

**SUPPLEMENTAL REPORT OF
FAULT SURFACE RUPTURE HAZARD
INVESTIGATION FOR PHASE I OF
THE BEVERLY HILTON REVITALIZATION PLAN**

**9876 WILSHIRE BOULEVARD
BEVERLY HILLS, CALIFORNIA**

Prepared for:

OASIS WEST REALTY, LLC

Beverly Hills, California

October 20, 2014

Project 4953-12-0141



October 20, 2014

Mr. Kent Warden
Senior Vice President
Oasis West Realty, LLC
9860 Wilshire Boulevard
Beverly Hills, California 90210

Subject: **Supplemental Report of Fault Surface Rupture Hazard Investigation
Proposed Waldorf-Astoria Luxury Hotel Tower
9876 Wilshire Boulevard
Beverly Hills, California
AMEC Project 4953-12-0141**

Dear Mr. Warden:

Attached are the results of our supplemental fault surface rupture hazard investigation for the first phase of the Beverly Hilton Revitalization Plan to be constructed at 9876 Wilshire Boulevard, Beverly Hills, California. This report expands on our original fault surface rupture hazard evaluation report dated July 23, 2014, which report was recommended for acceptance by the City by J Lee Engineering Inc. by letter dated August 20, 2014. This supplemental report was requested by the City of Beverly Hills Plan Review.

It has been a pleasure to be of professional service to you. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,

AMEC Environment & Infrastructure, Inc.



Michelle Sutherland
Senior Engineering Geologist



Reviewed by:



Rosalind Munro
Associate Engineering Geologist



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HAZARD INVESTIGATION
FOR PHASE I OF THE BEVERLY HILTON REVITALIZATION PLAN**

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OASIS WEST REALTY, LLC

Beverly Hills, California

AMEC Environment & Infrastructure, Inc.

Los Angeles, California

October 20, 2014

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EXECUTIVE SUMMARY

This report presents our fault surface rupture hazard investigation for the first phase of the Beverly Hilton Revitalization Plan and specifically the proposed Waldorf-Astoria Luxury Hotel Tower located at 9876 Wilshire Boulevard in Beverly Hills, California. The Site is not within an existing Alquist-Priolo Earthquake Fault Zone and no faults have been mapped to cross the Site by federal, state, or local government agencies. Nevertheless, because previously unidentified faults have been identified in the broader area, the City of Beverly Hills has therefore requested additional site-specific fault investigation.

We reviewed maps and reports by the California Geological Survey (CGS) and the United States Geological Survey (USGS) relative to faulting in the area as well as published maps and consultant reports.

Our subsurface investigation consisted of 5 continuous core borings and 12 cone penetration test (CPT) soundings, approximately 40 to 50 feet apart. The cores and CPTs were aligned northeast along the southern portion of the Site adjacent to Santa Monica Boulevard, and thus approximately perpendicular to potential north-northwest trending fault traces. The borings and CPTs extend to a depth of 50 feet, except due to refusal.

We found that unfaulted stratigraphic units crossed the Site. The sediments in the lower portions of the borings are greater than 14,800 radiocarbon years old, thus predate the Pleistocene-Holocene boundary. Additionally, groundwater levels were generally continuous across the Site. We therefore conclude that active faults (Holocene), as defined by the State of California (CGS, 2007), do not impact the Site.

1.0 SCOPE

We have conducted a supplemental fault, surface rupture hazard investigation for the proposed Waldorf-Astoria Luxury Hotel Tower at 9876 Wilshire Boulevard in Beverly Hills, California. The location of the Site is shown on Figure 1.

Our investigation included the following:

- Analysis of maps and reports by the California Geological Survey (CGS), previously the California Division of Mines and Geology (CDMG), and the United States Geological Survey (USGS) relative to faulting in the area as well as published papers and maps and reports by consultants.
- A Site reconnaissance to identify access for the planned continuous cores and Cone Penetrometer Test (CPT) soundings.
- Review of locations of the borings and soundings by Underground Service Alert and GeoVision (private utility locating company).
- Drilling, sampling, logging and backfilling of five continuous core borings to depths of 50 feet below ground surface (bgs).
- Advancement of twelve CPT soundings extending down to 50 feet bgs, or refusal.
- Preparation of this report including pertinent location and geological maps, locations of the explorations, boring and CPT logs, cross sections, radiocarbon test date results, and technical conclusions.

This report does not assess Site environmental conditions, nor seismic and related engineering design for construction purposes.

The professional opinions presented in this report have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical

and engineering geological consultants practicing in this or similar localities. No warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for Oasis West Realty, LLC and their consultants to be used solely in evaluating the potential for surface fault rupture hazards at the Site. The report has not been prepared for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses.

2.0 SITE CONDITIONS

The proposed Waldorf-Astoria Hotel is to be located in the triangular shaped Site, approximately 1.4 acres in size, at the southwest intersection of Santa Monica Boulevard and Wilshire Boulevard in the City of Beverly Hills, California (Figure 1.) In addition to the Waldorf Astoria Hotel a new conference center will be constructed along Wilshire Boulevard adjacent to the existing Beverly Hilton (replacing an existing building that was recently demolished at that location). The new luxury hotel will be 12-stories in height with a pool terrace on the roof. Three levels of subterranean parking are planned below the hotel at Elevation 235.5. The Site is within the western Benedict Canyon Wash flood plain, which slopes gently to the southeast. The Site slopes to the south from approximately elevation 275 to 270 feet. The Site was previously occupied by a portion of the existing Beverly Hilton Hotel.

The continuous cores and CPTs for this investigation were sited across the southeast boundary adjacent Santa Monica Boulevard. The locations are shown on Figure 2.

3.0 BACKGROUND

Topographically the Site is located in the western part of the southeast-sloping Benedict Canyon Wash flood plain. The historic Benedict Canyon Wash channel was about 1,100 feet west of the Site prior to enclosure in an existing buried box culvert. The western margin of the Benedict Canyon Wash is formed by the uplifted and dissected Cheviot Hills (San Jose De Buenos Ayres on Figure 3). Geologically, the proposed development resides in undifferentiated Quaternary-age alluvium as shown in the Hoots 1931 map (Figure 3). The Hoots topographic base is from USGS 1923 to 1925 surveys. At that time, the only development in the area was Santa Monica and Wilshire Boulevards and the alignment of the Pacific Electric Railroad (Figure 3.) Since that time, the area has been heavily urbanized and the original geomorphic surface is obscured by buildings, infrastructure, and parking lots/structures, (Figure 4.)

The Santa Monica fault has been previously interpreted by numerous investigators. Hill (1979) and Wright (1991) interpreted locations (Figure 5.1) relying heavily on oil and water well records.

Dolan and Sieh (1992) delineated a northeast trending Santa Monica fault zone (Figure 5.1) based on geomorphic interpretations. They also identified a northwest trending Newport-Inglewood structural zone subparallel to the Inglewood fault 0.2 miles to the south. Dolan et al. (2000) later investigated the Veterans Administration property 2.6 miles to the west, where they encountered tilted and faulted Holocene sediments. They concluded the Santa Monica fault at the Veterans Administration site accommodates oblique, left-lateral-reverse motion, which is partitioned in the near surface into closely spaced strike-slip faults above a shallow-dipping thrust fault. They also delineated a West Beverly Hills Lineament (Figure 5.1) at the approximate location of the Newport-Inglewood structural zone of Dolan and Sieh, (1992.)

In a 2005 compilation of late Quaternary faults, the California Geological Survey (CGS), Bryant (2005), included the approximate locations of the Dolan et al. (2000) Santa Monica Fault Zone and West Beverly Hills Lineament as active faults (Figure 5.1.)

In 2011, Parsons Brinkerhoff, in their Century City fault investigation report for the Westside subway extension, interpreted northeast-trending and northwest-trending faults as traces of the Santa Monica fault zone and West Beverly Hills Lineament/ Newport Inglewood fault zone, respectively (Figure 5.2.). A number of the interpreted northeast-trending and northwest-trending faults by Parsons (2011) were not found following site specific investigations.

Leighton Consulting Inc. (2012) investigated the mapped West Beverly Hills Lineament at Beverly Hills High School by trenching, continuous cores and CPTs. Those investigations did not encounter Parsons (2011) northwest trending faults through Beverly Hills High School but did expose the northeast-trending high angle fault (Figure 5.2) encountered by Parsons (2011) 0.25 miles to the west.

Kenney GeoScience (2014) compiled this prior data as a part of his structural and stratigraphic evaluation of the Century City-Beverly Hills area. No physical investigation was performed by Kenney in connection with this 2014 compilation. Additional fault traces were interpreted by Kenney; however, available data reviewed was considered insufficient to confirm the locations or determine the age of as such interpreted fault traces, if any. Further, certain fault interpretations of Kenney's were not found by Geocon's 2014 investigation of 9900 Wilshire Boulevard.

Geocon West (2014) investigated faults at 9900 Wilshire Boulevard, about 600 feet west of the proposed Waldorf-Astoria Site (Figure 5.2.) Northwest-trending fault traces of Parsons (2011) were not encountered, however other fault traces were interpreted from their continuous core borings and CPT soundings (Figure 5.2). Geocon (2014) concluded that only the northeast-trending faults interpreted northeast of that site, (Figure 5.2,) which trend away from 9876 Wilshire Boulevard and the hotel project Site, were active.

There are currently no Alquist-Priolo Earthquake Fault Zones for the Santa Monica fault or the West Beverly Hills Lineament. The CGS is in the process of compiling all data for Alquist-Priolo zonation, anticipated to be published in 2015.

None of the exposed or interpreted faults related to the Santa Monica fault or West Beverly Hills Lineament are present on, or project toward, the project Site.

4.0 SUBSURFACE INVESTIGATION

The presence of an extensive, gravel backfilled tank excavation over a large portion of the Site and numerous underground utility lines precluded excavation of fault trenches. The subsurface investigation consisted of continuous core borings and CPTs, generally 40 to 50 feet apart. The borings and CPTs extended to 50 feet depth, or refusal.

The field investigation was performed on September 18 and September 22 through September 23, 2014, and consisted of 5 hollow stem auger continuous core borings and 12 CPT soundings (Figure 2). The borings and CPTs were aligned northeast along the southern portion of the Site adjacent to Santa Monica Boulevard and specifically intended to intercept potential north-northwest trending faults.

The cores were collected with a hollow stem auger rig. A split core barrel, 2.5 inches in diameter and 5 feet in length, was advanced as the borehole was drilled. The core samples were wrapped in plastic and placed in core boxes. In general, recovery was good within finer grained sediments, however, intervals of coarse sand and gravel were lost resulting in locally poor core recovery (Appendix A.) Detailed logging was performed in AMEC's office by a certified engineering geologist in general accordance with the Unified Soil Classification System (USCS) and reviewed by an associate certified engineering geologist. The CPT soundings were advanced by a 30-ton rig equipped with a 15 square centimeter cone, which is directly pushed vertically into the ground. The borings and CPTs were backfilled with cement bentonite mix grout. Logs of cores and CPT soundings are presented in Appendix A.

Samples of charcoal and organics were collected from the cores for radiocarbon dating. Age dating tests were performed on the four samples by Beta Analytic Inc. (Appendix B) utilizing accelerator mass spectrometry radiocarbon dating (AMS.) Samples were collected from Boring B-F2 at 37.2 feet depth, B-F4 at 43.4 and 44 feet depth, and B-F5 at 33 feet depth. The locations of the samples are plotted on Cross Section A-A' (Figure 6) and noted within the corresponding boring log (Appendix A). The test results are presented in Appendix B.

5.0 GEOLOGIC MATERIALS AND GROUNDWATER

Quaternary deposition in the area is primarily controlled by channel and flood plain deposition from the Benedict Canyon Wash. Alluvial deposits from the wash are predominantly comprised of sediments derived from the Santa Monica Mountains to the north.

The cores recovered artificial fill (Af) placed during Site grading, and Holocene and Pleistocene alluvial deposits (Qal). Figure 6, Cross-section A-A', graphically presents the materials encountered. Detailed descriptions of materials recovered in the cores are presented on the logs in Appendix A.

The upper 5 to 6.5 feet of soils consisted of fill materials; primarily dark to medium brown silty sand with up to 15 percent gravel. Alluvial deposits were encountered underlying the fill to the maximum 50-foot depth cored. Overall, the alluvial deposits coarsen with depth from clayey sediments in the upper 11 to 16 feet, becoming silty down to about 18 feet depth, and predominantly sandy below. The upper clayey sediments are silty clay with sand to sandy clay with trace gravel and local thin clayey sand beds. The corresponding Munsell colors observed are dark grayish brown (10YR 4/2) to brown (10YR 4/3) and dark yellowish brown (10YR 4/4.) When sandier, the color becomes light olive brown (2.5Y 5/3) to olive brown (2.5Y 4/4.) Some fine root hairs and carbonate filaments are present within this layer. Over a narrow gradational zone the strata becomes silty. The silty sediments consist of sandy silt to clayey silt with sand and trace gravel and a few local thin silty sand beds. Fine root hairs and carbonate filaments were encountered in this layer down to about 25 feet. The corresponding Munsell colors observed are light olive brown (2.5Y 5/3-5/4) to olive brown (2.5Y 4/4). When sandier the color is yellowish brown (10YR 5/4) to brown (10YR 5/3). Below 18 feet a clay layer, about 1.5 to 2 feet thick, overlies the lower sandy sediments. The clay layer consists of sandy clay with 1 to 5 percent fine gravel. The Munsell color is olive brown (2.5Y 4/4) to dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/6), and brown (10YR 5/3). The lower sandy sediments consist of silty sand, clayey sand, and poorly graded sand with silt and/or clay. Local thin beds of clayey silt to silt are rare. Few 5 to 10 percent gravel beds grade in and out. Few clay layers, a few inches to two feet in thickness, occur within the dominantly sandy strata. The corresponding Munsell colors observed are brown (10YR 4/3), dark grayish brown (10YR 4/2) and (2.5Y 4/2). When clayey the color is

olive (5Y 4/4), and when coarser grained the color is yellowish brown (10YR 5/4), dark to very dark yellowish brown (10YR 4/4-3/2), and dark gray (2.5Y 4/1). Along the west portion of the cross section, below the sandy layer are clayey sediments consisting of silty clay with sand. The Munsell color is brown (10YR 4/3) and dark yellowish brown (10YR 4/4). Where observed in the cores, the upper contact with clayey sediments appears to be erosional. Manganese staining and increased oxidation were observed at about 30 to 40 feet depth at all boring locations. Several 10 to 40% gravel layers, less than one foot to over ten feet in thickness were encountered within the lower clayey and sandy stratigraphic sections at all boring locations. Generally, the gravel is subangular to angular, fine to medium in size, predominantly slate and sandstone. Fining upward sequences typically occur between the gravelly layers. Below the lower gravelly layer, a clayey layer was encountered in a few of the borings and CPTs. It consists of silty clay with few thin sandy layers and trace angular to subangular gravel and strong oxidation mottling. The corresponding Munsell color observed is dark grayish brown (2.5Y 4/2). Contacts are largely gradational, narrowly gradational within thin local beds. Contacts at the base of gravelly beds are generally erosional.

Four dates were obtained from four organic samples in three of the five cores. The dates ranged from 11,130 years bp at 33 feet in boring B-F5, to 14,800 years bp in boring B-F4 at 44 feet. The locations of the dated materials are shown on Cross Section A-A' (Figure 5.) The Beta Analytic data is presented in Appendix B.

The groundwater levels measured within the borings at the time of drilling ranged between 38.7 to 41.5 feet depth, relatively level across the Site.

6.0 DATA INTERPRETATION

Along Cross Section A-A', core and CPT data indicates stratigraphic continuity. Scattered gravels observed in the cores are frequently seen in the CPT signatures in the clayey horizons. Sections of non-recovery are interpreted as coarser grained sediments similar to the coarser grained sediments recovered either above or below. Where finer grained sediments are recovered above and below non-recovered zones contacts are estimated based on adjacent core and/or CPT. Due to the alluvial depositional environment of sediments, a degree of lateral gradation between cores is to be anticipated and correlations were made based on stratigraphic packages.

Several distinctive layers display stratigraphic continuity. A clay layer, 1.5 to 2 feet in thickness, is continuous across B-F1 through B-F3, in B-F5 and in CPT-8 through CPT-12 at about 18 feet depth. The clay layer is likely eroded by the channel deposit encountered at 18 feet depth in B-F4. Above this clay is a silty layer and below is a silty sand to sandy silt layer in all cores except B-F5, where a channel deposit likely eroded the lower contact of the silty layer above. Two gravelly channel layers, a few feet to over ten feet in thickness, are continuous between B-F1 through B-F5 and CPT-1 through CPT-9 at about 32 feet and 40 feet depth. CPT-10 through CPT-12 signatures did not pick up the upper channel and all hit refusal shallower than the lower channel deposit. Above the upper channel deposit is a sandy silt and silty sand layer, below is a clay layer. Above the lower channel is a silty to clayey sand layer between B-F1 through B-F3 and a clay layer between B-F4 and B-F5.

There are no abrupt breaks in groundwater levels in the borings across the Site that would suggest a fault was present.

The age of the sediments below approximately 33 feet is pre-Holocene. Therefore, Holocene sediments are not faulted.

In addition to our current borings and CPTs, we have included two prior borings in our interpretation which extended to greater depths than the current investigation. Boring T2E-B9 is a continuous core boring and Boring G-152 is a geotechnical boring with closely spaced (2.5 feet to 5 feet) sampling from the Parsons (2011) investigation. The

logs of the borings are included in Appendix A. These borings are plotted on the 40-scale Cross-section A-A' on Figure 6. The lower oxidized clay layer recovered in B-F3 correlates to an oxidized clay layer in borings T2E-B9 and G-152. The deeper stratigraphic units, including two clay beds correlate between these two deeper borings as shown.

7.0 CONCLUSIONS

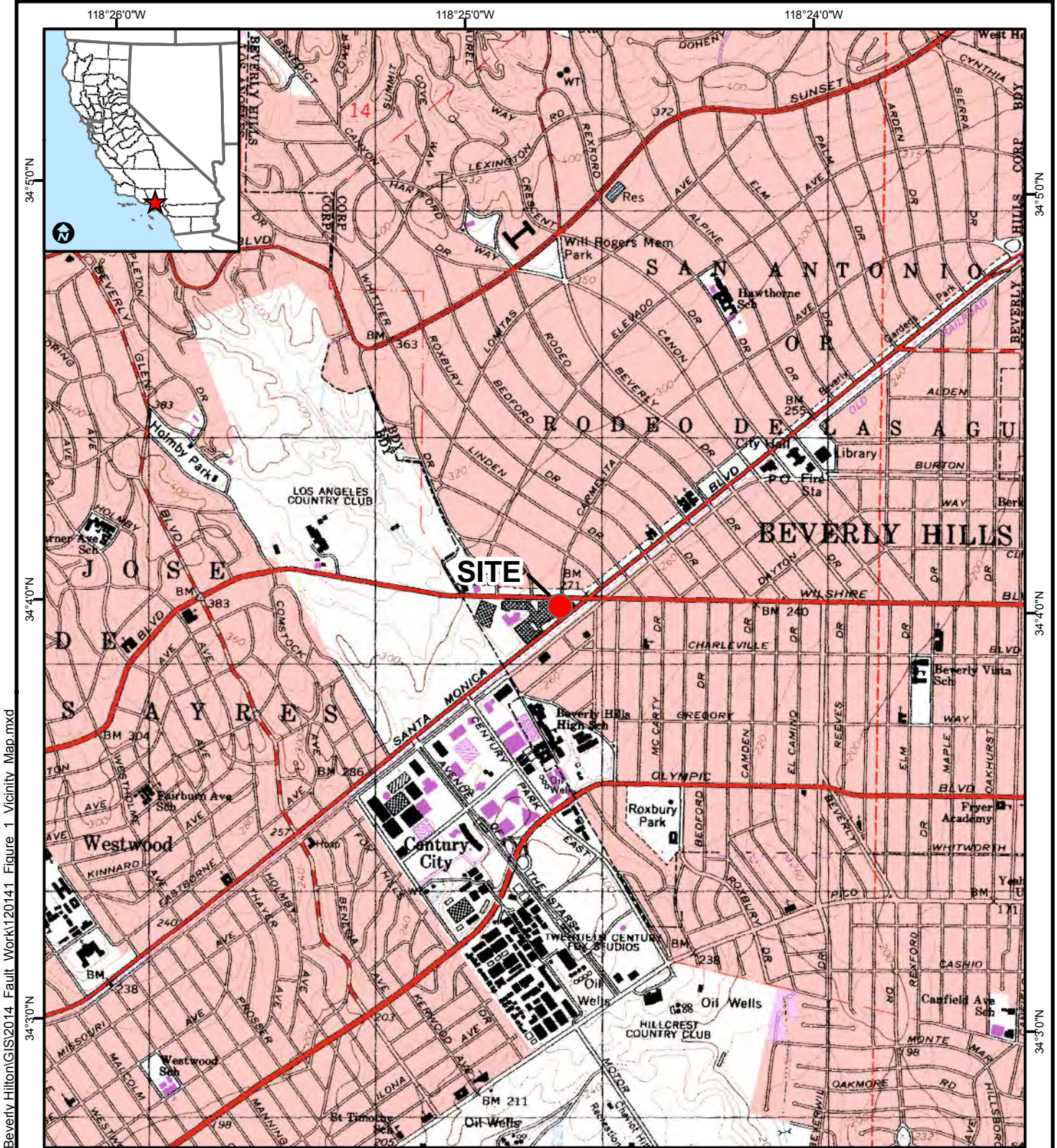
A subsurface fault rupture hazard investigation at the 9876 Wilshire Boulevard Site consisted of 5 continuous core borings and 12 CPTs. Continuous, unfaulted stratigraphic units occur across the Site. The alluvial sediments below 33 feet are pre-Holocene in age. There were no abrupt breaks in groundwater levels in the borings across the Site. We therefore conclude that active faults, as defined by the State of California (CGS, 2007) do not impact the Site.

