massive.
				38	SP	38' - Sand and Gravel, dark yellowish brown (10YR 4/6), fine- to medium-grained, predominantly slate, few siltstone (to 1").
				39	ML/SM	38.9' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/6), very fine-grained, minor clay, massive.
			■	40	SP/SM	39.5' - Sand to Silty Sand with Gravel, dark yellowish brown (10YR 4/4), 40% gravel (to 2"). 39.5' to 40' - No Recovery

Figure C-14b

BORING B1-B (continued)

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
				40		Same as Previous
				41		
					ML	40.9' - Sandy Silt, dark yellowish brown (10YR 4/4), very fine-grained, minor gravel (to 1/4").
5	9	90		42		
				43		
				44		44.1' - Sand with Silt, dark yellowish brown (10YR 4/6 to 10YR 5/4), fine- to medium-grained, trace coarse, minor gravel (to 1-1/2"), crude stratification, alternating Silty Sand and Sandy Silt beds.
					SP-SM	
				45		44.5 to 45' - No recovery
				46		
5	10	92		47		
				48		
				49		
				50		49.6 to 50' - No Recovery
						50.6'- grades to Silty Sand to Silt with Sand, very fine-grained, some oxidation stringers
				51		
				52	ML/SM	51.6 '- Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/4), trace to minor clay, fine-grained, weakly laminated.
6	11	96		53	SP	52.6 '- Sand, dark yellowish brown (10YR 4/6), very fine-grained, trace silt and gravel (to 1/2").
						LAKEWOOD FORMATION (Qlw)
				54	ML	53.6' - Clayey Silt, dark gray (10YR 4/1), massive to varved.
						54.5' - increase in clay content
				55		54.8 to 55' - No Recovery
				56		
					ML	55.9' - Silt with Sand, brown (7.5YR 4/3), very fine-grained, trace gravel (to 1/8"), massive.
6	12	100		57		
				58	CL/SC	57.6' - Clay with Sand to Clayey Sand, brown (7.5YR 4/3), very fine-grained, massive.
				59		
				60		60' - increase in clay content

Figure C-14c

BORING B1-B (continued)

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
				60		
						Same as Previous
				61		
				62		
7	13	100		63		
				64		
				65		
				66		
				67		
7	14	90		68	SM	67.9' - Silty Sand, brown (10YR 4/3 to 7.5YR 4/3), trace to minor gravel (to 1"), subangular to subrounded, trace clay.
				69	SP-SM	68.8' - Sand with Silt, brown (10YR 4/3 to 7.5YR 4/3) minor clay, fine- to medium-grained, massive.
				70		69.5' to 70' - No Recovery
				71		Total depth of boring: 70 feet. Depth of fill not determined.
				72		Groundwater encountered during drilling at 57 feet; static groundwater level at 54 feet (after 20 minutes).
				73		Backfilled with soil cuttings and tamped. Concrete patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-14d

BORING B2-B

GEOCON WEST, INC.

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

Excavation Date: January 20, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 288.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				0		Started sampling at 2.3'
				1		
				2		**ALLUVIUM (Qal)**
1	1	100			**ML**	Silt with Sand, dark yellowish brown (10YR 4/4), fine-grained, trace fine gravel (to 1/4").
				3		
					SM	3.3' - Silty Sand, 10YR 4/4, fine-grained, trace gravel (to 1/2"), predominantly slate, few siltstone siltstone clasts.
				4		4.8' - trace clay
				5		5' to 5.6' - No Recovery
				6	**SP-SM**	5.6' - Sand with Silt, dark yellowish brown (10YR 3/4 to 10YR 4/4), fine-grained, trace gravel (to 1 1/2"), few roots.
1	2	88		7		
				8	**SP**	7.3' - Sand, dark yellowish brown (10YR 5/6), very fine- to fine-grained, minor silt, trace gravel (to 1").
				9		
				10	**ML/SM**	9.7' - Silt with Sand to Silty Sand, brown (10YR 4/3), fine-grained, trace gravel (to 1/4").
				11		
				12	**SM**	**OLDER ALLUVIUM (Qoal)**
2	3	78				11.5' - Silty Sand with gravel, brown (10YR 4/3), minor clay, gravel (to 1/2") disseminated throughout unit (10% to 15%), massive.
				13		
				14		13.9' to 15' - No Recovery
				15		
					SM	15.4' - Silty Sand with Gravel, dark yellowish brown, gravel (to 3/4") disseminated
				16		throughout unit, trace clay, massive.
				17		17.0' - increase in sand content and decrease in silt content
2	4	100				
				18		
				19		
				20		

Figure C-15a

BORING B2-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 20, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 288.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		
3	5	100		21	SM	20.1' - Silty Sand, brown (7.5YR 4/3 to 7.5YR 4/4), trace to minor gravel (to 1/4"), massive.
				22		
				23		
				24	SM	23.9' - Silty Sand with Gravel, mottled brown (7.5YR 4/3) and light gray (7.5YR 7/1), oxidized.
3	6	100		25		
				26		
				27		
				28		
				29	SM	29.3' - Silty Sand, brown (7.5YR 4/3 to 10YR 4/3), minor clay films, massive.
4	7	100		30		
				31	ML/SM	30.6' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/4), very fine- to very fine-grained, faintly laminated.
				32		
				33		
				34	SP-SM	33.4' - Sand with Silt and Gravel, (10YR 4/4), fine- to medium-grained, trace coarse, gravel predominantly slate, some siltstone (to 1"), massive.
4	8	100		35		
				36		
				37	ML	36.1' - Silt with Sand, brown (10YR 4/3), minor clay, trace gravel; (to 1/4"), massive.
				38		
				39	SP-SM	38.4' - Sand with Silt, brown (10YR 4/3), fine-grained, trace clay, massive. 39.2' - trace gravel (up to 1/2")
				40		

Figure C-15b

BORING B2-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 20, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 288.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
				41		
				42	ML	40.9' - Silt with Sand, (10YR 4/4), very fine-grained, trace clay, massive.
5	9	98		43		
				44	SC	44.4' - Clayey Sand , dark yellowish brown (10YR 4/4), very fine-grained, thickly laminated.
				45		44.9' - 45' - No Recovery
					SP	45' - Sand, dark yellowish brown (10YR 4/4), fine-grained, trace silt and gravel (to 1/8").
				46	SM/ML	
				47		45.3' - Silty Sand and Silt with Sand, dark yellowish brown (10YR 4/4), 'trace gravel (to 1/8"), thickly laminated.
5	10	84			SP-SM	46.1' - Sand with Silt, dark yellowish brown (10YR 4/6), minor gravel (to 1"), crudely stratified,
				48		to thickly laminated, gravel zones between 46.6' and 46.8' and 47.5' and 48.1'.
				49		48.1' - decrease in gravel content
				50		49.1' to 50' - No Recovery
				51		
				52	ML	51.4' - Clayey Silt, very dark brown (10YR 3/3), fine-grained, trace sand, massive.
6	11	100				Increase in sand content below 52.5'.
				53		
					CL/ML	**LAKEWOOD FORMATION (Qlw)**
				54		53.0' - Silty Clay to Clayey Silt, gray (10YR 4/1), massive.
				55	ML/SM	54.8' - Silty Sand to silt with Sand, brown (7.5YR 4/4), very fine-grained, minor clay, massive.
				56		
					SP/SM	56.3' - Sand to Silty Sand, brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4), trace clay,
				57		massive.
6	12	96		58	ML	57.5' - Clayey Silt, brown (7.5YR 4/3), trace gravel (to 1/4"), subangular to subrounded,
						weakly laminated.
				59		
				60		59.4' to 60' - No Recovery

Figure C-15c

BORING B2-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 20, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 288.6 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		
					SM	60.1' - Silty Sand, brown (7.5YR 4/4), minor clay, trace to minor gravel (to 1/2"), massive.
				61		
				62	CL/ML	60.5' - Clayey Silt, dark brown (7.5YR 3/3), varved.
7	13	92		63		
				64		
				65		64.6' to 65' - No Recovery
				66		
				67		
7	14	100		68		
					SM	67.9' - Gravelly Silty Sand, dark brown (7.5YR 3/3 to 10YR 3/3), trace to minor clay, massive.
				69		
					ML	68.2' - Silt with Clay, dark brown (10YR 3/3), trace gravel; with gravel below 69.5'.
				70		Total depth of boring: 70 feet.
				71		Depth of fill not determined.
						Groundwater encountered during drilling at 58 feet; static groundwater at 54.5 feet
				72		(after 20 minutes).
						Backfilled with soil cuttings and tamped.
				73		Concrete patched.
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-15d

BORING B3-B

GEOCON WEST, INC.

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

Excavation Date: January 21, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 290.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				0		Started sampling at 2.3'
				1		
				2		**ALLUVIUM (Qal)**
1	1	100			**SM**	Silty Sand, brown (10YR 4/3), minor gravel (to 1"), fine-grained, massive.
				3		
					ML/SM	3.4' - Silt with Sand to Silty Sand, brown (10YR 4/3) to dark yellowish brown (10YR 4/4), fine-grained, trace clay and gravel (to 1/8"), some manganese staining, massive.
				4		
				5		
				6		
				7		
1	2	100				**OLDER ALLVIUM (Qoal)**
				8	**ML/SM**	7.0' - Sandy Silt to Silty Sand, brown (10YR 4/3), trace gravel (to 1/4"), massive.
					SM	7.9' - Silty Sand, brown (10YR 4/3), minor gravel (to 1/2"), gravel predominantly slate, few siltstone, subrounded to subagular very fine-grained, massive.
				9	**ML/SM**	9.1' - Silty Sand to Silt with Sand, dark yellowish brown (10YR 4/4), minor gravel (to 2"), massive.
				10		10' - Increase in gravel content, fine- to coarse-grained sand
				11		
				12		
2	3	100				
				13		
				14	**SW**	13.4' - Sand and Gravel, dark grayish brown (10YR 4/2), 30% to 40% gravel (to 2"), fine- to coarse-grained, trace silt, crudely statified.
				15		
				16		
					SC	15.8' - Clayey Sand to Sand with Clay, brown (7.5YR 4/2) to grayish brown (10YR 4/2), fine-grained, trace to minor gravel (to 1/8"), massive.
				17		
2	4	100		18		
				19		
				20		

Figure C-16a

BORING B3-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 21, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 290.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20	SC/SP	20.0' - Clayey Sand to Sand, minor clay, brown (7.5YR 4/4), fine-grained, porous, massive.
				21		
				22		
3	5	100			SC/SM	21.7' - Clayey Sand to Silty Sand, brown (7.5YR 4/4), very fine-grained, weakly laminated.
				23		
				24		
					SC/SP	23.9' - Clayey Sand, to Sand with Clay, brown (7.5YR 4/4), minor gravel (to 3/4"), predominantly
				25		few diatomaceous siltstone clasts, fine-grained, massive.
						24.9' to 25.0' - No Recovery
				26		25.0' to 27.9' - laminated
				27		
3	6	97				27.9' - increase in gravel content, with light gray (7.5YR 7/1) mottles
				28		
				29	CL	28.8' - Clay with Sand, brown (7.5YR 4/2 to 7.5YR 4/3), very fine-grained, massive.
				30	SM	30.0' - Silty Sand, dark yellowish brown (10YR 4/4), very fine-grained, massive.
				31	CL/SC	30.4' - Clay with Sand to Clayey Sand, dark yellowish brown (10YR 4/4), very fine-grained,
						faintly varved, trace manganese nodules.
				32		
4	7	100				32.5' to 32.6' - with gravel and fine sand
				33		
				34		
					SC/SM	33.7' - Clayey Sand with Gravel, dark yellowish brown (10YR 4/4), fine-grained, gravel to 1/2",
				35		crudely stratified.
						35.0' to 35.8' - grades to Silt with Sand to Silty Sand, very fine-grained, minor clay
				36	SP-SM	35.9' - Sand with Silt, brown (10YR 4/3) to dark yellowish brown (10YR 4/4), minor clay, very
						fine-grained, crudely stratified.
				37		
4	8	100				37.8' - grades to Sand, fine-grained, trace to minor silt, minor gravel (to 1/2")
				38		38.0' - grades to Silt with Sand, fine-grained
				39		38.6' - trace gravel (to 1-1/2"), medium- to coarse-grained, massive to crudely stratified
				40		

Figure C-16b

BORING B3-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 21, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 290.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		
					MLSM	40.0' - Silt to Silty Sand, (10YR 4/3), brown very fine-grained, massive to crudely stratified.
				41		
				42		41.9' - minor Clay
5	9	100		43		
					ML	43.1' - Silt with Sand, brown (10YR 4/3), very fine-grained, trace gravel (to 2"), weakly laminated.
				44		Increase in sand and gravel content with depth.
				45	SP-SM	44.5' - Sand with Silt, brown (10YR 4/3), trace to minor gravel, very fine-grained, thickly laminated.
				46		
				47		
5	10	100		48		
					SW	48.3' - Sand with Gravel, dark yellowish brown (10YR 4/6), fine- to medium-grained, trace coarse,
				49		coarse, gravel subangular to subrounded (to 1/2", few to 1 1/2"), trace silt, crudely statified.
				50		
				51		**LAKEWOOD FORMATION (Qlw)**
					CL	51.0' - Clay with Sand, dark gray (10YR 4/1), very fine-grained. Increase in sand content with
				52		depth.
6	11	100			SM/ML	52.4' - Silty Sand to Silt with Sand, brown (10YR 4/3), minor clay, very fine-grained,
				53		(to 1/4"), laminated.
				54		
				55		
				56	CL/ML	55.8' -Clay with Sand to Silt with Sand, dark yellowish brown (10YR 4/4), trace gravel.
				57		
						57.5' - increase in sand content
6	12	100		58		
				59		
				60		

Figure C-16c

BORING B3-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 21, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 290.0 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60		Same as Previous
				61	SM	60.9' - Silty Sand, dark yellowish brown (10YR 4/4 to 10YR 4/6), very fine-grained, trace to minor clay, trace gravel (to 1/4"), subrounded.
7	13	100		62	SC/CL	61.7' - Clayey Sand to Sandy Clay, dark yellowish brown (10YR 4/4), fine-grained, trace gravel (to 1/4").
				63		
				64	SM	63.6' - Silty Sand, dark yellowish brown (10YR 4/4), fine-grained.
				65		
				66	SC	65.8' - Clayey Sand, dark yellowish brown (10YR 4/4), fine-grained, massive.
				67	SP	66.9' - Sand and Gravel, dark yellowish brown (10YR 4/4), fine- to medium-grained, trace silt,
7	14	97		68		gravel (to 1/2"), manganese staining, massive.
				69	SC	68.6' - Clayey Sand, dark yellowish brown (10YR 4/4), fine-grained, massive.
					SP	69.3' - Sand, dark yellowish brown (10YR 4/4), trace gravel (to 1/4"), fine-grained, massive.
				70		Total depth of boring: 70 feet.
				71		Fill to 2.3 feet.
				72		Groundwater encountered during drilling at 59.4 feet; static groundwater level not determined. Backfilled with soil cuttings and tamped. Concrete patched.
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-16d

BORING B4-B

GEOCON WEST, INC.

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

Excavation Date: January 22, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 291.7 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				0 --		Hand Augered to 5'
				1 --		
				2 --		
1	1	0		3 --		
				4 --		
				5 --		**ARTIFICIAL FILL (af)**
					SM	Silty Sand, gray (10YR 5/1), fine-grained.
				6 --	**ML**	5.7' - Silt with Sand, dark yellowish brown (10YR 3/6), minor clay.
				7 --		
1	2	100		8 --	**ML/SM**	7.5' - Silt with Sand to Silty Sand, dark gray (10YR 4/1), very fine-grained, minor roots and organics.
				9 --		
				10 --		
				11 --		
				12 --		
2	3	90		13 --		
				14 --		**ALLUVIUM (Qal)**
					SM	13.9' - Silty Sand with gravel, yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/4),
				15 --		fine- to medium-grained, gravel subrounded (to 1"), massive.
						14.5' to 15.0' - No Recovery
				16 --	**ML/SM**	15.6' - Silt with Sand to Silty Sand, dark grayish brown (2.5Y 4/2), very fine-grained, massive.
				17 --		
2	4	100			**ML**	17.0' - Silt with Sand, very dark grayish brown (10YR 3/2) to dark brown (7.5R 3/2), very
				18 --		fine-grained, massive.
				19 --	**SP-SM**	18.4' - Sand with Silt to Sand, very dark grayish brown (10YR 3/2) to dark brown (7.5R 3/2),
						minor to with gravel (to 2"), subrounded, massive.
				20 --		

Figure C-17a

BORING B4-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 22, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 291.7 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
				21	SP	21.0' - Sand, dark yellowish brown (10YR 4/4), minor disseminated gravel (to 1/4"), fine-grained, trace medium, massive.
3	5	84		22	ML	**OLDER ALLUVIUM (Qoal)** 21.8' - Silt with Sand, dark yellowish brown (10R 4/4), trace clay, distinctive oxidation striping.
				23		
				24		24.2' to 25.0' - No Recovery
				25		
3	6	100		26		
				27		
				28		
				29		
				30		
4	7	100		31	CL	30.0' - Clay with Sand to Clayey Sand, grayish brown (2.5Y 5/2), very fine-grained, massive.
				32		
				33		
				34	SC	33.7' - Clayey Sand with Gravel, grayish brown (2.5Y 5/2), gravel subrounded (to 1/4"), fine- to medium-grained.
				35	SM	35' - Silty Sand with Gravel, grayish brown (2.5Y 5/2), gravel subrounded (to 1"), massive.
				36	SM	35.9' - Silty Sand, yellowish brown (10YR 5/6), minor clay, distinct oxidation striping.
4	8	100		37	ML/SM	37.3' - Silt with Sand to Silty Sand, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), very fine-grained, trace clay and gravel (to 1/4"), laminated.
				38		
				39		
				40		

Figure C-17b

BORING B4-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 22, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 291.7 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40	**ML/SM**	Same as Previous
				41		
				42		42.2' - increase in clay content
5	9	100		**43**		
				44	**SW**	43.7' - Sand and Gravel, yellowish brown (10YR 5/4), fine- to coarse-grained, gravel subangular to predominantly slate, few diatomaceous siltstone (to 3"), crudely stratified to massive, some manganese staining.
				45		
				46		
				47		
5	10	92		**48**		
				49		
						49.6' to 50' - No Recovery
				50		
					CL/SC	50.0' - Clay with Sand to Clayey Sand, mottled gray (10YR 5/1) and dark yellowish brown (10YR 4/6), trace gravel (to 1/4"), varved.
				51		
				52		
6	11	100		**53**		
				54		
				55		
				56		
					SM	55.9' - Silty Sand (10YR 4/6), fine-grained, trace gravel (to 1").
				57		
6	12	100			**SP-SM**	57.2' - Sand with Silt and Gravel, (10YR 4/4), fine-grained, gravel subrounded to subangular (to 1"), predominantly slate, some siltstone and sandstone clasts, trace manganese nodules and staining.
				58		
				59	**CL**	58.7' - Clay with Sand, dark yellowish brown (10YR 4/4), fine-grained.
						59.4' - with gravel (to 3/4")
				60		

Figure C-17c

BORING B4-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 22, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 291.7 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60	**CL/ML**	60.0' - Clay with Sand to Silt with Sand, dark yellowish brown (10YR 4/6), fine grained, trace to minor manganese nodules, varved.
				61		
				62		
7	13	100			**SM**	62.3" - Silty Sand, dark yellowish brown (10YR 4/6), fine- to medium-grained, trace silt and gravel (to 1/4"), thickly laminated. Increase in sand content with depth.
				63		
				64		
				65		
					CL	**LAKEWOOD FORMATION (Qlw)**
				66		65.0' - Clay with Sand, dark yellowish brown (10YR 4/6), very fine-grained, distinct oxidation striping.
				67		
7	14	100				
				68		
				69		
				70		
						Total depth of boring: 70 feet.
				71		Fill to 13.9 feet.
						Groundwater encountered during drilling at 43 feet; static groundwater level at 34.3 feet (after 20 mintes).
				72		Backfilled with soil cuttings and tamped.
						Concrete patched.
				73		
				74		
				75		
				76		
				77		
				78		
				79		
				80		

Figure C-17d

BORING B5-B

GEOCON WEST, INC.

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

Excavation Date: January 27, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 293.4 feet
Geologist: AL/SFK

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				0 --		Started sampling at 1.9'
				-		
				1 --		
				-		**ALLUVIUM (Qal)**
				2 --	**ML**	Silt with Sand, light yellowish brown (10YR 6/4), fine-grained, minor roots and organics.
1	1	100		-		
				3 --		
				-		
				4 --		
				-	**SC**	4.4' - Clayey Sand, brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4), minor gravel
				5 --		(to 1/4"), massive to crudely stratified.
				-		5.6' - grades to Silty Sand, minor Clay
				6 --		
				-		
				7 --		7.0' - grades to Clayey Sand
1	2	84		-		
				8 --		8.3' to 8.5' - Gravel bed (up to 3")
				-		
				9 --		
				-		9.2' to 10' - No Recovery
				10 --		
				-		10' - Increase in clay content
				11 --		
				-	**SM**	11.1' - Silty Sand,dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), very fine- to
				12 --		fine-grained, minor clay and gravel (to 1/4").
2	3	54		-		12.2' - trace clay
				13 --		
				-		12..7' to 15' - No Recovery
				14 --		
				-		
				15 --		15.3' - Sand, yellowish brown (10YR 5/6), fine-grained, trace medium and coarse, trace gravel
				-	**SP**	(to 1/8"), massive.
				16 --	**ML**	**OLDER ALLUVIUM (Qoal)**
				-		15.8' - Silt with Sand, yellowish brown (10YR 5/4 to 10YR 5/6), very fine-grained, minor clay.
				17 --		
				-	**SP-SM**	16.3' - Sand with Silt and Gravel, yellowish brown (10YR 5/6), fine- to coarse-grained, trace
2	4	76		18 --		clay and gravel (to 1"), subrounded to subangular slate, siltstone and sandstone clasts,
				-		crudely stratified.
				19 --		
				-		18.8' to 20' - No Recovery
				20 --		
				-		

Figure C-18a

BORING B5-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 27, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 293.4 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				20		Same as Previous
						20.8' - decrease in silt content
				21		
				22		
3	5	100			ML/CL	22.0' - Silt with Sand to Clay with Sand, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4),
				23		massive.
						23.8' - increase in clay content, distinct oxidation striping.
				24		
				25		
3	6	100		26		
				27		
				28		
				29	CL/SC	28.5' - Clayey Sand, mottled brown (7.5YR 4/2) and gray (7.5YR 5/1 and Gley 5/N), trace to minor gravel (to 1/4"), caliche nodules concentrated in weakly developed beds.
				30		
					SP	30.0' - Sand and Gravel, gray (Gley 1 5/N), fine- to medium-grainied, trace coarse, gravel
				31		subangular to subrounded (to 1-1/2"), crudely stratified.
				32		
4	7	83				
				33		
				34	SP-SM	33.7' - Sand with Silt, yellowish brown (10YR 5/6) to strong brown (7.5YR 5/6), fine-grained, massive.
				35		34.2' to 35' - No recovery
					ML/SM	35' - Silt with Sand to Silty Sand, yellowish brown (10YR 5/6) to strong brown (7.5YR 5/6),
				36		very fine-grained, trace clay, weakly laminated.
				37		37' - increase in clay, decrease in sand
4	8	100				
				38		
				39		
				40		

Figure C-18b

BORING B5-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 27, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 293.4 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				40		Same as Previous
				41		
				42		
5	9	100		43	SP/SM	42.4' - Sand and Gravel, strong brown (7.5YR 5/6) to yellowish brown (10YR 5/6), gravel subangular to subrounded (to 2").
						43.5' to 44.0' - Silty Sand, dark yellowish brown (10YR 4/6), minor gravel (to 1"), trace clay.
				44		44.0' - crudely stratified
5	10	88		45		
				46		
				47		
				48	CL	47.2' - Clay with Sand, dark yellowish brown (10YR 4/6) to strong brown (7.5YR 4/6), fine-grained, varved.
				49		
			■	50		49.4' to 50' - No Recovery
6	11	72		51	SW	50.0' - Sand and Gravel, brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4), gravel (to 3"), crudely stratified.
				52		
				53	SM	52.3' - Silty Sand, strong brown (7.5YR 4/6) to dark yellowish brown (10YR 4/6), minor clay, few mangense nodules, masive to weakly laminated.
			■	54		53.6' to 55' - No Recovery
6	12	87		55		
				56	SP	55.0' - Sand, dark yellowish brown (10YR 4/6), medium-grained, trace gravel at base (to 1/4"), subrounded, crudely stratified.
				57	SM	**LAKEWOOD FORMATION (Qlw)** 56.2' - Silty Sand, strong brown (7.5YR 4/6) to dark yellowish brown (10YR 4/6), minor clay, few manganese nodules, massive to crudely stratified.
				58		58.3' - increase in Sand content, minor gravel
				59		
			■	60		59.4' to 60.0' - No Recovery

Figure C-18c

BORING B5-B (continued)

GEOCON WEST, INC.

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

Excavation Date: January 27, 2014
Drilling Company: Martini Drilling
Excavation Method: H.S.A. - Continuous Core
Boring Diameter: 8 inches
Surface Elevation: 293.4 feet
Geologist: AL

Box	Run #	% Rec	REC.	Depth (feet)	USCS Class.	Description
				60	ML	60.0' - Silt, dark yellowish brown (10YR 4/4) to brown (7.5YR 4/4), massive.
				61	ML	60.9' - Silt with Sand, (7.5YR 4/4), fine-grained, massive.
7	13	96		62		62.0' - trace to minor clay.
				63	SP-SM	62.7' - Sand with Silt, brown (10YR 5/3) to yellowish brown (10YR 5/4), fine-grained, trace clay, massive.
				64		63.4' to 63.9' - sand bed, fine- to medium-grained.
						63.9' - laminated
				65		64.8' to 65.0' - No recovery
7	14	100		66		
				67		
				68		
				69		
						69.6' to 70' - No Recovery
				70		
				71		Total depth of boring: 70 feet.
				72		Depth of fill not determined.
				73		Groundwater encountered during drilling at 45 feet; static groundwater level at 40.5 feet (after 20 minutes).
				74		Backfilled with soil cuttings and tamped.
				75		Asphalt patched.
				76		
				77		
				78		
				79		
				80		

Figure C-18d

APPENDIX D

CONE PENETRATION TESTS

SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

9900 Wilshire Blvd.
Beverly Hills, CA
October 28-30, 2013

Prepared for:

Ms. Susan Kirkgard
Geocon West, Inc.
3303 N. San Fernando Blvd., Ste 100
Burbank, CA 91504
Office (818) 841-8388 / Fax (818) 841-1704

Prepared by:

KEHOE TESTING & ENGINEERING
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Huntington Beach, CA 92649-1518
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www.kehoetesting.com

TABLE OF CONTENTS

SUMMARY

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the project located at 9900 Wilshire Blvd. in Beverly Hills, California. The work was performed by Kehoe Testing & Engineering (KTE) on October 28-30, 2013. The scope of work was performed as directed by Geocon West, Inc. personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at nine locations to determine the soil lithology. Groundwater measurements and hole collapse depths provided in **TABLE 2.1** are for information only. The readings indicate the apparent depth to which the hole is open and the apparent water level (if encountered) in the CPT probe hole at the time of measurement upon completion of the CPT. KTE does not warranty the accuracy of the measurements and the reported water levels may not represent the true or stabilized groundwater levels.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
C-1	70	Hole open to 24.0 ft (dry)
C-2	70	Hole open to 24.3 ft (dry)
C-3	70	Hole open to 22.5 ft (dry)
C-4	70	Hole open to 55.0 ft (dry)
C-5	70	Hole open to 50.4 ft (dry)
C-6	70	Hole open to 50.7 ft (dry)
C-7	70	Hole open to 50.0 ft (dry)
C-8	70	Hole open to 50.0 ft (dry)
C-9	70	Hole open to 52.5 ft (dry)

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone and recorded the following parameters at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Inclination
- Penetration Speed

- Dynamic Pore Pressure (u)

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil classification on the CPT plots is derived from the attached CPT Classification Chart (Robertson) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

Tables of basic CPT output from the interpretation program CPeT-IT are provided for CPT data averaged over one foot intervals in the Appendix. Spreadsheet files of the averaged basic CPT output and averaged estimated geotechnical parameters are also included for use in further geotechnical analysis. We recommend a geotechnical engineer review the assumed input parameters and the calculated output from the CPeT-IT program. A summary of the equations used for the tabulated parameters is provided in the Appendix.

It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING

Richard W. Koester, Jr.
General Manager

11/14/13-cb-4110

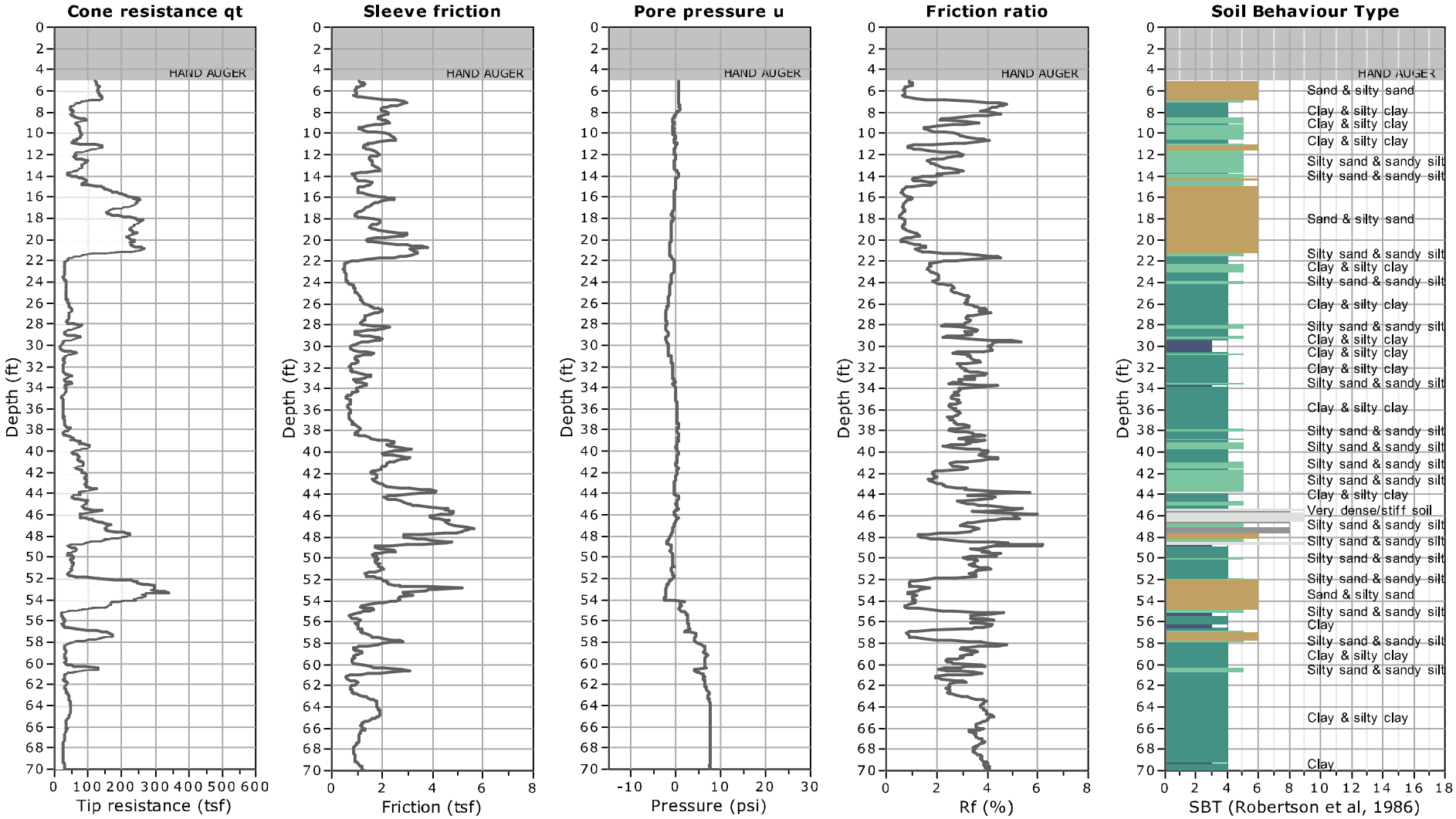
APPENDIX

Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: C-1

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.46 ft, Date: 10/31/2013
Cone Type: Vertek



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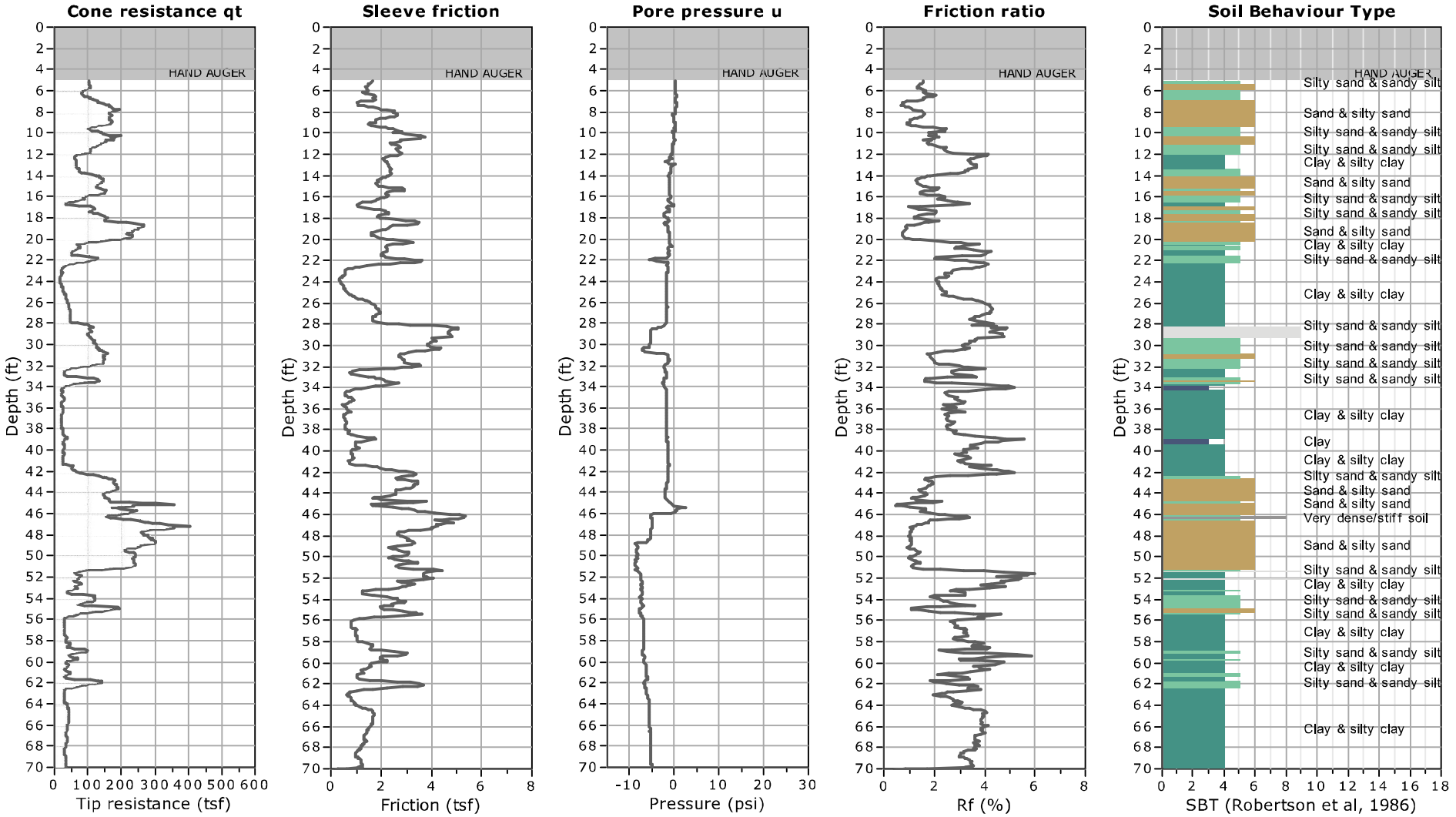
CPT: C-2

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.31 ft, Date: 10/31/2013
Cone Type: Vertek



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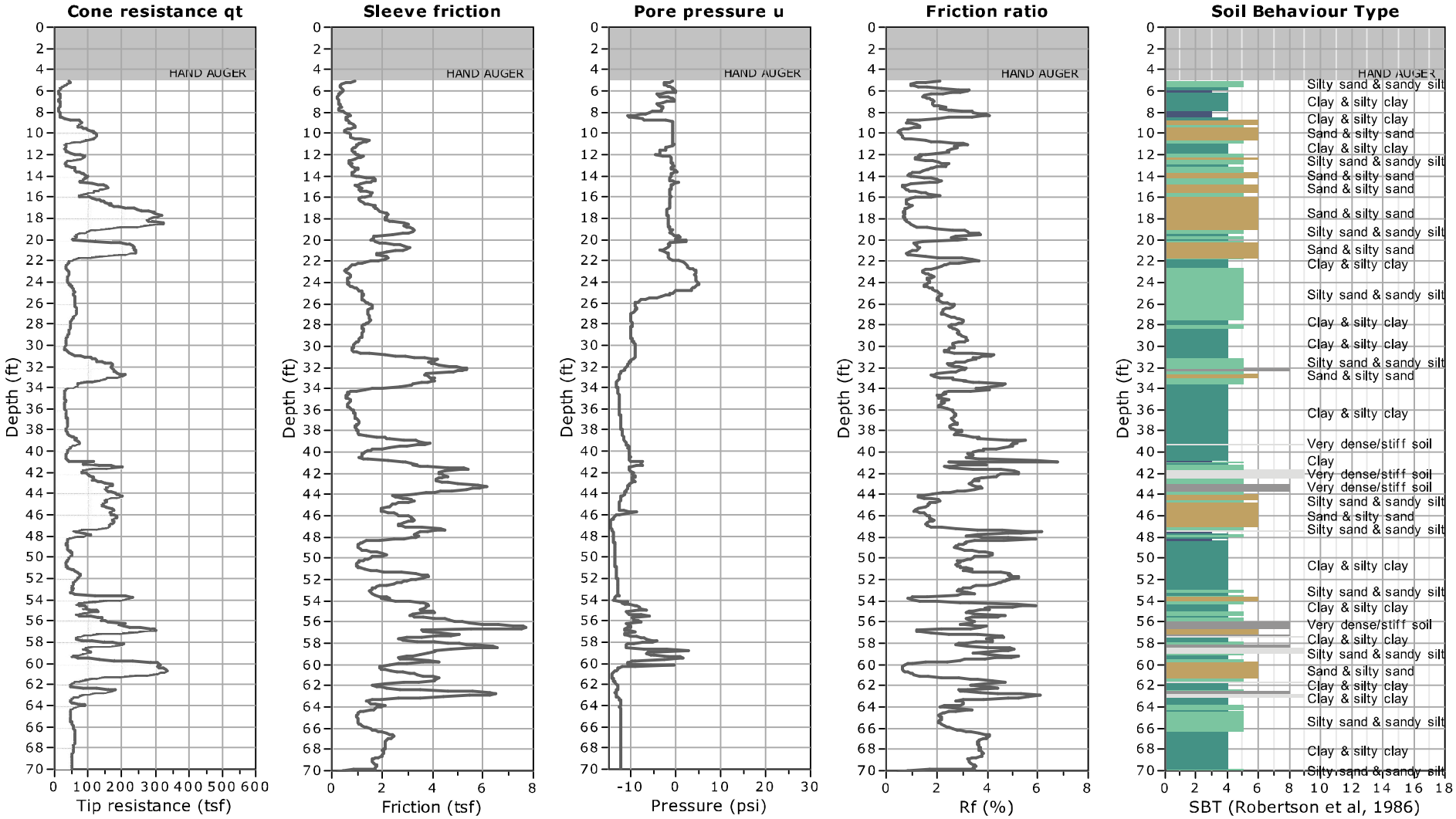
CPT: C-3

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.26 ft, Date: 10/30/2013
Cone Type: Vertek



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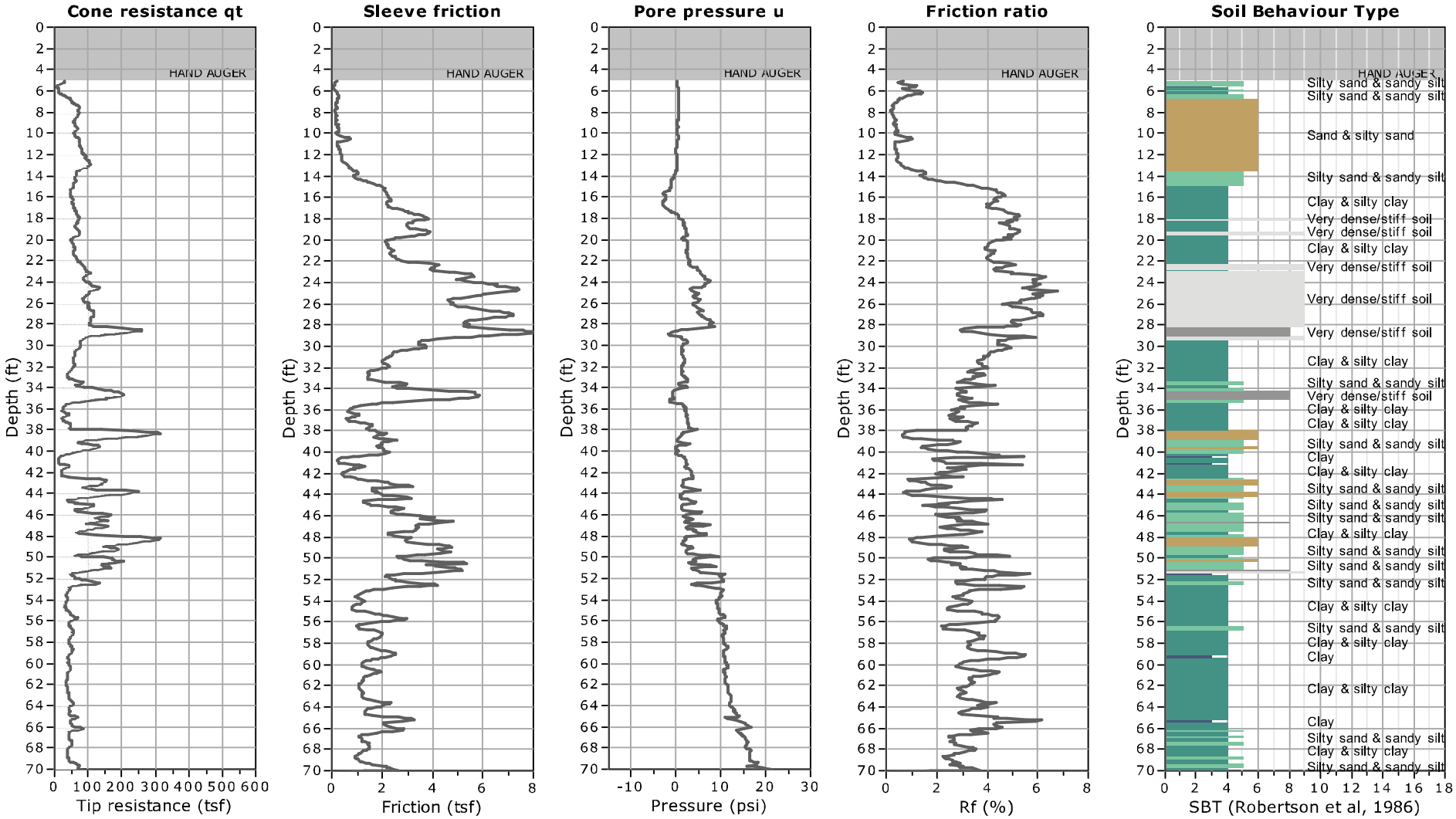
CPT: C-4

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.33 ft, Date: 10/30/2013
Cone Type: Vertek



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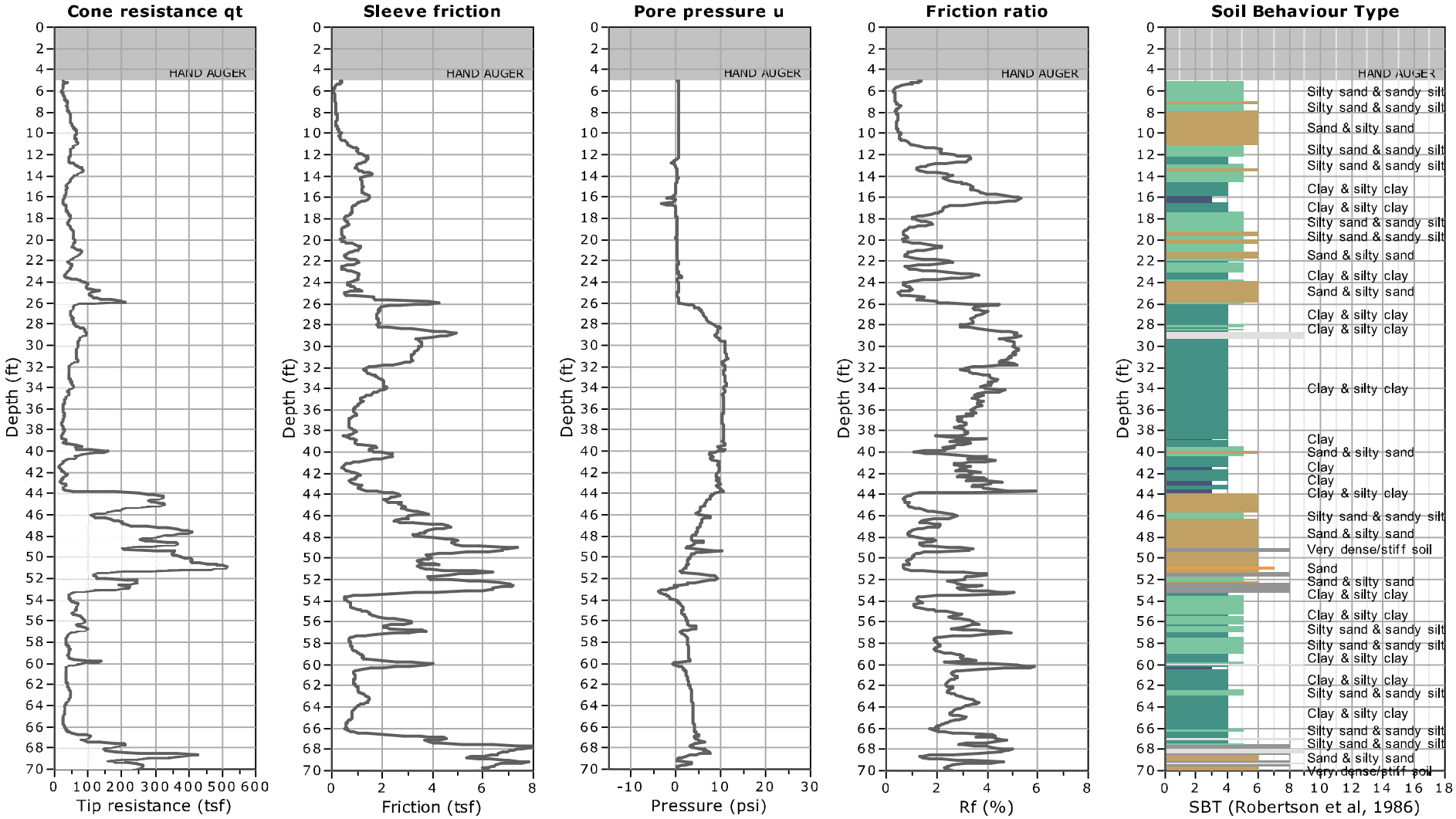
CPT: C-5

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.39 ft, Date: 10/30/2013
Cone Type: Vertek



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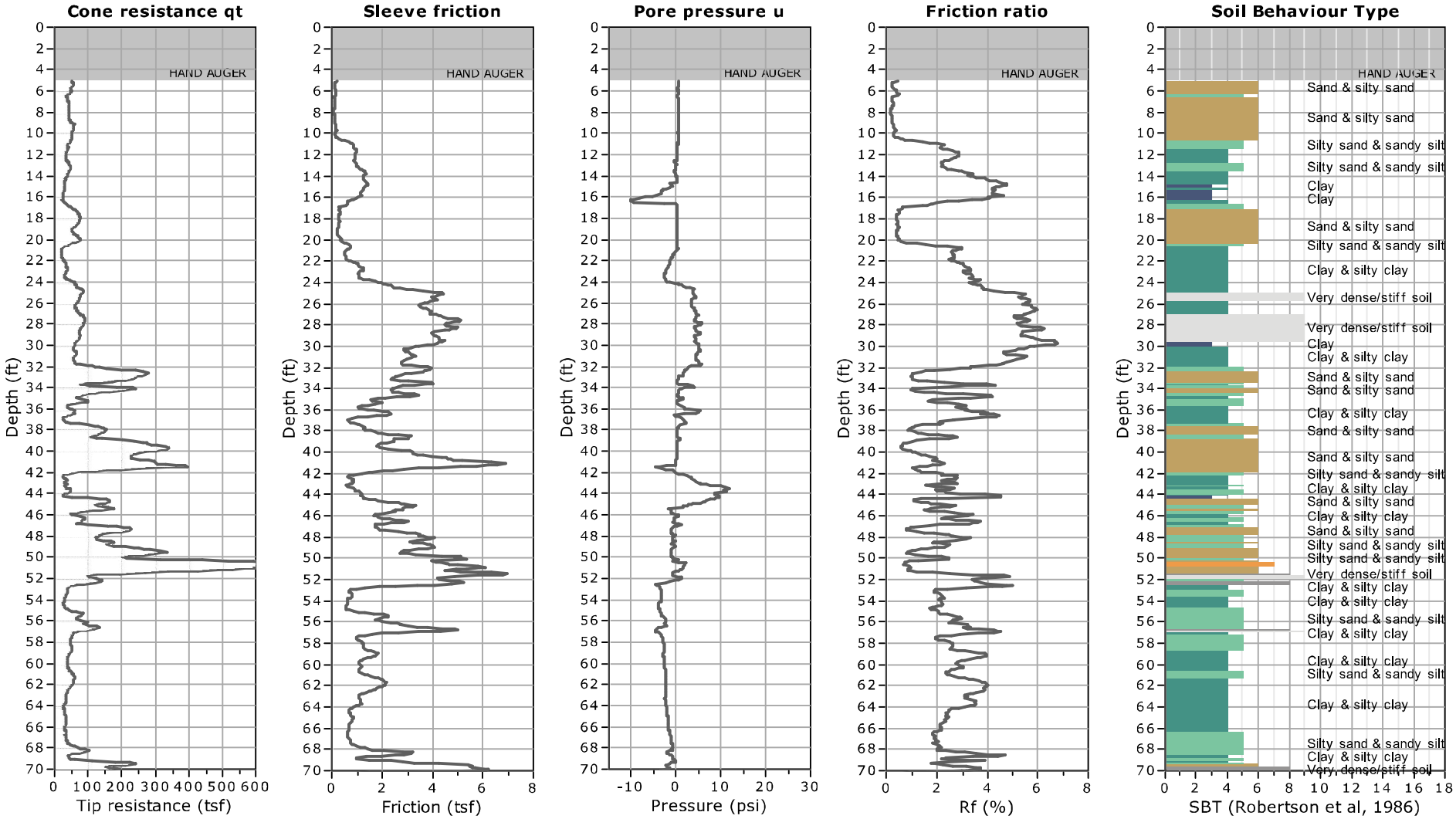
CPT: C-6

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.44 ft, Date: 10/30/2013
Cone Type: Vertek



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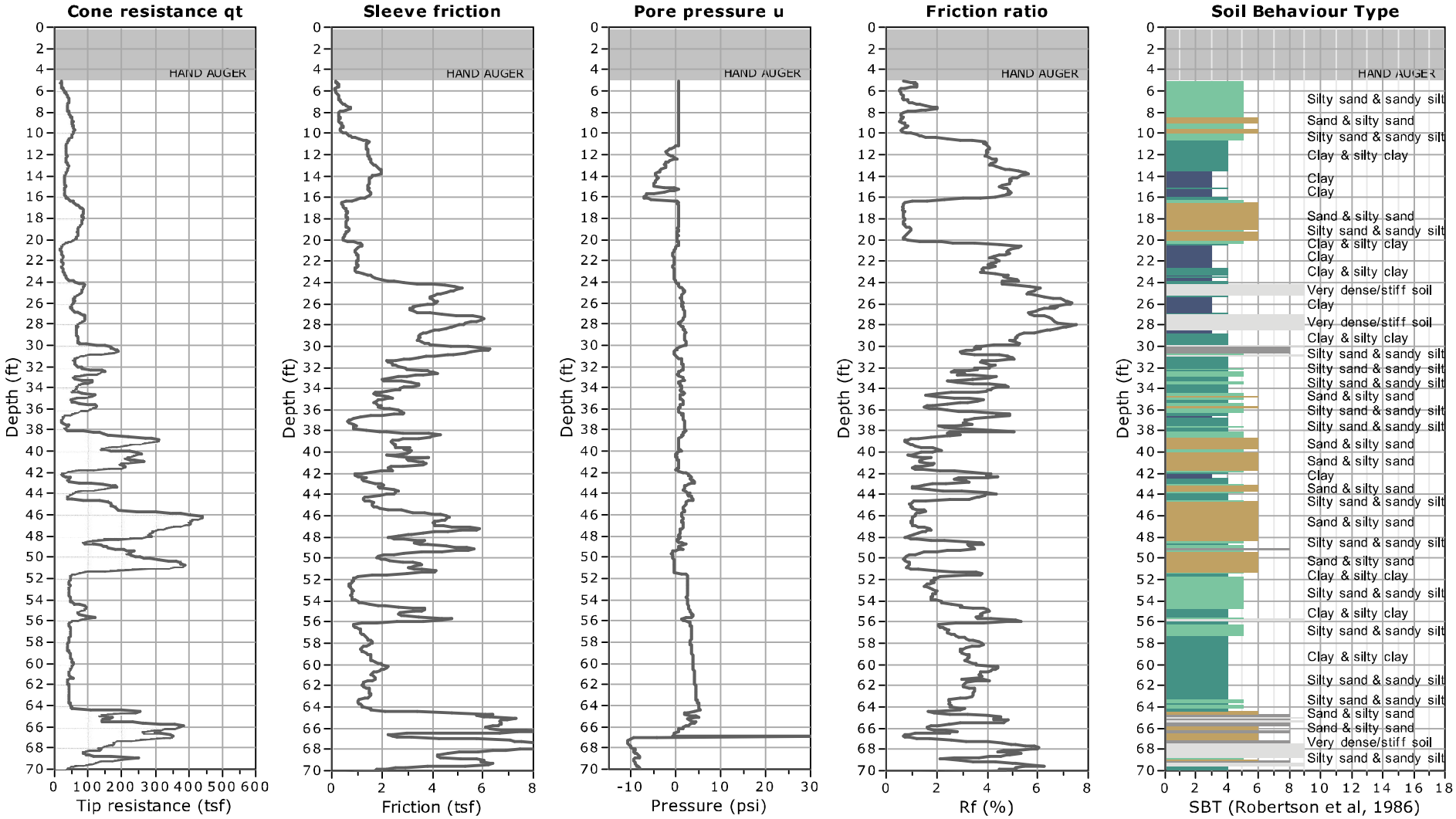
CPT: C-7

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.48 ft, Date: 10/30/2013
Cone Type: Vertek



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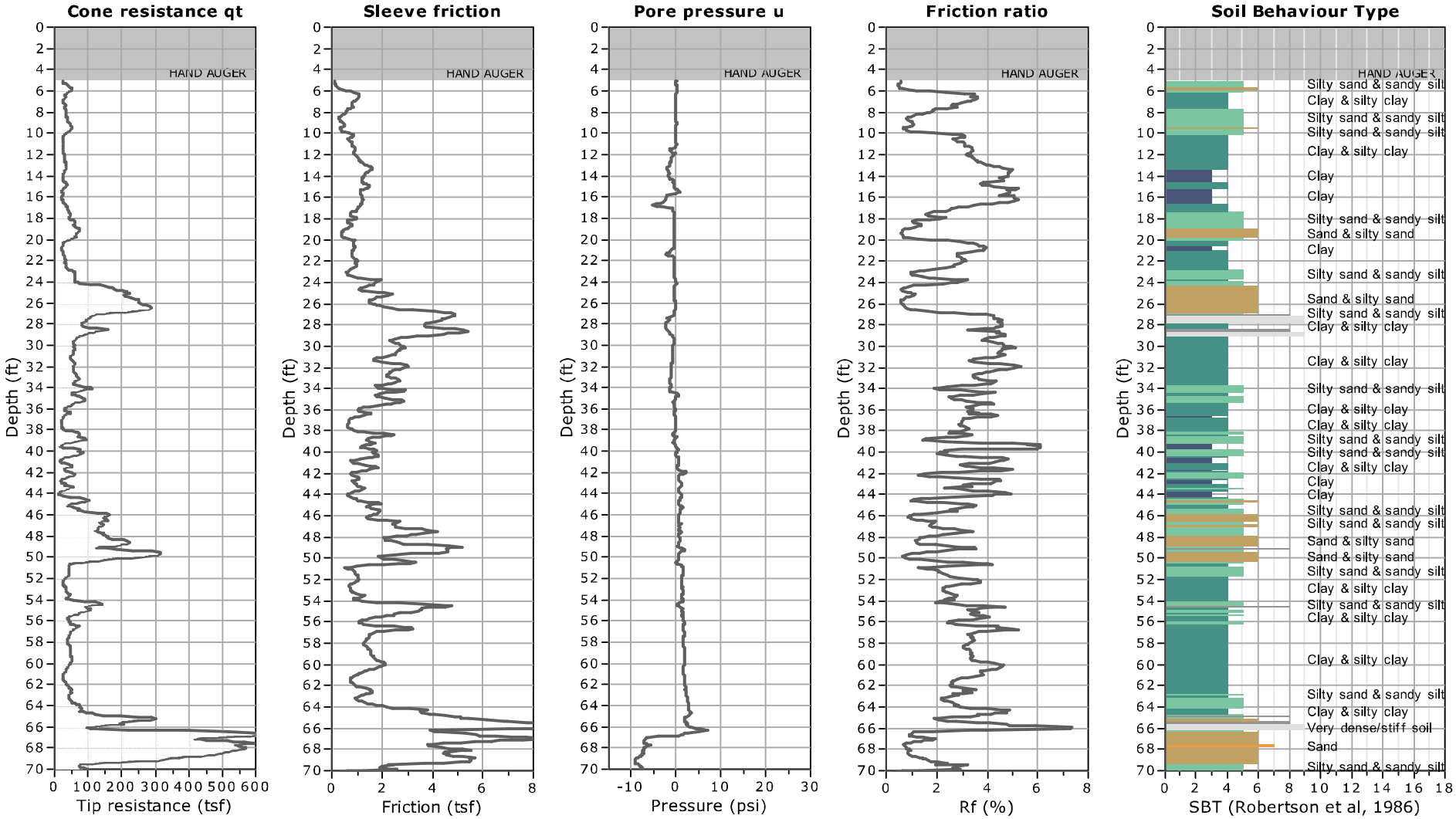
CPT: C-8

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.29 ft, Date: 10/31/2013
Cone Type: Vertek



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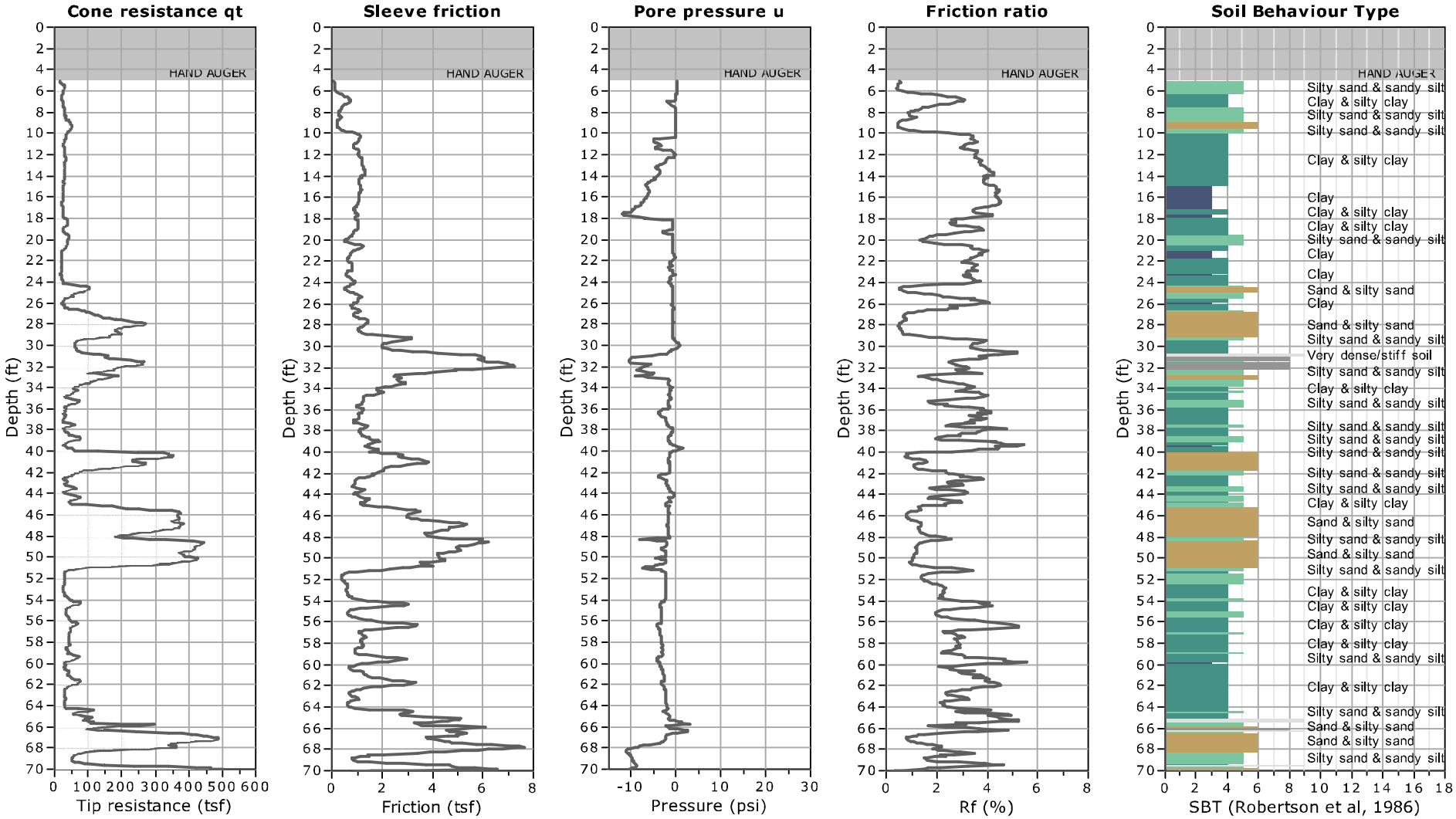
CPT: C-9

Project: **Geocon Consultants**
Location: **9900 Wilshire Blvd. Beverly Hills, CA**

