APPENDIX F

Geotech Report

GEOTECHNICAL EVALUATION REPORT
PROPOSED SKILLED NURSING FACILITY
BARLOW RESPIRATORY HOSPITAL
2000 STADIUM WAY
LOS ANGELES, CALIFORNIA

Prepared For:

Barlow Respiratory Hospital

2000 Stadium Way
Los Angeles, California 90026

Project No. 12080.004

November 24, 2020

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

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Project No. 12080.004

Barlow Respiratory Hospital
2000 Stadium Way
Los Angeles, California 90026

Attention: Mr. Rick Culp, Director of Engineering

Subject: Geotechnical Evaluation Report
Proposed Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way
Los Angeles, California

In accordance with your request and authorization, Leighton Consulting, Inc. (Leighton) has prepared this geotechnical evaluation report for the subject project. The purpose of our study was to evaluate the general geotechnical conditions of the site and provide preliminary geotechnical recommendations for project planning.

Our scope of work consisted of review of previous geotechnical investigation reports for the project site, preliminary engineering analysis, and preparation of this report presenting the results of our study. This geotechnical evaluation is solely intended for preliminary design purposes during the planning phases of the project.

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further service, please contact us at ***(866) LEIGHTON***; specifically, at the phone extensions or e-mail as listed below.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

PROFESSIONAL GEOLOGIST
ERIC M. HOLLIDAY
No. 9219
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CARL C. KIM
No. 2620
GEOTECHNICAL
STATE OF CALIFORNIA

Eric M. Holliday, PG 9219
Project Geologist
Ext: 4252, eholliday@leightongroup.com

Carl C. Kim, GE 2620
Senior Principal Engineer
Ext: 4262, ckim@leightongroup.com

EMH/CCK/lr

Distribution: (1) Addressee

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1.0 INTRODUCTION

1.1 Site Location

The project site, located at 2000 Stadium Way in the City of Los Angeles, is situated within Chavez Ravine on a relatively level, alluvial clay filled valley between rolling hills underlain by resistant sandstone and shale bedrock. The site location (latitude 34.0741°, longitude -118.2474°) and immediate vicinity are shown on Figure 1, *Site Location Map.*

The approximately 25-acre hospital campus was originally developed in 1902 with the 1927 addition constructed shortly after the original Solano Infirmary burned down in 1925.

1.2 Proposed Improvements

Our understanding of the proposed development is based on discussions with Mr. Michael Zakian of Zakian Woo Architects (ZWA) and review of the *Preliminary Entitlement Package* architectural plan set (6 Sheets), dated August 20, 2019, prepared by ZWA. A new Skilled Nursing Facility is proposed in the far southern portion of the Barlow Respiratory Hospital campus, directly west of the existing Guild House; in an area currently used as an asphalt concrete parking lot. The new Skilled Nursing Facility, as currently conceived, consists of a 4-story structure with a lobby and a parking garage on the first floor with a partial basement in the southern portion of the footprint.

The project is in the early planning stages of development and at the time of this writing, structural loading information was not available.

1.3 Previous Investigations

Several previous geotechnical explorations have been performed on the Barlow Respiratory Hospital campus. The following section briefly describes previous investigations by Leighton and others. Applicable findings and geotechnical data from the previous studies discussed below have been incorporated into this report. Full report references can be found in Appendix A.

Previous boring and CPT locations are presented on Plate 1, *Geotechnical Map.* Relevant boring and cone penetrometer test (CPT) logs are included in Appendix B.

MACTEC (2008)

MACTEC performed a geotechnical exploration in 2008 for a proposed four- to six-story hospital replacement building with excavation cuts as deep as 30 feet. The 2008 MACTEC exploration consisted of seven (7) CPT soundings to depths of 42 to 74 feet below ground surface (bgs) and utilizes data from a previous investigation in 2000 and 2001 by Law Crandall consisting of 10 borings to depths of 36 to 81 feet bgs and one 6-foot-deep test pit. Results of the investigation indicated approximately 2 to 38 feet of undocumented clayey, silty sandy fill soils with rubble debris was encountered, with the deepest fill located on the southeast edge of the campus in Boylston Street. Groundwater emanating as seepage between cohesive and granular soils and at the bedrock contact was reported at Elevations (El.) +417 feet to El. +421 feet mean sea level (msl). The surrounding slopes were considered by MACTEC as grossly stable. Foundation recommendations consisted of driven piles with floor slabs structurally supported on pile caps interconnected with rigid grade beams. Alternate recommendations consisted of ground improvement and conventional foundation support.

Geocon West Inc. (2013)

Geocon prepared a geologic-seismic hazards evaluation report as part of the 2010 HAZUS Reassessment for SB 90 in support of the existing non-administration buildings submitted to the Office of Statewide Health Planning and Development (OSHPD) for HAZUS building re-evaluation.

The 2013 Geocon report utilizes data from a series of previous explorations including a 2010 Geocon campus-wide investigation consisting of seven (7) large diameter borings and seven (7) test pits for purposes of downhole logging and recording of structural subsurface data for use in analysis. Explorations reached depths ranging from 4 feet to 50 feet bgs. Explorations from Geocon (2010), MACTEC (2008) and earlier studies by Law/Crandall (1993, 2001) were presented on the exploration map included in Geocon (2013).

Leighton (2017)

Leighton performed a geotechnical exploration consisting of four cone penetrometer tests (CPTs) around the immediate vicinity of the 1927 Addition for a Structural Performance Category 2 (SPC-2) upgrade project.

Leighton (2018)

In support of proposed SPC-4D upgrades, a proposed new utility building, and new canopy columns, Leighton performed a geotechnical field exploration consisting of three (3) hollow-stem auger borings (designated LB-1 through LB-3) advanced to approximate depths ranging from 30 feet to 50 feet bgs. Our findings, engineering analysis, and recommendations were presented in Leighton (2018).

Leighton (2019)

A supplemental field exploration consisting of two (2) hollow-stem auger borings (LB-1-2019 and LB-2-2019) was performed in May 2019 in support of a proposed new 20,000-gallon above ground water tank, and replacement of two existing underground fuel storage tanks. Our findings were presented in Leighton (2019).

1.4 Purpose and Scope

The purpose of this study was to evaluate the geotechnical conditions at the project site relative to the proposed Skilled Nursing Facility in order to provide preliminary geotechnical recommendations for project planning. This geotechnical evaluation has not been designed to meet the requirements of the 2019 California Building Code (CBC), ASCE 41-13, or the California Geological Survey (CGS) Note 48; and is solely intended for preliminary design purposes during the planning phases of the project.

The tasks completed as part of this study are described below in more detail.

- *Background Review* – As part of our study, we reviewed several geotechnical documents and maps pertinent to the subject site including the review of previous geotechnical investigation reports. The documents reviewed are referenced in Appendix A. Logs of relevant previous subsurface explorations are presented in Appendix B.

- *Engineering Analysis* – The data obtained from our background review was evaluated and analyzed to develop preliminary geotechnical recommendations for the proposed project.

- *Report Preparation* – This report presents our findings, conclusions, and preliminary geotechnical recommendations for the proposed development.

2.0 GEOTECHNICAL CONDITIONS

2.1 Geologic Setting

The site is located in the Los Angeles Basin along the southern contractional boundary of the Transverse Ranges within and atop the north central portion of the heavily folded Elysian Park-Repetto Hills. This is an area of complex plate boundary geology due to oblique convergence of the northward moving Peninsular Ranges Geomorphic Province colliding with the east-west trending Transverse Ranges (San Gabriel Mountains) Geomorphic Province. This area undergoes extreme strike-slip shearing and crustal shortening resulting in oblique shearing which has led to uplift of the Elysian-Repetto Hills. The Elysian Park-Repetto Hills are characterized by low elevations and steep sloped parallel ridges between narrow canyons, which are heavily dissected primarily by the Los Angeles and Arroyo Seco rivers and tributaries that trend across the anticlinal axis of the Elysian Park Anticline (Lamar, 1970).

Lamar regionally maps the northern majority of the Repetto Hills as being Puente Formation sandstone (Tpss), described as well bedded, medium to coarse grained and light brown to gray (Lamar, 1970). He locally mapped bedding dipping to the south-southwest at 48-51°. As also shown on the *Geologic Map of the Los Angeles Quadrangle* (Dibblee, 1989), the Repetto Hills are mapped as Monterey Formation sandstone (Tmss), described as tan to light grey, semi friable arkosic sandstone which includes some interbedded silty shale locally mapped with bedding dipping south at 30-51°. Dibblee mentions Lamar's Puente Formation alternative labeling of the same formational unit.

2.2 Geologic Structure

The Elysian-Repetto Hills are situated along the axis and southwestern arm of the Elysian Park anticline. The Elysian Park anticline is a 12 mile (19.3 km) long double plunging southward verging anticline lying between the left lateral Hollywood fault on the northwest to the right lateral East-Montebello fault on the east in the City of San Gabriel (Dolan, *et al.,* 2002). Uplift along this blind structure has created the Repetto, Elysian and Monterey Park Hills. Bedding within the Elysian Hills dips almost exclusively to the south and southwest generally at 10 to 60 degrees with local variations. Dip angles tend to steepen along the limbs as distance from the anticlinal axis increases. Measured dip angles at the site (Geocon, 2013) range from 41 to 58 degrees to the southwest.

Surface exposures, borings and test pits onsite (Plate 1) show the greater hospital campus is underlain by a variable thickness of artificial fill (afu), a thin discontinuous mantle of colluvium (Qcol), Quaternary age alluvium (Qal), and Monterey/Puente Formation (Tpss/Tpsl) bedrock. These units are briefly described below.

2.3 Subsurface Conditions

Presented below are brief descriptions of the geologic units encountered in previous exploratory borings completed at the site. Detailed descriptions of the geologic units encountered are presented on the exploration logs in Appendix B. Geotechnical conditions described on the logs represent the conditions at the actual exploratory excavation locations. Other variations may occur beyond and/or between the excavations. Lines of demarcation between the geologic units and the various earth materials on the logs represent approximated boundaries, and (unless otherwise noted) actual transitions may be gradual.

The existing developments at the site mask some surface exposures of natural geologic units, topography and structure. Artificial fill (Afu) materials were encountered underlying existing pavements within exploratory borings. Local geology was interpreted from published regional geologic maps of the area (Yerkes and Campbell, 2005; Dibblee, 1989, Lamar, 1970). Figure 2 illustrates the regional distribution of geologic units.

Of specific relevance to the proposed Skilled Nursing Facility based on proximity to the building footprint are mud rotary borings (map symbol: B-3 through B-7) performed by Law Crandall in 2000 and 2001 (Law Crandall, 2001); and CPTs (map symbol: CPT-3 through CPT-7) advanced by MACTEC (MACTEC, 2008). For the purposes of this preliminary evaluation, subsurface conditions in the vicinity of the Skilled Nursing Facility are based on the above referenced explorations.

A summary of the subsurface conditions and depth to earth units in the vicinity of the Skilled Nursing Facility are summarized below.

Undocumented Artificial Fill: (Map Symbol: Afu): In general, artificial fill materials were encountered by others at depths ranging from approximately 2 to 5 feet bgs in previous explorations in the vicinity of the proposed Skilled Nursing Facility. Boring B-6, located at the far western edge of the existing parking lot, encountered alluvial materials directly beneath the pavement section and did not encounter artificial fill.

The encountered fill material generally consists of brown to dark brown sandy silt, silty sand and silty clay, with brick fragments and concrete debris. No documentation or records related to fill placement was available at the time of this report preparation. Accordingly, existing fill onsite is considered undocumented and unsuitable for support of new improvements.