8.0 RELEVANT REFERENCES

- AMEC, 2014a, “Report of Fault Surface Rupture Hazard Evaluation, Proposed Waldorf-Astoria Luxury Hotel and Conference Center, Revitalization of The Beverly Hilton, 9876 Wilshire Boulevard, Beverly Hills, California,” report prepared for Oasis Realty, LLC, Project No. 4953-14-0441, dated July 18, 2014.
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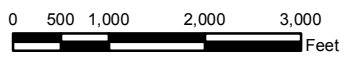
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FIGURES



Base: USGS 7.5 minute topographic maps, Beverly Hills quadrangle

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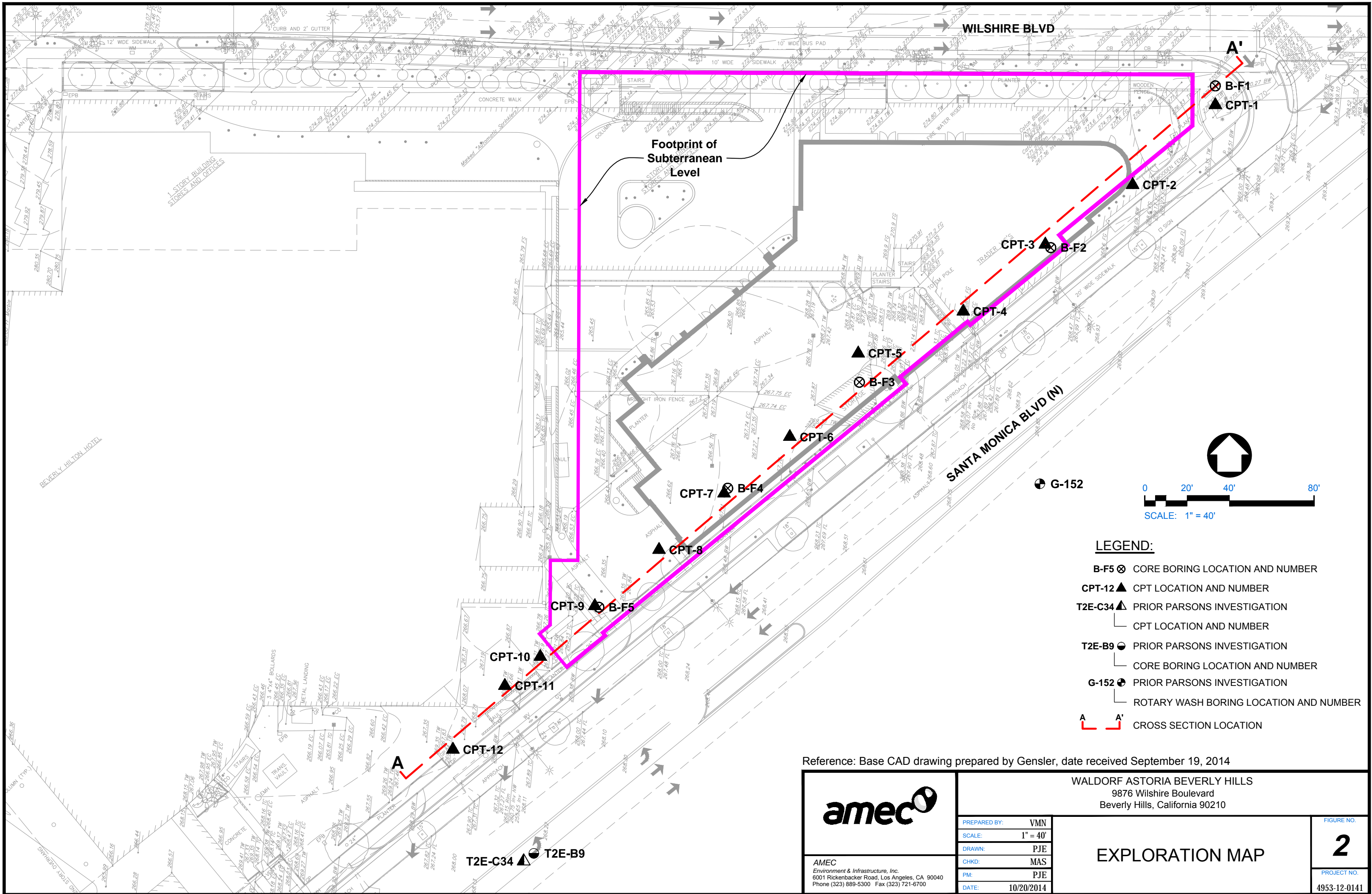
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Waldorf Astoria Beverly Hills
9876 Wilshire Boulevard
Beverly Hills, California 90210

SITE LOCATION MAP

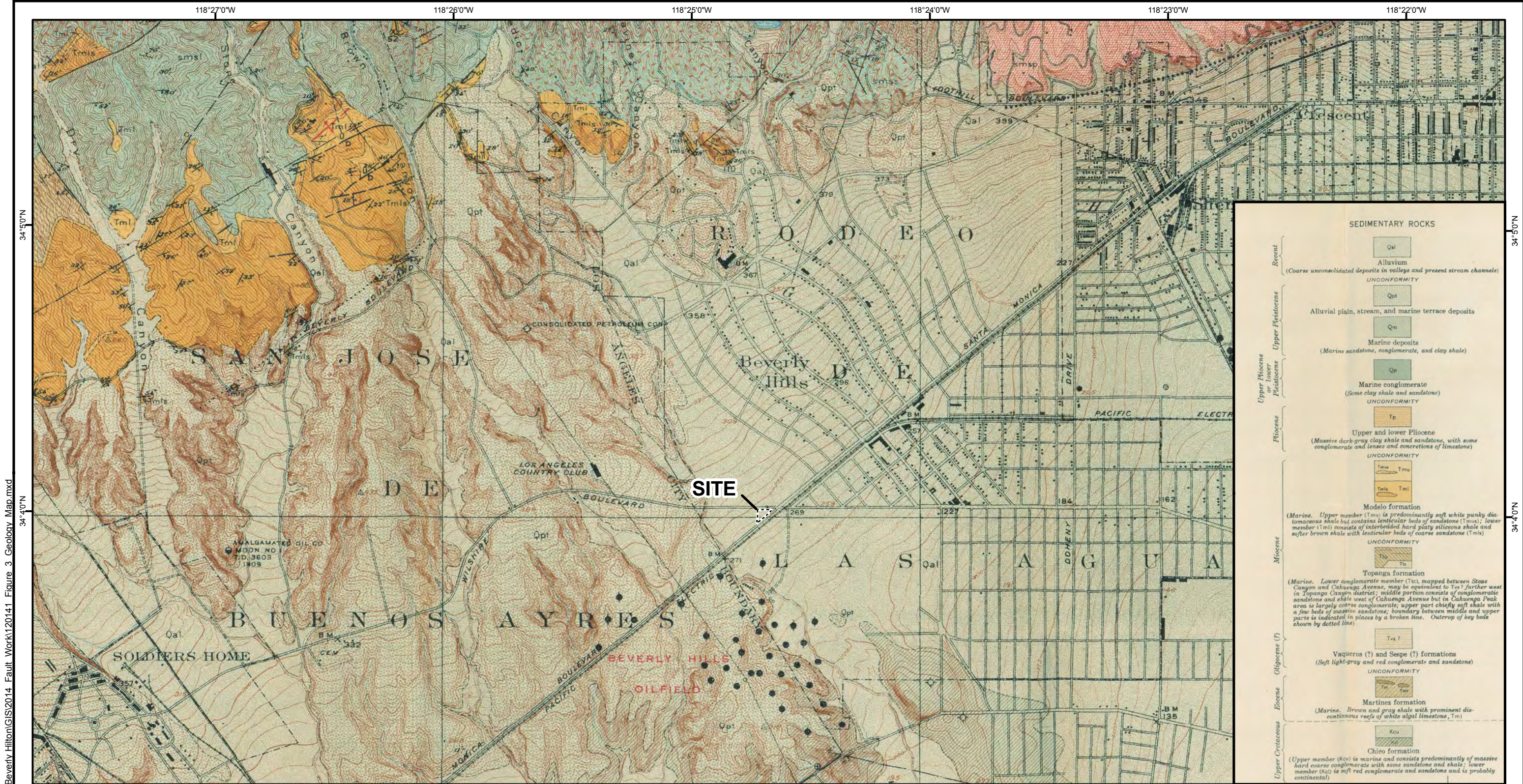
FIGURE:	1
PROJECT:	4953-12-0141



- LEGEND:**
- B-F5 ⊗ CORE BORING LOCATION AND NUMBER
 - CPT-12 ▲ CPT LOCATION AND NUMBER
 - T2E-C34 ▲ PRIOR PARSONS INVESTIGATION
 - ▲ CPT LOCATION AND NUMBER
 - T2E-B9 ● PRIOR PARSONS INVESTIGATION
 - CORE BORING LOCATION AND NUMBER
 - G-152 ● PRIOR PARSONS INVESTIGATION
 - ▲ ROTARY WASH BORING LOCATION AND NUMBER
 - A A' CROSS SECTION LOCATION

Reference: Base CAD drawing prepared by Gensler, date received September 19, 2014

	WALDORF ASTORIA BEVERLY HILLS 9876 Wilshire Boulevard Beverly Hills, California 90210		2 <small>FIGURE NO.</small> <small>PROJECT NO.</small>											
	<small>AMEC Environment & Infrastructure, Inc. 6001 Rickenbacker Road, Los Angeles, CA 90040 Phone (323) 899-5300 Fax (323) 721-6700</small>	<table border="1"> <tr><td>PREPARED BY:</td><td>VMN</td></tr> <tr><td>SCALE:</td><td>1" = 40'</td></tr> <tr><td>DRAWN:</td><td>PJE</td></tr> <tr><td>CHKD:</td><td>MAS</td></tr> <tr><td>PM:</td><td>PJE</td></tr> <tr><td>DATE:</td><td>10/20/2014</td></tr> </table>		PREPARED BY:	VMN	SCALE:	1" = 40'	DRAWN:	PJE	CHKD:	MAS	PM:	PJE	DATE:
PREPARED BY:	VMN													
SCALE:	1" = 40'													
DRAWN:	PJE													
CHKD:	MAS													
PM:	PJE													
DATE:	10/20/2014													



Base: Hoots, H.W., 1931, Geology of the eastern part of the Santa Monica Mountains, Los Angeles County, California, USGS Professional Paper 165-C.

SEDIMENTARY ROCKS	
Recent	<p>Qal Alluvium (Coarse unconsolidated deposits in valleys and present stream channels)</p>
Upper Pleistocene	<p>Qpt Alluvial plain, stream, and marine terrace deposits</p>
	<p>Qm Marine deposits (Marine sandstone, conglomerate, and clay shale)</p>
	<p>Qp Marine conglomerate (Some clay shale and sandstone)</p>
Pliocene	<p>UNCONFORMITY</p> <p>Tp Upper and lower Pliocene (Massive dark-gray clay shale and sandstone, with some conglomerate and lenses and concretions of limestone)</p>
	<p>UNCONFORMITY</p> <p>Tmu Tmi Tm Modelo formation (Marine. Upper member (Tmu) is predominantly soft white punky diatomaceous shale but contains lenticular beds of sandstone (Tmu); lower member (Tmi) consists of interbedded hard platy siliceous shale and softer brown shale with lenticular beds of coarse sandstone (Tmi))</p>
Miocene	<p>UNCONFORMITY</p> <p>Tm Topanga formation (Marine. Lower conglomerate member (Tm), mapped between Staus Canyon and Cahuenga Avenue, may be equivalent to Tm? farther west in Topanga Canyon district; middle portion consists of conglomeratic sandstone and shale west of Cahuenga Avenue but in Cahuenga Peak area is largely coarse conglomerate; upper part chiefly soft shale with a few beds of massive sandstone; boundary between middle and upper parts is indicated in places by a broken line. Outcrop of key beds shown by dotted line)</p>
Oligocene (?)	<p>Tv? T</p> <p>Vaqueros (?) and Sespe (?) formations (Soft light-gray and red conglomerate and sandstone)</p>
Eocene	<p>UNCONFORMITY</p> <p>Tm</p> <p>Martinez formation (Marine. Brown and gray shale with prominent discontinuous reefs of white algal limestone, Tm)</p>
	<p>Kcu</p> <p>Chico formation (Upper member (Kcu) is marine and consists predominantly of massive hard coarse conglomerate with some sandstone and shale; lower member (Kc) is soft red conglomerate and sandstone and is probably continental)</p>

G:\4953_Geotech\2012\4953-12-0141 Beverly Hilton\GIS\2014 Fault_Work\120141 Figure 3 Geology_Map.mxd



<p>AMEC Environment & Infrastructure, Inc. 6001 Rickenbacker Road Los Angeles, California 90040 Tel: 323.889.5300 Fax: 323.721.6700</p>	<p>Waldorf Astoria Beverly Hills 9876 Wilshire Boulevard Beverly Hills, California 90210</p>		<p>FIGURE: 3</p>
	LAT:	SCALE: 1 in=2,000 ft	<p>GEOLOGY MAP HOOTS 1931</p>
	LON:	DRAWN: PER	
	CHECK: RM	DATE: 10-06-14	
PROJECT: 4953-12-0141			

G:\4963_Geotech\2012\4953-12-0141_Beverly Hilton\GIS\2014_Fault_Work\120141_Figure 4 Aerial Map.mxd

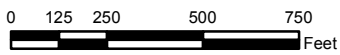
118°25'0"W



34°40'N

34°40'N

Base: Los Angeles County, 2014



AMEC
Environment & Infrastructure, Inc.
6001 Rickenbacker Road
Los Angeles, California 90040
Tel: 323.889.5300
Fax: 323.721.6700

Waldorf Astoria Beverly Hills
9876 Wilshire Boulevard
Beverly Hills, California 90210

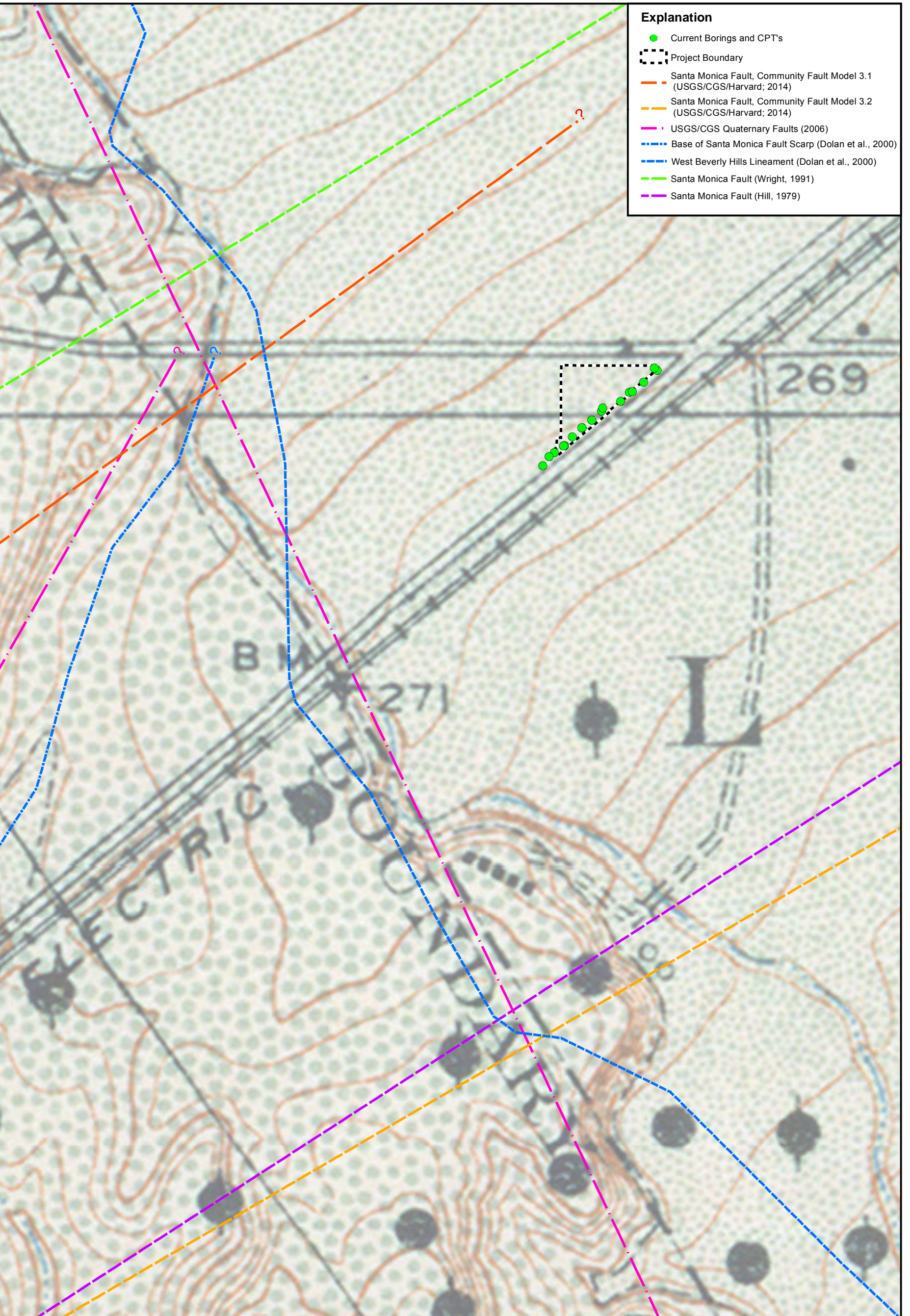
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LON:	
SCALE:	1 in=500 ft
DRAWN:	PER
CHECK:	RM
DATE:	10-06-14

AERIAL PHOTO OF SITE

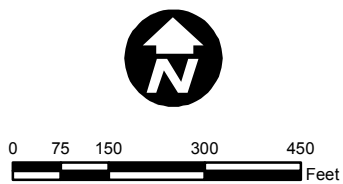
FIGURE:

4

PROJECT:
4953-12-0141



Base: Hoots, H. W., 1931, Geology of the eastern part of the Santa Monica Mountains, Los Angeles County, California, USGS Professional Paper: 165-C



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Beverly Hills, California 90210