Total depth: 70.31 ft, Date: 10/31/2013
Cone Type: Vertek



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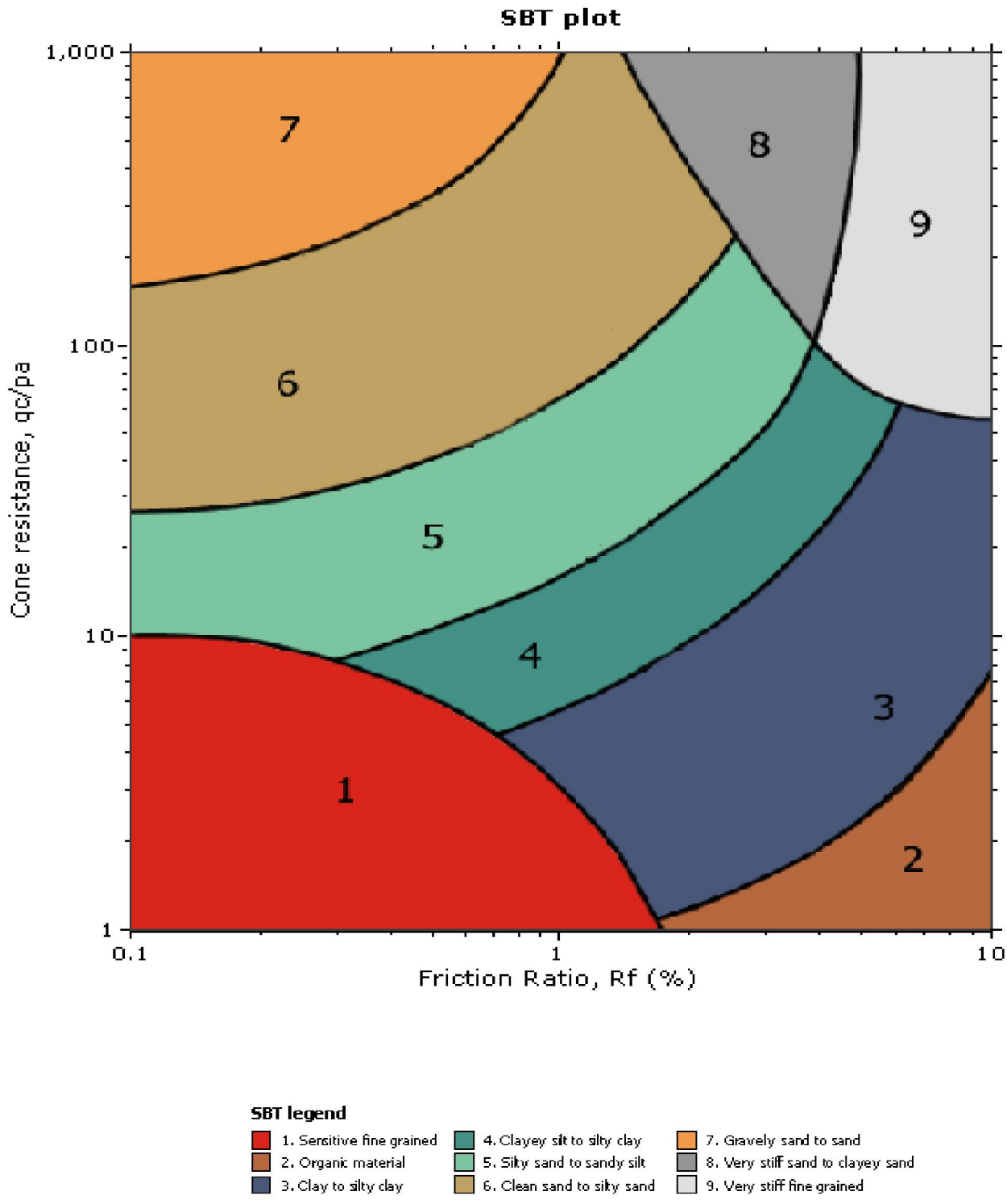

	C-1	In situ data			Basic output data														
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	47.6	0.97	0.51	2.04	47.6062	2.0376	5	2.37469	119.4703	0.05974	0	0.0597	795.96	2.0401	0.0008	5	0.6735	2	2.1539	89.8708
2	39.2	1.17	0.51	2.99	39.2062	2.9842	4	2.54694	120.3684	0.11992	0	0.1199	325.94	2.9934	0.0009	5	0.7444	2	2.3327	73.87965
3	62.6	0.92	0.51	1.46	62.6062	1.4695	5	2.19252	119.7511	0.17979	0	0.1798	347.21	1.4737	0.0006	6	0.6092	2	1.9704	117.9964
4	44.8	0.32	0.51	0.72	44.8062	0.7142	5	2.13317	111.208	0.2354	0	0.2354	189.34	0.718	0.0008	6	0.5783	2	1.8824	84.2463
5	121.5	1.08	0.46	0.89	121.506	0.8889	6	1.83141	122.5416	0.29667	0	0.2967	408.57	0.891	0.0003	6	0.4882	1.8604	1.6345	213.1098
6	126.1	0.87	0.51	0.69	126.106	0.6899	6	1.75034	121.0501	0.35719	0	0.3572	352.05	0.6919	0.0003	6	0.469	1.6642	1.5816	197.7782
7	79.7	2.95	0.61	3.7	79.7075	3.701	4	2.39496	128.8657	0.42163	0	0.4216	188.05	3.7207	0.0006	8	0.7154	1.9315	2.2183	144.7295
8	53.5	2.18	0.23	4.08	53.5028	4.0746	4	2.54332	125.6802	0.48447	0	0.4845	109.44	4.1118	0.0003	4	0.7779	1.8362	2.3732	92.00446
9	60.3	2.25	-0.57	3.73	60.293	3.7318	4	2.47985	126.2029	0.54757	0	0.5476	109.11	3.766	-7E-04	5	0.767	1.6574	2.3391	93.58521
10	80.1	2.28	-0.59	2.85	80.0928	2.8467	5	2.30965	126.9924	0.61107	0	0.6111	130.07	2.8686	-5E-04	5	0.717	1.4824	2.2001	111.3552
11	73	1.43	0.21	1.95	73.0026	1.9588	5	2.22417	123.353	0.67274	0	0.6727	107.51	1.9771	0.0002	5	0.694	1.3693	2.1318	93.5998
12	61.8	1.91	-0.12	3.1	61.7985	3.0907	5	2.41379	125.0643	0.73527	0	0.7353	83.048	3.1279	-1E-04	5	0.7753	1.326	2.3363	76.52478
13	80.7	1.6	-0.38	1.99	80.6954	1.9828	5	2.1961	124.4192	0.79748	0	0.7975	100.19	2.0026	-3E-04	5	0.7032	1.22	2.1406	92.12316
14	47.7	0.92	0.33	1.92	47.704	1.9286	5	2.35871	119.088	0.85703	0	0.857	54.662	1.9638	0.0005	5	0.773	1.1769	2.3158	52.10819
15	124.8	1.24	-0.25	0.99	124.797	0.9936	6	1.8539	123.6176	0.91884	0	0.9188	134.82	1.001	-2E-04	6	0.5913	1.087	1.8313	127.2634
16	230.5	2.12	-0.53	0.92	230.494	0.9198	6	1.63775	129.0382	0.98336	0	0.9834	233.39	0.9237	-2E-04	6	0.5172	1.0386	1.6291	225.2827
17	200.5	1.32	-0.34	0.66	200.496	0.6584	6	1.58123	125.2314	1.04597	0	1.046	190.68	0.6618	-1E-04	6	0.5024	1.0058	1.5825	189.5923
18	234.8	1.51	-0.58	0.64	234.793	0.6431	6	1.52329	126.6005	1.10927	0	1.1093	210.66	0.6462	-2E-04	6	0.4867	0.9773	1.5336	215.8324
19	220.6	1.7	-1.09	0.77	220.587	0.7707	6	1.59682	127.3155	1.17293	0	1.1729	187.06	0.7748	-4E-04	6	0.5216	0.9477	1.617	196.5158
20	228.8	1.33	-1.1	0.58	228.787	0.5813	6	1.50251	125.6086	1.23573	0	1.2357	184.14	0.5845	-4E-04	6	0.4919	0.9265	1.531	199.2491
21	257.6	2.88	-1.39	1.12	257.583	1.1181	6	1.66831	131.5509	1.30151	0	1.3015	196.91	1.1238	-4E-04	6	0.5612	0.8903	1.7046	215.6387
22	35.1	0.84	-0.46	2.39	35.0944	2.3936	4	2.52125	117.6737	1.36035	0	1.3604	24.798	2.4901	-1E-03	4	0.9138	0.7949	2.6232	25.34098
23	29.3	0.52	-0.53	1.78	29.2935	1.7751	5	2.50409	113.724	1.41721	0	1.4172	19.67	1.8654	-0.001	4	0.9189	0.7645	2.6294	20.14171
24	33.4	0.64	-1.18	1.92	33.3856	1.917	5	2.47843	115.5622	1.47499	0	1.475	21.634	2.0056	-0.003	4	0.915	0.7379	2.612	22.25368
25	34.7	0.95	-1.58	2.74	34.6807	2.7393	4	2.56273	118.5452	1.53426	0	1.5343	21.604	2.8661	-0.003	4	0.955	0.7013	2.7097	21.96841
26	41.5	1.22	-1.67	2.94	41.4796	2.9412	4	2.5245	120.8121	1.59467	0	1.5947	25.011	3.0588	-0.003	4	0.9451	0.6787	2.676	25.58146
27	40.7	1.55	-2.25	3.8	40.6725	3.8109	4	2.60726	122.5159	1.65593	0	1.6559	23.562	3.9727	-0.004	4	0.9854	0.6432	2.7745	23.71657
28	55.9	1.27	-1.96	2.28	55.876	2.2729	5	2.35344	121.8327	1.71684	0	1.7168	31.546	2.3449	-0.003	4	0.8896	0.6502	2.5145	33.27816
29	35.4	1.1	-1.81	3.09	35.3779	3.1093	4	2.59217	119.6664	1.77668	0	1.7767	18.912	3.2737	-0.004	4	0.9994	0.5957	2.7965	18.91785
30	18.5	0.74	-1.86	4.01	18.4772	4.0049	3	2.87843	115.1816	1.83427	0	1.8343	9.0734	4.4463	-0.008	3	1	0.5769	3.1306	9.07337
31	30.7	1.01	-1.37	3.28	30.6832	3.2917	4	2.65503	118.6946	1.89361	0	1.8936	15.204	3.5082	-0.003	3	1	0.5588	2.8898	15.20354
32	24.1	0.7	-0.82	2.91	24.09	2.9058	4	2.70127	115.422	1.95132	0	1.9513	11.345	3.1619	-0.003	3	1	0.5423	2.965	11.34544
33	40.3	1.36	-0.85	3.39	40.2896	3.3756	4	2.57416	121.536	2.01209	0	2.0121	19.024	3.553	-0.002	3	1	0.5259	2.8168	19.02373
34	33	0.95	0	2.89	33	2.8788	4	2.59314	118.424	2.0713	0	2.0713	14.932	3.0716	0	3	1	0.5108	2.8612	14.93199
35	24.5	0.68	0.04	2.76	24.5005	2.7755	4	2.68313	115.2511	2.12893	0	2.1289	10.508	3.0396	0.0001	3	1	0.497	2.9824	10.50836
36	26.5	0.74	0.21	2.78	26.5026	2.7922	4	2.65808	116.0614	2.18696	0	2.187	11.118	3.0433	0.0006	3	1	0.4838	2.9626	11.11845
37	28.4	0.74	0.32	2.61	28.4039	2.6053	4	2.61578	116.2303	2.24508	0	2.2451	11.652	2.8289	0.0009	3	1	0.4713	2.9277	11.65165
38	40.1	1.04	0.18	2.6	40.1022	2.5934	4	2.49935	119.5617	2.30486	0	2.3049	16.399	2.7515	0.0003	4	1	0.4591	2.8	16.399
39	68.7	2.44	0.39	3.55	68.7048	3.5514	4	2.42524	127.1146	2.36841	0	2.3684	28.009	3.6782	0.0004	4	0.9889	0.4508	2.6952	28.26059
40	54.7	2.19	0.29	4.01	54.7036	4.0034	4	2.53112	125.7679	2.4313	0	2.4313	21.5	4.1896	0.0004	3	1	0.4352	2.8218	21.49973
41	84.8	2.24	0.09	2.64	84.8011	2.6415	5	2.26901	127.0022	2.4948	0	2.4948	32.991	2.7215	8E-05	4	0.9366	0.4478	2.5408	34.83519
42	86.3	1.52	0.18	1.76	86.3022	1.7613	5	2.13953	124.2078	2.5569	0	2.5569	32.753	1.815	0.0002	5	0.8924	0.455	2.4184	36.01507
43	91.7	2.01	-0.32	2.19	91.6961	2.192	5	2.18719	126.4002	2.6201	0	2.6201	33.997	2.2565	-3E-04	5	0.9164	0.4357	2.4713	36.67553
44	77.1	2.57	-0.26	3.33	77.0968	3.3335	5	2.37102	127.7755	2.68399	0	2.684	27.725	3.4537	-3E-04	4	0.9992	0.3945	2.6832	27.74485
45	85.6	3.28	-0.11	3.83	85.5987	3.8318	4	2.38586	129.8155	2.7489	0	2.7489	30.139	3.959	-1E-04	4	1	0.3849	2.6958	30.13926
46	75.4	3.98	-0.34	5.28	75.3958	5.2788	9	2.52759	130.9214	2.81436	0	2.8144	25.79	5.4835	-3E-04	3	1	0.376	2.8418	25.7897
47	160.9	5.04	-0.51	3.13	160.894	3.1325	5	2.14551	134.4978	2.88161	0	2.8816	54.835	3.1896	-2E-04	5	0.9072	0.403	2.4144	60.17877
48	209.3	2.96	-1.23	1.41	209.285	1.4143	6	1.8045	131.2449	2.94723	0	2.9472	70.011	1.4345	-4E-04	5	0.772	0.4535	2.0533	88.43127
49	44.1	1.61	-1	3.65	44.0878	3.6518	4	2.56917	122.9905	3.00873	0	3.0087	13.653	3.9193	-0.002	3	1	0.3517	2.9562	13.6533
50	56.8	1.84	-1.03	3.24	56.7874	3.2402	4	2.45427	124.5849	3.07102	0	3.071	17.491	3.4254	-0.001	3	1	0.3446	2.8354	17.49139
51	46.6	2.06	-0.9	4.42	46.589	4.4217	4	2.61067	124.9285	3.13348	0	3.1335	13.868	4.7405	-0.001	3	1	0.3377	3.0023	13.86812
52	137	2.04	-0.85	1.49	136.99	1.4892	6	1.94526	127.4876	3.19723	0	3.1972	41.846	1.5248	-5E-04	5	0.8662	0.3837	2.2698	48.51836
53	295.9	3.84	-2.24	1.3	295.873	1.2979	6	1.68074	133.9939	3.26422	0	3.2642	89.641	1.3123	-6E-04	6	0.74	0.4345	1.9296	120.1504
54	228.9	2.47	-2.92	1.08	228.864	1.0792	6	1.69069	130.1389	3.32929	0	3.3293	67.743	1.0952	-9E-04	6	0.76	0.4185	1.9737	89.19817
55	55.8	1.35	0.68	2.42	55.8083	2.419	5	2.37204	122.2767	3.39043	0	3.3904	15.461	2.5755	0.0009	4	1	0.3121	2.8039	15.46054
56	31	1.05	2.26	3.39	31.0277	3.3841	4	2.65926	119.006	3.44993	0	3.4499	7.9937	3.8074	0.0059	3	1	0.3067	3.1358	7.9937
57	136.8	1.16	1.84	0.85	136.823	0.8478	6	1.7787	123.354	3.51161	0	3.5116	37.963	0.8702	0.001	5	0.8337	0.3679	2.1445	46.34688
58	51	2.05	4.4	4.01	51.0539	4.0154	4	2.55295	125.1161	3.57417	0	3.5742	13.284	4.3176	0.0067	3	1	0.296	2.9915	13.28412
59	32.8	1.1	5.99	3.35	32.8733	3.3462	4	2.63718	119.4873	3.63391	0	3.6339	8.0463	3.7621	0.0148	3	1	0.2912	3.1305	8.04626
60	32.3	1.15	6.46	3.56	32.3791	3.5517	4	2.65928	119.7756	3.6938	0	3.6938	7.7658	4.009	0.0162	3	1	0.2865	3.1589	7.76579
61	32.8	0.99	5.84	3	32.8715	3.0117	4	2.60717	118.7163	3.75316	0	3.7532	7.7584	3.3999	0.0144	3	1	0.2819	3.1185	7.75835
62	32.8	0.82	6.33	2.49	32.8775	2.4941	4	2.55449	117.3382	3.81183	0	3.8118	7.6251	2.8212	0.0157	3	1	0.2776	3.0801	7.62512
63	42.4	1.26	6.99	2.97	42.4856	2.9657	4	2.51919	121.1066	3.87238	0	3.8724	9.9714	3.2631	0.013	3	1	0.2732	3.0187	9.97143
64	47.7	1.78	7.54	3.73	47.7923	3.7245	4	2.55005	123.9217	3.93434	0	3.9343	11.147	4.0586	0.0124	3	1	0.2689	3.0353	11.14747
65	43	1.77	7.64	4.11	43.0935	4.1074	4	2.61189	123.6281	3.99616	0	3.9962	9.7837	4.5272	0.0141	3	1	0.2648	3.1091	9.78374

66	33.3	1.27	7.64	3.79	33.3935	3.8031	4	2.66924	120.5771	4.05644	0	4.0564	7.2322	4.329	0.0188	3	1	0.2609	3.2035	7.23221
67	29.3	1.09	7.49	3.71	29.3917	3.7085	4	2.70318	119.1475	4.11602	0	4.116	6.1408	4.3125	0.0213	3	1	0.2571	3.2607	6.1408
68	24.6	0.87	7.64	3.53	24.6935	3.5232	4	2.74595	117.0731	4.17455	0	4.1746	4.9153	4.24	0.0268	3	1	0.2535	3.3366	4.91525
69	23.8	0.91	7.54	3.79	23.8923	3.8088	4	2.77875	117.3216	4.23322	0	4.2332	4.644	4.6289	0.0276	3	1	0.25	3.3782	4.64401
70	32.4	1.3	7.52	4.01	32.492	4.001	4	2.69288	120.6812	4.29356	0	4.2936	6.5676	4.6102	0.0192	3	1	0.2464	3.2534	6.56763

	C-2	In situ data										Basic output data								
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	75.3	1.6	2.3	2.13	75.3282	2.124	5	2.23836	124.2514	0.06213	0	0.0621	1211.5	2.1258	0.0022	5	0.6271	2	2.032	142.2653
2	37.1	1.14	0.4	3.08	37.1049	3.0724	4	2.57322	120.044	0.12215	0	0.1222	302.77	3.0825	0.0008	5	0.7544	2	2.3585	69.90354
3	18	0.65	-0.09	3.61	17.9989	3.6113	3	2.85911	114.1688	0.17923	0	0.1792	99.422	3.6477	-4E-04	4	0.8628	2	2.6362	33.68213
4	34.6	0.81	-0.1	2.34	34.5988	2.3411	4	2.51995	117.3729	0.23792	0	0.2379	144.42	2.3573	-2E-04	5	0.737	2	2.2985	64.94773
5	97.5	1.69	0.09	1.73	97.5011	1.7333	5	2.09641	125.2811	0.30056	0	0.3006	323.4	1.7387	7E-05	6	0.5857	2	1.8937	183.7252
6	87	1.49	0.18	1.71	87.0022	1.7126	5	2.12865	124.0816	0.3626	0	0.3626	238.94	1.7198	0.0002	6	0.6051	1.9118	1.9352	156.5369
7	130.7	1.16	0.28	0.89	130.703	0.8875	6	1.8067	123.2424	0.42422	0	0.4242	307.1	0.8904	0.0002	6	0.5027	1.5833	1.6615	194.9389
8	168.2	2.51	0.09	1.49	168.201	1.4923	6	1.88478	129.5053	0.48897	0	0.489	342.99	1.4966	4E-05	6	0.5467	1.525	1.7684	241.7178
9	171.6	1.69	-0.03	0.98	171.6	0.9849	6	1.74926	126.6598	0.5523	0	0.5523	309.7	0.988	-1E-05	6	0.5051	1.3887	1.6515	224.4945
10	142.2	1.93	-0.29	1.35	142.196	1.3573	6	1.90518	127.1731	0.61589	0	0.6159	229.88	1.3632	-2E-04	6	0.5709	1.362	1.8159	182.2383
11	137.5	2.16	-0.1	1.57	137.499	1.5709	6	1.96083	127.9149	0.67985	0	0.6799	201.25	1.5787	-5E-05	6	0.6006	1.3043	1.8859	168.6569
12	71.5	2.76	-0.62	3.86	71.4924	3.8606	4	2.44018	128.1133	0.7439	0	0.7439	95.104	3.9011	-6E-04	4	0.7874	1.3197	2.3673	88.24068
13	62.8	2.32	0	3.69	62.8	3.6943	4	2.46447	126.5264	0.80717	0	0.8072	76.803	3.7424	0	4	0.8058	1.2438	2.4082	72.87024
14	126	2.31	-1.26	1.83	125.985	1.8336	5	2.03568	128.1929	0.87126	0	0.8713	143.6	1.8463	-7E-04	5	0.6543	1.1356	2.0025	134.2713
15	123.6	1.97	-1.05	1.59	123.587	1.594	6	1.99766	126.981	0.93475	0	0.9348	131.21	1.6062	-6E-04	6	0.6479	1.0836	1.978	125.6093
16	92.2	2.23	-0.9	2.42	92.189	2.4189	5	2.21632	127.1732	0.99834	0	0.9983	91.342	2.4454	-7E-04	5	0.7393	1.0439	2.2102	89.96784
17	111	1.16	-1.43	1.05	110.983	1.0452	6	1.90684	122.8435	1.05976	0	1.0598	103.72	1.0553	-9E-04	6	0.6289	0.999	1.913	103.7841
18	156.9	1.95	-1.78	1.25	156.878	1.243	6	1.84801	127.4881	1.12351	0	1.1235	138.63	1.252	-8E-04	6	0.6132	0.9639	1.8637	141.8863
19	249.4	2.26	-1.29	0.91	249.384	0.9062	6	1.60958	129.6982	1.18836	0	1.1884	208.86	0.9106	-4E-04	6	0.5276	0.9406	1.6308	220.6311
20	200.9	2.09	-1.05	1.04	200.887	1.0404	6	1.7177	128.5986	1.25266	0	1.2527	159.37	1.0469	-4E-04	6	0.5765	0.9073	1.7511	171.1767
21	65.2	2.21	-1.43	3.4	65.1825	3.3905	4	2.42635	126.2618	1.31579	0	1.3158	48.539	3.4603	-0.002	4	0.8633	0.8285	2.4962	50.00672
22	114.4	3.63	-5.77	3.17	114.329	3.175	5	2.24223	131.2633	1.38142	0	1.3814	81.762	3.2139	-0.004	5	0.7955	0.8089	2.3098	86.34487
23	20.7	0.56	-1.53	2.7	20.6813	2.7078	4	2.73477	113.4171	1.43813	0	1.4381	13.381	2.9101	-0.006	3	1	0.7358	2.8858	13.38071
24	18.2	0.38	-1.81	2.06	18.1779	2.0905	4	2.71432	110.2651	1.49326	0	1.4933	11.173	2.2776	-0.008	4	1	0.7086	2.8903	11.17327
25	26.8	0.66	-1.72	2.47	26.779	2.4646	4	2.6209	115.2495	1.55088	0	1.5509	16.267	2.6161	-0.005	4	0.9855	0.686	2.788	16.35708
26	40.2	1.61	-1.72	4	40.179	4.0071	4	2.62618	122.764	1.61227	0	1.6123	23.921	4.1746	-0.003	3	0.987	0.6599	2.7841	24.05258
27	46.1	1.95	-1.62	4.22	46.0802	4.2318	4	2.60043	124.5002	1.67452	0	1.6745	26.519	4.3913	-0.003	3	0.9825	0.637	2.7646	26.73254
28	70.8	2.7	-1.63	3.81	70.7801	3.8146	4	2.43926	127.9281	1.73848	0	1.7385	39.714	3.9107	-0.002	4	0.9202	0.6333	2.5925	41.31998
29	98.9	4.74	-5.33	4.8	98.8348	4.7959	9	2.42119	132.8603	1.80491	0	1.8049	53.759	4.8851	-0.004	4	0.9145	0.6136	2.5693	56.27125
30	123.6	3.85	-5.52	3.12	123.532	3.1166	5	2.21459	131.8826	1.87085	0	1.8709	65.03	3.1645	-0.003	5	0.8386	0.6201	2.3609	71.29755
31	140.5	2.72	-1.26	1.94	140.485	1.9362	5	2.02114	129.6541	1.93568	0	1.9357	71.576	1.9632	-7E-04	5	0.768	0.6289	2.1691	82.3431
32	103.5	3.26	-2.92	3.16	103.464	3.1509	5	2.26773	130.2331	2.00079	0	2.0008	50.712	3.213	-0.002	4	0.8767	0.5721	2.445	54.85498
33	52	1.6	-1.68	3.09	51.9794	3.0781	4	2.46617	123.3465	2.06247	0	2.0625	24.203	3.2053	-0.002	4	0.9772	0.5209	2.7024	24.57304
34	28	1.44	-2.16	5.15	27.9736	5.1477	3	2.81506	121.0644	2.123	0	2.123	12.176	5.5705	-0.006	3	1	0.4984	3.0904	12.17643
35	27.7	0.81	-1.7	2.92	27.6792	2.9264	4	2.65631	116.8286	2.18141	0	2.1814	11.689	3.1768	-0.005	3	1	0.4851	2.9557	11.68864
36	26.8	0.62	-1.78	2.31	26.7782	2.3153	4	2.60431	114.792	2.23881	0	2.2388	10.961	2.5266	-0.005	3	1	0.4726	2.922	10.96091
37	22	0.55	-1.62	2.52	21.9802	2.5023	4	2.693	113.4338	2.29553	0	2.2955	8.5752	2.7941	-0.006	3	1	0.4609	3.035	8.57522
38	24.3	0.65	-1.62	2.69	24.2802	2.6771	4	2.67654	114.8989	2.35298	0	2.353	9.3189	2.9644	-0.005	3	1	0.4497	3.0192	9.31892
39	30.8	1.53	-1.81	4.98	30.7779	4.9711	3	2.77453	121.741	2.41385	0	2.4139	11.751	5.3942	-0.005	3	1	0.4384	3.0935	11.75053
40	25.2	0.81	-1.39	3.21	25.183	3.2165	4	2.71408	116.5981	2.47215	0	2.4722	9.1867	3.5666	-0.004	3	1	0.428	3.07	9.18669
41	23.3	0.67	-1.24	2.9	23.2848	2.8774	4	2.71019	115.0186	2.52966	0	2.5297	8.2047	3.2281	-0.004	3	1	0.4183	3.0858	8.20474
42	63.3	3.26	-1.43	5.16	63.2825	5.1515	4	2.56894	129.0341	2.59417	0	2.5942	23.394	5.3717	-0.002	3	1	0.4079	2.8665	23.39409
43	174.4	3.46	-1.62	1.99	174.38	1.9842	6	1.96803	131.942	2.66014	0	2.6601	64.553	2.0149	-7E-04	5	0.8139	0.4722	2.1994	76.63466
44	151.3	2.57	-2.15	1.7	151.274	1.6989	6	1.95745	129.4195	2.72485	0	2.7249	54.516	1.7301	-0.001	5	0.8208	0.4601	2.2093	64.58888
45	253.1	2.1	-0.91	0.83	253.089	0.8298	6	1.57735	129.1969	2.78945	0	2.7895	89.731	0.839	-3E-04	6	0.664	0.5254	1.789	124.2799
46	208.7	5.16	-4.7	2.48	208.642	2.4731	5	1.99587	135.3038	2.8571	0	2.8571	72.026	2.5075	-0.002	5	0.8372	0.4353	2.2362	84.66693
47	293.1	4.2	-4.97	1.43	293.039	1.4333	6	1.71763	134.6261	2.92442	0	2.9244	99.204	1.4477	-0.001	6	0.7248	0.4786	1.9324	131.2252
48	268.5	2.76	-5.23	1.03	268.436	1.0282	6	1.62901	131.3402	2.99009	0	2.9901	88.775	1.0398	-0.001	6	0.6997	0.4834	1.8579	121.2752
49	258.9	2.64	-8.55	1.02	258.795	1.0201	6	1.63688	130.9257	3.05555	0	3.0556	83.697	1.0323	-0.002	6	0.7099	0.471	1.8764	113.8484
50	241.5	2.41	-8.52	1	241.396	0.9984	6	1.65008	130.089	3.12059	0	3.1206	76.356	1.0114	-0.003	6	0.7234	0.4573	1.9037	102.9832
51	231	2.63	-8.84	1.14	230.892	1.1391	6	1.70558	130.6197	3.1859	0	3.1859	71.473	1.155	-0.003	6	0.7523	0.4364	1.9715	93.91408
52	74.5	4.09	-7.74	5.5	74.4053	5.4969	9	2.54479	131.0886	3.25145	0	3.2515	21.884	5.7481	-0.008	3	1	0.3254	2.9077	21.88373
53	65.3	2.46	-7.23	3.77	65.2115	3.7723	4	2.45986	127.0471	3.31497	0	3.315	18.672	3.9744	-0.008	3	1	0.3192	2.8539	18.67181
54	114.6	2.64	-7.71	2.3	114.506	2.3056	5	2.13692	128.9369	3.37944	0	3.3794	32.883	2.3757	-0.005	4	0.9662	0.3256	2.5089	34.19791
55	186.2	2.3	-7.81	1.24	186.104	1.2359	6	1.79481	129.1127	3.444	0	3.444	53.037	1.2592	-0.003	5	0.8192	0.3803	2.1152	65.65196
56	30.3	0.83	-6.94	2.77	30.2151	2.747	4	2.60945	117.2209	3.50261	0	3.5026	7.6265	3.1072	-0.019	3	1	0.3021	3.103	7.62645
57	30.3	0.95	-6.9	3.15	30.2155	3.1441	4	2.64711	118.209	3.56171	0	3.5617	7.4834	3.5642	-0.019	3	1	0.2971	3.143	7.48343
58	31.2	1.16	-6.85	3.72	31.1162	3.728	4	2.68618	119.742	3.62158	0	3.6216	7.5919	4.219	-0.018	3	1	0.2922	3.1798	7.59187
59	98.4	2.76	-7.42	2.81	98.3092	2.8075	5	2.24479	128.8902	3.68603	0	3.686	25.671	2.9168	-0.006	4	1	0.2871	2.6617	25.67076
60	37.6	1.77	-6.8	4.72	37.5168	4.7179	4	2.69701	123.2901	3.74767	0	3.7477	9.0107	5.2415	-0.015	3	1	0.2823	3.1762	9.01068
61	46.7	1.26	-6.09	2.71	46.6255	2.7024	4	2.46215	121.3334	3.80834	0	3.8083	11.243	2.9428	-0.01	3	1	0.2778	2.9503	11.24299
62	128.6	3.63	-6.75	2.83	128.517	2.8245	5	2.17068	131.5486	3.87411	0	3.8741	32.173	2.9123	-0.004	4	1	0.2731	2.5861	32.17336
63	30.8	0.72	-6.09	2.34	30.7255	2.3433	4	2.56042	116.2215	3.93222	0	3.9322	6.8138	2.6873	-0.016	3	1	0.2691	3.11	6.81376
64	36.6	0.96	-5.61	2.63	36.5313	2.6279	4	2.53385	118.7486	3.9916	0	3.9916	8.1521	2.9502	-0.012	3	1	0.2651	3.0664	8.15206
65	42.6	1.7	-5.61	3.99	42.5313	3.9971	4	2.60769	123.3008	4.05325	0	4.0533	9.4932	4.4181	-0.011	3	1	0.2611	3.1132	9.49315
66	39.4	1.59	-5.52	4.04	39.3324	4.0425	4	2.63549	122.6206	4.11456	0	4.1146	8.5593	4.5148	-0.011	3	1	0.2572	3.1549	8.55933
67	36	1.29	-5.33	3.59	35.9348	3.5898	4	2.62882	120.8703	4.17499	0	4.175	7.6071	4.0617	-0.012	3	1	0.2534	3.1695	7.60714
68	33.1	1.16	-5.23	3.53	33.036	3.5113	4	2.64946	119.888	4.23494	0	4.2349	6.8008	4.0276	-0.013	3	1	0.2499	3.2073	6.80082
69	34.6	1.11	-5.14	3.22	34.5371	3.2139	4	2.60951	119.674	4.29478	0	4.2948	7.0417	3.6704	-0.012	3	1	0.2464	3.172	7.04165
70	35.9	0	-4.95	0	35.8394	0	0	0	769.6	4.67958	0	4.6796	6.6587	0	-0.011	0	1	0.2261	0	0

	C-3	In situ data										Basic output data								
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	41.8	0.08	-0.01	0.2	41.7999	0.1914	6	1.93943	100.8951	0.05045	0	0.0505	827.58	0.1916	-2E-05	6	0.4815	2	1.6512	78.91336
2	24.6	0.88	-0.04	3.57	24.5995	3.5773	4	2.75148	117.1474	0.10902	0	0.109	224.64	3.5932	-1E-04	4	0.8197	2	2.5315	46.2911
3	17.2	0.69	1.23	4	17.2151	4.0081	3	2.9025	114.4972	0.16627	0	0.1663	102.54	4.0472	0.0052	4	0.8793	2	2.6809	32.22504
4	11.8	0.65	0.43	5.51	11.8053	5.506	3	3.1166	113.1401	0.22284	0	0.2228	51.976	5.612	0.0027	3	0.9656	2	2.9005	21.89271
5	41.6	0.95	-0.06	2.28	41.5993	2.2837	5	2.45141	118.9888	0.28233	0	0.2823	146.34	2.2993	-1E-04	5	0.7144	2	2.2337	78.09587
6	13.4	0.45	-0.03	3.36	13.3996	3.3583	3	2.94172	110.7584	0.33771	0	0.3377	38.678	3.4451	-2E-04	4	0.9027	2	2.721	24.6892
7	15.1	0.28	-1.72	1.88	15.079	1.8569	4	2.75338	107.5748	0.3915	0	0.3915	37.516	1.9064	-0.008	4	0.8292	2	2.5214	27.76171
8	14.8	0.5	-5.7	3.42	14.7302	3.3944	3	2.91152	111.7603	0.44738	0	0.4474	31.925	3.5007	-0.029	4	0.8983	2	2.696	26.99696
9	83.4	0.69	-0.9	0.83	83.389	0.8275	6	1.94168	118.3452	0.50655	0	0.5066	163.62	0.8325	-8E-04	6	0.5606	1.5113	1.8032	118.3773
10	120	0.69	-0.9	0.57	119.989	0.5751	6	1.72138	119.2327	0.56617	0	0.5662	210.93	0.5778	-5E-04	6	0.4922	1.3604	1.6161	153.5437
11	34.4	1.06	-0.84	3.09	34.3897	3.0823	4	2.59893	119.3263	0.62583	0	0.6258	53.95	3.1395	-0.002	4	0.8214	1.5394	2.4721	49.12056
12	72.6	1.02	-4.21	1.41	72.5485	1.406	5	2.13096	120.8655	0.68627	0	0.6863	104.71	1.4194	-0.004	5	0.6608	1.3312	2.0431	90.41152
13	32.5	0.75	-0.9	2.32	32.489	2.3085	4	2.5374	116.6563	0.74459	0	0.7446	42.633	2.3626	-0.002	5	0.8209	1.3344	2.455	40.03252
14	98.7	0.94	-1.09	0.95	98.6867	0.9525	6	1.92044	121.0184	0.8051	0	0.8051	121.58	0.9603	-8E-04	6	0.6006	1.1784	1.8703	109.006
15	155.6	0.97	-1.28	0.63	155.584	0.6235	6	1.65121	122.3586	0.86628	0	0.8663	178.6	0.627	-6E-04	6	0.5082	1.107	1.62	161.8657
16	93.6	1.21	-1.34	1.29	93.5836	1.293	6	2.02328	122.7364	0.92765	0	0.9277	99.882	1.3059	-0.001	6	0.6564	1.0902	2.0013	95.46734
17	198.3	1.7	-1.51	0.86	198.282	0.8574	6	1.66229	127.0555	0.99118	0	0.9912	199.05	0.8617	-6E-04	6	0.5273	1.0351	1.6546	192.9918
18	286.7	2.07	-1.67	0.72	286.68	0.7221	6	1.49632	129.3956	1.05588	0	1.0559	270.51	0.7247	-4E-04	6	0.4707	1.001	1.4983	270.2065
19	147.9	3.27	-1.66	2.21	147.88	2.2113	5	2.05005	131.1267	1.12144	0	1.1214	130.87	2.2282	-8E-04	5	0.6902	0.9607	2.066	133.2444
20	47.5	1.47	-0.31	3.09	47.4962	3.095	4	2.4962	122.5064	1.18269	0	1.1827	39.159	3.174	-5E-04	4	0.8747	0.9072	2.5426	39.70958
21	239.9	2.74	-3.21	1.14	239.861	1.1423	6	1.69559	131.0124	1.2482	0	1.2482	191.17	1.1483	-1E-03	6	0.5667	0.9106	1.7258	205.3543
22	46.5	1.68	0.13	3.61	46.5016	3.6128	4	2.54929	123.4319	1.30992	0	1.3099	34.5	3.7175	0.0002	4	0.9133	0.8229	2.6282	35.14425
23	40.4	0.54	4.53	1.32	40.4555	1.3348	5	2.31797	114.7875	1.36731	0	1.3673	28.588	1.3815	0.0083	5	0.8349	0.8073	2.415	29.82336
24	38.2	0.66	4.65	1.72	38.2569	1.7252	5	2.40363	116.1195	1.42537	0	1.4254	25.84	1.7919	0.0091	4	0.8768	0.7701	2.5178	26.80583
25	58.5	1.22	-0.63	2.08	58.4923	2.0858	5	2.31373	121.6504	1.48619	0	1.4862	38.357	2.1401	-8E-04	5	0.844	0.7507	2.4239	40.44479
26	59.2	1.47	-9.21	2.48	59.0873	2.4879	5	2.36215	123.039	1.54771	0	1.5477	37.177	2.5548	-0.012	4	0.8703	0.7182	2.4852	39.05712
27	65.5	1.44	-10.18	2.21	65.3754	2.2027	5	2.29396	123.1348	1.60928	0	1.6093	39.624	2.2583	-0.011	5	0.8503	0.7001	2.4249	42.19059
28	48.2	1.28	-9.74	2.65	48.0808	2.6622	5	2.44789	121.5236	1.67004	0	1.67	27.79	2.758	-0.015	4	0.9228	0.6563	2.6079	28.78729
29	39.9	1.19	-10.07	2.98	39.7767	2.9917	4	2.54299	120.5277	1.73031	0	1.7303	21.988	3.1278	-0.019	4	0.9714	0.6202	2.7283	22.30026
30	32.4	0.87	-9.36	2.69	32.2854	2.6947	4	2.58196	117.727	1.78917	0	1.7892	17.045	2.8528	-0.022	4	0.9998	0.5915	2.7959	17.0469
31	74.6	2.86	-9.27	3.84	74.4865	3.8396	4	2.42648	128.4738	1.85341	0	1.8534	39.189	3.9376	-0.009	4	0.9279	0.5945	2.5985	40.80542
32	168.3	5.18	-11.06	3.08	168.165	3.0803	8	2.12818	134.8061	1.92081	0	1.9208	86.549	3.1159	-0.005	5	0.804	0.6192	2.2655	97.2793
33	177	3.88	-12.61	2.2	176.846	2.194	5	1.99808	132.8145	1.98722	0	1.9872	87.992	2.2189	-0.005	5	0.7597	0.6195	2.141	102.3802
34	45	1.6	-13.26	3.57	44.8377	3.5684	4	2.55693	122.986	2.04871	0	2.0487	20.886	3.7393	-0.022	3	1	0.5165	2.7995	20.88582
35	30.5	0.68	-12.74	2.25	30.3441	2.241	4	2.55269	115.7728	2.1066	0	2.1066	13.404	2.4082	-0.032	4	1	0.5023	2.8379	13.40431
36	31.3	0.82	-12.65	2.63	31.1452	2.6328	4	2.58758	117.2062	2.1652	0	2.1652	13.384	2.8295	-0.031	3	1	0.4887	2.8786	13.38443
37	39.1	1.04	-12.4	2.68	38.9482	2.6702	4	2.51724	119.4905	2.22494	0	2.2249	16.505	2.832	-0.024	4	1	0.4756	2.8052	16.50525
38	34.9	1.06	-12.21	3.06	34.7506	3.0503	4	2.59253	119.3518	2.28462	0	2.2846	14.211	3.265	-0.027	3	1	0.4631	2.8942	14.21064
39	59.5	3.41	-11.5	5.75	59.3592	5.7447	4	2.62288	129.2071	2.34922	0	2.3492	24.268	5.9814	-0.015	3	1	0.4504	2.8869	24.26759
40	37.8	1.31	-10.48	3.49	37.6717	3.4774	4	2.60437	121.0981	2.40977	0	2.4098	14.633	3.7151	-0.021	3	1	0.4391	2.9181	14.63289
41	98.1	3.08	-7.83	3.14	98.0042	3.1427	5	2.28233	129.6853	2.47462	0	2.4746	38.604	3.2241	-0.006	4	0.9348	0.452	2.5386	40.80375
42	79.8	4.2	-9.62	5.27	79.6823	5.2709	9	2.51179	131.4499	2.54034	0	2.5403	30.367	5.4445	-0.009	3	1	0.4165	2.7886	30.36676
43	155	5.1	-10.08	3.29	154.877	3.2929	8	2.17279	134.4915	2.60759	0	2.6076	58.395	3.3493	-0.005	4	0.8912	0.4476	2.4091	64.41562
44	184.4	2.8	-11.55	1.52	184.259	1.5196	6	1.86428	130.5277	2.67285	0	2.6729	67.937	1.542	-0.005	5	0.7735	0.4883	2.0917	83.80092
45	142.2	2.29	-12.84	1.62	142.043	1.6122	6	1.95928	128.4219	2.73706	0	2.7371	50.896	1.6439	-0.007	5	0.8248	0.4566	2.2184	60.11676
46	174.5	2.93	-13.17	1.68	174.339	1.6806	6	1.91305	130.7248	2.80242	0	2.8024	61.21	1.7081	-0.006	5	0.8064	0.4559	2.1619	73.91119
47	165.7	2.65	-14.78	1.6	165.519	1.601	6	1.91214	129.8633	2.86736	0	2.8674	56.725	1.6293	-0.007	5	0.8141	0.4442	2.174	68.27523
48	81.1	3.3	-14.11	4.08	80.9273	4.0777	4	2.42223	129.7231	2.93222	0	2.9322	26.599	4.231	-0.013	4	1	0.3609	2.7553	26.59935
49	38.2	1.03	-13.73	2.72	38.0319	2.7083	4	2.52908	119.3618	2.9919	0	2.9919	11.712	2.9395	-0.028	3	1	0.3537	2.9355	11.71165
50	43.2	1.45	-13.56	3.38	43.034	3.3694	4	2.55269	122.1656	3.05298	0	3.053	13.096	3.6267	-0.024	3	1	0.3466	2.95	13.09574
51	38.1	1.25	-13.49	3.28	37.9349	3.2951	4	2.58637	120.772	3.11337	0	3.1134	11.185	3.5897	-0.028	3	1	0.3399	3.0023	11.18452
52	65.1	3.17	-13.27	4.88	64.9376	4.8816	4	2.54398	128.8922	3.17781	0	3.1778	19.435	5.1328	-0.015	3	1	0.333	2.9129	19.43468
53	54.8	1.57	-13.07	2.88	54.64	2.8734	5	2.42984	123.3297	3.23948	0	3.2395	15.867	3.0544	-0.018	3	1	0.3266	2.8386	15.86692
54	186.2	2.68	-13.83	1.44	186.031	1.4406	6	1.84415	130.2306	3.30459	0	3.3046	55.295	1.4667	-0.005	5	0.825	0.3908	2.148	67.48864
55	115.9	3.9	-7.91	3.37	115.803	3.3678	5	2.25841	131.8195	3.3705	0	3.3705	33.358	3.4687	-0.005	4	1	0.3139	2.6246	33.35784
56	147.1	5.29	-8.29	3.6	146.999	3.5987	8	2.21725	134.6318	3.43782	0	3.4378	41.759	3.6849	-0.004	4	0.9921	0.3107	2.5683	42.15108
57	260.1	3.91	-10.54	1.51	259.971	1.504	6	1.76575	133.8106	3.50472	0	3.5047	73.177	1.5246	-0.003	5	0.799	0.3841	2.0548	93.09253
58	160.6	4.84	-6.62	3.02	160.519	3.0152	5	2.13289	134.1959	3.57182	0	3.5718	43.94	3.0838	-0.003	4	0.9679	0.308	2.4895	45.69071
59	103.4	3.78	-6.15	3.66	103.325	3.6584	5	2.31765	131.3127	3.63748	0	3.6375	27.406	3.7919	-0.004	4	1	0.2909	2.714	27.40559
60	309.6	2.45	-10.92	0.79	309.466	0.7917	6	1.503	130.8153	3.70289	0	3.7029	82.574	0.8013	-0.003	6	0.7084	0.4117	1.791	118.9823
61	296.6	3.42	-14.3	1.15	296.425	1.1538	6	1.63999	133.1509	3.76946	0	3.7695	77.639	1.1686	-0.004	6	0.7684	0.3768	1.9408	104.2057
62	45.9	1.48	-13.3	3.24	45.7372	3.2359	4	2.52139	122.464	3.83069	0	3.8307	10.94	3.5317	-0.023	3	1	0.2762	3.0059	10.93967
63	84.7	5.02	-13.41	5.95	84.5359	5.9383	9	2.53608	132.8991	3.89714	0	3.8971	20.692	6.2253	-0.012	3	1	0.2715	2.9491	20.69175
64	87.4	1.93	-12.62	2.21	87.2455	2.2122	5	2.2052	125.9816	3.96013	0	3.9601	21.031	2.3173	-0.011	4	1	0.2672	2.6688	21.03096
65	44.9	0.97	-12.4	2.17	44.7482	2.1677	5	2.41258	119.3192	4.01979	0	4.0198	10.132	2.3816	-0.022	3	1	0.2632	2.9365	10.13197
66	57	1.47	-12.36	2.58	56.8487	2.5858	5	2.38586	122.9448	4.08127	0	4.0813	12.929	2.7858	-0.017	3	1	0.2593	2.8869	12.92919
67	58.6	2.34	-12.5	4.01	58.447	4.0036	4	2.51128	126.414	4.14447	0	4.1445	13.102	4.3092	-0.017	3	1	0.2553	2.9956	13.1024
68	56.1	2.06	-12.5	3.68	55.947	3.6821	4	2.49825	125.3749	4.20716	0	4.2072	12.298	3.9815	-0.017	3	1	0.2515	2.9963	12.29804
69	50	1.63	-12.44	3.26	49.8477	3.27	4	2.49748	123.3803	4.26885	0	4.2689	10.677	3.5762	-0.02	3	1	0.2479	3.0177	10.67709
70	49.9	0	-12.4	0	49.7482	0	0	0	769.6	4.65365	0	4.6537	9.6902	0	-0.02	0	1	0.2274	0	0

	C-4	In situ data			Basic output data														
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	34.6	0.06	0.19	0.18	34.6023	0.1734	6	2.00858	98.32926	0.04916	0	0.0492	702.81	0.1737	0.0004	6	0.5068	2	1.7177	65.31122
2	34.1	0.35	0.16	1.01	34.102	1.0263	5	2.31615	111.1979	0.10476	0	0.1048	324.51	1.0295	0.0003	5	0.6433	2	2.0693	64.26035
3	41	0.68	0.19	1.67	41.0023	1.6584	5	2.36931	116.507	0.16302	0	0.163	250.52	1.6651	0.0003	5	0.6732	2	2.1405	77.19308
4	34.3	0.78	0.28	2.27	34.3034	2.2738	4	2.51488	117.0758	0.22155	0	0.2216	153.83	2.2886	0.0006	5	0.7338	2	2.2921	64.4204
5	31	0.2	0.36	0.64	31.0044	0.6451	5	2.25223	106.8709	0.27499	0	0.275	111.75	0.6508	0.0008	6	0.6229	2	1.9946	58.0837
6	14.2	0.18	0.38	1.24	14.2047	1.2672	4	2.68986	104.1962	0.32709	0	0.3271	42.428	1.2971	0.002	5	0.7975	2	2.4463	26.2309
7	53	0.21	0.57	0.41	53.007	0.3962	6	1.95001	108.536	0.38136	0	0.3814	138	0.3991	0.0008	6	0.5316	1.7203	1.7432	85.56147
8	71.3	0.15	0.38	0.21	71.3047	0.2104	6	1.72889	106.7973	0.43476	0	0.4348	163.01	0.2117	0.0004	6	0.465	1.5123	1.5628	101.29
9	58.8	0.15	0.28	0.26	58.8034	0.2551	6	1.83543	106.3271	0.48792	0	0.4879	119.52	0.2572	0.0004	6	0.5122	1.4866	1.6793	81.92892
10	57.4	0.19	0.28	0.33	57.4034	0.331	6	1.88669	107.998	0.54192	0	0.5419	104.93	0.3342	0.0004	6	0.5413	1.4365	1.7486	77.19515
11	72.2	0.24	0.27	0.34	72.2033	0.3324	6	1.79623	110.2668	0.59705	0	0.5971	119.93	0.3352	0.0003	6	0.5196	1.3463	1.6843	91.10761
12	87.7	0.39	0.01	0.45	87.7001	0.4447	6	1.77786	114.2935	0.6542	0	0.6542	133.06	0.448	1E-05	6	0.5238	1.2864	1.6877	105.8263
13	102.7	0.65	0.09	0.64	102.701	0.6329	6	1.80064	118.4163	0.71341	0	0.7134	142.96	0.6373	6E-05	6	0.5425	1.2384	1.7292	119.3669
14	62.7	0.84	-0.57	1.33	62.693	1.3399	5	2.1669	119.0888	0.77295	0	0.773	80.109	1.3566	-7E-04	5	0.6873	1.2409	2.1019	72.61676
15	55.7	2.04	-1.14	3.67	55.6861	3.6634	4	2.4981	125.2921	0.8356	0	0.8356	65.642	3.7192	-0.002	4	0.8227	1.2144	2.4491	62.9514
16	50.5	2.24	-2.38	4.43	50.4709	4.4382	4	2.58764	125.7366	0.89846	0	0.8985	55.175	4.5186	-0.003	4	0.8665	1.1523	2.5564	53.98301
17	57.9	2.34	-2.64	4.04	57.8677	4.0437	4	2.51739	126.3898	0.96166	0	0.9617	59.175	4.112	-0.003	4	0.8493	1.0846	2.5036	58.32867
18	73.8	3.83	0.82	5.19	73.81	5.189	9	2.5278	130.5884	1.02695	0	1.027	70.873	5.2622	0.0008	9	0.8622	1.0261	2.5292	70.58141
19	66.2	3.42	2.11	5.17	66.2258	5.1642	4	2.55677	129.4955	1.0917	0	1.0917	59.663	5.2507	0.0023	4	0.8826	0.9728	2.5748	59.88227
20	49	2.37	1.21	4.83	49.0148	4.8353	4	2.62335	126.078	1.15474	0	1.1547	41.447	4.9519	0.0018	4	0.9188	0.9228	2.6621	41.74164
21	57.6	2.44	2.33	4.23	57.6285	4.234	4	2.53316	126.6858	1.21808	0	1.2181	46.311	4.3254	0.003	4	0.8921	0.882	2.5839	47.01999
22	68.8	2.88	3.04	4.19	68.8372	4.1838	4	2.47711	128.3324	1.28225	0	1.2823	52.685	4.2632	0.0032	4	0.8777	0.8448	2.5382	53.93726
23	93.5	4.53	5.14	4.84	93.5629	4.8417	9	2.43923	132.395	1.34845	0	1.3485	68.386	4.9125	0.004	4	0.8687	0.8101	2.5063	70.59795
24	99.5	5.81	7.27	5.84	99.589	5.834	9	2.48657	134.3682	1.41563	0	1.4156	69.35	5.9181	0.0053	9	0.8942	0.7708	2.5649	71.51791
25	104.9	6.32	4.47	6.03	104.955	6.0216	9	2.48398	135.1118	1.48319	0	1.4832	69.763	6.108	0.0031	9	0.9006	0.7378	2.5732	72.14441
26	101.1	4.55	4.07	4.5	101.15	4.4983	9	2.39314	132.6174	1.5495	0	1.5495	64.279	4.5683	0.0029	4	0.8741	0.7165	2.4953	67.4403
27	114.3	7.2	4.72	6.29	114.358	6.296	9	2.4778	136.2749	1.61763	0	1.6176	69.694	6.3864	0.003	9	0.9125	0.6789	2.5877	72.33196
28	102.2	5.47	7.32	5.35	102.29	5.3476	9	2.44942	133.9922	1.68463	0	1.6846	59.719	5.4371	0.0052	4	0.911	0.6546	2.5753	62.24286
29	144	6.42	-1.68	4.46	143.979	4.459	9	2.29773	135.9977	1.75263	0	1.7526	81.151	4.5139	-9E-04	9	0.8548	0.6496	2.419	87.31834
30	77.3	3.75	1.43	4.85	77.3175	4.8501	4	2.49238	130.5472	1.8179	0	1.8179	41.531	4.9669	0.0014	4	0.9481	0.5986	2.6561	42.71507
31	58.9	2.3	1.34	3.91	58.9164	3.9038	4	2.50094	126.3074	1.88106	0	1.8811	30.321	4.0326	0.0017	4	0.965	0.574	2.6928	30.93753
32	56.5	2.25	1.17	3.99	56.5143	3.9813	4	2.51959	126.0451	1.94408	0	1.9441	28.07	4.1231	0.0015	4	0.9809	0.5507	2.7267	28.39881
33	40.8	1.41	2.03	3.45	40.8249	3.4538	4	2.57674	121.8324	2.00499	0	2.005	19.362	3.6322	0.0038	3	1	0.5277	2.8169	19.36158
34	99.9	2.73	2.25	2.73	99.9275	2.732	5	2.23125	128.8501	2.06942	0	2.0694	47.288	2.7898	0.0017	5	0.8712	0.5575	2.4215	51.55632
35	153.4	4.79	-0.54	3.12	153.393	3.1227	5	2.15693	134.0091	2.13642	0	2.1364	70.799	3.1668	-3E-04	5	0.8387	0.5547	2.3298	79.29777
36	25.5	0.65	1.94	2.55	25.5238	2.5467	4	2.64609	115.0207	2.19393	0	2.1939	10.634	2.7861	0.006	3	1	0.4823	2.9567	10.63378
37	23.7	0.59	2.5	2.47	23.7306	2.4862	4	2.66479	114.1344	2.251	0	2.251	9.5422	2.7468	0.0084	3	1	0.4701	2.9923	9.54224
38	148.5	1.71	4.52	1.15	148.555	1.1511	6	1.84136	126.3942	2.3142	0	2.3142	63.193	1.1693	0.0022	6	0.7361	0.5621	2.0382	77.68719
39	87	2.33	-0.19	2.68	86.9977	2.6782	5	2.26572	127.3528	2.37788	0	2.3779	35.586	2.7535	-2E-04	4	0.9218	0.4741	2.5163	37.91222
40	74.5	2.29	0.6	3.07	74.5073	3.0735	5	2.35542	126.8481	2.4413	0	2.4413	29.52	3.1776	0.0006	4	0.9678	0.4452	2.6303	30.32412
41	11.9	0.27	2.17	2.28	11.9266	2.2639	4	2.88564	106.7367	2.49467	0	2.4947	3.7808	2.8626	0.0166	3	1	0.4242	3.3433	3.78082
42	20.2	0.41	3.42	2.04	20.2419	2.0255	4	2.66812	111.0834	2.55021	0	2.5502	6.9373	2.3175	0.0139	3	1	0.4149	3.0697	6.93733
43	143.4	2.33	1.48	1.62	143.418	1.6246	6	1.95885	128.5721	2.6145	0	2.6145	53.855	1.6548	0.0008	5	0.8122	0.4797	2.2005	63.82834
44	207.1	1.88	1.09	0.91	207.113	0.9077	6	1.66614	127.8982	2.67844	0	2.6784	76.326	0.9196	0.0004	6	0.6943	0.5247	1.8826	101.3841
45	109.6	1.59	2.18	1.45	109.627	1.4504	6	2.00609	125.1207	2.741	0	2.741	38.995	1.4876	0.0015	5	0.8522	0.4443	2.2899	44.88378
46	164.9	3.65	1.79	2.21	164.922	2.2132	5	2.02006	132.1971	2.8071	0	2.8071	57.752	2.2515	0.0008	5	0.8498	0.4364	2.2755	66.8639
47	152.8	3.17	6.28	2.07	152.877	2.0736	5	2.01943	130.9805	2.87259	0	2.8726	52.219	2.1133	0.003	5	0.8586	0.4242	2.2904	60.13942
48	230.8	3.04	2.39	1.31	230.829	1.317	6	1.75334	131.6791	2.93843	0	2.9384	77.555	1.334	0.0008	6	0.7481	0.4658	1.9916	100.3141
49	134.9	4.77	3.15	3.53	134.939	3.5349	8	2.23355	133.6659	3.00527	0	3.0053	43.901	3.6155	0.0017	4	0.959	0.3675	2.5366	45.82063
50	143.2	2.75	7.83	1.92	143.296	1.9191	5	2.01255	129.7826	3.07016	0	3.0702	45.674	1.9611	0.004	5	0.8777	0.3926	2.3159	52.03014
51	165.7	5.03	3.55	3.03	165.743	3.0348	5	2.12676	134.5557	3.13744	0	3.1374	51.828	3.0934	0.0016	5	0.9234	0.3666	2.4252	56.33019
52	71.7	2.55	10.24	3.55	71.8253	3.5503	4	2.41199	127.5456	3.20121	0	3.2012	21.437	3.7159	0.0107	4	1	0.3305	2.7891	21.43695
53	45.3	1.59	9.93	3.51	45.4215	3.5005	4	2.5471	122.9717	3.26269	0	3.2627	12.921	3.7715	0.017	3	1	0.3243	2.9649	12.92149
54	38.5	1.31	8.75	3.4	38.6071	3.3932	4	2.58932	121.1579	3.32327	0	3.3233	10.617	3.7128	0.0179	3	1	0.3184	3.0292	10.61719
55	36	1.13	9.54	3.11	36.1168	3.1287	4	2.58723	119.9137	3.38323	0	3.3832	9.6752	3.4521	0.021	3	1	0.3128	3.0435	9.67523
56	47	1.95	9.41	4.14	47.1152	4.1388	4	2.58679	124.5543	3.44551	0	3.4455	12.674	4.4653	0.0155	3	1	0.3071	3.0165	12.67438
57	49.7	1.97	10.5	3.95	49.8285	3.9536	4	2.55555	124.7656	3.50789	0	3.5079	13.205	4.253	0.0163	3	1	0.3016	2.9894	13.2047
58	43.3	1.4	10.61	3.21	43.4299	3.2236	4	2.53666	121.9311	3.56886	0	3.5689	11.169	3.5122	0.0192	3	1	0.2965	2.9972	11.16913
59	48.9	2.56	10.33	5.22	49.0264	5.2217	4	2.64762	126.6428	3.63218	0	3.6322	12.498	5.6395	0.0164	3	1	0.2913	3.0851	12.49781
60	41.5	1.2	11.22	2.88	41.6373	2.882	4	2.51738	120.7004	3.69253	0	3.6925	10.276	3.1625	0.0213	3	1	0.2866	3.0002	10.27611
61	38.2	1.53	11.02	3.99	38.3349	3.9911	4	2.63971	122.2765	3.75366	0	3.7537	9.2127	4.4244	0.0229	3	1	0.2819	3.124	9.21266
62	34.1	1.11	11.28	3.24	34.2381	3.242	4	2.61484	119.6528	3.81349	0	3.8135	7.9781	3.6484	0.0267	3	1	0.2775	3.1259	7.97814
63	41.9	1.2	12.12	2.85	42.0484	2.8539	4	2.51135	120.7244	3.87385	0	3.8739	9.8544	3.1435	0.0229	3	1	0.2731	3.0136	9.8544
64	47.1	1.95	11.73	4.14	47.2436	4.1276	4	2.58512	124.561	3.93613	0	3.9361	11.003	4.5027	0.0195	3	1	0.2688	3.0672	11.00253
65	63.5	2.79	13.93	4.39	63.6705	4.3819	4	2.51474	127.9098	4.00009	0	4.0001	14.917	4.6757	0.0168	3	1	0.2645	2.974	14.91727
66	60.2	2.61	16.37	4.32	60.4004	4.3212	4	2.52573	127.2932	4.06374	0	4.0637	13.863	4.6329	0.0209	3	1	0.2604	2.9961	13.86326
67	43.8	1.17	15.22	2.66	43.9863	2.6599	4	2.4764	120.649	4.12406	0	4.1241	9.6658	2.9351	0.0275	3	1	0.2566	3.0037	9.66577
68	39.6	1.43	15.25	3.58	39.7867	3.5942	4	2.59673	121.8726	4.185	0	4.185	8.507	4.0167	0.0308	3	1	0.2528	3.1272	8.50698
69	41.2	1.06	16.48	2.56	41.4017	2.5603	4	2.48523	119.7789	4.24489	0	4.2449	8.7533	2.8528	0.0319	3	1	0.2493	3.0326	8.75332
70	73.3	0	20.8	0	73.5546	0	0	0	769.6	4.62969	0	4.6297	14.888	0	0.0217	0	1	0.2286	0	0