Quaternary Alluvium (Map Symbol: Qal): Quaternary age alluvium was encountered directly underlying the artificial fill at depths of approximately 2 to 5 feet bgs. The alluvium is characterized predominantly as stiff silty clay to clay and medium dense silty to clayey sand. The alluvial deposits are underlain by Miocene age bedrock consisting of sandstone and shale

Tertiary Puente Formation (Map Symbol: Tpss/Tpsl): Sedimentary bedrock (Lamar, 1970) consists of Miocene Age interbedded and steeply dipping, sandstone and minor shale. Puente formation was encountered in the vicinity of the Skilled Nursing Facility at depths ranging from approximately 38 to 69 feet bgs (Law Crandall, 2001). Puente Formation in the region is generally well bedded, slightly to moderately weathered and ranging from soft near surface exposure to hard with depth. Bedrock, if encountered in future excavations, should be expected to pose moderate difficulty during ripping.

2.4 Shear Wave Velocity Profile

Shear wave velocities were measured in two prior CPT's (LCPT-1 and LCPT-3), see Plate 1 for locations. Results are presented in Appendix B.

LCPT-3 encountered shallow refusal at 35 feet bgs. Based on the shear wave velocity of about 890 feet per second recorded LCPT-1, from ground surface down to about 75 feet bgs, the site is classified as Site Class D.

2.5 Corrosion

Corrosion: In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor for ferrous corrosivity. Based on findings of studies presented in the American Society for Testing and Materials (ASTM) STP 1013 titled "Effects of Soil Characteristics on Corrosion" (February, 1989), an approximate relationship between soil resistivity and soil corrosiveness was developed as shown in Table 1 below.

Table 1 - Soil Corrosivity as a Function of Resistivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very severe corrosion
900 to 2,300	Severely corrosive
2,300 to 5,000	Moderately corrosive
5,000 to 10,000	Mildly corrosive
10,000 to >100,000	Very mildly corrosive

Sulfate Exposure: Sulfate ions in the soil can lower the soil resistivity and can be highly aggressive to Portland cement concrete by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. A potentially high sulfate content could also cause corrosion of reinforcing steel in concrete. Section 1904A of the 2016 California Building Code (CBC) defers to the American Concrete Institute's (ACI's) ACI 318-14 for concrete durability requirements. Table 19.3.1.1 of ACI 318-14 lists "*Exposure categories and classes*," including sulfate exposure as follows:

Table 1A - Sulfate Concentration and Exposure

Soluble Sulfate in Water (parts-per-million)	Water-Soluble Sulfate (SO4) in soil (percentage by weight)	ACI 318-14 Sulfate Class
0-150	0.00 - 0.10	S0 (negligible)
150-1,500	0.10 - 0.20	S1 (moderate*)
1,500-10,000	0.20 - 2.00	S2 (severe)
>10,000	>2.00	S3 (very severe)

*or seawater

Representative composite, near surface (0-5 feet) bulk soil samples collected during a previous investigation for were tested to evaluate corrosion potential. The chemical analysis test results for the onsite soil from our geotechnical exploration are included in Appendix B, *Previous Laboratory Test Results* of this report and are summarized below.

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Table 2 – Previous Corrosivity Test Results

Test Parameter	LB-3 @ 0-5'	General Classification of Hazard
Water-Soluble Sulfate-SO_4 in Soil (ppm)	122	Negligible to Moderate sulfate exposure to buried concrete
Percent by Weight SO_4	.0122	
Water-Soluble Chloride in Soil (ppm)	42	Non-corrosive to buried concrete (per Caltrans Specifications)
Percent by Weight (Chl^-)	.0042	
pH	7.84	Mildly alkaline
Minimum Resistivity (saturated, ohm-cm)	1800	Corrosive to buried ferrous pipes

Additional corrosion testing should be performed upon completion of grading to confirm the preliminary findings and conclusions presented above.

2.6 Expansive Soils

Expansion Index (EI) testing of one representative bulk sample from the upper 5 feet at the site from a previous exploration (LB-3) indicate that near-surface site soils have a low expansion potential with an EI value of 32. For purposes of this report the expansion properties of the soil below the proposed developments can be considered as low. Additional exploration will be needed to confirm the expansion potential of the soils beneath the proposed Skilled Nursing Facility.

Based on geotechnical laboratory testing performed on selected soil samples collected from the site and review of previous laboratory test results, a synopsis of geotechnical properties of the site soils is provided in Table 3 below. Geotechnical laboratory testing results are presented in Appendix B, *Previous Laboratory Test Results.*

Table 3 – Preliminary Soil Geotechnical Properties Synopsis

Parameters	Soil Properties
In-situ Moisture:	Dry to moist
In-situ Density:	Medium dense to dense
Swell/Expansion Potential:	Mostly granular, swell/expansion potential is **low**.
Collapse Potential:	Not susceptible to collapse when wetted
Strength:	Adequate to provide structural support
Corrosivity:	No sulfate attack of concrete but **corrosive to ferrous metals**.

2.7 Groundwater

Groundwater as reported by MACTEC in the vicinity of the Skilled Nursing Facility ranged from a depth of approximately 5 to 8 feet bgs. However, groundwater depth elevations were measured from a mud rotary hole after bailing of mud with a minimal amount of time to allow levels to stabilize. Previous Leighton explorations encountered perched groundwater at depths ranging from 16 to 23 feet bgs in borings LB-1 through LB-3, adjacent to the main hospital building, approximately 460 feet north of the proposed Skilled Nursing Facility. Additional exploration will be required to accurately gauge current groundwater levels in the area.

Historic groundwater levels, as interpreted from the Los Angeles 7.5 Minute Quadrangle, Los Angeles County, California, Open File Report (CGS, 1998) indicate historic high groundwater at levels of approximately 20 feet below ground surface. Landscaping irrigation at the site, infiltration of stormwater runoff, fluctuations in rainfall, seasonal and/or otherwise may cause temporary perched water zones to exist below the site.

Groundwater or seepage may be encountered during excavation and dewatering may be required to during construction.

3.0 GEOLOGIC AND SEISMIC HAZARDS

Geologic and seismic hazards include surface fault rupture, seismic shaking, liquefaction, seismically-induced settlement, lateral spreading, seismically-induced landslides, flooding, seismically-induced flooding, seiches and tsunamis. The following sections discuss these hazards and their potential impact at the project site.

3.1 Faulting

There are no active or potentially active faults known to cross the project site and the site is not located within an Alquist-Priolo Earthquake Fault Zone (CGS, 1986; Bryant and Hart, 2007); and as such, the potential for surface fault rupture at the site is considered low. However, several active and potentially active faults are mapped within 10 km (6.2 miles) of the site. Figure 3, *Regional Fault and Historical Seismicity Map*, shows the proximity of known active and potentially active faults within the region.

Hollywood Fault: Located approximately 3 miles (4.8 km) northwest of the site, the Hollywood Fault begins near the Los Angeles River and eastern edge of the Santa Monica Mountains and extends westward for approximately 9½ miles where it is thought to shift its locus of active deformation to the area of the West Beverly Hills Lineament (WBHL), where faulting takes a left step to the Santa Monica Fault. The Hollywood Fault is capable of producing a M_w 6.4 to 6.6 earthquake (Dolan et al., 1997). Investigators have estimated the lateral slip rate to be about 1.0 $\pm$0.5 mm/year, with a vertical slip rate to be 0.25 mm/year (Dolan et al., 1997). Conversely, a lower slip rate of 0.04 - 0.4 mm/year (Ziony and Yerkes, 1985) leads to a long return period.

Recent detailed geologic and geotechnical studies have provided cumulative physical evidence for Holocene displacements resulting in an Alquist-Priolo Special Study Zone being established for the Hollywood Fault (CGS, 2014). Exposures identified in prior explorations (Crook and Proctor, 1992), coupled with bulk-soil radiocarbon ages provide scant evidence for an early to mid-Holocene age for the most recent surface rupture approximately 6,000 years to 11,000 years ago; suggesting a long period of quiescence between surface rupturing on the Hollywood Fault (Dolan, 1997, 2000) (Ziony and Yerkes, 1985).

Santa Monica Fault: The State of California has zoned the Santa Monica Fault, which is at a distance of approximately 3.2 miles (5.1 km) southwest of the site. The SMFZ is, mapped as being located primarily along Santa Monica Boulevard. This fault zone trends east-west along the southern boundary of the Santa Monica Mountains for more than 24.8 miles (40 km) and is included as part of the Transverse Ranges Southern Boundary fault system, which consists of east-west trending, left-lateral and oblique-reverse movements along several active faults. The SMFZ consists of one or more strands, is about 40 km (24.8 miles) in length, and is one of a series of east-southeast trending reverse, left-lateral oblique-slip structures that extend more than 200 km (125 miles) across southern California and accommodate westward motion of the Transverse Ranges (Dolan *et al*., 1997). Pleistocene or Holocene movement has been postulated, but **not** directly proven along some upper plate secondary fault segments related to the SMFZ (Dolan *et al.*, 2000). Recurrence interval and recency of movement along many fault segments are neither well documented nor understood, mainly because intense urbanization has modified or destroyed any surface traces of the fault (Hill *et al*., 1979). Southern California Earthquake Center (SCEC) identifies the most recent rupture as Late Quaternary with intervals between events unknown.

The State of California Geological Survey (CGS) has established an Earthquake fault Zone based on the criteria of “sufficiently active” and “well defined” (Bryant and Hart, 2007) in their Fault Evaluation Report (FER 259) dated June 28, 2017.

Raymond Hill Fault: The Raymond Hill fault, located 3.5 miles (5.6 km) from the site, diverges southwesterly from the range front near Monrovia and represents the southernmost element of the Transverse Ranges. The Raymond fault has long been recognized as a significant groundwater barrier in the Pasadena-San Marino area and was first described as a dike or buried ridge of impervious rock (Mendenhall, 1908; Conkling, 1927). The first recognition of offset alluvial gravels was made by Miller in 1928, who considered the feature a basinward extension of the Sawpit fault, which trends northeast into the range north of Monrovia. The fault was termed the Raymond Fault by Eckis (1934) and was the subject of extensive investigation by Buwalda (1940) in connection with litigation over water rights (California Department of Water Resources, 1961). In recent years it has been termed the Raymond fault and Raymond Hill fault on state geologic maps (Jennings, 1977).

The Raymond Hill fault extends 25 km from the Los Angeles River east of Griffith Park east to east-northeast across the San Gabriel Valley through South

Pasadena, Pasadena, San Marino, Arcadia, and Monrovia to a junction with the Sierra Madre fault at the foot of the San Gabriel Mountains (Dolan, 2000). Left deflected drainages, shutter ridges, sagponds, and pressure ridges in right-stepping restraining bends indicate that the Raymond fault is predominately a left-slip fault (Sieh, in Jones, 1990), although, on the basis of consistently south facing fault scarps together with evidence for north side up displacements, Crook and others (1987) suggested that the Raymond Hill fault is a high-angle reverse fault. However, the 1988 Pasadena earthquake focal mechanism shows nearly pure left-lateral motion on the fault (Jones and others, 1990)

Newport-Inglewood Fault Zone: The Newport-Inglewood fault zone (NIFZ), located approximately 8.2 miles (13.2 km) east of the project site is an active, zoned, northwest-trending, approximately 2- to 4-mile-wide belt of anticlinal folds and faults disrupting early Holocene to Late Pleistocene-age and older deposits (Barrows, 1974). The NIFZ is characterized by trends related to right-lateral shearing at depth (Moody and Hill, 1956). The zone defines the boundary between the western basement complex of Catalina type schist and related rocks to the southwest, and the eastern basement complex of metasedimentary, metavolcanic and plutonic rocks to the northeast (Yerkes, et al., 1965). Right-lateral, strike-slip displacement of 3,000 to 5,000 feet has been measured in Lower Pliocene strata along the NIFZ (Dudley, 1954; Hill, 1954; Poland, et al., 1959). Apparent vertical offset across faults of the NIFZ ranges from 4,000 feet at the basement interface, to 1,000 feet in the Pliocene strata, and 200 feet at the Plio-Pleistocene boundary (Yerkes, et al., 1965). Movement along this structural zone is inferred to have been initiated during middle Miocene time (circa 15 million years ago), with seismic activity continuing to the present time. There is abundant seismic evidence that the zone is tectonically active; thus, the surrounding metropolitan area is subject to certain seismic risks. At least five earthquakes of magnitude 4.9 or larger have been associated with the NIFZ since 1920 (Barrows, 1974). Estimated maximum deterministic magnitude earthquake is generally modeled between Magnitude (M_w) 6.5 and 7.2.