LAT:
LON:
SCALE: 1:3,600
DRAWN: PER
CHECK: RM
DATE: 10-06-14

**COMPILATION OF MAPPED
FAULT TRACES**

FIGURE:
5.1

PROJECT:
4953-12-0141

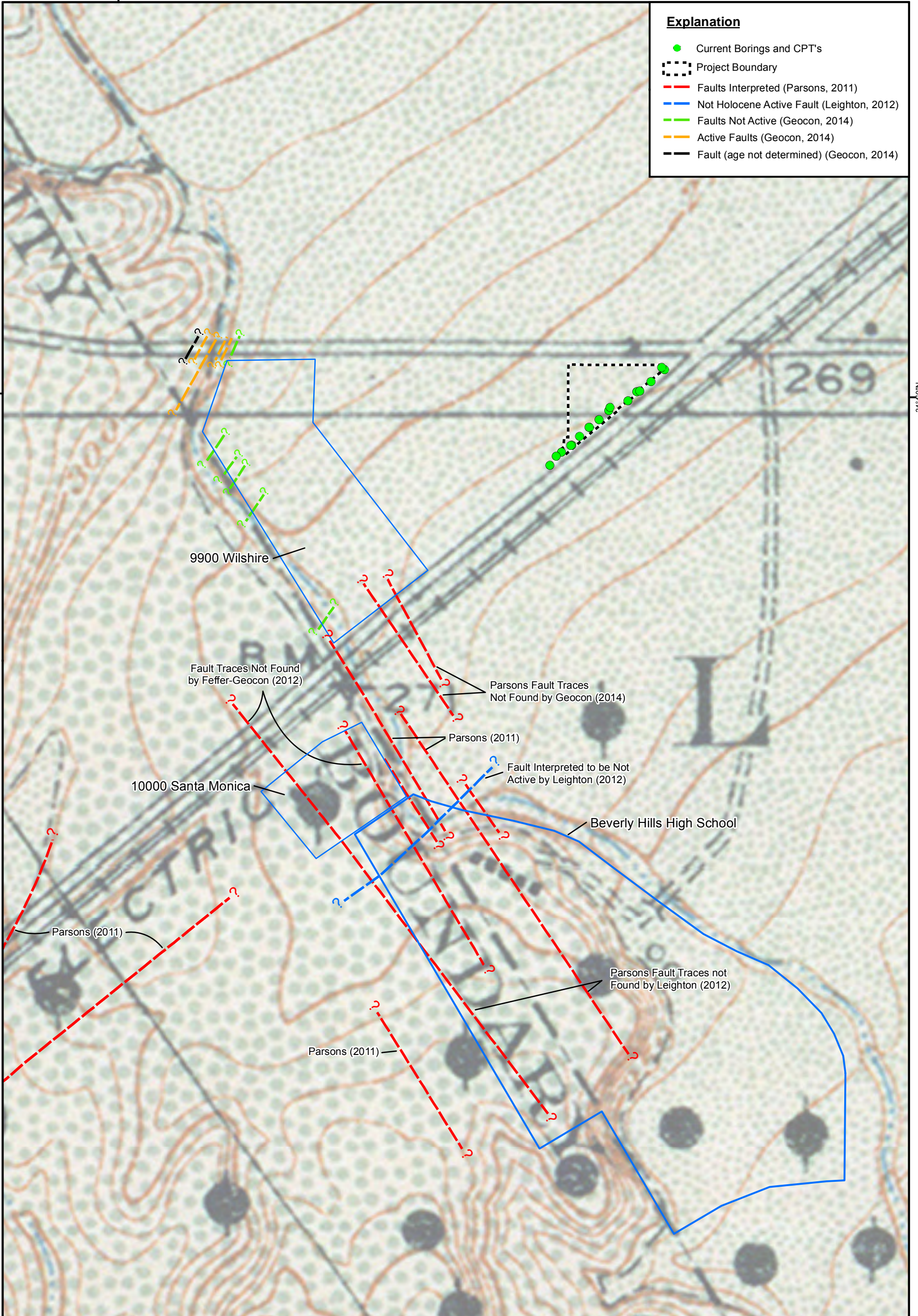
118°25'0"W

34°10'N

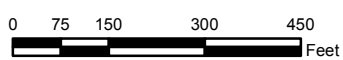
34°10'N

Explanation

- Current Borings and CPT's
- Project Boundary
- Faults Interpreted (Parsons, 2011)
- Not Holocene Active Fault (Leighton, 2012)
- Faults Not Active (Geocon, 2014)
- Active Faults (Geocon, 2014)
- Fault (age not determined) (Geocon, 2014)



Base: Hoots, H. W., 1931, Geology of the eastern part of the Santa Monica Mountains, Los Angeles County, California, USGS Professional Paper: 165-C



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 Beverly Hills, California 90210

LAT:
 LON:
 SCALE: 1 in=300 ft
 DRAWN: PER
 CHECK: RM
 DATE: 10-06-14

**COMPILATION OF FAULT
 TRACES FROM GEOCON,
 LEIGHTON, AND PARSONS**

FIGURE:
5.2

PROJECT:
 4953-12-0141

APPENDIX A
BORING LOGS AND CPT SOUNDINGS

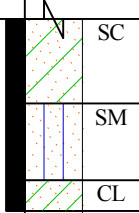
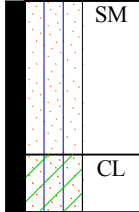
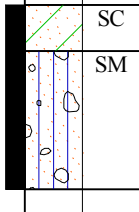
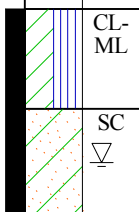
THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F1
								Soil Core	See Plan	
								September 22, 2014	8 inches	GROUND EL. 269.73 feet
								GROUND-WATER READINGS Groundwater level was measured at 37 feet below the ground surface 15 minutes after bailing of drilling mud.		
265	5	1	1	40			SM	FILL SILTY SAND - light gray, dry to moist, fine sand, some medium At 1 feet: Moist At 2.5 feet: More gravel At 3.5 feet: More sand		
260	10	1	2	100			SM SC/CL	QUATERNARY ALLUVIUM (Qal) SILTY SAND - grayish brown (10YR 5/2), moist, fine to medium sand, approx 10 percent fine gravel (up to 1/2 inch in size), trace rootlets CLAYEY SAND to SANDY LEAN CLAY - dark grayish brown (10YR 4/2), moist, fine to coarse sand, approx 1 percent coarse gravel, trace carbonate filaments No core recovery from 7 to 10 feet		
255	15	2	3	100			CL-ML CL/SC SC CL	SILTY CLAY - dark grayish brown (10YR 4/2), moist, approx 15 percent fine sand At 12 feet: Approx 1 percent fine gravel (up to 3/4 inch in size) SANDY LEAN CLAY to CLAYEY SAND - light olive brown (2.5Y 5/3), slightly moist, approx 30 percent fine to medium sand, approx 30 percent silt, some carbonate veins CLAYEY SAND - light olive brown (2.5Y 5/3), slightly moist, fine sand At 14 feet: Bone fragment, 1 inch long SILTY CLAY - light olive brown (2.5Y 5/3), slightly moist, fine sand, some root hair casts and carbonate filaments to 17.1, interbedded Clayey Sand layer, narrowly gradational contacts		
250	20						ML SC	SANDY SILT - light olive brown (2.5Y 5/3), moist, approx 30 percent fine sand, approx 1 percent fine gravel (up to 1/4 inch in size), few siltier layers, narrowly gradational contacts CLAYEY to SILTY SAND - light olive brown (2.5Y 5/3), slightly moist, fine sand		

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/25/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F1 (Continued)
								Soil Core	See Plan	
								September 22, 2014	8 inches	GROUND EL. 269.73 feet
								GROUND-WATER READINGS Groundwater level was measured at 37 feet below the ground surface 15 minutes after bailing of drilling mud.		
245	25	2	4	50			 <p>SC Slightly porous, fine root hair casts At 20.3 feet: Some coarse sand and gravel</p> <p>SM SILTY SAND - light olive brown (2.5Y 5/6), moist, fine sand</p> <p>CL At 22 feet: Fine gravel SILT CLAY with SAND - olive brown (2.5Y 4/4), fine grained fine root hairs No core recovery from 22.5 to 25 feet</p>			
240	30	3	5	55			 <p>SM SILTY SAND - light olive brown (2.5Y 5/4), moist, fine sand, some medium, approx 5 percent fine gravel (up to 1/2 inch in size), with clay</p> <p>CL At 26 feet: With clay SANDY LEAN CLAY - olive brown (2.5Y 4/4), moist, approx 30 to 60 percent fine sand, some layers of Clayey Sand to Poorly Graded Sand with Clay No core recovery from 27.75 to 30 feet</p>			
235	35	3	6	48			 <p>SC CLAYEY SAND - light olive brown (2.5Y 5/3), moist, fine sand</p> <p>SM SILTY SAND with GRAVEL - light olive brown (2.5Y 5/4), moist, fine sand, fine to coarse gravel, coarse sand angular, clay clod at bottom At 31 feet: Silty, fine Sand</p> <p>No core recovery from 32.4 to 35 feet</p>			
230	40	4	7	75			 <p>CL-ML SILTY CLAY - light olive brown (2.5Y 5/4), moist, approx 20 percent fine sand, oxidation mottling At 35.5 to 35.7 feet: Slight ped development, fine pores At 35.7 feet: Some coarse sand, fine gravel</p> <p>SC CLAYEY to SILTY SAND - light olive brown (2.5Y 5/4), moist, fine sand, some coarse sand and fine gravel (up to 1/2 inch in size), some thin silt interbeds At 36.7 to 37.5 feet: Gravelly bed of Poorly Graded Sand with Gravel At 37 feet: Wet At 37.3 feet: Clayey Sand to Silty Sand, olive brown to grayish brown, moist to wet, fine sand, some medium At 38.2 feet: Approx 1 percent gravel, up to 1 inch in diameter, micaceous No core recovery from 38.75 to 40 feet</p>			

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/25/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F1 (Continued)
								ABC Liovin / CME 75	Soil Core	See Plan
								September 22, 2014	HOLE DIAMETER	8 inches
								GROUND-WATER READINGS Groundwater level was measured at 37 feet below the ground surface 15 minutes after bailing of drilling mud.		
225	45	4	8	72			SM	SILTY SAND to SANDY SILT - brown (10YR 4/3), very moist, fine sand, with clay, increased oxidation, micaceous, some fine gravel, coarse sand At 41 feet: Trace manganese staining, less clay At 42.7 feet: Few coarse sand, fine gravel SILTY, CLAYEY SAND - olive (5Y 4/4), moist, fine sand, oxidized mottling, slightly micaceous No core recovery from 43.6 to 45 feet		
							SC-SM			
220	50	5	9	90			SM	SILTY SAND - dark grayish brown (10YR 4/2), wet, fine to medium sand, some Poorly Graded Sand with Clay layers (2 to 5 inches thick), oxidized, micaceous At 45.3 to 45.5 feet: Fine Silty Sand with few gravel SANDY LEAN CLAY - olive (5Y 4/4), wet		
							CL			
							ML	CLAYEY SILT - gray, wet, some fine sand, few Clayey Sand layers (2 inches thick)		
							SP-SC	POORLY GRADED SAND with CLAY and GRAVEL - fine to medium sand, approx 30 percent fine to medium slate gravel, angular to subangular No core recovery from 49.5 to 50 feet END OF BORING AT 50 FEET		
215	55							NOTES: Hand augered upper 5 feet to avoid damage to utilities. Groundwater level was measured at 37 feet below the ground surface 15 minutes after bailing of drilling mud. Borehole backfilled with bentonite grout.		
210	60									

Field Engineer: LH
 Prepared/Date: JF 9/25/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.	
								DRILLING METHOD	BOREHOLE LOCATION	B-F2	
								ABC Liovin / CME 75	Soil Core	See Plan	
								DATES DRILLED September 22, 2014 to September 23, 2014	HOLE DIAMETER 8 inches	GROUND EL. 270.44 feet	
								GROUND-WATER READINGS Groundwater level was measured at 41.5 feet below the ground surface on September 23, 2014.			
270							SM	FILL SILTY SAND - dry to moist, fine sand, some medium to coarse At 2 feet: Moist, cobble (up to 2 inches) At 3 feet: Less gravel At 4 feet: More silt			
265	5	1	1	100			CL-ML	QUATERNARY ALLUVIUM (Qal) SILTY CLAY with SAND - brown (10YR 4/3), moist, fine sand, approx 1 percent fine gravel, medium plasticity, rare carbonate filaments At 6.5 feet: More clay At 8 feet: Approx 1 percent fine gravel (up to 1/4 inch in size)			
260	10	1	2	100				At 13 feet: More sand and silt			
255	15	2	3	100			ML	CLAYEY SILT with SAND - olive brown (2.5Y 4/4), moist, some sandier and less clayey layers, fine root hair casts and carbonate filaments At 17 to 18 feet: Sandy Silt to Silty Sand, olive brown (2.5Y 4/4), moist, fine grained			
20	20						CL	LEAN CLAY with SAND - dark yellowish brown (10YR 4/4), approx 30 percent sand, approx 5 percent gravel (up to 3/4 inch in size), fine root hair casts and carbonate filaments			

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F2 (Continued)
								Soil Core	See Plan	
								September 22, 2014 to September 23, 2014	HOLE DIAMETER 8 inches	GROUND EL. 270.44 feet
								GROUND-WATER READINGS Groundwater level was measured at 41.5 feet below the ground surface on September 23, 2014.		
250		2	4	60				CLAYEY SILT with SAND - yellowish brown (10YR 5/6) to olive brown (2.5Y 4/4), fine sand SILTY SAND - yellowish brown (10YR 5/6), moist, fine sand, some medium, approx 1 percent gravel (up to 3/4 inch in size), (slate) At 22 feet: Silty Sand to Poorly Graded Sand with Silt, light olive brown (2.5Y 5/4), moist, fine to medium sand, some coarse, approx 10 to 15 percent fine to coarse gravel (up to 1 inch in size) No core recovery from 23 to 25 feet		
245	25	3	5	60				POORLY GRADED SAND with SILT and GRAVEL - approx 20 to 30 percent fine to medium gravel, angular to subangular, oxidation coating in gravels, erosional lower contact SILTY SAND - yellowish brown (10YR 5/4), moist, fine sand, some medium grained No core recovery from 28 to 30 feet		
240	30	3	6	90				SILTY CLAY - olive brown (2.5Y 4/4), moist, some fine sand, approx 5 to 10 percent fine gravel (up to 1/2 inch in size) At 31.5 feet: Approx 15 to 20 percent gravel (up to 1 1/2 inches in size) SILTY SAND - brown (10YR 4/3), moist, approx 15 to 25 percent gravel, erosional lower contact SANDY SILT to SILTY SAND - brown (10YR 4/3), moist, fine sand, with clay, approx 1 percent fine gravel (up to 1/4 inch in size) At 33 feet: Dark manganese staining At 34.2 feet: Clayey No core recovery from 34.5 to 35 feet		
235	35	4	7	60				SILTY CLAY - dark grayish brown (10YR 4/2), very moist, some fine sand At 37 feet: 1 inch layer of fine to medium Poorly Graded Sand with Silt At 37.2 feet: Sample collected for carbon dating At 37.5 feet: Silty, Clayey Sand At 37.8 feet: Silty Sand, approx 10 to 15 percent gravel No core recovery from 38 to 40 feet		
40										

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F2 (Continued)
								ABC Liovin / CME 75		
								Soil Core	See Plan	
								DATES DRILLED September 22, 2014 to September 23, 2014	HOLE DIAMETER 8 inches	GROUND EL. 270.44 feet
								GROUND-WATER READINGS Groundwater level was measured at 41.5 feet below the ground surface on September 23, 2014.		
230		4	8	45				POORLY GRADED SAND - brown (10YR 4/3), moist to wet, fine to medium sand, some coarse, some fine gravel (up to 1½ inches in size), clods of clay, oxidized strong brown (7.5YR 5/6)		
								WELL-GRADED SAND with GRAVEL - yellowish brown (10YR 5/4) with mottled black, white and red colors, fine to coarse sand, fine to coarse gravel (up to 1 inch in size) No core recovery from 42.25 to 45 feet		
225		5	9	40				POORLY GRADED SAND with CLAY and GRAVEL - dark yellowish brown (10YR 4/4), wet, fine gravel, angular to subangular At 45.6 feet: Fine to coarse gravel, angular to subangular, mostly slate		
								No core recovery from 47 to 50 feet		
220								END OF BORING AT 50 FEET		
								NOTES: Hand augered upper 5 feet to avoid damage to utilities. Groundwater level was measured at 41.5 feet below the ground surface on September 23, 2014. Borehole backfilled with bentonite grout.		
215										
60										

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

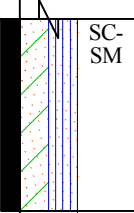
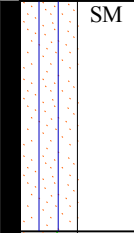
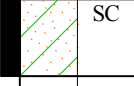
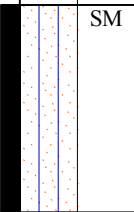
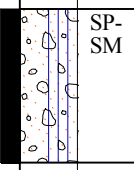
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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F3
								Soil Core	See Plan	
								September 22, 2014	8 inches	GROUND EL. 267.75 feet
								GROUND-WATER READINGS Groundwater level was measured at 40.5 feet below the ground surface on September 22, 2014.		
								6-inch thick Asphalt Concrete over 5-inch thick Base Course		
								SM	FILL SILTY SAND - yellowish brown to olive brown, moist, fine sand, trace fine gravel (up to 1/2 inch in size)	
265								SM	QUATERNARY ALLUVIUM (Qal) SILTY SAND - dark olive brown (2.5Y 3/3), moist, fine to medium sand, approx 5 percent fine gravel, angular to subangular	
	5	1	1	80					At 7 feet: Approx 5 to 10 percent fine to coarse gravel (up to 1 inch in size)	
260								CL-ML	SILTY CLAY - dark grayish brown (10YR 4/2), moist, approx 5 percent fine sand, carbonate filaments, plastic	
									No core recovery from 9 to 10 feet	
	10							CL-ML		
		1	2	90					At 12 to 14.5 feet: Increase carbonate filaments, some pores	
255								CL	SANDY LEAN CLAY - light olive brown (2.5Y 5/3), slightly moist, fine sand, with silt	
								SC	CLAYEY SAND - light olive brown (2.5Y 5/3), slightly moist, fine sand	
									No core recovery from 14.5 to 15 feet	
	15							ML	SANDY, CLAYEY SILT - light olive brown (2.5Y 5/3), slightly moist, approx 30 to 40 percent sand, fine root hair casts and carbonate filaments, narrowly gradational contacts	
		2	3	86				ML	SILT with SAND - light olive brown (2.5Y 5/3), moist, fine sand, approx 1 percent fine gravel (up to 1/2 inch in size), angular to subangular	
250									At 17 feet: Silty Sand interbed, light olive brown (2.5Y 5/4), fine sand, narrowly gradational contacts	
								SM	SILTY SAND - light olive brown (2.5Y 5/4), moist, fine sand, some fine gravel (up to 1/2 inch in size)	
								CL	SANDY LEAN CLAY - dark yellowish brown (10YR 4/4), slightly moist, approx 1 to 5 percent gravel	
20									No core recovery from 19.3 to 20 feet	

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F3 (Continued)
								Soil Core	See Plan	
								September 22, 2014	8 inches	GROUND EL. 267.75 feet
								GROUND-WATER READINGS		
								Groundwater level was measured at 40.5 feet below the ground surface on September 22, 2014.		
245		2	4	50			 SC-SM	SILTY, CLAYEY SAND - yellowish brown (10YR 5/6), slightly moist to dry, fine sand, few medium to coarse, approx 1 percent fine gravel, angular, layer of Clayey Sand (3 inches thick)		
								No core recovery from 22.5 to 25 feet		
240		3	5	80			 SM	SILTY SAND - light olive brown (2.5Y 5/4), moist, fine sand, some medium, approx 1 percent fine gravel (up to 1/4 inch in size)		
								At 26.5 feet: Some clay		
								At 27.4 feet: Poorly Graded Sand with Clay, fine sand, approx 10 to 15 percent fine to medium gravel, angular, erosional lower contact		
							 SC	CLAYEY SAND - dark yellowish brown (10YR 4/4), moist, fine sand, approx 5 to 10 percent fine to medium gravel, angular		
								No core recovery from 29 to 30 feet		
30		3	6	54			 SM	SILTY SAND - dark yellowish brown (10YR 4/6), moist, fine sand, some medium, approx 5 percent fine gravel (up to 3/4 inch in size)		
								At 31 feet: Grades siltier, finer grained		
235								At 32.2 feet: Approx 10 to 15 percent fine to medium gravel, angular At 32.3 feet: Sandy Lean Clay, dark grayish brown (10YR 4/2), moist, approx 5 percent gravel, trace manganese staining No core recovery from 32.7 to 35 feet		
35		4	7	40			 SP-SM	POORLY GRADED SAND with SILT and GRAVEL - moist, fine to medium sand, fine to coarse gravel (up to 1/2 inch in size), angular to subangular (slate)		
								At 36.3 feet: Less gravel layering, thinly oxidized		
230								No core recovery from 37 to 40 feet		