	C-5	In situ data						Basic output data											
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	29	0.04	0.09	0.13	29.0011	0.1379	5	2.0637	94.93178	0.04747	0	0.0475	609.99	0.1382	0.0002	6	0.5262	2	1.7689	54.72718
2	46.8	0.2	0.19	0.42	46.8023	0.4273	6	2.01289	107.8753	0.1014	0	0.1014	460.55	0.4283	0.0003	6	0.52	2	1.746	88.27251
3	32.9	0.27	0.19	0.81	32.9023	0.8206	5	2.27947	109.2117	0.15601	0	0.156	209.9	0.8245	0.0004	6	0.6296	2	2.0268	61.89598
4	22.3	0.07	0.19	0.31	22.3023	0.3139	5	2.2627	98.3859	0.2052	0	0.2052	107.68	0.3168	0.0006	6	0.6159	2	1.9847	41.76724
5	25	0.32	0.29	1.29	25.0036	1.2798	5	2.48128	109.7853	0.2601	0	0.2601	95.132	1.2933	0.0008	5	0.7154	2	2.2391	46.76924
6	21.2	0.06	0.47	0.26	21.2058	0.2829	5	2.26974	97.13501	0.30866	0	0.3087	67.702	0.2871	0.0016	6	0.6237	2	1.9924	39.49897
7	37.5	0.13	0.47	0.35	37.5058	0.3466	6	2.06529	104.1832	0.36075	0	0.3608	102.96	0.35	0.0009	6	0.5634	1.8335	1.8286	64.36338
8	37.9	0.16	0.47	0.43	37.9058	0.4221	5	2.09407	105.7284	0.41362	0	0.4136	90.644	0.4268	0.0009	6	0.5869	1.7354	1.8839	61.49093
9	46.5	0.19	0.47	0.42	46.5058	0.4086	6	2.00723	107.4845	0.46736	0	0.4674	98.507	0.4127	0.0007	6	0.5692	1.5922	1.8312	69.2781
10	64.1	0.38	0.57	0.6	64.107	0.5928	6	1.95803	113.3391	0.52403	0	0.524	121.33	0.5976	0.0007	6	0.5663	1.4887	1.8161	89.45988
11	64.3	0.62	0.57	0.97	64.307	0.9641	5	2.07206	116.9288	0.58249	0	0.5825	109.4	0.9729	0.0006	6	0.6199	1.4478	1.9491	87.19402
12	46.9	1.24	0.38	2.65	46.9047	2.6437	5	2.45384	121.2309	0.64311	0	0.6431	71.934	2.6804	0.0006	5	0.7722	1.4689	2.3409	64.22154
13	61.8	0.99	-0.35	1.6	61.7957	1.6021	5	2.22078	120.2558	0.70324	0	0.7032	86.873	1.6205	-4E-04	5	0.6964	1.3291	2.1345	76.74038
14	57.1	1.48	0.17	2.6	57.1021	2.5919	5	2.38514	123.0053	0.76474	0	0.7647	73.669	2.627	0.0002	5	0.7687	1.2835	2.3156	68.3393
15	36.2	1.24	0	3.44	36.2	3.4254	4	2.61274	120.599	0.82504	0	0.825	42.877	3.5053	0	4	0.8639	1.2398	2.5585	41.44908
16	28.8	1.5	-0.79	5.23	28.7903	5.2101	3	2.80958	121.4333	0.88576	0	0.8858	31.504	5.3755	-0.002	3	0.9496	1.1839	2.7761	31.22251
17	35.4	0.81	0	2.3	35.4	2.2881	4	2.50596	117.4287	0.94447	0	0.9445	36.481	2.3509	0	4	0.8435	1.1006	2.4903	35.83829
18	47.3	0.48	0.09	1.02	47.3011	1.0148	5	2.19434	114.307	1.00162	0	1.0016	46.224	1.0367	0.0001	5	0.7328	1.041	2.1928	45.55176
19	49.6	0.42	0.09	0.84	49.6011	0.8468	5	2.13398	113.4457	1.05835	0	1.0584	45.867	0.8652	0.0001	5	0.718	0.9998	2.147	45.86949
20	58.1	0.44	0.07	0.75	58.1009	0.7573	6	2.05	114.1719	1.11543	0	1.1154	51.088	0.7721	9E-05	5	0.6933	0.9641	2.075	51.92152
21	75.1	0.97	0.09	1.29	75.1011	1.2916	5	2.09587	120.5821	1.17572	0	1.1757	62.876	1.3121	9E-05	5	0.7175	0.9272	2.131	64.77673
22	41.3	1.03	0.09	2.49	41.3011	2.4939	4	2.47857	119.5629	1.23551	0	1.2355	32.429	2.5708	0.0002	4	0.877	0.8729	2.5422	33.05266
23	39.8	0.83	0.32	2.08	39.8039	2.0852	5	2.44101	117.8932	1.29445	0	1.2945	29.75	2.1553	0.0006	4	0.8717	0.8388	2.5209	30.52914
24	88.4	0.67	0.31	0.75	88.4038	0.7579	6	1.89885	118.2724	1.35359	0	1.3536	64.311	0.7697	0.0003	6	0.6632	0.8493	1.9664	69.87284
25	102.3	0.35	0.38	0.34	102.305	0.3421	6	1.66521	113.8774	1.41053	0	1.4105	71.529	0.3469	0.0003	6	0.5789	0.8467	1.738	80.73531
26	132.3	3.97	0.34	3	132.304	3.0007	5	2.18302	132.2745	1.47666	0	1.4767	88.597	3.0345	0.0002	5	0.7822	0.7705	2.2628	95.26759
27	47	1.8	5.91	3.81	47.0723	3.8239	4	2.56278	123.9664	1.53865	0	1.5387	29.593	3.9531	0.0094	4	0.9497	0.7008	2.6952	30.15638
28	59.2	1.8	7.99	3.04	59.2978	3.0355	5	2.42098	124.5296	1.60091	0	1.6009	36.04	3.1198	0.01	4	0.8995	0.689	2.5553	37.57178
29	90.2	4.61	8.48	5.1	90.3038	5.105	9	2.46681	132.4366	1.66713	0	1.6671	53.167	5.201	0.0069	4	0.9177	0.6589	2.5952	55.19343
30	69.9	3.54	11	5.05	70.0346	5.0546	4	2.53387	129.8842	1.73207	0	1.7321	39.434	5.1828	0.0116	4	0.9557	0.6244	2.6869	40.30457
31	63.3	3.03	11.13	4.78	63.4362	4.7765	4	2.54364	128.5046	1.79633	0	1.7963	34.314	4.9157	0.013	4	0.9693	0.5987	2.7146	34.87707
32	42	1.45	10.85	3.44	42.1328	3.4415	4	2.56568	122.114	1.85738	0	1.8574	21.684	3.6002	0.0194	4	0.9956	0.5711	2.7756	21.73774
33	44.5	1.85	10.91	4.14	44.6335	4.1449	4	2.60384	124.0372	1.9194	0	1.9194	22.254	4.3311	0.0184	3	1	0.5513	2.82	22.25389
34	53.8	2.15	10.51	3.99	53.9286	3.9868	4	2.53413	125.5982	1.9822	0	1.9822	26.206	4.1389	0.0146	4	0.9929	0.5362	2.7523	26.32438
35	32.8	1.13	10.44	3.43	32.9278	3.4318	4	2.64391	119.6883	2.04204	0	2.042	15.125	3.6587	0.0243	3	1	0.5182	2.9027	15.12491
36	25.4	0.87	10.36	3.39	25.5268	3.4082	4	2.72564	117.1541	2.10062	0	2.1006	11.152	3.7138	0.0318	3	1	0.5037	3.0121	11.15203
37	23.5	0.65	10.25	2.75	23.6255	2.7513	4	2.6932	114.8322	2.15804	0	2.158	9.9477	3.0278	0.0344	3	1	0.4903	3.001	9.94766
38	30.5	0.96	10.67	3.14	30.6306	3.1341	4	2.64171	118.3189	2.2172	0	2.2172	12.815	3.3787	0.027	3	1	0.4772	2.9391	12.81501
39	34.3	0.89	10.25	2.59	34.4255	2.5853	4	2.54902	118.0498	2.27622	0	2.2762	14.124	2.7683	0.023	4	1	0.4649	2.8541	14.12395
40	157.5	1.9	9.41	1.2	157.615	1.2055	6	1.83713	127.3095	2.33988	0	2.3399	66.36	1.2236	0.0044	6	0.7355	0.5578	2.0332	81.86236
41	24.2	0.75	9.39	3.09	24.3149	3.0845	4	2.71436	115.9495	2.39785	0	2.3979	9.1403	3.422	0.0309	3	1	0.4413	3.0615	9.1403
42	28.3	0.95	9.29	3.34	28.4137	3.3435	4	2.68475	118.0591	2.45688	0	2.4569	10.565	3.6599	0.0258	3	1	0.4307	3.0273	10.56495
43	21.3	0.89	9.67	4.13	21.4184	4.1553	3	2.83941	116.8924	2.51533	0	2.5153	7.5151	4.7082	0.0368	3	1	0.4207	3.2112	7.51514
44	274.5	2.73	7.97	0.99	274.598	0.9942	6	1.61152	131.3155	2.58098	0	2.581	105.39	1.0036	0.0021	6	0.6559	0.5572	1.7941	143.2405
45	325.2	2.73	6.36	0.84	325.278	0.8393	6	1.50778	131.7286	2.64685	0	2.6469	121.89	0.8462	0.0014	6	0.6169	0.568	1.6832	173.1994
46	103.3	2.97	4.84	2.87	103.359	2.8735	5	2.23785	129.5489	2.71162	0	2.7116	37.117	2.9509	0.0035	4	0.9409	0.4125	2.5252	39.23888
47	227.1	4.73	4.93	2.08	227.16	2.0822	6	1.91378	134.8746	2.77906	0	2.7791	80.74	2.108	0.0016	5	0.7957	0.4638	2.1368	98.35018
48	320	3.61	3.71	1.13	320.045	1.128	6	1.61167	133.7335	2.84593	0	2.8459	111.46	1.1381	0.0008	6	0.6744	0.5131	1.8096	153.8206
49	266.4	7.41	2.85	2.78	266.435	2.7812	8	1.97795	137.28	2.91457	0	2.9146	90.415	2.8119	0.0008	5	0.8272	0.4325	2.2029	107.7131
50	387	3.88	3.15	1	387.039	1.0025	6	1.52094	134.7248	2.98193	0	2.9819	128.79	1.0103	0.0006	6	0.6447	0.5127	1.7146	186.1051
51	495.7	3.76	2.05	0.76	495.725	0.7585	6	1.35969	135.0986	3.04948	0	3.0495	161.56	0.7632	0.0003	6	0.5798	0.5413	1.5354	252.0594
52	141.1	4.32	9.04	3.06	141.211	3.0593	5	2.17192	133.0516	3.116	0	3.116	44.318	3.1283	0.0047	4	0.9447	0.3605	2.4846	47.04568
53	196.1	6.3	-1.48	3.21	196.082	3.2129	8	2.1041	136.613	3.18431	0	3.1843	60.577	3.266	-6E-04	5	0.9126	0.3659	2.3907	66.70243
54	43.9	0.59	-0.62	1.34	43.8924	1.3442	5	2.29102	115.6343	3.24213	0	3.2421	12.538	1.4514	-0.001	4	1	0.3264	2.7449	12.53815
55	60.8	1.3	1.15	2.14	60.8141	2.1377	5	2.30829	122.21	3.30323	0	3.3032	17.41	2.2604	0.0014	4	1	0.3203	2.729	17.41047
56	92.3	2.84	2.47	3.07	92.3302	3.0759	5	2.29251	128.9462	3.36771	0	3.3677	26.416	3.1924	0.002	4	1	0.3142	2.6772	26.41635
57	66.4	3.22	1.08	4.85	66.4132	4.8484	4	2.53531	129.0615	3.43224	0	3.4322	18.35	5.1127	0.0012	3	1	0.3083	2.9305	18.34983
58	35.8	0.72	2.56	2.02	35.8313	2.0094	5	2.46665	116.5964	3.49054	0	3.4905	9.2653	2.2263	0.0057	3	1	0.3031	2.9535	9.26528
59	41.9	1.13	2.71	2.68	41.9332	2.6948	4	2.4957	120.2779	3.55067	0	3.5507	10.81	2.9441	0.0051	3	1	0.298	2.9644	10.80992
60	84.7	4.01	-0.79	4.73	84.6903	4.7349	9	2.45901	131.2599	3.6163	0	3.6163	22.419	4.9461	-7E-04	3	1	0.2926	2.8559	22.41903
61	33.9	0.89	2.19	2.63	33.9268	2.6233	4	2.55794	118.0142	3.67531	0	3.6753	8.231	2.942	0.0052	3	1	0.2879	3.0622	8.231
62	39.8	0.95	2.94	2.39	39.836	2.3848	4	2.47791	118.8832	3.73475	0	3.7348	9.6663	2.6315	0.0059	3	1	0.2833	2.9773	9.6663
63	47.8	1.39	3.42	2.9	47.8419	2.9054	4	2.47516	122.1147	3.79581	0	3.7958	11.604	3.1558	0.0056	3	1	0.2788	2.9566	11.60386
64	31.9	0.97	3.7	3.04	31.9453	3.0364	4	2.6189	118.4972	3.85506	0	3.8551	7.2866	3.4532	0.0095	3	1	0.2745	3.1449	7.28659
65	25.9	0.82	3.61	3.17	25.9442	3.1606	4	2.69927	116.7605	3.91344	0	3.9134	5.6295	3.7221	0.0118	3	1	0.2704	3.2562	5.62951
66	30	0.61	3.98	2.02	30.0487	2.03	4	2.52989	114.9541	3.97092	0	3.9709	6.5672	2.3392	0.011	3	1	0.2665	3.0922	6.5672
67	104	4.54	3.16	4.36	104.039	4.3638	9	2.37521	132.67	4.03725	0	4.0373	24.77	4.5399	0.0023	3	1	0.2621	2.7988	24.76968
68	144.9	7.29	4.34	5.03	144.953	5.0292	9	2.33877	136.944	4.10572	0	4.1057	34.305	5.1758	0.0022	3	1	0.2577	2.7355	34.30513
69	241.8	6.9	0.27	2.85	241.803	2.8536	8	2.01032	137.28	4.17436	0	4.1744	56.926	2.9037	8E-05	5	0.9566	0.269	2.3842	60.41866
70	237	6.29	0.38	2.65	237.005	2.654	8	1.98904	137.0637	4.2429	0	4.2429	54.859	2.7023	0.0001	5	0.9557	0.2652	2.3732	58.33887

	C-6	In situ data						Basic output data											
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	28.1	0.02	0.28	0.09	28.1034	0.0712	0	2.04705	89.78334	0.04489	0	0.0449	625.03	0.0713	0.0007	0	0.5177	2	1.747	53.0353
2	16.8	0.19	0.31	1.13	16.8038	1.1307	4	2.60199	105.0017	0.09739	0	0.0974	171.54	1.1373	0.0013	5	0.749	2	2.3476	31.57788
3	29.8	0.09	0.29	0.29	29.8036	0.302	5	2.13809	100.9319	0.14786	0	0.1479	200.57	0.3035	0.0007	6	0.5653	2	1.8591	56.05419
4	40.1	0.08	0.38	0.2	40.1047	0.1995	6	1.96149	100.7942	0.19826	0	0.1983	201.29	0.2005	0.0007	6	0.4979	2	1.6758	75.42972
5	50.3	0.25	0.38	0.49	50.3047	0.497	6	2.01351	109.6841	0.2531	0	0.2531	197.76	0.4995	0.0006	6	0.5302	2	1.7538	94.60576
6	47.1	0.2	0.28	0.43	47.1034	0.4246	6	2.00919	107.891	0.30704	0	0.307	152.41	0.4274	0.0004	6	0.5348	1.9381	1.7567	85.71458
7	41.3	0.09	0.29	0.23	41.3036	0.2179	6	1.95974	101.7278	0.35791	0	0.3579	114.4	0.2198	0.0005	6	0.525	1.7667	1.7291	68.3663
8	42.9	0.07	0.38	0.16	42.9047	0.1632	6	1.91162	99.98171	0.4079	0	0.4079	104.18	0.1647	0.0006	6	0.5192	1.6403	1.708	65.88064
9	51.2	0.12	0.38	0.24	51.2047	0.2344	6	1.88015	104.3569	0.46008	0	0.4601	110.3	0.2365	0.0005	6	0.5214	1.5438	1.7071	74.03781
10	51.7	0.13	0.3	0.25	51.7037	0.2514	6	1.88598	104.9662	0.51256	0	0.5126	99.874	0.254	0.0004	6	0.5341	1.4728	1.7337	71.25124
11	39.2	0.86	0.34	2.2	39.2042	2.1936	5	2.46004	118.1159	0.57162	0	0.5716	67.585	2.2261	0.0006	5	0.7592	1.596	2.3158	58.27103
12	32.5	0.91	0.02	2.79	32.5002	2.8	4	2.59042	118.072	0.63065	0	0.6307	50.534	2.8554	5E-05	4	0.8187	1.5276	2.4645	46.00925
13	44.8	0.99	0	2.2	44.8	2.2098	5	2.4176	119.4714	0.69039	0	0.6904	63.891	2.2444	0	5	0.7667	1.3873	2.3206	57.83376
14	37.6	1.25	0.08	3.34	37.601	3.3244	4	2.59179	120.7504	0.75076	0	0.7508	49.084	3.3921	0.0002	4	0.843	1.3355	2.5126	46.50981
15	29.8	1.35	-0.77	4.53	29.7906	4.5316	3	2.75727	120.7457	0.81114	0	0.8111	35.727	4.6585	-0.002	4	0.9162	1.2758	2.6977	34.94027
16	24.8	1.01	-6.55	4.09	24.7198	4.0858	3	2.78744	118.1675	0.87022	0	0.8702	27.406	4.2349	-0.02	4	0.9388	1.2015	2.7498	27.08068
17	48.8	0.2	0.11	0.42	48.8014	0.4098	6	1.98877	107.9773	0.92421	0	0.9242	51.803	0.4177	0.0002	6	0.6427	1.0909	1.9656	49.3587
18	76.4	0.31	0.19	0.41	76.4023	0.4058	6	1.81182	112.2773	0.98035	0	0.9804	76.934	0.411	0.0002	6	0.583	1.0455	1.8022	74.52379
19	51.7	0.25	0.19	0.49	51.7023	0.4835	6	1.9975	109.7509	1.03522	0	1.0352	48.943	0.4934	0.0003	6	0.6623	1.0146	2.0037	48.58313
20	79.1	0.35	0.19	0.44	79.1023	0.4425	6	1.81605	113.25	1.09185	0	1.0919	71.448	0.4487	0.0002	6	0.5994	0.9814	1.8314	72.35224
21	21.3	0.58	0.29	2.73	21.3036	2.7226	4	2.72596	113.7462	1.14872	0	1.1487	17.545	2.8777	0.001	4	0.9662	0.9237	2.7872	17.59425
22	28.6	0.78	-1.24	2.74	28.5848	2.7287	4	2.62626	116.631	1.20704	0	1.207	22.682	2.849	-0.003	4	0.9336	0.8843	2.6942	22.88112
23	36.2	0.95	-2.37	2.63	36.171	2.6264	4	2.53698	118.6478	1.26636	0	1.2664	27.563	2.7217	-0.005	4	0.9055	0.8499	2.6131	28.03504
24	55.9	1.86	-1.84	3.33	55.8775	3.3287	4	2.4675	124.6246	1.32867	0	1.3287	41.055	3.4098	-0.002	4	0.8825	0.818	2.5448	42.16883
25	86.1	4.41	3.87	5.12	86.1474	5.1191	9	2.48056	131.9972	1.39467	0	1.3947	60.769	5.2034	0.0033	4	0.891	0.7819	2.5591	62.62584
26	64.6	3.56	3.51	5.51	64.643	5.5072	4	2.58479	129.7301	1.45954	0	1.4595	43.29	5.6344	0.004	3	0.9426	0.7385	2.6865	44.09697
27	73.2	4.04	4.44	5.52	73.2544	5.515	9	2.55021	130.9606	1.52502	0	1.525	47.035	5.6323	0.0045	3	0.9358	0.7103	2.6605	48.15149
28	85.1	4.38	5.67	5.14	85.1694	5.1427	9	2.48523	131.9194	1.59098	0	1.591	52.533	5.2406	0.0049	4	0.9167	0.688	2.6021	54.34752
29	75.6	4.07	4.66	5.38	75.657	5.3795	9	2.53295	131.0934	1.65652	0	1.6565	44.672	5.5	0.0045	3	0.9448	0.6548	2.6676	45.79171
30	59.2	3.52	5.03	5.93	59.2616	5.9398	3	2.63431	129.4354	1.72124	0	1.7212	33.43	6.1175	0.0063	3	0.9963	0.6159	2.7946	33.49013
31	57.7	3.3	4.34	5.71	57.7531	5.714	4	2.62896	128.9003	1.78569	0	1.7857	31.342	5.8963	0.0056	3	1	0.5926	2.8033	31.34216
32	115.1	3.83	3.02	3.33	115.137	3.3265	5	2.25586	131.6729	1.85153	0	1.8515	61.185	3.3808	0.0019	4	0.8536	0.6203	2.403	66.40848
33	241.8	2.43	0.51	1.01	241.806	1.0049	6	1.65169	130.1536	1.9166	0	1.9166	125.16	1.013	0.0002	6	0.6139	0.6944	1.767	157.4289
34	234	2.42	1.89	1.03	234.023	1.0341	6	1.67044	130.0436	1.98163	0	1.9816	117.1	1.0429	0.0006	6	0.6278	0.6744	1.7954	147.8965
35	70.9	1.73	1.43	2.43	70.9175	2.4395	5	2.299	124.6758	2.04396	0	2.044	33.696	2.5119	0.0015	4	0.9028	0.5519	2.508	35.9239
36	48.9	1.54	2.28	3.15	48.9279	3.1475	4	2.49185	122.9193	2.10542	0	2.1054	22.239	3.289	0.0035	4	0.9946	0.5044	2.7417	22.32218
37	23.1	0.61	1.43	2.62	23.1175	2.6387	4	2.68953	114.3145	2.16258	0	2.1626	9.6898	2.911	0.0049	3	1	0.4893	3.0008	9.68977
38	157.2	1.53	0.28	0.97	157.203	0.9733	6	1.77336	125.7184	2.22544	0	2.2254	69.639	0.9872	0.0001	6	0.6997	0.5944	1.9535	87.05942
39	238.6	2.47	0.2	1.04	238.602	1.0352	6	1.66513	130.2405	2.29056	0	2.2906	103.17	1.0452	6E-05	6	0.654	0.6035	1.8255	134.7703
40	289.4	3.17	0.19	1.09	289.402	1.0954	6	1.629	132.537	2.35683	0	2.3568	121.79	1.1044	5E-05	6	0.6413	0.5984	1.7838	162.324
41	280.5	6.75	-0.26	2.41	280.497	2.4064	8	1.91306	137.28	2.42547	0	2.4255	114.65	2.4274	-7E-05	5	0.7573	0.5335	2.0802	140.2117
42	61.5	1.32	-0.38	2.14	61.4954	2.1465	5	2.30591	122.3489	2.48664	0	2.4866	23.73	2.237	-5E-04	4	0.9608	0.44	2.6059	24.53828
43	27.7	0.73	5.32	2.61	27.7651	2.6292	4	2.62598	116.0753	2.54468	0	2.5447	9.911	2.8945	0.0152	3	1	0.4158	2.9913	9.91104
44	29.5	1.2	7.96	4.06	29.5974	4.0544	4	2.72671	119.868	2.60462	0	2.6046	10.363	4.4456	0.0212	3	1	0.4062	3.0844	10.36345
45	123.5	3.12	3.39	2.53	123.541	2.5255	5	2.14467	130.3445	2.66979	0	2.6698	45.274	2.5813	0.002	5	0.894	0.4372	2.4086	49.94264
46	48.7	1.61	0.26	3.3	48.7032	3.3057	4	2.50803	123.2333	2.7314	0	2.7314	16.831	3.5022	0.0004	3	1	0.3874	2.8545	16.83082
47	146.3	1.64	0.32	1.12	146.304	1.121	6	1.83816	126.0511	2.79443	0	2.7944	51.356	1.1428	0.0002	5	0.783	0.4675	2.1012	63.40273
48	129	3.74	-0.5	2.9	128.994	2.8994	5	2.17841	131.7761	2.86032	0	2.8603	44.098	2.9651	-3E-04	4	0.9255	0.3984	2.4656	47.48763
49	207.2	4.06	-0.1	1.96	207.199	1.9595	6	1.91692	133.5326	2.92708	0	2.9271	69.787	1.9876	-4E-05	5	0.8136	0.437	2.1654	84.36077
50	176.9	5.12	-1.04	2.9	176.887	2.8945	5	2.09339	134.8442	2.99451	0	2.9945	58.071	2.9443	-4E-04	5	0.8934	0.3948	2.3667	64.88251
51	597.3	5.26	1.42	0.88	597.317	0.8806	6	1.36847	137.28	3.06315	0	3.0632	194	0.8851	0.0002	6	0.5777	0.5411	1.5286	303.909
52	127.2	4.28	1.17	3.37	127.214	3.3644	5	2.23244	132.729	3.12951	0	3.1295	39.65	3.4493	0.0007	4	0.9731	0.3481	2.5585	40.82514
53	37.5	0.71	-3.6	1.9	37.4559	1.8956	5	2.43588	116.6023	3.18781	0	3.1878	10.75	2.0719	-0.008	4	1	0.3319	2.8822	10.74973
54	28.8	0.61	-3.51	2.12	28.757	2.1212	4	2.55663	114.8469	3.24524	0	3.2452	7.8613	2.3911	-0.01	3	1	0.3261	3.0304	7.86131
55	43.4	0.91	-3.77	2.09	43.3539	2.099	5	2.41415	118.7748	3.30462	0	3.3046	12.119	2.2722	-0.007	4	1	0.3202	2.8602	12.11915
56	90.6	2.29	-2.18	2.53	90.5733	2.5283	5	2.23553	127.3244	3.36829	0	3.3683	25.89	2.626	-0.002	4	1	0.3141	2.6302	25.89004
57	65.2	2.78	-4.64	4.26	65.1432	4.2675	4	2.49955	127.9393	3.43225	0	3.4323	17.98	4.5049	-0.005	3	1	0.3083	2.9014	17.97971
58	47.1	1.24	-2.94	2.63	47.064	2.6347	5	2.45176	121.2392	3.49287	0	3.4929	12.474	2.8459	-0.005	3	1	0.3029	2.905	12.47429
59	46.5	1.83	-2.94	3.94	46.464	3.9385	4	2.57583	124.0557	3.5549	0	3.5549	12.07	4.2648	-0.005	3	1	0.2977	3.0209	12.07041
60	39.4	1.03	-2.78	2.62	39.366	2.6165	4	2.50796	119.4458	3.61463	0	3.6146	9.8908	2.881	-0.006	3	1	0.2927	2.9909	9.89075
61	54.6	1.37	-2.37	2.5	54.571	2.5105	5	2.39012	122.3296	3.67579	0	3.6758	13.846	2.6918	-0.003	4	1	0.2879	2.854	13.84606
62	50.8	2.03	-2.47	3.99	50.7698	3.9984	4	2.55334	125.0307	3.73831	0	3.7383	12.581	4.3163	-0.004	3	1	0.283	3.0099	12.58096
63	35.5	1.1	-2.56	3.1	35.4687	3.1013	4	2.5906	119.6727	3.79814	0	3.7981	8.3384	3.4733	-0.006	3	1	0.2786	3.0979	8.33843
64	28	0.87	-2.18	3.12	27.9733	3.1101	4	2.66965	117.3773	3.85683	0	3.8568	6.2529	3.6075	-0.007	3	1	0.2744	3.2107	6.25293
65	34.4	0.85	-1.88	2.47	34.377	2.4726	4	2.53713	117.7099	3.91569	0	3.9157	7.7793	2.7904	-0.004	3	1	0.2702	3.0702	7.7793
66	32	0.7	-1.61	2.18	31.9803	2.1889	4	2.52843	116.113	3.97374	0	3.9737	7.0479	2.4994	-0.004	3	1	0.2663	3.0809	7.0479
67	35.9	0.69	-1.14	1.93	35.8861	1.9228	5	2.45435	116.2888	4.03189	0	4.0319	7.9006	2.1661	-0.003	3	1	0.2624	3.0062	7.90056
68	76.7	1.49	-0.79	1.95	76.6903	1.9429	5	2.20609	123.7739	4.09377	0	4.0938	17.733	2.0524	-8E-04	4	1	0.2585	2.6985	17.73341
69	46.2	1.29	-0.69	2.8	46.1916	2.7927	4	2.47476	121.4828	4.15451	0	4.1545	10.118	3.0687	-0.001	3	1	0.2547	2.9982	10.1184
70	193.8	6.04	-2.19	3.12	193.773	3.1171	8	2.09627	136.2757	4.22265	0	4.2227	44.889	3.1865	-8E-04	4	1	0.2506	2.5049	44.88898

	C-7	In situ data						Basic output data											
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	38.5	0.04	0.1	0.1	38.5012	0.1039	6	1.92366	95.62289	0.04781	0	0.0478	804.27	0.104	0.0002	6	0.4718	2	1.626	72.68334
2	45.5	0.13	0.19	0.28	45.5023	0.2857	6	1.95693	104.6546	0.10014	0	0.1001	453.39	0.2863	0.0003	6	0.4944	2	1.6789	85.81768
3	44.3	0.18	0.19	0.4	44.3023	0.4063	6	2.02546	106.9705	0.15362	0	0.1536	287.38	0.4077	0.0003	6	0.5267	2	1.7572	83.44838
4	29.9	0.14	0.28	0.46	29.9034	0.4682	5	2.20645	104.173	0.20571	0	0.2057	144.37	0.4714	0.0007	6	0.5984	2	1.9389	56.13362
5	21.2	0.14	0.38	0.67	21.2047	0.6602	5	2.4045	103.3346	0.25738	0	0.2574	81.387	0.6683	0.0013	5	0.6791	2	2.1443	39.59383
6	30.1	0.15	0.38	0.5	30.1047	0.4983	5	2.21485	104.6942	0.30972	0	0.3097	96.198	0.5034	0.0009	6	0.608	2	1.9509	56.31736
7	42	0.37	0.38	0.88	42.0047	0.8809	5	2.2042	112.1129	0.36578	0	0.3658	113.84	0.8886	0.0007	6	0.6196	1.9313	1.9727	75.99975
8	42	0.33	0.42	0.79	42.0051	0.7856	5	2.17835	111.2757	0.42142	0	0.4214	98.675	0.7936	0.0007	6	0.6221	1.773	1.9749	69.67949
9	52.7	0.32	0.47	0.61	52.7058	0.6071	6	2.0369	111.6041	0.47722	0	0.4772	109.44	0.6127	0.0007	6	0.5843	1.5924	1.8692	78.60073
10	55.2	0.55	0.47	1	55.2058	0.9963	5	2.13445	115.68	0.53506	0	0.5351	102.18	1.006	0.0006	6	0.633	1.5397	1.9894	79.55359
11	35.1	1.34	0.47	3.81	35.1058	3.817	4	2.65432	121.0917	0.59561	0	0.5956	57.941	3.8829	0.001	4	0.8365	1.6172	2.5155	52.74552
12	36.6	1.43	-1.62	3.91	36.5802	3.9092	4	2.64831	121.6676	0.65644	0	0.6564	54.725	3.9807	-0.003	4	0.847	1.4984	2.5342	50.87129
13	40.9	1.71	-2.68	4.19	40.8672	4.1843	4	2.63398	123.2464	0.71806	0	0.7181	55.913	4.2591	-0.005	4	0.8535	1.3922	2.5441	52.82665
14	30.6	1.63	-4.69	5.35	30.5426	5.3368	3	2.7983	122.1855	0.77916	0	0.7792	38.2	5.4765	-0.011	3	0.926	1.3276	2.7271	37.3437
15	32.6	1.45	-5.02	4.44	32.5386	4.4563	4	2.72432	121.4837	0.8399	0	0.8399	37.741	4.5743	-0.011	4	0.9089	1.2336	2.6748	36.95486
16	33.3	1.37	-7.16	4.12	33.2124	4.125	4	2.69489	121.1184	0.90046	0	0.9005	35.884	4.2399	-0.016	4	0.9082	1.1578	2.6655	35.35604
17	75.8	0.52	0.38	0.69	75.8047	0.686	6	1.92963	116.043	0.95848	0	0.9585	78.088	0.6948	0.0004	6	0.6249	1.0638	1.9149	75.24521
18	84.7	0.63	0.38	0.74	84.7047	0.7438	6	1.90933	117.7178	1.01734	0	1.0173	82.261	0.7528	0.0003	6	0.625	1.0249	1.9079	81.05782
19	69.4	0.68	0.28	0.98	69.4034	0.9798	6	2.04933	117.7907	1.07623	0	1.0762	63.487	0.9952	0.0003	5	0.6868	0.9884	2.0629	63.82594
20	57.4	0.44	0.28	0.76	57.4034	0.7665	6	2.05724	114.1424	1.1333	0	1.1333	49.651	0.7819	0.0004	5	0.6987	0.9532	2.0868	50.68933
21	19	0.9	-0.28	4.71	18.9966	4.7377	3	2.91602	116.6815	1.19165	0	1.1917	14.941	5.0548	-0.001	3	1	0.8879	2.9951	14.94146
22	22.3	0.99	-0.57	4.45	22.293	4.4409	3	2.84505	117.7691	1.25053	0	1.2505	16.827	4.7048	-0.002	3	1	0.8461	2.9355	16.82686
23	25.4	0.77	-0.47	3.02	25.3943	3.0322	4	2.69503	116.2479	1.30865	0	1.3087	18.405	3.1969	-0.001	4	0.9778	0.8124	2.7979	18.49174
24	61	2.79	0	4.57	61	4.5738	4	2.54102	127.8053	1.37256	0	1.3726	43.443	4.6791	0	4	0.9153	0.7881	2.6257	44.41039
25	80.1	4.47	1.93	5.58	80.1236	5.5789	9	2.5294	131.9193	1.43852	0	1.4385	54.699	5.6809	0.0018	4	0.9159	0.7548	2.6191	56.12953
26	54.9	4.01	1.33	7.29	54.9163	7.302	3	2.724	130.2033	1.50362	0	1.5036	35.523	7.5076	0.0018	3	1	0.7037	2.8418	35.52276
27	76.4	4.36	1.9	5.71	76.4233	5.7051	9	2.54988	131.6216	1.56943	0	1.5694	47.695	5.8247	0.0018	3	0.9405	0.6902	2.6673	48.82672
28	68.3	5.12	0.71	7.49	68.3087	7.4954	9	2.67282	132.5236	1.63569	0	1.6357	40.761	7.6793	0.0008	3	0.9976	0.6476	2.8088	40.80471
29	66.5	3.47	1.89	5.22	66.5231	5.2162	4	2.5588	129.6126	1.7005	0	1.7005	38.12	5.3531	0.0021	3	0.9624	0.6334	2.7084	38.80645
30	128.1	4.84	2.2	3.78	128.127	3.7775	8	2.27011	133.6461	1.76732	0	1.7673	71.498	3.8303	0.0013	4	0.8479	0.6473	2.3987	77.30083
31	80.2	3.83	-0.28	4.78	80.1966	4.7758	9	2.47703	130.7908	1.83272	0	1.8327	42.758	4.8875	-3E-04	4	0.9432	0.5957	2.6414	44.11417
32	66.8	2.85	1.64	4.27	66.8201	4.2652	4	2.49197	128.1833	1.89681	0	1.8968	34.228	4.3898	0.0018	4	0.9605	0.5709	2.6789	35.02634
33	58	2.42	1.2	4.17	58.0147	4.1714	4	2.52645	126.6419	1.96013	0	1.9601	28.597	4.3172	0.0015	4	0.9847	0.5449	2.735	28.86774
34	64.6	2.66	0.78	4.12	64.6096	4.117	4	2.49045	127.5964	2.02393	0	2.0239	30.923	4.2502	0.0009	4	0.9758	0.5311	2.7035	31.41175
35	60.5	2.14	0.76	3.54	60.5093	3.5367	4	2.46197	125.8449	2.08685	0	2.0869	27.996	3.663	0.0009	4	0.9742	0.516	2.6914	28.49052
36	109.8	2.52	0.76	2.29	109.809	2.2949	5	2.1477	128.4944	2.1511	0	2.1511	50.048	2.3407	0.0005	5	0.8448	0.5492	2.3439	55.87474
37	21.8	0.68	1.71	3.13	21.8209	3.1163	4	2.7538	114.9686	2.20858	0	2.2086	8.8801	3.4672	0.0063	3	1	0.4791	3.0751	8.88007
38	37.4	1.9	2.08	5.07	37.4255	5.0768	3	2.72021	123.8027	2.27048	0	2.2705	15.483	5.4046	0.0043	3	1	0.466	3.0021	15.48349
39	309.5	2.36	0.54	0.76	309.507	0.7625	6	1.49086	130.5418	2.33575	0	2.3358	131.51	0.7683	0.0001	6	0.5847	0.6294	1.6377	182.7178
40	195.1	3.12	1	1.6	195.112	1.5991	6	1.86484	131.4591	2.40148	0	2.4015	80.247	1.619	0.0004	5	0.7463	0.5425	2.0541	98.79475
41	250.7	3.64	0.63	1.45	250.708	1.4519	6	1.76339	133.1985	2.46808	0	2.4681	100.58	1.4663	0.0002	6	0.7067	0.5496	1.9417	128.9466
42	30.1	1.22	1.55	4.04	30.119	4.0506	4	2.72082	120.0315	2.5281	0	2.5281	10.914	4.4218	0.004	3	1	0.4185	3.0652	10.91369
43	92.5	1.88	3.65	2.04	92.5447	2.0315	5	2.16091	125.9334	2.59106	0	2.5911	34.717	2.09	0.0029	5	0.9019	0.4459	2.4391	37.90666
44	54.1	2.11	2.89	3.9	54.1354	3.8976	4	2.52592	125.4701	2.6538	0	2.6538	19.399	4.0986	0.004	3	1	0.3987	2.8497	19.3992
45	168.4	1.55	2.09	0.92	168.426	0.9203	6	1.73488	125.9816	2.71679	0	2.7168	60.994	0.9354	0.0009	6	0.731	0.5019	1.9743	78.60293
46	397.9	4.53	1.04	1.14	397.913	1.1384	6	1.5587	135.9257	2.78475	0	2.7848	141.89	1.1465	0.0002	6	0.6419	0.5373	1.732	200.6497
47	384.5	4.56	1.36	1.19	384.517	1.1859	6	1.58176	135.8905	2.8527	0	2.8527	133.79	1.1948	0.0003	6	0.6575	0.5209	1.7645	187.9068
48	286.3	2.15	0.69	0.75	286.308	0.7509	6	1.50903	129.6699	2.91753	0	2.9175	97.134	0.7587	0.0002	6	0.6451	0.5198	1.7231	139.2248
49	151.5	5.21	0.64	3.44	151.508	3.4388	8	2.19358	134.594	2.98483	0	2.9848	49.759	3.5079	0.0003	4	0.9375	0.3782	2.482	53.09115
50	260.5	1.8	-0.66	0.69	260.492	0.691	6	1.51201	128.1393	3.0489	0	3.0489	84.438	0.6992	-2E-04	6	0.6613	0.4967	1.7491	120.8427
51	331.5	3.01	-0.39	0.91	331.495	0.908	6	1.52862	132.4892	3.11514	0	3.1151	105.41	0.9166	-9E-05	6	0.6645	0.488	1.7496	151.4392
52	45.8	0.89	2.28	1.94	45.8279	1.9421	5	2.37407	118.7476	3.17452	0	3.1745	13.436	2.0866	0.0039	4	1	0.3333	2.8024	13.43618
53	43.3	0.83	2.37	1.92	43.329	1.9156	5	2.38917	118.1001	3.23357	0	3.2336	12.4	2.0701	0.0043	4	1	0.3272	2.8297	12.39975
54	47.9	0.98	2.37	2.05	47.929	2.0447	5	2.37343	119.5618	3.29335	0	3.2934	13.553	2.1956	0.0038	4	1	0.3213	2.8115	13.55328
55	83.8	3.51	3.08	4.18	83.8377	4.1867	4	2.42091	130.2607	3.35848	0	3.3585	23.963	4.3614	0.0028	3	1	0.3151	2.7979	23.963
56	51	2.3	2.17	4.5	51.0266	4.5075	4	2.58922	125.9567	3.42146	0	3.4215	13.914	4.8314	0.0033	3	1	0.3093	3.0064	13.91369
57	47.1	1.13	3.58	2.39	47.1438	2.3969	5	2.42391	120.5636	3.48174	0	3.4817	12.54	2.5881	0.0059	3	1	0.3039	2.8795	12.54031
58	41.5	1.58	3.09	3.8	41.5378	3.8038	4	2.60009	122.7075	3.54309	0	3.5431	10.724	4.1585	0.0059	3	1	0.2986	3.0551	10.72361
59	45.6	1.4	3.56	3.07	45.6436	3.0672	4	2.50615	122.0524	3.60412	0	3.6041	11.664	3.3302	0.0061	3	1	0.2936	2.9684	11.66428
60	55.3	1.99	3.74	3.59	55.3458	3.5956	4	2.49418	125.0956	3.66667	0	3.6667	14.094	3.8507	0.0052	3	1	0.2886	2.9406	14.0943
61	42.4	1.57	4.02	3.71	42.4492	3.6985	4	2.58485	122.714	3.72802	0	3.728	10.387	4.0546	0.0075	3	1	0.2838	3.0596	10.38652
62	41.2	1.22	4.19	2.97	41.2513	2.9575	4	2.52789	120.7986	3.78842	0	3.7884	9.8888	3.2566	0.0081	3	1	0.2793	3.0212	9.88878
63	44.7	1.53	4.46	3.41	44.7546	3.4186	4	2.54464	122.6541	3.84975	0	3.8498	10.625	3.7404	0.0079	3	1	0.2749	3.0308	10.62532
64	48.3	1.26	5	2.6	48.3612	2.6054	5	2.43973	121.4225	3.91046	0	3.9105	11.367	2.8346	0.0081	3	1	0.2706	2.9371	11.36713
65	132.3	6.56	4.59	4.95	132.356	4.9563	9	2.35635	135.9503	3.97844	0	3.9784	32.268	5.1099	0.0026	3	1	0.266	2.7505	32.26839
66	379.5	6.07	1.9	1.6	379.523	1.5994	6	1.69275	137.28	4.04708	0	4.0471	92.777	1.6166	0.0004	6	0.8003	0.3418	1.9906	121.2794
67	339.6	4.84	-6.27	1.43	339.523	1.4255	6	1.67823	136.023	4.11509	0	4.1151	81.507	1.443	-0.001	6	0.8061	0.3346	1.9972	106.0634
68	128.8	7.31	-9.91	5.68	128.679	5.6808	9	2.41176	136.6736	4.18342	0	4.1834	29.759	5.8717	-0.006	3	1	0.2529	2.8179	29.75918
69	236.2	5.89	-9.16	2.49	236.088	2.4948	5	1.96786	136.5734	4.25171	0	4.2517	54.528	2.5406	-0.003	5	0.9488	0.2672	2.3535	58.55219
70	38.2	1.72	-8.15	4.52	38.1002	4.5144	4	2.67881	123.118	4.31327	0	4.3133	7.8333	5.0907	-0.017	3	1	0.2453	3.2169	7.83326

	C-8	In situ data			Basic output data														
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	73.8	0.32	0	0.44	73.8	0.4336	6	1.83848	112.4251	0.05621	0	0.0562	1311.9	0.4339	0	6	0.4542	2	1.5789	139.388
2	26.6	0.55	0	2.08	26.6	2.0677	4	2.57704	113.8991	0.11316	0	0.1132	234.06	2.0765	0	5	0.7487	2	2.3448	50.06453
3	35.8	0.52	0	1.45	35.8	1.4525	5	2.38251	114.2132	0.17027	0	0.1703	209.26	1.4595	0	5	0.6762	2	2.1474	67.34611
4	27.3	0.13	0	0.48	27.3	0.4762	5	2.24564	103.4086	0.22197	0	0.222	121.99	0.4801	0	6	0.6142	2	1.9782	51.18197
5	24.8	0.14	0.03	0.56	24.8004	0.5645	5	2.31397	103.7166	0.27383	0	0.2738	89.568	0.5708	9E-05	6	0.6445	2	2.0512	46.35923
6	44	0.66	0.09	1.49	44.0011	1.5	5	2.31851	116.4607	0.33206	0	0.3321	131.51	1.5114	0.0002	5	0.6623	2	2.0907	82.54174
7	27.3	0.89	0	3.26	27.3	3.2601	4	2.6909	117.4842	0.3908	0	0.3908	68.856	3.3074	0	4	0.8123	2	2.4771	50.86285
8	33	0.58	0	1.75	33	1.7576	5	2.4598	114.8136	0.44821	0	0.4482	72.626	1.7818	0	5	0.7313	1.8741	2.2549	57.65643
9	43.1	0.46	0	1.06	43.1	1.0673	5	2.24009	113.7687	0.50509	0	0.5051	84.331	1.0799	0	5	0.6637	1.6336	2.0737	65.76126
10	35.2	0.71	-0.1	2.01	35.1988	2.0171	5	2.47377	116.4507	0.56332	0	0.5633	61.484	2.0499	-2E-04	5	0.7616	1.6162	2.323	52.90427
11	26.3	0.81	0.08	3.08	26.301	3.0797	4	2.68753	116.7041	0.62167	0	0.6217	41.307	3.1543	0.0002	4	0.8522	1.5733	2.5534	38.18353
12	29.1	0.92	-0.84	3.15	29.0897	3.1626	4	2.66133	117.8816	0.68061	0	0.6806	41.74	3.2384	-0.002	4	0.8553	1.4585	2.553	39.15863
13	34.2	1.4	-1.42	4.11	34.1826	4.0957	4	2.68363	121.3472	0.74129	0	0.7413	45.113	4.1864	-0.003	4	0.8758	1.3657	2.5999	43.16209
14	26.7	1.3	-1.77	4.89	26.6783	4.8729	3	2.81386	120.2004	0.80139	0	0.8014	32.29	5.0238	-0.005	3	0.9359	1.2971	2.7506	31.7204
15	35.1	1.48	-0.52	4.22	35.0936	4.2173	4	2.68401	121.8179	0.8623	0	0.8623	39.698	4.3235	-0.001	4	0.8974	1.2016	2.6419	38.873
16	23.4	1.18	-2.19	5.05	23.3732	5.0485	3	2.86664	119.1691	0.92188	0	0.9219	24.354	5.2558	-0.007	3	0.9787	1.1444	2.8482	24.28251
17	38	1.05	-2.45	2.78	37.97	2.7653	4	2.53554	119.4985	0.98163	0	0.9816	37.681	2.8387	-0.005	4	0.8605	1.0667	2.5305	37.28833
18	41.2	0.96	-0.38	2.32	41.1954	2.3304	5	2.46031	119.0417	1.04115	0	1.0412	38.567	2.3908	-7E-04	5	0.8408	1.0137	2.4715	38.46809
19	72.2	0.56	-0.38	0.78	72.1954	0.7757	6	1.97685	116.4662	1.09938	0	1.0994	64.669	0.7877	-4E-04	6	0.6621	0.975	1.9952	65.51047
20	47.2	0.76	-0.38	1.62	47.1954	1.6103	5	2.31318	117.6639	1.15822	0	1.1582	39.748	1.6508	-6E-04	5	0.8013	0.9301	2.3532	40.46871
21	21.9	0.86	-1.05	3.95	21.8872	3.9293	3	2.81654	116.6943	1.21656	0	1.2166	16.991	4.1605	-0.004	3	1	0.8698	2.8981	16.99097
22	33.2	1.05	-0.61	3.16	33.1925	3.1634	4	2.61793	119.1705	1.27615	0	1.2762	25.01	3.2899	-0.001	4	0.939	0.8387	2.7	25.29726
23	54.1	0.67	-0.38	1.24	54.0954	1.2386	5	2.19685	117.0745	1.33469	0	1.3347	39.53	1.2699	-5E-04	5	0.7803	0.8343	2.2756	41.59977
24	58.6	1.74	-0.24	2.97	58.5971	2.9694	5	2.41795	124.2525	1.39681	0	1.3968	40.951	3.0419	-3E-04	4	0.8721	0.7849	2.509	42.43178
25	210	1.98	-0.48	0.94	209.994	0.9429	6	1.67364	128.3111	1.46097	0	1.461	142.74	0.9495	-2E-04	6	0.5804	0.8292	1.7359	163.4262
26	248.6	1.66	-0.19	0.67	248.598	0.6678	6	1.51627	127.4329	1.52468	0	1.5247	162.05	0.6719	-6E-05	6	0.5246	0.8256	1.5814	192.7819
27	133.8	4.88	-0.43	3.64	133.795	3.6474	8	2.24658	133.8119	1.59159	0	1.5916	83.064	3.6913	-2E-04	5	0.8191	0.7158	2.3452	89.43185
28	80.7	3.6	-2.5	4.46	80.6694	4.4627	4	2.45287	130.352	1.65677	0	1.6568	47.691	4.5562	-0.002	4	0.9131	0.664	2.5843	49.58547
29	82.1	3.88	-0.77	4.73	82.0906	4.7265	9	2.46707	130.9427	1.72224	0	1.7222	46.665	4.8278	-7E-04	4	0.926	0.6369	2.6099	48.37849
30	58	2.83	-0.95	4.88	57.9884	4.8803	4	2.57666	127.786	1.78613	0	1.7861	31.466	5.0354	-0.001	3	0.9826	0.5978	2.751	31.75393
31	48.5	2.13	-0.86	4.39	48.4895	4.3927	4	2.5965	125.2705	1.84876	0	1.8488	25.228	4.5668	-0.001	3	1	0.5723	2.7947	25.22804
32	56.3	2.96	-1.02	5.26	56.2875	5.2587	4	2.6094	128.042	1.91279	0	1.9128	28.427	5.4437	-0.001	3	1	0.5532	2.8091	28.42698
33	67.4	2.39	-1.05	3.55	67.3872	3.5467	4	2.43057	126.9159	1.97624	0	1.9762	33.099	3.6538	-0.001	4	0.9463	0.5537	2.6315	34.2283
34	104	1.95	-1.38	1.87	103.983	1.8753	5	2.10059	126.4851	2.03949	0	2.0395	49.985	1.9128	-1E-03	5	0.816	0.5854	2.2823	56.39838
35	88.6	2.38	-0.16	2.69	88.598	2.6863	5	2.26125	127.5527	2.10326	0	2.1033	41.124	2.7516	-1E-04	4	0.8894	0.5428	2.4652	44.37216
36	31.3	1.07	-0.21	3.42	31.2974	3.4188	4	2.65935	119.1652	2.16285	0	2.1629	13.47	3.6726	-5E-04	3	1	0.4892	2.9436	13.47049
37	23.3	0.7	-0.19	2.99	23.2977	3.0046	4	2.72168	115.3404	2.22052	0	2.2205	9.492	3.3211	-7E-04	3	1	0.4765	3.0406	9.49201
38	35.5	1.05	-0.19	2.95	35.4977	2.9579	4	2.57679	119.3343	2.28018	0	2.2802	14.568	3.161	-4E-04	3	1	0.4641	2.8772	14.56791
39	71.4	1.32	-0.57	1.86	71.393	1.8489	5	2.21436	122.7129	2.34154	0	2.3415	29.49	1.9116	-6E-04	5	0.9045	0.4875	2.4748	31.81369
40	65.8	1.62	0.09	2.47	65.8011	2.462	5	2.32512	124.0125	2.40355	0	2.4036	26.377	2.5553	0.0001	4	0.9563	0.4563	2.6043	27.34031
41	20.3	0.83	0.57	4.11	20.307	4.0873	3	2.85247	116.2517	2.46167	0	2.4617	7.2493	4.6511	0.0023	3	1	0.4298	3.2208	7.24926
42	46.7	0.77	2.09	1.65	46.7256	1.6479	5	2.32278	117.7352	2.52054	0	2.5205	17.538	1.7419	0.0034	4	0.9816	0.4266	2.6569	17.82016
43	27.2	0.99	1.11	3.62	27.2136	3.6379	4	2.72286	118.2556	2.57967	0	2.5797	9.5493	4.0189	0.0032	3	1	0.4102	3.0867	9.54926
44	13.7	0.58	0.99	4.26	13.7121	4.2298	3	2.99439	112.6716	2.636	0	2.636	4.2019	5.2365	0.0064	3	1	0.4014	3.4442	4.20186
45	46.7	1.43	0.57	3.07	46.707	3.0616	4	2.49829	122.2637	2.69713	0	2.6971	16.317	3.2493	0.0009	3	1	0.3923	2.8451	16.31726
46	162.6	1.5	0.7	0.93	162.609	0.9225	6	1.74676	125.6559	2.75996	0	2.76	57.917	0.9384	0.0003	6	0.741	0.4915	1.9949	74.24497
47	139.8	2.52	0.74	1.8	139.809	1.8025	6	1.99949	129.0835	2.8245	0	2.8245	48.499	1.8396	0.0004	5	0.8494	0.4343	2.2722	56.22507
48	155.8	1.97	0.66	1.26	155.808	1.2644	6	1.85537	127.5461	2.88828	0	2.8883	52.945	1.2883	0.0003	5	0.7965	0.4494	2.1251	64.94685
49	142.7	4.92	0.23	3.45	142.703	3.4477	8	2.21015	134.0289	2.95529	0	2.9553	47.287	3.5206	0.0001	4	0.9432	0.3796	2.5007	50.13046
50	248.8	1.86	0.53	0.75	248.806	0.7476	6	1.55021	128.2673	3.01943	0	3.0194	81.402	0.7568	0.0002	6	0.6749	0.4928	1.7887	114.4651
51	41.5	0.4	1.33	0.96	41.5163	0.9635	5	2.2293	112.6548	3.07575	0	3.0758	12.498	1.0406	0.0025	4	1	0.344	2.6763	12.49793
52	29.7	1.07	1.14	3.62	29.714	3.601	4	2.69118	119.0386	3.13527	0	3.1353	8.4773	4.0258	0.0031	3	1	0.3375	3.129	8.47731
53	33.7	0.76	1.24	2.24	33.7152	2.2542	4	2.51838	116.8436	3.19369	0	3.1937	9.5568	2.4901	0.0029	3	1	0.3313	2.9683	9.5568
54	43.8	0.59	1.33	1.35	43.8163	1.3465	5	2.29207	115.6301	3.25151	0	3.2515	12.476	1.4545	0.0024	4	1	0.3254	2.7473	12.47568
55	100.5	3.44	0.87	3.42	100.511	3.4225	5	2.3032	130.5557	3.31679	0	3.3168	29.304	3.5393	0.0006	4	1	0.319	2.6723	29.30362
56	44.4	1.07	1.71	2.42	44.4209	2.4088	5	2.44478	120.0193	3.3768	0	3.3768	12.155	2.607	0.003	3	1	0.3134	2.8925	12.15476
57	48.6	1.75	1.75	3.6	48.6214	3.5992	4	2.53431	123.8393	3.43872	0	3.4387	13.139	3.8732	0.0028	3	1	0.3077	2.9662	13.13941
58	39.1	1.27	1.71	3.26	39.1209	3.2463	4	2.57212	120.9632	3.4992	0	3.4992	10.18	3.5652	0.0035	3	1	0.3024	3.0336	10.17997
59	46.4	1.57	1.81	3.39	46.4222	3.382	4	2.52992	122.9322	3.56066	0	3.5607	12.038	3.663	0.003	3	1	0.2972	2.9819	12.0375
60	46.9	2.15	1.71	4.58	46.9209	4.5822	4	2.61961	125.2587	3.62329	0	3.6233	11.95	4.9656	0.0028	3	1	0.292	3.0652	11.9498
61	26.5	1.01	1.71	3.8	26.5209	3.8083	4	2.74435	118.339	3.68246	0	3.6825	6.202	4.4224	0.0054	3	1	0.2873	3.2634	6.20196
62	36.8	0.95	1.95	2.58	36.8239	2.5799	4	2.52603	118.6914	3.74181	0	3.7418	8.8412	2.8717	0.0042	3	1	0.2828	3.0305	8.8412
63	41.1	1.15	2.28	2.81	41.1279	2.7962	4	2.51263	120.359	3.80199	0	3.802	9.8175	3.081	0.0044	3	1	0.2783	3.01	9.81748
64	74	2.19	2.85	2.96	74.0349	2.9581	5	2.3453	126.5059	3.86524	0	3.8652	18.154	3.121	0.0029	4	1	0.2738	2.7978	18.15402
65	191.8	5.1	2.85	2.66	191.835	2.6585	5	2.04275	135.0134	3.93275	0	3.9328	47.779	2.7142	0.0011	5	0.9589	0.284	2.4203	50.4294
66	112.5	8.08	3.17	7.18	112.539	7.1798	9	2.52847	137.0795	4.00129	0	4.0013	27.126	7.4444	0.0021	3	1	0.2644	2.9195	27.12565
67	446.7	8.52	-6.35	1.91	446.622	1.9077	6	1.72187	137.28	4.06993	0	4.0699	108.74	1.9252	-0.001	5	0.8054	0.3379	2.0013	141.3368
68	568.1	5.37	-7.22	0.95	568.012	0.9454	6	1.40618	137.28	4.13857	0	4.1386	136.25	0.9523	-9E-04	6	0.6783	0.3965	1.6578	211.2977
69	339.3	5.47	-9.16	1.61	339.188	1.6127	6	1.7226	136.9159	4.20702	0	4.207	79.624	1.6329	-0.002	5	0.8309	0.3176	2.0512	100.5535
70	98.3	0	-7.73	0	98.2054	0	0	0	769.6	4.59182	0	4.5918	20.387	0	-0.006	0	1	0.2304	0	0

	C-9	In situ data			Basic output data														
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	38	0.35	0.09	0.93	38.0011	0.921	5	2.25138	111.462	0.05573	0	0.0557	680.87	0.9224	0.0002	6	0.6156	2	2.0025	71.72306
2	42.6	0.37	0.07	0.88	42.6009	0.8685	5	2.19577	112.1472	0.1118	0	0.1118	380.03	0.8708	0.0001	6	0.5975	2	1.9482	80.31137
3	21.3	0.06	0	0.29	21.3	0.2817	5	2.26733	97.14583	0.16038	0	0.1604	131.81	0.2838	0	6	0.6142	2	1.9859	39.9574
4	15.9	0.04	0.09	0.25	15.9011	0.2516	5	2.37561	93.46608	0.20711	0	0.2071	75.776	0.2549	0.0004	5	0.6575	2	2.0937	29.66425
5	15.5	0.07	0.09	0.47	15.5011	0.4516	5	2.46462	97.49864	0.25586	0	0.2559	59.584	0.4592	0.0004	5	0.6985	2	2.1953	28.81604
6	24.8	0.16	0	0.63	24.8	0.6452	5	2.33892	104.6936	0.30821	0	0.3082	79.465	0.6533	0	5	0.6572	2	2.0803	46.29356
7	25	0.72	-1.48	2.89	24.9819	2.8821	4	2.68671	115.7168	0.36607	0	0.3661	67.244	2.925	-0.004	4	0.8076	2	2.468	46.52799
8	30.4	0.27	-0.1	0.89	30.3988	0.8882	5	2.32642	109.0187	0.42057	0	0.4206	71.279	0.9007	-2E-04	5	0.6722	1.8593	2.1063	52.67602
9	47.4	0.19	-0.1	0.4	47.3988	0.4009	6	1.9963	107.5309	0.47434	0	0.4743	98.926	0.4049	-2E-04	6	0.5668	1.5758	1.8241	69.88379
10	36.7	0.97	-0.19	2.64	36.6977	2.6432	4	2.53399	118.8355	0.53376	0	0.5338	67.753	2.6822	-4E-04	5	0.7786	1.7037	2.3715	58.22994
11	27.5	0.88	-4.13	3.2	27.4495	3.2059	4	2.6844	117.4148	0.59246	0	0.5925	45.331	3.2766	-0.011	4	0.8451	1.6325	2.5385	41.43629
12	29.8	1.04	-0.33	3.5	29.796	3.4904	4	2.68135	118.8372	0.65188	0	0.6519	44.707	3.5685	-8E-04	4	0.8574	1.5148	2.5618	41.7228
13	31.9	1.22	-3.79	3.82	31.8536	3.83	4	2.68647	120.1681	0.71197	0	0.712	43.74	3.9176	-0.009	4	0.8712	1.4122	2.5912	41.56387
14	30.4	1.15	-4.25	3.79	30.348	3.7894	4	2.699	119.6176	0.77178	0	0.7718	38.322	3.8883	-0.01	4	0.8869	1.323	2.6255	36.97911
15	26.8	1.17	-6.9	4.38	26.7155	4.3795	3	2.78218	119.4329	0.83149	0	0.8315	31.13	4.5202	-0.019	4	0.9295	1.2511	2.7301	30.6052
16	24.5	1.08	-6.58	4.42	24.4195	4.4227	3	2.81414	118.628	0.89081	0	0.8908	26.413	4.5902	-0.02	3	0.9528	1.1782	2.784	26.19918
17	24	0.91	-9.19	3.82	23.8875	3.8095	4	2.77887	117.3211	0.94947	0	0.9495	24.159	3.9672	-0.029	4	0.9502	1.1084	2.7698	24.02881
18	31.9	0.9	-6.49	2.82	31.8206	2.8284	4	2.60027	117.9396	1.00844	0	1.0084	30.554	2.9209	-0.015	4	0.8905	1.0437	2.6058	30.39382
19	26.3	1.01	-0.74	3.83	26.2909	3.8416	4	2.74968	118.3178	1.0676	0	1.0676	23.626	4.0042	-0.002	3	0.9588	0.9915	2.7779	23.63499
20	39.5	0.51	-0.74	1.28	39.4909	1.2914	5	2.31825	114.3104	1.12475	0	1.1248	34.111	1.3293	-0.001	5	0.7997	0.9523	2.3531	34.5307
21	23.3	0.9	-0.74	3.88	23.2909	3.8642	3	2.79124	117.1786	1.18334	0	1.1833	18.682	4.071	-0.002	3	0.9957	0.8946	2.8602	18.69134
22	21.4	0.65	-0.86	3.02	21.3895	3.0389	4	2.75383	114.5897	1.24064	0	1.2406	16.241	3.226	-0.003	3	0.9925	0.8539	2.8444	16.26011
23	19.9	0.6	-0.78	3	19.8905	3.0165	4	2.77673	113.8268	1.29755	0	1.2976	14.329	3.227	-0.003	3	1	0.8155	2.8883	14.32925
24	25.6	0.94	-1.53	3.66	25.5813	3.6746	4	2.74607	117.7255	1.35641	0	1.3564	17.86	3.8803	-0.005	3	1	0.7801	2.8622	17.85952
25	72.2	0.85	-0.76	1.17	72.1907	1.1774	5	2.08403	119.5194	1.41617	0	1.4162	49.976	1.201	-8E-04	5	0.7444	0.805	2.1708	53.8418
26	21.4	0.79	-0.96	3.71	21.3883	3.6936	3	2.80703	116.0168	1.47418	0	1.4742	13.509	3.967	-0.003	3	1	0.7178	2.963	13.50858
27	110.6	0.82	-0.79	0.74	110.59	0.7415	6	1.81471	120.2968	1.53433	0	1.5343	71.077	0.7519	-5E-04	6	0.6495	0.7856	1.908	80.96521
28	264.9	1.29	-0.72	0.49	264.891	0.487	6	1.40415	125.7425	1.5972	0	1.5972	164.85	0.49	-2E-04	6	0.4877	0.8181	1.4755	203.5614
29	169.2	1.77	-0.76	1.04	169.191	1.0462	6	1.77193	126.9638	1.66068	0	1.6607	100.88	1.0565	-3E-04	6	0.6409	0.7491	1.8697	118.6055
30	60.4	1.98	0.86	3.27	60.4105	3.2776	4	2.43884	125.2723	1.72332	0	1.7233	34.055	3.3738	0.0011	4	0.9213	0.638	2.5975	35.38697
31	157.3	5.95	-6.76	3.79	157.217	3.7846	8	2.2176	135.656	1.79115	0	1.7912	86.775	3.8282	-0.003	4	0.8268	0.6471	2.3403	95.05791
32	215.6	6.9	-6.43	3.2	215.521	3.2015	8	2.07963	137.28	1.85979	0	1.8598	114.89	3.2294	-0.002	5	0.7748	0.646	2.1965	130.4433
33	167.3	2.72	-6.53	1.63	167.22	1.6266	6	1.91432	130.079	1.92482	0	1.9248	85.875	1.6455	-0.003	5	0.7225	0.649	2.0509	101.3896
34	51.1	1.64	-0.89	3.22	51.0891	3.2101	4	2.48422	123.485	1.98657	0	1.9866	24.717	3.34	-0.001	4	0.9753	0.541	2.7068	25.10498
35	43.5	1.22	-1.14	2.8	43.4861	2.8055	4	2.49553	120.9273	2.04703	0	2.047	20.243	2.9441	-0.002	4	0.9925	0.5195	2.7432	20.34365
36	19.7	1.24	-2.29	6.3	19.672	6.3034	3	2.98692	119.1116	2.10659	0	2.1066	8.3383	7.0593	-0.009	3	1	0.5023	3.2828	8.33831
37	26.8	0.92	-2.28	3.44	26.7721	3.4364	4	2.71215	117.6791	2.16543	0	2.1654	11.363	3.7388	-0.007	3	1	0.4886	3.0073	11.36343
38	29.5	0.99	-0.86	3.34	29.4895	3.3571	4	2.67366	118.4515	2.22465	0	2.2247	12.256	3.6311	-0.002	3	1	0.4756	2.9734	12.25577
39	43	1.89	-1.71	4.39	42.9791	4.3975	4	2.6336	124.1016	2.2867	0	2.2867	17.795	4.6446	-0.003	3	1	0.4627	2.9134	17.79521
40	118.4	1.21	-0.84	1.02	118.39	1.0221	6	1.87922	123.3099	2.34836	0	2.3484	49.414	1.0427	-5E-04	5	0.7604	0.5454	2.0976	59.81335
41	244.9	3.81	-1.59	1.55	244.881	1.5559	6	1.79331	133.4752	2.4151	0	2.4151	100.4	1.5714	-5E-04	6	0.714	0.5548	1.9675	127.124
42	67	1.57	-1.3	2.35	66.9841	2.3438	5	2.30477	123.8265	2.47701	0	2.477	26.042	2.4338	-0.001	4	0.9562	0.4434	2.595	27.02984
43	31.8	0.92	-2.62	2.88	31.7679	2.896	4	2.60743	118.0964	2.53606	0	2.5361	11.527	3.1473	-0.006	3	1	0.4172	2.9582	11.52651
44	30.9	0.88	-0.48	2.85	30.8941	2.8484	4	2.61208	117.7031	2.59491	0	2.5949	10.906	3.1096	-0.001	3	1	0.4078	2.9748	10.90567
45	63.7	1.16	-2.76	1.83	63.6662	1.822	5	2.24727	121.4881	2.65565	0	2.6557	22.974	1.9013	-0.003	4	0.9564	0.4147	2.5731	23.91337
46	365.2	2.99	-1.62	0.82	365.18	0.8188	6	1.46722	132.6765	2.72199	0	2.722	133.16	0.8249	-3E-04	6	0.6042	0.565	1.6406	193.5491
47	374	4.89	-1.9	1.31	373.977	1.3076	6	1.62347	136.3339	2.79016	0	2.7902	133.03	1.3174	-4E-04	6	0.6692	0.5226	1.8031	183.3436
48	171.4	3.97	-1.57	2.31	171.381	2.3165	5	2.02502	132.9057	2.85661	0	2.8566	58.994	2.3558	-7E-04	5	0.8552	0.4277	2.2834	68.12168
49	390.6	4.91	-2.19	1.26	390.573	1.2571	6	1.59871	136.4697	2.92485	0	2.9249	132.54	1.2666	-4E-04	6	0.6695	0.5062	1.7871	185.4672
50	420.4	4.29	-4.28	1.02	420.348	1.0206	6	1.50618	135.6612	2.99268	0	2.9927	139.46	1.0279	-7E-04	6	0.6371	0.5156	1.6933	203.3768
51	88.8	2.52	-7.93	2.84	88.7029	2.8409	5	2.27869	127.9738	3.05666	0	3.0567	28.02	2.9423	-0.007	4	0.9983	0.3468	2.6342	28.06977
52	28.2	0.41	-2.38	1.44	28.1709	1.4554	5	2.46851	111.8896	3.11261	0	3.1126	8.0506	1.6362	-0.007	3	1	0.3399	2.9378	8.05057
53	26.3	0.59	-2.47	2.24	26.2698	2.2459	4	2.60292	114.3823	3.1698	0	3.1698	7.2875	2.5541	-0.008	3	1	0.3338	3.0735	7.28752
54	47.9	1.41	-2.75	2.95	47.8663	2.9457	4	2.47907	122.2205	3.23091	0	3.2309	13.815	3.1589	-0.004	3	1	0.3275	2.8955	13.81513
55	33.9	0.69	-3.42	2.04	33.8581	2.0379	5	2.4898	116.1469	3.28898	0	3.289	9.2944	2.2572	-0.008	3	1	0.3217	2.9555	9.29441
56	48.8	2.01	-3.33	4.12	48.7592	4.1223	4	2.57509	124.8597	3.35141	0	3.3514	13.549	4.4266	-0.005	3	1	0.3157	2.9915	13.54886
57	48.3	1.03	-3.62	2.13	48.2557	2.1345	5	2.38326	119.9425	3.41138	0	3.4114	13.145	2.2968	-0.006	4	1	0.3102	2.8334	13.14549
58	41.3	1.19	-3.33	2.87	41.2592	2.8842	4	2.52055	120.6169	3.47169	0	3.4717	10.884	3.1492	-0.006	3	1	0.3048	2.9787	10.88448
59	36.6	0.95	-3.26	2.61	36.5601	2.5985	4	2.53043	118.6739	3.53103	0	3.531	9.354	2.8763	-0.007	3	1	0.2997	3.0106	9.35395
60	30	1.1	-3.74	3.66	29.9542	3.6723	4	2.69418	119.2605	3.59066	0	3.5907	7.3423	4.1724	-0.01	3	1	0.2947	3.1888	7.34226
61	35.8	1.38	-2.86	3.87	35.765	3.8585	4	2.65159	121.3523	3.65134	0	3.6513	8.795	4.2972	-0.006	3	1	0.2898	3.1327	8.79504
62	51.2	2.3	-3.2	4.5	51.1608	4.4956	4	2.5876	125.9631	3.71432	0	3.7143	12.774	4.8476	-0.005	3	1	0.2849	3.0361	12.77395
63	28.6	0.82	-2.66	2.88	28.5674	2.8704	4	2.64038	116.9955	3.77281	0	3.7728	6.5719	3.3072	-0.008	3	1	0.2805	3.1718	6.57192
64	28.9	0.65	-2.05	2.26	28.8749	2.2511	4	2.57092	115.3216	3.83048	0	3.8305	6.5382	2.5954	-0.006	3	1	0.2762	3.1172	6.5382
65	102.3	4.54	-1.24	4.44	102.285	4.4386	9	2.38558	132.6285	3.89679	0	3.8968	25.248	4.6144	-9E-04	3	1	0.2715	2.7974	25.24848
66	169.6	5.62	-2.47	3.31	169.57	3.3143	8	2.15166	135.4229	3.9645	0	3.9645	41.772	3.3936	-0.001	4	1	0.2669	2.5464	41.77203
67	474.6	3.71	-2.38	0.78	474.571	0.7818	6	1.38146	134.8943	4.03195	0	4.032	116.7	0.7885	-4E-04	6	0.6694	0.4084	1.6472	181.6265
68	321.7	6.28	-9.12	1.95	321.588	1.9528	6	1.80464	137.28	4.10059	0	4.1006	77.425	1.978	-0.002	5	0.8559	0.3137	2.1303	94.11735
69	52	0.81	-9.8	1.57	51.8801	1.5613	5	2.27259	118.361	4.15977	0	4.1598	11.472	1.6974	-0.015	4	1	0.2544	2.8128	11.47186
70	472.1	0	-10.28	0	471.974	0	0	0	769.6	4.54457	0	4.5446	102.85	0	-0.002	0	1	0.2328	0	0

Presented below is a list of formulas used for the estimation of various soil properties. The formulas are presented in SI unit system and assume that all components are expressed in the same units.