3.2 Historical Seismicity

An evaluation of historical seismicity from significant past earthquakes related to the site was performed (see Figure 4). Peak ground accelerations (PGA) at the site resulting from significant past earthquakes between 1800 to 2016, with magnitudes M4.0 or greater, were estimated using the EQSEARCH computer program (Blake, 2000) with 2016 updates. This historical seismicity search was performed for a 100-kilometer (62-mile) radius from the project site. The largest earthquake magnitude found in the search was the M7.7 earthquake, known as the Arvin-Tehachapi quake that occurred on July 21, 1952 approximately 77.5 miles (124.7 kilometers) from the site producing an estimated site acceleration of approximately 0.044g. The largest estimated PGA found in the search was approximately 0.250g from an earthquake approximately 0.8 miles (1.3 kilometers) from the site.

Review of additional data publicly available from the Center for Engineering Strong Motion Data (CESMD) website (http://strongmotioncenter.org/) was reviewed for stations in the vicinity of the project site. The data reviewed indicates that a site (Station 0872, 1111 Sunset Boulevard) less than 1.2 miles to the southwest of the project site experienced a peak ground acceleration of 0.141g from the M6.7 Northridge earthquake that occurred on January 17, 1994. This earthquake occurred less than 28.1 km northwest of the project site along a blind thrust fault damaging structures throughout Los Angeles, Ventura, Orange, and San Bernardino Counties.

3.3 Liquefaction and Lateral Spreading

Liquefaction is the loss of soil strength due to a buildup of excess pore-water pressure during strong and long-duration ground shaking. Liquefaction is associated primarily with loose (low density), saturated, relatively uniform fine- to medium-grained, clean cohesionless soils. As shaking action of an earthquake progresses, soil granules are rearranged and the soil densifies within a short period. This rapid densification of soil results in a buildup of pore-water pressure. When the pore-water pressure approaches the total overburden pressure, soil shear strength reduces abruptly and temporarily behaves similar to a fluid. For liquefaction to occur there must be:

(1) loose, clean granular soils,

(2) shallow groundwater, **and**

(3) strong, long-duration ground shaking.

According to the City of Los Angeles Safety Element (1990) and the City of Los Angeles Safety Element (1996) the site is not within an area identified as having a potential for liquefaction. However, review of the Seismic Hazard Zone Report for the Los Angeles 7.5-Minute Quadrangle (CGS, 1999) indicates that the site **is** within an area potentially susceptible to liquefaction (Figure 4, *Seismic Hazard Map*).

A site-specific liquefaction analysis was performed in 2017 for the site using the CPTs advanced in the immediate area of the 1927 Addition. A historic high groundwater of 10 feet bgs was assumed in the analysis based on the CGS reported historic high of 20 feet bgs and groundwater levels reported at depths ranging from 9 to 20 feet bgs. A peak ground acceleration of 1.012g corresponding to the PGA_M was used in the analysis.

The results, which are presented in Appendix E, indicate the potential for liquefaction is low. However, given the shallow groundwater of 5 to 8 feet bgs encountered by MACTEC in the vicinity of the Skilled Nursing Facility, a site-specific liquefaction analysis will need to be performed based on additional exploration.

3.4 Seismically-Induced Settlement

Seismically-induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within loose to moderately dense sandy soil due to reduction in volume during and shortly after an earthquake event.

Based on our analysis, the total seismically-induced settlement is expected to be on the order of 1½ inches or less. Seismically-induced differential settlement based on the calculated variance between CPT locations is expected to be on the order of ¼ inch over 30 feet.

3.5 Lateral Spreading

The occurrence of liquefaction may also cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along gently sloping ground toward an unconfined area. Due to the lack of a laterally unconstrained surface, and a previously documented low potential for liquefaction to occur, the potential for lateral spreading at the site is considered low. However, additional exploration and a site-specific liquefaction analysis will need to be performed to confirm conditions within the footprint of the proposed Skilled Nursing Facility.

3.6 Ground Lurching

Certain soils have been observed to move in a wave-like manner in response to intense seismic ground shaking, forming ridges or cracks on the ground surface. At present, the potential for ground lurching to occur at a given site can be predicted only generally. Areas underlain by thick accumulations of colluvium and alluvium appear to be more susceptible to ground lurching than bedrock. Under strong seismic ground motion conditions, lurching can be expected within loose, cohesionless soils, or in clay-rich soils high in moisture content such as found below the site. Generally, ground lurching damages only lightly loaded structures such as pavement, fences, pipelines and walkways; more heavily loaded structures appear to resist such deformation. Following removal of compressible soils and placement of engineered fill, the potential for damage resulting from ground lurching in the canyon areas of the site is considered to be low.

3.7 Seismically-Induced Landslides

The site is **not** located in an area mapped as potentially susceptible to seismically-induced landslides (Figure 4, *Seismic Hazard Map*). No landslides are mapped or known to exist within the Barlow Respiratory Hospital Campus. However, there are thin regions on the western slopes of the canyon, the opposite side of Stadium Way from the hospital campus, that are mapped as potentially susceptible to seismically-induced landslides.

Previous grading and construction at the site has created level pads for buildings and parking lots. The potential for seismically induced landslides to affect the proposed Skilled Nursing Facility is low.

3.8 Flooding

As shown on Figure 5, *Flood Hazard Zone Map*, the site is located outside of areas recognized by the Federal Emergency Management Agency (FEMA) to within 0.2% annual flood potential (FEMA, 2008). Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of an earthquake. The site is located outside of a dam inundation area due to the absence of such structures near the site, therefore the potential for earthquake-induced flooding at the site is considered low.

3.9 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are sea waves generated by large-scale disturbance of the ocean floor that induces a rapid displacement of the water column above. The most frequent causes of tsunamis are shallow underwater earthquakes and submarine landslides.

The project site has a site elevation of approximately 425 feet above mean seal level (msl) and is not located near an enclosed body of water. Based on the site's elevation and the lack of nearby enclosed water bodies, the risks associated with tsunamis and seiches are considered negligible.

3.10 Methane and Oil Fields

The Site is not located within a City of Los Angeles designated methane zone or methane buffer zone. Based on review of the California Geologic Energy Management (CalGEM) Website there are no mapped oil wells on the Barlow Respiratory Hospital campus site.

See:https://maps.conservation.ca.gov/doggr/wellfinder/#openModal/-118.24847/34.07595/19

Based on readily available information it is our opinion methane will not affect the project.

4.0 CONCLUSIONS

Based on the results of our study, it is our opinion that the site does not have significant geological constraints that would require mitigation other than strong ground motion and liquefaction potential. In our opinion, the following geotechnical factors should be considered:

- The project site is underlain by approximately 2 to 5 feet of artificial fill overlying quaternary age alluvium consisting predominantly of clayey soils with Tertiary Puente Formation sandstone and siltstone at depths of greater than 38 feet bgs.

- Our review of the geologic literature (Appendix A) indicates there are no known active faults on or in the immediate vicinity of the site. Because of the lack of known active faults on the site, the potential for surface rupture at the site is considered low.

- The main seismic hazard that may affect the site is ground shaking from one of the active regional faults. The nearest known active faults that could produce significant ground shaking at the site include, but are not limited to, the Hollywood fault, Raymond Hills fault, and NIFZ located approximately 4.0 miles, 4.8 miles, 4.3 miles and 7.8 miles from the site, respectively.

- The site **is** located within State of California Liquefaction Hazard Zone. Previous campus liquefaction evaluations indicate the potential for liquefaction is low. However, an additional field exploration and site-specific evaluation is required to analyze liquefaction potential in the vicinity of the Skilled Nursing Facility.

- Seismically-induced settlement is estimated to be on the order of 1½ inch or less across the site.

- Groundwater was encountered during previous site investigations on the Barlow Respiratory Hospital Campus at depths ranging from approximately 5 to 23 feet bgs. The historic high groundwater at the site as reported by CGS is on the order of approximately 20 feet bgs. An additional subsurface exploration will be required to accurately measure groundwater levels in the vicinity of the proposed Skilled Nursing Facility.

- Localized layers of clay that have a potential for expansion exist at the site and should be anticipated in the near-surface subgrade.

- New structural elements may be supported on spread-type shallow footing foundation systems founded in engineered fill or undisturbed natural soils.

5.0 RECOMMENDATIONS

Presented below are preliminary geotechnical recommendations for the proposed site improvements. These recommendations are based upon the exhibited geotechnical engineering properties of the soils from previous investigations and their anticipated response both during and after construction. An additional subsurface exploration will be required to provide design-level geotechnical recommendations. Leighton should review the grading plans, shoring plans, foundation plans, and specifications when they are available to verify that the recommendations presented in this report have been properly interpreted and incorporated.

5.1 General Earthwork and Grading

All earthwork and grading should be performed in accordance with the following recommendations and the *Earthwork and Grading Guide Specifications* presented in Appendix F.

5.1.1 Site Preparation

Prior to construction, the area of proposed new structures should be cleared of any vegetation and demolition trash and debris. These materials should be removed from the site. Any underground obstructions onsite should be removed. Efforts should be made to locate any existing utility lines to be removed or rerouted where interfering with the proposed construction. Any resulting cavities should be properly backfilled and compacted. After the site is cleared, the soils should be carefully observed for the removal of all unsuitable deposits. All undocumented fill should be excavated from proposed seismic retrofit improvement and structure footprints.

5.1.2 General Grading Recommendations

The proposed utility building and canopy columns may be supported on conventional shallow footing foundation systems established on a minimum of 2 feet of engineered fill soils. The existing undocumented artificial fill should be removed and replaced as engineered fill in the area of the planned improvements. Overexcavation and recompaction should extend a minimum horizontal distance equal to the vertical distance between the proposed footing bottom and depth of overexcavation.

After completion of the overexcavation and prior to fill placement, the exposed soils should be scarified to a minimum depth of 12 inches, moisture conditioned and compacted to at least 95 percent relative compaction based on ASTM Test Method D 1557.

The onsite soils, less any deleterious material or organic matter, can be used in required fills. Cobbles larger than 6 inches in largest diameter should not be used in the fill. Any required import material should consist of relatively non-expansive soils with an Expansion Index (EI) less than 20. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable and result in a stable subgrade when compacted. All proposed import materials should be approved by the geotechnical engineer of record prior to being placed at the site.

All fill should be moisture conditioned and compacted to at least 95 percent relative compaction based on ASTM Test Method D 1557.