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F3 (Continued)
								ABC Liovin / CME 75		
								Soil Core	See Plan	
								September 22, 2014	8 inches	GROUND EL. 267.75 feet
								GROUND-WATER READINGS		
								Groundwater level was measured at 40.5 feet below the ground surface on September 22, 2014.		
225		4	8	50				SILTY CLAY - brown (10YR 4/3), wet, fine sand SILTY SAND - dark grayish brown (10YR 4/2) POORLY GRADED GRAVEL with SAND - brownish gray, wet, fine to coarse slate gravel (up to 1½ inches in size), subangular to angular, approx 30 percent fine to medium sand, some coarse No core recovery from 42.5 to 45 feet		
45								POORLY GRADED SAND with GRAVEL - very dark grayish brown (10YR 3/2), wet, fine to coarse sand, approx 10 percent fine to coarse gravel (up to 1/2 inch in size), erosional lower contact SILTY CLAY - dark grayish brown (2.5Y 4/2), wet, some few sandy layers, plastic, some fine gravel, some oxidation mottling along contact		
220		5	9	75						
										At 48 feet: Predominantly oxidized, approx 1 to 5 percent gravel, subangular to angular No core recovery from 48.75 to 50 feet
50										END OF BORING AT 50 FEET
										NOTES: Hand augered upper 5 feet to avoid damage to utilities. Groundwater level was measured at 40.5 feet below the ground surface on September 22, 2014. Borehole backfilled with bentonite grout and patched with cold patch asphalt.
215										
55										
210										
60										

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

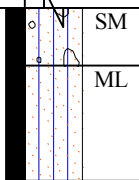
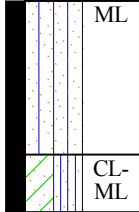
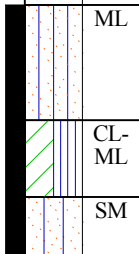
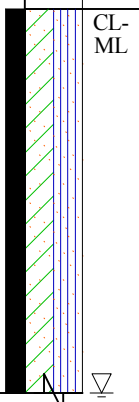
THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F4
								Soil Core	See Plan	
								September 23, 2014	8 inches	GROUND EL. 267.05 feet
								GROUND-WATER READINGS Groundwater level was measured at 40 feet below the ground surface 10 minutes after bailing of drilling mud.		
								5-inch thick Asphalt Concrete over 6-inch thick Base Course		
265							SM	FILL SILTY SAND - olive yellow to yellowish brown, moist, fine to medium sand, some coarse, approx 5 percent fine to coarse gravel (up to 3/4 inch in size)		
	5							At 4 feet: Olive brown, slightly more gravel		
								At 5 feet: Sandy Silt, brownish gray		
260		1	1	82			SP-SM	POORLY GRADED SAND with SILT - light grayish brown, moist, fine to medium sand, approx 10 to 15 percent fine gravel (up to 1/2 inch in size), some coarse		
							CL-ML	QUATERNARY ALLUVIUM (Oal) SILTY CLAY - brown (10YR 4/3) to yellowish brown (10YR 5/4), slightly moist, approx 15 percent fine sand, few coarse		
								No core recovery from 9.1 to 10 feet		
	10						CL-ML	SILTY CLAY - brown (10YR 4/3), moist, some fine sand, approx 1 percent fine gravel (up to 1/4 inch in size)		
							ML	CLAYEY SILT with SAND - yellowish brown (10YR 5/4), moist		
255		1	2	80			ML/SM	At 12 feet: Gravel lens SANDY SILT to SILTY SAND - yellowish brown (10YR 5/4), moist, fine sand, with clay, fine root hair casts and carbonate filaments		
								At 13.5 feet: Grades sandier, gravel lens		
								No core recovery from 14 to 15 feet		
	15						ML	SANDY SILT - light olive brown (2.5Y 5/3), moist, fine sand, some fine gravel (up to 1/4 inch in size), minor fine root hairs, narrowly gradational contacts		
								At 16.5 feet: Approx 1 percent fine gravel, angular (slate)		
250		2	3	90			ML/CL	SANDY SILT with CLAY - brown (10YR 5/3), moist, approx 5 percent fine to medium gravel, angular (slate), minor root hairs		
							SM	SILTY SAND with GRAVEL - olive brown, moist, fine sand, some medium, approx 25 percent fine gravel (up to 1/2 inch in size)		
								At 19 feet: Roots		
	20							No core recovery from 19.5 to 20 feet		

(CONTINUED ON FOLLOWING FIGURE)

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 Prepared/Date: JF 9/26/2014
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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F4 (Continued)
								Soil Core	See Plan	
								September 23, 2014	8 inches	GROUND EL. 267.05 feet
								GROUND-WATER READINGS		
								Groundwater level was measured at 40 feet below the ground surface 10 minutes after bailing of drilling mud.		
245		2	4	45				At 20 feet: Slightly more silt At 20.5 feet: Fine root hairs SANDY SILT - light olive brown (2.5Y 5/6), moist, fine sand At 21.5 feet: Thin fine gravel lens No core recovery from 22.25 to 25 feet		
25										
240		3	5	55				At 25 feet: Approx 1 to 5 percent fine to coarse gravel (up to 3/4 inch in size) At 26 feet: Approx 10 percent gravel SANDY SILTY CLAY - olive brown (2.5Y 4/3), moist, fine sand, few manganese stain splotches, erosional upper contact No core recovery from 27.75 to 30 feet		
30										
235		3	6	66				SANDY SILT - olive brown (2.5Y 4/3), moist, fine sand, some medium, some fine gravel (up to 1/4 inch in size), with clay At 31.25 feet: Thin fine sand lens SILTY CLAY - olive brown (2.5Y 4/3), moist, some fine sand SILTY SAND - olive, moist, fine sand, some medium, approx 5 to 10 percent fine to coarse gravel (up to 3/4 inch in size), with clay At 33.3 feet: Approx 30 to 40 percent fine to medium gravel, angular to subangular No core recovery from 33.3 to 35 feet		
35										
230		4	7	100				SILTY CLAY with SAND - dark yellowish brown (10YR 4/4), moist to wet, fine sand, slightly mottled		
40										

(CONTINUED ON FOLLOWING FIGURE)

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F4 (Continued)
								ABC Liovin / CME 75		
								Soil Core	See Plan	
								September 23, 2014	8 inches	GROUND EL. 267.05 feet
								GROUND-WATER READINGS		
								Groundwater level was measured at 40 feet below the ground surface 10 minutes after bailing of drilling mud.		
225		4	8	85				At 40 feet: Wet, some fine sand		
45								At 43 feet: Manganese staining At 43.1 feet: Oxidized horizon (1/2 inch thick), flat laying At 43.4 feet: Sample collected for carbon dating At 44 feet: Sample collected for carbon dating At 44.25 feet: Grades sandier No core recovery from 44.25 to 45 feet POORLY GRADED SAND with GRAVEL - dark grayish brown (2.5Y 4/2), wet, fine to coarse sand, fine to coarse gravel (up to 3/4 inch in size), some clay		
220		5	9	65				At 46 feet: More gravel		
								At 47 feet: Olive brown (2.5Y 4/4), moist		
								No core recovery from 48.25 to 50 feet		
50								END OF BORING AT 50 FEET		
								NOTES: Hand augered upper 5 feet to avoid damage to utilities. Groundwater level was measured at 40 feet below the ground surface 10 minutes after bailing of drilling mud. Borehole backfilled with bentonite grout and patched with cold patch asphalt.		
215										
55										
210										
60										

Field Engineer: LH
Prepared/Date: JF 9/26/2014
Checked/Date: MAS/RM 10/2/2014

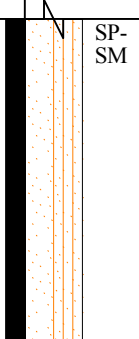
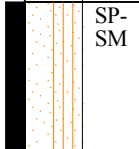
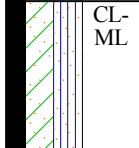
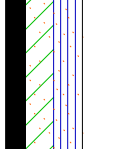
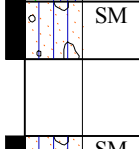
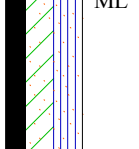

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F5
								ABC Liovin / CME 75	Soil Core	See Plan
								September 23, 2014	HOLE DIAMETER	8 inches
								GROUND-WATER READINGS Groundwater level was measured at 38.75 feet below the ground surface 10 minutes after bailing of drilling mud.		
								5-inch thick Asphalt Concrete over 6-inch thick Base Course		
265								SM	FILL SILTY SAND - olive yellow to olive brown, moist, fine sand, some medium, some fine to coarse gravel (up to 1 inch in size) At 3 feet: More silt At 5 feet: Gravel	
260	5	1	1	25				ML	QUATERNARY ALLUVIUM (Qal) SANDY SILT - light olive brown (2.5Y 5/4), dry to moist, fine sand No core recovery from 6.25 to 10 feet	
255	10	1	2	90				CL-ML	SILTY CLAY - brown (10YR 4/3), moist, fine sand, few carbonate filaments, fine root hair casts, slightly porous	
250	15	2	3	50				ML	SANDY SILT with CLAY - yellowish brown (10YR 5/4), moist, fine sand, with clay, carbonate filaments, root hair casts, slightly porous	
								SP-SM	No core recovery from 14.5 to 15 feet POORLY GRADED SAND with SILT - light olive brown (2.5Y 5/6), slightly moist, fine sand At 15.4 feet: Poorly Graded Sand with Silt and Gravel, olive brown (2.5Y 4/3), some medium to coarse sand, erosional lower contact	
250								CL	SANDY LEAN CLAY - yellowish brown (10YR 5/6), slightly moist At 17 feet: Approx 5 percent gravel No core recovery from 17.5 to 20 feet	

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	MOISTURE CONTENT (% of dry wt.)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
								DRILLING METHOD	BOREHOLE LOCATION	B-F5 (Continued)
								Soil Core	See Plan	
								September 23, 2014	8 inches	GROUND EL. 266.78 feet
								GROUND-WATER READINGS		
								Groundwater level was measured at 38.75 feet below the ground surface 10 minutes after bailing of drilling mud.		
245		2	4	85				SP-SM	POORLY GRADED SAND with SILT - moist, trace fine gravel (up to 1/4 inch in size), some silt and clay, roots and root hairs	
									No core recovery from 24.25 to 25 feet	
25									At 25.75 to 26 feet: More clay	
240		3	5	100				SM	SILTY SAND - light olive brown (2.5Y 5/4), moist, fine sand, grades to clay at 27.75 feet	
								CL-ML	SILTY CLAY with SAND - olive brown (2.5Y 4/3), moist, fine sand. manganese staining	
30									At 29.5 feet: Olive brown (2.5Y 4/4), more clay	
									At 30 feet: Grades sandier	
235		3	6	80				SM	At 31.5 feet: Thin layer of Silty Sand, olive brown, moist, fine sand	
									At 32.75 feet: Roots	
									At 33 feet: Sample collected for organic dating	
									SILTY SAND with GRAVEL - yellowish brown, moist, fine to coarse sand, fine to coarse gravel (up to 1 1/4 inches in size)	
									No core recovery from 34 to 35 feet	
35								SM	At 35.25 feet: Less gravel	
								CL-ML	SILTY CLAY to CLAYEY SILT with SAND - dark yellowish brown (10YR 4/4), mottled, moist to wet, fine sand, trace fine gravel (up to 1/2 inch in size), erosional upper contact	
230		4	7	90					At 36.25 feet: More clay	
									At 38 feet: Increase in moisture	
40									No core recovery from 39.25 to 40 feet	

(CONTINUED ON FOLLOWING FIGURE)

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

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								DRILLING METHOD	BOREHOLE LOCATION	B-F5 (Continued)	
								ABC Liovin / CME 75	Soil Core	See Plan	
								September 23, 2014	8 inches	GROUND EL. 266.78 feet	
								GROUND-WATER READINGS			
								Groundwater level was measured at 38.75 feet below the ground surface 10 minutes after bailing of drilling mud.			
225		4	8	70				<p>SANDY LEAN CLAY - wet, gravel at top of sample</p> <p>SILTY SAND to POORLY GRADED SAND with SILT - olive brown, wet, fine to medium sand, gradational contacts</p> <p>At 42 feet: Grades to more gravelly</p> <p>POORLY GRADED GRAVEL - very dark grayish brown (2.5Y 3/2), wet, fine to medium gravel, some coarse, subangular to angular, some clay</p> <p>No core recovery from 43.5 to 45 feet</p>			
45								<p>At 45 feet: Dark gray (2.5Y 4/1), wet</p>			
220		5	9	60				<p>POORLY GRADED GRAVEL to POORLY GRADED SAND - fine to medium slate gravel, angular, few granitics</p> <p>No core recovery from 48 to 50 feet</p>			
50								END OF BORING AT 50 FEET			
215								NOTES:			
								Hand augered upper 5 feet to avoid damage to utilities. Groundwater level was measured at 38.75 feet below the ground surface 10 minutes after bailing of drilling mud. Borehole backfilled with bentonite grout and patched with cold patch asphalt.			
55											
210											
60											

Field Engineer: LH
 Prepared/Date: JF 9/26/2014
 Checked/Date: MAS/RM 10/2/2014

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						Jet Drilling / CME 75		T2E-B9
						DRILLING METHOD	BOREHOLE LOCATION	
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
							11 inches of asphaltic concrete over 3 inches of base	
						SM/ML	FILL [Af] Silty Sand and Sandy Silt, very fine grained, trace coarse sand and fine gravel (Jsm and Tm) NOTE: Jsm = Santa Monica Slate Tm = Modelo formation See end of log for more detailed descriptions of clasts	
265	5	1	1	42		ML	YOUNGER / OLDER ALLUVIAL FAN DEPOSITS [Qf/Qfo] Clayey Silt, variable fine sand, trace coarse sand and fine gravel (Jsm and Tm); very dark grayish brown (10YR 3/2); appears moist At 6.1 to 9.0': No recovery	
260	10	1	2	100		CL	Clay and Silty Clay, trace coarse sand (Jsm and Tm); very dark grayish brown (10YR 3/2); appears moist and very stiff to hard; lower contact is gradational At 11.7 to 12.6': Trace calcium carbonate filaments and uncemented nodules up to 1/8 inch	
255	15	1	3	30		ML	ESTUARINE DEPOSITS [Qe] Clayey to Sandy Silt; dark yellowish brown (10YR 4/6); appears damp to moist and very stiff to hard; faint brown (10YR 4/3) laminations, rare (<1%) coarse sand and fine gravel (Jsm and Tm); well sorted; lower contact is gradational At 15.5 to 19.0': No recovery	
20	20					SM	At 19.0 to 20.0': Silty Sand with Gravel, fine to coarse grained, clasts 20 to 30% up to 1 inch, mainly subangular to subrounded slate (Jsm), shale (Tm) and sandstone (Tm); dark yellowish brown (10YR 4/4); appears moist and dense	

(CONTINUED ON FOLLOWING FIGURE)

Geologist: LH/MF
 Prepared/Date: WL/PK 10/14/2011
 Checked/Date: MW/MF 10/14/2011

MTA Westside Subway Extension
Los Angeles, California



LOG OF BORING
 Project No.: 4953-10-1561 Figure: T2E-B9a

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						Jet Drilling / CME 75		T2E-B9 (Continued)
						DRILLING METHOD	BOREHOLE LOCATION	GROUND EL. 270 feet
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	
						6/4/2011 - 6/30/2011	8 inches	
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		1	4	100			Qe Continued At 20.0 to 21.5': No recovery	
						ML	Clayey to Sandy Silt as above	
		1	5	16			At 22.3 to 24.0': No recovery	
							At 24.5' to 27.7': Predominantly Sandy Silt, trace to some clay	
245	25	2	6	100			At 26.5 to 31.5': Becomes very moist and medium stiff	
		2	7	80			At 29.5 to 31.5': Color becomes dark brown (10YR 3/3)	
240	30	2	8	100				
		2	9	48		CL	Silty Clay, rare (<1%) coarse sand and fine gravel (Jsm and Tm); dark grayish brown (10YR 4/2); appears very moist to wet and soft; variable manganese oxide staining; lower contact occurs between runs	
		2	10	72			At 32.7 to 34.0': No Recovery	
235	35	2	11	36			At 35.2 to 35.8': Color becomes dark gray (2.5Y 4/1), slightly micaceous	
						SM- SC CL	OLDER ALLUVIAL FAN DEPOSITS [Qfo] Clayey, Silty Sand, fine grained; dark grayish brown (10YR 4/2); appears wet and medium dense	
							At 36.9 to 37.4': Silty Clay with Sand, sand decreases with depth; dark grayish brown (10YR 4/2); appears wet and soft	
							At 37.4 to 39.0': No recovery	
						SP	Poorly Graded Sand, fine to medium grained; color variable, generally very dark grayish brown (2.5Y 3/2); appears wet and dense; coarse sand content increasing with depth; lower contact is gradational	

(CONTINUED ON FOLLOWING FIGURE)

Geologist: LH/MF
 Prepared/Date: WL/PK 10/14/2011
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




MTA Westside Subway Extension
 Los Angeles, California



LOG OF BORING

Project No.: 4953-10-1561 Figure: T2E-B9b

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						Jet Drilling / CME 75		T2E-B9 (Continued)
						DRILLING METHOD	BOREHOLE LOCATION	GROUND EL.
						Hollow-Stem Auger	See Plate 3	270 feet
						DATES DRILLED	HOLE DIAMETER	
						6/4/2011 - 6/30/2011	8 inches	
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		2	12	100		SP	Qfo Continued	
						CL/ML	Silty Clay, variable fine sand, trace coarse sand (Jsm and Tm), dark gray (10YR 4/1), appears wet and soft; poorly sorted	
		2	13	56			At 42.7 to 42.9': Becomes gravelly, clasts 30 to 40%, up to 1½ inches, mainly subangular slate (Jsm) At 42.9 to 44.0': No recovery	
225	45					GM	Silty Gravel, clast 60 to 70%, up to 1 inch, mainly slate (Jsm), matrix is fine silty sand, very dark grayish brown (10YR 3/2), appears wet and dense, lower contact is sharp, erosional	
						CL/ML	ESTUARINE DEPOSITS - FINE GRAINED [Qef]	
		3	14	40			Clay to Silty Clay, variable fine sand, trace coarse sand and fine gravel (Jsm and Tm); strongly mottled, grayish brown (10YR 5/2) to strong brown (7.5YR 5/6), appears very moist and stiff; occasional sandy silt pockets; lower contact is narrowly gradational At 46.0 to 49.0': No recovery	
							At 49.0 to 52.0': Becomes mottled, grayish brown (10YR 5/2) to reddish brown (5YR 4/4); occasional manganese oxide flecks and staining	
220	50							
		3	15	100			At 54.5 to 55.5': Occasional reddish brown (5YR 4/4), mottling	
						CL/CH	Clay, mottled, brown (7.5YR 4/4) to dark grayish brown (10YR 4/2); appears moist and very stiff to hard; variable (2 to 15%) manganese oxide flecks and staining	
215	55							
		3	16	100			At 59.0 to 61.9': Appears very moist to wet and soft to medium stiff; variable fine to coarse sand	
								
60								

(CONTINUED ON FOLLOWING FIGURE)