:: Unit Weight, g (kN/m³) ::

$$g = g_w \cdot \left(0.27 \cdot \log(R_f) + 0.36 \cdot \log(\frac{q_t}{p_a}) + 1.236 \right)$$

where g_w = water unit weight

:: Permeability, k (m/s) ::

$I_c < 3.27$ and $I_c > 1.00$ then $k = 10^{0.952-3.04 \cdot I_c}$

$I_c \leq 4.00$ and $I_c > 3.27$ then $k = 10^{-4.52-1.37 \cdot I_c}$

:: N_{SPT} (blows per 30 cm) ::

$$N_{60} = \left(\frac{q_c}{P_a} \right) \cdot \frac{1}{10^{1.1268-0.2817 \cdot I_c}}$$

$$N_{1(60)} = Q_{tn} \cdot \frac{1}{10^{1.1268-0.2817 \cdot I_c}}$$

:: Young's Modulus, Es (MPa) ::

$(q_t - \sigma_v) \cdot 0.015 \cdot 10^{0.55 \cdot I_c + 1.68}$

(applicable only to $I_c < I_{c\_cutoff}$)

:: Relative Density, Dr (%) ::

$100 \cdot \sqrt{\frac{Q_{tn}}{k_{DR}}}$ (applicable only to SBT_n: 5, 6, 7 and 8 or $I_c < I_{c\_cutoff}$)

:: State Parameter, ψ ::

$\psi = 0.56 - 0.33 \cdot \log(Q_{tn,cs})$

:: Peak drained friction angle, φ (°) ::

$\varphi = 17.60 + 11 \cdot \log(Q_{tn})$

(applicable only to SBT_n: 5, 6, 7 and 8)

:: 1-D constrained modulus, M (MPa) ::

If $I_c > 2.20$

$\alpha = 14$ for $Q_{tn} > 14$

$\alpha = Q_{tn}$ for $Q_{tn} \leq 14$

$M_{CPT} = \alpha \cdot (q_t - \sigma_v)$

If $I_c \leq 2.20$

$M_{CPT} = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$

:: Small strain shear Modulus, Go (MPa) ::

$$G_0 = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$$

:: Shear Wave Velocity, Vs (m/s) ::

$$V_s = \left(\frac{G_0}{\rho} \right)^{0.50}$$

:: Undrained peak shear strength, Su (kPa) ::

$N_{kt} = 10.50 + 7 \cdot \log(F_r)$ or user defined

$$S_u = \frac{(q_t - \sigma_v)}{N_{kt}}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Remolded undrained shear strength, Su(rem) (kPa) ::

$S_{u(rem)} = f_s$ (applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Overconsolidation Ratio, OCR ::

$$k_{OCR} = \left[\frac{Q_{tn}^{0.20}}{0.25 \cdot (10.50 \cdot +7 \cdot \log(F_r))} \right]^{1.25}$$ or user defined

$OCR = k_{OCR} \cdot Q_{tn}$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: In situ Stress Ratio, Ko ::

$K_O = (1 - \sin\varphi') \cdot OCR^{\sin\varphi'}$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Soil Sensitivity, S_t ::

$$S_t = \frac{N_S}{F_r}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Effective Stress Friction Angle, φ' (°) ::

$\varphi' = 29.5° \cdot B_q^{0.121} \cdot (0.256 + 0.336 \cdot B_q + \log Q_t)$

(applicable for $0.10 < B_q < 1.00$)

References

• Robertson, P.K., Cabal K.L., Guide to Cone Penetration Testing for Geotechnical Engineering, Gregg Drilling & Testing, Inc., 5th Edition, November 2012

• Robertson, P.K., Interpretation of Cone Penetration Tests - a unified approach., Can. Geotech. J. 46(11): 1337–1355 (2009)

APPENDIX E

STRATIGRAPHIC ANALYSIS AND SOIL AGE ESTIMATES

Soil Stratigraphy Study And Relative Age Estimates
For A Fault Rupture Hazard Investigation At 9900 Wilshire Boulevard, City of Beverly Hills, California

Prepared by:

John Helms, CEG
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Voice & FAX (661) 206-5860

Submitted to:

Ms. Susan Kirkgard
GEOCON, Inc.
3303 North San Fernando Boulevard, Suite 100
Burbank, CA 91504

March 26, 2014

John Helms, CEG
40344 Wood Court, Palmdale, CA 93551;(661) 206-5860

Ms. Susan Kirkgard
GEOCON Inc.
3303 North San Fernando Boulevard, Suite 100
Burbank, CA 91504

March 26, 2014

Subject: Soil Stratigraphy Study And Relative Age Estimates For A Fault Rupture Hazard Investigation At 9900 Wilshire Boulevard, California

Dear Ms. Kirkgard:

I am pleased to present to you this soil stratigraphic study and relative-age estimates to be used with your fault rupture hazard investigation at 9900 Wilshire Boulevard, in Beverly Hills, California. This information presents relative age estimates for the deposits in twelve locations along three separate trench exposures and two separate transects of borings.

Geocon retained John Helms CEG to describe and assist in correlations of the soil stratigraphy from the trench exposures and the continuously cored bore hole samples and to assign relative age dates for the deposits identified across the site. A total of five soil profiles were described across three different trench exposures. The continuously cored borehole samples were obtained from two separate transects of borings, transect A (across the project site area) and transect B (along Wilshire Boulevard). The soils within the upper portions of five boreholes from transect A are described in detail, and two boreholes from transect B are completely described in detail. 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 age ranges for the soils understudy.

The attached report classifies each described soil profile, identifies stratigraphic relationships, defines soil chronosequences, and estimates relative age for each soil profile described across the study area. Calculated soil development index (or SDI) values show strong correlations to the SDI values of other published, described, and dated soil profiles with similar parent materials.

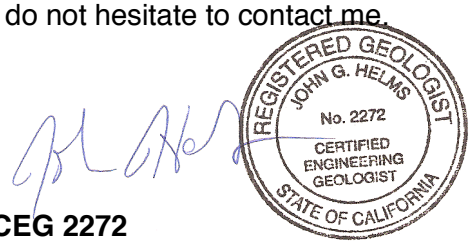
Age estimates range from 71 to 140 ka for the entire stratigraphic section studied across the entire project site area. The youngest major stratigraphic unit observed is a young (Holocene) stream terrace deposit (Qyt) with relative age estimates that range from 4 to 16 ka across the project site area. This unit buries and truncates an older (Pleistocene) alluvial fan deposit (Qof) with relative age estimates that range from 15 to 42 ka across the project site area. The alluvial fan (Qof) unit caps a thick sequence of stacked and truncated older stream terrace deposits (Qot1 – Qot6) which have a cumulic relative age estimate that ranges from 32 to 94 ka. The top of this stream terrace sequence (unit Qot1) correlates well across the entire project site area and has an relative age estimate that ranges from 20 to 58 ka. A deeper unit within this stream terrace sequence (Qot5) and key marker bed or stratigraphic unit has an relative age estimate that ranges from 32 to 86 ka. The deepest and oldest units observed are the undifferentiated old alluvium or Lakewood Formation (Qoa). The upper surface of this

unit (Qoa) has a relative age estimate that ranges from 56 to 112 ka across the project site area.

The young stream terrace deposit (unit Qyt) can be correlated across the northern and central portions of the project site. This unit appears to pinch out to the south. The old alluvial fan deposit (Qof) can be correlated across the entire project site area, and is a well developed and truncated buried argillic soil profile that is Pleistocene in age. This unit is exhumed at or near the ground surface across the southern portions of the project site. The thick sequence of older stream terrace deposits (Units Qot1 through Qot6) can also be correlated across the entire project site area. Lateral facies changes and localized interfingering within these deposits are minimal. Please see Tables 16a through 16w in the attached report for a summary listing of all of the observed stratigraphic units and estimated relative ages at the study site.

Thank you for this opportunity to be of service. Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,



John Helms, CEG 2272

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Soil Stratigraphy Study And Relative Age Estimates For A Fault Rupture Hazard Assessment At 9900 Wilshire Boulevard, City of Beverly Hills, California.

Introduction

Twelve soil profiles have been studied for geomorphic characteristics and relative degrees of weathering to estimate deposit relative-ages. The relative age estimates are based on index value comparisons with other published and dated soil profile descriptions. The comparative soils are from areas with a similar climate and similar parent material to this study area. The estimated relative ages in this report will be used by Geocon to assess the recency and recurrence of faulting across the study area. Alluvial units are assessed chronostratigraphically across a three separate trench exposures and 17 evenly spaced and continuously cored boreholes that span a majority of the project site area. In this study, the soil stratigraphy is defined with soil field description data, and no laboratory data. This study identifies the soil stratigraphy and estimates the relative age of 12 soil profiles. The entire project site is located across an graded alluvial fan surface that may be capped by a thin veneer of young stream terrace deposits locally.

For the Quaternary geologist, a soil can be defined as a natural body that consists of horizons of organic and/or mineral constituents which differ from it's parent material in some way (Birkland, 1984). A chronosequence is a group of soils for which all soil forming factors (such as topography, parent material, vegetation, and climate) except time is relatively equal (Jenny, 1941). Recent geologic studies in the coastal region of southern California provide age constraints for several deposits and geomorphic surfaces ranging in age from middle Pleistocene to recent (McFadden, 1982; Rockwell, 1988; and WLA, 1998). Often it has proven difficult to date older deposits due to changes in past climatic regimes. Studies on the impacts of glacial to interglacial climatic changes on soil development in specific regions (McFadden, 1982; Birkland, 1984; McFadden, 1988) indicate that soil development has occurred throughout the Quaternary.

This study is concerned with a section of alluvium along the southern range front of the Santa Monica Mountains, which is within the Transverse Ranges Geomorphic Province. A series of stacked and truncated argillic and cambic soil subsurface horizons within all of the stratigraphic sections studied indicates that the modified ground surface across the southern study area is old. Ages range from 15 to 30 ka along the southern portion of the site. A thin veneer of young stream terrace deposits occupies the ground surface across the central and northern portions of the project site area and ranges in estimated age from 4 to 16 ka. The underlying old alluvial fan is characterized by clay rich, very hard, medium-to coarse-grained sand with strong angular blocky ped structure. The soils encountered in this study classify as Inceptisols and Alfisols that relative age estimates range from 4 to 8 ka at the surface soil in profile 1 in the southern end of Trench 1 to 71 to 123 ka at the lowest buried soil in profile 12 in the northwestern corner of the site. Soil relative age estimates have broad ranges, dependant upon the pool of comparative data used. The soils across the study area fall into a great group classifications (Soil Conservation Service, 2000) of Typic Palexeralfs, Typic Haploxeralfs, and Fluventic Xerumbrepts. Soil profile locations are indicated on the trench logs and geologic map provided with the fault rupture hazard report.

Materials and Methods

Five soil profiles from three separate trench exposures were described, sampled, classified, and quantified within the study area. An additional seven soil profiles were described from seven continuously cored and samples boreholes. The soils were described in the field, using guidelines set by the Soil Survey Staff (1991 and 1999). Soil horizons from the trench exposures were sampled as to prevent contamination from adjacent horizons (Soil Survey Staff, 1991). Sample sizes varied according to the gravel content of the soil horizon. Soil horizons thicker than 2 feet were sampled on a 1-foot interval.

Soil profile field description values quantify soil properties that are used to develop a soil development index (SDI) value as outlined by Harden (1982). Points are assigned to descriptive data for each of several observed soil properties, such as dry color, moist color, texture, structure, dry, moist, and wet consistence, clay film content, and calcium carbonate stage level, for every horizon in a profile relative to the horizon's thickness, and normalized to a common depth. The maturity of a soil profile is gauged through data collected from active wash deposits (or raw alluvium).

Table 1.1 through Table 12.1 lists the soil description for each studied surface in longhand format. Table 1.2 through Table 12.2 lists the soil using soil conservation service notation and shows the SDI calculations. These tables show the calculated SDI values, the soil profile description, and the normalization values for raw alluvium. SDI values are calculated by assigning point values to described soil properties. The points are summed for each soil horizon and divided by the total number of descriptive properties used. This equals the mean horizon index value (HI). HI values are multiplied by the corresponding soil horizon thickness. The SDI value equals the sum of the normalized horizon indices. The maximum horizon index (MHI) is the value of the horizon with the largest summed descriptive value. MHI is independent of horizon thickness, and is usually the diagnostic subsurface soil horizon for most soil profiles. Tables 1.2 through Table 12.2 list all of the determined HI, SDI, and MHI values for the soils under study.

SDI values have shown significant correlations to soil age in many recent studies (Harden, 1981; Rockwell *et al.*, 1985; Reheis *et al.*, 1990; Rockwell *et al.*, 1994). The soils described in this study are compared to soils described and dated by McFadden (1982 and 1987) in San Bernardino County near Mission Creek, by Rockwell (1988) in the Ventura River basin, and by William Lettis and Associates, Inc. (1998) in West Hollywood. SDI values are calibrated to a common depth of 7 feet.

The changes in the subsurface pedogenic properties of the inceptisol and alfisol soil orders allows for relative age determinations by emphasizing specific soil properties (such as color and clay film content) that are most diagnostic. Soil properties that express themselves well through time are most often used in the assessment of soil relative ages through a specific soil property index such as the color or clay film index. MHI is a comparison of a soil pedons master (or diagnostic) subsurface horizon (typically an argillic or cambic horizon). Independent of horizon thickness, the MHI directly compares the properties of the soil profiles strongest soil horizon. The color index (Rockwell *et al.,* 1985, 1994) is used to quantify observed colors (in Mussel notation) of each profile in order to compare relative

degrees of reddening. The color index is simply the summation of an entire profile's horizon index values for dry colors. The clay film index (Rockwell *et al.,* 1985, 1994) is used to quantify field descriptions of this soil property in order to compare relative profile maturity. The clay film index is simply the summation of an entire soil profile's horizon index values for clay films.

SOIL RELATIVE AGE METHODS

Soil relative ages are calculated and compared independently for each soil profile described. The twelve soil profiles are all located across the same alluvial surface that has minor variations in relative age, facies of deposition, and degrees of preservation. A series of stacked, buried, and truncated hard, fine-grained soils with pedogenic structure and illuvial clays characterize all of the soil profiles on this project site.

All of the soil profiles described have a surface age implied by estimating the time of inception for the exposed surficial soil. All of the soils within this study area also contain a stacked or buried series of soils. In this case, a deposit age assessment is obtained by identifying and isolating the different parent materials (or deposits). Then comparing a set of abridged calculated indices to an additional suite of similar soils that have been radiometrically dated yields the equivalent to a surface age estimate. Such burial relationships are common along the southern Santa Monica Mountains range front; especially where soils have developed into alluvial fan deposits and buries or locally truncates soils that have developed previously in older sediments. A cumlic soil profile estimated age can assess landform age, and has potential to assess rates of erosion, rates of landform evolution, and rates of tectonic activity across the study area.

Each described soil profile has an SDI value, which is used to estimate the soil relative age. Cumulic relative age estimates for a stacked or buried soil profile are specifically referred to as "deposit ages". The relative age estimate for the surface profile or modern soil is referred to as the "surface age". All of the relative age estimates given are considered minimum ages given that an unknown amount of erosion has occurred after the formation of and before the burial of each truncated soil studied.

SOIL SUMMARY DESCRIPTIONS

Soil summary descriptions were generated for each exposure in this study. The summary descriptions record diagnostic pedogenic features for each soil horizon identified. This was done in order to assist with establishing stratigraphic correlations across the site. Relative age estimates were only generated for the detailed soil descriptions. The soil summary descriptions for the materials encountered are listed in Tables 16a through 16e for the trench exposures, Tables 16f through 16r for the borings in Transect A and Tables 16s through 16w for the borings in Transect B.

DISCUSSION AND RESULTS

This section is broken up by each individual soil profile described. Each section contains a brief write up with tables designated for each soil profile described. The attached Tables 1.1

through 12.1 present the soil profile descriptions in longhand format. Tables 1.2 through 12.2 present the results of the calculated SDI values. Table 13 is a compilation of the comparative data in a format that compares to the data generated for this study. Table 14 is a soil abbreviation key to be used in conjunction with the SDI calculation sheets. Table 15 lists the stratigraphic unit relative ages. Tables 16a – 16w are summary descriptions of the materials under study.

Soil descriptions, SDI calculations, and relative age determinations follow for each of the soil profiles studied.

Soil Profile 1
Trench 1 At Station 51 Feet

Soil profile 1 is located near the southern end of trench at station 51 feet. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a truncated weak Inceptisol soil (Qyt) over a sequence of two stacked and truncated Alfisol soils (Qof and Qot1). The entire section in this locality is capped by 4.9 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. This deposit contains faint mottling and gleying that decreases at depth and may faintly overprint or mask some of the original soil properties (mainly soil color). Soil profile 1 at station 51 feet in trench 1 contains a surface soil and two buried soils to a depth of approximately 12.55 feet below the ground surface. This stratigraphic section tracks across the entire trench 1 exposure. Additionally, the stratigraphic correlation units assigned to all three soil members within this profile correlate well to the adjacent trench exposures and borehole samples (Table 16a). A detailed soil description for this profile is listed in table 1.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 1.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Fluventic Xerumbrept. This is a thin and highly truncated soil that consists of a single weak to juvenile argillic or cambic diagnostic subsurface horizon (Bw / Bt) soil remnant. The deposit consists of a subtle fining upwards sequence. A majority of this soil member has been mechanically stripped away during grading and has most likely been incorporated into the overlying artificial fill (Af). This soil is characterized by a silt-rich or fine-grained deposit with slight organics and few thin and very few moderately thick clay films on ped faces. A relative age estimate of 4 to 8 ka for the surface soil in profile 1 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This very thin surficial stream terrace deposit is termed Qyt and correlates well with the surface soil at the northern end of trench 1 and the surficial deposits described in Boring 3 from transect A.

Buried soil member 1 (or first buried soil) in soil profile 1 classifies as a Typic Palexeralf. This is a highly truncated soil remnant that consists of three moderately well developed argillic diagnostic subsurface horizons (2Btb1 – 2Btb2 – 2Btb3). The deposit consists of a crudely stratified coarsening upwards sequence. This soil member is characterized by a gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films on ped faces and coating gravel. A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 1 was obtained by comparing the observed clay film index

and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well with buried soil 1 at the northern end of trench 1, the surface soil exposed in trench 3 and the Qof unit described along boring transect A.

Buried soil member 2 (or second buried soil) in soil profile 1 classifies as a Typic Haploxeralf. This is a truncated soil remnant that consists of two weakly developed argillic diagnostic subsurface horizons over a sequence of two crudely stratified transitional horizons (3Btb1 – 3Btb2 – 3BCb1 – 3BCb2). The deposit consists of a crudely stratified fining upwards sequence. This soil member is characterized by a fine-grained deposit with 7.5YR hues and many to common thin and few to common moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 2 in soil profile 1 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot1. This unit correlates well with buried soil 3 in the center and the northern end of trench 1, buried soil 2 exposed in trench 3 and the Qot1 unit described along boring transect A.

In conclusion, the entire stratigraphic section of soil profile 1 in trench 1 at station 51 feet is estimated to be 27 to 50 ka in age. Most of this age resides within the first buried soil (buried soil 1) of this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 5.1 feet in this locality. All three of the soil members within this soil profile correlate well to the first three buried soils within soil profile 3 at the northern end of trench 1 and with the upper three units observed in boring 3 from Transect A. Buried soil 2 in soil profile 1 is continuous across the entire trench 1 exposure.

TABLE 1.1 Soil Profile – 1, Trench 1 at Station 51 feet.

Geocon Inc.'s Fault Rupture Hazard Study at 9900 Wilshire Boulevard, Beverly Hills, California.

Soil Classification: Series of stacked and truncated Alfisols and Inceptisols
Geomorphic Surface: Alluvial Fan Remnant
Parent Material: Benedict Canyon Alluvium
Vegetation: Urban
Described By: John Helms
Date Described: 11/5/13 and 11/16/13
Exposure Type: Excavator Trench

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 51 feet
Af	0 – 4.9	4.9	Artificial fill, mixed soil and debris, crude lifts, not described; abrupt wavy boundary to:
Bt / Bw	4.9 – 5.1	0.2	Brown (10YR 5/3d; 10YR 4/2 m); silt loam; weak fine and medium sub angular blocky; very hard, firm, moderately sticky, moderately to very plastic; yellowish brown (10YR 5/4 d; 10YR 4/3 m) clay films few thin and very few moderately thick on ped faces and few moderately thick lining pores; very fine-grained very well sorted sand, slight organics; 0-3% very fine and fine rounded gravel; few fine and medium pores; faint redox with >3% faint brown (7.5YR 4/3 d; 7.5YR 3/3 m) mottles and ~10% faint light olive brown (2.5Y 5/3d; 2.5Y 4/2 m) gleying; massive; clear wavy boundary to:
2Btb1	5.1 – 6.2	1.1	Brown (7.5YR 5/3 d; 7.5YR 3/2 m); clay loam; weak fine and medium angular blocky; very hard, friable, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces, common moderately thick coating clasts; fine- to medium-grained moderately well sorted sand, slightly oxidized; 5 - 15% fine and medium sub rounded gravel; slight redox with >3% faint reddish yellow (7.5YR 6/6 d; 7.5YR 5/4 m) mottles and ~5% faint light brownish gray (2.5Y 6/2d; 2.5Y 4/1 m) gleying; massive; clear wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 51 feet (Cont.)
2Btb2	6.2 – 8.45	2.25	Brown (7.5YR 5/4 d; 7.5YR 4/3 m); clay loam to clay; weak medium and coarse angular blocky; very to extremely hard, friable, very sticky, very plastic; brown (7.5YR 4/3 d; 7.5YR 3/2 m) clay films common thin, few moderately thick, and very few thick on ped faces, and common thick coating clasts; fine- to medium grained moderately well sorted sand, moderately well oxidized; 20 - 25% fine and medium sub rounded slate rich gravel; moderate redox with localized weak strong brown (7.5YR 5/6 d; 7.5YR 4/4 m) mottles and localized moderate light olive brown (2.5Y 5/3d; 2.5Y 4/2m) gleying; massive, gradational wavy boundary to:
2Btb3	8.45 – 9.0	0.55	Brown (7.5YR 4/4 d; 7.5YR 3/3 m); sandy clay loam; weak fine sub angular to angular blocky; hard to very hard, friable, moderately to very sticky, very plastic; strong brown (7.5YR 4/6 d; 7.5YR 3/4 m) clay films common thin, few moderately thick, and very few thick on ped faces, and common moderately thick coating clasts; medium- to coarse-grained poorly sorted sand, moderately well oxidized; few fine MnO coatings on gravel and webbing on ped faces; 25 - 30% fine, medium, and large sub rounded gravel; faint redox with very localized faint strong brown (7.5YR 5/6 d; 7.5YR 4/4 m) mottles and common weak grayish brown (2.5Y 5/2d; 2.5Y 3/1 m) gleying; massive, clear irregular boundary to:
3Btb1	9.0 – 9.65	0.65	Brown (7.5YR 5/3 d; 7.5YR 3/2 m); clay loam to silty clay loam; weak fine and medium angular blocky to prismatic; very hard, firm, moderately to very sticky, very plastic; brown (7.5YR 4/3 d; 7.5YR 3/3 m) clay films many thin, common moderately thick, and few thick on ped faces, common thick coating clasts; very fine-grained very well sorted sand, slightly oxidized; very few fine MnO webbing on ped faces; >1% very fine sub rounded slate rich gravel; weak redox with very localized faint strong brown (7.5YR 5/6 d; 7.5YR 4/4 m) mottles and weak light olive brown (2.5Y 5/3d; 2.5Y 4/2 m) gleying; massive; gradational wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 51 feet (Cont.)
3Btb2	9.65 – 11.15	1.5	Dark yellowish brown (10YR 5/4-6 d; 10YR 4/3 m); silty clay; weak fine and medium sub angular blocky; very hard, firm, very sticky, very plastic; dark yellowish brown (10R 4/4 d; 10YR 3/3 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand, slightly well oxidized; few fine calcium carbonate nodules in soil matrix; 10 - 15% very fine and fine sub rounded gravel; massive; gradational smooth boundary to:
3BCb1	11.15 – 11.85	0.7	Brown (7.5YR 4/4 d; 7.5YR 3/3 m); loam to sandy clay loam; weak fine and medium sub angular blocky; hard, very friable, moderately sticky, slightly plastic; strong brown (7.5YR 4/6 d; 7.5YR 3/4 m) clay films few thin and very few moderately thick on ped faces, and common moderately thick coating clasts; medium- to coarse-grained moderately well sorted sand, moderately well oxidized; 3 - 5% fine and medium sub rounded gravel; massive to crudely stratified, scour deposit; clear wavy boundary to:
3BCb2	11.85 – 12.55	0.7	Brown (7.5YR 4/3 d; 7.5YR 3/2 m); loam to sandy loam; weak fine and medium sub angular blocky; slightly hard to hard, very friable, slightly sticky, non- to slightly plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films few thin on ped faces, and few thin coating clasts; medium- to coarse-grained moderately well sorted sand, slightly well oxidized; 10 - 15% fine and medium sub rounded gravel; crudely stratified scour deposit, undetermined lower boundary.

TABLE 1.2 - Soil Development Index Calculation Sheet
Soil Profile - 1; Trench 1 at Station 51 Feet

Unit	Thickness (Feet)	Color				Texture		Structure		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist						Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/5*	*sg*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Profile 1																	
Bt / Bw	0.2	10YR 5/3	0.2	10YR 4/2	0	sil	0.8	1 sbk	0.33	vh	0.80	s, p-vp	0.75	1npf, v1mkpf, 1mkpo	0.43	0.47	0.09
2Bt1b	1.1	7.5YR 5/3	0.3	7.5YR 3/2	0.1	cl	0.8	1 abk	0.50	vh	0.8	vs, vp	1.00	2npf, 1mkpf, 2mkcl	0.5	0.57	0.63
2Bt2b	2.25	7.5YR 5/4	0.4	7.5YR 4/3	0.1	cl-c	0.9	1 abk	0.50	vh - eh	0.9	vs, vp	1.00	2npf, 1mkpf, 2kcl	0.567	0.62	1.40
2Bt3b	0.55	7.5YR 4/4	0.4	7.5YR 3/3	0.1	scl	0.8	1 sbk-abk	0.42	h - vh	0.7	s-vs, vp	0.92	3npf, 2mkpf, 1kpf	0.4	0.53	0.29
3Bt1b	0.65	7.5YR 5/3	0.3	7.5YR 3/2	0.1	sl-scl	0.8	1 abk - pr	0.58	vh	0.8	s-vs, vp	0.92	3npf, 2mkpf, 1kpf	0.4	0.56	0.36
3Bt2b	1.5	10YR 5/4-6	0.6	10YR 4/3	0	sic	0.9	1 sbk	0.33	vh	0.8	vs, vp	1.00	2npf, 1mkpf	0.3	0.56	0.84
3BCb1	0.7	7.5YR 4/4	0.4	7.5YR 3/3	0.1	l-scl	0.7	1 sbk	0.33	h	0.6	s, ps	0.50	1npf, v1mkpf, 2mkcl	0.483	0.44	0.31
3BCb1	0.7	7.5YR 4/3	0.3	7.5YR 3/2	0.1	sl-l	0.5	1 sbk	0.33	sh-h	0.5	ss, po-ps	0.25	1npf, 1ncl	0.367	0.34	0.24

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.47**	**0.09**	**3.31**	**0.2**	**0.43**	**4 - 8**	**4 - 8**
Buried Soil 1	**0.62**	**2.33**	**4.17**	**1.4**	**1.11**	**15 - 30**	**19 - 38**
Buried Soil 2	**0.56**	**1.75**	**3.45**	**1.9**	**1.60**	**8 - 12**	**27 - 50**

Soil Profile 2
Trench 1 At Station 151 Feet

Soil profile 2 is located near the central portion of trench 1 at station 151 feet. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a truncated weak Inceptisol soil (Qyc) over a sequence of two stacked and truncated Alfisol soils (Qoc and Qot1). The entire section in this locality is capped by 6.5 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. This deposit contains weak to moderately strong mottling and gleying that increases with depth and may faintly overprint or mask some of the original soil properties (mainly soil color). Soil profile 2 at station 151 feet in trench 1 contains a surface soil and two buried soils to a depth of approximately 14.55 feet below the ground surface. This stratigraphic section contains a channel fill sequence for the surface and first buried soils. The lowest or second buried soil is a truncated stream terrace deposit which tracks across the entire trench 1 exposure. Additionally, the lowest stratigraphic correlation unit assigned to the deepest soil member within this profile correlates well to the base of the adjacent trench exposures and to terrace units within the borehole samples (Table 16b). A detailed soil description for this profile is listed in table 2.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 2.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Fluventic Xerumbrept This is a weakly developed and well-preserved soil that was deposited as a fine-grained channel infill. This soil member is well horizonated and consists of an organic-rich transitional (AB) horizon over a series of two weakly developed diagnostic subsurface juvenile argillic to cambic horizons. The deposit is massive and an unknown amount of this soil member has been mechanically stripped away during grading and has most likely been incorporated into the overlying artificial fill (Af). This soil is characterized by a silt-rich or fine-grained deposit with slight organics and few thin and very few moderately thick clay films on ped faces. A relative age estimate of 4 to 8 ka for the surface soil in profile 2 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This massive surficial channel infill deposit is termed Qyc. It has notched into or scoured out the laterally continuous Qof deposit of trench 1 and this surficial deposit is localized.

Buried soil member 1 (or first buried soil) in soil profile 2 classifies as a Typic Haploxeralf. This is a highly truncated soil remnant that consists of two moderately well developed argillic diagnostic subsurface horizons (2Btb1 – 2Btb2). The deposit is massive, and this soil member is characterized by a fine-

grained deposit with moderate to strong redox and common thin and few moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 1 in soil profile 2 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as an older channel infill deposit, and is termed Qoc. It has notched into or scoured out the laterally continuous Qof deposit and the top of the Qot1 deposit of trench 1 and this buried deposit is localized.

Buried soil member 2 (or second buried soil) in soil profile 2 also classifies as a Typic Haploxeralf. This is a highly truncated soil remnant that consists of a weakly developed argillic diagnostic subsurface horizon over a crudely stratified transitional horizon (3Btb – 3BCb). The deposit consists of a crudely stratified fining upwards sequence. This soil member is characterized by a fine-grained deposit with 7.5YR hues and many to common thin and few to common moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 2 in soil profile 1 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot1. This unit correlates well with buried soil 3 in the southern and northern ends of trench 1, buried soil 2 exposed in trench 3 and the Qot1 unit described along boring transect A.

In conclusion, the entire stratigraphic section of soil profile 2 in trench 1 at station 151 feet is estimated to be 20 to 32 ka in age. Most of this age resides within the buried soils (buried soil 1 and 2) of this exposure. The Holocene – Pleistocene boundary is represented by the Qyc and Qoc contact at a depth of approximately 10.15 feet in this locality. The lowest soil member (buried soil 3) within this soil profile correlates well to the lowest buried soils within soil profiles 1 and 3 at the southern and northern ends of trench 1 and with unit (Qot1) observed along boring transect A. The surface and first buried soil in soil profile 2 represent a channel infill sequence that is localized to this area and is not continuous across the trench 1 exposure or the project site area.

TABLE 2.1 Soil Profile – 2, Trench 1 at Station 151 feet.
Geocon Inc.'s Fault Rupture Hazard Study at 9900 Wilshire Boulevard, Beverly Hills, California.

Soil Classification: Series of stacked and truncated Alfisols and Inceptisols
Geomorphic Surface: Channel Infill, Alluvial Fan Remnant
Parent Material: Benedict Canyon Alluvium
Vegetation: Urban
Described By: John Helms
Date Described: 11/7/13 and 11/16/13
Exposure Type: Excavator Trench

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 151 feet
Af	0 – 6.5	6.5	Artificial fill, mixed soil, imported material, and debris, not described; abrupt wavy boundary to:
AB	6.5 – 7.25	0.75	Brown (10YR 4/3d; 10YR 3/2 m); loam to silt loam; weak fine and medium sub angular blocky; hard to very hard, firm to friable, slightly to moderately sticky, moderately plastic; dark yellowish brown (10YR 3/4 d; 10YR 2/2m) clay films common very thin, few thin, and very few moderately thick on ped faces, and very few moderately thick lining pores; fine-grained well sorted sand, slight organics; no gravel; few to common fine and medium pores; slight redox with >3% faint yellowish brown (10YR 5/4 d; 10YR 4/2 m) mottles and >5% weak light olive brown (2.5Y 5/3d; 2.5Y 4/2 m) gleying; massive; diffuse wavy boundary to:
Bt1 / Bw1	7.25 – 8.85	1.6	Brown (10YR 4/3 d; 10YR 3/2 m); silty clay loam; weak to moderately strong fine and medium sub angular blocky; very hard, firm, moderately to very sticky, very plastic; yellowish brown (10YR 5/4 d; 10YR 4/3 m) clay films few thin and very few moderately thick on ped faces, few moderately thick lining pores; very fine-grained very well sorted sand, slight organics; 0 - 3% very fine and fine rounded gravel; slight redox with >10% weak yellowish brown (10YR 5/6 d; 10YR 4/4 m) mottles and >3% faint light olive brown (2.5Y 5/3d; 2.5Y 4/2 m) gleying; massive; gradational wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 151 feet (Cont.)
Bt2 / Bwb2	8.85 – 10.15	1.3	Yellowish Brown (10YR 5/4 d; 10YR 4/3 m); clay loam; weak fine and medium sub angular blocky; very hard, firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 4/3 m) clay films few to common thin and few moderately thick on ped faces; fine-grained well sorted sand; no gravel; moderate redox with common moderately strong yellowish brown (10YR 5/6 d; 10YR 4/4 m) mottles and common strong grayish brown (2.5Y 5/2d; 2.5Y 4/1 m) gleying; massive, gradational wavy boundary to:
2Btb1	10.15 – 11.85	1.7	Yellowish brown (10YR 5/4 d; 10YR 4/3 m); clay loam; weak fine and medium sub angular to angular blocky; very to extremely hard, very firm to firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; fine-grained well sorted sand; >3% very fine and fine rounded slate rich gravel; moderate redox with common strong, strong brown (7.5YR 4/6 d; 7.5YR 3/4 m) mottles and common coarse moderately strong grayish brown (2.5Y 5/2d; 2.5Y 3/1 m) gleying; massive, gradational wavy boundary to:
2Btb2	11.85 – 12.4	0.55	Dark yellowish brown (10YR 4/4 d; 10YR 3/3 m); clay loam to clay; weak fine and medium sub angular blocky; very hard to extremely hard, very firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand; localized MnO webbing on ped faces; 3-5% very fine and fine rounded slate rich gravel; strong redox with common strong strong brown (7.5YR 5/8 d; 7.5YR 4/6 m) mottles and common moderately strong light olive brown (2.5Y 5/3d; 2.5Y 4/2 m) gleying; massive; clear irregular boundary to:
3Btb	12.4 – 13.5	1.1	Brown (7.5YR 5/4 d; 7.5YR 4/3 m); clay loam to clay; weak to moderately strong fine and medium angular blocky to prismatic; extremely hard, very firm, very sticky, very plastic; brown (7.5YR 5/3 d; 7.5YR 4/2 m) clay films many thin, common moderately thick and few thick on ped faces; very fine-grained very well sorted sand, slightly oxidized; no gravel; strong redox with common moderate strong brown (7.5YR 5/8 d; 7.5YR 4/6 m) mottles and common strong light olive brown (2.5Y 5/3d; 2.5Y 4/2 m) gleying; truncated, massive; abrupt wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 151 feet (Cont.)
3BCb	13.5 – 14.5+	1.0+	Brown (7.5YR 4/3 d; 7.5YR 3/2 m); loam to clay loam; weak fine and medium sub angular to angular blocky; very hard, friable, moderately sticky, moderately plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films few thin on ped faces; medium-grained moderately well sorted sand; 3-5% fine sub rounded gravel; moderately strong redox with common moderate strong brown (7.5YR 5/8 d; 7.5YR 4/6m) mottles and common moderate grayish brown (2.5Y 5/2d; 2.5Y 4/1 m) gleying; crudely stratified; undetermined lower boundary.

TABLE 2.2 - Soil Development Index Calculation Sheet
Soil Profile - 2; Trench 1 at Station 151 Feet

Unit	Thickness (Feet)	Color				Texture		Structure		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist						Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/5*	*sg*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Profile 2																	
AB	0.75	10YR 4/3	0.2	10YR 3/2	0	l-sil	0.6	1 sbk	0.33	h-vh	0.70	ss-s, p	0.58	1npf, v1mkpf, v1mkpo	0.433	0.41	0.31
Bt1 / Bw1	1.6	10YR 4/3	0.2	10YR 3/2	0	sicl	0.8	1-2 sbk	0.42	vh	0.8	s-vs, vp	0.92	1npf, v1mkpf, 1mkpo	0.35	0.50	0.80
Bt2 / Bw2	1.3	10YR 5/4	0.3	10YR 4/3	0	cl	0.8	1 sbk	0.30	vh	0.8	vs, vp	1.00	1-2npf, 1mkpf	0.33	0.50	0.66
2Bt1b	1.7	10YR 5/4	0.3	10YR 4/3	0	cl	0.8	1 sbk-abk	0.42	vh-eh	0.9	vs, vp	1.00	2npf, 1mkpf	0.33	0.54	0.91
2Bt2b	0.55	10YR 4/4	0.3	10YR 3/3	0	cl-c	0.9	1 sbk	0.33	vh-eh	0.9	vs, vp	1.00	2npf, 1mkpf	0.33	0.54	0.30
3Btb	1.1	7.5YR 5/4	0.4	7.5YR 4/3	0.1	cl-c	0.9	1-2 abk-pr	0.67	eh	1	vs, vp	1.00	3npf, 2mkpf, 1kpf	0.4	0.64	0.70
3BCb	0.5	7.5YR 5/3	0.3	7.5YR 3/2	0.1	l-cl	0.6	1 sbk-abk	0.42	vh	0.8	s, p	0.67	1npf	0.27	0.45	0.23

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.50**	**1.76**	**3.37**	**0.7**	**1.11**	**4 - 8**	**4 - 8**
Buried Soil 1	**0.54**	**1.21**	**3.75**	**0.6**	**0.66**	**8 - 12**	**12 - 20**
Buried Soil 2	**0.64**	**0.93**	**4.06**	**0.9**	**0.67**	**8 - 12**	**20 - 32**

Soil Profile 3
Trench 1 At Station 233 Feet

Soil profile 3 is located near the northern end of trench at station 233 feet. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a truncated weak Inceptisol soil (Qyt) over a sequence of two stacked and truncated Alfisol soils (Qof and Qot1) over a basal weakly developed inset Inceptisol soil (Qot1a). The entire section in this locality is capped by 6.25 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. This deposit contains faint to weak mottling and gleying throughout and may overprint or mask some of the original soil properties (mainly soil color). Soil profile 3 at station 233 feet in trench 1 contains a surface soil and three buried soils to a depth of approximately 14.75 feet below the ground surface. This stratigraphic section tracks across the entire trench 1 exposure. Additionally, the stratigraphic units assigned to the upper three soil members within this profile correlate well to the adjacent trench exposures and boring transects (Table 16c). A detailed soil description for this profile is listed in table 3.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 3.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Xerumbrept. This thin and highly truncated soil consists of a single weak organic rich transitional to juvenile argillic diagnostic subsurface horizon (AB / Bt) soil remnant. The deposit is massive and a majority of this soil member has been mechanically stripped away during grading and has most likely been incorporated into the overlying artificial fill (Af). This soil is characterized by a massive deposit with slight organics and common thin and very few moderately thick clay films on ped faces. A relative age estimate of 4 to 8 ka for the surface soil in profile 3 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This very thin surficial stream terrace deposit is termed Qyt and correlates well with the surface soil at the southern end of trench 1, the surface soil exposed in trench 2, and the surficial deposits described in the adjacent borings from transect A.

Buried soil member 1 (or first buried soil) in soil profile 3 classifies as a Typic Palexeralf. This is a truncated soil remnant that consists of an organic-rich transitional horizon over three moderately well developed argillic diagnostic subsurface horizons (ABb - 2Btb1 – 2Btb2 – 2Btb3). The deposit is crudely stratified, and consists of a gross coarsening upwards sequence. This soil member is characterized by a gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films on ped faces and

coating gravel. A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 3 was obtained by comparing the observed clay film index and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well with buried soil 1 at the southern end of trench 1, the buried soil 1 exposed in trench 2, and the Qof unit described in the adjacent borings from transect A.

Buried soil member 2 (or second buried soil) in soil profile 3 classifies as a Typic Haploxeralf. This is a highly truncated soil remnant that consists of two weakly developed argillic diagnostic subsurface horizons over a crudely stratified transitional horizon (3Btb1 – 3Btb2 – 3BCb). The deposit consists of a crudely stratified fining upwards sequence. This soil member is characterized by a fine-grained deposit with 7.5YR hues and common thin and few to common moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 2 in soil profile 3 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot1. This unit correlates well with the buried soil 3 in the center and buried soil 2 in the northern end of trench 1, buried soil 2 exposed in trench 2 and the Qot1 unit described in the adjacent borings from transect A.

Buried soil member 3 (or the lowest buried soil) in soil profile 3 classifies as a Fluventic Xerumbrept. This is a highly truncated and thin soil remnant that consists of a weakly developed juvenile argillic to cambic diagnostic subsurface horizon over a crudely stratified transitional horizon (4Btb / 4Bwb – 4BCb). This deposit is massive and silt-rich. This soil member is characterized by a fine-grained deposit with 7.5YR hues and few thin and very few moderately thick clay films. A relative age estimate of 4 to 8 ka for the buried soil 3 in profile 3 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as an inset and laterally discontinuous stream terrace deposit, and is termed Qot1a. This unit represents a gradational lateral facies change and inset surface within buried soil 2 above. Similar fluvial sequences are recognized within the terrace sequences preserved in trench 3 and along the adjacent borings from transects A and B.

In conclusion, the entire stratigraphic section of soil profile 3 in trench 1 at station 233 feet is estimated to be 31 to 58 ka in age. Most of this age resides within the first buried soil (buried soil 1) of this exposure. The Holocene – Pleistocene

boundary is represented by the Qyt and Qof contact at a depth of approximately 7.0 feet in this locality. The uppermost three soil members within this soil profile correlate well to the first three buried soils within soil profile 3 at the southern end of trench 1 and with the upper three units observed along boring transect A. The buried soil 2 in soil profile 2 is continuous across the entire trench 1 exposure.

TABLE 3.1 Soil Profile – 3, Trench 1 at Station 233 feet.

Geocon Inc.'s Fault Rupture Hazard Study at 9900 Wilshire Boulevard, Beverly Hills, California.

Soil Classification: Series of stacked and truncated Alfisols and Inceptisols
Geomorphic Surface: Alluvial Fan Remnant
Parent Material: Benedict Canyon Alluvium
Vegetation: Urban
Described By: John Helms
Date Described: 11/5/13 and 11/17/13
Exposure Type: Excavator Trench

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 233 feet
Af	0 – 6.25	6.25	Artificial fill, mixed soil and debris, not described; clear wavy boundary to:
AB / Bt	6.25 – 7.0	0.75	Dark grayish brown (10YR 4/2d; 10YR 3/1 m); loam; weak fine and medium sub angular blocky; very hard, firm, slightly sticky, slightly to moderately plastic; dark yellowish brown (10YR 4/4 d; 10YR 3/3 m) and light yellowish brown (10YR 6/4 d; 10 4/4 m) clay films common thin and few moderately thick on ped faces, few moderately thick coating clasts, and common moderately thick lining pores; very fine-grained very well sorted sand, slight organics; >1% very fine and fine rounded gravel; common fine and very fine pores; faint redox with localized faint strong brown (7.5YR 5/4 d; 7.5YR 4/3 m) mottles and localized weak grayish brown (2.5Y 5/2d; 2.5Y 3/1 m) gleying; massive; gradational wavy boundary to:
2ABb	7.0 – 7.85	0.85	Brown (7.5YR 5/3 d; 7.5YR 4/2 m); clay; weak to moderately strong medium and coarse angular blocky; extremely hard, very firm, very sticky, very plastic; brown (7.5YR 4/3 d; 7.5YR 3/2 m) clay films few to common thin and few moderately thick on ped faces, common moderately thick coating clasts, and common moderately thick lining pores; very fine-grained very well sorted sand, slightly oxidized; 0 - 3% very fine and fine sub rounded gravel; weak redox with localized faint strong brown (7.5YR 5/6 d; 7.5YR 4/4 m) mottles and localized weak gray (2.5Y 5/1d; 2.5Y 3/1 m) gleying; massive; gradational wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 233 feet (Cont.)
2Btb1	7.85 – 9.8	1.95	Brown (7.5YR 4/4 d; 7.5YR 3/3 m); silty clay to clay; moderately strong to strong medium and coarse angular blocky; extremely hard, very firm, very sticky, very plastic; brown (7.5YR 5/4 d; 7.5YR 4/3 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand, slightly well oxidized; few fine MnO coatings on gravel and webbing on ped faces; 3 - 5% fine sub rounded gravel; weak redox with localized weak strong brown (7.5YR 5/6 d; 7.5YR 4/4 m) mottles and localized weak grayish brown (2.5Y 5/2d; 2.5Y 4/1 m) gleying; massive to crudely stratified, clear wavy boundary to:
2Btb2	9.8 – 10.8	1.0	Brown (7.5YR 4/3 d; 7.5YR 3/2 m); clay loam; weak fine and medium sub angular blocky; very hard, friable to firm, moderately to very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films few to common thin and few moderately thick on ped faces, and common moderately thick coating clasts; fine- to medium-grained moderately well sorted sand, slightly oxidized; few to common fine MnO coatings on gravel and webbing on ped faces; 30 - 35% fine and medium sub rounded slate rich gravel; weak redox with localized weak strong brown (7.5YR 5/8 d; 7.5YR 4/6 m) mottles and common coarse weak grayish brown (2.5Y 5/2d; 2.5Y 3/1 m) gleying; massive to crudely stratified, gradational wavy boundary to:
2Btb3	10.8 – 11.45	0.65	Dark brown (7.5YR 3/3 d; 7.5YR 2.5/2 m); loam to sandy clay loam; weak fine and medium sub angular to angular blocky; hard, friable, moderately sticky, moderately plastic; brown (7.5YR 4/3 d; 7.5YR 3/2 m) clay films common thin and few moderately thick on ped faces, common thin and few moderately thick coating clasts; medium- to coarse-grained moderately well sorted sand, slightly oxidized; very few fine MnO coatings on gravel and webbing on ped faces; 15 - 20% fine sub rounded slate rich gravel; faint redox with localized faint strong brown (7.5YR 5/8 d; 7.5YR 4/6 m) mottles and localized faint gray (2.5Y 5/1d; 2.5Y 3/1 m) gleying; massive, scour deposit, truncates underlying deposit; clear wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 233 feet (Cont.)
3Btb1	11.45 – 12.25	0.8	Brown (7.5YR 5/3 d; 7.5YR 4/2 m); silty clay loam; weak fine and medium angular blocky; very hard, very firm, moderately to very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand, slightly oxidized; few fine MnO webbing on ped faces; 0 - 1% very fine rounded gravel; moderately strong redox with strong common strong brown (7.5YR 5/8 d; 7.5YR 4/6 m) mottles and few fine faint light brownish gray (2.5Y 6/2d; 2.5Y 4/1 m) gleying; truncated, massive; gradational wavy boundary to:
3Btb2	12.25 – 12.75	0.5	Brown (7.5YR 5/4 d; 7.5YR 4/3 m); loam to silty clay loam; weak fine and medium angular blocky; extremely hard, very firm, moderately to very sticky, moderately plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; fine-grained well sorted sand, slightly well oxidized; few fine MnO webbing on ped faces; 0 - 1% very fine rounded gravel; faint redox with few faint strong brown (7.5YR 4/6 d; 7.5YR 3/ m) mottles and few fine faint brown(2.5Y 5/3d; 2.5Y 4/2 m) gleying; massive; clear wavy boundary to:
3BCb	12.75 – 13.05	0.3	Brown (7.5YR 4/3 d; 7.5YR 3/2 m); loam to sandy clay loam; weak fine and medium sub angular to angular blocky; hard to very hard, friable, moderately sticky, moderately plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films few thin and very few moderately thick on ped faces, and common moderately thick coating clasts; medium- to coarse-grained poorly sorted sand, slightly oxidized; localized few fine MnO coatings on gravel and webbing on ped faces; 3 - 5% fine and very fine sub rounded gravel; faint redox with few faint strong brown (7.5YR 5/6-8 d; 7.5YR 4/6 m) mottles and few fine weak gray (2.5Y 5/1d; 2.5Y 3/1 m) gleying; crudely stratified scour deposit, abrupt wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-1, Station 233 feet (Cont.)
4Btb / 4Bwb	13.05–14.25	1.2	Brown (7.5YR 5/3 d; 7.5YR 4/2 m); silt loam; weak medium and coarse angular blocky; very to extremely hard, very firm, moderately sticky, very plastic; brown (7.5YR 5-4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand, slightly oxidized; common fine MnO webbing on ped faces; 0 - 1% very fine rounded gravel; faint redox with no mottles and localized faint grayish brown (2.5Y 5/2d; 2.5Y 3/1 m) gleying; truncated, massive; gradational wavy boundary to:
4BCb	14.25 – 14.75+	0.5	Brown (7.5YR 5/3 d; 7.5YR 4/2 m); silty clay loam; weak fine and medium sub angular blocky; very hard, very firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand, slightly oxidized; common fine MnO webbing on ped faces; 0 - 1% very fine rounded gravel; weak redox with weak localized strong brown (7.5YR 5/6 d; 7.5YR 4/4 m) mottles and common moderate grayish brown (2.5Y 5/2d; 2.5Y 4/1 m) gleying; massive; undetermined lower boundary.

TABLE 3.2 - Soil Development Index Calculation Sheet
Soil Profile - 3; Trench 1 at Station 233 Feet

Unit	Thickness (Feet)	Color				Texture		Structure		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist						Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/5*	*sg*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Profile 3																	
AB / Bt	0.75	10YR 4/2	0.1	10YR 3/1	0	l	0.6	1 sbk	0.33	vh	0.80	ss, ps-p	0.42	1npf, v1mkpf, 1mkcl, 2mkpo	0.533	0.40	0.30
2ABb	0.85	7.5YR 5/3	0.3	7.5YR 4/2	0.1	c	1	1-2 abk	0.75	eh	1	vs, vp	1.00	2npf, 1mkpf, 2ncl, 1mkcl, 2mkpo	0.533	0.67	0.57
2Bt1b	1.95	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sic - c	0.9	2-3 abk	0.75	eh	1	vs, vp	1.00	2-3npf, 2mkpf, 2mkpo, 2mkcl	0.633	0.68	1.33
2Bt2b	1	7.5YR 4/3	0.3	7.5YR 3/2	0.1	cl	0.8	1 sbk-abk	0.42	vh	0.8	s-vs, vp	0.92	2npf, 1mkpf	0.267	0.51	0.51
2Bt3b	0.65	7.5YR 3/3	0.3	7.5YR 2.5/2	0.1	l-scl	0.7	1 sbk-abk	0.42	vh	0.8	s, p	0.67	2npf, 1mkpf, 2ncl, 1mkcl	0.5	0.50	0.32
3Bt1b	0.8	7.5YR 5/3	0.3	7.5YR 4/2	0.1	scl	0.8	1 abk	0.5	vh	0.8	s-vs, vp	0.92	2npf, 1mkpf, 2mkcl	0.433	0.55	0.44
3Bt2b	0.5	7.5YR 5/4	0.4	7.5YR 4/3	0.1	l-sicl	0.7	1 abk	0.5	eh	1	ss-s, p	0.58	2npf, 1mkpf, 2mkcl	0.43	0.53	0.27
3BCb	0.3	7.5YR 4/3	0.3	7.5YR 3/2	0.1	l-scl	0.7	1 sbk	0.33	h-vh	0.7	s, p	0.67	1npf, v1mkpf, 3ncl, 2mkcl	0.417	0.46	0.14
4Btb /4Bwb	1.2	7.5YR 5/3	0.3	7.5YR 4/2	0.1	sil	0.8	1 abk	0.50	vh-eh	0.9	s, vp	0.833	2npf, 1mkpf, 1mkcl	0.383	0.55	0.65
4BC	0.5	7.5YR 5/3	0.3	7.5YR 4/2	0.1	sicl	0.8	1 sbk	0.33	vh	0.8	vs, vp	1	1npf, v1mkpf, 1mkcl	0.35	0.53	0.26

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.40**	**0.30**	**2.78**	**0.1**	**0.53**	**4 - 8**	**4 - 8**
Buried Soil 1	**0.68**	**2.74**	**4.31**	**1.7**	**1.92**	**15 - 30**	**19 - 38**
Buried Soil 2	**0.55**	**0.84**	**3.69**	**1.3**	**2.17**	**8 - 12**	**27 - 50**
Buried Soil 3	**0.55**	**0.92**	**3.78**	**0.8**	**0.73**	**4 - 8**	**31 - 58**

Soil Profile 4
Trench 2 At Station 80 Feet

Soil profile 4 is located near the northern end of trench 2 at station 80 feet. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a truncated weak Inceptisol soil (Qyt) over a sequence of three stacked and truncated Alfisol soils (Qof, Qot1, and Qot2). The entire section in this locality is capped by only 0.65 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 4 at station 80 feet in trench 2 contains a surface soil and two buried soils to a depth of approximately 11.4 feet below the ground surface. This stratigraphic section tracks across the entire trench 2 exposure. Additionally, the stratigraphic correlation units assigned to all four soil members within this profile correlate well to the adjacent trench exposures and borehole samples (Table 16d). A detailed soil description for this profile is listed in table 4.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 4.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Xerumbrept. This is a very thin and highly truncated soil that consists of a transitional horizon with slight organics over a weak to juvenile argillic or cambic diagnostic subsurface horizon (AB - Bw / Bt) soil remnant. The deposit is massive. A majority of this soil member has been mechanically stripped away during grading. This soil is characterized by a sandy deposit with slight organics and few thin clay films on ped faces and few moderately thick clay films coating clasts. A relative age estimate of 4 to 8 ka for the surface soil in profile 4 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This very thin surficial stream terrace deposit is termed Qyt and correlates well with the surface soil at the southern end of trench 1 and the surficial deposits described along the central and northern portions of boring transect A.

Buried soil member 1 (or first buried soil) in soil profile 4 classifies as a Typic Palexeralf. This is a highly truncated soil remnant that consists of three moderately well developed argillic diagnostic subsurface horizons (2Btb1 – 2Btb2 – 2Btb3). The deposit consists of a crudely stratified and subtle coarsening upwards sequence. This soil member is characterized by fine-grained deposit with strong angular blocky soil structure and 7.5YR hues and many thin and common moderately thick clay films on ped faces and coating gravel.
A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 4 was obtained by comparing the observed clay film index and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile

Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well with buried soil 1 in the southern end of trench 1, the surface soil exposed in trench 3 and the Qof unit described along boring transect A.

Buried soil member 2 (or second buried soil) in soil profile 4 classifies as a Typic Haploxeralf. This is a truncated soil remnant that consists of two weakly developed argillic diagnostic subsurface horizons over a crudely stratified transitional horizon (3Btb1 – 3Btb2 – 3BCb). The deposit consists of a crudely stratified fining upwards sequence. This soil member is characterized by a fine-grained deposit with 7.5YR hues and common thin and few moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 2 in soil profile 4 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot1. This unit correlates well with buried soil 3 in the center and the northern end of trench 1, buried soil 2 exposed in trench 3 and the Qot1 unit described along boring transect A.

Buried soil member 3 (or the lowest buried soil) in soil profile 4 also classifies as a Typic Haploxeralf. This is a highly truncated soil remnant that consists of a weakly developed argillic diagnostic subsurface horizon (4Btb). This deposit is massive. This soil member is characterized by a very fine-grained deposit with 7.5YR hues and common thin and few moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 3 in soil profile 4 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot2. This unit correlates well with the Qot2 unit along boring transects A and B. This unit lies beneath the observed Trench 1 exposure.

In conclusion, the entire stratigraphic section of soil profile 4 in trench 2 at station 80 feet is estimated to be 35 to 62 ka in age. Most of this age resides within the first buried soil (buried soil 1) of this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 1.7 feet in this locality. The upper three soil members within this soil profile correlate well to the upper three soils observed in soil profile 3 at the northern end of trench 1 and with the entire stratigraphic section observed in trench 3. The lowest soil members within this soil profile correlate well to the sequence of buried and stacked stream terrace deposits encountered along boring transects A and B. All of the soil members observed in soil profile 4 are continuous across the entire trench 2 exposure.

TABLE 4.1 Soil Profile – 4, Trench 2 at Station 80 feet.

Geocon Inc.'s Fault Rupture Hazard Study at 9900 Wilshire Boulevard, Beverly Hills, California.

Soil Classification: Series of stacked and truncated Alfisols and Inceptisols
Geomorphic Surface: Alluvial Fan Remnant
Parent Material: Benedict Canyon Alluvium
Vegetation: Urban
Described By: John Helms
Date Described: 10/23/13 and 11/10/13
Exposure Type: Excavator Trench

Horizon	Depth (ft)	Thickness (ft)	Description of T-2, Station 80 feet
Af	0 – 0.65	0.65	Concrete Layer and Artificial fill, concrete base material; abrupt smooth boundary to:
AB	0.65 – 1.25	0.6	Brown (10YR 4/3d; 10YR 3/2 m); sandy loam to loam; weak to moderately strong fine and medium angular blocky; extremely hard, friable, non- to slightly sticky, non- to slightly plastic; brown (10YR 5/3 d; 10YR 3/2 m) clay films very few thin on ped faces, and few moderately thick coating clasts; fine- to medium-grained moderately well sorted sand, slight organics; 10 - 25% fine sub rounded gravel; massive; artificially compacted; clear wavy boundary to:
Bt / Bw	1.25 – 1.7	0.45	Dark yellowish brown (10YR 4/4d; 10YR 3/3 m); loam; weak fine sub angular blocky; hard to very hard, friable, slightly to moderately sticky, slightly plastic; yellowish brown (10YR 5/4 d; 10YR 3/2 m) clay films few thin on ped faces, and common thin and few moderately thick coating clasts; medium-grained moderately well sorted sand, slightly oxidized; 3 - 5% fine sub rounded slate rich gravel; crudely stratified; slightly artificially compacted; clear irregular boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-2, Station 80 feet (Cont.)
2Btb1	1.7 – 3.5	1.8	Brown (10-7.5YR 5/3 d; 7.5YR 3/3 m); loam to clay loam; weak fine and medium sub angular blocky; hard to very hard, friable, moderately sticky, moderately to very plastic; brown (7.5YR 5/4 d; 7.5YR 4/3 m) clay films common thin and few moderately thick on ped faces, and common thin and few moderately thick coating clasts; fine-grained well sorted sand, slightly well oxidized; 5 - 15% fine and medium rounded gravel; massive, gradational irregular boundary to:
2Btb2	3.5 – 4.1	0.6	Yellowish brown to brown (10-7.5YR 5/4 d; 7.5YR 3/2 m); clay loam; weak fine sub angular blocky; hard, friable to firm, moderately to very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films few to common thin and few moderately thick on ped faces, and common thin and few moderately thick coating clasts; fine-grained well sorted sand, slightly well oxidized; 5 - 10% fine and medium sub rounded slate rich gravel; massive to crudely stratified, gradational smooth boundary to:
2Btb3	4.1 – 5.5	1.4	Brown (7.5YR 5/3 d; 7.5YR 3/3 m); silty clay loam; weak fine and medium sub angular to angular blocky; hard to very hard, firm, moderately sticky, very plastic; brown (7.5YR 5/4 d; 7.5YR 2.5/3 m) clay films common thin, few moderately thick, and very few thick on ped faces; very fine-grained very well sorted sand, moderately well oxidized; very few fine MnO coatings on gravel and webbing on ped faces; >3% fine and very fine sub rounded slate rich gravel; massive; clear wavy boundary to:
3Btb1	5.5 – 8.0	2.5	Brown (7.5YR 4/3 d; 7.5YR 2.5/3 m); silty clay; weak to moderately strong medium angular blocky; very hard, firm, very sticky, very plastic; brown (7.5YR 5/4 d; 7.5YR 3/2 m) clay films common thin and few moderately thick on ped faces, common moderately thick and few thick coating clasts; very fine-grained very well sorted sand, slightly well oxidized; 10 - 25% fine sub rounded slate rich gravel; massive; gradational wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-2, Station 80 feet (Cont.)
3Btb2	8.0 – 8.6	0.6	Brown (7.5YR 5/4 d; 7.5YR 3/3 m); silty clay to silty clay loam; weak fine and medium angular blocky; very hard, firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin and few moderately thick on ped faces; medium-grained moderately well sorted sand, moderately well oxidized; massive; gradational wavy boundary to:
3BCb	8.6 – 10.3	1.7	Brown (7.5YR 5/4 d; 7.5YR 3/3 m); loam; weak fine and medium sub angular blocky; hard, friable, slightly to moderately sticky, slightly plastic; brown (7.5YR 4/4 d; 7.5YR 2.5/3 m) clay films few thin and very few moderately thick on ped faces; medium-grained moderately well sorted sand, moderately well oxidized; massive, clear smooth boundary to:
4Btb	10.3– 11.4+	1.1	Brown (7.5YR 4/4 d; 7.5YR 3/3 m); silty clay; weak fine and medium angular blocky; very hard, very firm, very sticky, very plastic; strong brown (7.5YR 5/6 d; 7.5YR 3/4 m) clay films common thin and few moderately thick on ped faces; very fine-grained very well sorted sand, moderately well oxidized; no gravel; massive; undetermined lower boundary.