5.1.3 Temporary Construction Dewatering

Groundwater or seepage may be encountered in during excavation of the proposed basement and construction dewatering may be required. An additional subsurface exploration will be required to accurately measure groundwater levels and develop temporary construction dewatering recommendations. In the event that dewatering is necessary, discharge permits (NPDES) may be required to discharge water to local storm drains.

5.1.4 Pipe Bedding

Any proposed pipe should be placed on properly placed bedding materials. Pipe bedding should extend to a depth in accordance to the pipe manufacturer's specification. The pipe bedding should extend to at least 12 inches over the top of the pipeline. The bedding material may consist of compacted free-draining sand, gravel, or crushed rock. Pipe bedding material should have a Sand Equivalent (SE) of at least 30.

5.1.5 Trench Backfill

Trench excavations above pipe bedding may be backfilled with onsite soils under the observation of the geotechnical consultant. All fill soils should be placed in loose lifts, moisture conditioned as required and compacted to a minimum of 95 percent relative compaction based on ASTM Test Method D 1557. Lift thickness will be dependent on the equipment used as suggested in the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). The fill soils should extend to the bottom of the aggregate base for new pavement, or to finish grade.

5.2 Foundation Recommendations

5.2.1 Spread Footings

New or existing footings established in engineered fill or undisturbed natural soils may impose an allowable bearing of 3,000 pounds per square feet (psf) based on a minimum width of 12 inches and embedment depth of 18 inches below the lowest adjacent grade. The allowable bearing pressure may be increased by one-third for wind or seismic loading.

The allowable bearing capacity incorporates a factor of safety of 3.0 and is based on a total settlement (static and seismic) of 1 inch and differential settlement of ½ inch over a horizontal distance of 30 feet. Accordingly, the ultimate bearing capacity of footings established in engineered fill or undisturbed natural soils is 9,000 psf.

Since settlement is a function of footing size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists. The settlement estimate should be reviewed by Leighton when final foundation plans and loads for the proposed buildings become available.

A modulus of subgrade reaction (*k)* of 50 pounds per cubic inch (pci) may be used for static loading. For seismic loading, the modulus of subgrade reaction may be increased to 100 pci.

Resistance to lateral loads will be provided by a combination of friction between the soil and foundation interface and passive pressure acting against the vertical portion of the foundation. A friction coefficient of 0.35 may be used at the soil-concrete interface for calculating the sliding resistance. A passive pressure based on an equivalent fluid pressure of 300 pounds per cubic foot (pcf) may be used for calculating the lateral passive resistance. The lateral passive resistance can be taken into account only if it is ensured that the soil against embedded structures will remain intact with time. The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

A friction coefficient of 0.35 may be used at the soil-concrete interface for calculating uplift resistance. The coefficient of horizontal earth pressure (ratio of horizontal vs vertical earth pressure) may be assumed to be 0.5.

5.3 Slabs-on-Grade

Concrete slabs may be designed using a modulus of subgrade reaction of 150 pci provided the subgrade is prepared as described in Section 6.1. From a geotechnical standpoint, we recommend slab-on-grade be a minimum 5 inches thick with No. 3 rebars placed at the center of the slab at 24 inches on center in each direction. The structural engineer should design the actual thickness and reinforcement based on anticipated loading conditions. Where moisture-sensitive floor coverings or equipment is planned, the slabs should be protected by a minimum 10-mil-thick vapor barrier between the slab and subgrade.

Minor cracking of concrete after curing due to drying and shrinkage is normal and should be expected; however, concrete is often aggravated by a high water/cement ration, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking. Additionally, our experience indicates that the use of reinforcement in slabs and foundations can generally reduce the potential for concrete cracking.

To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals. Joints should be laid out to form approximately square panels.

5.4 Lateral Earth Pressures

Recommended lateral earth pressures are provided as equivalent fluid unit weights, in psf/ft or pcf, for design of basement and retaining walls in drained conditions using onsite sandy soils as backfill. These values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Condition	**Equivalent Fluid Unit Weight with Granular Backfill (psf/ft)**	
	Level Backfill, Static Condition	**Level Backfill, Seismic Condition**
Active	35	55
At-Rest	55	85
Passive	300	--
Coefficient of Friction	0.35	--

Walls that are free to rotate or deflect may be designed using active earth pressure. For the basement walls or walls that are fixed against rotation, the at-rest pressure should be used. For seismic condition, the pressure should be distributed as an inverted triangular distribution and the dynamic thrust should be applied at a height of 0.6H above the base of the wall.

For upward sloping backfill at 2:1 (horizontal to vertical) and 1½:1, the active and at-rest pressures should be increased by a factor of 1.5 and 2, respectively.

Care should be taken to provide appropriate drainage so as no water is allowed to remain behind the retaining wall for any significant length of time. Retaining structures should be provided with a drainage system, as illustrated on Figure 6, *Retaining Wall Backfill and Subdrain Detail*, to prevent buildup of hydrostatic pressure behind the wall.

In addition to the recommended earth pressures, walls below grade adjacent to existing structures or streets and areas of traffic should be designed to accommodate surcharge loads. For traffic surcharge, a uniform lateral pressure of 100 pounds per square foot acting as a result of an assumed 300 pounds per square foot surcharge behind the wall due to normal traffic; the traffic surcharge load may be neglected provided a minimum of 10-foot clearance between the wall and the traffic is maintained.

Backfills for retaining walls should be compacted to a minimum of 90 percent relative compaction (based on ASTM Test Method D1557). During construction of retaining walls, the backcut should be made in accordance with the requirements of Cal/OSHA Construction Safety Orders. Relatively light construction equipment should be used to backfill retaining walls. We also recommend using at-rest pressures for design of walls supporting settlement-sensitive structures.

Earth pressures used in the design of the walls should be indicated on the retaining wall plans. All retaining wall designs and plans should be reviewed by the project geotechnical consultant to confirm that the appropriate soil parameters are used.

5.5 Seismic Design Considerations

To accommodate effects of ground shaking produced by regional seismic events, seismic design can be performed by the project structural engineer in accordance with the 2019 Edition of the California Building Code (CBC 2019). The table below, *2019 CBC Seismic Parameters*, lists seismic design parameters based on the 2019 CBC, Section 1613A.3 (ASCE 07-16) methodology:

2019 CBC Site-Specific Seismic Parameters

Categorization/Coefficients	Code-Based (1) (2)
Site Longitude (decimal degrees) West	-118.2474
Site Latitude (decimal degrees) North	34.0741
Site Class	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s	2.039
Mapped Spectral Response Acceleration at 1s Period, S_1	0.728
Short Period Site Coefficient at 0.2s Period, F_a	1.0
Long Period Site Coefficient at 1s Period, F_v	null*
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	2.039
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	null*
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	1.359
Design Spectral Response Acceleration at 1s Period, S_{D1}	null*

1. All were derived from the SEA web page: https://seismicmaps.org/
2. All coefficients in units of g (spectral acceleration)
3. See Appendix C for details of the seismic evaluation.
4. *Requires C_s calculation, see below.

Based on the 2019 CBC Table 1613.2.3(2), the long period site coefficient should be determined in accordance with Section 11.4.8 of ASCE 7-16 since the mapped spectral response acceleration at 1 second is greater than 0.2g for Site Class D. In accordance with Section 11.4.8 of ASCE 7-16, a site-specific seismic analysis is required; however, the values provided herein may be utilized if design is performed in accordance with exception (2) in Section 11.4.8 of ASCE 7-16, with special requirements for the seismic response coefficient (Cs). The project structural engineer should review the seismic parameters. A site-specific seismic analysis can be performed upon request.

5.6 Temporary Excavation and Shoring Design

All temporary excavations, including utility trenches, retaining wall excavations and foundation excavations should be performed in accordance with project plans, specifications, and all OSHA requirements. Excavations 5 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the cut, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structure.

Typical cantilever shoring should be designed based on the active fluid pressure of 35 pounds per cubic foot (pcf). If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 25H, where H is equal to the depth of the excavation being shored.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the “competent person” required by OSHA, standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

5.7 Preliminary Corrosion Protection Measures

Water-soluble sulfates in soil can react adversely with concrete. As referenced in the 2016 California Building Code (CBC), Section 1904A, concrete subject to exposure to sulfates shall comply with requirements set forth in ACI 318. Based on laboratory testing results of the onsite soils, concrete structures in contact with the onsite soil will likely have “negligible” exposure to water-soluble sulfates in the soil. Therefore, common Type II Portland cement may be used for concrete construction in contact with site soils. However, concrete exposed to recycled water (with high sulfate content) may need to be designed using Type V Portland cement.

Subgrade soil should be tested for water-soluble sulfate content prior to final design of the concrete structures. Import fill soil should be tested for corrosivity, expansion and sulfate attack before import to the site. Further testing of the subgrade soils near finish grade should be performed to verify these results.

Based on corrosivity test performed on a sample collected from previous boring LB-3, the onsite soil is considered corrosive to ferrous metals. As a general mitigation measure, ferrous pipe buried in moist to wet site earth materials should be avoided by using high-density polyethylene (HDPE), polyvinyl chloride (PVC) and/or other non-ferrous pipe when possible. Ferrous pipe can also be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from on-site soils. A qualified corrosion engineer should be consulted for necessary mitigations for corrosive soil.

5.8 Preliminary Pavement Design

To provide support for paving, the subgrade soils should be prepared as recommended in Section 6.1, Grading. Compaction of the subgrade, including trench backfills, to at least 90 to 95 percent as recommended relative compaction based on ASTM Test Method D 1557 and achieving a firm, hard and unyielding surface will be important for paving support. The upper 12 inches of subgrade should be compacted to 95% relative compaction. The preparation of the paving area subgrade should be performed immediately prior to placement of the base course. Proper drainage of the paved areas should be provided since this will reduce moisture infiltration into the subgrade and increase the life of the paving.

5.8.1 Base Course

The base course for both asphalt concrete and Portland Cement Concrete paving should meet the specifications for Class 2 Aggregate Base as defined in Section 26 of the latest edition of the State of California, Department of Transportation, and Standard Specifications. Alternatively, the base course could meet the specifications for untreated base as defined in Section 200-2 of the latest edition of *Standard Specifications for Public Works Construction* (Greenbook). Crushed Miscellaneous Base (CMB) may be used for the base course provided the geotechnical consultant evaluates and tests it before delivery to the site.

5.8.2 Asphalt Concrete

The required asphalt paving and base thicknesses will depend on the expected wheel loads and volume of traffic (Traffic Index or TI).On a preliminary basis, and assuming that the paving subgrade will consist of the sandy onsite or comparable soils with an R-value of at least 20 (Appendix B, *Previous Laboratory Testing*) compacted to at least 90 percent relative compaction based on ASTM Test Method D 1557 below 12-inches and 95% relative compaction in the upper 12 inches, the minimum recommended paving thicknesses are presented in the following table:

Area	Traffic Index	Asphalt Concrete (inches)	Base Course (inches)
Light Truck	5	3	8
Heavy Truck	6	4	10
Main Drives	7	4	12

The asphalt paving sections were determined using the Caltrans design method. We can determine the recommended paving and base course thicknesses for other Traffic Indices if required. Careful inspection is recommended to verify that the recommended thicknesses or greater are achieved, and that proper construction procedures are followed.

5.8.3 Portland Cement Concrete Paving

Portland Cement Concrete (PCC) paving and walks may be supported directly on sandy onsite soils or compacted fill. PCC paving and walks supported on clayey onsite soils should be underlain by at least 18 inches of engineered fill consisting of relatively non-expansive (EI < 20) soils. We have assumed that such a subgrade will have an R-value of at least 20, which will need to be verified during grading.