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
						CL/ CH	Qef Continued	
		4	17	60			ESTUARINE DEPOSITS [Qe] Clay; mottled, brown (7.5YR 4/4) to dark grayish brown (10YR 4/2); appears moist and very stiff to hard; occasional gravelly or sandy beds as noted above; lower contact is gradational At 61.1 to 61.9': Becomes gravelly, clasts 25 to 35%, up to 1-inch, mainly subrounded slate (Jsm), shale (Tm) and sandstone (Tm) At 61.9 to 62.3': Some oxidized, strong brown (7.5YR 4/6) silt laminations At 62.0 to 64.0': No recovery At 64.0 to 64.8': Appears wet and medium stiff At 64.8 to 65.3': Grades to Sandy Clay	
205	65	4	18	80		CL	Silty Clay and Sandy Clay, variable fine to coarse sand, trace fine gravel (Jsm and Tm); color variable; very dark grayish brown (10YR 3/2); occasional dark reddish brown (5YR 3/4) mottling; appears wet and soft to medium stiff, lower contact occurs between runs At 67.9 to 68.1': Becomes very moist and very stiff At 68.0 to 69.0': No recovery	
200	70	4	19	100		SC CL/ ML	OLDER ALLUVIAL FAN DEPOSITS [Qfo] Clayey Sand with gravel, fine to coarse grained, clasts 15 to 20%, up to 3/4 inch; mainly subangular to subrounded slate (Jsm), shale (Tm) and sandstone (Tm); color variable; appears wet and dense At 69.9 to 70.3': Silty Clay, dark reddish brown (5YR 3/3); appears wet and soft Clayey Silt and Silty Clay, variable fine to coarse sand and gravel, clasts 5 to 20%, up to 3/4 inch, mainly subangular to subrounded slate (Jsm), shale (Tm) and sandstone (Tm); brown (7.5YR 4/4); appears very moist and very stiff; poorly sorted; occasional less gravelly (2-5%) beds; occasional dark reddish brown (5YR 3/4) mottling, lower contact is narrowly gradational At 71.5 to 73.0': Appears wet and soft to medium stiff At 74.0 to 77.7': Becomes brown (7.5YR 4/4); appears very moist to wet and medium stiff At 77.7 to 80.2': Becomes reddish brown (5YR 4/4); appears very moist to wet and stiff	
195	75	5	20	100				
80								

(CONTINUED ON FOLLOWING FIGURE)

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 G:\PROJECT_DIRECTORIES\4953\2010\101561\METRO_WESTSIDE_EXTENSION\6.2.3.2 FAULT HAZARD INVESTIGATION\3.2 ALL FIELD NOTES\GINT LOGS\101561-TRANSECT 2E.GPJ 10/14/11

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


ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		5	21	100		CL/ML	Qfo Continued At 80.2 to 83.0': Becomes reddish brown (5YR 4/4) to dark grayish brown (10YR 4/2) mottles; appears very moist to wet and medium stiff to stiff At 83.0 to 83.8': Gravel increases to 25 to 30%	
185	85	5	22	100		CL/ML	ESTUARINE DEPOSITS [Qe] Silty Clay and Clayey Silt, variable fine sand, trace coarse sand and fine gravel (Jsm and Tm); brown (7.5YR 4/4) with occasional grayish brown (2.5Y 5/2) mottling; appears very moist and very stiff; lower contact is narrowly gradational At 85.4 to 85.0': Gravel increases to 5 to 10% At 86.3 to 89.0': Trace manganese oxide flecks At 86.5 to 86.3': Some grayish brown laminations	
180	90	6	23	64		CL/CH	Clay, rare (<1%) coarse sand (Jsm and Tm); brown (7.5YR 4/4); appears moist and very stiff to hard; variable varve-like bedding; lower contact occurs between runs	
						ML	At 91.8 to 92.2': Grades to Clayey to Sandy Silt, trace coarse sand and fine gravel (Jsm and Tm) At 92.2 to 94.0': No recovery	
175	95	6	24	38		CL/CH	At 94.0 to 95.1': Sandy Silt, variable clay, trace coarse sand and fine gravel (Jsm and Tm); brown (7.5YR 4/4); appears very moist and stiff; micaceous At 95.9 to 99.0': No recovery	
100						CL	OLDER ALLUVIAL FAN DEPOSITS [Qfo] Clay and Silty Clay, variable fine to coarse sand; brown (7.5YR 5/4); appears very moist to wet and medium stiff; poorly sorted; occasional clayey silt and sandy silt	

(CONTINUED ON FOLLOWING FIGURE)

Geologist: LH/MF
 Prepared/Date: WL/PK 10/14/2011
 Checked/Date: MW/MF 10/14/2011



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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		6	25	70		CL	beds; Qfo Continued occasional strong brown (7.5YR 4/6) or grayish brown (10YR 5/2) mottling At 101.1 to 102.2': Trace manganese oxide flecks	
						CL	Sandy Clay with Gravel, clasts, 20 to 30%, up to 2 inches, mainly subangular to subrounded slate (Jsm), shale (Tm) and sandstone (Tm); mottled, color variable; appears wet and medium stiff; lower contact is sharp At 125.0 to 104.0': No recovery	
165	105	7	26	24			At 104.7 to 105.2': Clay; mottled, light brownish gray (10YR 6/2); appears very moist and stiff; trace manganese oxide flecks At 105.2 to 109': No recovery	
160	110					CL/ CH	ESTUARINE DEPOSITS - FINE GRAINED [Qef] Clay, strongly mottled, grayish brown (2.5Y 5/2) to strong brown (7.5YR 4/6), occasional reddish brown (5YR 4/4) mottles; appears moist and stiff to very stiff; lower contact is gradational At 110.5 to 111.2': Prominant varve-like bedding	
		7	27	80		CL	At 111.2 to 112.2': Clay described above alternates with Sandy Silt beds; slightly micaceous; appears very moist and medium stiff to stiff	
						CL/ CH	At 113.0 to 114.0': No recovery At 115.0 to 115.8': Distinct laminations defined by color	
155	115	7	28	38			At 115.8 to 115.9': Clayey Sand bed, fine to coarse grained At 115.9 to 119.0': No recovery	
						ML	At 119.0 to 119.5': Sandy Silt to Clayey Silt interbeds At 119.8 to 120.2': Distinct laminations defined by color	

(CONTINUED ON FOLLOWING FIGURE)

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		8	29	34		ML	OLDER ALLUVIAL FAN DEPOSITS [Qfo] Clayey Silt with sand and gravel increasing with depth; mottled, grayish brown (2.5Y 5/2) to strong brown (7.5YR 4/6); appears moist and stiff At 120.7 to 124.0': No recovery	
145	125	8	30	34		SW	Well Graded Sand, fine to coarse grained, trace fine gravel (Jsm and Tm); light brownish gray (2.5Y 6/2); appears wet and dense At 125.7 to 129.0': No recovery	
140	130	8	31	0			At 129.0 to 134.0': Recovered only slough	
135	135	8	32	60		SM- SC CL CH	At 134 to 134.3': Clayey Silty Sand with Gravel, fine to coarse grained; clasts 20 to 30%, up to 1/2 inch, mainly subangular to subrounded slate (Jsm); brown (7.5YR 4/4); appears wet and dense; lower contact is sharp ESTUARINE DEPOSITS - FINE GRAINED [Qe/Qef] Clay, very dark grayish brown (10YR 3/2); appears very moist and very stiff; variable (5 to 20%) manganese oxide flecks; lower contact is narrowly gradational Clay, rare (<1%) coarse sand (Jsm and Tm); strongly mottled, very dark gray (10YR 3/1) to strong brown (7.5YR 4/6); appears moist and very stiff to hard; variable varve-like bedding; strong brown mottling occurs as coarse, irregular pockets and diffuse zones; trace manganese oxide flecks; lower contact is gradational At 137.0 to 139': No recovery	
	140					CL	At 139 to 141.5': Color becomes dark gray (10YR 4/1) with strong brown (7.5YR 5/6) mottling; trace coarse sand and fine gravel (Jsm and Tm)	

(CONTINUED ON FOLLOWING FIGURE)

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		8	33	74		CL	Qef Continued	
							At 141.5 to 142.1': Increasing fine to coarse sand and fine gravel, clasts 5 to 10%, up to 1/2 inch (Jsm and Tm) At 142.3 to 142.7' and 144.0-145.4': Color becomes dark brown (7.5YR 3/2) with dark gray (10YR 4/1) mottling At 142.7 to 144.0': No recovery	
125	145	8	34	100		CL/ CH	Clay, very dark gray (10YR 3/1); appears very moist and very stiff; calcium carbonate occurs as irregular, steeply dipping stringers and pockets, total calcium carbonate about 10%; lower contact is gradational	
						CL/ CH	Clay and Silty Clay, rare (<1%) coarse sand (Jsm and Tm); dark brown (7.5YR 3/3); appears very moist and stiff to very stiff; trace calcium carbonate filaments and stringers	
120	150					CL/ CH	Top 12 inches of sample disturbed Clay, dark brown (7.5YR 3/2), appears wet and soft, lower contact is narrowly gradational	
		1	1	50		SM	OLDER ALLUVIAL FAN DEPOSITS [Qfo] Silty Sand with Gravel, trace to some clay, clasts 15 to 20%, up to 1 inch, mainly sandstone and shale (Tm) and slate (Jsm), subangular; dark yellowish brown (10YR 3/6) to (10YR 4/4); appears moist and dense; poorly sorted; lower contact occurs between runs At 151.5 to 154.0': No recovery	
115	155	1	2	70		ML	Clayey Silt, variable fine to medium sand, trace gravel, occasional more gravelly beds; dark yellowish brown (10YR 4/4); appears very moist to wet and firm	
						SM	At 155.8 to 156.2': Silty Sand, trace gravel	
						ML	At 157.3': Trace calcium carbonate At 157.5 to 159.0': No recovery	
160								

(CONTINUED ON FOLLOWING FIGURE)

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						Jet Drilling / CME 75		T2E-B9 (Continued)
						DRILLING METHOD	BOREHOLE LOCATION	
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		1	3	94		ML	Qe Continued At 160.8': Sand layer (1½ inch thick) At 160.8 to 164.0': Gravel decreases, deposits generally finer At 162.4': Color change to dark brown (10YR 1/2); silt becomes sandy, very fine sand, trace clay; lower contact occurs between runs At 163.0': Trace calcium carbonate At 164.0 to 165.0': Clayey Silt; olive gray (5Y 4/2); appears moist and stiff, trace to some fine gravel, granitic rock, shale (Tm), sandstone (Tm), and slate (Jsm); poorly sorted	
105	165	2	4	80		ML	ESTUARINE DEPOSITS [Qe] Sandy Silt, trace clay; dark grayish brown (2.5Y 4/2); well sorted Clayey Silt; olive brown (2.5Y 4/3); indistinct laminations of oxidized siltier beds At 168.0 to 169.0': No recovery	
100	170	2	5	88		SM-ML	At 169.5 to 171.7': Distinct wavy laminations and thin beds of oxidized, fine Silty Sand At 170.3': Decomposing wood fragment At 172.5 to 172.8': Silty Clay bed, olive brown (2.5Y 4/3) At 173.1 to 175.0': Becomes Sandy Silt with some Clay and trace fine gravel, lower contact occurs between runs	
95	175	2	6	20		CL ML	175.0 to 179.0': No recovery	
	180					ML	OLDER ALLUVIAL FAN / ESTUARINE DEPOSITS [Qfo/Qe] Clayey Silt with Gravel, clasts 30 to 40%, up to 2 inches, mainly subangular slate (Jsm) and shale (Tm); lower contact is sharp	

(CONTINUED ON FOLLOWING FIGURE)

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 Checked/Date: MW/MF 10/14/2011

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 G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.2_FAULT_HAZARD_INVESTIGATION\3.2_ALL_FIELD_NOTES\GINT LOGS\101561-TRANSECT 2E.GPJ 10/14/11

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
		2	7	80	ML ML	Qfo/Qe Continued At 180.7': Silt bed (1/3 inch thick); dark reddish brown (5YR 2.5/2) Clayey to Sandy Silt; olive brown (2.5Y 4/4); appears wet and firm to stiff, thin sand and clay interbeds; sandier beds are dark reddish brown (5YR 4/3); occasional beds with trace fine gravel At 183.0 to 184.0': No recovery		
85	185	3	8	70	SP	At 186.4': Coarse gravelly layer, mainly slate (Jsm) and shale (Tm) At 187.1 to 187.5': Grades to fine Sand At 187.4': Sand becomes fine to coarse grained, lower contact occurs between runs At 187.5 to 189.0': No recovery		
80	190	3	9	88	ML CL	Clayey to Sandy Silt, coarsening downward to sand At 189.7 to 189.9': Appears very moist to wet and stiff to dense, lower contact is sharp, subhorizontal At 189.9 to 191.2': Clay; olive brown (2.5Y 4/3); appears very moist and stiff		
75	195	3	10	42	ML SP SM SP SM	Clayey Silt, olive brown (2.5Y 4/3), appears very moist and stiff; trace gravel (2%), mainly shale (Tm), sandstone (Tm), and slate (Jsm) At 191.2 to 191.7': Fracture infilled with calcium carbonate At 195.0 to 195.8': Poorly Graded Sand, some Clay and Silt, fine to medium grained, some coarse, trace gravels, fine shale (Tm), sandstone (Tm) and slate (Jsm) At 195.8 to 196.1': Silty Sand, very fine grained; olive brown (2.5Y 4/4); appears very moist and dense At 196.1 to 199.0 No recovery		
200						END OF BORING AT 199 FEET NOTES:		

(CONTINUED ON FOLLOWING FIGURE)


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 Prepared/Date: WL/PK 10/14/2011
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MTA Westside Subway Extension
Los Angeles, California



LOG OF BORING
 Project No.: 4953-10-1561 Figure: T2E-B9j

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ELEVATION (ft)	DEPTH (ft)	BOX #	RUN #	% RECOVERY	SAMPLE LOC.	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
						DRILLING METHOD	BOREHOLE LOCATION	T2E-B9 (Continued)
						Jet Drilling / CME 75		
						Hollow-Stem Auger	See Plate 3	
						DATES DRILLED	HOLE DIAMETER	GROUND EL.
						6/4/2011 - 6/30/2011	8 inches	270 feet
						GROUNDWATER READINGS		
						Encountered at 38 feet.		
65	205					Boring backfilled with cement/bentonite grout from bottom up and patched. -Munsell colors listed in order of predominance (most predominant color first). -Where observed, contacts and bedding appear subhorizontal unless otherwise noted. -Non-recovery intervals are assumed to occur at the bottom of run unless otherwise noted. -Santa Monica Slate (Jsm) clasts are generally very dark gray, subangular to subrounded slate unless otherwise noted. Modelo Formation (Tm) clasts are generally white to pale yellow to tan, subangular to subrounded shale and sandstone unless otherwise noted. -The term "clasts" herein describes gravel-size rock fragments (larger than ¼ inch). -Beds are generally massive unless otherwise noted. Boring deepened from 149 to 199 on 6/28 to 6/30/11. Location of deepened boring offset south-east approximately 1 foot from original boring location		
60	210							
55	215							
220								
						Geologist: LH/MF Prepared/Date: WL/PK 10/14/2011 Checked/Date: MW/MF 10/14/2011		
MTA Westside Subway Extension Los Angeles, California								LOG OF BORING Project No.: 4953-10-1561 Figure: T2E-B9k

LA METRO PB-TUNNEL_ZONE_S:\70131 GEOTECH\GINT\LIBRARY\MACTEC\JUNE2011\GLB
 G:\PROJECT_DIRECTORIES\4953\2010\101561\METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-101561_(140-160).GPI 10/18/11

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
										C & L Drilling / Mayhew 1000		G-152
										DRILLING METHOD	BOREHOLE LOCATION	
										Rotary Wash	Sta 683+20, Lt 40 feet	
										DATES DRILLED	HOLE DIAMETER	GROUND EL.
										1/31/2011 - 2/1/2011	4-7/8 inches	271 feet
GROUND-WATER READINGS Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 minutes after bailing of drilling mud.												
270											5-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete and 4-inch thick Base Course	
	5										FILL [Af] SILTY SAND - moist, light brown to brown, fine to medium-grained, some coarse, trace slate gravel	
265												
	10										QUATERNARY YOUNGER ALLUVIUM [Qal] SILTY SAND - moist, brown, fine to medium-grained	
260			0.8	19.6	103	14					LEAN CLAY - stiff, moist, dark olive brown, trace slate gravel (up to 1/4 inch in size)	
	15											
255		8	5.4	22.6	-						QUATERNARY OLDER ALLUVIUM [Qalo] LEAN CLAY - medium stiff, olive brown	
	20											
250			3.7	15.5	104	7					SILTY SAND - loose, moist, olive brown, fine to medium-grained, some coarse, some gravel SILT - moist, olive brown, some clay	
	25											
245		18	4.7	10.4	-		12				WELL GRADED SAND with SILT - medium dense, moist, gray, fine to coarse-grained, some gravel (up to 1/2 inch in size)	
	30											
240			3.9	15.0	110	25					SILTY SAND - medium dense, moist, olive brown, fine to medium-grained, some coarse	
	35											
235		8	13.1	28.3	-						SANDY SILT - medium stiff, moist, gray, with sand lenses	
	40											
												SILTY SAND - loose, moist, gray, fine to medium-grained, trace gravel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
 Prepared/Date: JF 3/31/2011
 Checked/Date: LT/PE 9/19/2011



L.A. METRO PB-TUNNEL_ZONE_S:\70131 GEOTECH\GINT\LIBRARY MACTEC\JUNE2011.GLB
 G:\PROJECT_DIRECTORIES\4953\2010\101561\METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-101561_(140-160).GPI 10/18/11

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
										C & L Drilling / Mayhew 1000		G-152 (Continued)
										DRILLING METHOD	BOREHOLE LOCATION	
										Rotary Wash	Sta 683+20, Lt 40 feet	
										DATES DRILLED	HOLE DIAMETER	GROUND EL.
										1/31/2011 - 2/1/2011	4-7/8 inches	271 feet
GROUND-WATER READINGS Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 minutes after bailing of drilling mud.												
230			3.0	15.6	107	57		⊗		SW	Becomes wet, brownish gray, some coarse sand WELL GRADED SAND with GRAVEL - dense, wet, brown, fine to coarse-grained	
				-	-	38		⊗			(Sample not recovered)	
45		44	8.5	8.3	-			⊗			Becomes gray, gravel (up to 1 inch in size)	
				10.8	116	55		⊗				
50		50/6"	8.7	10.3	-		16	⊗		SM	SILTY SAND with GRAVEL - very dense, very moist, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)	
				4.9	116	49		⊗		ML	SILT - hard, moist, reddish brown	
55									NV			
			3.0	30.9	88	10	39	⊗		SM	SILTY SAND - loose, wet, light to dark brown, fine to medium-grained, some coarse, trace gravel (up to 1/2 inch in size), with thin layers of Clayey Silt	
60		28	9.6	19.2	-			⊗			Slate gravel (up to 1 inch in size) Becomes medium dense, thin layer of Well Graded Sand with gravel (up to 1 inch in size)	
			5.1	18.8	99	29	59	⊗		CL	SANDY LEAN CLAY - very stiff, moist, olive brown, trace gravel (up to 1/2 inch in size), with thin layers of Silty Sand	
65									NV			
205			4.5	23.9	97	54	82	⊗			Becomes hard	
70										CH	FAT CLAY - very stiff, moist, dark and reddish brown, trace sand, trace gravel	
200		22	7.0	22.2	-		64	⊗			Becomes hard	
			3.7	27.4	95	67		⊗				
75									NV			
195			3.7	15.3	112	57	50	⊗		CL	SANDY LEAN CLAY - hard, moist, brown, trace gravel (up to 3/8 inch in size)	
80												

MTA Westside Subway Extension
Los Angeles, California



LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.47b

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

LA METRO PB-TUNNEL_ZONE_S:\70131 GEOTECH\GINT\LIBRARY MACTEC\JUNE2011.GLB
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THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD. PEN. TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
										C & L Drilling / Mayhew 1000		G-152 (Continued)
										DRILLING METHOD	BOREHOLE LOCATION	
										Rotary Wash	Sta 683+20, Lt 40 feet	
										DATES DRILLED	HOLE DIAMETER	GROUND EL.
										1/31/2011 - 2/1/2011	4-7/8 inches	271 feet
GROUND-WATER READINGS Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 minutes after bailing of drilling mud.												
190		55	1.4	14.0	-		26	☒	SC	CLAYEY SAND with GRAVEL - very dense, wet, brown, fine to medium-grained, some coarse, gravel (up to 1 inch in size)		
				11.1	123	75		☒	SM	Increase in gravel content SILTY SAND - very dense, very moist, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)		
85		50/5"	6.5	13.3	-			☒	SW	WELL GRADED SAND - very dense, wet, gray, fine to coarse-grained, with gravel (up to 3/4 inch in size)		
185			3.6	20.0	105	45		☒	MH	ELASTIC SILT - hard, moist, olive gray to gray, trace sand, calcium carbonate nodules		
90		41	5.8	19.5	-			☒	CL	Trace gravel (up to 1/4 inch in size)		
180			4.3	15.0	115	52		☒	CL	SANDY LEAN CLAY - hard, moist, brown, with gravel (up to 1/4 inch in size)		
95		42	4.9	17.1	-			☒	ML	SANDY SILT - hard, moist, brown, some clay		
175			4.3	21.8	105	42		☒	SW	WELL GRADED SAND - wet, brown, fine to coarse-grained, with gravel (up to 1/4 inch in size)		
100									SP	POORLY GRADED SAND - very dense, moist, fine to coarse-grained, trace gravel (up to 1/4 inch in size)		
170		59	2.9	15.1	-			☒	SM	SILTY SAND - dense, moist, reddish brown, fine to coarse-grained, trace gravel		
105			3.2	14.5	117	49		☒		END OF BORING AT 111 FEET		
160										NOTES: Hand augered upper 9 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.		
110										"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches		
165										*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches		
115										**Photo Ionization Detector used for OVA readings Downhole Test: NV = Noise/Vibration		
155												
120												