TABLE 4.2 - Soil Development Index Calculation Sheet
Soil Profile - 4; Trench 2 at Station 80 Feet

Unit	Thickness (Feet)	Color				Texture		Structure		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist						Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/5*	*sg*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Profile 4																	
AB	0.6	10YR 4/3	0.2	10YR 3/2	0	sl-l	0.5	1-2 abk	0.58	eh	1.00	ss, po-ps	0.25	v1npf, 1mkcl	0.383	0.42	0.25
Bt / Bw	0.45	10YR 4/4	0.3	10YR 3/3	0	l	0.6	1 sbk	0.33	h-vh	0.7	ss-s, ps	0.58	1npf, 2ncl, 1mkcl	0.45	0.42	0.19
2Bt1b	1.8	10-7.5YR 5/3	0.25	7.5YR 3/3	0.1	l-cl	0.7	1 sbk	0.33	h-vh	0.7	s, p-vp	0.75	2npf, 1mkpf, 2ncl, 1mkcl	0.467	0.47	0.85
2Bt2b	0.6	10-7.5YR 5/4	0.35	7.5YR 3/2	0.1	cl	0.8	1 sbk	0.33	h	0.6	s-vs, vp	0.92	1-2npf, 1mkpf, 2ncl, 1mkcl	0.467	0.51	0.31
2Bt3b	1.4	7.5YR 5/3	0.3	7.5YR 3/3	0.1	sicl	0.8	1 sbk-abk	0.42	h-vh	0.7	s, vp	0.83	2npf, 1mkpf, 2ncl, 1mkcl	0.467	0.52	0.72
3Bt1b	2.5	7.5YR 4/3	0.3	7.5YR 2.5/3	0.1	sic	0.9	1-2 abk	0.58	vh	0.8	vs, vp	1.00	2npf, 1mkpf, 2mkcl, 1kcl	0.5	0.60	1.49
3Bt2b	0.6	7.5YR 5/4	0.4	7.5YR 3/3	0.1	sicl-sic	0.85	1 abk	0.5	vh	0.8	vs, vp	1.00	2npf, 1mkpf	0.333	0.57	0.34
3BCb	1.7	7.5YR 5/4	0.4	7.5YR 3/3	0.1	l	0.6	1 sbk	0.33	h	0.6	ss-s, ps	0.58	1npf, v1mkpf	0.267	0.41	0.70
4Btb	1.1	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sic	0.9	1 abk	0.50	vh	0.8	vs, vp	1	2npf, 1mkpf	0.333	0.58	0.63

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.42**	**0.44**	**2.94**	**0.5**	**0.83**	**4 - 8**	**4 - 8**
Buried Soil 1	**0.52**	**1.88**	**3.46**	**1.2**	**1.40**	**15 - 30**	**19 - 38**
Buried Soil 2	**0.6**	**2.53**	**3.70**	**1.4**	**1.10**	**8 - 12**	**27 - 50**
Buried Soil 3	**0.68**	**0.63**	**4.03**	**0.5**	**0.33**	**8 - 12**	**35 - 62**

Soil Profile 5
Trench 3 At Station 57 Feet

Soil profile 5 is located near the center portion of trench 3 at station 57 feet. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a sequence of two stacked and truncated Alfisol soils (Qof and Qot1) over a a basal weakly developed inset Inceptisol soil (Qot1a). The entire section in this locality is capped by only 0.55 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 5 at station 57 feet in trench 3 contains a surface soil and two buried soils to a depth of approximately 7.4 feet below the ground surface. This stratigraphic section tracks across the entire trench 3 exposure. Additionally, the stratigraphic correlation units assigned to the upper two soil members within this profile correlate well to the adjacent trench exposures and boring transects (Table 16e). A detailed soil description for this profile is listed in table 5.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 5.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Palexeralf. This is a well preserved soil remnant that consists of an organic-rich transitional horizon over a sequence of three moderately well developed argillic diagnostic subsurface horizons and a transitional (scour) horizon (AB – Bt1 – Bt2 – Bt3 - BC). The deposit is massive. This soil member is characterized by fine-grained deposit with strong angular blocky soil structure and 7.5YR hues and many thin and common moderately thick clay films on ped faces. A relative age estimate of 15 to 30 ka for this surface soil in soil profile 5 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well with buried soil 1 in the southern end of trench 1, the surface soil exposed in trench 3 and the Qof unit described along boring transect A.

Buried soil member 1 (or first buried soil) in soil profile 5 classifies as a Typic Haploxeralf. This is a truncated soil remnant that consists of two weakly developed argillic diagnostic subsurface horizons over a crudely stratified transitional horizon (2Btb1 – 2Btb2 / 2BCb1 – 2BCb2). This deposit consists of a crudely stratified fining upwards sequence. This soil member is characterized by a silty deposit with 7.5YR hues and common thin and few moderately thick clay films on ped faces. A relative age estimate of 8 to 12 ka for buried soil 1 in soil profile 5 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This

buried soil member is interpreted as stream terrace deposit Qot1. This unit correlates well with buried soil 3 in the center and the northern end of trench 1, buried soil 2 exposed in trench 3 and the Qot1 units described along boring transect A.

Buried soil member 3 (or the lowest buried soil) in soil profile 5 classifies as a Fluventic Xerumbrept. This is a highly truncated and thin soil remnant that consists of a weakly developed juvenile argillic to cambic diagnostic subsurface horizon (3Btb / 3Bwb – 3BCb). The deposit is massive and silty. This soil member is characterized by a fine-grained deposit with 7.5YR hues and few thin and very few moderately thick clay films on ped faces. A relative age estimate of 4 to 8 ka for the buried soil 3 in profile 3 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as an inset and laterally discontinuous stream terrace deposit, and is termed Qot1a. This unit represents a gradational lateral facies change and inset surface with the buried soil 2 of trench 3. Similar fluvial sequences are recognized within the terrace sequences preserved along the adjacent borings from transects A and B.

In conclusion, the entire stratigraphic section of soil profile 5 in trench 3 at station 57 feet is estimated to be 27 to 50 ka in age. Most of this age resides within the surface soil of this exposure. The Holocene – Pleistocene boundary is represented by the Af and Qof contact at a depth of approximately 0.55 feet in this locality. The upper two soil members within this soil profile correlate well to the buried soils 1 and 2 observed in soil profile 1 at the southern end of trench 1 and with the buried soils 1 and 2 observed in trench 2. The lowest soil members within this soil profile correlates well to the buried sequence of stacked stream terrace deposits encountered in the boring transects A and B. All of the soil members observed in soil profile 5 are continuous across the entire trench 3 exposure.

TABLE 5.1 Soil Profile – 5, Trench 3 at Station 57 feet.

Geocon Inc.'s Fault Rupture Hazard Study at 9900 Wilshire Boulevard, Beverly Hills, California.

Soil Classification: Series of stacked and truncated Alfisols and Inceptisols
Geomorphic Surface: Alluvial Fan Remnant
Parent Material: Benedict Canyon Alluvium
Vegetation: Urban
Described By: John Helms
Date Described: 11/11/13 and 11/15/13
Exposure Type: Excavator Trench

Horizon	Depth (ft)	Thickness (ft)	Description of T-3, Station 57 feet
Af	0 – 0.55	0.55	Concrete Layer and Artificial fill, mixed soil and concrete base, not described; abrupt smooth boundary to:
AB	0.55 – 1.6	1.05	Brown (7.5YR 4/2d; 7.5YR 3/2 m); silty clay loam to silty clay; moderately strong to strong medium angular blocky to prismatic; extremely hard, very firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/2 m) clay films common thin and few moderately thick on ped faces and common moderately thick lining pores; fine-grained well sorted sand, slight organics; 0-3% fine sub rounded gravel; few fine and medium pores; massive; abrupt planar boundary to:
Btb	1.6 – 3.35	1.75	Brown (7.5YR 5/3 d; 7.5YR 3/3 m); silty clay; moderately strong to strong medium angular blocky to prismatic; extremely hard, very firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/2 m) clay films common thin, few moderately thick, and very few thick on ped faces; very fine-grained very well sorted sand, slightly well oxidized; 3 - 5% fine and medium sub rounded gravel; massive; gradational wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-3, Station 57 feet (Cont.)
Bt2	3.35 – 3.95	0.6	Brown (7.5YR 5/3 d; 7.5YR 3/2 m); silty clay loam to clay loam; weak to moderately strong fine and medium angular blocky to prismatic; very to extremely hard, firm, very sticky, very plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films common thin, few moderately thick on ped faces; very fine-grained very well sorted sand, slightly well oxidized; 3 - 5% fine and very fine sub rounded slate rich gravel; massive, gradational wavy boundary to:
Bt3	3.95 – 5.15	1.2	Brown (7.5YR 5/4 d; 7.5YR 3/3 m); clay loam; weak fine and medium sub angular to angular blocky; very hard, friable to firm, moderately sticky, moderately to very plastic; brown (7.5YR 5/2 d; 7.5YR 3/2 m) clay films few thin,and very few moderately thick on ped faces, and common moderately thick coating clasts; fine-grained well sorted sand, moderately well oxidized; 3 - 5% fine sub rounded gravel; massive, clear planar boundary to:
BCox	5.15 – 6.15	1.0	Strong brown (7.5YR 4/6 d; 7.5YR 3/4 m); loam; weak fine and medium sub angular blocky; hard, friable, slightly sticky, non- to slightly plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films very few thin, on ped faces, and few moderately thick coating clasts; fine-grained well sorted sand, moderately well oxidized; 5 - 10% fine and medium sub rounded gravel; massive, scour deposit; clear wavy boundary to:
2Btb1	6.15 – 6.35	0.2	Brown (7.5YR 4/3 d; 7.5YR 3/2 m); loam to silt loam; weak fine and medium sub angular blocky; slightly hard to hard, friable, slightly to moderately sticky, moderately plastic; brown (7.5YR 4/4 d; 7.5YR 3/2 m) clay films few thin and very few moderately thick on ped faces; fine- to medium-grained moderately well sorted sand, slightly well oxidized; >3% fine and very fine sub rounded gravel; massive, gradational wavy boundary to:
2BCb1	6.35 – 6.55	0.2	Brown (7.5YR 4/3 d; 7.5YR 3/2 m); loam to clay loam; weak fine sub angular blocky; hard, friable, moderately sticky, moderately plastic; brown (7.5YR 5/4 d; 7.5YR 4/3 m) clay films few thin on ped faces; fine- to medium-grained moderately well sorted sand, slightly well oxidized; >3% fine and very fine sub rounded gravel; crudely stratified, gradational wavy boundary to:

Horizon	Depth (ft)	Thickness (ft)	Description of T-3, Station 57 feet (Cont.)
2BCb2	6.55 – 6.85	0.3	Brown (7.5YR 5/4 d; 7.5YR 3/2 m); loam to sandy loam; weak fine and medium sub angular blocky; slightly hard, very friable to friable, non- to slightly sticky, non- to slightly plastic; brown (7.5YR 4/4 d; 7.5YR 3/3 m) clay films very few thin on ped faces, and few thin coating clasts; medium-grained moderately well sorted sand, moderately well oxidized; 5 - 10% fine and medium sub rounded gravel; crudely stratified, scour deposit; abrupt planar boundary to:
3Btb / 3Bwb	6.85 – 7.4+	0.55	Light brown (7.5YR 6/4 d; 7.5YR 5/3 m); silty loam; weak fine and medium sub angular blocky; hard to very hard, firm, moderately to very sticky, very plastic; brown (7.5YR 5/4 d; 7.5YR 4/3 m) clay films few thin and very few moderately thick on ped faces; very fine-grained very well sorted sand, moderately well oxidized; >3% fine and very fine sub rounded gravel; massive, truncated, undetermined lower boundary.

TABLE 5.2 - Soil Development Index Calculation Sheet
Soil Profile - 5; Trench 3 at Station 57 Feet

Unit	Thickness (Feet)	Color				Texture		Structure		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist						Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/5*	*sg*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Profile 5																	
AB	1.05	7.5YR 4/2	0.2	7.5YR 3/2	0.1	sicl-sic	0.85	2-3 abk-pr	0.83	eh	1.00	vs, vp	1.00	2npf, 1mkpf, 2mkpo	0.5	0.64	0.67
Bt1	1.75	7.5YR 5/3	0.3	7.5YR 3/3	0.1	sic	0.9	2-3 abk-pr	0.83	eh	1	vs, vp	1.00	2npf, 1mkpf, v1kpf	0.367	0.64	1.12
Bt2	0.6	7.5YR 5/3	0.3	7.5YR 3/2	0.1	sicl - cl	0.8	1-2 abk-pr	0.80	eh	1	vs, vp	1.00	2npf, 1mkpf	0.333	0.62	0.37
Bt3	1.2	7.5YR 5/4	0.3	7.5YR 3/3	0.1	cl	0.8	1 sbk-abk	0.42	vh	0.8	s, p-vp	0.75	1npf, v1mkpf	0.3	0.50	0.59
BC ox	1	7.5YR 4/6	0.6	7.5YR 3/4	0.2	l	0.6	1 sbk	0.33	h	0.6	ss, po-ps	0.25	v1npf, 1mkcl	0.35	0.42	0.42
2Bt1b	0.2	7.5YR 4/3	0.3	7.5YR 3/2	0.1	l-sil	0.6	1 sbk	0.33	sh-h	0.5	ss-s, p	0.58	1npf, v1mkpf	0.3	0.39	0.08
2Bt2b / 2BC1b	0.2	7.5YR 4/3	0.3	7.5YR 3/2	0.1	l-cl	0.7	1 sbk	0.33	h	0.6	s, p	0.67	1npf	0.2	0.41	0.08
2BC2b	0.3	7.5YR 5/4	0.4	7.5YR 3/2	0.1	sl-l	0.5	1 sbk	0.33	sh	0.4	so-ss, po-ps	0.167	v1npf, 1ncl	0.283	0.31	0.09
3Btb / 3Bwb	0.55	7.5YR 6/4	0.4	7.5YR 5/3	0.1	sil	0.6	1 sbk	0.33	h-vh	0.7	s-vs, vp	0.917	1npf, v1mkpf	0.3	0.48	0.26

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.64**	**3.18**	**3.98**	**2.3**	**1.85**	**15 - 30**	**15 - 30**
Buried Soil 1	**0.41**	**0.25**	**2.54**	**1.3**	**0.78**	**8 - 12**	**23 - 42**
Buried Soil 2	**0.48**	**0.26**	**3.35**	**0.5**	**0.30**	**4 - 8**	**27 - 50**

Soil Profile 6
Transect A, Boring 3

Soil profile 6 is located near the southern end of boring transect A in Boring 3 and was described in detail to a depth of 36.4 feet below the ground surface. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a sequence of two stacked and truncated Alfisol soils (Qof and Qot1) over series of two weakly developed Inceptisol soils (Qot2 and Qot4) and a basal Entisol soil (Qot5) or scour deposit over Lakewood Formation or undifferentiated old alluvium (Qoa1). The entire section in this locality is capped by 5.8 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 6 in boring 3 contains a surface soil and four buried soils above the Lakewood Formation to a depth of approximately 23.4 feet below the ground surface. This stratigraphic section tracks across the remaining length of Transect A to the south (Borings 1 and 2), and across borings 4 and 5 to the north. The stratigraphic units assigned to the upper three soil members within this profile correlate well to the adjacent trench exposures and across the entirety of Transect A (Table 16h). A detailed soil description for this profile is listed in table 6.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 6.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of single massive moderately well developed argillic diagnostic subsurface horizon (Bt). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for this surface soil in soil profile 6 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well across the entire length of transect A (borings 1 through 12).

Buried soil member 1 (or first buried soil) in soil profile 6 classifies as a Typic Haploxeralf. This is a truncated soil remnant that consists of a weak organic transitional horizon over a weakly developed juvenile argillic to cambic diagnostic subsurface horizon over a crudely stratified transitional scour horizon (2ABb – 2Btb / 2Bwb – 2BCb). The deposit consists of a crudely stratified fining upwards sequence. This soil member is characterized by a silty deposit with 7.5YR hues and few to common thin and very few moderately thick clay films. A relative age estimate of 8 to 12 ka for buried soil 1 in soil profile 6 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the

Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot1. This unit also correlates well across the entire length of transect A (borings 1 through 12).

Buried soil members 2 and 3 in soil profile 6 both classify as a Fluventic Xerumbrepts. These are highly truncated, thin, and interfingering soil remnants that consist of a weakly developed juvenile argillic to cambic diagnostic subsurface horizon over a transitional scour horizon (3Btb / 3Bwb – 3BCb) and (4Btb / 4Bwb – 4BCb). These deposits are massive to locally crudely stratified. These soil member are characterized by sandy deposits with 10 - 7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for each of these buried soils in profile 6 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as stream terrace deposits, and are termed Qot2 and Qot4. These units contain gradational lateral facies changes and inset surfaces laterally along Transect A. This fluvial sequences is recognized within the stream terrace deposits preserved along the adjacent borings in transect A from boring 1 through boring 5. Unit Qot2 correlates well across the entire length of transect A (borings 1 through 12). Unit Qot4 correlates well across the southern portion of transect A (borings 1 through 5), and this unit may be faulted between borings 5 and 10 along transect A.

Buried soil member 4 in soil profile 6 classifies as a Typic Xerofluvent. This is a highly truncated, well stratified, and weakly developed soil remnant. This soil consists of a single, thick, and crudely laminated transitional (5BCb lam) horizon. This deposit is well stratified with a basal scour. A relative age estimate of 1 to 4 ka for buried soil 4 in profile 6 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the similar soil profile S-7 in the Mission Creek soil chronosequence (McFadden, 1988). This buried soil member is a strong marker bed that lies across a majority of the project site area. It is interpreted as an highly truncated and laterally continuous stream terrace deposit, and is termed Qot5. Unit Qot5 correlates well across the southern portion of transect A, however this unit may be faulted at depth along transect A.

Buried soil members 5 and 6 (or the deepest buried soils described in detail) in soil profile 6 classify as Typic Haplo to Palexeralfs. This is a sequence of well-developed and highly truncated soil remnants that consist of a set of stacked argillic horizons (6Btb – 7Btb). The deposits are massive. These soil members are characterized by fine-grained deposits with 7.5YR hues and plugged with secondary clay. A relative age estimate of 8 to 12 ka for buried soil 5 in soil profile 6 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the

Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). A relative age estimate of 15 to 30 ka for buried soil 6 in soil profile 6 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as being part of the undifferentiated Lakewood Formation alluvium and termed Qoa1. This unit does not to correlate well across the length of transect A (borings 1 through 12). It appears to be affected by faulting.

In conclusion, the entire stratigraphic section of soil profile 6 in boring 3 along Transect A to a depth of 35 feet is estimated to be 55 to 104 ka in age. Most of this age resides within the surface soil and the described Lakewood Formation in this exposure. The Holocene – Pleistocene boundary is represented by the Af and Qof contact at a depth of approximately 5.8 feet in this locality. The upper five soil members within this soil profile correlate well across the entirety of Transect A. Within this section the alluvial fan deposit (Qof) has an estimated age of 15.0 – 30.0 ka, and the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot4, and Qot5) have an estimated age of 32.0 – 62.0 ka. The upper 3 soil members observed in soil profile 6 have an age estimate of 27.0 – 50.0 ka, and are continuous and appear un-faulted across the entirety of transect A.

Table 6.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 6 - Transect A; Boring 3

Date Described: 10/17/13 and 11/12/2013

Depth (Ft)	Horizon	Transect A; B-3 Description
0 - 5.8	Af	Artificial Fill - not described
5.8 - 10.5	Bt	Brown to yellowish brown (10-7.5YR 5/4d, 7.5YR 3/3m), clay loam, slightly to moderately well oxidized, hard to very hard, friable to firm, moderately to very sticky, very plastic, fine to medium grained moderately well sorted sand with ~25% fine and medium sub rounded slate-rich gravel, brown (7.5YR 4/4d, 7.5YR 3/2m) clay films few to common thin and few moderately thick on ped faces and common thin and moderately thick coating clasts, weak redox with >3% weak strong brown (7.5YR4/6d, 7.5YR 3/4m) mottles and >7% moderately strong grayish brown (2.5Y 5/2d, 2.5Y 4/1m) gleying, truncated, massive, clear lower boundary to;
10.5 - 11.1	2ABb	Brown (7.5YR 4/3d, 7.5YR 3/2m), silty clay, slight organics, moderately well oxidized, hard to very hard, firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films common to many thin and common moderately thick on ped faces, truncated, massive, clear lower boundary to;
11.1 - 12.75	2Btb / 2Bwb	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, moderately well oxidized, hard, friable, moderately to very sticky, moderately to very plastic, fine to medium grained moderately well sorted sand with ~3% fine and very fine slate-rich well rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films few to common thin and few moderately thick on ped faces and few moderately thick coating clasts, massive to crudely stratified, gradational lower boundary to;
12.75 - 13.7	2BCb	Strong brown (7.5YR 4/6d, 7.5YR 3/4m), sandy loam, moderately well oxidized, slightly hard, very friable to friable, slightly sticky, non- to slightly plastic, medium grained moderately well sorted sand with ~15-20% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few to few thin on ped faces and few thin coating clasts, crudely stratified, scour deposit, clear lower boundary to;
13.7 - 15.4	3Btb / 3Bwb	Brown (7.5YR 4/4d, 7.5YR 3/3m), loam, moderately well oxidized, slightly hard, friable, slightly to moderately sticky, slightly plastic, fine grained well sorted sand with ~0-3% fine and very fine slate-rich sub rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films few to common thin and few moderately thick on ped faces and few thin coating clasts, truncated, massive, gradational lower boundary to;
15.4 - 16.0	3BCb	Brown (7.5YR 5/3d, 7.5YR 3/2m), sandy loam to loamy sand, slightly oxidized, soft to slightly hard, very friable to friable, non-sticky, non- plastic, medium grained moderately well sorted sand with ~15-20% fine and very fine slate-rich well rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few to few thin on ped faces and few thin coating clasts, crudely stratified, scour deposit, clear lower boundary to;
16.0 - 17.8	4Btb / 4Bwb	Yellowish brown to brown (10YR - 7.5YR 5/4d, 7.5YR 4/3m), silt loam, slightly oxidized, slightly hard, firm, moderately sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few to very few thin and very few moderately thick on ped faces, weak redox with >15% weak strong brown (7.5YR4/6d, 7.5YR 3/4m) mottles and >5% weak light yellowish brown (2.5Y 6/3d, 2.5Y 5/2m) gleying, truncated, massive, gradational lower boundary to;
17.8 - 18.5	4BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), sandy loam, slightly hard, friable, non- to slightly sticky, non-plastic, fine-grained well sorted sand with no gravel, brown (7.5YR 5/4d, 7.5YR 4/3m) clay films very few thin and few clay stains on ped faces, weak redox with >3% weak strong brown (7.5YR4/6d, 7.5YR 4/4m) mottles and >15% weak light brownish gray (2.5Y 6/2d, 2.5Y 5/1m) gleying, crude laminations up to 0.5' thick, massive, scour deposit, gradational lower boundary to;

Depth (Ft)	Horizon	Transect A; B-3 Description (Cont.)
18.5 - 23.4	5BCb lam	Pale brown (10YR 6/3d, 10YR 5/2m), sandy loam to loam, slightly hard, friable to very friable, slightly sticky, slightly plastic, fine-grained well sorted sand with ~5-15% localized very fine and fine sub rounded slate-rich gravel, moderately strong redox with ~30% moderate brown (7.5YR 5/4d, 7.5YR 4/3m) mottles and ~50% strong light brownish gray (2.5Y 6/2d, 2.5Y 5/1m) gleying, well stratified, stacked and truncated, basal scour deposit, abrupt lower boundary to;
23.4 - 27.5	6Btb	Brown (7.5YR 4/4d, 7.5YR 3/3m), silty clay, moderately well oxidized, very hard, firm to very firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films common thin and few moderately thick on ped faces, moderately strong redox with ~20% moderate strong brown (7.5YR 5/6d, 7.5YR 3/4m) mottles and ~40% strong light olive brown (2.5Y 5/3d, 2.5Y 4/2m) gleying, truncated, massive, clear lower boundary to;
27.5 - 35.0	7Btb	Brown (7.5YR 4/4d, 7.5YR 3/2m), clay loam to clay, moderately well oxidized, very hard, firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 4/3d, 7.5YR 3/3m) clay films common to many thin and common moderately thick on ped faces, moderately strong redox with ~20% moderate strong brown (7.5YR 4/6d, 7.5YR 3/4m) mottles and ~20% strong light olive brown (2.5Y 5/3d, 2.5Y 4/2m) gleying, truncated and stacked, crudely stratified, Lakewood Formation, Older Alluvium, gradational lower boundary.
35.0 - 75.0+	--	Lakewood Formation, Older Alluvium, Not described in detail, See Summary Description

Table 6.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 6 - Transect A, Boring 3

Unit	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 3															
Bt	4.7	10 - 7.5YR 5/4	0.35	7.5YR 3/3	0.1	cl	1	h-vh	0.70	s-vs, vp	0.92	1-2npf, 1mkpf, 2ncl, 1mkcl	0.47	0.64	3.00
2ABb	0.6	7.5YR 4/3	0.3	7.5YR 3/2	0.1	sic	0.8	h-vh	0.7	vs, vp	1.00	1-2npf, 1mkpf	0.33	0.59	0.35
2Btb / 2Bwb	1.7	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	1	h	0.6	s-vs, p-vp	0.83	2npf, 1mkpf, 1mkcl	0.47	0.60	0.99
2BCb	1.0	7.5YR 4/6	0.6	7.5YR 3/4	0.2	sl	0.3	sh	0.4	ss, po-ps	0.25	v1-1npf, 1ncl	0.27	0.28	0.27
3Btb / 3Bwb	1.7	7.5YR 4/4	0.4	7.5YR 3/3	0.1	l	0.5	sh	0.4	ss-s, ps	0.42	1-2npf, 1mkpf, 1ncl	0.43	0.37	0.63
3BCb	0.6	7.5YR 5/3	0.3	7.5YR 3/2	0.1	sl - ls	0.2	so-sh	0.3	so, po	0.00	v1npf, 1ncl	0.33	0.19	0.11
4Btb / 4Bwb	1.8	10-7.5YR 5/4	0.35	7.5YR 4/3	0.1	sil	0.7	sh	0.4	s, vp	0.83	v1-1npf, v1mkpf	0.3	0.47	0.84
4BCb	0.7	10YR 5/4	0.3	10YR 4/3	0	sl	0.3	sh	0.4	so-ss, po	0.01	v1npf	0.23	0.19	0.13
5BCb lam	4.9	10YR 6/3	0.2	10YR 5/2	0	sl-l	0.4	sh	0.4	ss, ps	0.33		0	0.23	1.11
6Btb	4.1	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sic	0.8	vh	0.80	vs, vp	1.00	2npf, 1mkpf	0.47	0.63	2.60
7Btb	7.5	7.5YR 4/4	0.4	7.5YR 3/2	0.1	cl-l	0.6	vh	0.80	vs, vp	1.00	2-3npf, 2mkpf	0.57	0.61	4.61

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.64**	**3.00**	**4.46**	**0.45**	**0.47**	**15 - 30**	**15 - 30**
Buried Soil 1	**0.60**	**1.61**	**3.53**	**1.7**	**1.07**	**8 - 12**	**23 - 42**
Buried Soil 2	**0.37**	**0.74**	**2.25**	**0.9**	**0.76**	**4 - 8**	**27 - 50**
Buried Soil 3	**0.47**	**0.97**	**2.72**	**0.75**	**0.53**	**4 - 8**	**31 - 58**
Buried Soil 4	**0.23**	**1.11**	**1.59**	**0.2**	**0.00**	**1 - 4**	**32 - 62**
Buried Soil 5	**0.63**	**2.60**	**4.44**	**0.5**	**0.47**	**8 - 12**	**40 - 74**
Buried Soil 6	**0.61**	**4.61**	**4.30**	**0.5**	**0.57**	**15 - 30**	**55 - 104**

Soil Profile 7
Transect A, Boring 6

Soil profile 7 is located near the center of Transect A in Boring 6 and was described in detail to a depth of 11.0 feet below the ground surface. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of highly truncated and weakly developed Inceptisol soil (Qyt) over a stacked and truncated Alfisol soils (Qof). This section appears to be a cut and is not capped by any artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 7 in boring 6 contains a weak surface soil and well-developed buried soil. Both of the horizons described in detail track across the remaining length of Transect A to the north. The stratigraphic correlation units assigned to the upper two soil members within this profile also correlate well to the adjacent trench exposures (Table 16k). A detailed soil description for this profile is listed in table 7.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 7.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Xerumbrept. This is a very thin and highly truncated soil that consists of a weak argillic diagnostic subsurface horizon (Bt) soil remnant. The deposit is massive. A majority of this soil member has been mechanically stripped away during grading. This soil is characterized by a silt-rich deposit with few to common thin and few moderately thick clay films. A relative age estimate of 8 to 12 ka for the surface soil in soil profile 7 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This very thin surficial stream terrace deposit is termed Qyt and correlates well with the surface soil in the northern portion of trench 1 and the surficial deposits described along the northern portion of boring transect A.

Buried soil member 1 (or first buried soil) in soil profile 7 classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of a sequence of two moderately well developed argillic diagnostic subsurface horizons over a transitional scour horizon (2Btb1 – 2Btb2 – 2BCb). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 7 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as

debris flow deposit, and is termed Qof. This unit correlates well across the entire project site area.

In conclusion, the entire stratigraphic section of soil profile 7 in boring 6 along Transect A to a depth of 11.0 feet is estimated to be 23 to 42 ka in age. Most of this age resides within the first buried soil in this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 3.5 feet in this locality. The first buried soil member within this soil profile correlates well across the entirety of boring transect A and the project site area. Within this section the alluvial fan deposit (Qof) has an estimated age of 23.0 – 42.0 ka. The ages of the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot4, and Qot5), and the upper Lakewood Formation were not assessed in this boring.

Table 7.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 7 - Transect A; Boring 6

Date Described: 11/20/2013

Depth (Ft)	Horizon	Transect A; B-6 Description
0 - 3.5	Bt /Bw	Brown (7.5YR 5/4d, 7.5YR 3/3m), silty clay loam to clay loam, slightly oxidized, very hard, very firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, common fine and few medium pores, brown (7.5YR 4/4d, 7.5YR 2.5/3m) clay films few to common thin and few moderately thick on ped faces and few moderately thick lining pores, truncated, massive, clear lower boundary to;
3.5 - 8.7	2Btb1	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, slightly oxidized, extremely hard, very firm, very sticky, very plastic, fine grained well sorted sand with ~5-10% fine and medium sub rounded slate-rich gravel, brown (7.5YR 4/3d, 7.5YR 2.5/2m) clay films common to many thin and few moderately thick on ped faces and common moderately thick lining pores and few thick coating clasts, faint to weak redox with localized faint strong brown (7.5YR 5/6d, 7.5YR4/4m) mottles and localized weak light brownish gray (2.5Y6/2d, 2.5Y4/1m) , truncated, massive, clear lower boundary to;
8.7 - 70.0+	--	Remainder not described in detail, See Summary Description

Table 7.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 7 - Transect A, Boring 6

Unit	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 6															
Bt / Bw	3.5	7.5YR 5/4	0.4	7.5YR 3/3	0.1	sicl - cl	0.8	vh	0.80	vs, vp	1.00	2npf, 1mkpf, 2mkpo	0.467	0.63	2.22
2Btb1	5.2	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	0.8	eh	1	vs, vp	1.00	2-3npf, 2mkpf, 2mkcl, 1kcl	0.533	0.69	3.57

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.63**	**2.22**	**4.43**	**0.5**	**0.63**	**8 - 12**	**8 - 12**
Buried Soil 1	**0.69**	**3.57**	**4.81**	**0.5**	**0.69**	**15 - 30**	**23 - 42**

Soil Profile 8
Transect A, Boring 7

Soil profile 8 is located near the center portion of Transect A in Boring 7 and was described in detail to a depth of 27.2 feet below the ground surface. The soil profile lies across a graded and stripped surface that is geomorphically inactive. This soil profile consists of a two truncated Alfisol soils (Qyt and Qof) over a sequence of interbedded and weakly developed Inceptisol and Alfisol soils (Qot1 through Qot4) and a basal Entisol soil or scour deposit and weak terrace sequence (Qot5 and Qot6) over Lakewood Formation or undifferentiated old alluvium (Qoa1). The entire stratigraphic section in this locality is apparently cut and not capped by any artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 8 in boring 7 contains a surface soil and seven buried soils to a depth of approximately 27.2 feet below the ground surface. This entire stratigraphic section tracks across the northern portion of transect A and is truncated to the south in Borings 1 through 5. The stratigraphic correlation units assigned to the upper three soil members within this profile correlate well to the adjacent trench exposures and across the entirety of Transect A (Table 16l). A detailed soil description for this profile is listed in table 8.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 8.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Haploxeralf. This is a very thin and highly truncated soil that consists of a weak argillic to cambic diagnostic subsurface horizon (Bt / Bw) soil remnant. The deposit is massive. A majority of this soil member has been mechanically stripped away during grading. This soil is characterized by a silt-rich deposit with few to common thin and few moderately thick clay films. A relative age estimate of 8 to 12 ka for the surface soil in soil profile 8 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This very thin surficial stream terrace deposit is termed Qyt and correlates well with the surface soil in trench 1 and the surficial deposits described along adjacent borings in transect A.

Buried soil member 1 (or first buried soil) in soil profile 8 classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of a sequence of two moderately well developed argillic diagnostic subsurface horizons over a transitional scour horizon (2Btb1 – 2Btb2 – 2BCb). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 8 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more

mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well across all the entire project site area.

Buried soil members 2, 3, 4, and 5 in soil profile 8 classify as a repeating stacked sequence of Fluventic Xerumbrepts and Typic Haploxeralfs. These are highly truncated, thin, and locally interfingering soil remnants that consist of a repeating sequence of weakly developed juvenile argillic to cambic diagnostic subsurface horizons over transitional scour horizons (3Btb / 3Bwb – 3BCb), (4Btb – 4BCb), (5Btb / 5Bwb – 5BCb), and (6Btb – 6BCb). These deposits are massive to locally crudely stratified. These soil members are characterized by sandy deposits with 10 - 7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for buried soils 2 and 4 in profile 8 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as inset stream terrace deposits, and are termed Qot1 and Qot3. These units contain gradational lateral facies changes and inset surfaces laterally along boring transect A. Relative age estimates of 8 to 12 ka for buried soils 3 and 5 in soil profile 8 were obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as stream terrace deposits, and are termed Qot2 and Qot4. This fluvial sequence recognized within buried soils 2 through 5 in soil profile 8 are stream terrace deposits. Units Qot1 and Qot2 correlate well across the entire length of transect A (borings 1 through 12). Units Qot3 and Qot4 correlates well across the most of transect A (borings 1 through 12); however, these units contain gradational lateral facies changes and localized discontinuous inset surfaces. The base of unit Qot4 may be faulted at depth along transect A.

Buried soil member 6 in soil profile 8 classifies as a Typic Xerofluvent. This is a highly truncated, well stratified, and weakly developed soil remnant. This soil consists of a single, thick, and crudely laminated transitional (7BCb lam) horizon. This deposit is well stratified with a basal scour. A relative age estimate of 1 to 4 ka for buried soil 6 in profile 8 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the similar soil profile S-7 in the Mission Creek soil chronosequence (McFadden, 1988). This buried soil member is a strong marker bed across a majority of the project site area It is interpreted as an highly truncated and laterally continuous stream terrace deposits, and is termed unit Qot5. Unit Qot5 correlates well across the entire project site area, however this unit may be faulted at depth in boring transect A.

Buried soil member 7 in soil profile 8 classifies as a Fluventic Xerumbrept. This is a highly truncated, thin, and discontinuous soil remnant that consist of a weakly developed juvenile argillic to cambic diagnostic subsurface horizon over a transitional scour horizon (8Btb / 8Bwb – 8BCb). This deposit is massive to locally crudely stratified. These soil members are characterized by sandy deposits with 7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for buried soil 7 in profile 8 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as a basal laterally discontinuous stream terrace deposit, and is termed Qot6. This unit contains gradational lateral facies changes across the northern portion of transect A where it directly overlies the Lakewood Formation. To the south this unit is completely scoured out by the overlying Qot5 sour deposit within Transect A. Unit Qot6 is faulted at depth in boring transect A.

In conclusion, the entire stratigraphic section of soil profile 8 in boring 7 along Transect A to a depth of 27.2 feet is estimated to be 52 to 94 ka in age. Most of this age resides within the first buried soil in this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 3.2 feet in this locality. The upper five soil members within this soil profile correlate well across the entirety of Transect A. Within this section the surfical stream terrace deposits (Qyt) have an estimated age of 8.0 – 12.0 ka, the alluvial fan deposit (Qof) has an estimated age of 23.0 – 42.0 ka, and the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot4, and Qot5) have an estimated age of 52.0 – 94.0 ka. The upper 4 soil members observed in soil profile 6 have an age estimate of 35.0 – 62.0 ka, and are continuous and appear un-faulted across the entirety of transect A.

Table 8.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 8 - Transect A - Boring 7

Date Described: 11/18/2013

Depth (Ft)	Horizon	Transect A; B-7 Description
0 - 3.2	Bt / Bw	Yellowish brown (10YR 5/4d, 10YR 4/3m), silty clay loam to silty clay, very hard, very firm, moderately sticky, very plastic, very fine grained very well sorted sand with 0-3% fine and very fine rounded slate-rich gravel, dark yellowish brown (10YR 4/4d, 10YR 3/3m) clay films few to common thin and few moderately thick on ped faces and few moderately thick lining pores, truncated, massive, clear lower boundary to;
3.2 - 9.0	2Btb1	Brown (7.5YR 5/4d, 7.5YR 4/3m), clay loam to clay, slightly oxidized, very hard, firm, very sticky, very plastic, fine to medium grained moderately well sorted sand with ~10-15% fine and medium sub rounded slate-rich gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films common to many thin and common moderately thick on ped faces and common moderately thick coating clasts, weak to moderately strong redox with weak localized strong brown (7.5YR5/6d, 7.5YR 3/4m) mottles and moderately strong gray (2.5Y 6/1d, 2.5Y 4/1m) gleying, stacked and truncated, massive, gradational lower boundary to;
9.0 - 10.0	2Btb2	Yellowish brown (10YR 5/4d, 10YR 4/3m), clay loam, very hard, firm, moderately to very sticky, very plastic, very fine to fine grained very well to well sorted sand with 0-3% very fine rounded slate-rich gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films common thin and few moderately thick on ped faces and few to common moderately thick coating clasts, very faint localized redox, massive, gradational lower boundary to;
10.0 - 10.6	2BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), loam, hard, firm, moderately sticky, moderately to very plastic, very fine grained very well sorted sand with no gravel, yellowish brown to brown (10-7.5YR 4/4d, 10-7.5YR 3/3m) clay films few thin on ped faces, massive, abrupt lower boundary to;
10.6 - 13.8	3Btb / 3Bwb	Brown (7.5YR 5/4d, 7.5YR 4/3m), loam to sandy clay loam, slightly oxidized, hard, friable to firm, moderately to very sticky, moderately to very plastic, fine grained well sorted sand with ~0-3% fine and very fine slate-rich rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few to few thin and very few moderately thick on ped faces, truncated, massive, gradational lower boundary to;
13.8 - 16.0	3BCb	Brown (7.5YR 5/4d, 7.5YR 4/3m), sandy loam to loam, slightly oxidized, hard, friable, slightly sticky, slightly plastic, medium grained moderately well sorted sand with ~10-15% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few to few thin on ped faces and few thin coating clasts, crudely stratified, scour deposit, abrupt lower boundary to;
16.0 - 17.2	4Btb	Brown (7.5YR 4/3d, 7.5YR 3/2m), silty clay loam, hard, firm, moderately to very sticky, very plastic, very fine grained very well sorted sand with ~0-3% fine and very fine slate-rich rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films common thin and few moderately thick on ped faces and common moderately thick coating clasts, truncated, massive, gradational lower boundary to;
17.2 - 18.4	4BCb	Brown (7.5YR 4/4d, 7.5YR 3/3m), sandy loam, slightly hard to hard, friable, slightly sticky, non- to slightly plastic, medium to coarse grained moderately well sorted sand with ~5-15% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films very few thin and common clay stains on ped faces and few thin and common very thin coating clasts, crudely stratified, scour deposit, abrupt lower boundary to;

Depth (Ft)	Horizon	Transect A; B-7 Description (Cont.)
18.4 - 19.4	5Btb / 5Bwb	Yellowish brown (10YRYR 5/4d, 10YR 4/3m), silt loam to silty clay loam, hard to very hard, firm, moderately sticky, very plastic, very fine grained very well sorted sand with 3-5% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and very few moderately thick on ped faces and few moderately thick coating clasts, truncated, massive, gradational lower boundary to;
19.4 - 20.3	5BCb	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), clay, hard, firm, very sticky, very plastic, very fine-grained very well sorted sand with no gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films very few to few thin on ped faces, massive, clear lower boundary to;
20.3 - 22.0	6Btb	Brown (7.5YR 4/4d, 7.5YR 3/3m), sandy loam to loam, slightly oxidized, hard, friable, slightly sticky, non- to slightly plastic, fine-grained well sorted sand with no gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films few to common thin and few moderately thick on ped faces, truncated and stacked, massive, gradational lower boundary to;
22.0 - 23.5	6BCb	Brown (7.5YR 5/4d, 10YR 4/3m), sandy loam to loam, slightly oxidized, hard, friable, non- to slightly sticky, slightly plastic, fine-grained well sorted sand with ~0-3% fine and very fine slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few thin on ped faces and few thin coating clasts, crudely stratified, scour deposit, clear lower boundary to;
23.5 - 25.5	7BCb lam	Brown (7.5YR 4/4d, 7.5YR 3/3m), laminated loam and sandy loam, slightly oxidized, hard, friable, slightly sticky, non- to slightly plastic, fine to medium grained moderately well sorted sand with no gravel, common clay stains on ped faces, truncated and stacked, well stratified, clear lower boundary to;
25.5 - 26.5	8Btb / 8Bwb	Yellowish brown to brown (10-7.5YR 5/4d, 10-7.5YR 4/3m), loam, slightly oxidized, hard, friable, slightly sticky, slightly plastic, fine-grained well sorted sand with no gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and few moderately thick on ped faces, truncated, stratified, clear lower boundary to;
26.5 - 27.2	8BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), loamy sand, soft to slightly hard, very friable, non- to slightly sticky, non-plastic, fine to medium grained moderately well sorted sand with ~0-3% fine and very fine slate-rich sub rounded gravel, common clay stains on ped faces, crudely stratified, scour deposit, abrupt lower boundary to;
27.2 - 70.0+		Lakewood Formation, Older Alluvium, Not described in detail, See Summary Description

Table 8.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 8 - Transect A, Boring 7

Unit	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 7															
Bt / Bw	3.2	10YR 5/4	0.3	10YR 4/3	0	sicl-sic	0.75	vh	0.80	s, vp	0.83	1-2npf, 1mkpf, 1mkpo	0.47	0.57	1.83
2Btb1	5.8	7.5YR 5/4	0.4	7.5YR 4/3	0.1	cl-c	0.92	vh	0.8	vs, vp	1.00	2-3npf, 2mkpf, 2mkcl	0.57	0.68	3.93
2Btb2	1.0	10YR 5/4	0.3	10YR 4/3	0	cl	0.83	vh	0.8	s, vp	0.83	2npf, 1mkpf, 1-2mkcl	0.48	0.59	0.59
2BCb	0.6	10YR 5/4	0.3	10YR 4/3	0	l	0.5	h	0.6	s, p-vp	0.75	1npf	0.27	0.42	0.25
3Btb / 3Bwb	3.2	7.5YR 5/4	0.4	7.5YR 4/3	0.1	l-scl	0.6	h	0.6	s-vs, p-vp	0.83	v1-1npf, v1mkpf	0.3	0.49	1.56
3BCb	2.2	7.5YR 5/4	0.4	7.5YR 4/3	0.1	sl-l	0.42	h	0.6	ss, ps	0.33	v1-1npf, 1ncl	0.32	0.35	0.78
4Btb	1.2	7.5YR 4/3	0.3	7.5YR 3/2	0.1	sicl	0.8	h	0.6	s-vs, vp	0.92	2npf, 1mkpf, 2mkcl	0.48	0.58	0.70
4BCb	1.2	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sl	0.33	sh-h	0.5	ss, po-ps	0.25	v1npf	0.17	0.27	0.32
5Btb / 5Bwb	1.0	10YR 5/4	0.3	10YR 4/3	0	sil-sicl	0.75	h-vh	0.7	s, vp	0.83	1npf, v1mkpf, 1mkcl	0.4	0.54	0.54
5BCb	0.9	10YR 4/4	0.3	10YR 3/3	0	c	1	h	0.60	vs, vp	1.00	v1-1npf	0.23	0.57	0.51
6Btb	1.7	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sl-l	0.42	h	0.60	ss, po-ps	0.25	1-2npf, 1mkpf	0.33	0.34	0.58
6BCb	1.5	7.5YR 5/4	0.4	7.5YR 4/3	0.1	sl-l	0.42	h	0.60	so-ss, ps	0.25	v1npf	0.23	0.32	0.48
7BCb lam	2.0	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sl-l	0.42	h	0.60	ss, po-ps	0.25	v1vnpf	0.2	0.31	0.63
8Btb / 8Bwb	1.0	10-7.5YR 5/4	0.35	10-7.5YR 4/3	0.05	l	0.5	h	0.60	ss, ps	0.33	1npf, 1mkpf	0.33	0.36	0.36
8BCb	0.7	10YR 5/4	0.3	10YR 4/3	0	sl	0.33	so-sh	0.30	so-ss, po	0.08	2vnpf	0.3	0.20	0.14

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.57**	**1.83**	**3.99**	**0.3**	**0.47**	**8 - 12**	**8 - 12**
Buried Soil 1	**0.68**	**4.78**	**4.52**	**1.1**	**1.32**	**15 - 30**	**23 - 42**
Buried Soil 2	**0.49**	**2.34**	**3.03**	**1**	**0.62**	**4 - 8**	**27 - 50**
Buried Soil 3	**0.58**	**1.02**	**2.97**	**0.9**	**0.62**	**8 - 12**	**35 - 62**
Buried Soil 4	**0.57**	**1.05**	**3.85**	**0.6**	**0.63**	**4 - 8**	**39 - 70**
Buried Soil 5	**0.34**	**1.06**	**2.31**	**1**	**0.55**	**8 - 12**	**47 - 82**
Buried Soil 6	**0.31**	**0.63**	**2.20**	**0.5**	**0.20**	**1 - 4**	**48 - 86**
Buried Soil 7	**0.36**	**0.50**	**2.07**	**0.7**	**0.63**	**4 - 8**	**52 - 94**

Soil Profile 9
Transect A, Boring 11

Soil profile 9 is located near the northern portion of Transect A in Boring 11 and was described in detail to a depth of 53.9 feet below the ground surface. The soil profile lies across a graded and stripped surface that is geomorphically inactive. This soil profile consists of a two truncated Alfisol soils (Qyt and Qof) over a sequence of weakly developed Inceptisol soils and truncated Alfisols (Qot1 through Qot4) and a basal Entisol soil or scour deposit and weak terrace sequence (Qot5 and Qot6) over Lakewood Formation or undifferentiated old alluvium (Qoa1). The entire section in this locality is apparently cut and not capped by any artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 9 in boring 11 contains a surface soil and seven buried soils to a depth of approximately 53.9 feet below the ground surface. This entire stratigraphic section tracks across the center and northern portions of Transect A and is truncated to the south. The stratigraphic correlation units assigned to the upper four soil members within this profile correlate well across the entirety of boring transect A (Table 16p). A detailed soil description for this profile is listed in table 9.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 9.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Haploxeralf. This is a truncated soil that consists of a weak argillic to cambic diagnostic subsurface horizon (Bt / Bw) soil remnant. The deposit is massive. A majority of this soil member has been mechanically stripped away during grading. This soil is characterized by a coarse-grained deposit with few to common thin and few moderately thick clay films. A relative age estimate of 8 to 12 ka for the surface soil in soil profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This surficial stream terrace deposit is termed Qyt and correlates well with the surface stream terrace soil encountered in the adjacent borings of transect A.

Buried soil member 1 (or first buried soil) in soil profile 9 classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of a sequence of two moderately well developed argillic diagnostic subsurface horizons over a transitional scour horizon (2Btb1 – 2Btb2 – 2BCb). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as

a debris flow deposit, and is termed Qof. This unit correlates well across the entire project site area.

Buried soil members 2, 3, and 4 in soil profile 9 classify as a repeating stacked sequence of Fluventic Xerumbrepts over Typic Haploxeralfs. These are highly truncated, thin, and locally interfingering soil remnants that consist of a repeating sequence of weakly developed juvenile argillic to cambic diagnostic subsurface horizons over transitional scour horizons (3Btb / 3Bwb – 3BCb), (4Btb – 4BCb), and (5Btb / 5Bwb – 5BCb). These deposits are massive to locally crudely stratified. These soil member are characterized by sandy deposits with 10 - 7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for buried soils 2 and 4 in profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as inset stream terrace deposits, and are termed Qot1 and Qot3. These units contain gradational lateral facies changes and inset surfaces laterally along Transect A. An relative age estimate of 8 to 12 ka for buried soil 3 in soil profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as stream terrace deposit, and is termed Qot2. This fluvial sequence recognized in soil profile 9 are stream terrace deposits. Units Qot1 and Qot2 correlate well across the entire length of transect A . Unit Qot3 contains gradational lateral facies changes and discontinuous inset surfaces along the length of boring transect A. The base of unit Qot3 may be faulted at depth.

Buried soil member 5 in soil profile 9 classifies as a Typic Xerofluvent. This is a highly truncated, well stratified, and weakly developed soil remnant. This soil consists of a single, thick, and crudely laminated transitional (6BCb lam) horizon. This deposit is well stratified with a basal scour. A relative age estimate of 1 to 4 ka for buried soil 5 in profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the similar soil profile S-7 in the Mission Creek soil chronosequence (McFadden, 1988). This buried soil member is a strong marker bed across the project site area. It is interpreted as an highly truncated and laterally continuous stream terrace deposits, and is termed Qot5. Unit Qot5 correlates well across the southern portion of transect A. This unit may be faulted between to the north along boring transect A.

Buried soil member 6 in soil profile 9 classifies as a Fluventic Xerumbrept. This is a highly truncated, thin, and discontinuous soil remnant that consist of a weakly developed juvenile argillic to cambic diagnostic subsurface horizon over a

transitional scour horizon (8Btb / 8Bwb – 8BCb). This deposit is massive to locally crudely stratified. This soil member is characterized by sandy deposits with 7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for buried soil 6 in profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as a laterally discontinuous stream terrace deposit, and is termed Qot6. This unit contains gradational lateral facies changes across the northern portion of Transect A where it directly overlies the Lakewood Formation. To the south this unit is completely scoured out by the overlying Qot5 sour deposit within boring transect A. Unit Qot6 is faulted at depth in boring transect A.

Buried soil member 7 (or the deepest buried soil described in detail) in soil profile 9 classifies as a Typic Palexeralf. This is a well-developed and truncated soil remnant that consists of a stacked organic-rich transitional and clay rich argillic horizon (9ABb – 9Btb). The deposit is thick and massive. This soil member is characterized by a fine-grained deposit with 7.5YR hues and plugged with secondary clay. A relative age estimate of 15 to 30 ka for buried soil 7 in soil profile 9 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as being part of the undifferentiated Lakewood Formation alluvium and termed Qoa1. This unit does not to correlate well across the length of boring transect A. It appears to be severely affected by faulting.

In conclusion, the entire stratigraphic section of soil profile 9 in boring 11 along Transect A to a depth of 53.9 feet is estimated to be 59.0 to 112.0 ka in age. Most of this age resides within the first and lowest buried soil members in this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 5.5 feet in this locality. The upper five soil members within this soil profile correlate well across the entirety of Transect A. Within this section the surfical stream terrace deposits (Qyt) have an estimated age of 8.0 – 12.0 ka, the alluvial fan deposit (Qof) has an estimated age of 23.0 – 42.0 ka, and the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot3, Qot5, and Qot6) have an estimated age of 44.0 – 82.0 ka. The upper 4 soil members observed in soil profile 9 have an age estimate of 35.0 – 62.0 ka, and are continuous and appear un-faulted across the entirety of transect A.

Table 9.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 9 - Transect A - Boring 11

Dates Described: 11/12/2013 and 10/15/13

Depth (Ft)	Horizon	Transect A; B-11 Description
0.5 - 5.5	Bt / Bw	Brown (7.5YR 5/4d, 7.5YR 3/2m), loam to clay loam, slightly oxidized, very hard, firm, moderately sticky, very plastic, very fine grained very well sorted sand with 0-3% fine and very fine rounded slate-rich gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few to common thin and few moderately thick on ped faces, truncated, massive, gradational lower boundary to;
5.5 - 10.3	2Btb1	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, slightly oxidized, very hard, friable to firm, very sticky, very plastic, medium grained moderately well sorted sand with ~15% fine and medium sub rounded slate-rich gravel, dark brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films common thin and common moderately thick on ped faces and common moderately thick and few thick coating clasts, stacked and truncated, massive, clear lower boundary to;
10.3 - 11.3	2Btb2	Brown (7.5YR 4/4d, 7.5YR 3/3m), silty clay loam, slightly oxidized, hard to very hard, firm, very sticky, very plastic, very fine grained very well to well sorted sand with no gravel, dark brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few to common thin and few moderately thick on ped faces, massive, gradational lower boundary to;
11.3 - 12.2	2BCb	Strong brown (7.5YR 4/6d, 7.5YR 3/4m), loam to clay loam, moderately well oxidized, very hard, friable, moderately sticky, moderately plastic, fine grained well sorted sand with >3% very fine slate-rich rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few to very few thin and very few moderately thick on ped faces, massive, clear lower boundary to;
12.2 - 15.0	3Btb / 3Bwb	Dark yellowish brown (10YR 5/4d, 10YR 4/3m), loam, very hard to extremely hard, friable to firm, moderately sticky, slightly to moderately plastic, fine grained well sorted sand with >3% very fine slate-rich rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and very few moderately thick on ped faces, truncated, massive, gradational lower boundary to;
15.0 - 17.0	3BCb	Brown (7.5YR 5/4d, 7.5YR 4/3m), sandy loam to loam, slightly oxidized, slightly hard, friable, slightly sticky, non- to slightly plastic, fine to medium grained moderately well sorted sand with ~10% fine and medium slate-rich sub rounded gravel, dark brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films very few to few thin and very few moderately thick on ped faces and few thin and very few moderately thick coating clasts, massive, scour deposit, abrupt lower boundary to;
17.0 - 19.0	4Btb	Brown (7.5YR 4/4d, 7.5YR4/3 m), silty loam, slightly oxidized, hard, firm, moderately to very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 4/2d, 7.5YR 3/1m) clay films common thin and few moderately thick on ped faces, truncated, massive, gradational lower boundary to;
19.0 - 20.4	4BCb	Brown (7.5YR 5/4d, 7.5YR 4/3m), sandy loam to loam, slightly oxidized, soft, friable, non-sticky, non-plastic, medium to coarse grained moderately well sorted sand with ~15-20% fine slate-rich sub rounded gravel, clay stains on ped faces and coating clasts, crudely stratified, scour deposit, clear lower boundary to;
20.4 - 22.2	5Btb / 5Bwb	Yellowish brown (10YRYR 5/4d, 10YR 4/3m), sandy loam to loam, hard, friable, non- to slightly sticky, non-plastic, fine grained well sorted sand with no gravel, brown (7.5YR 5/4d, 7.5YR 4/3m) clay films few thin and common stains on ped faces, truncated, massive, gradational lower boundary to;

Depth (Ft)	Horizon	Transect A; B11 Description (Cont.)
22.2 - 26.5	5BCb	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), loamy sand to sandy loam, soft, friable, non-sticky, non-plastic, medium to coarse-grained poorly sorted sand with 15-20% fine slate-rich sub rounded gravel, very few clay stains on ped faces and on clasts, crudely stratified, scour deposit, undetermined lower boundary to;
26.5 - 27.5	NR	no recovery
27.5 - 30.1	6BCb lam	Brown (7.5YR 5/4d, 7.5YR 4/3m), laminated loam to silt loam and sandy loam to loam, slightly oxidized, slightly hard to hard, friable, moderately sticky, moderately plastic, fine-grained well sorted sand with ~0-3% fine and very fine slate-rich rounded gravel, strong brown (7.5YR 5/6d, 7.5YR 4/4m) clay films few thin on ped faces, well stratified, scour deposit, clear lower boundary to;
30.1 - 32.3	7Btb / 7Bwb	Brown (10YR 5/3d, 10YR 4/2m), silty clay, very hard, firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 5/3d, 7.5YR4/2m) clay films few thin and very few moderately thick on ped faces, weak redox with ~30% weak strong brown (7.5YR 5/6d, 7.5YR 4/4m) mottles and ~60% weak light brownish gray (2.5Y 6/2d, 2.5Y 4/1m) gleying, truncated, massive, clear abrupt boundary to;
32.3 - 34.5	8ABb	Dark grayish brown (2.5Y 4/2d, 2.5Y 3/1m), clay, slight organics, very hard to extremely hard, very firm, very sticky, very plastic, very fine-grained very well sorted sand with no gravel, grayish brown (2.5Y 5/2d, 2.5Y 4/1m) clay films many thin and common moderately thick and few thick on ped faces, moderate redox with no mottles and ~100% moderately gleyed, truncated, massive, gradational lower boundary to;
34.5 - 53.9	8Btb	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, hard to very hard, firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, strong brown (7.5YR 5/6d, 7.5YR 3/4m) clay films common thin and moderately thick and few thick on ped faces, weak redox with ~5%weak strong brown (7.5YR 4/6d, 7.5YR 4/4m) mottles and ~15% weak light brownish gray (2.5Y 6/2d, 2.5Y 4/1m) gleying, massive, gradational lower boundary to;
53.9 - 70.0+	--	Lakewood Formation, Older Alluvium, Not described in detail, See Summary Description

Table 9.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 9 - Transect A, Boring 11

Unit	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 11															
Bt / Bw	5.0	7.5YR 5/4	0.4	7.5YR 3/2	0.1	l-cl	0.58	vh	0.80	s, vp	0.83	1-2npf, 1mkpf, 1mkcl	0.47	0.56	2.78
2Btb1	5.2	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	0.67	vh	0.8	vs, vp	1.00	2npf, 2mkpf, 1ncl, 2mkcl	0.57	0.63	3.27
2Btb2	1.0	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sicl	0.83	h-vh	0.7	vs, vp	1.00	1-2npf, 1mkpf,	0.33	0.59	0.59
2BCb	0.9	7.5YR 4/6	0.6	7.5YR 3/4	0.2	l-cl	0.58	vh	0.8	s, p	0.67	v1-1npf, v1mkpf	0.23	0.50	0.45
3Btb / 3Bwb	2.8	10YR 5/4	0.3	10YR 4/3	0.1	l	0.5	vh-eh	0.9	s, ps-p	0.58	1npf, v1mkpf	0.3	0.48	1.33
3BCb	2.0	7.5YR 5/4	0.4	7.5YR 4/3	0.1	sl-l	0.42	sh-h	0.5	ss, po-ps	0.25	v1-1npf, v1mkpf	0.3	0.31	0.63
4Btb	2.0	7.5YR 4/4	0.4	7.5YR 4/3	0.1	sil	0.83	h	0.6	s-vs, vp	0.92	2npf, 1mkpf	0.33	0.56	1.11
4BCb	1.4	7.5YR 5/4	0.4	7.5YR 4/3	0.1	sl-l	0.42	sh	0.4	ss, po-ps	0.25	v1vnpf, 1vncl	0.28	0.29	0.41
5Btb / 5Bwb	1.8	10YR 5/4	0.3	10YR 4/3	0	sl-l	0.42	h	0.6	so-ss, po	0.08	1npf, 2vnpf	0.3	0.28	0.51
5BCb	4.3	10YR 4/4	0.3	10YR 3/3	0	ls-sl	0.25	so	0.20	so, po	0.00	v1vnpf	0.2	0.13	0.56
6BCb lam	2.6	7.5YR 5/4	0.4	7.5YR 4/3	0.1	l-sil	0.58	sh	0.40	s, p	0.67	1npf	0.27	0.40	1.05
7Btb / 7Bwb	2.2	10YR 5/3	0.2	7.5YR 4/2	0.1	sic	0.83	vh	0.80	vs, vp	1.00	1npf, v1mkpf	0.28	0.60	1.32
8ABb	2.2	2.5Y 4/2	0	2.5Y 3/1	0	c	1	vh-eh	0.90	vs, vp	1.00	3npf, 2mkpf, 1kpf	0.4	0.66	1.45
8Btb	19.4	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	0.67	vh-h	0.70	vs, vp	1.00	2npf, 2mkpf, 1kpf	0.4	0.57	11.14

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.56**	**2.78**	**3.90**	**0.5**	**0.47**	**8 - 12**	**8 - 12**
Buried Soil 1	**0.63**	**4.30**	**4.24**	**1.8**	**1.13**	**15 - 30**	**23 - 42**
Buried Soil 2	**0.48**	**1.96**	**2.86**	**0.9**	**0.60**	**4 - 8**	**27 - 50**
Buried Soil 3	**0.56**	**1.52**	**3.12**	**1**	**0.61**	**8 - 12**	**35 - 62**
Buried Soil 4	**0.28**	**1.06**	**1.22**	**0.6**	**0.50**	**4 - 8**	**39 - 70**
Buried Soil 5	**0.40**	**1.05**	**2.83**	**0.5**	**0.27**	**1 - 4**	**40 - 74**
Buried Soil 6	**0.6**	**1.32**	**4.21**	**0.3**	**0.28**	**4 - 8**	**44 - 82**
Buried Soil 7	**0.66**	**12.59**	**4.08**	**0.5**	**0.80**	**15 - 30**	**59 - 112**

Soil Profile 10
Transect A, Boring 12

Soil profile 10 is located near the northern end of Transect A in Boring 12 and was described in detail to a depth of 17.2 feet below the ground surface. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of two highly truncated and weakly developed Inceptisol soils (Qyt-a and Qyt) over a stacked and truncated Alfisol soil (Qof). This section appears to be a cut and is not capped by any artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 10 in boring 12 contains a sequence of weak surface soils and well-developed buried soil. The two buried soil members described in detail track across the majority of transect A to the south and all three soil members described track across the entire length of transect A. The stratigraphic units assigned to the upper two soil members within this profile also correlate well to the adjacent boring Transect B (Table 16q). A detailed soil description for this profile is listed in table 10.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 10.2, and the individual soil profile members are briefly described below.