PCC paving sections were determined in accordance with procedures developed by the Portland Cement Association. Concrete paving sections for a range of Traffic Indices are presented in the table below. We have assumed that the PCC will have a compressive strength $\left(f_c^{'}\right)$ of at least 3,000 pounds per square inch (psi).

Area	Traffic Index	Portland Cement Concrete (inches)	Base Course (inches)
Light Truck	5	6½	4
Heavy Truck	6	7	4
Main Drives	7	7½	4

The paving should be provided with expansion joints at regular intervals no more than 15 feet in each direction. Load transfer devices, such as dowels or keys, are recommended at joints in the paving to reduce possible offsets. The paving sections in the above table have been developed based on the strength of unreinforced concrete. Steel reinforcing may be added to the paving to reduce cracking and to prolong the life of the paving.

5.9 Additional Geotechnical Services

The geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our conclusions and recommendations presented in this report should be reviewed and verified by Leighton during site construction and revised accordingly if exposed geotechnical conditions vary from our preliminary findings and interpretations. The recommendations presented in this report are only valid if Leighton verifies the site conditions during construction. Geotechnical observation and testing should be provided during the following activities:

- Grading and excavation of the site;
- Overexcavation and compaction;
- Compaction of all fill materials;
- Shoring system installation;
- Excavation and installation of foundations;
- After excavation of all slabs and footings and prior to placement of steel or concrete to confirm the slabs and footings are founded in firm, compacted fill;
- Utility trench backfilling and compaction; and
- When any conditions are encountered that varies significantly from the conditions described in this report.

Leighton should review the grading and foundation plans and specifications, when available, to comment on the geotechnical aspects. Our recommendations should be revised, as necessary, based on future plans and incorporated into the final design plans and specifications.

6.0 LIMITATIONS

The geologic analyses presented in this geotechnical and geologic hazard evaluation report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report.

Please also note that our evaluation was limited to assessment of the geologic and seismic aspects of the site, and did not include evaluation of structural issues, environmental concerns or the presence of hazardous materials. Our conclusions, recommendations and opinions are based on an analysis of the observed site conditions, engineering characteristics of the site soils and our review of the referenced geologic literature and reports. This geotechnical evaluation has not been designed to meet the requirements of the 2019 California Building Code (CBC), ASCE 41-13, or the California Geological Survey (CGS) Note 48 and is solely intended for preliminary design purposes during the planning phases of the project. If geologic or geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request.

Project: 12080.004	Eng/Geol: CCK/JAR
Scale:1 " = 2,000 '	Date: November 2020

Base Map: ESRI ArcGIS Online 2020
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way, Los Angeles, California

Figure 1

Leighton

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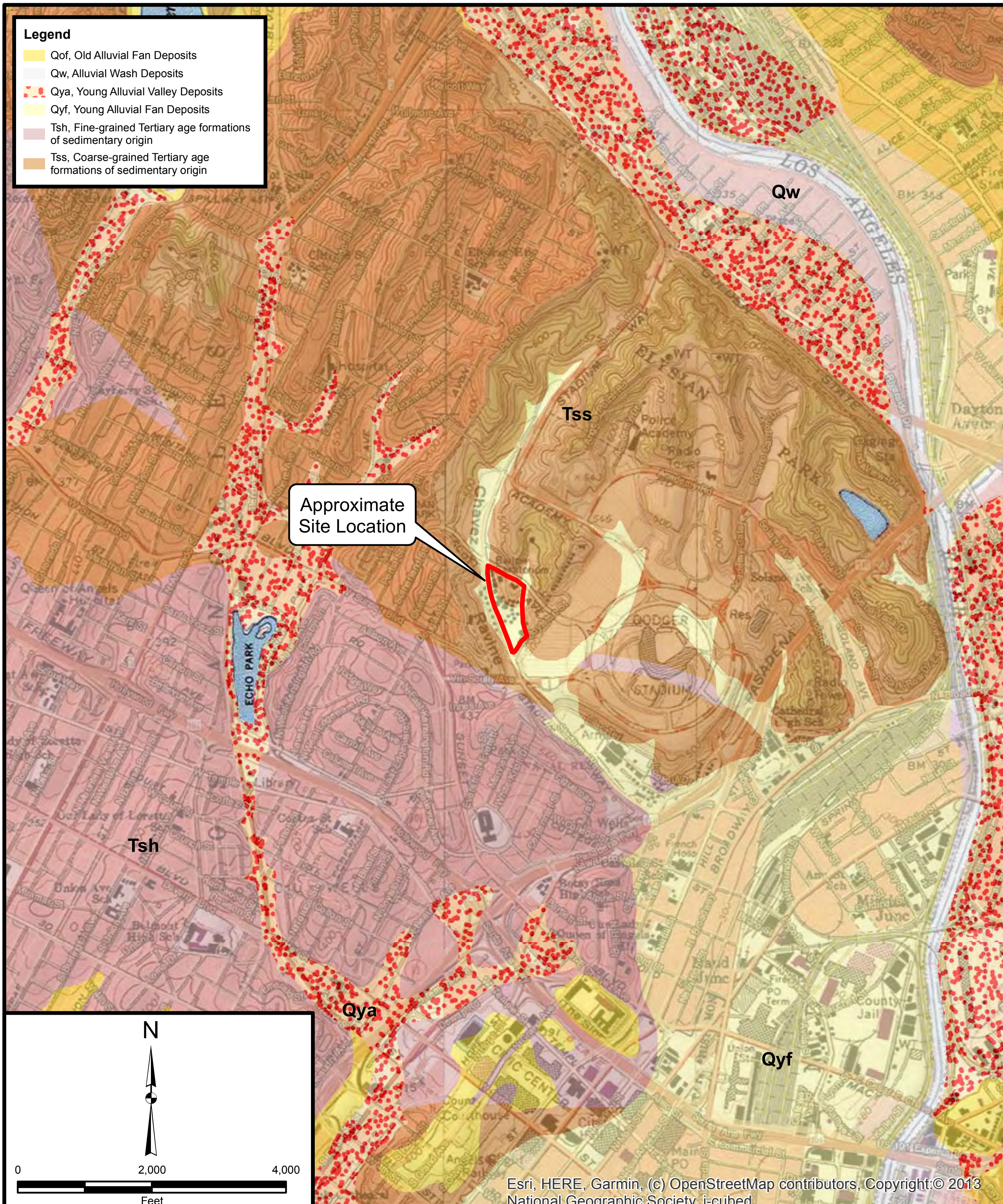

Project: 12080.004	Eng/Geol: CCK/JAR	Figure 2
Scale:1 " = 2,000 '	Date: November 2020	

Base Map: ESRI ArcGIS Online 2020
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

REGIONAL GEOLOGY MAP

Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way, Los Angeles, California

Leighton

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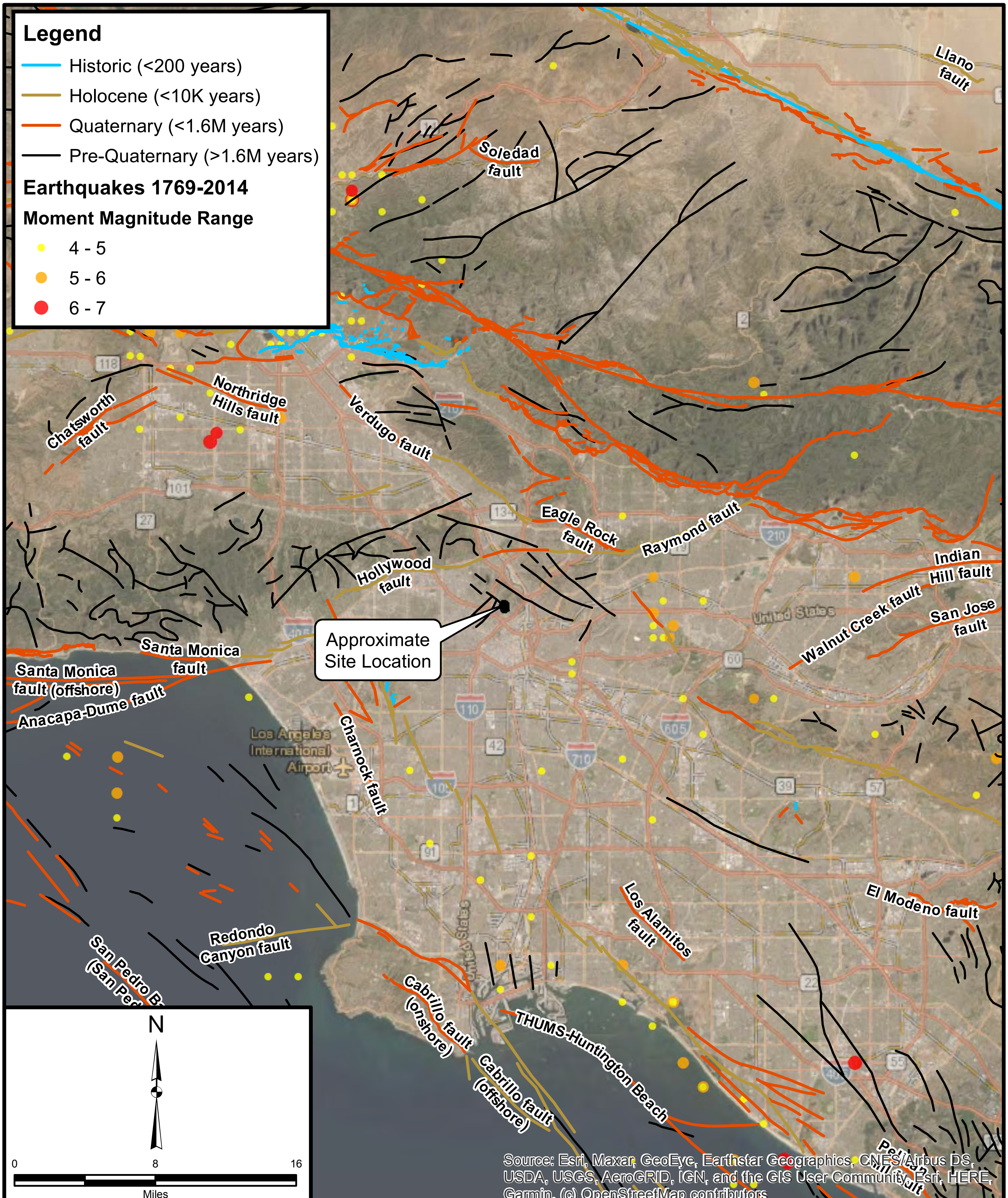

Project: 12080.004	Eng/Geol: CCK/JAR
Scale:1 " = 8 miles	Date: November 2020

Base Map: ESRI ArcGIS Online 2020
Thematic Information: Leighton, CGS, Bryant 2010
Author: Leighton Geomatics (btran)

REGIONAL FAULT AND HISTORIC SEISMICITY MAP

Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way, Los Angeles, California