Field Tech: AR
 Prepared/Date: JF 3/31/2011
 Checked/Date: LT/PE 9/19/2011

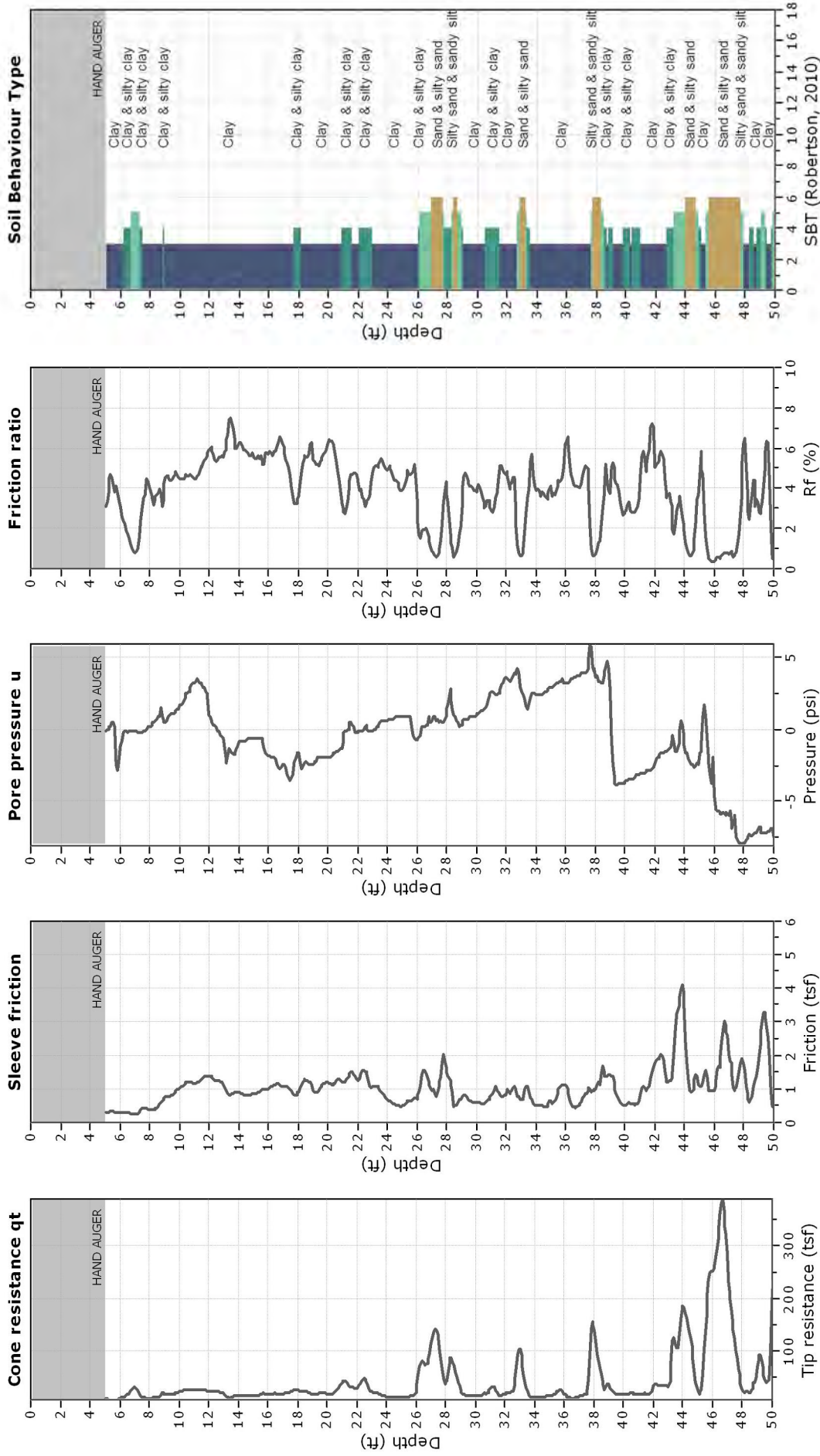




Kehoe Testing and Engineering
 714-901-7270
 rich@kehoetesting.com
 www.kehoetesting.com

Project: AMEC\Beverly Hilton-Hotel
Location: 9876 Wilshire Blvd. Beverly Hills, CA

CPT: CPT-1
 Total depth: 50.08 ft, Date: 9/18/2014
 Cone Type: Vertek





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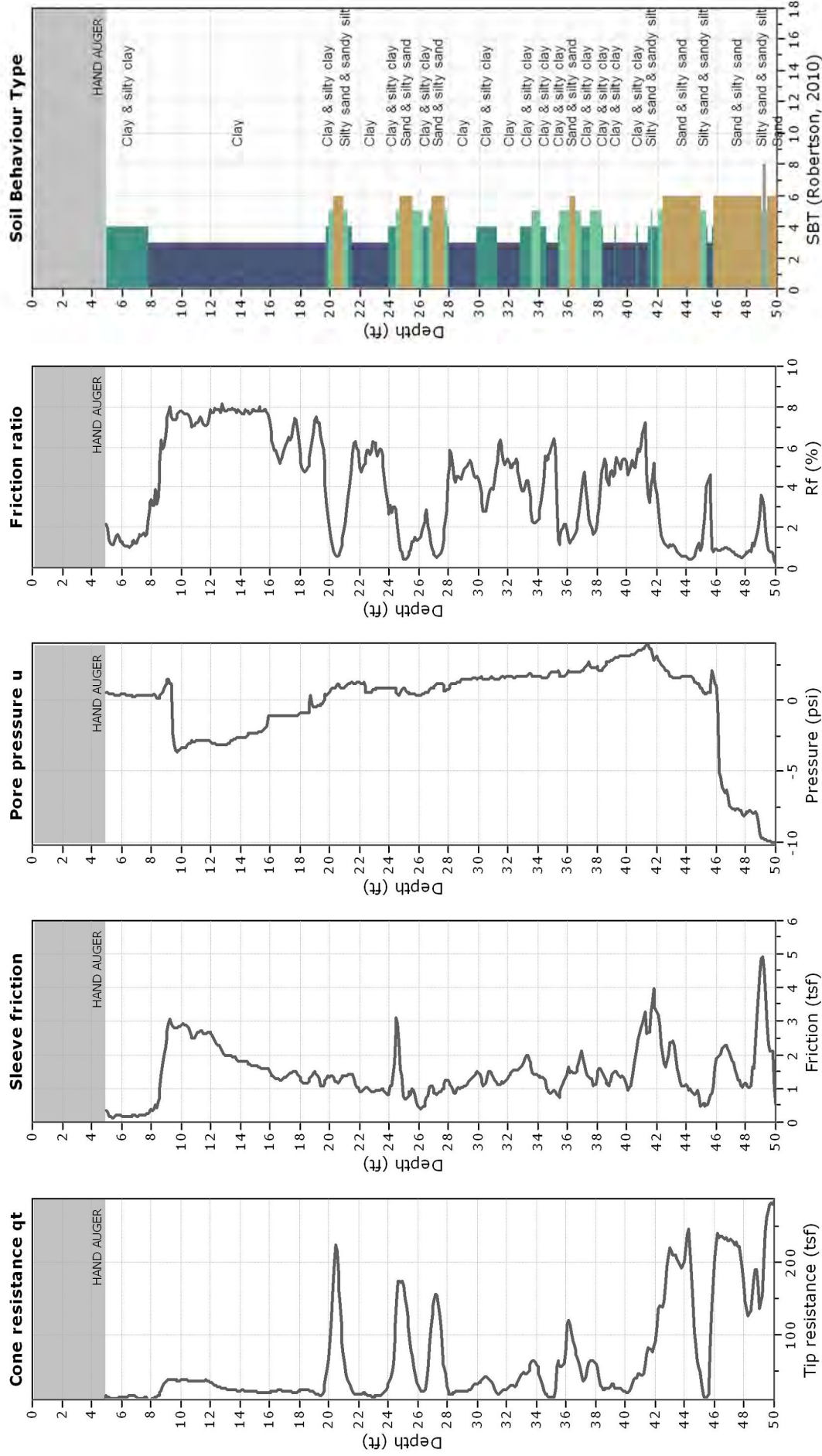
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-2

Total depth: 50.19 ft, Date: 9/18/2014

Cone Type: Vertek





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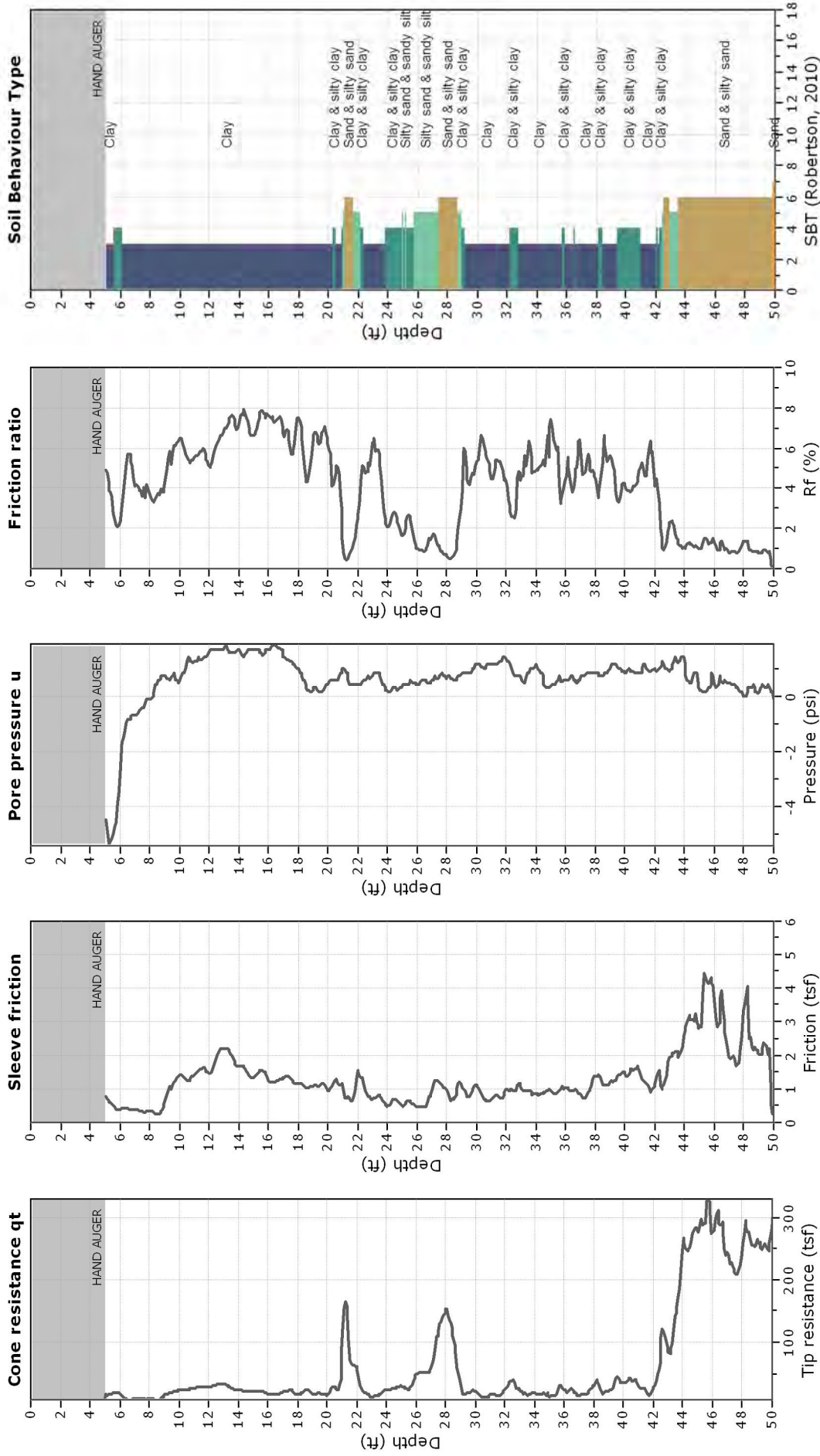
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-3

Total depth: 50.05 ft, Date: 9/18/2014

Cone Type: Vertek





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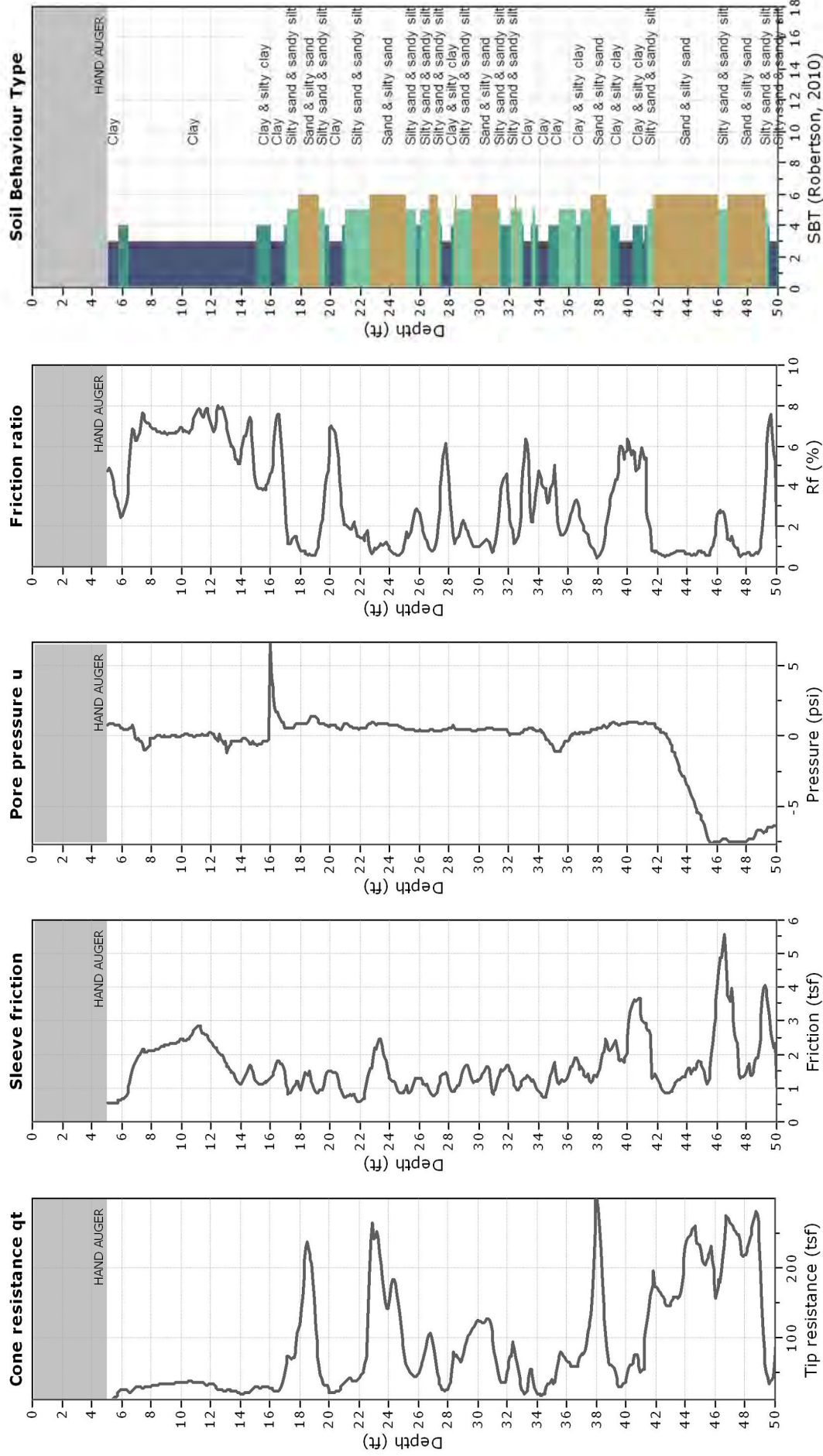
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-4

Total depth: 50.25 ft, Date: 9/18/2014

Cone Type: Vertek





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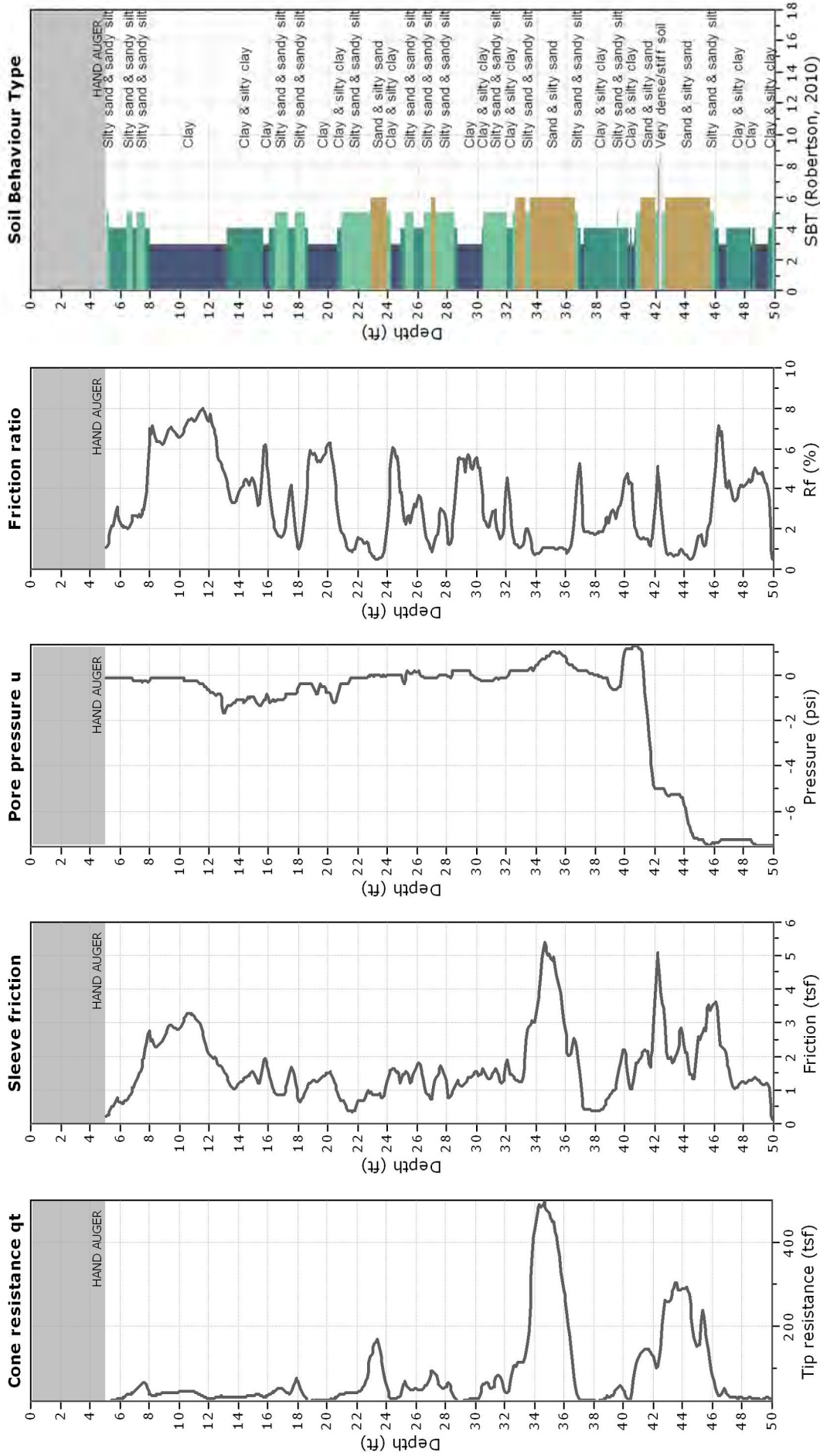
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-5