The uppermost or surface soils at this locality classify as Typic Xerumbrepts. This is a sequence of thin and highly truncated soils that consists of an organic-rich transitional horizon over a series of stacked weak argillic to cambic diagnostic subsurface horizon (AB – Bt / Bw – 2Btb / 2Bwb) soil remnants. The deposit is massive, and a majority of this soil member may have been mechanically stripped away during grading. This soil is characterized by a silt-rich deposit with few to common thin and very few to few moderately thick clay films. Relative age estimates of 4 to 8 ka for the surface and first buried soil in profile 10 was obtained by comparing the observed clay film index and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as inset stream terrace deposits, and are termed Qyt-a and Qyt. These units contain gradational lateral facies changes and inset surfaces laterally along boring transect A. Unit Qyt-a pinches out to the south and correlates well to the north. Unit Qyt correlates well across the entirety of boring transect A, Trench 1, and Trench 2.

Buried soil member 2 in soil profile 12 classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of a sequence of two moderately well developed argillic diagnostic subsurface horizons over a transitional scour horizon (2Btb1 – 2Btb2 – 2BCb). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for buried soil 2 in soil profile 12 was obtained by comparing the observed soil development index

(SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well across the entire project site area.

In conclusion, the entire stratigraphic section of soil profile 10 in boring 12 along Transect A to a depth of 17.2 feet is estimated to be 23 to 46 ka in age. Most of this age resides within the second buried soil in this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 10 feet in this locality. The first and second buried soil members within this soil profile correlates well across the entirety of Transect A. Within this section the alluvial fan deposit (Qof) has an estimated age of 23.0 – 46.0 ka. The ages of the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot3, Qot5, and Qot6), and the upper Lakewood Formation were not assessed in this boring.

Table 10.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 10 - Transect A - Boring 12

Date Described: 10/15/2013 and 10/17/2013

Depth (Ft)	Horizon	Transect A; B-12 Description
1.5 - 2.1	AB	Dark yellowish brown (10YR 4/4d, 10YR 4/2m), sandy loam to loam, slight organics, hard, friable, slightly sticky, slightly plastic, coarse grained poorly sorted sand with no gravel, clay stains common on ped faces, few fine pores, few very fine CaCO3 nodules and few veinlet, truncated, massive, gradational lower boundary to;
2.1 - 4.8	Bt / Bw	Yellowish brown (10YR 5/4d, 10YR 3/3m), silty clay loam, very hard, firm, very sticky, moderately plastic, very fine grained very well sorted sand with no gravel, dark brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few to common thin and very few moderately thick on ped faces, massive, clear lower boundary to;
4.8 - 10.0	2Btb / 2Bwb	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, slightly oxidized, extremely hard to very hard, very firm, very sticky, very plastic, fine grained well sorted sand with no gravel, dark brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few to common thin and few moderately thick on ped faces, truncated and stacked, massive, gradational lower boundary to;
10.0 - 14.7	3Btb1	Dark brown (7.5YR 3/4d, 7.5YR 3/3m), sandy clay loam, slightly oxidized, very hard, friable, very sticky, very plastic, coarse grained poorly sorted sand with 25-30% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films common to many thin and few to common moderately thick on ped faces and common moderately thick coating clasts, massive, clear lower boundary to;
14.7 - 15.5	3Btb2	Dark yellowish brown (10YR 5/4d, 10YR 4/3m), silty clay loam, very hard, firm, moderately sticky, very plastic, fine grained well sorted sand with >3% very fine and fine slate-rich rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few to common thin and few moderately thick on ped faces, massive, gradational lower boundary to;
15.5 - 17.2	3BCb	Dark yellowish brown (10YR 5/4d, 10YR 3/3m), loam, hard, friable, moderately sticky, moderately plastic, medium grained moderately well sorted sand with >3% very fine and fine slate-rich rounded gravel, clay stains common on ped faces, massive, gradational lower boundary to;
17.2 - 70.0+	--	Additional Old Terrace deposits over Lakewood Formation, Older Alluvium, Not described in detail, See Summary Description

Table 10.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 10 - Transect A - Boring 12

Unit	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 12															
AB	1.4	10YR 4/4	0.3	10YR 4/3	0	sl-l	0.41667	h	0.60	ss, ps	0.33	2vnpf	0.3	0.33	0.46
Bt / Bw	2.7	10YR 5/4	0.3	10YR 3/3	0	sicl	0.83	vh	0.8	vs, p	0.83	1-2npf, v1mkpf	0.3	0.55	1.49
2Btb	5.2	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	0.83	vh	0.8	vs, vp	1.00	1-2npf, 1mkpf	0.333	0.61	3.19
3Btb1	4.7	7.5YR 3/4	0.4	7.5YR 3/3	0.1	scl	0.67	vh	0.8	vs, vp	1.00	2-3npf, 2mkpf, 2mkcl	0.567	0.63	2.95
3Btb2	0.8	10YR 5/4	0.3	10YR 4/3	0	sicl	0.83	vh	0.8	s, vp	0.83	1-2npf, 1mkpf	0.333	0.56	0.45
3BCb	1.7	10YR 5/4	0.3	10YR 3/3	0	l	0.5	h	0.6	s, p	0.80	2vnpf	0.333	0.45	0.76

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.55**	**1.95**	**3.34**	**0.6**	**0.60**	**4 - 8**	**4 - 8**
Buried Soil 1	**0.61**	**3.19**	**4.29**	**0.5**	**0.33**	**4 - 8**	**8 - 16**
Buried Soil 2	**0.63**	**4.15**	**4.04**	**1.1**	**1.23**	**15 - 30**	**23 - 46**

Soil Profile 11
Transect B, Boring 2b

Soil profile 11 is located near the eastern end of Transect B in Boring 2b and was described in detail to a depth of 70.0 feet below the ground surface. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a sequence of four stacked and truncated Alfisol soils (Qyt, Qof, Qot1, and Qot2) over series of two weakly developed Inceptisol soils (Qot3 and Qot6) separated by an Entisol soil (Qot5) or scour deposit over Lakewood Formation or undifferentiated old alluvium (Qoa1, Qoa2, and Qoa3). The entire section in this locality is capped by 3.3 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 11 in boring 2b contains a surface soil and nine buried soils to a depth of approximately 70.0 feet below the ground surface. The upper portion of this stratigraphic section to a depth of 53.0 feet below the ground surface tracks across the length of Transect B. The upper six stratigraphic units within this profile correlate well to the adjacent trench exposures and Transect A (Table 16t). A detailed soil description for this profile is listed in table 11.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 11.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as a Typic Haploxeralf. This is a truncated soil that consists of an organic-rich transitional horizon over a weak argillic to cambic diagnostic subsurface horizon over a transitional horizon and parent material scour deposit (AB - Bt / Bw – BC - C) soil remnant. The deposit is massive. A portion of this soil member has been mechanically stripped away during grading. This soil is characterized by a silt-rich deposit with few to common thin and few moderately thick clay films. A relative age estimate of 8 to 12 ka for the surface soil in soil profile 11 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This surficial stream terrace deposit is termed Qyt and correlates well with the surface soil in trench 1 and the surficial deposits described along adjacent borings in transect A. This unit correlates well across the entire project site area however; this unit may be faulted between borings 3b and 5b along Transect B.

Buried soil member 1 (or first buried soil) in soil profile 11 classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of a sequence of two moderately well developed argillic diagnostic subsurface horizons (2Btb1 – 2Btb2). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for buried soil 1 in soil profile 11 was

obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well across the entire project site area however; this unit may be faulted between borings 3b and 5b along Transect B.

Buried soil members 2 and 3 in soil profile 6 both classify as Typic Haploxeralfs. These are truncated, thin, and interfingering soil remnants that consist of weakly developed argillic diagnostic subsurface horizons over transitional scour horizons (3Btb – 3BCb1 – 3BCb2) and (4Btb1 – 4Btb2 – 4BCb). These deposits are massive to locally crudely stratified. These soil members are characterized by silty deposits with 10 - 7.5YR hues and common to many thin clay films. A relative age estimate of 8 to 12 ka for each of these buried soils in profile 11 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as stream terrace deposits, and are termed Qot1 and Qot2. These units contain gradational lateral facies changes and inset surfaces laterally along Transect B. Units Qot1 and Qot2 correlate well across the entire length of transect B; however, these units may be faulted between borings 3b and 5b along Transect B.

Buried soil members 4 and 6 in soil profile 11 both classify as a Fluventic Xerumbrepts. These are highly truncated, thin, and discontinuous soil remnants that consist of weakly developed juvenile argillic to cambic diagnostic subsurface horizons over transitional scour horizons (5Btb / 5Bwb – 5BCb) and (7Btb / 7Bwb – 7BCb). These deposits are massive to locally crudely stratified. These soil members are characterized by sandy deposits with 7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for each buried soil 4 and 6 in profile 11 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are both interpreted as inset stream terrace deposits, and are termed Qot3 and Qot6. These units contain gradational lateral facies changes across the length of transect B. Unit Qot6 directly overlies the Lakewood Formation. These units both correlate well across the entire length of transect B; however, these units are faulted between borings 3b and 5b along Transect B.

Buried soil member 5 in soil profile 11 classifies as a Typic Xerofluvent. This is a highly truncated, well stratified, and weakly developed soil remnant. This soil consists of a single, thick, and crudely laminated transitional (6BCb - 6BCb lam) horizons. This deposit is well stratified with a basal scour. A relative age estimate

of 1 to 4 ka for buried soil 5 in profile 11 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the similar soil profile S-7 in the Mission Creek soil chronosequence (McFadden, 1988). This buried soil member is a strong marker bed across a majority of the project site area. It is interpreted as an highly truncated and laterally continuous stream terrace deposits, and is termed Qot5. This fluvial sequences is recognized within the stream terrace deposits preserved across the project site area. Unit Qot5 correlates well across the entire project site area however; this unit is faulted between borings 3b and 5b along transect B.

Buried soil members 7, 8, and 9 (or the deepest buried soils described in detail) in soil profile 11 classifies as Typic Haplo to Palexeralfs. This is a sequence of well-developed and highly truncated soil remnants that consist of a set of stacked transitional and argillic horizons (8ABb - 8Btb – 8BCb - 9Btb – 9BCb – 10Btb – 10BCb). The deposit is crudely stratified, and these soil members are characterized by a fine-grained deposits with 7.5YR hues and plugged with secondary clay. A relative age estimate of 8 to 12 ka for buried soils 7 and 8 in soil profile 11 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). A relative age estimate of 15 to 30 ka for buried soil 9 in soil profile 11 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as being part of the undifferentiated Lakewood Formation alluvium and termed Qoa1, Qal2, and Qal3. This unit does not to correlate well across the entire project site area. It appears to be severely affected by faulting.

In conclusion, the entire stratigraphic section of soil profile 11 in boring 2b along Transect B to a depth of 70 feet is estimated to be 79 to 140 ka in age. Most of this age resides within first buried soil and the described Lakewood Formation at the base of this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 11.6 feet in this locality. The upper six soil members within this soil profile correlate well across the entire project site area. Within this section the surfical stream terrace deposits (Qyt) have an estimated age of 8.0 – 12.0 ka, the alluvial fan deposit (Qof) has an estimated age of 23.0 – 42.0 ka, the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot3, Qot5, and Qot6) have an estimated age of 48.0 – 86.0 ka. All of the members observed in soil profile 11 may be faulted between borings 3b and 5b in transect B.

Table 11.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 11 - Transect B - Boring 2b

Date Described: 1/28/14 and 1/30/14

Depth (Ft)	Horizon	Transect B; B-2b Description
3.3 - 4.8	AB	Dark grayish brown (10YR 4/2d, 10YR 2/1m), silty loam to silty clay loam, slight organics, slightly hard, firm, very sticky, very plastic, fine grained well sorted sand with >5% fine and very fine rounded slate-rich gravel, few fine and few to common medium pores, brown (10YR 4/3d, 10YR 3/2m) clay films few thin on ped faces and common thin lining pores, truncated, massive, gradational lower boundary to;
4.8 - 7.3	Bt / Bw	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), silty clay loam, slightly hard, firm, moderately to very sticky, moderately to very plastic, very fine grained very well sorted sand with >3% fine and very fine sub rounded slate-rich gravel, brown (10YR 4/3d, 10YR 3/2m) clay films common fine on ped faces, massive, gradational lower boundary to;
7.3 - 9.7	BC	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), loam, slightly hard, friable, slightly to moderately sticky, slightly plastic, medium grained moderately well sorted sand with 5-7% fine and medium sub rounded slate-rich gravel, brown (10YR 4/3d, 10YR 3/2m) clay films few to common fine on ped faces and few fine coating clasts, massive, gradational lower boundary to;
9.7 - 11.6	C	Dark yellowish brown (10YR 4/4d, 10YR 3/4m), sandy loam, soft to slightly hard, friable, slightly sticky, non- to slightly plastic, medium grained moderately well sorted sand with 7-10% fine and medium slate-rich sub rounded gravel, brown (10YR 4/3d, 10YR 3/2m) clay films very few thin on ped faces and few fine coating clasts, massive, clear lower boundary to;
11.6 - 15.4	2Btb1	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), clay loam, hard to very hard, friable to firm, very sticky, moderately to very plastic, fine grained well sorted sand with 10-15% fine and medium slate-rich sub rounded gravel, brown (10YR 4/3d, 10YR 3/2m) clay films common thin and few moderately thick on ped faces and common moderately thick coating clasts, truncated, massive, gradational lower boundary to;
15.4 - 20.1	2Btb2	Brown (7.5YR 4/4d, 7.5YR 3/3m), loam to clay loam, slightly oxidized, hard, firm, moderately to very sticky, moderately to very plastic, fine to medium grained moderately well sorted sand with >3% fine slate-rich sub rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/3m) clay films common to many thin and few moderately thick on ped faces, massive, clear lower boundary to;
20.1 - 23.9	3Btb	Brown (7.5YR 4/4d, 7.5YR 3/3m), silt loam, slightly oxidized, slightly hard, firm, moderately sticky, moderately to very plastic, very fine grained very well sorted sand with no gravel, dark brown (10YR 3/3d, 10YR 2.5/2m) clay films common thin and few moderately thick on ped faces, few to common MnO coatings on ped faces, stacked and truncated, massive, clear lower boundary to;
23.9 - 25.2	3BCb1	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), loam to clay loam, slightly hard to hard, firm, very sticky, very plastic, very fine grained very well sorted sand with ~3-7% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and very few moderately thick on ped faces and few thin coating clasts, strong redox with weak yellowish brown (10YR 5/6d, 7.5YR4/4m) >10% mottled and strong light brownish gray (2.5Y 6/2d, 2.5Y4/1m) <50% gleying, massive, gradational lower boundary to;

Depth (Ft)	Horizon	Transect B; B-2b Description (Cont.)
25.2 - 29.3	3BCb2	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), loam to clay loam, slightly hard to hard, firm, very sticky, very plastic, very fine grained very well sorted sand with ~7-10% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few to few thin on ped faces and very few to few thin coating clasts, strong redox with weak yellowish brown (10YR 5/6d, 7.5YR4/4m) >5% mottled and strong light brownish gray (2.5Y 6/2d, 2.5Y4/1m) >30% gleying, massive, gradational lower boundary to;
29.3 - 30.6	4Btb1	Yellowish brown to brown (10-7.5YR 5/4d, 10-7.5YR 4/3m), loam to clay loam, hard to very hard, friable to firm, moderately to very sticky, very plastic, very fine grained very well sorted sand with >3% fine slate-rich sub rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films common to many thin and common moderately thick on ped faces, stacked and truncated, massive, clear lower boundary to;
30.6 - 33.4	4Btb2	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), sandy loam to loam, hard to very hard, friable, moderately to slightly sticky, slightly plastic, very fine-grained very well sorted sand with 3-7% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films common thin and few moderately thick on ped faces and few to common moderately thick coating clasts, crudely stratified, gradational lower boundary to;
33.4 - 36.1	4BCb	Dark yellowish brown to brown (10-7.5YR 4/4d, 10-7.5YR 3/3m), sandy loam, soft to slightly hard, very friable, slightly sticky, non- to slightly plastic, medium to coarse grained poorly sorted sand with ~50-60% fine and medium slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and very few moderately thick coating clasts, crudely stratified, scour deposit, abrupt lower boundary to;
36.1 - 38.5	5Btb / 5Bwb	Yellowish brown (10YR 5/4d, 10YR 4/3m), loam, slightly hard to hard, friable, moderately to very sticky, very plastic, medium grained moderately well sorted sand with >5% fine slate-rich sub rounded gravel, dark yellowish brown (10YR 4/4d, 10YR 3/3m) clay films few fine and very few moderately thick on ped faces and few thin coating clasts, truncated , massive, gradational lower boundary to;
38.5 - 40.9	5BCb	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), sandy loam, slightly hard, friable, slightly sticky, non- to slightly plastic, medium-grained moderately well sorted sand with ~5-7% fine slate-rich sub rounded gravel, brown (10YR 4/3d, 10YR 3/2m) clay films very few thin on ped faces and few thin coating clasts, massive, clear lower boundary to;
40.9 - 44.5	6BCb1	Yellowish brown (10YR 5/4d, 10YR 4/3m), silt loam, hard, friable, moderately sticky, moderately to very plastic, very fine to fine grained very well sorted sand with no gravel, dark yellowish brown (4/4d, 10YR 3/3m) clay films few fine on ped faces, truncated and stacked, massive, gradational lower boundary to;
44.5 - 51.4	6BCb2 lam	Yellowish brown to dark yellowish brown (10YR 5/4-4/6d, 10YR 4/3-3/4m), laminated loamy sand to sandy loam, slightly hard to hard, friable, slightly to moderately sticky, slightly plastic, very fine to fine grained very well sorted sand with localized 5-30% fine and medium slate rich sub rounded gravel, dark yellowish brown (4/4d, 10YR 3/3m) clay films few fine on ped faces and few clay stains coating clasts, localized weak redox with weak yellowish brown (10YR 5/6d, 10YR4/4m) few mottles and weak grayish brown (2.5Y 5/2d, 2.5Y 4/1) gleyed, truncated and stacked, stratified, gradational lower boundary to;
51.4 - 52.5	7Btb / 7Bwb	Yellowish brown (10YR 5/4d, 10YR 4/3m), loam, slightly hard to hard, friable, moderately sticky, slightly plastic, fine to medium grained moderately well sorted sand with no gravel, dark yellowish brown (10YR 4/4d, 10YR 2/3m) clay films few to common fine on ped faces and few thin coating clasts, truncated , massive, gradational lower boundary to;

Depth (Ft)	Horizon	Transect B; B-2b Description (Cont.)
52.5 - 53.0	7BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), sandy loam, slightly hard, friable, slightly sticky, non- to slightly plastic, medium-grained moderately well sorted sand with >3% fine slate-rich sub rounded gravel, dark yellowish brown (10YR 4/4d, 10YR 3/3m) clay films very few to few thin on ped faces, moderate redox with moderate strong brown (7.5YR 5/6d, 7.5YR 4/4m) ~25-30% mottles and weak light olive brown (2.5Y 5/3d, 2.5Y 3/2m) ~10% gleying, massive, scour deposit,, abrupt lower boundary to;
53.0 -54.6	8ABb	Dark grayish brown (10YR 4/2d, 2.5Y 4/2m), clay loam to clay, slight organics, very hard, firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, very dark grayish brown (2.5Y 3/2d, 2.5Y 2/1m) clay films few thin and very few moderately thick on ped faces, moderately well gleyed, truncated, massive, gradational lower boundary to;
54.6 - 56.3	8Btb	Dark yellowish brown to brown (10-7.5YR 4/4d, 10YR 3/3m), clay loam, very hard, firm, very sticky, very plastic, medium grained moderately well sorted sand with >3% fine slate-rich sub rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films common to many thin and common moderately thick on ped faces, strong redox with moderate to strong strong brown (7.5YR 4/6d, 7.5YR4/4m) ~30% mottles and moderate gray (2.5Y 6/1d, 2.5Y 4/1m) ~10% gleying, massive, gradational lower boundary to;
56.3 - 57.5	8BCb	Yellowish brown to strong brown (10-7.5YR 5/6d, 10-7.5YR 4/4m), sandy loam to loam, slightly oxidized, slightly hard, friable, slightly sticky, non- to slightly plastic, fine to medium-grained moderately well sorted sand with no gravel, dark yellowish brown (10YR 4/4d, 10YR 3/3m) clay films very few thin and few clay stains on ped faces, massive, scour deposit, abrupt lower boundary to;
57.5 - 60.0	9Btb	Strong brown (7.5YR 5/6d, 7.5YR 4/4m), clay loam to clay, slightly to moderately well oxidized, hard to very hard, firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 3/4d, 7.5YR 2/3m) clay films common to many thin common moderately thick and few thick on ped faces, massive, gradational lower boundary to;
60.0 - 60.6	9BCb	Brown (7.5YR 4/4d, 7.5YR 3/3m), sandy loam to loam, slightly hard to hard, friable, moderately sticky, slightly plastic, medium-grained moderately well sorted sand with ~10-15% fine and medium slate-rich sub rounded gravel, dark brown (7.5YR 3/4d, 7.5YR 2/3m) clay films few to common moderately thick coating clasts, massive, scour deposit,, abrupt lower boundary to;
60.6 - 68.0	10Btb	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, slightly oxidized, very hard, firm, very sticky, moderately to very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 3/4d, 7.5YR 2/3m) clay films many thin common moderately thick and few thick on ped faces, massive, gradational lower boundary to;
68.0 - 70.0+	10BCb	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), sandy loam to loam, slightly hard to hard, friable, slightly sticky, non- to slightly plastic, fine grained well sorted sand with 5-7% fine slate-rich sub rounded gravel, brown (10YR 4/3d, 10YR 3/2m) clay films few thin on ped faces, crudely stratified, scour deposit, undetermined lower boundary.

Table 11.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 11 - Transect B - Boring 2b

Horizon	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 2b															
AB	1.5	10YR 4/2	0.1	10YR 2/1	0	sil-sicl	0.75	sh	0.40	vs, vp	1.00	1npf, 2npo	0.3	0.49	0.74
Bt / Bwb	2.5	10YR 4/4	0.3	10YR 3/3	0	sicl	0.83	sh	0.4	s-vs, p-vp	0.83	2npf	0.267	0.47	1.17
BC	2.4	10YR 4/4	0.3	10YR 3/3	0	l	0.5	sh	0.4	ss-s, ps	0.42	1-2npf, 1ncl	0.32	0.33	0.79
C	1.9	10YR 4/4	0.3	10YR 3/4	0.1	sl	0.33	so-sh	0.3	ss, po-ps	0.25	v1npf, 1ncl	0.25	0.25	0.47
2Btb1	3.8	10YR 4/4	0.3	10YR 3/3	0	cl	0.67	h-vh	0.7	vs, p-vp	0.92	3npf, 1mkpf, 2mkcl	0.52	0.56	2.13
2Btb2	4.7	7.5YR 4/4	0.4	7.5YR 3/3	0.1	l-cl	0.58	h	0.6	s-vs, p-vp	0.83	2-3npf, 1mkpf	0.3	0.48	2.27
3Btb	3.8	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sil	0.67	sh	0.4	s, p-vp	0.75	2npf, 1mkpf	0.27	0.44	1.66
3BCb1	2.7	10YR 4/4	0.3	10YR 3/3	0	cl	0.67	sh-h	0.5	vs, vp	1	1npf, v1mkpt, 1ncl	0.33	0.50	1.35
3BCb2	4.1	10YR 4/4	0.3	10YR 3/3	0	cl	0.67	sh-h	0.5	vs, vp	1.00	v1-1npf, v1-1ncl	0.24	0.48	1.98
4Btb1	1.3	10-7.5YR 5/4	0.35	10-7.5YR 4/3	0.05	cl	0.67	h-vh	0.70	s-vs, vp	0.92	2-3npf, 2mkpf	0.4	0.55	0.71
4Btb2	2.8	10YR 4/4	0.3	10YR 3/3	0	sl-l	0.42	h-vh	0.70	ss-s, ps	0.42	2npf, 1mkpf, 1-2mkcl	0.4	0.39	1.09
4BCb	2.7	10-7.5YR 4/4	0.35	10-7.5YR 3/3	0.05	sl	0.33	so-sh	0.25	ss, po-ps	0.25	1ncl, v1mkcl	0.2	0.22	0.58
5Btb / 5Bwb	2.4	10YR 5/4	0.3	10YR 4/3	0	l	0.5	sh-h	0.50	s-vs, vp	0.92	1npf, v1mkpf, 1ncl	0.32	0.45	1.08
5BCb	2.4	10YR 4/4	0.3	10YR 3/3	0	sl	0.33	sh	0.40	ss, po-ps	0.25	v1npf, 1ncl	0.25	0.25	0.59
6BCb	3.6	10YR 5/4	0.3	10YR 4/3	0	sil	0.67	h	0.60	s, p-vp	0.75	1npf	0.2	0.44	1.60
6BClam	10.9	10YR 4/6	0.5	10YR 3/4	0.1	sl	0.33	sh	0.40	ss-s, ps	0.42	1npf, 1vncl	0.27	0.30	3.31
7Btb / 7Bwb	1.1	10YR 5/4	0.3	10YR 4/3	0	l	0.5	sh-h	0.50	s, ps	0.50	1-2npf, 1ncl	0.32	0.36	0.40
7BCb	0.5	10YR 5/4	0.3	10YR 4/3	0	sl	0.33	sh	0.40	ss, po-ps	0.25	v1-1npf	0.23	0.24	0.12
8ABb	1.6	10YR 4/2	0.1	2.5Y 4/2	0	cl-c	0.92	vh	0.80	vs, vp	1.00	1npf, v1mkpf	0.23	0.59	0.94
8Btb	1.7	10-7.5YR 4/4	0.35	10YR 3/3	0	cl	0.83	vh	0.80	vs, vp	1.00	2-3npf, 2mkpf	0.33	0.59	1.01
8BCb	1.2	10-7.5YR 5/6	0.55	7.5YR 4/4	0.2	sl-l	0.42	sh	0.40	ss, po-ps	0.25	v1npf	0.17	0.29	0.35
9Btb	2.5	7.5YR 5/6	0.6	7.5YR 4/4	0.2	cl-c	0.92	h-vh	0.70	vs, vp	1.00	2-3npf, 2mkpf, 1kpf	0.33	0.63	1.58
9BCb	0.6	7.5YR 4/4	0.4	7.5YR 3/3	0.1	sl-l	0.42	sh-h	0.50	s, ps	0.50	1-2mkcl	0.27	0.36	0.21
10Btb	7.4	7.5YR 4/4	0.4	7.5YR 3/3	0.2	cl	0.83	vh	0.80	vs, p-vp	0.92	3npf, 2mkpf, 1kpf	0.33	0.62	4.56
10BCb	2.0	10YR 4/4	0.3	10YR 3/3	0	sl-l	0.42	sh-h	0.50	ss, po-ps	0.25	1npf	0.2	0.27	0.55

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.49**	**3.15**	**2.66**	**1.1**	**1.14**	**8 - 12**	**8 - 12**
Buried Soil 1	**0.56**	**4.40**	**3.62**	**0.8**	**0.82**	**15 - 30**	**23 - 42**
Buried Soil 2	**0.5**	**4.99**	**3.30**	**1.1**	**0.84**	**8 - 12**	**31 - 54**
Buried Soil 3	**0.55**	**2.38**	**2.45**	**1.1**	**0.85**	**8 - 12**	**39 - 66**
Buried Soil 4	**0.45**	**1.67**	**2.43**	**0.6**	**0.57**	**4 - 8**	**43 - 74**
Buried Soil 5	**0.44**	**4.91**	**2.37**	**0.9**	**0.47**	**1 - 4**	**44 - 78**
Buried Soil 6	**0.36**	**0.52**	**2.28**	**0.6**	**0.55**	**4 - 8**	**48 - 86**
Buried Soil 7	**0.59**	**2.30**	**3.57**	**1.2**	**0.73**	**8 - 12**	**56 - 98**
Buried Soil 8	**0.63**	**1.79**	**4.04**	**1.3**	**0.60**	**8 - 12**	**64 - 110**
Buried Soil 9	**0.62**	**5.11**	**3.80**	**0.9**	**0.53**	**15 - 30**	**79 - 140**

Soil Profile 12
Transect B, Boring 5b

Soil profile 12 is located at the western end of Transect B in Boring 5b and was described in detail to a depth of 70.0 feet below the ground surface. The soil profile lies across a graded (or stripped) and artificially filled surface that is geomorphically inactive. This soil profile consists of a weak Inceptisol soil (Qty1a-) over a sequence of three stacked and truncated Alfisol soils (Qyt, Qof, and Qot1) over a thick series of five weakly developed and stacked Inceptisol soils (Qot1, Qot2, Qot3, Qot4, and Qot5) over Lakewood Formation or undifferentiated old alluvium (Qoa1 and Qoa2). The entire section in this locality is capped by 2.0 feet of artificial fill. Parent materials for these soils consist chiefly of slate-rich debris flow and/ or stream terrace deposits that have most likely emanated from Benedict Canyon. Soil profile 12 in boring 5b contains a surface soil and ten buried soils to a depth of approximately 70.0 feet below the ground surface. The upper portion of this stratigraphic section to a depth of 56.2 feet below the ground surface tracks across the length of transect B. The stratigraphic units assigned to the upper seven soil members within this profile correlate well to the adjacent trench exposures and transect A (Table 16w). A detailed soil description for this profile is listed in table 12.1, the calculated soil development indices for this soil profile and relative age estimates are listed in table 12.2, and the individual soil profile members are briefly described below.

The uppermost or surface soil at this locality classifies as Typic Xerumbrept. This is a thin and truncated soil that consists of an weak argillic to cambic diagnostic subsurface horizon over a transitional horizon and parent material scour deposit (Bt / Bw – BC - C) soil remnant. The deposit is massive, and a majority of this soil member may have been mechanically stripped away during grading. This soil is characterized by a gravel-rich deposit with few thin clay films. Relative age estimates of 4 to 8 ka for the surface soil in profile 12 was obtained by comparing the observed clay film index and master horizon index (MHI) values to the more mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This surface soil member is interpreted as an inset stream terrace deposit, and is termed Qyt-a. This unit contains gradational lateral facies changes and is not continuous along boring transect B. Unit Qyt-a pinches out to the east, and this unit may be faulted between borings 3b and 5b in transect B.

Buried soil member 1 (or first buried soil) in soil profile 12 classifies as a Typic Haploxeralf. This is a truncated soil that consists of a weak argillic to cambic diagnostic subsurface horizon over a transitional horizon scour deposit (2Btb / 2Bwb – 2BCb) soil remnant. The deposit is massive, and the soil is characterized by a sandy deposit with few to common thin and few moderately thick clay films. A relative age estimate of 8 to 12 ka for buried soil 1 in soil profile 12 was obtained by comparing the observed soil development index (SDI) and master

horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This stream terrace deposit is termed Qyt and correlates well with the surface soil in trench 1 and the surficial deposits described along adjacent borings in transect A. This unit correlates well across the entire project site area however; this unit may be faulted between borings 3b and 5b along Transect B.

Buried soil member 2 (or second buried soil) in soil profile 12 classifies as a Typic Palexeralf. This is a severely truncated soil remnant that consists of a sequence of two moderately well developed argillic diagnostic subsurface horizons over a transitional horizon scour deposit (3Btb1 – 3Btb2 – 3BCb). This soil member is characterized by gravel-rich and fine-grained deposit with 7.5YR hues and many thin and common moderately thick clay films. A relative age estimate of 15 to 30 ka for buried soil 2 in soil profile 12 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S-5b and the less mature soil profile Qt5a in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as debris flow deposit, and is termed Qof. This unit correlates well across the entire project site area however; this unit is faulted between borings 3b and 5b along Transect B.

Buried soil member 3 in soil profile 12 classifies as an Typic Haploxeralf. This is a truncated and thin soil remnant that consists of a moderately well developed argillic diagnostic subsurface horizon (4Btb). This deposit is massive, and this soil member is characterized by a fine-grained deposit with 7.5YR hues and common thin and few moderately thick clay films. A relative age estimate of 8 to 12 ka for each of this buried soil in profile 12 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). This buried soil member is interpreted as an stream terrace deposit, and is termed Qot1. Unit Qot1 correlates well across the entire length of transect B; however, this unit may be faulted between borings 3b and 5b along Transect B.

Buried soil members 4, 5, 6, 7, and 8 in soil profile 12 all classify as a Fluventic Xerumbrepts. These are highly truncated, thin, and discontinuous soil remnants that consist of a organic rich transitional horizons to weakly developed juvenile argillic to cambic diagnostic subsurface horizon over a transitional scour horizon (5ABb - 5BCb), (6Btb / 6Bwb – 6BCb), (7Btb / 7Bwb – 7BCb), (8Btb / 8Bwb – 8BCb), and (9Btb / 9Bwb – 9BCb). These deposits are massive to locally crudely stratified. These soil members are characterized by sandy deposits with 10-7.5YR hues and few thin clay films. A relative age estimate of 4 to 8 ka for each buried soil 4 through 8 in profile 12 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more

mature soil profile S-5 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as stream terrace deposits, and are termed Qot1 (base of), Qot2, Qot3, Qot4, Qot5, and Qot6. These units contain gradational lateral facies changes across the length of transect B. Unit Qot6 directly overlies the Lakewood Formation. These units correlate well across the entire length of transect B; however, these units are faulted between borings 3b and 5b along Transect B.

Buried soil members 9 and 10 (or the deepest buried soils described in detail) in soil profile 12 classifies as Typic Haploxeralfs. This is a sequence of well-developed and highly truncated soil remnants that consist of a set of stacked argillic and transitional horizons (10Btb – 10BCb lam - 11Btb). The deposit is crudely stratified, and these soil members are characterized as fine-grained with 7.5YR hues and plugged with secondary clay. A relative age estimate of 8 to 12 ka for buried soils 9 and 10 in soil profile 12 was obtained by comparing the observed soil development index (SDI) and master horizon index (MHI) values to the more mature soil profile S4 in the Mission Creek soil chronosequence (McFadden, 1988) and the less mature soil profile Qt3 in the Ventura Basin soil chronosequence (Rockwell, 1988). These buried soil members are interpreted as being part of the undifferentiated Lakewood Formation alluvium and termed Qoa1 and Qal2. These units do not to correlate well across the length of transect B. They appear to be severely affected by faulting.

In conclusion, the entire stratigraphic section of soil profile 12 in boring 5b along Transect B to a depth of 70 feet is estimated to be 71 to 123 ka in age. Most of this age resides within second buried soil and the described Lakewood Formation in this exposure. The Holocene – Pleistocene boundary is represented by the Qyt and Qof contact at a depth of approximately 15.8 feet in this locality. The upper six soil members within this soil profile correlate well across the entire project site area. Within this section the surfical stream terrace deposits (Qyt) have an estimated age of 12.0 – 20.0 ka, the alluvial fan deposit (Qof) has an estimated age of 27.0 – 50.0 ka, the underlying sequence of stream terrace deposits (Qot1, Qot2, Qot3, Qot4, Qot5, and Qot6) have an estimated age of 55.0 – 99.0 ka. All of the members observed in soil profile 12 may be faulted between borings 3b and 5b along Transect B.

Table 12.1
9900 Wilshire Boulevard, Core Sample Soil Description

Soil Profile 12 - Transect B; Boring 5b

Date Described: 1/28/14 and 2/3/2014

Depth (Ft)	Horizon	Transect B; B-5b Description
2.0 - 5.6	Bt / Bw	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam to clay, slightly oxidized, very hard, friable, very sticky, very plastic, medium to coarse grained poorly sorted sand with ~7-10% fine sub rounded slate-rich gravel, brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few to common thin and few moderately thick on ped faces and common moderately thick coating clasts, truncated, massive, gradational lower boundary to;
5.6 - 7.2	BC	Brown (7.5YR 4/3d, 7.5YR 3/2m), loam to clay loam, slightly oxidized, hard, friable, moderately to very sticky, moderately to very plastic, coarse grained poorly sorted sand with ~10-15% fine and medium sub rounded slate-rich gravel, brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few fine and very few moderately thick on ped faces and few to common thin and few moderately thick coating clasts, crudely stratified, gradational lower boundary to;
7.2 - 11.1	C	Brown (7.5YR 4/3d, 7.5YR 3/2m), sandy loam to loam, slightly oxidized, slightly hard to hard, friable, slightly to moderately sticky, slightly plastic, coarse grained poorly sorted sand with ~15-20% fine and medium sub rounded slate-rich gravel, brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few fine on ped faces and very few to few moderately thick coating clasts, crudely stratified, scour deposit, abrupt lower boundary to;
11.1 - 15.4	2Btb / 2Bwb	Brown (7.5YR 4/4d, 7.5YR 3/3m), clay loam, slightly oxidized, hard to very hard, friable, very sticky, very plastic, fine to medium grained moderately well sorted sand with >5% fine slate-rich sub rounded gravel, brown (7.5YR 3/4d, 7.5YR 2.5/3m) clay films few thin and very few moderately thick on ped faces and few moderately thick coating clasts, truncated, massive, clear lower boundary to;
15.4 - 15.8	2BCb	Brown (7.5YR 4/4d, 7.5YR 3/3m), sand to loamy sand, slightly oxidized, loose to soft, very friable, non-sticky, non-plastic, medium grained moderately well sorted sand with ~5-7% fine slate-rich sub rounded gravel, few clay stains on ped faces and common clay stains coating clasts, massive, scour deposit, abrupt lower boundary to;
15.8 - 16.3	3Btb1	Brown (10YR 5/4d, 10YR 4/3m), loam, hard, friable, moderately sticky, moderately to very plastic, very fine to fine grained moderately well sorted sand with >3% fine slate-rich sub rounded gravel, strong brown (7.5YR 4/6d, 7.5YR 4/4m) clay films few to common thin and few moderately thick on ped faces, truncated, massive, gradational lower boundary to;
16.3 - 20.8	3Btb2	Yellowish brown (10YR 5/4d, 10YR 4 /3m), loamy sand to sandy loam, soft to slightly hard, very friable, non- to slightly sticky, non-plastic, coarse grained poorly sorted sand with 15-20% fine and medium slate-rich sub rounded gravel, strong brown (7.5YR 6/6d, 7.5YR 4/4m) clay films few thin on ped faces and common thin and few moderately thick coating clasts, localized weak redox with moderate strong brown (7.5YR 4/6d, 7.5YR3/4m) ~15% mottled and weak gray (2.5Y 5/1d, 2.5Y3/1m) ~7% gleying, crudely stratified, gradational lower boundary to;
20.8 - 22.0	3BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), loamy sand, soft, very friable, non- to slightly sticky, non-plastic, coarse grained poorly sorted sand with ~10-15% fine slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films very few very thin on ped faces and very few thin coating clasts, localized weak redox with faint strong brown (10YR 6/6d, 10YR4/4m) ~5% mottled and weak grayish brown (2.5Y 5/2d, 2.5Y3/1m) ~5% gleying, crudely stratified, scour deposit, abrupt lower boundary to;

Depth (Ft)	Horizon	Transect B; B-5b Description (Cont.)
22.0 - 28.5	4Btb	Dark yellowish brown to brown (10-7.5YR 4/4d, 10-7.5YR 3/3m), loam to clay loam, very hard, firm, moderately to very sticky, moderately to very plastic, fine grained well sorted sand with ~5% fine slate-rich sub rounded gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films few thin and very few moderately thick on ped faces and few moderately thick coating clasts, localized weak redox with faint yellowish brown (10YR 5/6d, 10YR4/4m) >10% mottled and weak light brownish gray (2.5Y 6/2d, 2.5Y4/1m) >10% gleying, truncated, massive, clear lower boundary to;
28.5 - 30.0	5ABb	Grayish brown (10YR 5/2d, 10YR 3/1m), clay loam, organic-rich, very hard to extremely hard, very firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, dark grayish brown (10YR 4/2d, 10YR 3/1m) clay films common to many thin and common moderately thick and few thick on ped faces, weak redox with faint yellowish brown (10YR 5/6d, 10YR4/4m) >5% mottled and weak light brownish gray (2.5Y 6/2d, 2.5Y4/1m) >10% gleying, stacked and truncated, massive, clear lower boundary to;
30.0 - 33.7	5BCb	Light olive brown (2.5Y 5/3d, 2.5Y 4/2m), clay loam, hard, friable to firm, very sticky, moderately to very plastic, fine to medium grained moderately well sorted sand with 15-20% fine and medium slate-rich sub rounded gravel, grayish brown (10YR 5/2d, 10YR 4/1m) clay films very few thin on ped faces and few thin coating clasts, moderate redox with weak yellowish brown (10YR 5/6d, 10YR4/4m) >5% mottled and strong gray (2.5Y 5/2d, 2.5Y4/1m) ~70% gleying, crudely stratified, scour deposit, abrupt lower boundary to;
33.7 - 42.4	6Btb / 6Bwb	Dark yellowish brown (10YR 4/4d, 10YR 3/3m), loam to silt loam, very hard, firm, moderately to very sticky, very plastic, fine grained poorly sorted sand with >5% fine slate-rich sub rounded gravel, yellowish brown (10YR 5/4d, 10YR 4/3m) clay films few thin on ped faces, weak redox with weak yellowish brown (10YR 5/6d, 10YR4/4m) >5% mottled and strong gray (2.5Y 5/2d, 2.5Y4/1m) ~20% gleying, truncated, massive, gradational lower boundary to;
42.4 - 43.5	6BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), sandy loam, slightly hard, friable, slightly sticky, non- to slightly plastic, fine to medium grained moderately well sorted sand with ~10-15% fine and medium slate-rich sub rounded gravel, few clay stains coating clasts, massive, scour deposit, clear lower boundary to;
43.5 - 44.0	7Btb / 7Bwb	Yellowish brown (10YR 5/4d, 10YR 4/3m), sandy loam, slightly hard to hard, friable, slightly sticky, non- to slightly plastic, fine to medium grained moderately well sorted sand with >5% fine slate-rich sub rounded gravel, dark yellowish brown (10YR 4/4d, 10YR 3/3m) clay films few thin and very few moderately thick on ped faces, truncated, massive, gradational lower boundary to;
44.0 - 47.2	7BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), loamy sand to sandy loam, slightly hard, friable, non- to slightly sticky, non-plastic, medium to coarse grained poorly sorted sand with 15-20% fine and medium slate-rich sub rounded gravel, dark yellowish brown (4/4d, 10YR 3/3m) clay films few fine on ped faces and common fine and few moderately thick coating clasts, massive to crudely stratified, scour deposit, abrupt lower boundary to;
47.2 - 50.0	8Btb / 8Bwb	Brown (7.5YR 5/4d, 7.5YR 4/3m), loam, very hard, friable to firm, slightly to moderately sticky, slightly plastic, fine-grained well sorted sand with no gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few fine and very few moderately thick on ped faces, massive, gradational lower boundary to;
50.0 - 52.3	8BCb	Yellowish brown (10YR 5/4d, 10YR 4/3m), sandy loam to loam, slightly hard, friable, slightly sticky, non- to slightly plastic, medium to coarse grained poorly sorted sand with ~30% fine and medium slate-rich sub rounded gravel, very few to few clay stains on ped faces and coating clasts , massive, scour deposit, abrupt lower boundary to;

Depth (Ft)	Horizon	Transect B; B-5b Description (Cont.)
52.3 - 53.6	9Btb / 9Bwb	Yellowish brown to brown (10-7.5YR 5/4d, 10-7.5YR 4/3m), clay loam, slightly oxidized, hard to very hard, firm, very sticky, very plastic, very fine to fine grained well sorted sand with >3% very fine slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and very few moderately thick on ped faces, strong redox with moderate strong brown (7.5YR 4/6d, 7.5YR 3/4m) ~20% mottles and strong gray (2.5Y 5/1d, 2.5Y 3/1m) ~30% gleying, truncated, massive, undetermined lower boundary to;
53.6 - 55.0	NR	Zone of no recovery
55.0 - 56.2	9Cb	Yellowish brown to brown (10YR 5/4d, 10YR 4/3m), sand to loamy sand, loose to soft, very friable, non-sticky, non-plastic, medium to coarse grained poorly sorted sand with >5% fine slate-rich sub rounded gravel, massive to crudely stratified, abrupt lower boundary to;
56.2 - 60.9	10Btb	Yellowish brown (10YR 5/4d, 10YR 4/3m), clay loam, hard to very hard, firm, very sticky, very plastic, very fine grained well sorted sand with >5% fine slate-rich sub rounded gravel, brown (7.5YR 4/4d, 7.5YR 3/3m) clay films few thin and very few moderately thick on ped faces and few moderately thick coating clasts, strong redox with strong strong brown (7.5YR 4/6d, 7.5YR 3/4m) ~30% mottles and strong gray (2.5Y 5/1d, 2.5Y 3/1m) ~30% gleying, truncated, massive, gradational lower boundary to;
60.9 - 62.7	10BCb lam	Brown (7.5YR 4/4d, 7.5YR 3/3m), loamy sand to sandy loam, slightly oxidized, slightly hard, friable, slightly sticky, non- to slightly plastic, fine-grained well sorted sand with no gravel, very few clay stains on ped faces, crudely stratified, scour deposit,, abrupt lower boundary to;
62.7 - 70.0+	11Btb	Brown (7.5YR 5/4d, 7.5YR 4/3m), clay loam, slightly oxidized, very hard, very firm, very sticky, very plastic, very fine grained very well sorted sand with no gravel, brown (7.5YR 4/3d, 7.5YR 3/2m) clay films few thin and very few moderately thick on ped faces, strong redox with strong strong brown (7.5YR 4/6d, 7.5YR 3/4m) ~20% mottles and strong gray (2.5Y 6/1d, 2.5Y 4/1m) ~30% gleying, massive, undetermined lower boundary.

Table 12.2 Soil Development Index Calculation Sheet
9900 Wilshire Boulevard
Soil Profile 12 - Transect B - Boring 5b

Horizon	Thickness (Feet)	Color				Texture		Consistence				Clay Films		Horizon Values	Mean Hor. Values
		Dry		Moist				Dry		Wet					
Raw Alluvium	*3*	*2.5Y 7/2*	*X/10*	*10YR 6/3*	*X/10*	*s*	*X/6*	*lo*	*X/5*	*so*	*X/6*	*0*	*X/15*		
Boring 5b															
Bt / Bw	3.6	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	0.67	vh	0.80	vs, vp	1.00	1-2npf, 1mkpf, 2mkcl	0.433	0.60	2.16
BC	1.6	7.5YR 4/3	0.3	7.5YR 3/2	0.1	cl	0.67	h	0.6	s-vs, p-vp	0.83	1npf, v1mkpf, 1-2ncl, 1mkcl	0.35	0.51	0.82
C	3.9	7.5YR 4/3	0.3	7.5YR 3/2	0.1	sl-l	0.42	sh-h	0.5	ss-s, ps	0.42	1npf, v1-1mkcl	0.367	0.36	1.41
2Btb / 2Bwb	4.3	7.5YR 4/4	0.4	7.5YR 3/3	0.1	cl	0.67	h-vh	0.7	vs, vp	1.00	1npf, v1mkpf, 1mkcl	0.35	0.56	2.43
2BCb	0.4	7.5YR 4/4	0.4	7.5YR 3/3	0.1	s-ls	0.1	lo-so	0.1	so, po	0.00	1vnpf, 2vncl	0.37	0.13	0.05
3Btb1	0.5	10YR 5/4	0.3	10YR 4/3	0	l	0.1	h	0.6	s, p-vp	0.75	1-2npf, 1mkpf	0.5	0.39	0.20
3Btb2	4.5	10YR 5/4	0.3	10YR 4/3	0	sl-ls	0.25	so-sh	0.3	so-ss, po	0.08	1npf, 2ncl, 1mkcl	0.35	0.20	0.89
3BCb	1.2	10YR 5/4	0.3	10YR 4/3	0	ls	0.17	so	0.2	so-ss, po	0.08	v1vnpf, v1ncl	0.2	0.13	0.16
4Btb	6.5	10-7.5YR 4/4	0.35	10-7.5YR 3/3	0.05	l-cl	0.58	vh	0.8	s-vs, p-vp	0.83	1npf, 1mkpf, 1mkcl	0.35	0.52	3.40
5ABb	1.5	10YR 5/2	0.2	10YR 4/2	0	cl	0.67	vh-eh	0.90	vs, vp	1.00	2-3npf, 2mkpf, 1kpf	0.333	0.58	0.87
5BCb	3.7	2.5Y 5/3	0.1	2.5Y 4/2	0	l-cl	0.58	h	0.60	vs, p-vp	0.92	v1npf, 1ncl	0.25	0.47	1.74
6Btb / 6Bwb	8.7	10YR 4/4	0.3	10YR 3/3	0	l-sil	0.58	vh	0.80	s-vs, vp	0.92	1npf	0.2	0.50	4.35
6BCb	1.1	10YR 5/4	0.3	10YR 4/3	0	sl	0.33	sh	0.40	ss, po-ps	0.25	1vncl	0.133	0.22	0.24
7Btb / 7Bwb	0.5	10YR 5/4	0.3	10YR 4/3	0	sl	0.33	sh-h	0.50	ss, po-ps	0.25	1npf, v1mkpf	0.233	0.26	0.13
7BCb	3.2	10YR 5/4	0.3	10YR 4/3	0	ls-sl	0.25	sh	0.40	so-ss, po	0.08	1npf, 2ncl, 1mkcl	0.35	0.22	0.69
8Btb / 8Bwb	2.8	10YR 5/4	0.3	10YR 4/3	0	l	0.5	vh	0.80	ss-s, ps	0.42	1npf, v1mkpf	0.233	0.39	1.09
8BCb	2.3	10YR 5/4	0.3	10YR 4/3	0	sl-l	0.42	sh	0.40	ss, po-ps	0.25	v1-1vnpf, v1-1vncl	0.15	0.24	0.56
9Btb / 9Bwb	1.3	10-7.5YR 5/4	0.35	10-7.5YR 4/3	0.05	l-cl	0.58	h-vh	0.70	vs, vp	1.00	1npf, v1mkpf	0.233	0.51	0.67
9Cb	1.2	10YR 5/4	0.3	10YR 4/3	0	s-ls	0.1	so-lo	0.10	so, po	0.00		0	0.04	0.05
10Btb	4.7	10YR 5/4	0.3	10YR 4/3	0	l-cl	0.58	h-vh	0.70	vs, vp	1.00	1npf, v1mkpf, 1mkcl	0.35	0.53	2.47
10BCb lam	1.8	7.5YR 4/4	0.4	7.5YR 3/3	0.1	ls-sl	0.25	sh	0.40	ss, po-ps	0.25	v1vnpf	0.133	0.23	0.41
11Btb	7.3	7.5YR 5/4	0.4	7.5YR 4/3	0.1	l-cl	0.58	vh	0.80	vs, vp	1.00	1npf, v1mkpf	0.233	0.54	3.96

INDEX VALUES AND DETERMINED AGES (ka)

Soil Member	MHI	Mean Soil Index	SDI @ 7 feet	Color Index	Clay Film Index	Soil Age Estimate ka	Section Age Estimate ka
Surface Soil	**0.60**	**4.39**	**3.37**	**1.3**	**1.15**	**4 - 8**	**4 - 8**
Buried Soil 1	**0.56**	**2.48**	**3.69**	**1**	**0.72**	**8 - 12**	**12 - 20**
Buried Soil 2	**0.39**	**1.24**	**1.40**	**0.9**	**1.05**	**15 - 30**	**27 - 50**
Buried Soil 3	**0.52**	**3.40**	**3.66**	**0.4**	**0.35**	**8 - 12**	**35 - 62**
Buried Soil 4	**0.58**	**2.61**	**3.51**	**0.3**	**0.58**	**4 - 8**	**39 - 70**
Buried Soil 5	**0.50**	**4.59**	**3.28**	**0.6**	**0.33**	**4 - 8**	**43 - 78**
Buried Soil 6	**0.26**	**0.82**	**1.56**	**0.6**	**0.58**	**4 - 8**	**47 - 86**
Buried Soil 7	**0.39**	**1.65**	**2.27**	**0.6**	**0.38**	**4 - 8**	**51 - 91**
Buried Soil 8	**0.51**	**0.71**	**2.00**	**0.7**	**0.23**	**4 - 8**	**55 - 99**
Buried Soil 9	**0.53**	**2.88**	**3.10**	**0.8**	**0.48**	**8 - 12**	**63 - 111**
Buried Soil 10	**0.54**	**3.96**	**3.80**	**0.5**	**0.23**	**8 - 12**	**71 - 123**

Table 13. Comparison Soil Data Indices Value Summary

(McFadden) Mission Creek Soils	SDI At 7'	MHI	Reddening Index	Clay Film Index
S7 0-1000 yrbp	0.84	0.12	0	0
S5 4-13 ka	1.46	0.3	0.1	0
S4 13-70 ka	4.49	0.37	3.94	7.37
S2 70-250 ka	8.01	0.61	4.80	6.24
S2 250-700 ka	10.81	0.39	6.20	10.31

(Rockwell) Ventura River Basin Soils	SDI At 7'	MHI	Reddening Index	Clay Film Index
Qt3 4 - 8 ka	2.43	0.17	0.5	0
Qt4 10 -15 ka	3.86	0.43	2	4
Qt5a 15 – 20 ka	4	0.37	3.5	4.2
Qt5b 30 ka	4.57	0.46	5	7

(WLA) West Hollywood Buried Soils	SDI At 7'	MHI	Reddening Index	Clay Film Index
Qol1 100 ka	3.1	0.42	1.05	1.99
Qol2 100-300 ka	10.5	0.8	8.2	13.2

TABLE 14. Soil Field Description Abbreviation Key

Texture		Structure		Consistence						Clay Films		Calcium Carbonate	
				Dry		Moist		Wet				(Pedogenic CaCO3)	
S	- sand	m	- massive	l	- loose	vfr	-very friable	so	non stickey	v1	veryfew	sl dis	slightly dissemenated
LS	- laomy sand	sg	- single grained	so	-soft	fr	-friable	ss	slightly stickey	1	few	l	slight coatings common on clast bottoms
SL	- sandy loam	**OR**		sh	-slightly hard	fi	-firm	s	moderately sitecke	2	common	II	bottoms; few medium common fine nooduses
L	- loam	1	- weak	h	-hard	vfi	-very firm	vs	very stickey	3	continuous	III	thick coatings common on clast bottoms, common medium nodules, common fine pendants, many fine nodules
CL	- clay loam	2	- moderate	vh	-very hard			**AND**		**AND**		VI	many thick coatings on clasts bottoms common coarse pendants few clasts completely enveloped
SCL	- sandy clay loam	3	- strong	eh	-extremely hard			po	non plastci	vn	stains	V	many thick coatings on clasts bottoms, many coarse pendants common clasts completely enveloped-petrocalcic
C	- clay	**AND**						ps	slightly plastic	n	thin	V+	many thick coatings on clasts bottoms, many coarse pendants many clasts completely enveloped, completely disseminated in matrix - petrocalcic
Si	- silt	vf	- very fine					p	moderately plastic	mk	moderately thick		
SiL	- silt loam	f	- fine					vp	very plastic	k	thick		
SiCL	- silt clay loam	m	- medium							**AND**			
SiC	- silty clay	c	- coarse							cl	coating clasts		
		vc	- very coarse							pf	ped faces		
		AND								br	brodgeing sand grains		
		gr	- granular							po	lining pores		
		pl	- platty										
		pr	-prismatic										
		abk	-angular blockey										
		sbk	- sub angular blockey										

Table 15. Stratigraphic Unit Correlation Sheet

Stratigraphic Unit	Location	Relative Age Estimates (ka)	Preferred Unit Ages (ka)
Qyt	Central Portion of site (T-1 and T-2)	4 - 8	**8 -12**
	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	**19 - 38**
	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	**27 - 50**
	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	**35 - 62**
	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	**39 - 70**
	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	**40 - 86**
	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	**48 - 86**
	Northern portion of site (B-2b)	48 - 86	
Qoa1	Southern Portion of Site (B-3)	55 - 104	**59 - 112**
	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	**71 - 140**
	Northwestern portion of site (B-5b)	71 - 123	

Table 16a
9900 Wilshire Boulevard, Trench Exposure Soil Summary

Soil Profile 1 - Trench 1 south, station 51 feet

Summary Description on 11/5/13, Detailed Description on 11/16/13

Depth (Ft)	Horizon	Summary Description of T-1 South	Correlation Unit / Age Estimate (ka)
0 - 4.9	Af	zone of artificial fill	Modern Fill Af / 0
4.9 - 5.1	Bt / Bw	truncated, weak argillic or cambic, massive, slight organics, silty, thin	Holocene Alluvium Qyt2 / 4.0 - 8.0
5.1 - 6.2	2Btb1	truncated, moderate argillic, massive, gravel-rich	Pleistocene Alluvium Qof / 19.0 - 38.0 (15.0 - 30.0)
6.2 - 8.45	2Btb2	moderate argillic, massive, gravel-rich	
8.45 - 9.0	2Btb3	moderate argillic, massive, gravel-rich	
9.0 - 9.65	3Btb1	weak to moderate argillic, silty, massive	
9.65 - 11.15	3Btb2	weak to moderate argillic, massive, moderately well oxidized	Qot1 / 27.0 - 50.0 (8.0 - 12.0)
11.15 - 11.85	3BCb1	massive to crudely stratified, scour deposit, sandy	
11.85 - 12.55+	3BCb2	crudely stratified, sandy and gravel-rich, slightly oxidized, scour deposit	

Table 16b
9900 Wilshire Boulevard, Trench Exposure Soil Summary

Soil Profile 2 - Trench 1 channel, station 151 feet

Summary Description on 11/7/13, Detailed Description on 11/16/13

Depth (Ft)	Horizon	Summary Description of T-1 Center	Correlation Unit / Age Estimate (ka)
0 - 6.5	Af	zone of artificial fill	Modern Fill Af / 0
6.5 - 7.25	AB	truncated, massive, slight organics, thin	Holocene Alluvium Qyc / 4.0 - 8.0
7.25 - 8.85	Bt1 / Bw1	weak argillic to cambic, massive	
8.85 - 10.15	Bt2 / Bw2	weak argillic to cambic, massive	
10.15 - 11.85	2Bt1b	truncated moderate argillic, massive	Pleistocene Alluvium Qoc / 12.0 - 20.0 (8.0 - 12.0)
11.85 - 12.4	2Bt2b	moderate argillic, massive, with MnO	
12.4 - 13.5	3Btb	weak to moderate argillic, massive, slightly oxidized	Qot1 / 20.0 - 32.0 (8.0 - 12.0)
13.5 - 14.5+	3BCb	weak argillic or cambic, massive, slightly well oxidized	

Table 16c
9900 Wilshire Boulevard, Trench Exposure Soil Summary
Soil Profile 3 - Trench 1 north, station 233 feet

Summary Description on 11/5/13, Detailed Description on 11/17/13

Depth (Ft)	Horizon	Summary Description of T-1 North	Correlation Unit / Age Estimate (ka)
0 - 6.25	Af	zone of artificial fill	Modern Fill Af / 0
6.25 - 7.0	AB / Bt	truncated, weak argillic, massive, slight organics, silty, thin	Holocene Alluvium Qyt / 4.0 - 8.0
7.0 - 7.85	2ABb	stacked, weak to moderate argillic, massive, slight organics	Pleistocene Alluvium
7.85 - 9.80	2Btb1	moderate to strong argillic, massive	Qof / 19.0 - 38.0 (15.0 - 30.0)
9.80 - 10.8	2Btb2	moderate to strong argillic, massive, gravel-rich	
10.8 - 11.45	2Btb3	moderate argillic, massive, gravel-rich	
11.45 - 12.25	3Btb1	truncated, weak to moderate argillic, massive, silty	
12.25 - 12.75	3Btb2	weak to moderate argillic, massive, slightly oxidized	Qot1 / 27.0 - 50.0 (8.0 - 12.0)
12.75 - 13.05	3BCb	crudely stratified, scour deposit	
13.05 - 14.25	4Btb / 4Bwb	truncated weak argillic or cambic, massive, silty	
14.25 - 14.75+	4BCb	massive, silty	Qot1a / 31.0 - 58.0 (4.0 - 8.0)

Table 16d
9900 Wilshire Boulevard, Trench Exposure Soil Summary
Soil Profile 4 - Trench 2, station 80 feet

Summary Description on 10/23/13, Detailed Description on 11/10/13

Depth (Ft)	Horizon	Summary Description of T-2	Correlation Unit / Age Estimate (ka)
0 - 0.65	Af	zone of artificial fill	Modern Fill Af / 0
0.65 - 1.25	AB	truncated, massive, slight organics, thin	Holocene Alluvium
1.25 - 1.7	Bt / Bw	weak argillic to cambic, massive	Qyt1 / 4.0 - 8.0
1.7 - 3.5	2Btb1	truncated, weak to moderate argillic, massive, gravel-rich	Pleistocene Alluvium
3.5 - 4.1	2Btb2	weak to moderate argillic, massive, slightly well oxidized	Qof1 / 19.0 - 38.0 (15.0 - 30.0)
4.1 - 5.5	2Btb3	weak to moderate argillic, silty, massive	
5.5 - 8.0	3Btb1	truncated, weak argillic, massive, silty	Qot1 / 27.0 - 50.0 (8.0 - 12.0)
8.0 - 8.6	3Btb2	weak to moderate argillic, massive, slightly well oxidized	
8.6 - 10.3	3BCb	crudely stratified, slightly well oxidized, scour deposit	
10.3 - 11.4+	4Btb	truncated, weak to moderate argillic, massive, slightly well oxidized, silty	Qot2 / 35.0 - 62.0 (8.0 - 12.0)

Table 16e
9900 Wilshire Boulevard, Trench Exposure Soil Summary
Soil Profile 5 - Trench 3, station 57 feet

Summary Description on 11/7/13, Detailed Description on 11/15/13

Depth (Ft)	Horizon	Summary Description of T-3	Correlation Unit / Age Estimate (ka)
0 - 0.55	Af	zone of artificial fill	Modern Fill Af / 0
0.55 - 1.6	AB	massive, slight organics, silty, thin	Pleistocene Alluvium
1.6 - 3.35	Bt1	moderate to strong argillic, massive	Qof1 / 15.0 - 30.0
3.35 - 3.95	Bt2	moderate to strong argillic, massive, slightly oxidized	
3.95 - 5.15	Bt3	moderate argillic, massive, slightly well oxidized	
5.15 - 6.15	BC	massive, sandy, moderately well oxidized, scour deposit	
6.15 - 6.35	2Btb1	truncated, weak to moderate argillic, massive, slightly oxidized, silty	
6.35 - 6.55	2BCb1	weak argillic, massive, slightly oxidized	Qot1 / 23.0 - 42.0 (8.0 - 12.0)
6.55 - 6.85	2BCb2	crudely stratified, slightly oxidized, scour deposit	
6.85 - 7.4+	3Btb / 3Bwb	truncated, weak argillic to cambic, massive, slightly oxidized	Qot1a / 27.0 - 50.0 (4.0 - 8.0)

Table 16f
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect A - Boring 1

Summary Description on 10/17/13

Depth (Ft)	Horizon	Summary Description of Boring 1	Correlation Unit / Age Estimate (ka)
0 - 10.0	Af	zone of no recovery over Artificial Fill	Modern Fill Af
10.0 - 14.2	Bt	truncated, moderate to strong argillic, massive, gravel-rich	Pleistocene Alluvium
14.2 - 15.0	BC	coarse-grained, gravel-rich, scour deposit	Qof
15.0 - 16.0	2Btb / 2Bwb	truncated, weak argillic to cambic, coarse-grained, slightly well oxidized	
16.0 - 16.7	2BCb	coarse-grained, gravel-rich thin scour deposit	Qot1
16.7 - 17.9	3Btb / 3Bwb	truncated, weak argillic to cambic, fine-grained, slightly well oxidized	
17.9 - 19.8	3BCb	massive, silty	Qot2
19.8 - 21.7	4BCb lam	truncated and stacked, crudely stratified, thickly laminated, scour deposit	Qot5
21.7 - 23.1	5Btb	truncated, moderate argillic, fine-grained, massive	
23.1 - 34.0	6Btb	stacked and truncated, moderate argillic, well stratified, finely laminated	Lakewood Formation
34.0 - 34.4	6BCb	fine-grained, thin scour deposit, massive	
34.4 - 34.8	7Btb	truncated, weak to moderate argillic, well stratified, finely laminated, moderate to strong redox	Qoa1
34.8 - 35.5	7BCb	sandy, thin, massive, scour deposit, slightly well oxidized	
35.5 - 37.4	8BCb ox	stacked and truncated, silty, massive, strong redox	
37.4 - 39.5	9Btb	truncated, weak to moderate argillic, massive	Qoa2
39.5 - 40.8	9BCb	sandy, thin, massive, scour deposit	
40.8 - 42.0	10ABb	organic-rich, massive, silty	
42.0 - 47.1	10Btb	moderate to strong argillic, massive, moderate redox	Qoa3