Figure 3

Leighton

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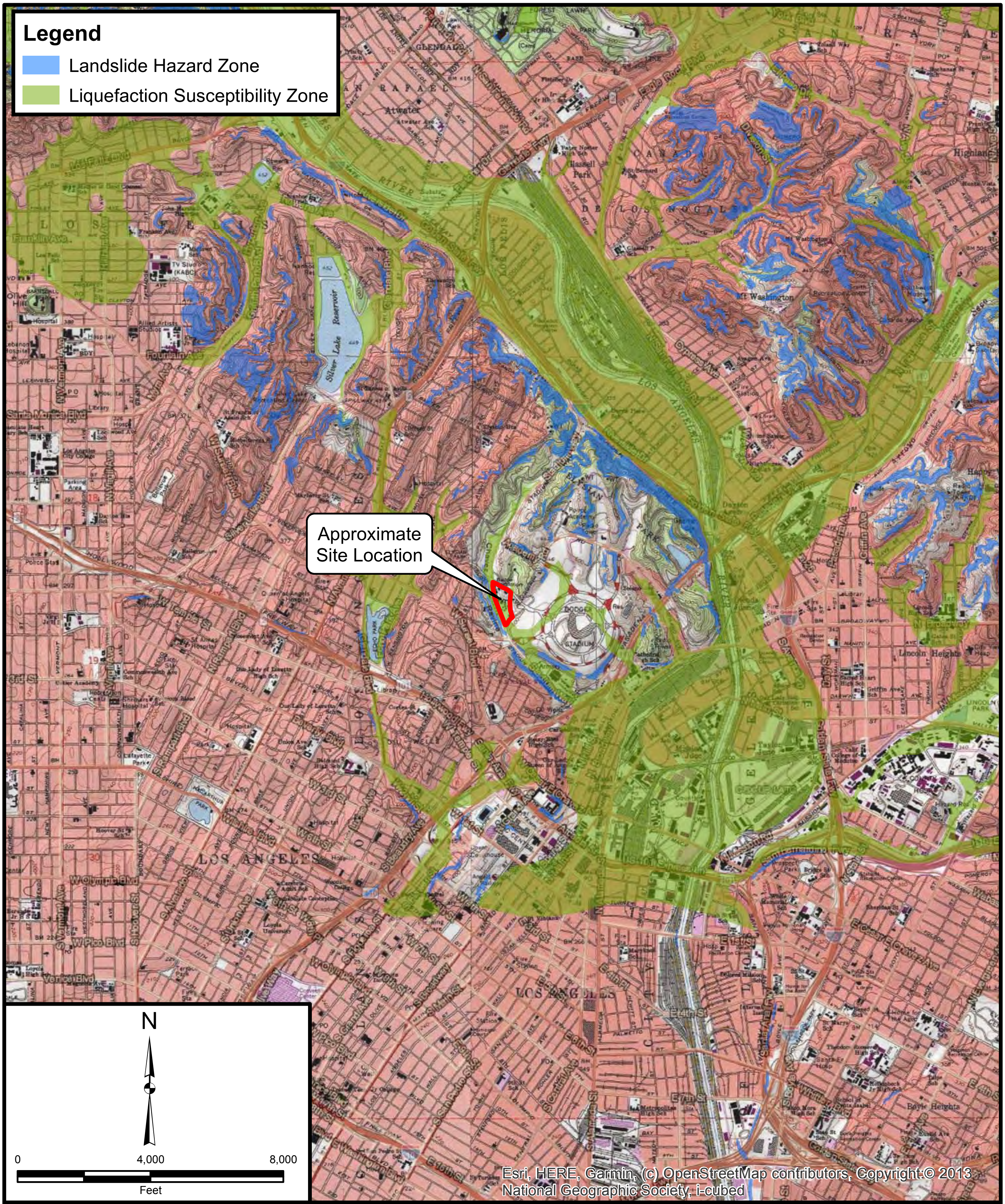

Project: 12080.004	Eng/Geol: CCK/JAR
Scale:1 " = 4,000 '	Date: November 2020

Base Map: ESRI ArcGIS Online 2020
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

SEISMIC HAZARD MAP

Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way, Los Angeles, California

Figure 4

Leighton

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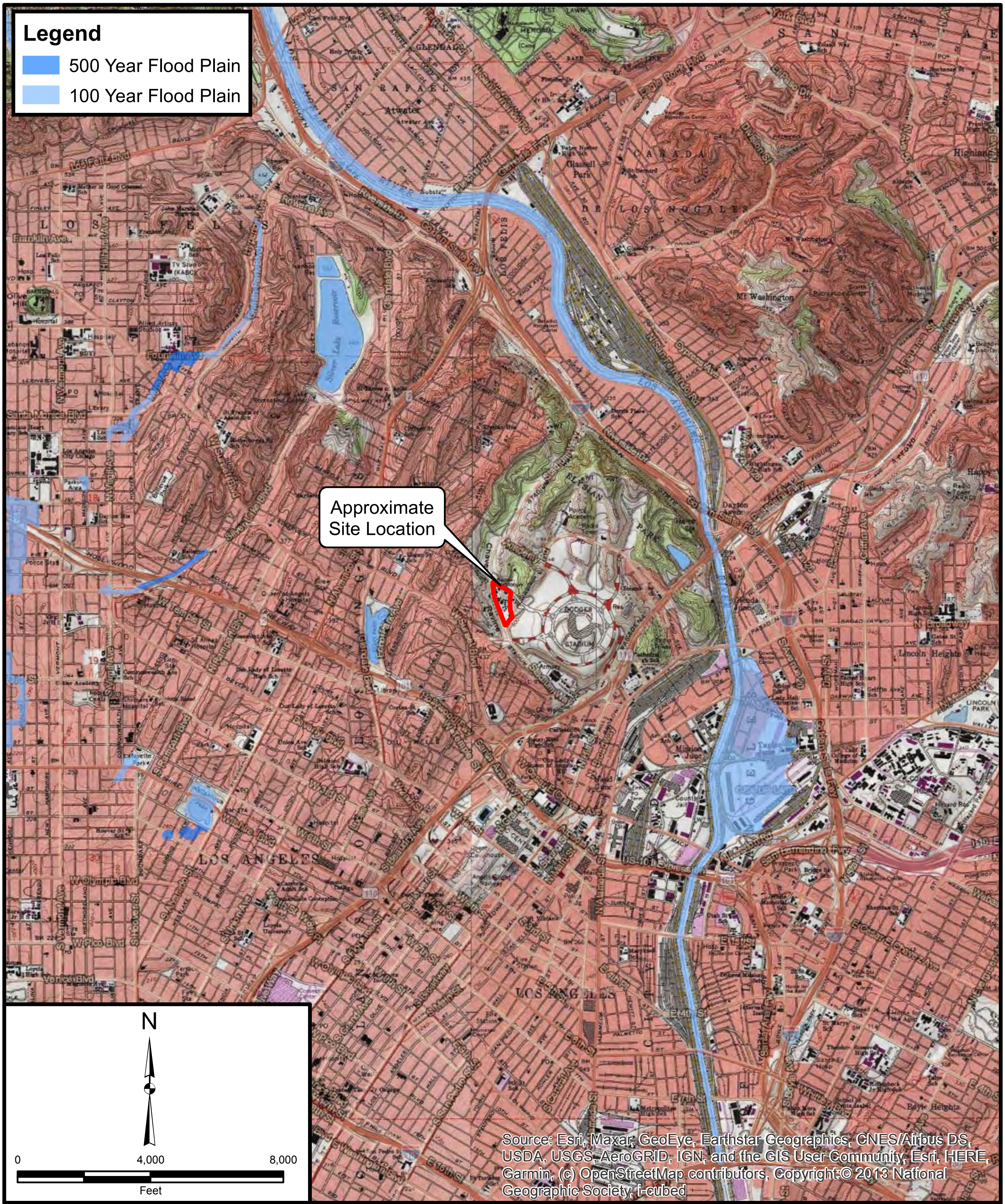


Project: 12080.004	Eng/Geol: CCK/JAR
Scale:1 " = 4,000 '	Date: November 2020

Base Map: ESRI ArcGIS Online 2020
Thematic Information: Leighton, CA DWR, FEMA
Author: Leighton Geomatics (btran)

FLOOD HAZARD ZONE MAP

Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way, Los Angeles, California

Figure 5

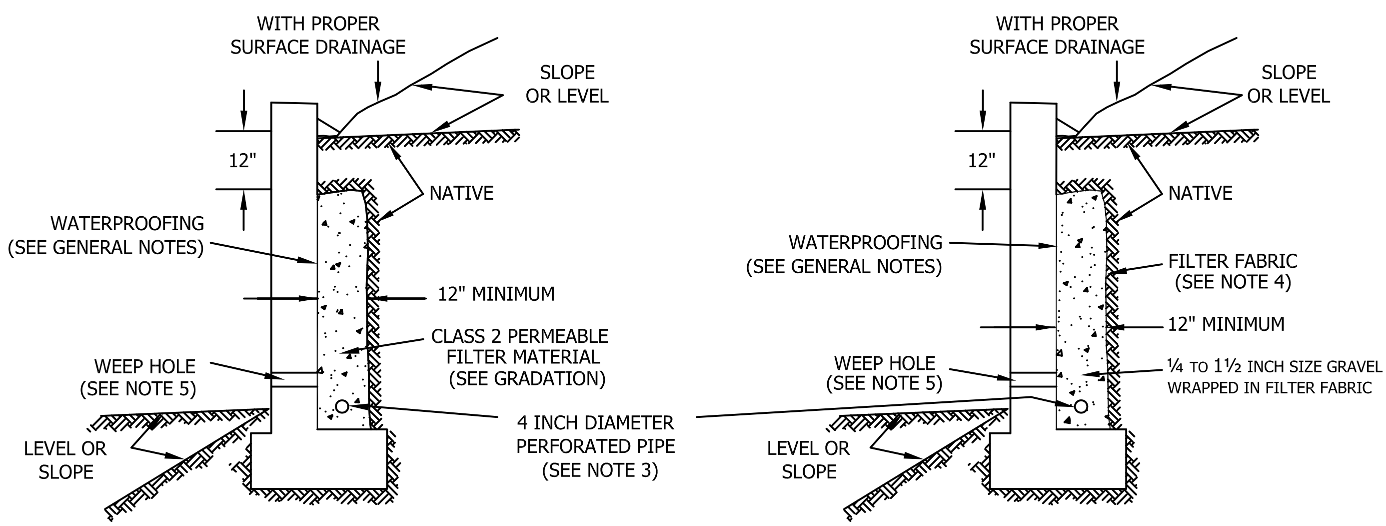
Leighton

Map Saved as V:\Drafting\12080\004\Maps\12080-004_F05_FHM_2020-11-23.mxd on 7/27/2018 1:11:00 PM