Total depth: 50.09 ft, Date: 9/18/2014

Cone Type: Vertek





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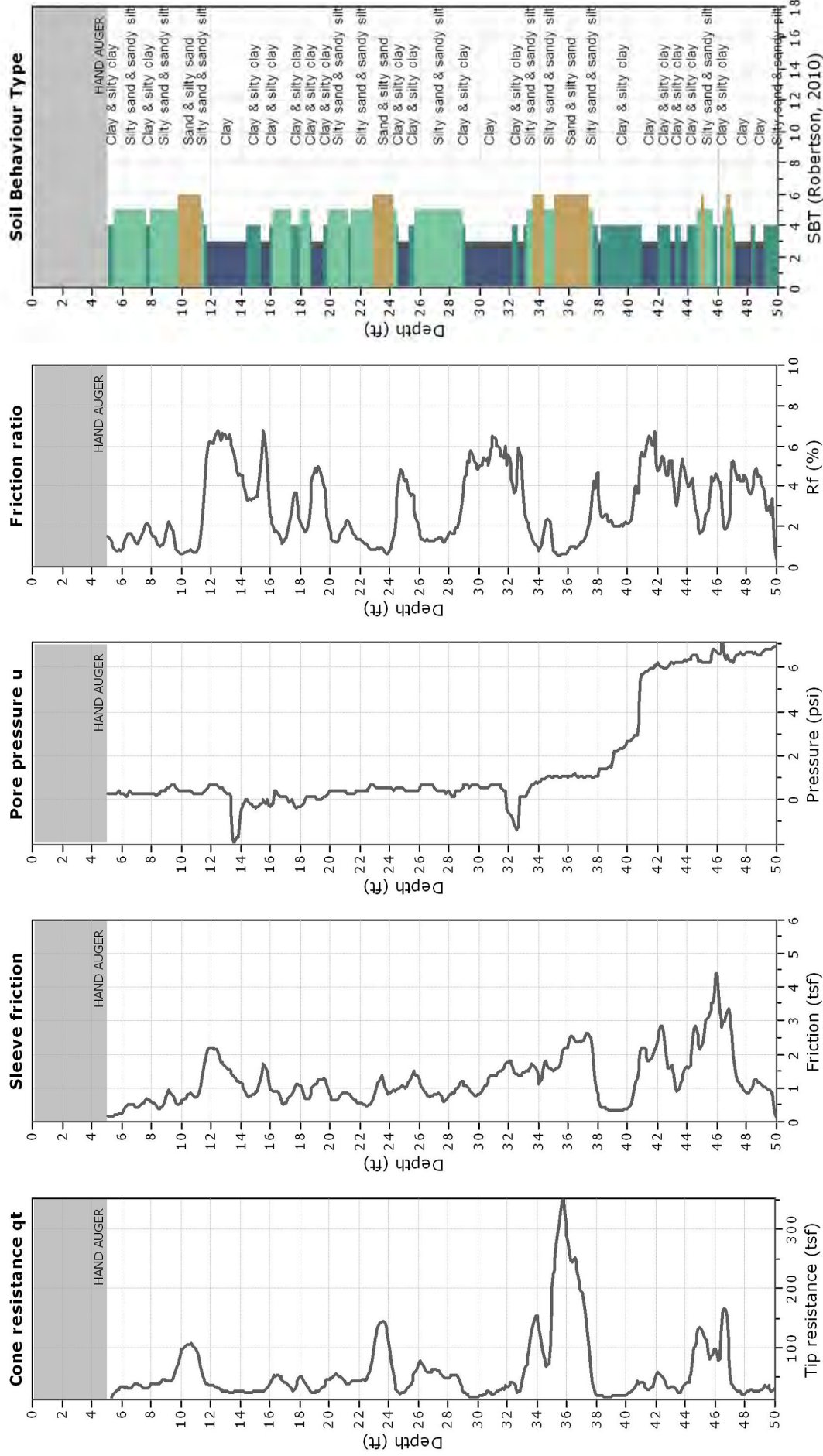
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd. Beverly Hills, CA

CPT: CPT-6

Total depth: 50.10 ft, Date: 9/18/2014

Cone Type: Vertek

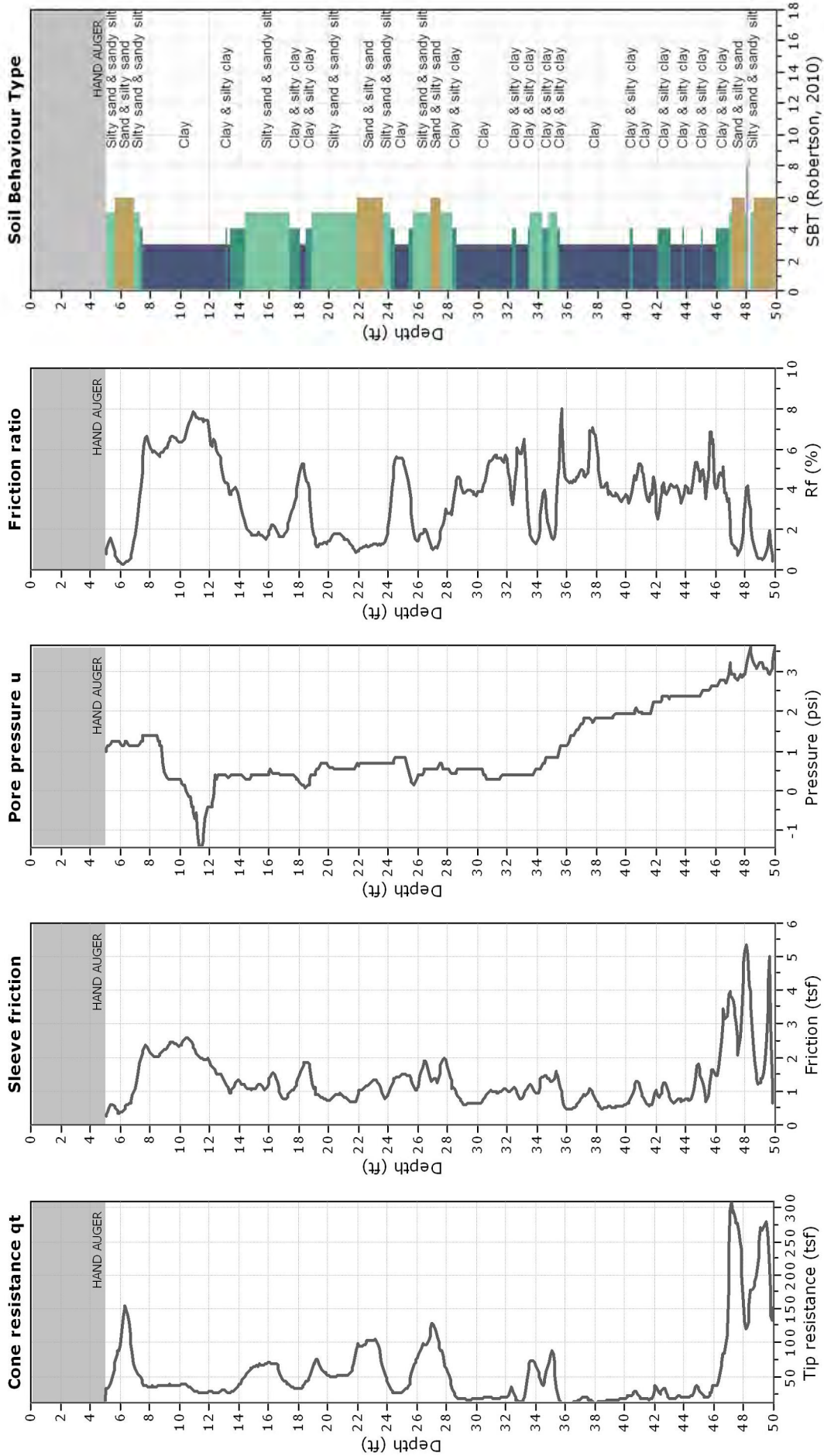




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 714-901-7270
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Project: AMEC\Beverly Hilton-Hotel
Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-7
 Total depth: 50.00 ft, Date: 9/18/2014
 Cone Type: Vertek





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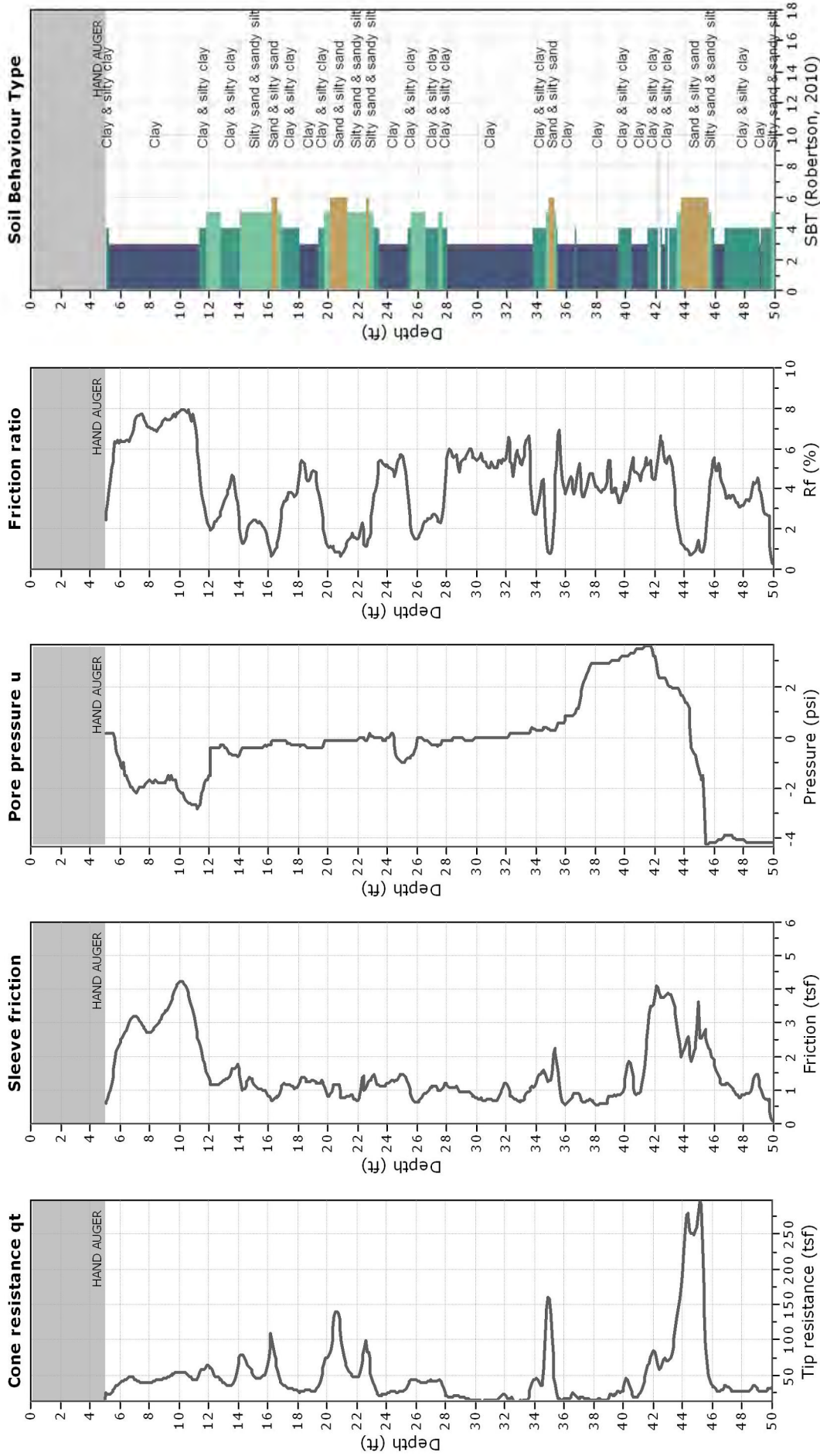
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-8

Total depth: 50.08 ft, Date: 9/18/2014

Cone Type: Vertek





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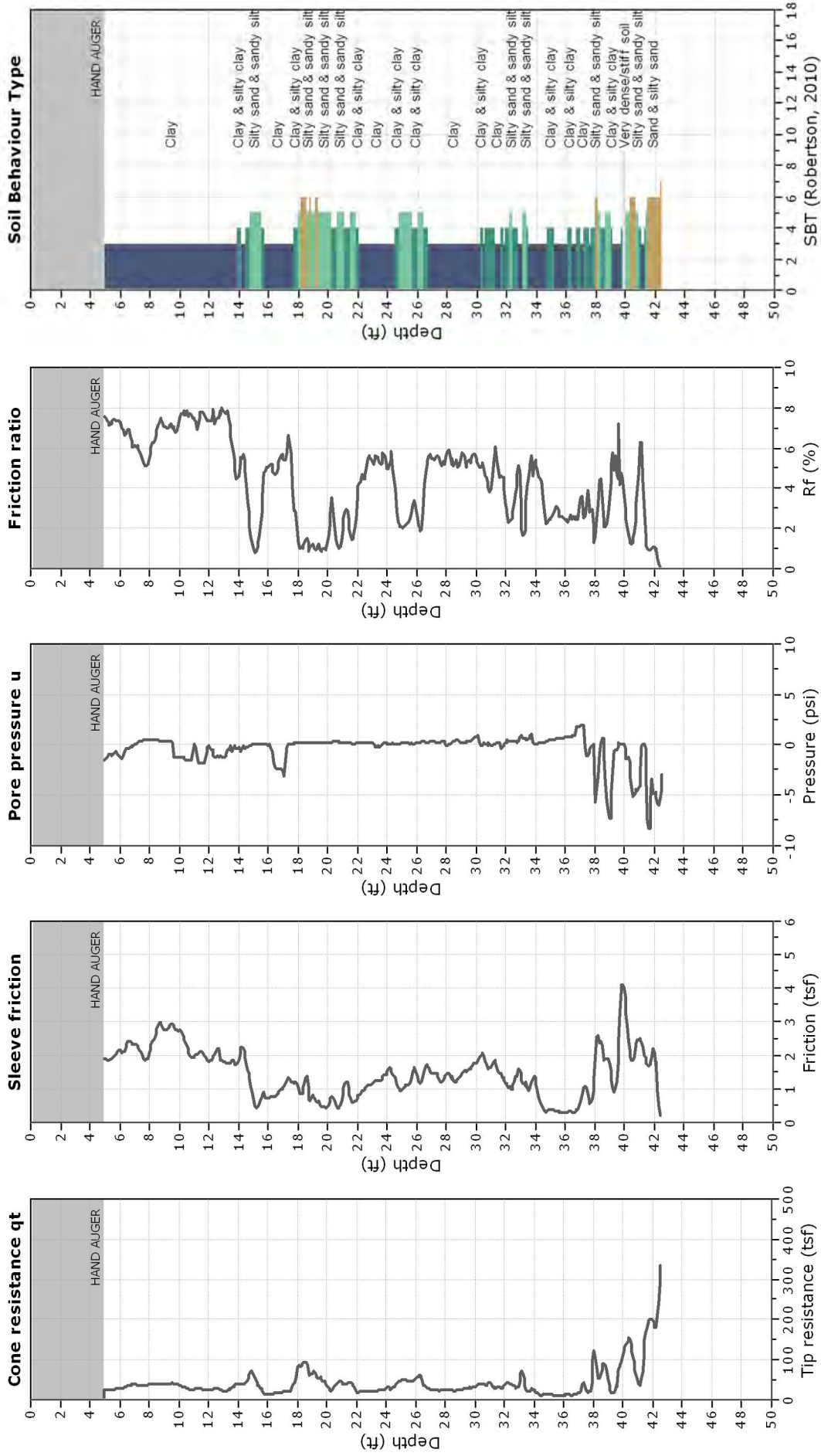
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd. Beverly Hills, CA

CPT: CPT-10

Total depth: 42.52 ft, Date: 9/22/2014

Cone Type: Vertek





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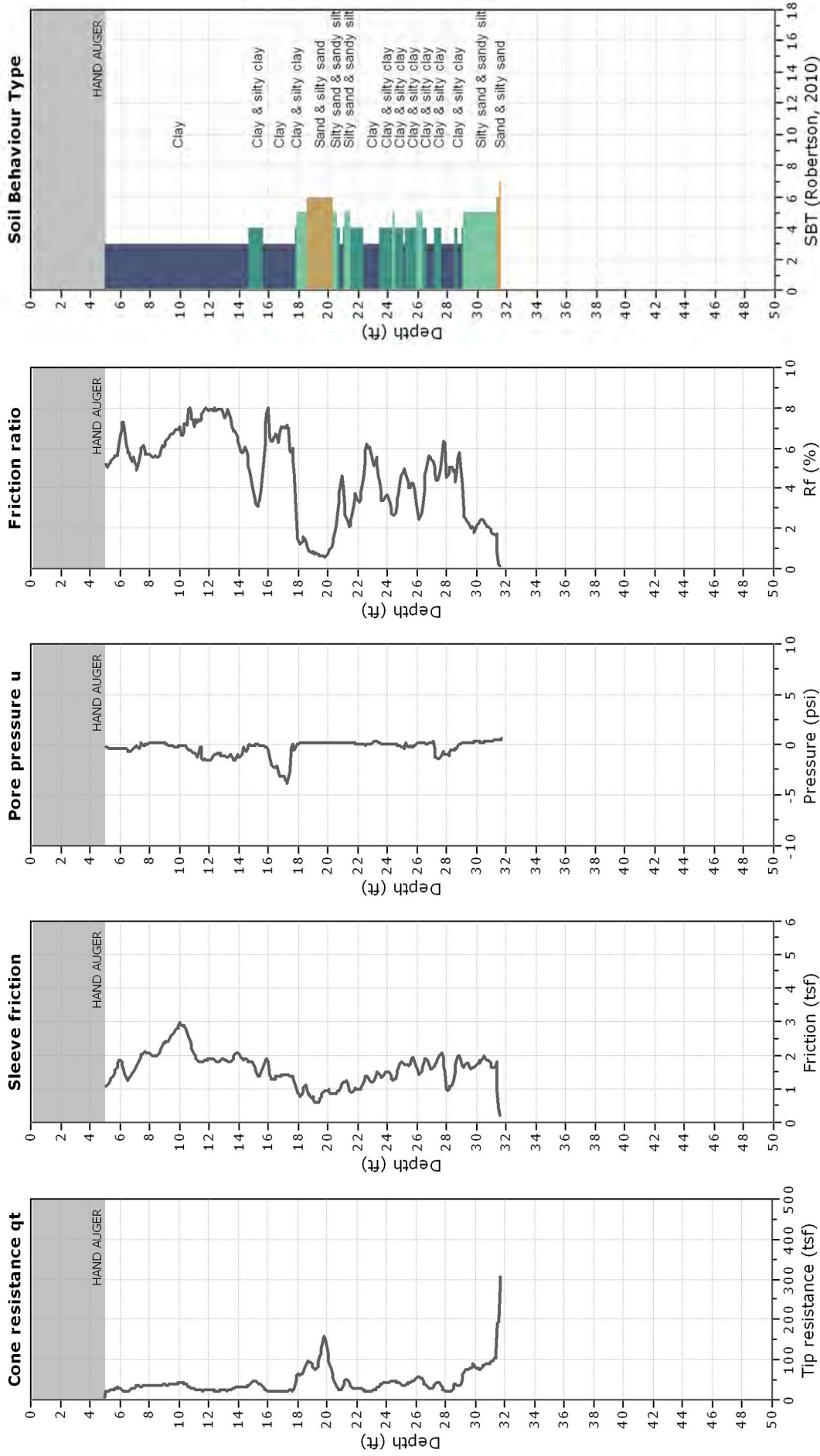
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-11