Depth (Ft)	Horizon	Summary Description of Boring 1 (Cont.)	Correlation Unit / Age Estimate (ka)
47.1 - 57.5	11Btb	stacked, moderate argillic, massive, moderate redox	
57.5 - 60.0	11BCb	sandy, massive, scour deposit	Qoa4
60.0 - 61.9	12Btb	truncated, weak to moderate argillic, massive	Qoa5
61.9 - 63.4	12BCb	massive, scour deposit	
63.4 - 70.0	13Btb	truncated, moderate to strong argillic, massive, moderate redox	
70.0 - 73.4	13BCb	massive, scour deposit	
73.4 - 75.0+	14BCb lam	stacked and truncated, crudely stratified, thick laminations	Qoa6

Table 16g
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect A - Boring 2

Summary Description on 10/17/13

Depth (Ft)	Horizon	Summary Description of Boring 2	Correlation Unit / Age Estimate (ka)
0 - 6.2	Af	zone of no recovery and artificial fill	Modern Fill Af / 0
6.2 - 11.1	Bt	truncated, moderate to strong argillic, massive, gravel-rich, slightly well oxidized	Pleistocene Alluvium Qof
11.1 - 11.6	2AB	stacked, organic-rich, massive, fine-grained with pores	Qot1
11.6 - 12.5	2Btb / 2Bwb	weak argillic to cambic, coarse-grained	
12.5 - 13.6	2BCox b	coarse-grained, gravel-rich, thin, scour deposit	
13.6 - 15.25	3Btb / 3Bwb	truncated, weak argillic to cambic, fine-grained, slightly well oxidized	Qot2
15.25 - 16.4	3BCb	sandy, massive, scour deposit	
16.4 - 18.4	4Btb	truncated, weak to moderate argillic, massive	Qot4
18.4 - 20.0	4BCb	sandy, massive, scour deposit	Qot5
20.0 - 21.6	5BCb lam	truncated and stacked, crudely stratified, thick laminations, scour deposit	
21.6 - 24.2	6ABb	slight organics, fine-grained, massive	Lakewood Formation
24.2 - 27.5	6Btb	moderate argillic, masive, moderate to strong redox	Qoa1
27.5 - 38.3	7Btb	stacked, moderate argillic, massive, moderate redox	
38.3 - 38.8	7BCb	sandy, thin, massive, scour deposit	
38.8 - 41.4	8ABb	organic-rich, fine-grained, massive	Qoa2
41.4 - 44.8	8Btb1	moderate to strong argillic, slight organics, masive	
44.8 - 55.0	8Btb2	moderate argillic, moderately well oxidized, masive	
55.0 - 56.0	8BCb	thin, massive, scour deposit	

Depth (Ft)	Horizon	Summary Description of Boring 2 (Cont.)	Correlation Unit / Age Estimate (ka)
56.0 - 58.3	9Btb	truncated, weak to moderate argillic, masive	Qoa3
58.3 - 59.4	9BCb	sandy, thin, massive, scour deposit	
59.4 - 60.7	10Btb	truncated, thin, weak to moderate argillic, masive	
60.7 - 62.9	10BCb	coarase-grained, massive, scour deposit	
62.9 - 75.0+	11Btb	truncated, moderate to strong argillic, well stratified, finely laminated, moderate redox	Qoa4

Table 16h
9900 Wilshire Boulevard, Core Sample Soil Summary
Soil Profile 6 - Transect A - Boring 3

Summary Description on 10/17/13 and Detailed Description on 11/12/13

Depth (Ft)	Horizon	Summary Description of Boring 3	Correlation Unit / Age Estimate (ka)
0 - 5.8	Af	zone of no recovery and artificial Fill	Modern Fill Af / 0
5.8 - 10.5	Bt	truncated, moderate to strong gravel-rich argillic, 7.5YR hues	Pleistocene Alluvium Qof / 15.0 - 30.0
10.5 - 11.1	2ABb	truncated and stacked, organic-rich, massive, silty	Qot1 / 23.0 - 48.0 (8.0 - 12.0)
11.1 - 12.75	2Btb / 2Bwb	weak argillic to cambic, massive	
12.75 - 13.7	2BCb	crudely stratified, gravel-rich, slightly well oxidized, scour deposit	
13.7 - 15.4	3Btb / 3Bwb	truncated, weak argillic to cambic, mazssive, slightly well oxidized	
15.4 - 16.0	3BCb	crudely stratified, gravel-rich, scour deposit	Qot2 / 27.0 - 50.0 (4.0 - 8.0)
16.0 - 17.8	4Btb / 4Bwb	truncated, weak argillic to cambic, massive	Qot4 / 31.0 - 58.0 (4.0 - 8.0)
17.8 - 18.5	4BCb	sandy, massive, light deposit	
18.5 - 23.4	5BCb lam	well stratified, crude and thick laminations, basal scour deposit	Qot5 / 32.0 - 64.0 (1.0 - 4.0)
23.4 - 27.5	6Btb	truncated, weak to moderate argillic, masive, moderate redox	Lakewood Formation (?)
27.5 - 35.0	7Btb	stacked and truncated, moderate argillic, crudely stratified, moderate redox	Qoa1 / 55.0 - 104.0 (23.0- 42.0)
35.0 - 36.4	7BCb	sandy, massive, slightly oxidized, scour deposit	
36.4 - 47.0	8Btb1	truncated, moderate to strong argillic, masive, strong redox	Qoa2
47.0 - 49.5	9ABb	stacked, organic-rich, massive	Qoa3
49.5 - 57.0	9Btb	moderate argillic, slightly oxidized, masive	
57.0 - 61.1	9BCb	sandy, crudely stratified, scour deposit	
61.1 - 63.6	10Btb	truncated, weak to moderate argillic, masive	Qoa4

Depth (Ft)	Horizon	Summary Description of Boring 3 (Cont.)	Correlation Unit / Age Estimate (ka)
63.6 - 65.0	10BCb	sandy, massive, scour deposit	Qoa4
65.0 - 75.0+	11Btb	truncated, moderate argillic, massive, strong redox	

Table 16i
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect A - Boring 4

Summary Description on 10/17/13

Depth (Ft)	Horizon	Summary Description of Boring 4	Correlation Unit / Age Estimate (ka)
0 - 1.0	Af	zone of no recovery over artificial fill	Modern Fill Af
1.0 - 1.1	BC ox	truncated, coarse-grained, thin, scour deposit	Holocene Alluvium Qyt
1.1 - 1.4	2Btb1	truncated, moderate argillic, massive, fine-grained	Pleistocene Alluvium
1.4 - 8.3	2Btb2	moderate to strong argillic, gravel-rich, massive, slightly well oxidized	Qof
8.3 - 10.0	3Btb	stacked, weak to moderate argillic, massive, fine-grained, slightly well oxidized	
10.0 - 10.3	3BCox b	thin, weak, scour deposit	Qot1a
10.3 - 11.3	4Btb / 4Bwb	truncated, weak argillic to cambic, gravel-rich, moderately well oxidized	
11.3 - 11.8	4BCb	coarse-grained, massive, moderately well oxidized, scour deposit	
11.8 - 13.6	5Btb / 5Bwb	truncated, weak argillic to cambic, fine-grained, massive	
13.6 - 14.1	5BCb	fine-grained, massive, thin, scour deposit	Qot1
14.1 - 15.25	6Btb	truncated, moderate argillic, massive	
15.25 - 16.3	6BCb	sandy, thin, massive, scour deposit	
16.3 - 18.9	7Btb	truncated, weak argillic to cambic, massive	
18.9 - 19.8	7BCb	fine-grained, massive	Qot2
19.8 - 23.8	8BC lam	stacked and truncated, crudely stratified and thickly laminated, scour deposit	Qot5
23.8 - 35.1	9Btb	truncated, moderate argillic, fine-grained, well stratified, fine laminations	Lakewood Formation
35.1 - 37.6	9BCb	gravel-rich, crudely stratified, scour deposit	Qoa1
37.6 - 39.25	10Btb	truncated, weak to moderate argillic, slight organics, massive	

Depth (Ft)	Horizon	Summary Description of Boring 4 (Cont.)	Correlation Unit / Age Estimate (ka)
39.25 - 39.5	10BCb	sandy, thin, massive, scour deposit	
39.5 - 40.0	11Btb	truncated, thin argillic, massive	
40.0 - 40.5	11BCb	sandy, massive, thin, moderately well oxidized, scour deposit	Qoa2
40.5 - 41.6	12Btb	truncated, moderate to strong argillic, massive, moderate redox	
41.6 - 42.0	12BCb	sandy, crudely stratified, scour deposit	
42.0 - 43.0	13Btb	truncated, moderate argillic, slight organics, massive, clayey	
43.0 - 48.0	13BCb lam	sandy, crudely stratified, thickly laminated, moderately well oxidized, scour deposit	Qoa3
48.0 - 56.7	14Btb	truncated, weak to moderate argillic, massive	
56.7 - 66.25	14BCb	massive, scour deposit	
66.25 - 67.5	NR	no recovery	
67.5 - 70.0+	15Btb ox	truncated, moderate argillic, moderately well oxidized, gravel-rich, massive	Qoa4

Table 16j
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect A - Boring 5

Summary Description on 10/17/13

Depth (Ft)	Horizon	Summary Description of Boring 5	Correlation Unit / Age Estimate (ka)
0 - 1.3	NR	zone of no recovery	Modern Fill Af
1.3 - 1.4	BC	truncated, coarse-grained with gravel, thin, scour	Holocene Alluvium Qyt1
1.4 - 2.7	2Btjb / 2Bwb	truncated, weak argillic to cambic, massive, sandy, slightly oxidized	
2.7 - 5.4	2BCox b	coarse-grained with gravel, crudely stratified, scour, 7.5YR hues	Qyt1a
5.4 - 7.1	3Btb1	truncated, moderate argillic, massive, fine-grained	Pleistocene Alluvium
7.1 - 13.1	3Btb2	moderate to strong gravel-rich argillic, 7.5YR hues	Qof
13.1 - 13.9	4Btb	stacked, weak to moderate argillic, massive, fine-grained, 7.5YR hues	
13.9 - 15.4	5Btb / 5Bwb	truncated, weak argillic to cambic, gravel-rich, 7.5YR hues	
15.4 - 15.9	5BCox b	fine-grained, sandy, massive, scour, 7.5YR hues	Qot1
15.9 - 16.3	6Btb / 6Bwb	truncated, weak argillic to cambic, fine-grained, massive	
16.3 - 17.7	6BCox b	fine-grained, silty, massive, thin, 7.5YR hues	Qot2
17.7 - 18.1	7Btb / 7Bwb	truncated and stacked, weak argillic to cambic, fine-grained, massive	
18.1 - 19.5	7BCox b	fine-grained, sandy, massive, scour, 7.5YR hues	Qot4
19.5 - 22.9	8BCb lam	truncated and stacked, sandy, well stratified, thickly laminated, basal scour	Qot5
22.9 - 25.7	9BCb lam	truncated and stacked, fine-grained, well stratified, finely laminated	
25.7 - 40.0	10Btb	truncated and stacked, moderate argillic, fine-grained, massive, moderate redox	Lakewood Formation
40.0 - 42.1	10BCb	gravel-rich, crudely stratified, scour	Qoa1
42.1 - 45.2	11Btb	truncated, moderate argillic, fine-grained, massive, moderate redox	

Depth (Ft)	Horizon	Summary Description of Boring 5 (Cont.)	Correlation Unit / Age Estimate (ka)
45.2 - 46.5	12ABb	stacked, slight organics, silty, massive	Qoa2
46.5 - 51.9	12Btb	moderate argillic, gravel-rich, massive, weak to moderate redox	
51.9 - 52.7	13Btb	truncated, weak to moderate argillic, massive, thin	
52.7 - 53.5	13BCb	gravel-rich, massive, scour	
53.5 - 55.0	14ABb	truncated, slight organics, silty, massive	Qoa3
55.0 - 70.0+	14Btb ox	moderate to strong argillic, moderately well oxidized, crudely stratified, moderate redox	

Table 16k
9900 Wilshire Boulevard, Core Sample Soil Summary
Soil Profile 7 - Transect A - Boring 6

Summary Description on 10/15/13 and Detailed Description on 11/20/13

Depth (Ft)	Horizon	Summary Description of Boring 6	Correlation Unit / Age Estimate (ka)
0 - 3.5	Bt	truncated, weak argillic, massive, fine-grained	Holocene Alluvium Qyt1 / 8.0 - 12.0
3.5 - 8.3	2Btb1	stacked and truncated, moderate to strong argillic, gravel-rich, massive, slightly well oxidized	
8.3 - 10.0	2Btb2	moderate argillic to cambic, massive, thin	Pleistocene Alluvium Qof / 23.0 - 42.0 (15.0 - 30.0)
10.0 - 11.0	2BCb	coarse-grained, gravel-rich thin massive, scour deposit	
11.0 - 14.9	3Btb / 3Bwb	truncated, weak argillic to cambic, slightly oxidized, massive	
14.9 - 15.6	3BCb	massive, thin, scour deposit	Qot1
15.6 - 16.4	4Btb1	truncated, weak to moderate argillic, fine-grained, massive	
16.4 - 17.8	4Btb2	truncated, weak argillic, gravel-rich, massive	Qot2
17.8 - 18.6	4BCb	sandy, massive, thin, scour deposit	
18.6 - 19.4	5Btb / 5Bwb	truncated, weak argillic to cambic, massive	
19.4 - 20.0	NR	zone of no recovery	Qot3
20.0 - 20.4	5BCb	sandy, massive, thin, scour deposit	
20.4 - 21.4	6Btb / 6Bwb	truncated, weak argillic to cambic, massive, thin	
21.4 - 22.0	6BCb	thin, massive, scour deposit	Qot4
22.0 - 25.0	7BCb lam	truncated and stacked, crudely stratified, thickly laminated, scour deposit	Qot5
25.0 - 27.6	8Btb	truncated, moderate argillic, massive, moderate redox	Qot6
27.6 - 29.2	9ABb	stacked, slight organics, massive	Lakewood Formation
29.2 - 37.2	9Btb	moderate to strong argillic, crudely stratified to massive	Qoa1

Depth (Ft)	Horizon	Summary Description of Boring 6 (Cont.)	Correlation Unit / Age Estimate (ka)
37.2 - 40.3	10Btb	stacked, weak to moderate argillic, massive, moderate redox	Qoa2
40.3 - 50.0	10BCb	sandy, moderately well oxidized, scour deposit	
50.0 - 52.6	11ABb	truncated, organic-rich, massive	Qoa3
52.6 - 58.8	11Btb	truncated, weak to moderate argillic, massive, moderately well oxidized	
58.8 - 61.8	11BCb	sandy, massive, scour deposit	
61.8 - 65.0	NR	zone of no recovery	--
65.0 - 66.3	12Btb	truncated, moderate to strong argillic, massive, moderately well oxidized	Qoa4
66.3 - 70.0+	12BCb lam	crudely stratified, gravel-rich, thickly laminated, scour deposit	

Table 16l
9900 Wilshire Boulevard, Core Sample Soil Summary
Soil Profile 8 - Transect A - Boring 7

Summary Description on 10/15/13 and Detailed Description on 11/18/13

Depth (Ft)	Horizon	Summary Description of Boring 7	Correlation Unit / Age Estimate (ka)
0 - 3.2	Bt / Bw	truncated, weak argillic to cambic, massive	Holocene Alluvium Qyt / 8.0 - 12.0
3.2 - 9.0	2Btb1	truncated and stacked, moderate to strong argillic, gravel-rich, slightly well oxidized	Pleistocene Alluvium / Qof
9.0 - 10.0	2Btb2	moderate argillic, massive, thin	23.0 - 42.0 / (15.0 - 30.0)
10.0 - 10.6	2BCb	massive, gravel-rich, scour deposit	
10.6 - 13.8	3Btb / 3Bwb	truncated, weak argillic to cambic, massive, slightly oxidized	
13.8 - 16.0	3BCb	gravel-rich, crudely stratified, scour deposit	Qot1 / (27.0 - 50.0) 4.0 - 8.0
16.0 - 17.2	4Btb	truncated, weak argillic, massive, slightly well oxidized	
17.2 - 18.4	4BCb	gravel-rich, crudely stratified, scour deposit	Qot2 / 35.0 - 62.0 (8.0 - 12.0)
18.4 - 19.4	5Btb / 5Bwb	truncated, thin, weak argillic to cambic, massive	
19.4 - 20.3	5BCb	massive, thin	Qot3 / 39.0 - 70.0 (4.0 - 8.0)
20.3 - 22.0	6Btb	truncated, weak argillic, massive, sandy, slightly well oxidized	
22.0 - 23.5	6BCb	massive, thin, scour deposit	Qot4 / 47.0 - 82.0 (8.0 - 12.0)
23.5 - 25.5	7BCb lam	truncated and stacked, sandy, crudely stratified, thickly laminated	Qot5 / 48.0 - 86.0 (1.0 - 4.0)
25.5 - 26.5	8Btb / Bwb	truncated, weak argillic to cambic, massive	
26.5 - 27.2	8BCb	sandy, crudely stratified, scour deposit	Qot6 / 52.0 - 94.0 (4.0 - 8.0)
27.2 - 29.1	9ABb	truncated, organic-rich, massive	Lakewood Formation
29.1 - 37.5	9Btb	moderate to strong argillic, crudely stratified to massive	Qoa1
37.5 - 43.5	10Btb	truncated and stacked, moderate to strong argillic, massive	

Depth (Ft)	Horizon	Summary Description of Boring 7 (Cont.)	Correlation Unit / Age Estimate (ka)
43.5 - 51.4	10BCb	sandy, massive, scour deposit	Qoa2
51.4 - 53.5	11ABb	truncated, organic-rich, massive	
53.5 - 59.3	11Btb	moderate to strong argillic, massive, moderately well oxidized	Qoa3
59.3 - 62.3	11BCb	massive, gravel-rich, scour deposit	
62.3 - 70.0+	12Btb	truncated, moderate to strong argillic, massive	Qoa4

Table 16m
9900 Wilshire Boulevard, Core Sample Soil Summary
Summary Description - Transect A - Boring 8

Summary Description on 10/15/13

Depth (Ft)	Horizon	Summary Description of Boring 8	Correlation Unit
0 -1.0	NR	zone of no recovery	Modern Fill Af
1.0 - 3.5	Bt / Bw	truncated, weak argillic to cambic, coarse-grained	Holocene Alluvium Qyt
3.5 - 8.9	2Btb1	moderate to strong argillic, massive, gravel-rich, slightly oxidized	Pleistocene Alluvium
8.9 - 10.0	2Btb2	moderate argillic, massive, thin	Qof
10.0 - 10.5	2BCb	massive, thin, scour deposit	
10.5 - 14.6	3Btb / 3Bwb	truncated, weak argillic to cambic, massive, slightly oxidized	
14.6 - 16.0	3BCb	massive to crudely stratified, scour deposit	Qot1
16.0 - 17.3	4Btb	truncated, weak argillic, thin, massive, slightly well oxidized	
17.3 - 18.8	4BCb	crudely stratified, gravel-rich, scour deposit	Qot2
18.8 - 19.7	5Btb / 5Bwb	truncated, weak argillic to cambic, thin, massive	
19.7 - 20.0	5BCb	sandy, massive, thin, scour deposit	Qot3
20.0 - 20.4	NR	zone of no recovery	
20.4 - 22.3	6Btb	truncated, weak argillic, massive	
22.3 - 23.4	6BCb	massive, thin, scour deposit	Qot4
23.4 - 28.0	7BCb lam	truncated and stacked, crudely stratified, thickly laminated	Qot5
28.0 - 30.0	8Btb / Bwb	truncated, weak argillic to cambic, moderate redox, massive	
30.0 - 30.4	8BCb	massive, thin, scour deposit	Qot6
30.4 - 33.2	9ABb	truncated, organic-rich, massive	Lakewood Formation

Depth (Ft)	Horizon	Summary Description of Boring 8 (Cont.)	Correlation Unit / Age Estimate (ka)
33.2 - 40.8	9Btb	moderate to strong argillic, crudely stratified to massive	Qoa1
40.8 - 43.2	10ABb	stacked, organic-rich, massive	
43.2 - 47.3	10Btb	weak to moderate argillic, massive	Qoa2
47.3 - 48.1	10BCb	massive, scour deposit	
48.1 - 50.4	11ABb	truncated, organic-rich, massive	
50.4 - 55.0	11Btb	moderate to strong argillic, massive	
55.0 - 62.0	11BCb	massive to crudely stratified, moderately well oxidized	Qoa3
62.0 - 70.0+	11Cb	crudely stratified, gravel-rich, massive, slightly well oxidized	

Table 16n
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect A - Boring 9

Summary Description on 10/15/13

Depth (Ft)	Horizon	Summary Description of Boring 9	Correlation Unit / Age Estimate (ka)
0 - 2.5	Bt / Bw	truncated, weak argillic to cambic, massive, coarse-grained	Holocene Alluvium Qyt
2.5 - 7.5	2Btb1	moderate to strong argillic, gravel-rich, massive, slightly well oxidized	Pleistocene Alluvium
7.5 - 11.1	2Btb2	moderate argillic, massive, thin	
11.1 - 11.7	2BCb	massive, coarse-grained, thin, scour deposit	Qof
11.7 - 13.0	3Btb / 3Bwb	truncated, weak argillic to cambic, massive, slightly well oxidized	
13.0 - 13.4	3BCb	sandy, thin, massive, scour deposit	Qot1
13.4 - 14.6	4Btb	truncated, weak argillic, massive, slightly oxidized	
14.6 - 16.6	4BCb	massive to crudely stratified, scour deposit	Qot2
16.6 - 18.1	5Btb / 5Bwb	truncated, weak argillic to cambic, massive	
18.1 - 19.3	5BCb	massive, thin, scour deposit	Qot3
19.3 - 25.5	6BCb lam	truncated and stacked, crudely stratified, thickly laminated, scour deposit	Qot5
25.5 - 26.7	7Btb	truncated, weak argillic to cambic, thin, massive	
26.7 - 27.7	7BCb	massive, thin, scour deposit	Qot6
27..7 - 29.4	8ABb	truncated, organic-rich, massive	Lakewood Formation
29.4 - 32.4	8Btb1	moderate argillic, massive	Qoa1
32.4 - 34.0	9ABb	truncated and stacked, organic-rich, massive	
34.0 - 50.0	9Btb1	moderate argillic, slightly oxidized, massive	Qoa2
50.0 - 51.0	9BCb	thin, massive, scour deposit	

Depth (Ft)	Horizon	Summary Description of Boring 9 (Cont.)	Correlation Unit / Age Estimate (ka)
51.0 - 53.2	10ABb	truncated, organic-rich, massive	
53.2 - 61.5	10Btb	moderate to strong argillic, massive, gravel-rich, moderately well oxidized	Qoa3
61.5 - 66.3	10BCb	crudely stratified, gravel-rich, scour deposit	
66.3 - 70+	11Btb	truncated, moderate to strong argillic, massive, moderately well oxidized	Qoa4

Table 16o
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect A - Boring 10

Summary Description on 10/15/13

Depth (Ft)	Horizon	Summary Description of Boring 10	Correlation Unit
0 - 2.2	Bt / Bw	truncated, weak argillic to cambic, coarse-grained, massive	Holocene Alluvium Qyt
2.2 - 9.1	2Btb1	moderate to strong argillic, massive, gravel-rich, slightly well oxidized	Pleistocene Alluvium
9.1 - 10.2	2Btb2	moderate argillic, massive, thin	
10.2 - 11.1	2BCb	massive, thin, scour deposit	Qof
11.1 - 15.0	3Btb / 3Bwb	truncated, weak argillic to cambic, sandy, moderately well oxidized	
15.0 - 16.8	3BCb	massive, gravel-rich, scour deposit	Qot1
16.8 - 19.4	4Btb	truncated, weak argillic, fine-grained, massive, slightly oxidized	
19.4 - 20.0	NR	zone of no recovery	
20.0 - 21.1	4BCb	massive, coarse-grained, scour deposit	Qot2
21.1 - 22.4	5Btb / 5Bwb	truncated, weak argillic to cambic, massive	
22.4 - 23.4	5BCb	sandy, massive, thin, gravel-rich, scour deposit	Qot3
23.4 - 25.2	6BCb lam	truncated and stacked, crudely stratified, thickly laminated, scour deposit	Qot5
25.2 - 26.5	7Btb	truncated, weak argillic, thin, massive	
26.5 - 26.9	7BCb	massive, sandy, thin, scour deposit	Qot6
26.9 - 30.0	8ABb	truncated, organic-rich, massive	Lakewood Formation
30.0 - 32.5	8Btb1	weak to moderate argillic, thin, massive	Qoa1
32.5 - 34.2	9ABb	stacked, slight organics, massive	
34.2 - 51.5	9Btb1	moderate argillic, massive, moderately strong redox	Qoa2

Depth (Ft)	Horizon	Summary Description of Boring 10 (Cont.)	Correlation Unit
51.5 - 52.1	9BCb	thin, massive, scour deposit	
52.1 - 53.5	10ABb	truncated, organic-rich, massive	
53.5 - 55.0	10Btb1	moderate argillic, massive, moderately well oxidized	Qoa3
55.0 - 65.0	10Btb2	moderate argillic, massive to crudely stratified, gravel-rich	
65.0 - 66.0+	10BCb	massive, gravel-rich, scour deposit	

Table 16p
9900 Wilshire Boulevard, Core Sample Soil Summary

Soil Profile 9 - Transect A - Boring 11

Summary Description on 10/15/13 and Detailed Description on 11/12/13

Depth (Ft)	Horizon	Summary Description of Boring 11	Correlation Unit / Age Estimate (ka)
0 - 0.5	NR	zone of no recovery	Modern Fill Af / 0
0.5 - 5.5	Bt / Bw	truncated, weak argillic to cambic, coarse-grained	Holocene Alluvium Qyt / 8.0 - 12.0
5.5 - 10.3	2Btb1	moderate to strong gravel-rich argillic, 7.5YR hues	Pleistocene Alluvium
10.3 - 11.3	2Btb2	moderate argillic, massive, thin, sandy	Qof / 23.0 - 42.0 (15.0 - 30.0)
11.3 - 12.2	2BCb	massive, fine-grained, light scour	
12.2 - 15.0	3Btb / 3Bwb	truncated, weak argillic to cambic, fine-grained, sandy	
15.0 - 17.0	3BCb	medium-grained with gravel, massive, scour	Qot1 / 27.0 - 50.0 (4.0 - 8.0)
17.0 - 19.0	4Btb	truncated, weak to moderate argillic, fine-grained, massive, 7.5YR Hues	
.19.0 - 20.4	4BCb	coarse-grained with gravel, crudely stratified, scour	Qot2 / 35.0 - 62.0 (8.0 - 12.0)
20.4 - 22.2	5Btb / 5Bwb	truncated, weak argillic to cambic, fine-grained, sandy	
22.2 - 26.5	5BCb	medium to coarse-grained, crudely stratified, scour	Qot3 / 39.0 - 70.0 (4.0 - 8.0)
26.5 - 27.5	NR	zone of no recovery	
27.5 - 30.1	6BCb lam	truncated and stacked, sandy, well stratified, thinly laminated	Qot5 / 40.0 - 74.0 (1.0 - 4.0)
30.1 - 32.3	7Btb	truncated, weak argillic to cambic, fine-grained	Qot6 / 44.0 - 82.0 (4.0 - 8.0)
32.3 - 34.5	8ABb	truncated and stacked, organic-rich, silty, massive	Lakewood Formation
34.5 - 53.9	8Btb1	moderate argillic, massive, slight redox	Qoa1 / 59.0 - 112.0 (15.0 - 30.0)
53.9 - 56.8	8BCb	fine-grained, massive, thin, scour	

Depth (Ft)	Horizon	Summary Description of Boring 11 (Cont.)	Correlation Unit / Age Estimate (ka)
56.8 - 59.0	9ABb	truncated, slight organics, silty, massive	Qoa2
59.0 - 70.0	9Btb	moderate argillic, moderate redox, massive	

Table 16q
9900 Wilshire Boulevard, Core Sample Soil Summary
Soil Profile 10 - Transect A - Boring 12

Summary Description on 10/15/13 and Detailed Description on 10/17/13

Depth (Ft)	Horizon	Summary Description of Boring 12	Correlation Unit / Age Estimate (ka)
0 - 1.5	NR	zone of no recovery over artificial fill	Modern Fill Af / 0
1.5 - 2.1	AB	truncated, slight organics, massive	Holocene Alluvium
2.1 - 4.8	Bt / Bw	weak argillic to cambic, massive, fine-grained	Qyt-a / 4.0 - 8.0
4.8 - 10.0	2Btb / 2Bwb	truncated, weak argillic to cambic, massive, slightly oxidized	Qyt / 8.0 - 16.0 (4.0 - 8.0)
10.0 - 14.7	3Btb1	moderate to strong argillic, massive, gravel-rich, slightly well oxidized	Pleistocene Alluvium
14.7 - 15.5	3Btb2	moderate argillic, massive, thin	Qof / 23.0 - 46.0 (15.0 - 30.0)
15.5 - 17.2	3BCb	massive, thin, gravel-rich, scour deposit	
17.2 - 19.6	4Btb / 4Bwb	truncated, weak argillic to cambic, massive	
19.6 - 21.9	4BCb	crudely stratified, coarse-grained, gravel-rich, scour deposit	Qot1
21.9 - 23.5	5Btb	truncated, weak argillic, thin, massive, slightly well oxidized	
23.5 - 26.6	5BCb	coarse-grained, gravel-rich, crudely stratified, scour deposit	Qot2
26.6 - 28.2	6Btb / 6Bwb	truncated, weak argillic to cambic, massive	
28.2 - 29.2	6BCb	coarse-grained, massive, gravel-rich, scour deposit	Qot3
29.2 - 33.5	7BCb lam	truncated and stacked, crudely stratified, thickly laminations	Qot5
33.5 - 36.2	8Btb / 8Bwb	truncated, weak argillic to cambic, massive, moderate redox	Qot6
36.2 - 38.5	9ABb	stacked, organic-rich, massive, moderate redox	Lakewood Formation
38.5 - 54.7	9Btb	moderate to strong argillic, massive, slight redox	Qoa1
54.7 - 56.3	9BCb	massive, scour deposit	

Depth (Ft)	Horizon	Summary Description of Boring 12 (Cont.)	Correlation Unit / Age Estimate (ka)
56.3 - 59.8	10Btb	truncated, moderate argillic, massive	
59.8 - 61.3	10BCb / 10Cb	coarse-grained, massive, gravel-rich, scour deposit	Qoa2
61.3 - 62.0	11ABb	truncated, slight organics, silty, massive, moderate redox	
62.0 - 70+	11Btb	moderate argillic, moderately well oxidized, massive	Qoa3

Table 16r
9900 Wilshire Boulevard, Core Sample Soil Summary
Summary Description - Transect A - Boring 13

Summary Description on 1/30/14

Depth (Ft)	Horizon	Summary Description of Boring 13	Correlation Unit
0 - 1.3	NR	zone of no recovery over artificial fill	Modern Fill Af
1.3 - 3.7	AB	truncated, slight organics, massive, silty	Holocene Alluvium
3.7 - 6.1	Bt / Bw	weak argillic to cambic, massive, silty	Qyt-a
6.1 - 8.1	2ABb1	truncated and stacked, organic-rich, massive, silty	
8.1 - 8.9	2ABb2	slight organics, massive, silty	Qyt
8.9 - 12.7	2Btb / 2Bwb	truncated, weak argillic to cambic, massive, sandy	
12.7 - 15.5	3Btb1	moderate to strong argillic, massive, gravel-rich, slightly well oxidized	Pleistocene Alluvium
15.5 - 17.7	3Btb2	moderate argillic, massive, thin, sandy	
17.7 - 18.7	3BCb1	massive, sandy	Qof
18.7 - 19.4	3BCb2	massive, gravel-rich, scour deposit	
19.4 - 20.0	4Btb / 4Bwb	truncated, weak argillic to cambic, massive	
20.0 - 22.7	4BCb	coarse-grained, sandy, massive, scour	Qot1
22.7 - 23.7	5Btb	truncated, weak argillic, massive, slightly well oxidized	
23.7 - 25.0	5BCb	massive, thin, sandy, scour deposit	Qot2
25.0 - 26.6	6Btb / 6Bwb	truncated, weak argillic to cambic, massive, sandy	
26.6 - 27.3	6BCb	massive to crudely stratified, scour deposit	Qot3
27.3 - 30.6	7BCb lam	truncated and stacked, crudely stratified, thickly laminated	Qot5
30.6 - 32.1	8Btb / 8Bwb	truncated, weak argillic to cambic, massive	Qot6

Depth (Ft)	Horizon	Summary Description of Boring 13 (Cont.)	Correlation Unit / Age Estimate (ka)
32.1 - 36.2	9ABb	truncated, slight organics, massive	Lakewood Formation
36.2 - 45.7	9Btb	moderate to strong argillic, massive, moderately well oxidized	
45.7 - 47.1	9BCb	sandy, massive, scour deposit	
47.1 - 50.3	10Btb	truncated, moderate argillic, massive	Qoa1
50.3 - 53.6	10BCb lam	well stratified, thinly laminated, scour deposit	
53.6 - 58.4	11Btb1	truncated, organic-rich, massive	
58.4 - 60.0	11Btb2	moderate argillic, massive, silty	
60.0 - 61.3	11BCb	coarse-grained, gravel-rich, massive, thin, scour deposit, with MnO	Qoa2
61.3 - 62.5	12BCb	sandy, massive, scour deposit, moderate redox	
62.5 - 65.0	13Btb	truncated, weak to moderate argillic, massive	
65.0 - 65.5	13BCb	sandy, thin, massive, moderately well oxidized, scour deposit	
65.5 - 66.3	14Btb	truncated, weak to moderate argillic, massive	Qoa3
66.3 - 66.6	14BCb	sandy, thin, massive, moderately well oxidized, scour deposit	
66.6 - 70+	15Btb	truncated, moderate to strong argillic, massive	Qoa4

Table 16s
9900 Wilshire Boulevard, Core Sample Soil Summary
Summary Description - Transect B - Boring 1b

Summary Description on 1/23/14

Depth (Ft)	Horizon	Summary Description of Boring 1b	Correlation Unit
0 - 1.8	NR	zone of no recovery	Modern Fill Af
1.8 - 2.5	AB	organic-rich, massive, silty	Holocene Alluvium
2.5 - 3.9	Bt1 / Bw1	weak argillic to cambic, massive, slight organics	
3.9 - 7.5	Bt2 / Bw2	weak argillic to cambic, massive	Qyt
7.5 - 10.9	BC	massive, slightly oxidized, gravel-rich, scour deposit	
10.9 - 15.3	2Btb1	truncated, moderate to strong argillic, massive, gravel-rich, slightly well oxidized	Pleistocene Alluvium
15.3 - 19.1	2Btb2	weak to moderate argillic, massive, slightly oxidized	Qof
19.1 - 20.0	2BCb	coarse-grained, massive, thin scour deposit	
20.0 - 22.5	3Btb / 3Bwb	truncated, weak argillic to cambic, massive, slightly well oxidized	
22.5 - 23.2	3BCb	massive, slightly well oxidized, thin, scour deposit	Qot1
23.2 - 24.1	4Btb / 4Bwb	truncated, weak argillic to cambic, massive, silty, slightly well oxidized	
24.1 - 30.0	4BCb	massive, sandy, scour, moderate redox	Qot2
30.0 - 32.5	5Btb	truncated, weak argillic, massive	
32.5 - 35.7	5BCb1	massive, sandy	
35.7 - 37.1	5BCb2	massive, gravel-rich, scour deposit	
37.1 - 38.1	6Btb / 6Bwb	truncated, weak argillic to cambic, massive, slightly well oxidized	
38.1 - 39.0	6BCb	massive, gravel-rich, thin, scour deposit	Qot3

Depth (Ft)	Horizon	Summary Description of Boring 1b (Cont.)	Correlation Unit
39.0 - 39.5	7Btb / 7Bwb	truncated, weak argillic to cambic, massive, slightly well oxidized	
39.5 - 40.9	7BCb	massive, gravel-rich, thin, scour deposit	Qot4
40.9 - 44.2	8BCb	truncated and stacked, massive to crudely stratified	
44.2 - 51.6	8BCb lam	crudely stratified, sandy, thickly laminated, gravel-rich, scour deposit	Qot5
51.6 - 52.6	9Btb / 9Bwb	truncated, weak argillic to cambic, massive	
52.6 - 53.6	9BCb	massive, thin, scour deposit	Qot6
53.6 - 54.5	10ABb	organic-rich, massive	Lakewood Formation
54.5 - 55.9	10Btb	moderate to strong argillic, massive	Qoa1
55.9 - 57.6	10BCb	massive, moderately well oxidized, scour deposit	
57.6 - 65.9	11Btb1	truncated, moderate to strong argillic, massive, moderately well oxidized	
65.9 - 68.8	11Btb2	weak to moderate argillic, massive, moderately well oxidized	Qoa2
68.8 - 70.0+	11BCb	massive, slightly oxidized	

Table 16t
9900 Wilshire Boulevard, Core Sample Soil Summary
Soil Profile 11 - Transect B - Boring 2b

Summary Description on 1/23/14, Detailed Description on 1/30/14

Depth (Ft)	Horizon	Summary Description of Boring 2b	Correlation Unit / Age Estimate (ka)
0 - 3.3	NR / Af	zone of no recovery and artificial fill	Modern Fill Af / 0
3.3 - 4.8	AB	organic-rich, massive, silty	Holocene Alluvium
4.8 - 7.3	Bt / Bw	weak argillic, massive, slight organics	
7.3 - 9.7	BC	massive, slightly oxidized, sandy	Qyt1 / 8.0 - 12.0
9.7 - 11.6	C	massive, sandy, scour deposit	
11.6 - 15.4	2Btb1	truncated, moderate argillic, massive, gravel-rich, slightly well oxidized	Pleistocene Alluvium
15.4 - 20.1	2Btb2	weak to moderate argillic, massive	Qof / 23.0 - 42.0 (15.0 - 30.0)
20.1 - 23.9	3Btb	stacked, weak argillic, silty	
23.9 - 25.2	3BCb1	massive, sandy	Qot1 / 31.0 - 54.0 (8.0 - 12.0)
25.2 - 29.3	3BCb2	massive, sandy, gleyed	
29.3 - 30.6	4Btb1	truncated, weak argillic, massive	
30.6 - 33.4	4Btb2	weak argillic, massive, moderate redox, with MnO	Qot2 / 39.0 - 66.0 (8.0 - 12.0)
33.4 - 36.1	4BCb	crudely stratified, sandy with gravel, scour	
36.1 - 38.5	5Btb / 5Bwb	truncated, weak argillic to cambic, massive, sandy	
38.5 - 40.9	5BCb	massive, gravel-rich, scour deposit	Qot3 / 43.0 - 74.0 (4.0 - 8.0)
40.9 - 44.5	6BCb	truncated and stacked, massive	
44.5 - 51.4	6BCb lam	crudely stratified, thickly laminated	Qot5 / 44.0 - 78.0 (1.0 - 4.0)

Depth (Ft)	Horizon	Summary Description of Boring 2b (Cont.)	Correlation Unit / Age Estimate (ka)
51.4 - 52.5	7Btb / 7Bwb	truncated, weak argillic to cambic, massive	
52.5 - 53.0	7BCb	massive, thin, scour deposit	Qot6 / 48.0 - 86.0 (4.0 - 8.0)
53.0 - 54.6	8ABb	truncated, organic-rich, massive	Lakewood Formation
54.6 - 56.3	8Btb	weak argillic, massive, slightly well oxidized	Qoa1 / 56.0 - 98.0 (8.0 - 12.0)
56.3 - 57.5	8BCb	sandy, massive, slightly well oxidized, scour deposit	
57.5 - 60.0	9Btb	truncated, moderate argillic, massive, moderately well oxidized	
60.0 - 60.6	9BCb	sandy, massive, scour deposit	Qoa2 64.0 - 110.0 (8.0 - 12.0)
60.6 - 68.0	10Btb	truncated, moderate argillic, massive, gravel-rich	
68.0 - 70.0+	10BCb	sandy, crudely stratified, scour deposit	Qoa3 79.0 - 140.0 (15.0 - 30.0)

Table 16u
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect B - Boring 3b

Summary Description on 1/23/14

Depth (Ft)	Horizon	Summary Description of Boring 3b	Correlation Unit
0 - 2.3	NR / Af	zone of no recovery and artificial fill	Modern Fill Af
2.3 - 3.1	AB	organic-rich, massive, thin	Holocene Alluvium
3.1 - 4.8	Bt1	weak argillic, massive	Qyt
4.8 - 7.0	BC	massive, sandy	
7.0 - 7.9	2ABb	truncated, organic-rich, massive	Pleistocene Alluvium
7.9 - 9.1	2Btb	moderate to strong argillic, gravel-rich, slightly well oxidized	
9.1 - 13.5	2BCb1	massive, slightly oxidized	Qof
13.5 - 15.8	2BCb2	crudely stratified, gravel-rich, scour deposit	
15.8 - 20.0	3Btb	truncated, weak to moderate argillic, massive, slightly well oxidized	
20.0 - 21.7	3BCb	massive, sandy, slightly oxidized	Qot1
21.7 - 24.0	4Btb / 4Bwb	truncated, weak argillic to cambic, massive	
24.0 - 28.7	4BCb	massive, sandy, slightly oxidized, scour deposit	
28.7 - 30.0	5Btb1	truncated, weak argillic, slightly well oxidized, massive	
30.0 - 33.7	5Btb2	weak argillic, massive	Qot2
33.7 - 34.8	5BCb1	massive to crudely stratified, gravel-rich	
34.8 - 35.0	5BCb2	crudely stratified, gravel-rich, scour deposit	
35.0 - 35.7	6Btb / 6Bwb	truncated, weak argillic to cambic, massive	

Depth (Ft)	Horizon	Summary Description of Boring 3b (Cont.)	Correlation Unit
35.7 - 40.0	6BCb	crudely stratified, gravel-rich, scour deposit	Qot3
40.0 - 43.1	7BCb	truncated and stacked, massive, sandy	
43.1 - 51.1	7BCb lam	crudely stratified, thickly laminated, scour deposit	Qot5
51.1 - 52.5	8ABb	organic-rich, massive	Lakewood Formation
52.5 - 55.8	8Btb1	moderate to strong argillic, massive, moderate redox	Qoa1
55.8 - 63.6	8Btb2	moderate argillic, massive, silty, moderate redox	
63.6 - 65.8	8BCb	massive, sandy, moderate redox, scour deposit	
65.8 - 66.9	9Btb	weak to moderate argillic, moderately well oxidized, massive	
66.9 - 68.6	9BCb	massive, gravel-rich, MnO, scour deposit	Qoa2
68.6 - 69.3	10Btb	moderate argillic, slight organics, massive	
69.3 - 70.0+	10BCb	sandy, massive, slightly oxidized, scour deposit	Qoa3

Table 16v
9900 Wilshire Boulevard, Core Sample Soil Summary

Summary Description - Transect B - Boring 4b

Summary Description on 1/28/14

Depth (Ft)	Horizon	Summary Description of Boring 4b	Correlation Unit
0 - 13.9	NR / Af	zone of no recovery and artificial fill	Modern Fill Af
13.9 - 14.5	Bt / Bw	truncated, weak argillic to cambic, massive, slightly oxidized	Holocene Alluvium
14.5 - 15.6	C	massive, thin, scour deposit	Qyt1-a
15.6 - 17.1	2ABb	organic-rich, massive, silty	
17.1 - 18.5	2Btb	weak argillic, massive	
18.5 - 21.0	2BCb1	massive, thick, sandy	Qyt1
21.0 - 21.7	2BCb2	massive, scour deposit, with argillic rip ups	
21.7 - 30.0	3Btb	truncated, moderate to strong argillic, massive, gravel-rich, slightly oxidized	Pleistocene Alluvium
30.0 - 33.7	3Btb	moderate argillic, massive, gleyed	Qof1
33.7 - 35.9	3BCb	massive, gravel-rich, gleyed, scour deposit	
35.9 - 43.8	4Btb	truncated, moderate argillic, moderate redox	Qot1
43.8 - 50.0	4BCb	crudely stratified, gravel-rich, MnO, scour deposit, moderate redox	
50.0 - 55.9	5BCb lam	stacked and truncated, crudely stratified, thickly laminated	
55.9 - 58.7	5BCb	massive, gravel-rich, MnO, scour	Qot5
58.7 - 62.4	6Btb / 6Bwb	truncated, weak argillic, massive	
62.4 - 65.0	6BCb lam	crudely stratified, thickly laminated	Qot6
65.0 - 70.0+	7Btb	truncated, moderate to strong argillic, thick, moderate redox	Lakewood Formation Qoa1

Table 16w
9900 Wilshire Boulevard, Core Sample Soil Summary
Soil Profile 12 - Transect B - Boring 5b

Summary Description on 1/28/14, Detailed Description on 2/3/14

Depth (Ft)	Horizon	Summary Description of Boring 5b	Correlation Unit / Age Estimate (ka)
0 - 2.0	NR	zone of no recovery	Modern Fill Af / 0
2.0 - 5.6	Bt / Bw	truncated, weak argillic to cambic, massive	Holocene Alluvium
5.6 - 7.2	BC	massive, gravel-rich	
7.2 - 11.1	C	massive, gravel-rich, scour deposit	Qyt-a / 4.0 - 8.0
11.1 - 15.4	2Btb / 2Bwb	truncated, weak argillic to cambic, massive	
15.4 - 15.8	2BCb	massive, thin, scour deposit	Qyt / 12 - 20 (8.0 - 12.0)
15.8 - 16.3	3Btb1	truncated, moderate to strong argillic, massive	Pleistocene Alluvium
16.3 - 20.8	3Btb2	moderate argillic, gravel rich, massive	Qof / 27.0 - 50.0 (15.0 - 30.0)
20.8 - 22.0	3BCb	massive, with MnO, scour deposit	
22.0 - 28.5	4Btb1	truncated, moderate argillic, slight organics, massive, moderate redox	Qot1 / 39.0 - 70.0 (8.0 - 12.0) (4.0 - 8.0)
28.5 - 30.0	5ABb	truncated and stacked, organic-rich, massive	
30.0 - 33.7	5BCb	massive, gravel-rich, scour deposit, gleyed	
33.7 - 42.4	6Btb / 6Bwb	truncated, weak argillic to cambic, massive	
42.4 - 43.5	6BCb	massive, gravel-rich, with MnO, scour deposit	Qot2 / 43.0 - 78.0 (4.0 - 8.0)
43.5 - 44.0	7Btb / 7Bwb	truncated, weak argillic to cambic, massive, moderate redox	
44.0 - 47.2	7BCb	massive, gravel-rich, with MnO, scour deposit	Qot3 / 47.0 - 86.0 (4.0 - 8.0)
47.2 - 50.0	8Btb / 8Bwb	truncated, weak argillic to cambic, massive, moderately well oxidized	

Depth (Ft)	Horizon	Summary Description of Boring 5b (Cont.)	Correlation Unit / Age Estimate (ka)
50.0 - 52.3	8BCb	massive, sandy, scour deposit	Qot4 / 51.0 - 91.0 (4.0 - 8.0)
52.3 - 53.6	9Btb / 9Bwb	truncated, weak argillic to cambic, massive, moderately well oxidized	
53.6 - 55.0	NR	zone of no recovery	Qot5 / 55.0 - 99.0 (4.0 - 8.0)
55.0 - 56.2	9Cb	massive, sandy, scour deposit	
56.2 - 60.9	10Btb	truncated, moderate argillic, massive	Lakewood Formation
60.9 - 62.7	10BCb lam	crudely stratified, thickly laminated, scour deposit	Qoa1 / 63.0 - 111.0 (15.0 - 30.0)
62.7 - 70.0+	11Btb	truncated, medium to strong argillic, massive, moderate redox	Qoa2 / 71.0 - 123.0 (8.0 - 12.0)

CONCLUSIONS

The soils observed across the study area are mainly inceptisols and alfisols that have developed in alluvial environments. All twelve of the soil profiles across the three trench exposures and boring Transects A and B consist of a series of stacked, truncated, and buried argillic and cambic diagnostic subsurface soil horizons. The truncated and buried soils are weakly, moderately well, and strongly developed. The buried inceptisol soils typically have 10-7.5YR colors with a low amount of secondary (pedogenic) clay in a series of weak argillic (Bt) to cambic (Bw) diagnostic subsurface horizons. The buried alfisol soils typically have 7.5YR colors with a moderate amount of secondary (pedogenic) clay in a series of argillic (Bt) diagnostic subsurface horizons.

The near surface buried soil profiles across the project site area are laterally continuous, and relatively flat lying. Lateral variability in the soils across the site is due to 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 given in this study are minimum ages.

These soil relative age determinations are consistent with the general geologic and pedogenic observations of soils in southern California. Strongly developed, well horizonated, thick, and oxidized alfisols can be as much as 130 ka in age. Erosion tends to act as a rejuvenating aspect in soil development, by decreasing the strength of the soil development properties consequent age estimates are younger. In that past magnitudes and rates of erosion is difficult to assess the soil relative age estimates are utilized as minimum ages.

The soils observed across the project site area are Holocene to Pleistocene in age. The buried and stacked soils display soil horizons that have punctuated soil horizon development. Age estimates range from 4 to 16 ka for the young and thin surfical alluvial stream terrace (Qyt). An older and thick alluvial fan deposit that underlies the entire project site area has relative age estimates that range from 15 – 42 ka in age. This is the uppermost Pleistocene aged soil that can be correlated across the entire project site area.

The buried sequence of terrace deposits observed across the project site area are also Pleistocene in age. These buried and stacked soils display soil horizons that also have weak argillic horizon development. Age estimates range from 32 to 94 ka for this thick alluvial section. The oldest alluvial section observed across the project site area is interpreted to be the Lakewood Formation and has relative age estimate that ranges from 71 – 140 ka.

LIMITATIONS

The conclusions and recommendations presented herein are the results of an inherently limited scope. Specifically, the scope of services consisted of an assessment of relative age and did not participate in many mapping or logging activities at the site. Additionally, the scope of services consisted of an assessment of relative age from core samples and did not participate in any drilling activities at the site. The conclusions and

recommendations contained in this report are professional opinions derived in accordance with current standards of professional practice. No warranty is expressed or implied.

This report has been prepared for the exclusive use of GEOCON, Inc. and applies only to the Fault Rupture Hazard Study located at 9900 Wilshire Boulevard. In the event that significant changes in the interpretations of this study to be made, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed by John Helms, CEG, and the conclusions and recommendations of this report are verified in writing.

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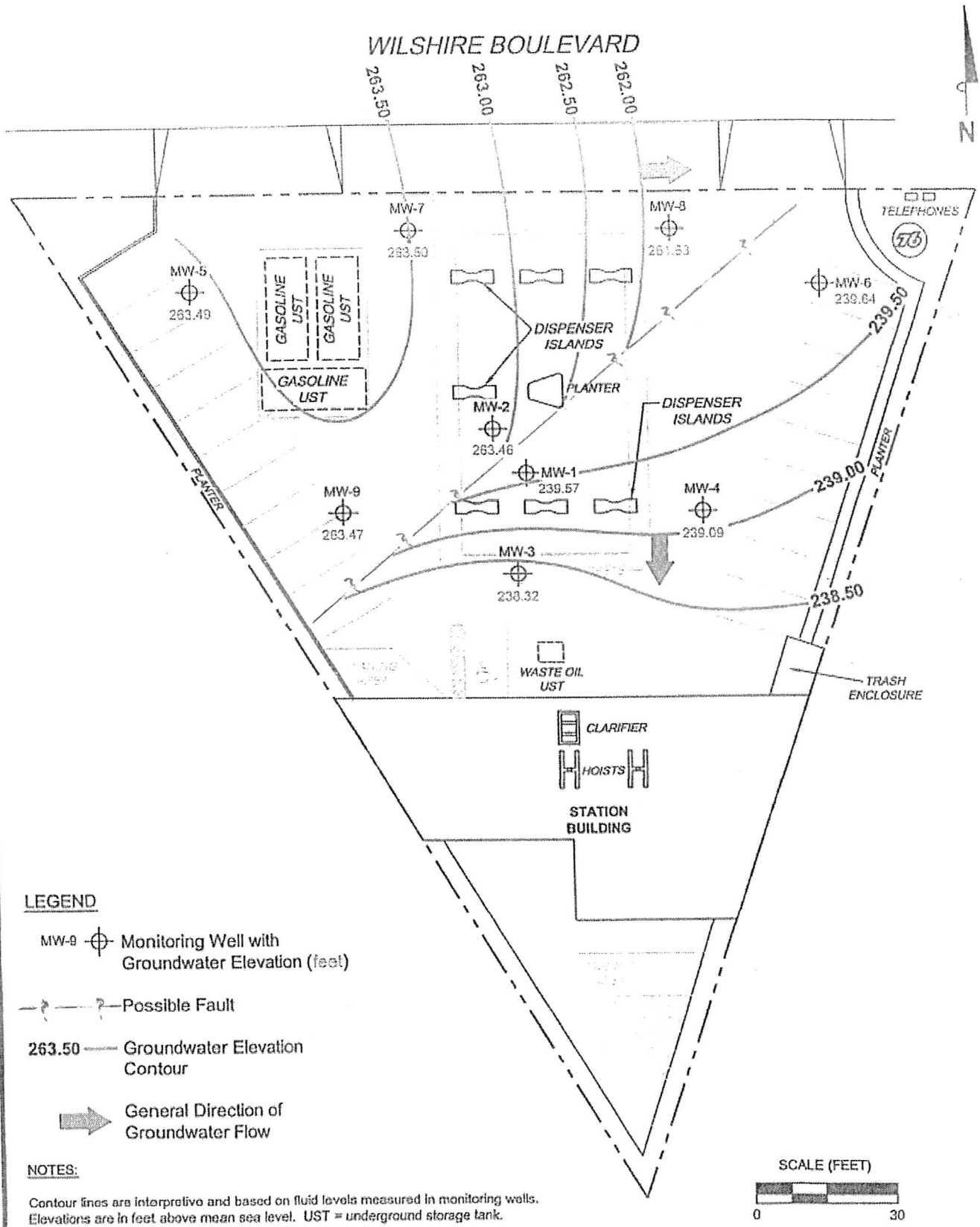
APPENDIX F

GROUNDWATER ELEVATION CONTOUR MAP AND BORING LOGS

9988 WILSHIRE BOUEVARD



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TRC

PROJECT: 165520

FACILITY:
76 STATION 0703
9988 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
June 4, 2009

FIGURE 2

LITHOLOGY
(UNIFIED SOILS CLASSIFICATION SYSTEM)

MAJOR DIVISIONS			TYPICAL NAMES	
COARSE-GRAINED SOILS (MORE THAN HALF IS LARGER THAN No. 200 SIEVE)	GRAVELS (MORE THAN HALF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (MORE THAN HALF COARSE FRACTION IS SMALLER THAN No. 4 SIEVE SIZE)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS (MORE THAN HALF IS SMALLER THAN No. 200 SIEVE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW- TO MEDIUM-PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM- TO HIGH-PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

SYMBOLS AND NOTES

- SAMPLE INTERVAL
- SAMPLE NOT RECOVERED
- CONCRETE
- BENTONITE CHIPS
- COATED BENTONITE PELLETS
- VOLCLAY or BENTONITE GROUT
- FILTER SAND PACK
- WATER LEVEL ENCOUNTERED WHEN DRILLING
- STATIC WATER LEVEL

CLAST SIZE (Field Classification)

Gravel = >0.2 inches
Sand = 0.003 - 0.2 inches
Silt = <0.003 (not plastic)
Clay = <0.003 (plastic)

DESCRIPTORS

Trace = 1% - 5%
Some = 6% - 10%
With = 11% - 25%
-ly = 26% - 40%
And = >40%

SANDS

4-10 blows per foot = Loose
10-30 blows per foot = Medium Dense
30-50 blows per foot = Dense
>50 blows per foot = Very Dense

SILTS & CLAYS

2-4 blows per foot = Soft
4-8 blows per foot = Medium Stiff
8-15 blows per foot = Stiff
15-30 blows per foot = Very Stiff
>30 blows per foot = Hard

USCS = Unified Soil Classification System
ppm = Parts Per Million (mg/kg)

PID = Photoionization Detector
CGI = Combustible Gas Indicator

TRC

KEY TO BORING LOG

L:\LIBRARY\GEOLOGY\Standards_Figures\boring log key.DWG Jul 21, 2005 - 1:55pm rhughes

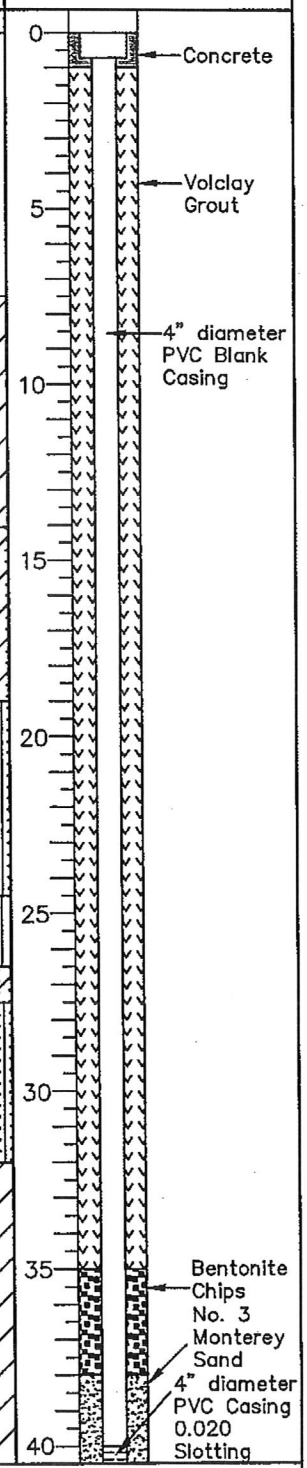
PROJECT NO.: 20-0896	DATE DRILLED: October 4 and 5, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 8 and 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 60.5 feet DEPTH TO WATER: 50.0 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
			0	Air Knifed to 5 feet.	
7/7/8	0.6		5	CLAYEY SILT: very dark gray (10YR 3/1), very stiff, moist, trace fine-grained sand and fine gravel.	ML
8/8/9					
7/11/13				SANDY CLAY: very dark grayish brown (10YR 3/2), very stiff, moist, fine-grained sand, some silt.	CL
8/8/9			10		
10/14/18	1.0			SILTY CLAY: very dark grayish brown (10YR 3/2), very stiff, moist, trace fine-grained sand.	
13/15/18				Trace fine gravel and medium-grained sand.	
13/15/18	0.5		15	CLAYEY SAND: dark grayish brown (10YR 4/2), dense, moist, fine-grained, trace medium-grained sand, trace silt, trace fine gravel.	SC
13/13/13					
13/13/15				Very dark grayish brown (10YR 3/2), medium dense, trace silt.	
10/12/14					
8/9/12	8.1		20	SILTY SAND: very dark gray (5Y 3/1), medium dense, moist, fine-grained, trace medium-grained sand and fine gravel, trace clay.	SM
8/9/10				Cobble @ 22.0 fbg.	
17/23/31				Greenish black (2 for GLEY 10BG) very dense, no clay.	
17/21/22	5.4		25	SANDY SILT: dark greenish gray (2 for GLEY 3/1), hard moist, fine-grained sand, trace fine gravel and clay.	ML
17/18/19				CLAYEY SAND: dark gray (5Y 4/1), dense, moist, fine-grained, some silt, trace medium-grained sand and fine gravel.	SC
50 for 6"				SILTY SAND: dark olive gray (5Y 3/2), very dense, moist, fine-grained, trace clay.	SM
22/50	12.7		30		
8/9/14					
9/11/15				SILTY CLAY: dark greenish gray (1 for GLEY 4/1), very stiff, moist, trace fine-grained sand and fine gravel.	CL
8/9/14	2.3		35		
10/12/16					
19/23/25				Hard.	
21/25/30					
20/24/26			40		

GRAPHIC LOG

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

B-1/MW-1

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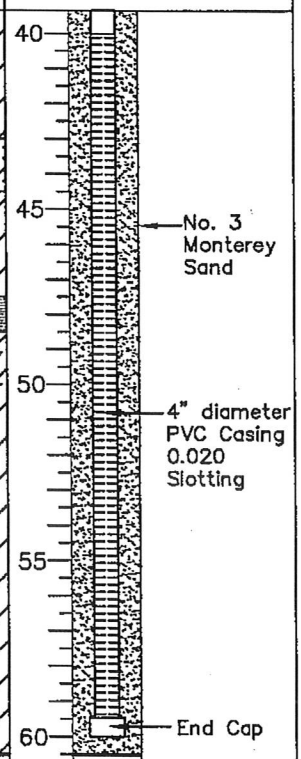
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 8 and 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 60.5 feet DEPTH TO WATER: 50.0 feet

BLOWS PER 6 INCHES	PID (ppmv)	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
20/24/26	38.9	40		CL	
22/25/28					
22/50			CLAYEY SAND: dark greenish gray (1 for GLEY 4/1/10GY), very dense, moist, fine-grained, trace silt.	SC	
22/25/28	3.0	45	SANDY CLAY: dark greenish gray (1 for GLEY 4/1/10Y), hard, moist, fine-grained sand, trace fine gravel.	CL	
42/50					
18/21/24			SAND: dark grayish brown (10YR 4/2), dense, moist, fine- to medium-grained, trace fine and coarse gravel ,trace clay.	SP	
13/22/29	0.6		SANDY CLAY: dark yellowish brown (10YR 4/4), hard, wet, fine-grained sand, trace fine gravel.	CL	
22/50		50			
10/20/20					
42/28/30					
21/24/32	0.3	55			
28/32/35					
50 for 6"			Some fine gravel.		
21/33/36		60			
		65			
		70			
		75			
		80			

WELL CONSTRUCTION DETAIL



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PROJECT NO.: 20–0896	DATE DRILLED: October 5, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 10–inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 61.5 feet DEPTH TO WATER: 50.0 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			0	Air Knifed to 5 feet.		
10/10/10	0.6		5	CLAYEY SILT: very dark grayish brown (10YR 3/2), very stiff, moist, trace fine- and medium-grained sand, trace coarse-grained sand and fine gravel.	ML	
12/14/16	0.0		10	SILTY CLAY: dark brown (10YR 3/3), hard, moist, trace fine- and medium-grained sand, trace fine gravel.	CL	
15/16/20	0.0		15	SANDY CLAY: dark grayish brown (10YR 4/2), hard, moist, fine-grained sand, trace medium- and coarse-grained sand, trace fine gravel.		
13/17/20	3.4		20	SILTY SAND: dark olive gray (5Y 3/2), dense, moist, fine-grained, trace fine gravel and clay.	SM	
12/14/16	198.4		25	SANDY CLAY: dark olive gray (5Y 3/2), dense, moist, fine-grained sand, some silt, trace medium-grained sand and fine gravel.	CL	
17/18/20	1,347		30	Dark greenish gray (1 for GLEY 4/1/10Y), hard, trace silt.		
22/25/30	94.2		35	Dark greenish gray (1 for GLEY 3/1/5GY), trace silt and coarse gravel.		
			40			