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL

OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 6 FEET OR LESS IN HEIGHT

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

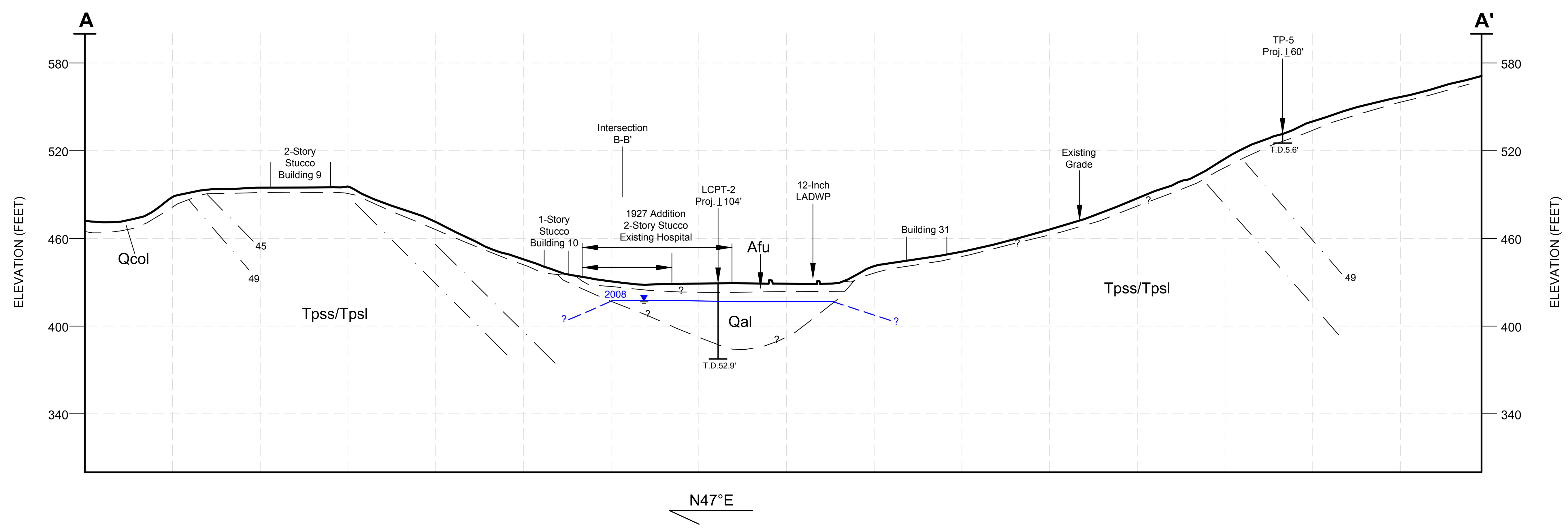
Leighton
Figure 6

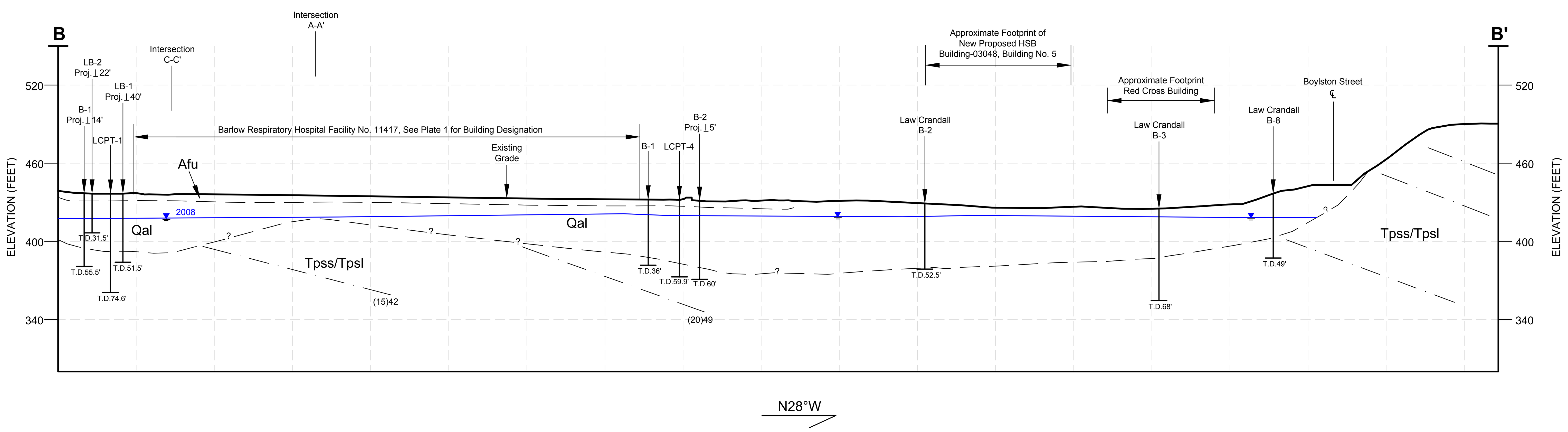
Plate 1	**GEOTECHNICAL MAP** Skilled Nursing Facility Barlow Respiratory Hospital 2000 Stadium Way, Los Angeles, California	
Leighton	Proj: 12080.004	Eng/Geol: CCK/EMH
	Scale: 1"=50'	Date: November 2020
	Drafted By: BQT · Checked By: BQT	V:\DRAFTING\12080\004\CAD\2020-11-23\12080-004_P01_GM_2020-11-24.DWG (11-24-20 2:54:20PM) Plotted by: btran

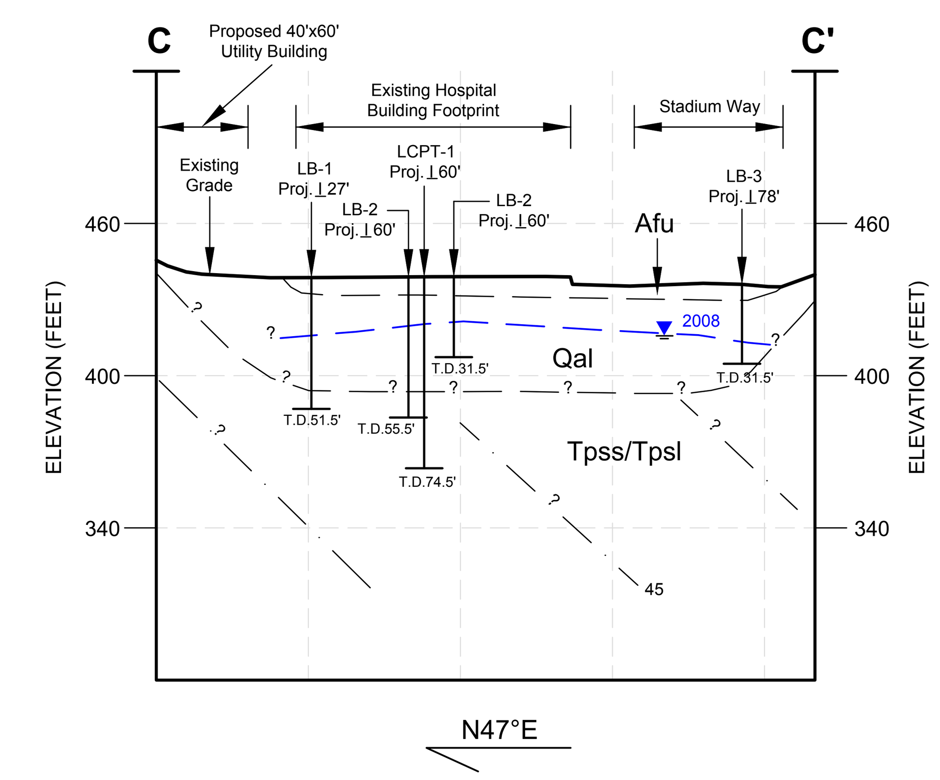
LEGEND

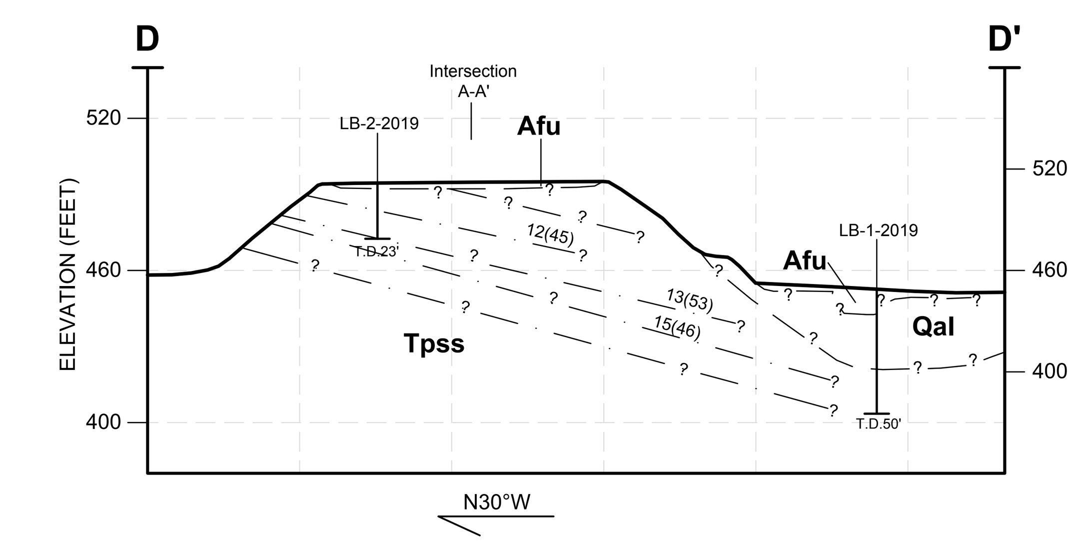
LB-2-2019	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING SHOWING TOTAL DEPTH (T.D.), DEPTH TO EARTH UNITS IN FEET BELOW GROUND SURFACE (LCI, 5/2019)
LB-3 T.D.31.5' Afu@0-5' Qal@5' Perched G.W.@23.6'	APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING SHOWING TOTAL DEPTH (T.D.), DEPTH TO EARTH UNITS IN FEET BELOW GROUND SURFACE (LCI, 7/18)
B-7	APPROXIMATE LOCATION OF SOIL BORING SHOWING TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE WHERE AVAILABLE (GEOCON, 5/13)
B-3 T.D.75'	APPROXIMATE LOCATION OF SOIL BORING SHOWING TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE (LAW CRANDALL, 4/01)
B-10 T.D.47'	APPROXIMATE LOCATION OF SOIL BORING SHOWING TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE (LAW CRANDALL, 11/01)
CPT-9 T.D.31.5'	APPROXIMATE LOCATION OF CONE PENETROMETER TEST (CPT) SOUNDING SHOWING TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE, (MACTEC, OCTOBER 2008)
LCPT-4 T.D.59.9'	APPROXIMATE LOCATION OF CONE PENETROMETER TEST (CPT) SOUNDING SHOWING TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE, (LCI, 2017)
TP-9	APPROXIMATE LOCATION OF TEST PIT (GEOCON, 5/13)
TP-1	APPROXIMATE LOCATION OF TEST PIT (LAW CRANDALL, 11/01)
TP-6 T.D.4.5'	APPROXIMATE LOCATION OF TEST PIT, SHOWING TOTAL DEPTH (T.D.) IN FEET BELOW GROUND SURFACE (LAW CRANDALL, 4/01)