Total depth: 31.69 ft, Date: 9/22/2014

Cone Type: Vertek





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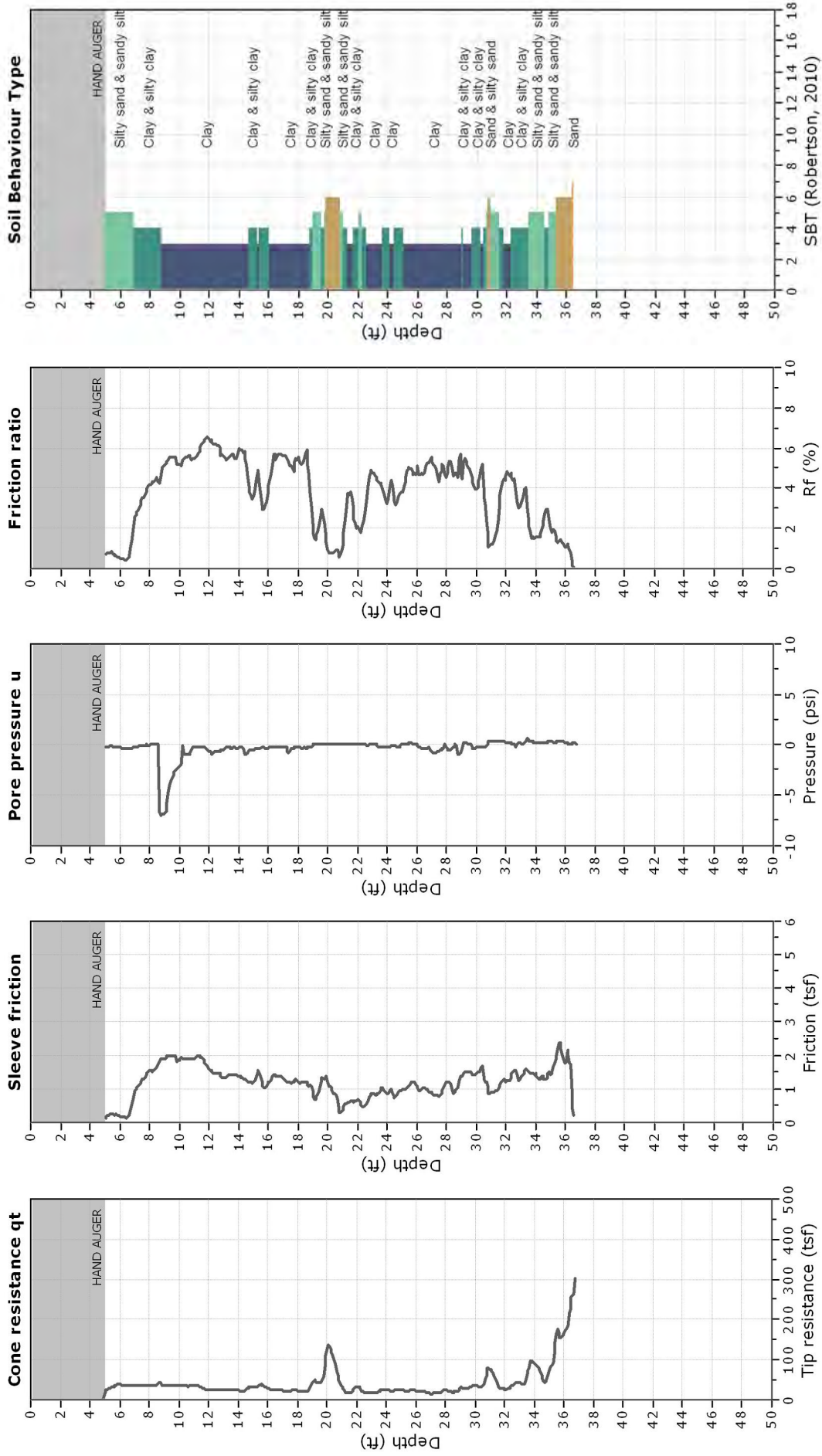
Project: AMEC\Beverly Hilton-Hotel

Location: 9876 Wilshire Blvd, Beverly Hills, CA

CPT: CPT-12

Total depth: 36.71 ft, Date: 9/22/2014

Cone Type: Vertek



APPENDIX B

BETA ANALYTIC INC. REPORT OF RADIOCARBON DATING RESULTS



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... Delivered On-time*

Beta Analytic Inc.
4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305 667 5167
Fax: 305 663 0964
Beta@radiocarbon.com
www.radiocarbon.com

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

October 6, 2014

Ms. Rosalind Munro
AMEC
6001 Rickenbacker Road
Los Angeles, CA 90040
United States

RE: Radiocarbon Dating Results For Samples SB2-37.2, SB4-43.4, SB4-44, SB5-33

Dear Ms. Munro:

Enclosed are the radiocarbon dating results for four samples recently sent to us. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable. The Conventional Radiocarbon Ages have all been corrected for total fractionation effects and where applicable, calibration was performed using 2013 calibration databases (cited on the graph pages).

The web directory containing the table of results and PDF download also contains pictures, a cvs spreadsheet download option and a quality assurance report containing expected vs. measured values for 3-5 working standards analyzed simultaneously with your samples.

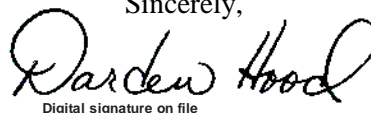
Reported results are accredited to ISO-17025 standards and all chemistry was performed here in our laboratories and counted in our own accelerators here in Miami. Since Beta is not a teaching laboratory, only graduates trained to strict protocols of the ISO-17025 program participated in the analyses.

As always Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result.

When interpreting the results, please consider any communications you may have had with us regarding the samples. As always, your inquiries are most welcome. If you have any questions or would like further details of the analyses, please do not hesitate to contact us.

The cost of the analysis was charged to the VISA card provided. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,



Darden Hood

Digital signature on file



REPORT OF RADIOCARBON DATING ANALYSES

Ms. Rosalind Munro

Report Date: 10/6/2014

AMEC

Material Received: 10/1/2014

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 391742 SAMPLE : SB2-37.2 ANALYSIS : AMS-TIMEGUIDE delivery MATERIAL/PRETREATMENT : (organic sediment): acid washes 2 SIGMA CALIBRATION : Cal BC 14165 to 13890 (Cal BP 16115 to 15840)	13270 +/- 50 BP	-23.8 o/oo	13290 +/- 50 BP
Beta - 391743 SAMPLE : SB4-43.4 ANALYSIS : AMS-TIMEGUIDE delivery MATERIAL/PRETREATMENT : (organic sediment): acid washes 2 SIGMA CALIBRATION : Cal BC 14725 to 14315 (Cal BP 16675 to 16265)	13550 +/- 70 BP	-18.4 o/oo	13660 +/- 70 BP
Beta - 391744 SAMPLE : SB4-44 ANALYSIS : AMS-TIMEGUIDE delivery MATERIAL/PRETREATMENT : (organic sediment): acid washes 2 SIGMA CALIBRATION : Cal BC 16145 to 15955 (Cal BP 18095 to 17905)	14670 +/- 50 BP	-16.8 o/oo	14800 +/- 50 BP
Beta - 391745 SAMPLE : SB5-33 ANALYSIS : AMS-TIMEGUIDE delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 11130 to 10975 (Cal BP 13080 to 12925)	11120 +/- 40 BP	-24.5 o/oo	11130 +/- 40 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "**". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -23.8 o/oo : lab. mult = 1)

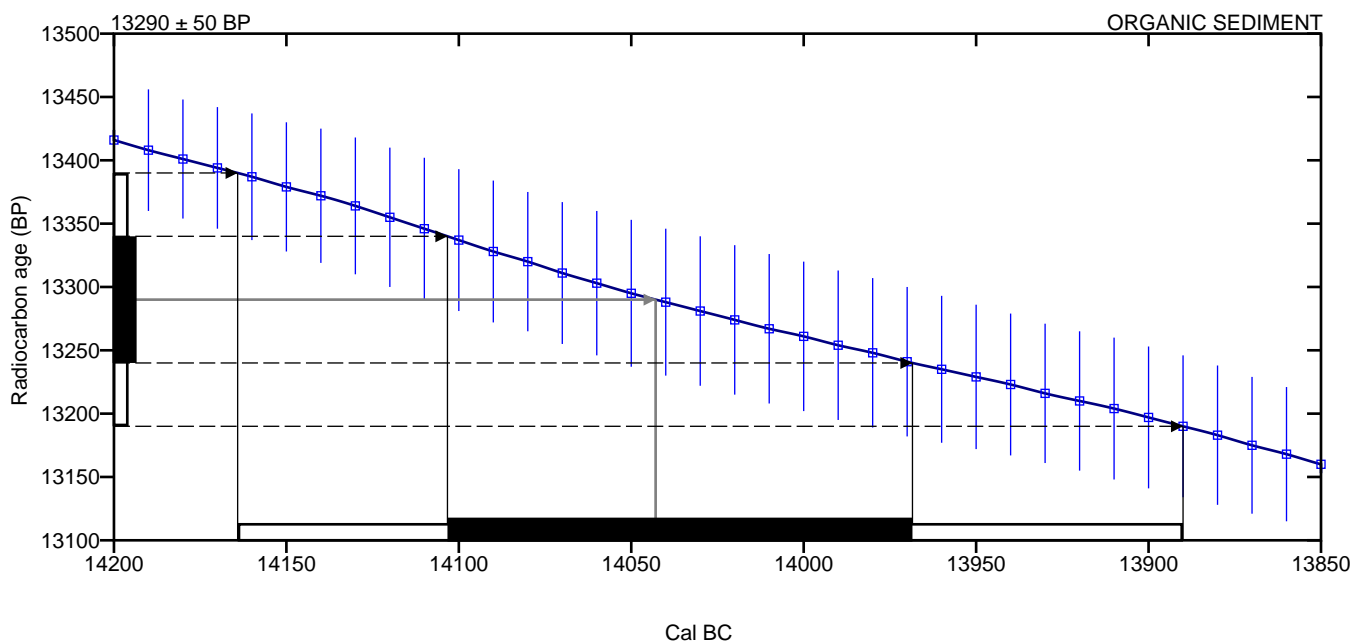
Laboratory number **Beta-391742**

Conventional radiocarbon age **13290 ± 50 BP**

2 Sigma calibrated result **Cal BC 14165 to 13890 (Cal BP 16115 to 15840)**
95% probability

Intercept of radiocarbon age with calibration curve Cal BC 14045 (Cal BP 15995)

1 Sigma calibrated results Cal BC 14105 to 13970 (Cal BP 16055 to 15920)
68% probability



Database used
INTCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to INTCAL13 database

Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. Radiocarbon 55(4):1869–1887.

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -18.4 o/oo : lab. mult = 1)

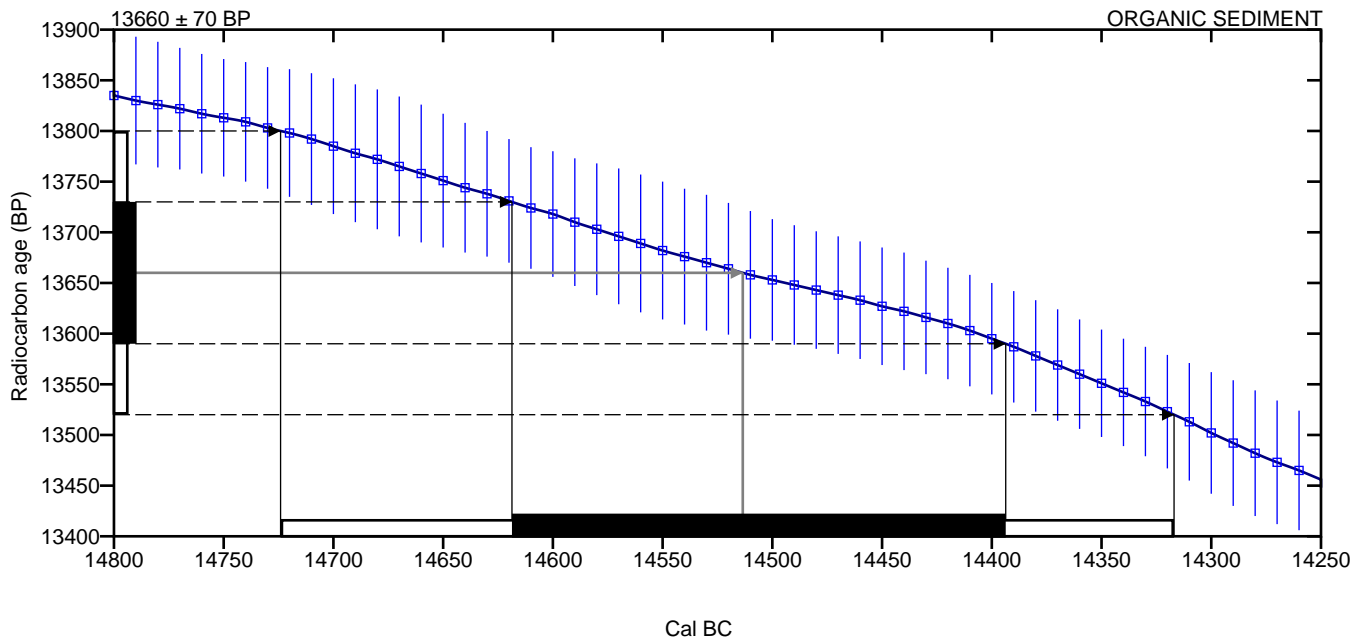
Laboratory number **Beta-391743**

Conventional radiocarbon age **13660 ± 70 BP**

2 Sigma calibrated result **Cal BC 14725 to 14315 (Cal BP 16675 to 16265)**
95% probability

Intercept of radiocarbon age with calibration curve Cal BC 14515 (Cal BP 16465)

1 Sigma calibrated results **Cal BC 14620 to 14395 (Cal BP 16570 to 16345)**
68% probability



Database used
INTCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to INTCAL13 database

Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. Radiocarbon 55(4):1869–1887.

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -16.8 o/oo : lab. mult = 1)

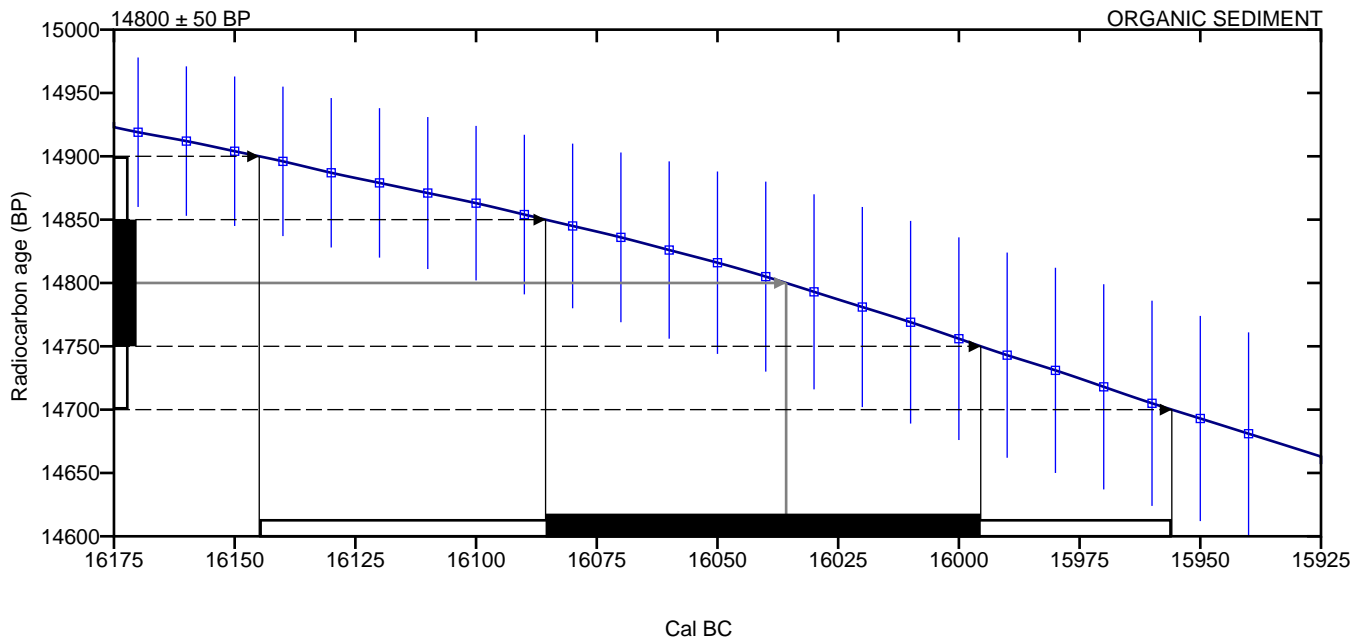
Laboratory number **Beta-391744**

Conventional radiocarbon age **14800 ± 50 BP**

2 Sigma calibrated result **Cal BC 16145 to 15955 (Cal BP 18095 to 17905)**
95% probability

Intercept of radiocarbon age with calibration curve Cal BC 16035 (Cal BP 17985)

1 Sigma calibrated results Cal BC 16085 to 15995 (Cal BP 18035 to 17945)
68% probability



Database used
INTCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to INTCAL13 database

Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. Radiocarbon 55(4):1869–1887.

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -24.5 o/oo : lab. mult = 1)

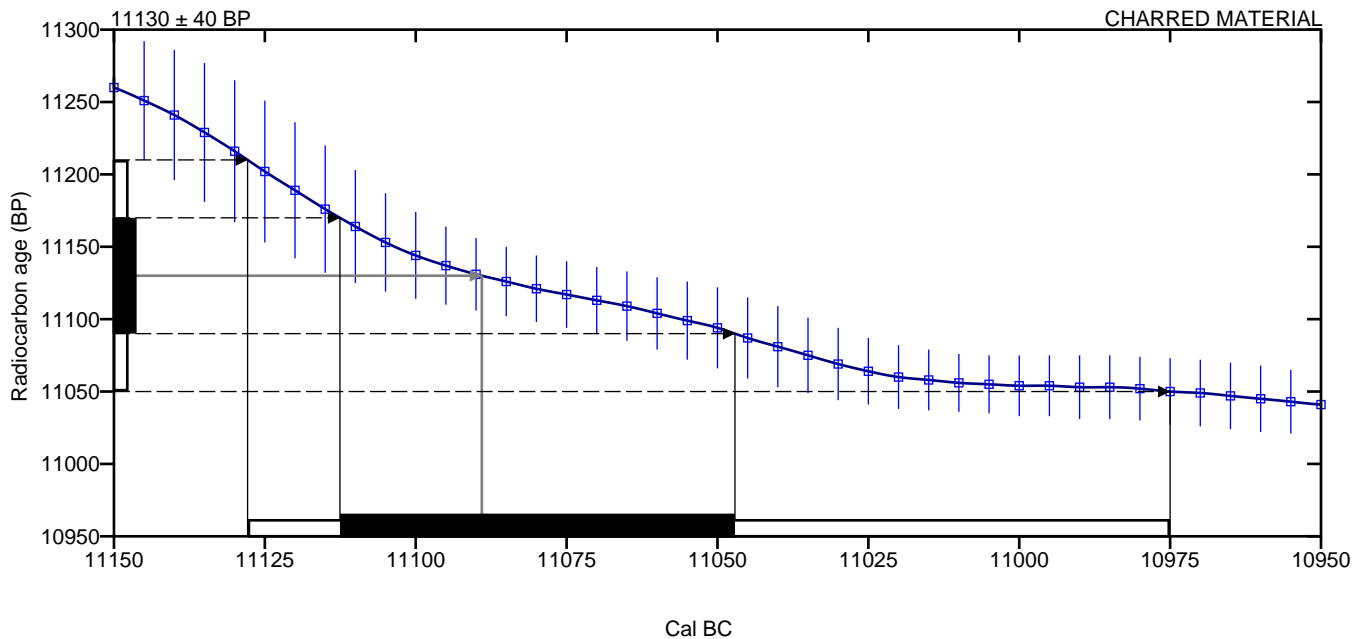
Laboratory number **Beta-391745**

Conventional radiocarbon age **11130 ± 40 BP**

2 Sigma calibrated result **Cal BC 11130 to 10975 (Cal BP 13080 to 12925)**
95% probability

Intercept of radiocarbon age with calibration curve Cal BC 11090 (Cal BP 13040)

1 Sigma calibrated results Cal BC 11115 to 11045 (Cal BP 13065 to 12995)
68% probability



Database used
INTCAL13

References

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