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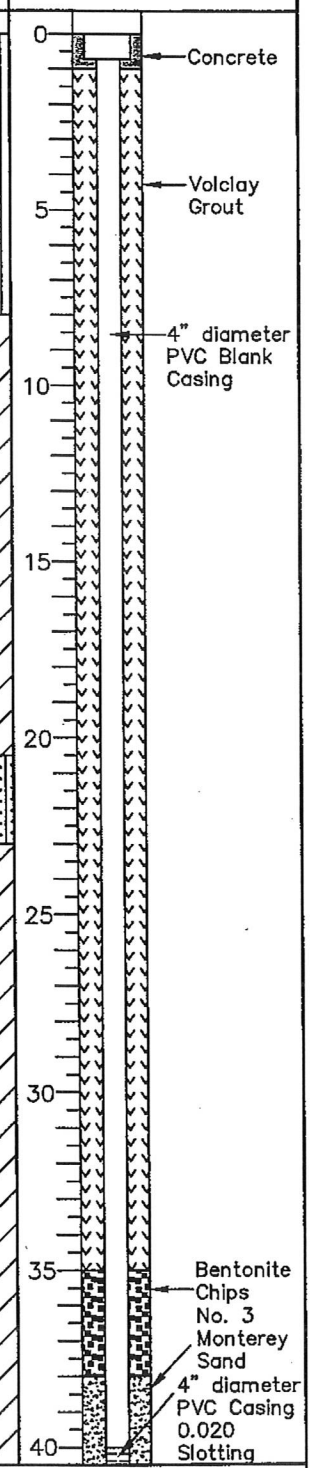

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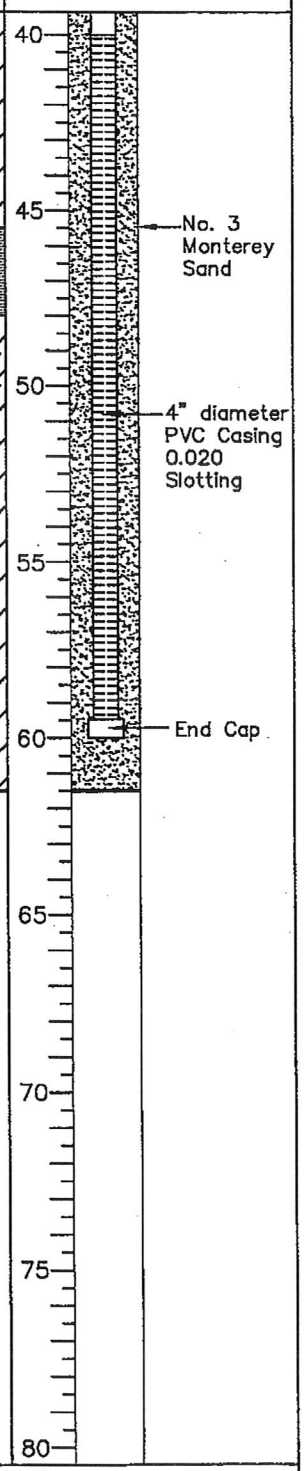
PROJECT NO.: 20-0896	DATE DRILLED: October 5, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 61.5 feet DEPTH TO WATER: 50.0 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
12/16/26	2,701		40	SANDY CLAY: dark greenish gray (1 for GLEY 4/1/5GY), hard, moist, fine-grained sand, trace silt and fine gravel, cobble @ 41.0 fbg.	CL	
13/25/28	1.2		45	SAND: dark grayish brown (10YR 4/2), very dense, moist, fine- to medium-grained, trace coarse-grained sand, some fine gravel, trace coarse gravel.	SP	
22/50	0.4		50	SANDY CLAY WITH GRAVEL: olive gray (5Y 4/2), hard, wet, fine-grained sand, fine gravel, trace silt and coarse gravel.	CL	
50 for 6"	7.0		55			
10/12/16	3.2		60	Dark olive gray (5Y 3/2).		
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

B-3/MW-2

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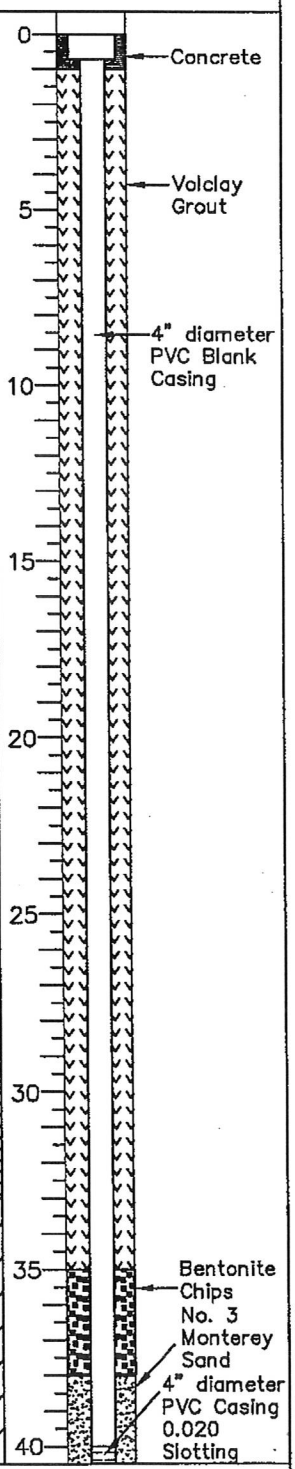
PROJECT NO.: 20–0896	DATE DRILLED: October 6, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 10–inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 61.5 feet DEPTH TO WATER: 50.5 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
			0	Air Knifed to 5 feet.	
50 for 6"	0.3		5	SANDY SILT: very dark grayish brown (10YR 3/2), hard, moist, fine-grained sand, trace medium-grained sand and fine gravel.	ML
50 for 6"	0.2		10	CLAYEY SILT: dark yellowish brown (10YR 4/4), hard, moist, trace fine- and medium-grained sand, trace fine gravel.	
50 for 6"	0.0		15	SILTY SAND: very dark grayish brown (10YR 3/2), very dense, moist, fine-grained, trace medium-grained sand and fine gravel, trace clay.	SM
42/50	2.2		20	CLAYEY SAND: dark olive gray (5Y 3/2), very dense, moist, fine-grained, trace medium-grained sand and fine gravel, trace silt.	SC
32/50	8.6		25	SILTY SAND: very dark gray (5Y 3/1), very dense, moist, fine-grained, trace medium-grained sand and clay.	SM
50 for 6"	2.7		30	Trace coarse-grained sand, trace fine and coarse gravel.	
18/25/30	3.1		35	SILTY CLAY: very dark gray (5Y 3/1), hard, moist, trace fine-grained sand and fine gravel.	CL
			40		

GRAPHIC LOG

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

B-5/MW-3

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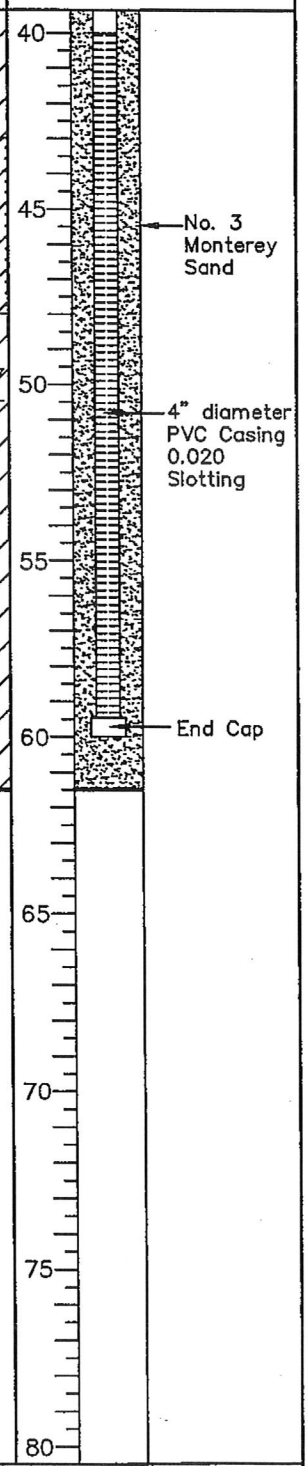
PROJECT NO.: 20-0896	DATE DRILLED: October 6, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 61.5 feet DEPTH TO WATER: 50.5 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
20/27/32	13.3		40	SANDY CLAY: very dark gray (5Y 3/1), hard, moist, fine-grained sand, some silt, trace fine gravel.	CL	
17/23/29	7.2		45	CLAYEY SAND: dark olive gray (5Y 3/2), very dense, moist, fine-grained, some silt, trace fine gravel.	SC	
28/32/50	33.8		50	SANDY CLAY: olive gray (5Y 4/2), hard, wet, fine-grained sand, trace silt and fine gravel.	CL	
28/50	11.2		55			
36/50	0.5		60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

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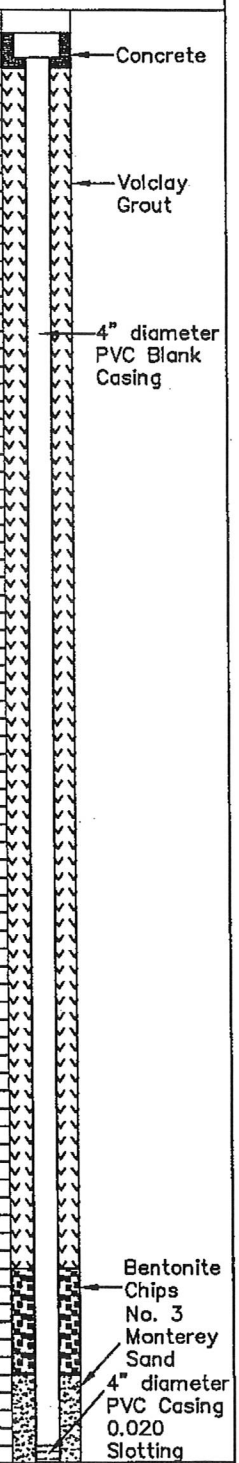
PROJECT NO.: 20-0896	DATE DRILLED: October 6, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 61.5 feet DEPTH TO WATER: 50.0 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
			0	Air Knifed to 5 feet.	
7/7/8	1.6		5	CLAYEY SILT: very dark gray (10YR 3/1), stiff, moist, trace fine- and medium-grained sand, trace fine and coarse gravel.	ML
11/17/23	1.1		10	SANDY SILT: very dark grayish brown (10YR 3/2), hard, moist, fine-grained sand, trace medium-grained sand and fine gravel.	
15/20/21	5.6		15	SILTY SAND: dark olive gray (5Y 3/2), dense, moist, fine-grained, some clay, trace medium-grained sand, trace fine and coarse gravel.	SM
21/22/25	7.6		20	SAND: dark greenish gray (1 for GLEY 3/1/5GY), dense, moist, fine- to medium-grained, some silt, trace fine and coarse gravel, trace clay.	SP
15/20/23	50.3		25	SILTY SAND: dark greenish gray (1 for GLEY 4/1/5G), dense, moist, fine-grained, trace clay.	SM
14/17/22	51.8		30	Dark greenish gray (1 for GLEY 3/1/10Y), fine- to medium-grained, some fine-gravel, trace coarse-grained sand and coarse gravel.	
42/50	>1,999		35	SAND: dark greenish gray (1 for GLEY 4/1/10Y), very dense, moist, fine- to medium-grained, some fine gravel, trace coarse gravel and silt.	SP
			40		CL

GRAPHIC LOG

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

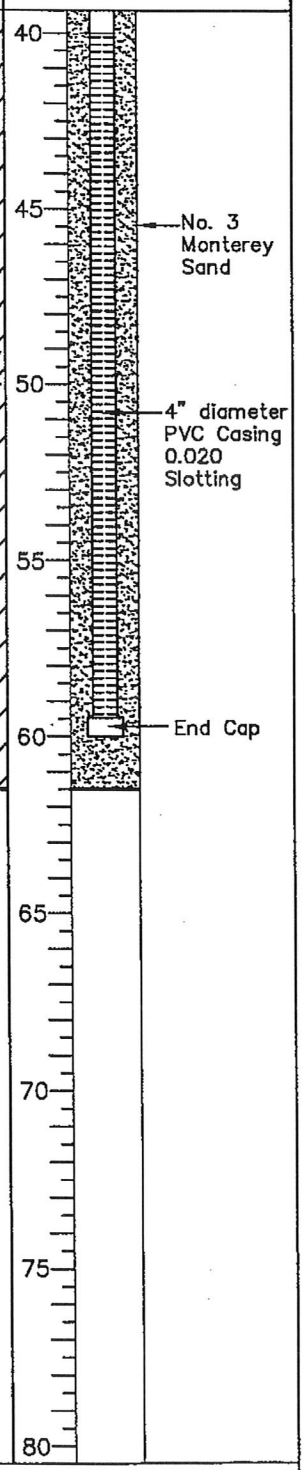
B-6/MW-4

PROJECT NO.: 20–0896	DATE DRILLED: October 6, 2005
LOCATION: 76 Station 0703	LOGGED BY: R. Ponce
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, RG
Beverly Hills, California	DRILLING CO./RIG: Cascade/LAR

DRILLING METHOD: 10–inch Diameter Hollow Stem Auger
SAMPLER TYPE: California Modified Split Spoon
TOTAL DEPTH: 61.5 feet DEPTH TO WATER: 50.0 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
22/25/30	196.2		40	SILTY CLAY: very dark gray (5Y 3/1), hard, moist, trace fine-grained sand and fine gravel, trace coarse-grained sand.	CL	
25/27/39	42.5		45	SANDY CLAY: dark olive gray (5Y, 3/2), hard, very moist, fine-grained sand, some silt, trace fine gravel.		
42/50	6.2		50	Wet.		
33/38/39	0.0		55	SANDY CLAY WITH GRAVEL: olive gray (5Y 4/2), hard, wet, fine- to medium-grained sand, fine gravel, some coarse grained sand, trace coarse gravel.		
24/50	0.0		60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

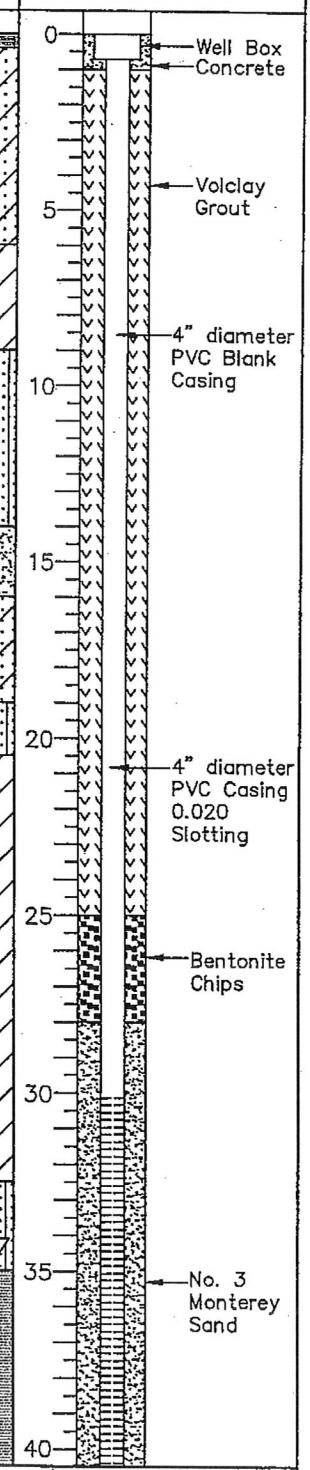
B-6/MW-4

PROJECT NO.: 20–0896	DATE DRILLED: February 27, 2007
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME–85

DRILLING METHOD: 10–inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5–foot Core Barrel
TOTAL DEPTH: 45 feet DEPTH TO WATER: 35 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			0	Air-Knifed to 5 feet. 5" of Asphalt.		
	0.4		5	CLAYEY SAND: brown (10YR 4/3), medium dense, dry, fine-grained, some medium-grained sand, trace fine gravel.	SC	
				SANDY CLAY: dark yellowish brown (10YR 4/4), stiff, dry, fine-grained sand, trace fine gravel.	CL	
	0.8		10	SILTY SAND: dark yellowish brown (10YR 4/4), medium dense, slightly moist, fine-grained, trace clay.	SM	
			15	GRAVELLY SAND: dark yellowish brown (10YR 4/5), medium dense, slightly moist, fine- to medium-grained, some coarse-grained sand, some fine gravel.	SW	
	1.6			CLAYEY SAND: yellowish brown (10YR 5/4), medium dense, slightly moist, fine-grained, trace silt at 17.5', possible shear.	SC	
			20	SILTY SAND w/ GRAVEL: brown (10YR 4/3), medium dense, moist, fine-grained, some medium- to coarse-grained sand, fine gravel.	SM	
	61			SANDY CLAY: light olive brown (2.5Y 5/3), medium stiff, moist, fine- to coarse-grained sand, some fine gravel.	CL	
	111		25	With gray mottling.		
	3.1		30	SILTY CLAY: olive gray (5Y 4/2), with gray mottling, medium stiff, very moist, some fine-grained sand, trace fine gravel.		
				SILTY SAND: dark olive gray (5Y 3/2), very moist, loose, medium-grained, some coarse-grained sand, trace fine gravel.	SM	
	0		35	SAND: very dark olive gray (5Y 3/2), wet, loose, medium-grained, some coarse-grained sand, some fine gravel.	SP	
			40			

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

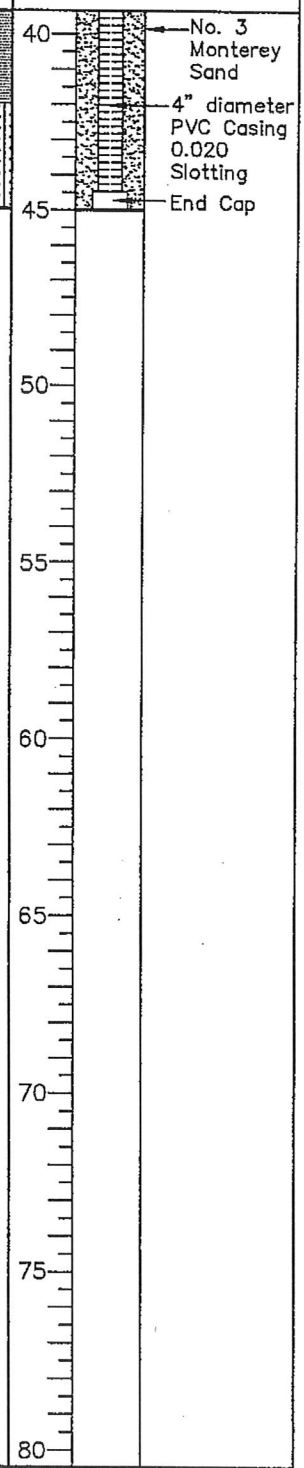
MW-5

PROJECT NO.: 20–0896	DATE DRILLED: February 27, 2007
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME–85

DRILLING METHOD: 10–inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5–foot Core Barrel
TOTAL DEPTH: 45 feet DEPTH TO WATER: 35 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
	3.0		40	GRAVELLY SAND: dark olive gray, (5Y 3/2), loose, wet, medium- to coarse-grained, fine and coarse gravel, trace silt and clay.	SP	
			45	SILTY SAND: very dark grayish brown (2.5Y 3/2), loose, wet, medium- to coarse-grained, some silt and fine gravel.	SM	
			50			
			55			
			60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

MW-5
PAGE 2 OF 2

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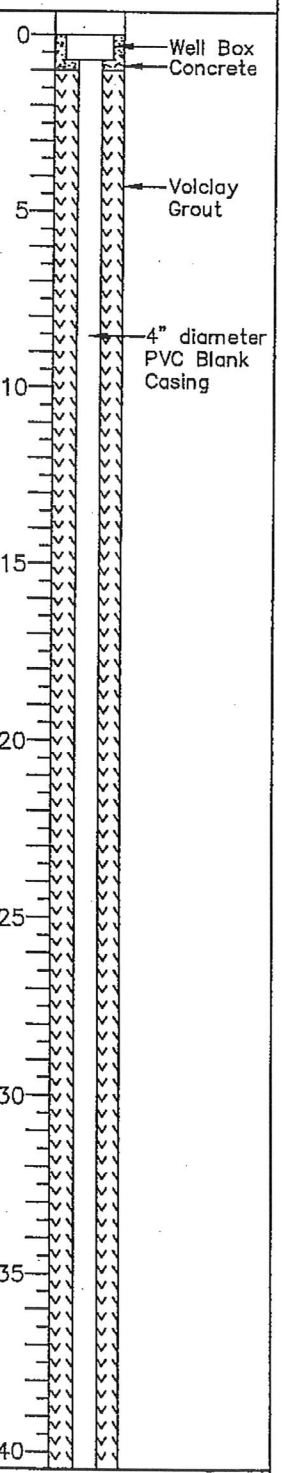
PROJECT NO.: 20--0896	DATE DRILLED: February 28, 2007
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME--85

DRILLING METHOD: 10--inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5--foot Core Barrel
TOTAL DEPTH: 60 feet DEPTH TO WATER: 53 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			0	Air-Knifed to 5 feet. 5" of Asphalt.		
	0		5	SILTY SAND: brown (10YR 4/3), loose, dry, fine- to coarse-grained, trace fine gravel and clay.	SM	
			10	Cobble at 10.5'.		
	0			CLAY: dark brown (10YR 3/3), slightly moist, stiff, some fine-grained sand, trace fine gravel.	CL	
				SILTY SAND: brown (10YR 4/3), medium dense, moist, fine- to medium-grained, some coarse-grained sand, trace fine gravel.	SM	
	0		15	SILTY CLAY: dark yellowish brown (10YR 4/4), stiff, slightly moist, some fine-grained sand, trace fine gravel.	CL	
	4.4		20	Dark yellowish brown (10YR 3/4), moist, no fine-grained sand or fine gravel.		
				SILTY SAND: dark grayish brown (10YR 4/2), medium dense, moist, fine-grained, some coarse-grained sand.	SM	
			25	SILTY CLAY: dark grayish brown (2.5Y 4/2), medium stiff, moist.	CL	
	16.1			SILTY SAND: very dark gray (5Y 3/1), medium dense, moist, fine-grained, some coarse-grained sand and fine gravel, 3-inch clay lens @27.0'.	SM	
				SANDY SILT: dark olive gray (5Y 3/2), soft, moist, fine-grained sand.	ML	
			30	CLAYEY SILT: olive gray (5Y 4/2), medium stiff, moist, some medium-grained sand, trace fine gravel.		
	0			CLAY: very dark grayish brown (2.5Y 3/2), very stiff, moist, trace coarse-grained sand and fine gravel.	CL	
			35	SANDY CLAY: olive brown (2.5Y 4/3), medium stiff, moist, some fine-grained sand, trace fine gravel.		
	7.2			CLAY: olive brown (2.5Y 4/3), stiff, moist, trace fine and coarse gravel.		
			40		GC	

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

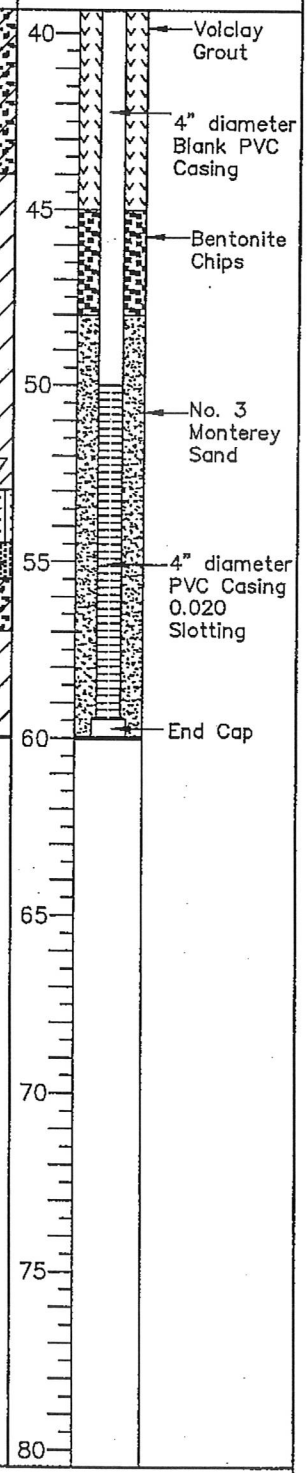
MW-6

PROJECT NO.: 20-0896	DATE DRILLED: February 28, 2007
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-85

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 60 feet DEPTH TO WATER: 53 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
	3.3		40	GRAVELLY CLAY/CLAYEY GRAVEL: dark gray (5Y 4/1), dense, moist, some silt, fine gravel, trace fine- to medium-grained sand.	GC	
	5.5		45	SILTY CLAY: brown (10YR 4/3), medium stiff, very moist, some fine-grained sand.	CL	
				CLAY: dark yellowish brown (10YR 4/4), stiff, moist, some silt.		
	3.3		50	SILTY CLAY: dark yellowish brown (10YR 4/4), medium stiff, moist, some fine-grained sand, trace fine gravel.		
				SILTY SAND: dark olive gray (5Y 3/2), dense, wet, fine- to coarse-grained sand, some fine and coarse gravel.	SM	
			55	GRAVEL: very dark gray (5Y 3/1), dense, wet, fine and coarse gravel, trace coarse-grained sand.	GP	
	45.3			CLAYEY GRAVEL: verk dark gray (5Y 3/1), dense, wet, fine and coarse gravel, some cobbles, some medium- to coarse-grained sand, trace fine-grained sand.	GC	
				SANDY CLAY: olive brown (2.5Y 4/3), stiff, wet, fine-grained sand, trace coarse-grained sand.	CL	
			60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

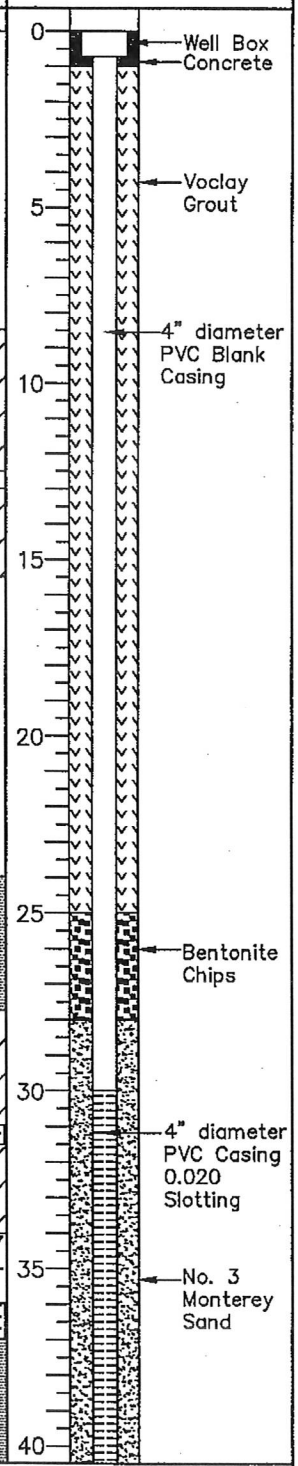
MW-6

PROJECT NO.: 157903	DATE DRILLED: March 19, 2008
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-75

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 48 feet DEPTH TO WATER: 35 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			0	Air Excavated to 5 feet.		
	0		5	SANDY SILT: brown (10YR 5/3), stiff, moist, some coarse- to fine-grained sand, fine and coarse gravel.	ML	
	0		10	CLAY: dark yellowish brown (10YR 4/4), stiff, moist, some fine-grained sand, trace silt.	CL	
				SANDY SILT: dark olive gray (5Y 3/2), soft, moist, some fine-grained sand.	ML	
	15.2		15	SILTY CLAY: dark olive gray (5Y 3/2), medium stiff, very moist, trace fine-grained sand.	CL	
				No recovery - cobbles.		
	–		20			
	–		25	SAND: very dark gray (5Y 3/1), medium dense, very moist, fine- to medium-grained, some coarse-grained sand, trace fine gravel, trace silt.	SP	
	16			SILTY CLAY: brown (10YR 5/3), medium stiff, moist, trace fine-grained sand.	CL	
			30	SILTY SAND: dark olive gray (5Y 3/2), medium dense, very moist to wet, fine-grained, trace fine gravel.	SM	
	0			SILTY CLAY: light olive brown (2.5Y 5/3), moist, stiff, trace fine-grained sand.	CL	
			35	CLAYEY SILT: light olive brown (2.5Y 5/3), wet, medium stiff, some fine-grained sand.	ML	
				SILTY SAND: light olive brown (2.5Y 5/4), medium dense, wet, fine-grained, trace fine gravel.	SM	
	0			GRAVELLY SAND: dark olive gray (5Y 3/2), dense, wet, fine- to coarse-grained, fine to coarse gravel, little silt, trace clay.	SP	
			40			

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

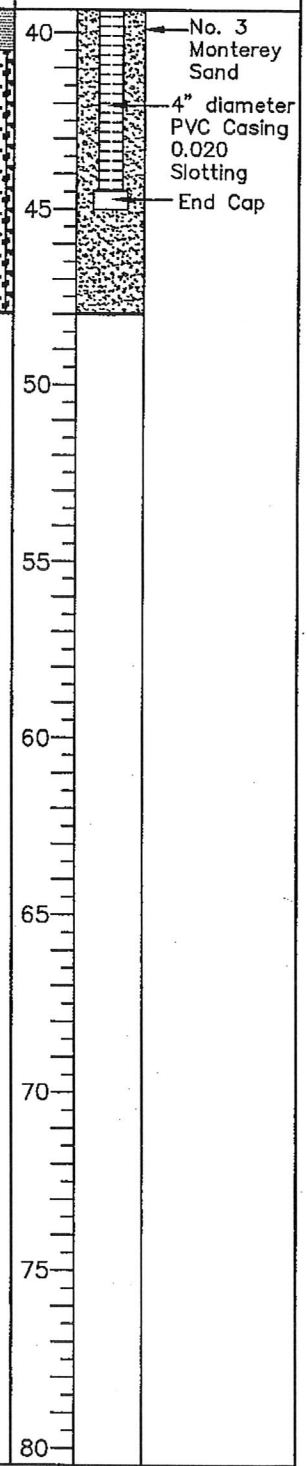
MW-7

PROJECT NO.: 157903	DATE DRILLED: March 19, 2008
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-75

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 48 feet DEPTH TO WATER: 35 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
	0		40		SP	
				SILTY GRAVEL: dark olive gray (5Y 3/2), very stiff, moist, some fine-grained sand, little coarse-grained sand, fine and coarse gravel, trace clay and medium-grained sand.	GM	
			45			
			50			
			55			
			60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

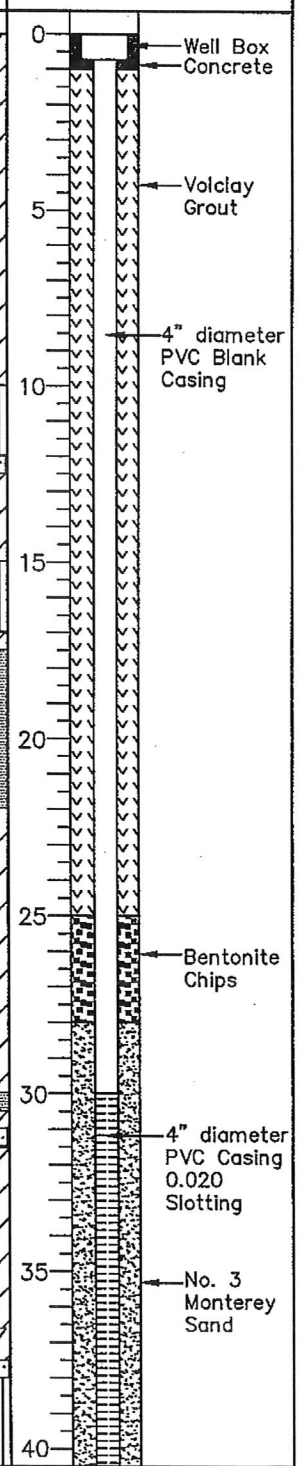
MW-7

PROJECT NO.: 157903	DATE DRILLED: March 21, 2008
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-85

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 47 feet DEPTH TO WATER: 37.5 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			0	Air Excavated to 5 feet.		
			5	CLAY: very dark grayish brown (10YR 3/2), very stiff, moist, some fine-grained sand and silt.	CL	
				Increased sand content.		
	0		10	SILT: olive gray (5Y 4/2), soft, moist, some fine-grained sand.	ML	
				SILTY SAND: olive gray (5Y 4/2), medium dense, moist, medium-grained, trace clay.	SM	
	0			SILTY CLAY: olive gray (5Y 4/2), medium stiff, moist, some fine-grained sand.	CL	
			15	SANDY SILT: dark gray (5Y 4/1), soft, moist, fine-grained sand, trace clay.	ML	
				3-inch thick sand lense.		
				SILTY CLAY: very dark gray (5Y 3/1), medium stiff, moist, some fine-grained sand.	CL	
	0			SAND: very dark gray (5Y 3/1), medium dense, moist, medium-grained, some fine-grained sand, trace coarse-grained sand and fine gravel.	SP	
			20			
	0			SILTY CLAY: dark gray (5Y 4/1), stiff, moist, some fine-grained sand and fine gravel.	CL	
			25			
				CLAY: dark grayish brown (10YR 4/1), very stiff, slightly moist, some coarse-grained sand.		
	0		30	SAND: dark gray (5Y 4/1), very moist to wet, medium dense, medium-grained, trace coarse-grained sand.	SP	
					CL	
				SILTY CLAY: light yellowish brown (10YR 6/3), medium stiff, slightly moist, fine-grained sand.	SM	
	0			SILTY SAND: dark gray (5Y 4/1), very moist to wet, medium dense, medium-grained, trace coarse-grained sand and clay.		
				SILTY CLAY: dark gray (5Y 4/1), very moist, stiff, trave fine-grained sand.	CL	
			35			
				SILTY SAND: olive (5Y 4/3), medium dense, wet, fine-grained sand, some clay.	SM	
	0			CLAYEY SILT: yellowish brown (10YR 5/4), stiff, moist, some fine-grained sand.	ML	
			40	Wet.		

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

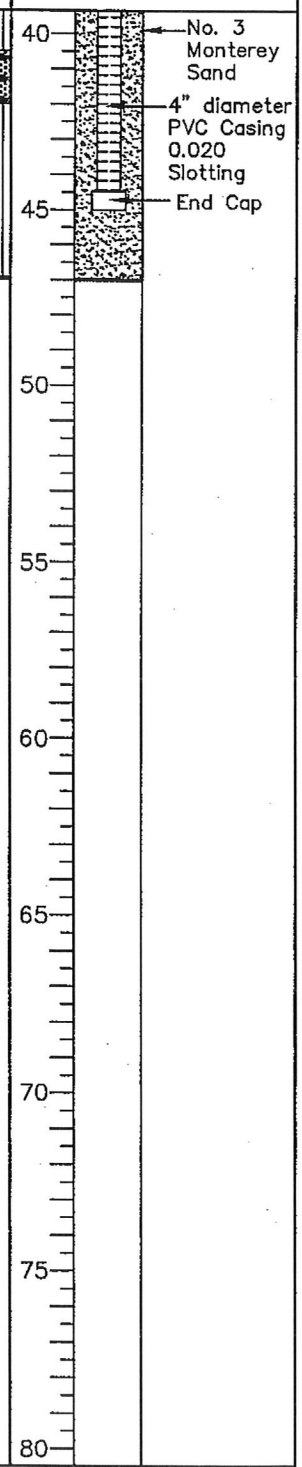
MW-8

PROJECT NO.: 157903	DATE DRILLED: March 21, 2008
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-85

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 47 feet DEPTH TO WATER: 37.5 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			40		ML	
				SANDY GRAVEL: very dark gray (5Y 3/1), dense, wet, fine gravel, coarse-grained sand, some medium-grained sand, trace fine-grained sand.	GP	
	0			GRAVELLY CLAY: yellowish brown (10YR 5/6), very stiff, very moist, fine gravel, some fine- and coarse-grained sand, some silt.	CL	
			45			
			50			
			55			
			60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



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LOG OF EXPLORATORY BORING

MW-8

PAGE 2 OF 2

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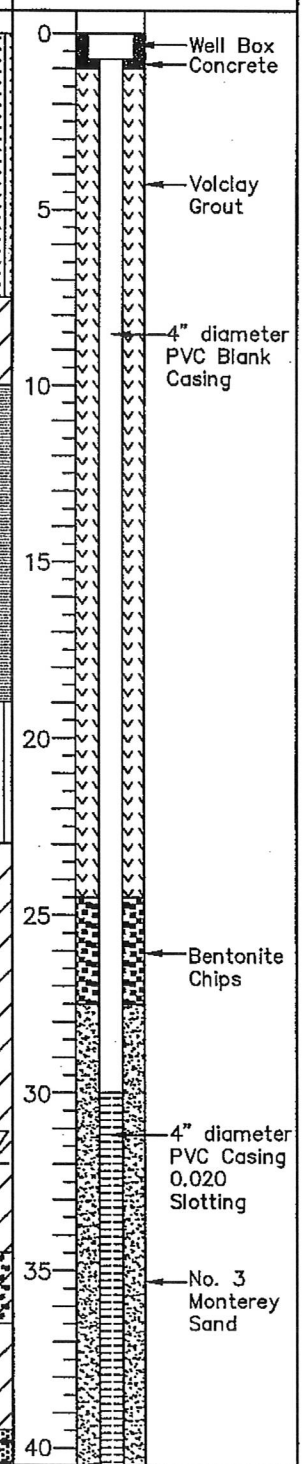
PROJECT NO.: 157903	DATE DRILLED: March 24, 2008
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-85

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 46 feet DEPTH TO WATER: 32 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
			0	Air Excavated to 5 feet.		
			5	SILTY SAND: dark yellowish brown (10YR 4/4), medium dense, dry, fine-grained, some fine and coarse gravel, trace clay.	SM	
	0			SILTY CLAY: yellowish brown (10YR 5/4), hard, dry, some fine-grained sand.	CL	
			10	SAND: dark yellowish brown (10YR 4/4), medium dense, dry, fine- to medium-grained, some coarse-grained sand, some fine to coarse gravel, some silt.	SP	
	0					
			15	Fine- to coarse-grained sand.		
	0					
			20	CLAYEY SILT: olive (5Y 4/3), medium stiff, slightly moist, some fine-grained sand.	ML	
				CLAY: dark yellowish brown (10YR 4/4), hard, slightly moist, trace silt and fine-grained sand.	CL	
	0		25	SILTY CLAY: olive gray (5Y 4/2), medium stiff, moist, some fine-grained sand.		
				CLAY: olive gray (5Y 4/2), stiff, moist, some coarse-grained sand, and fine gravel.		
	0		30	Medium stiff, wet at 32 feet, some fine-grained sand, locally sandy, some silt.		
				Becomes gravelly clay with fine and coarse gravel (shale).		
	0		35	CLAYEY GRAVEL: olive gray (5Y 4/2), stiff, wet, fine and coarse gravel, some coarse-grained sand.	GC	
				SILTY CLAY: yellowish brown (10YR 5/4), medium stiff, moist, some fine-grained sand, some fine and coarse gravel.	CL	
	0			SANDY CLAY: yellowish brown (10YR 5/4), medium stiff, wet, medium- to coarse-grained sand, some fine gravel.		
			40		GP	

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

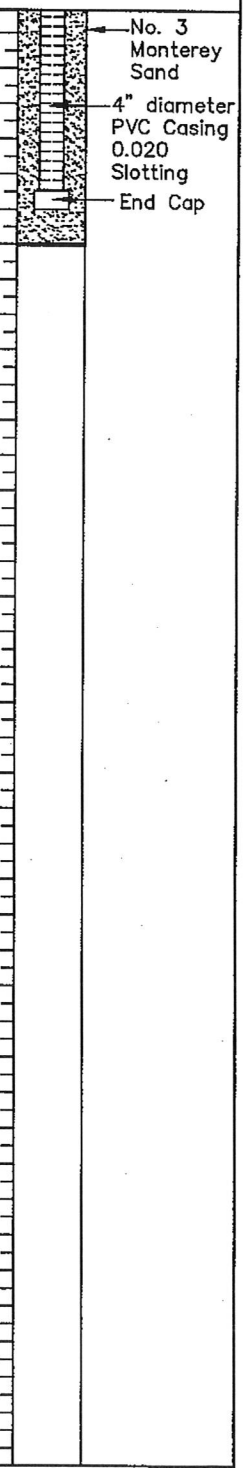
MW-9

PROJECT NO.: 157903	DATE DRILLED: March 24, 2008
LOCATION: 76 Station 0703	LOGGED BY: J. Nordenstam, P.G.
9988 Wilshire Boulevard	APPROVED BY: J. Nordenstam, P.G.
Beverly Hills, California	DRILLING CO./RIG: Cascade/CME-85

DRILLING METHOD: 10-inch Diameter Hollow Stem Auger
SAMPLER TYPE: 5-foot Core Barrel
TOTAL DEPTH: 46 feet DEPTH TO WATER: 32 feet

BLOWS PER 6 INCHES	PID (ppmv)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	GRAPHIC LOG
	0		40	SANDY GRAVEL: very dark gray (5Y 3/1), dense, wet, coarse-grained sand, fine gravel, some medium-grained sand, trace fine-grained sand.	GP	
			45	SILTY GRAVEL/SAND: very dark gray (5Y 3/1), medium dense, wet, medium- to coarse-grained sand, fine and coarse gravel, some clay.	GM	
			50			
			55			
			60			
			65			
			70			
			75			
			80			

WELL CONSTRUCTION DETAIL



TRC

LOG OF EXPLORATORY BORING

MW-9
PAGE 2 OF 2

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EXPLORATION MAP

EL RODEO
605 WHITTIER DRIVE
BEVERLY HILLS, CALIFORNIA

PLATE 1

Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=30'	Date: 02/2015

Drafted By: BGT | Checked By: BGT | P:\DRAFTING\10274\WORKF_2015-02-04\10274-006-PLATE-1.DWG-[02-18-15 3:43:53PM]- Plotted by: bbee

Leighton

LEGEND

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 A. (LEIGHTON CONSULTING, INC., 2012 & 2014)

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

CPT–9 — APPROXIMATE LOCATION OF CONE PENETROMETER TEST (CPT) SOUNDING SEE PLATE 2 FOR SUBSURFACE PROFILES. (GEOCON WEST INC., 2014)

FT-2 0+00 to FT-2 1+25 — APPROXIMATE LOCATION OF FAULT TRENCH EXCAVATIONS SHOWN WITH STATION NUMBERING. TRENCH LOGS INCLUDED IN APPENDIX A. BOLDENED RED 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)

B – B' — LOCATION OF GEOLOGIC CROSS SECTIONS (SEE PLATES 2 AND 3)

N

0 30 60
SCALE FEET

APPROXIMATE SITE BOUNDARY

Sewer Trench Excavation–24–Inches Wide 7 to 10 Feet Deep, Shored

Underlying artificial fill is unbroken greyish black, layed organic rich silty sandy clay

Artificial fill to total depth

Artificial fill to 4.5 feet in depth overlying reddish brown clayey sand

5 feet of artificial fill overlying sandy gravelly channel deposits

Artificial fill to 3.9 feet in depth.

Artificial fill to 5 feet in depth.

BUILDING "A"
BUILDING "B"
BUILDING "C"
BUILDING "D"
BUILDING "E"

CB–1 T.D.125'
CB–2 T.D.125'
CB–3 T.D.125'
CB–4 T.D.125'
CB–5 T.D.185'
CB–6 T.D.160'
CB–7 T.D.195'
CB–8 T.D.145'
CB–9 T.D.75'
CB–10 T.D.75'
CB–11 T.D.75'
CB–12 T.D.75'
CB–13 T.D.75'
CB–14 T.D.75'
CB–15 T.D.95'
CB–16 T.D.95'

FT-1 0+00
FT-1 1+05
FT-2 0+00
FT-2 1+25

B1–B T.D.70'
B2–B T.D.54.5'
B3–B T.D.70'
B4–B T.D.70'
B5–B T.D.70'

CPT–1 CPT–2 CPT–3 CPT–4 CPT–5 CPT–6 CPT–7 CPT–8 CPT–9

FAULT F FAULT G FAULT H FAULT I FAULT J

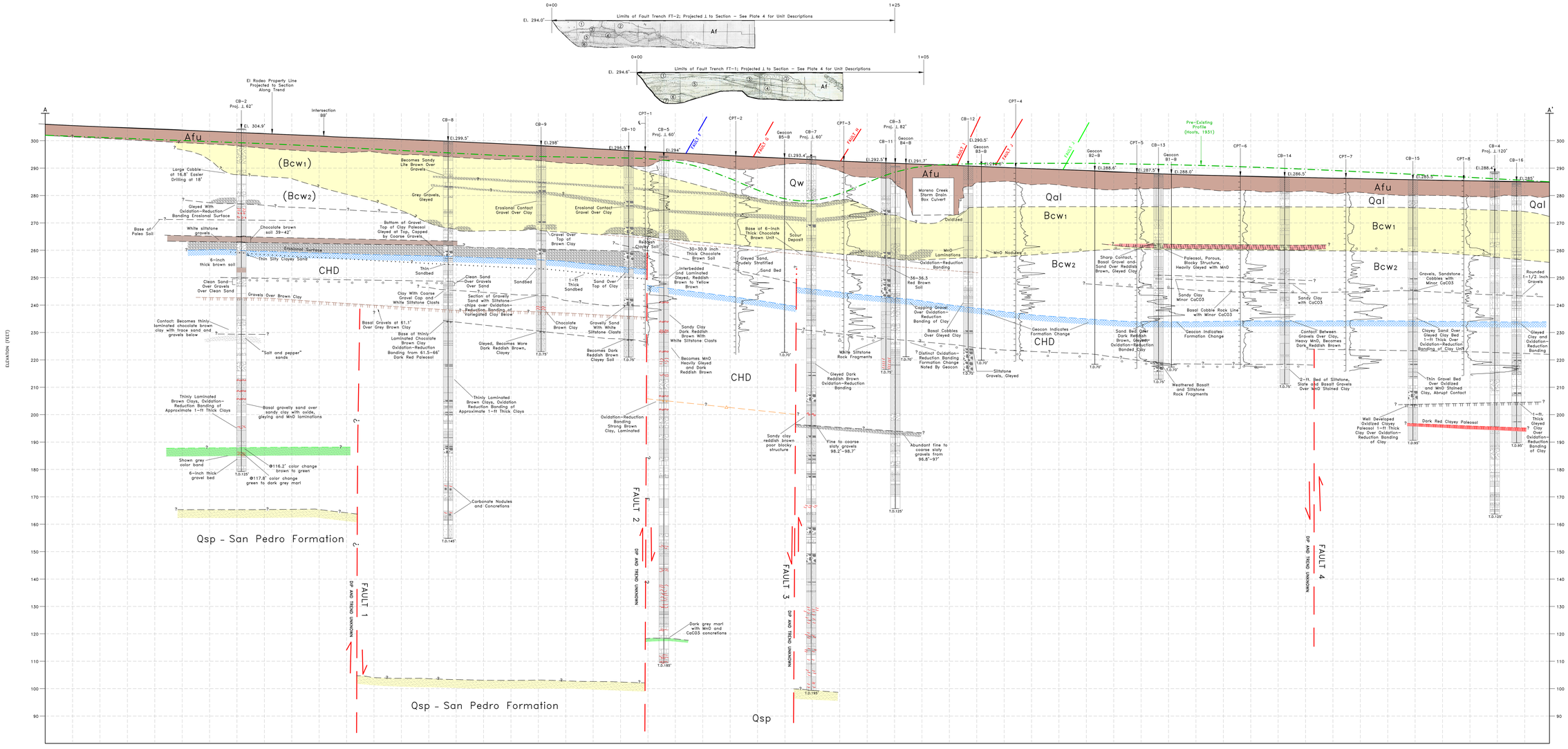
WILSHIRE BOULEVARD

WHITTIER DRIVE

ELEVADO AVENUE

CITY OF LOS ANGELES
CITY OF BEVERLY HILLS

APPROXIMATE LIMITS OF 9900 WILSHIRE BOULEVARD



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 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 Chevrot Hills deposits.

Pleistocene Chevrot 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.

EXPLANATION

- $CaCO_3$ 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, arrows denote inferred direction of movement, 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

GEOLOGIC CROSS SECTION A-A'

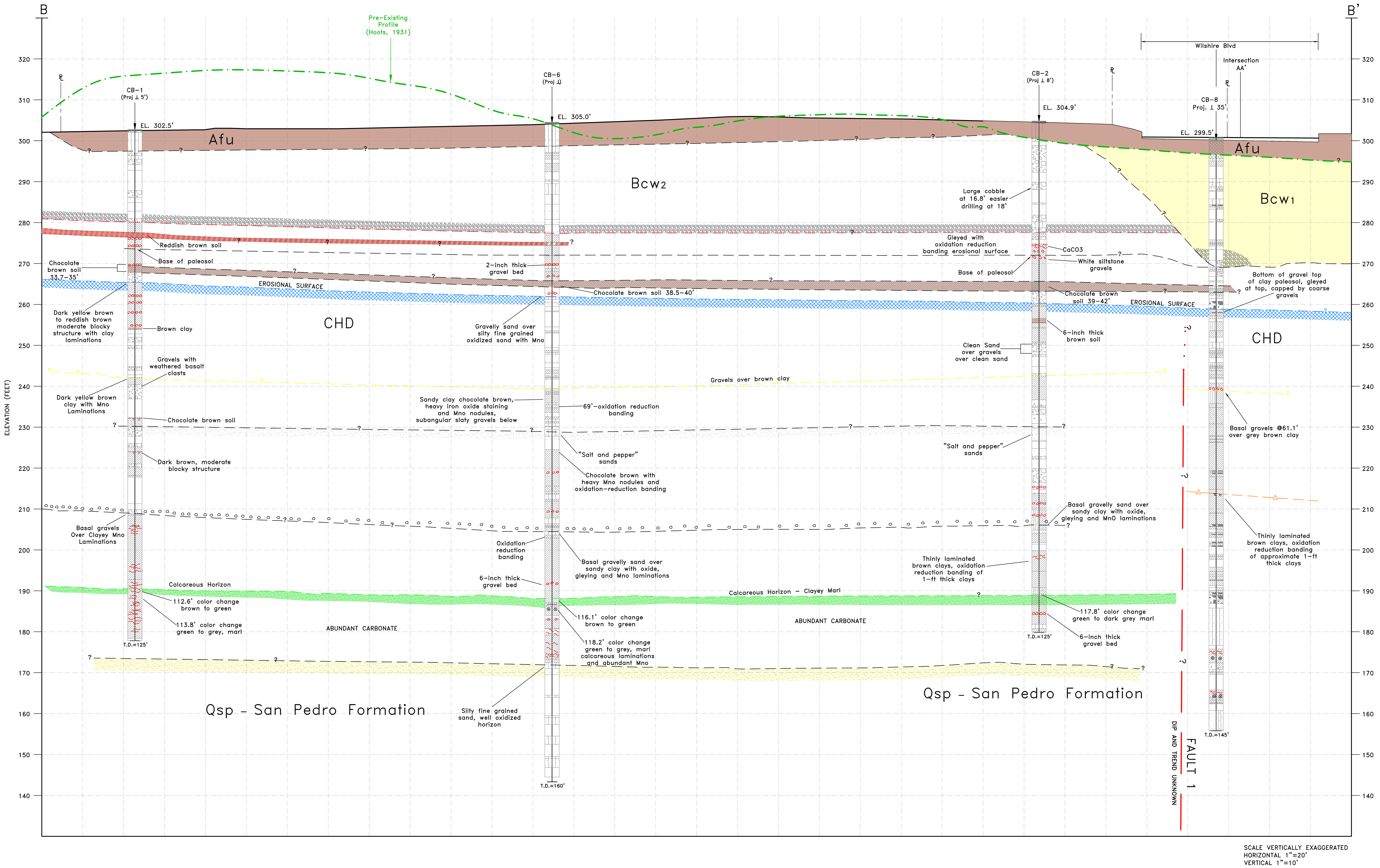
EL RODEO
605 WHITTIER DRIVE
BEVERLY HILLS, CALIFORNIA

PLATE 2

Proj: 10274.006	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 02/2015

Drafted by: RJT | Checked by: RJT

Leighton



EXPLANATION

- $CaCO_3$ stringers and along soil faces as vertical deposits
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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:

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Holocene 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.

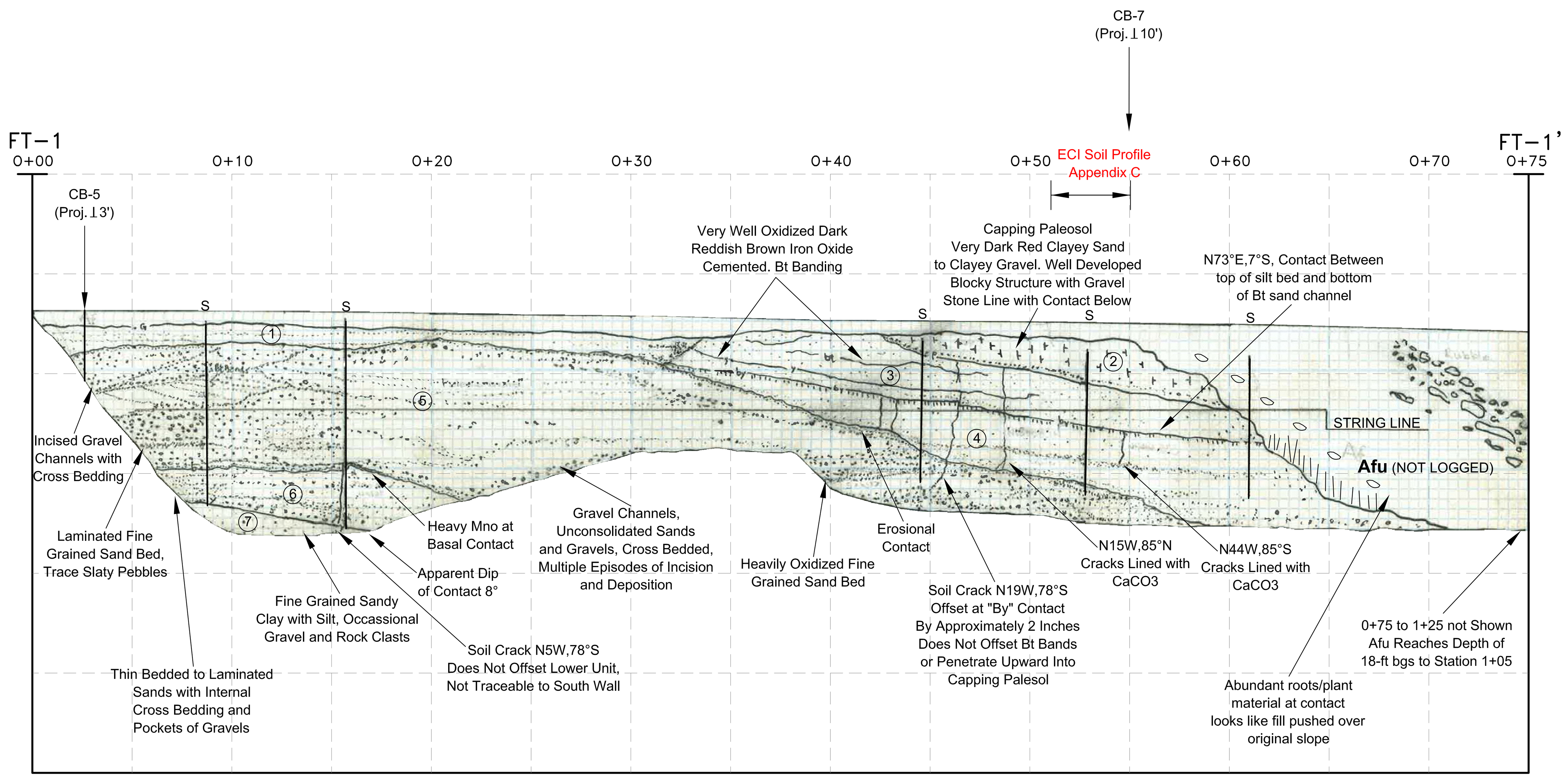
Pleistocene Alluvium of Benedict Canyon Wash (BCW2): Sandy clay, clayey sand and silty clay grading laterally to silty sand to sand with silt; with lenses and interbeds of sandy gravel; coarsening downwards to a basal channel deposit of sand, gravelly sand and gravel; dark grayish brown, reddish brown, 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.

SCALE 0 20 40 FEET

PLATE 3	GEOLOGIC CROSS-SECTION B-B' EL RODEO 605 WHITTIER DRIVE BEVERLY HILLS, CALIFORNIA	
Leighton	Proj: 10274.006	Eng/Geol: TCB/JAR
	Scale: Vertical: 1"=10' Horizontal: 1"=20'	Date: 02/2015
	Drafted By: MAM / Checked By:	P:\DRAFTING\10274\006\OF_2015-02-04\10274-006-PLATE-3 SECTION.DWG (02-19-15 9:23:15AM) Plotted by: mmurphy



See Photos In Appendix B
- S = Shoring
- 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)

Earth Units-FT-1: Pleistocene Alluvium of Benedict Canyon Wash (BCW1)

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.

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.

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.

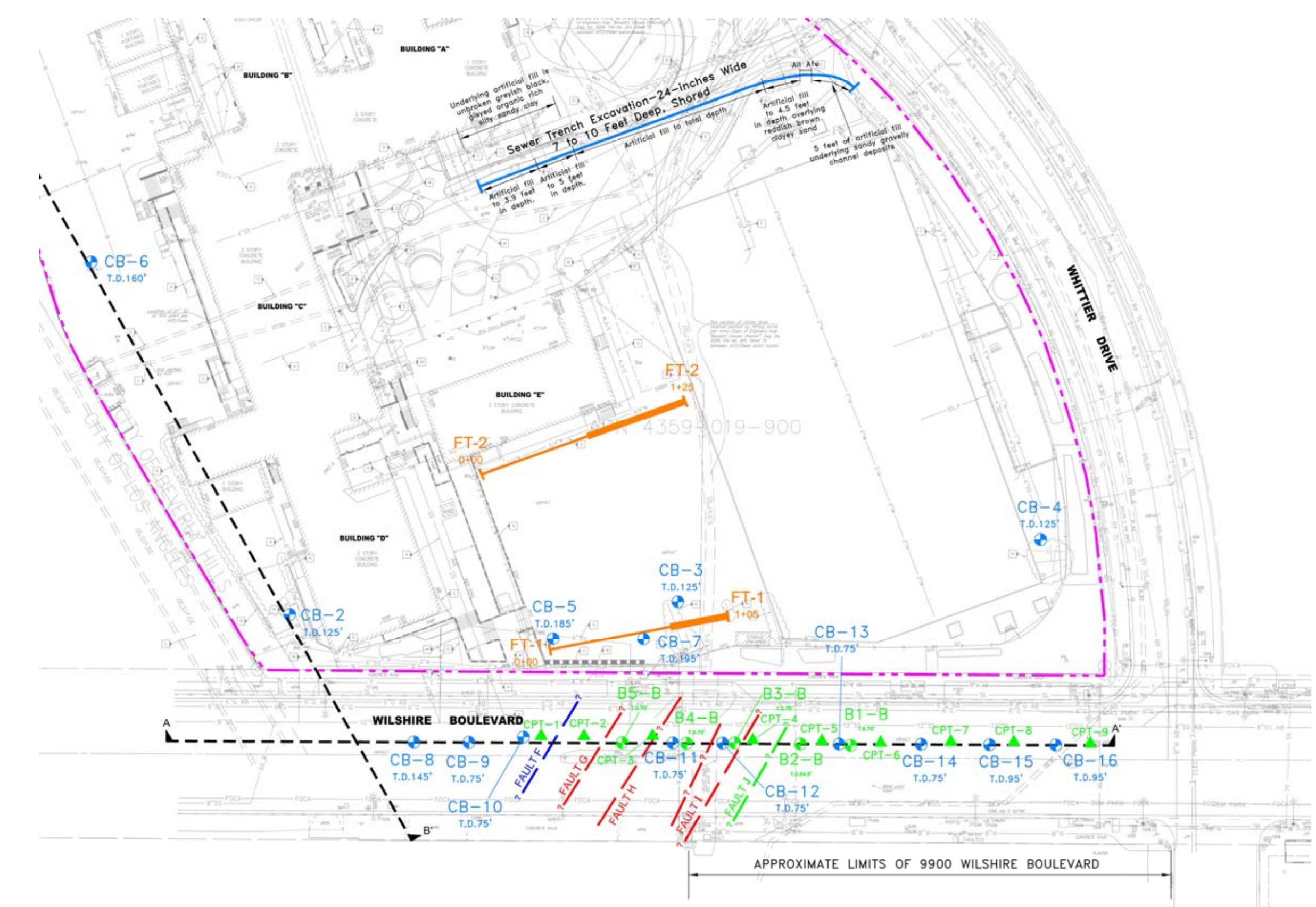
4-Sandy SILT to Silty SAND with Clay (ML-SM),10YR 5/4, yellowish brown to brown, windblown silt in upper portion, very fine grained massive subangular sand with secondary clay to fine gravely interbeds, iron oxide coating of quartz and grains and pores, lower portion becomes Gravelly SAND to Sandy GRAVEL (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.

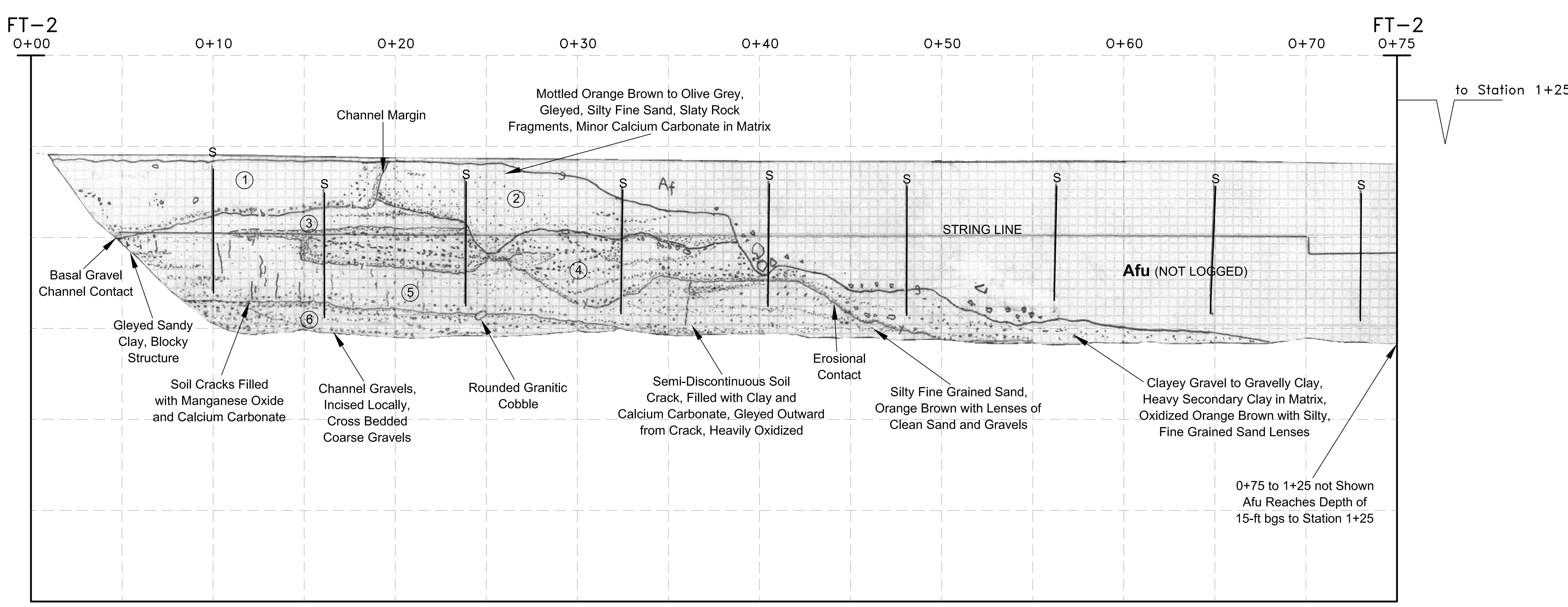
5-Silty GRAVEL to Sandy GRAVEL (GM-GP), 10YR 5/3 to 5/4, brown to yellowish brown, main channel deposit, interbedded gravel and sand, cross bedded to very fine laminations, fine to coarse grained clear to frosted quartz sand grains, fine to coarse flattened, tabular slaty and siltstone gravels, severely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

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.

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.

INDEX MAP





See Photos In Appendix B
- S = Shoring
- 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-2: Pleistocene Alluvium of Benedict Canyon Wash (BCW2)

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.

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.

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

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.

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.

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

FAULT TRENCH LOGS FT-1 AND FT-2 EL RODEO GEOHAZARDS		PLATE 4
Proj: 10274.006	Eng/Geol: TCB/JAR	Leighton
Scale: 1"=50'	Date: 02/2015	