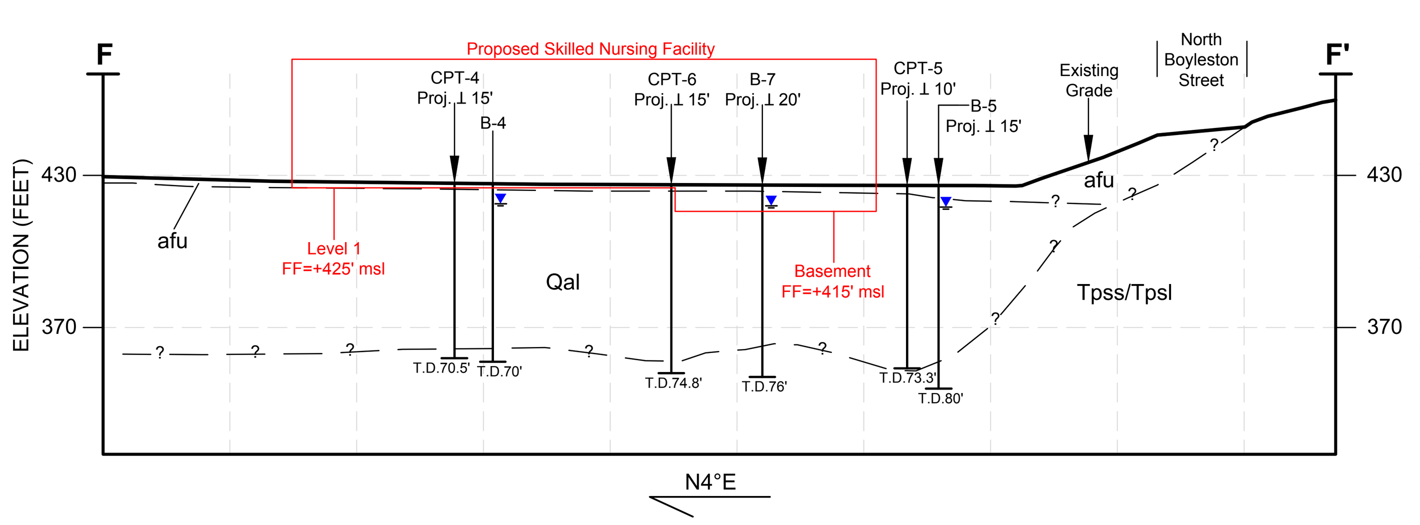
Afu	ARTIFICIAL FILL, UNDOCUMENTED. CONSISTS PRIMARILY OF CLAY AND SILT
Qsw	QUATERNARY AGE SLOPEWASH
Qcol	QUATERNARY AGE COLLUVIUM, SLOPEWASH. DERIVED FROM WEATHERING OF FORMATIONAL MATERIAL
Qal	QUATERNARY AGE ALLUVIUM. CONSISTS OF CLAY AND SILT WITHIN CENTRAL VALLEY
Tpss/Tpsl	MIOCENE AGE PUENTE FORMATION SANDSTONE AND SHALE
45	STRIKE AND DIP OF BEDDING
45	STRIKE AND DIP OF SHEAR
45	STRIKE AND DIP OF JOINT
G — G'	GENERAL LOCATION OF GEOLOGIC CROSS SECTION SEE PLATE 2

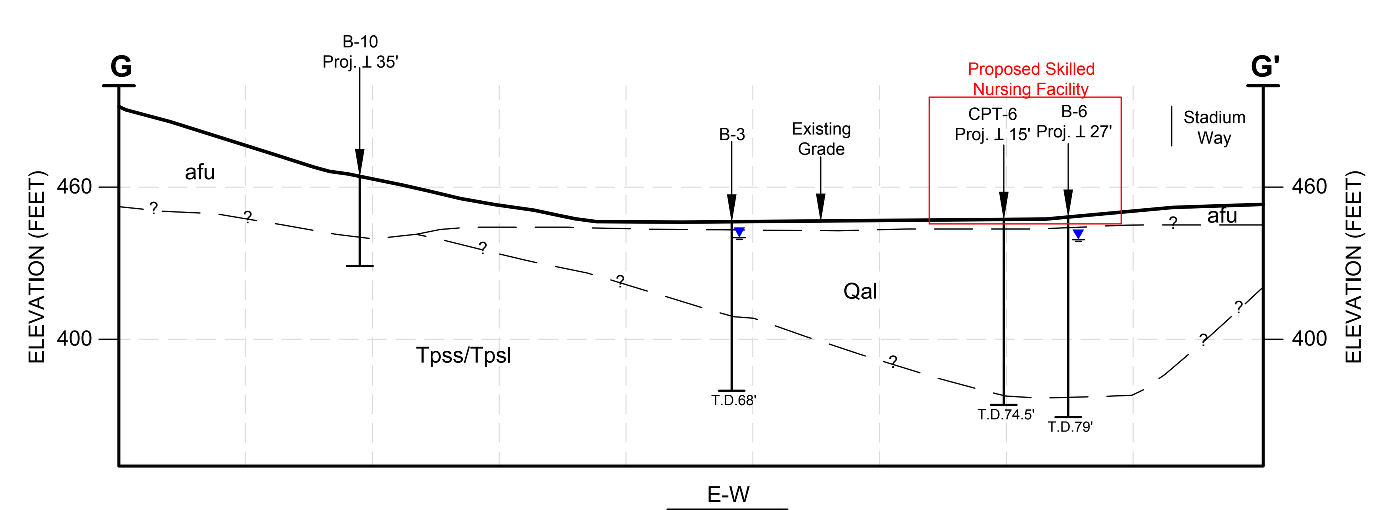












LEGEND

Qcol	Quaternary Age Colluvium, Slopewash. Derived from Weathering of Formational Material
Afu	Artificial Fill, Undocumented. Consists Primarily of Clay and Silt
Qal	Quaternary Age Alluvium. Consists of Clay and Silt within Central Valley
Tpss/Tpsl	Miocene Age Puente Formation Sandstone and Shale
49	Strike and Dip of Bedding as Measured by Others. Number Denotes Actual Dip Apparent Dip in Parentheses
?	Geologic Contact Dashed Where Approximate, Queried Where Uncertain
	Approximate Groundwater Level With Date (2008) of Measurement. Groundwater Levels Expected to Fluctuate

SEE PLATE 1 FOR VARIOUS GENERATIONS OF BORING EXPLORATIONS BY FIRM AND DATE OF EXPLORATION.

GEOTECHNICAL CROSS SECTIONS A-A', B-B', C-C', D-D', F-F' AND G-G'

Skilled Nursing Facility
Barlow Respiratory Hospital
2000 Stadium Way, Los Angeles, California

Plate 2

Proj: 12080.004	Eng/Geol: CCK/EMH
Scale: 1"=60'	Date: November 2020

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Drafted By: BQT Checked By: BQT

APPENDIX A

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APPENDIX A

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APPENDIX B

Exploration Logs

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GEOTECHNICAL BORING LOG LB-1-2019

Project No.	12080.003	**Date Drilled**	5-1-19
Project	Barlow Hospital Supplemental	**Logged By**	EMH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer	**Ground Elevation**	450'
Location	See Plate 1, *Geotechnical Map*	**Sampled By**	EMH

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
450	0			BB-1				ML	@0': 3-inch Asphalt/No Base SILT with Clay, dark brown, moist, some fine sand	CN, CR DS, EI MX, RV
445	5			R-1	4 7 9	108	12		@5': Sandy SILT with Clay, dark brown, moist, fine sand, low plasticity	
440	10			S-1	5 7 8		9	ML	**Quaternary Alluvium (Qal)** @10': Sandy SILT, brown to faint reddish brown, stiff, slightly moist, fine sand, high sand content	
435	15			R-2	4 7 10				@15': with trace clay	CN, DS
430	20			S-2	2 3 5		19	CL	@20': Clay with Silt, brown to reddish brown, stiff, moist, medium plasticity, with fine gravel size siltstone fragments	
425	25			R-3	3 7 11				@25': CLAY, dark brown, stiff, very moist to wet, little silt, trace fine sand	DS
420	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG LB-1-2019

Project No.	12080.003	**Date Drilled**	5-1-19
Project	Barlow Hospital Supplemental	**Logged By**	EMH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer	**Ground Elevation**	450'
Location	See Plate 1, *Geotechnical Map*	**Sampled By**	EMH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No. (Bulk / Driven)	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
420	30			S-3	8 9 12		23		**Puente Formation (Tpss)** @30': Interlaminated SANDSTONE and SILTSTONE, orange brown to gray brown, heavily weathered, soft, friable, wet, oxidized	
415	35			R-4	18 16 50/3"	89	31		@35': increased oxidation, moist	
410	40			S-4	50/6"		23		@40': SANDSTONE, orange brown, wet, heavily weathered, poorly cemented	
405	45			R-5	37 50/2"	102	22		@45': SANDSTONE, yellowish brown, moist,weathered, fine sand, friable, poorly cemented	
400	50			S-5			19		@50': slight increase in cementation	
									Total Depth: 50.75 feet Groundwater encountered while drilling at 30 feet bgs. 24 feet after drilling Boring backfilled with tamped cuttings and asphalt patched upon completion	
395	55									
390	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG LB-2-2019

Project No.	12080.003	**Date Drilled**	5-1-19
Project	Barlow Hospital Supplemental	**Logged By**	EMH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer	**Ground Elevation**	495'
Location	See Plate 1, *Geotechnical Map*	**Sampled By**	EMH

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
495	0			BB-1	Bulk				SM	@0': 3-inch Asphalt/No Base **Artificial Fill, undocumented (Afu)** Silty SAND, yellowish brown, slightly moist, fine sand **Puente Formation (Tpss)**	
490	5			R-1	Driven	50/5"	99	4		@5': Silty SANDSTONE, yellowish brown, hard, weathered, fine sand	
485	10			S-1	Driven	20 50/4"		14		@10': yellowish brown, weathered, laminated with fissile gray SILTSTONE, oxidized	
480	15			R-2	Driven	40 50/3"	94	14		@15': Interlaminated SANDSTONE and SILSTONE, orange brown to gray brown, oxidized, sandstone is friable and oxidized	
475	20			S-2	Driven	26 50/1"		4		@20': Silty SANDSTONE, yellowish brown, weathered, friable, slightly oxidized @22': very hard drilling @23': minimal advancement, refusal. Total Depth: 23 feet Groundwater not encountetred to maximum depth explored Boring backfilled with tamped cuttings and asphalt patched upon completion	
470	25										
465	30										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-1

Project No.	12080.001	**Date Drilled**	7-25-18
Project	Barlow Respiratory Hospital	**Logged By**	KMD
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	439'
Location	2000 Stadium Way, Los Angeles	**Sampled By**	KMD

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	PID	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0									@0': 2-inches asphalt concrete over 4-inches base.	
				B-1	Bulk				SM	**Artificial Fill, undocumented (Afu):** @0.5': Silty SAND with clay, dark brown, slightly moist, fine to medium sand, some fine gravels, up to 2-inch brick fragments, 0.5-inch concrete fragments, with a zone of yellowy silty SAND with fine to medium sand at ~4-feet.	
435	5			R-1	Driven	5 8 12			SC	@5': Clayey SAND with gravel, dark brown, medium dense, slightly moist, medium to coarse sand, fine subrounded gravels, smaller brick fragments and concrete debris.	
									CL	**Quaternary Alluvium (Qal):** @6': CLAY, dark brown, stiff, slightly moist, stiff, moderate plasticity.	
430	10			S-1	Driven	4 5 6			SC/CL	@10': Sandy CLAY to clayey SAND, interlayered, dark yellowy brown, medium dense/stiff, slightly moist, very fine to fine sand.	
425	15			R-2	Driven	2 3 5			CLs	@15': CLAY with sand to sandy CLAY, dark brown, firm, very moist, fine sand, MnO streaks.	
420	20			S-2	Driven	Push Push Push				@20': CLAY with sand to sandy CLAY, dark brown, soft, wet, fine sand.	
415	25			R-3	Driven	3 3 4				@25': CLAY with sand to sandy CLAY, dark brown, firm, wet, fine sand, few yellow-oxidized coarse sand-sized siltstone chips.	
410	30										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

GEOTECHNICAL BORING LOG LB-1

Project No.	12080.001	**Date Drilled**	7-25-18
Project	Barlow Respiratory Hospital	**Logged By**	KMD
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	439'
Location	2000 Stadium Way, Los Angeles	**Sampled By**	KMD

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	PID	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			S-3		Push 3 4			CLs	@30': CLAY with sand to sandy CLAY, mottled red brown and greyish brown, firm, moist to very moist, fine sand, with siltstone chips, oxidation stains.	
405											
	35			R-4		4 7 9				@35': Becomes mottled dark reddish brown and greyish brown, very moist, very stiff.	
400											
	40			S-4		3 3 5				@40': CLAY with sand to sandy CLAY, mottled red brown and greyish brown, firm, very moist, fine to medium sand, trace coarse sand, yellow and red oxidation staining.	
395									SAND-STONE	**Puente Formation (Tpss):**	
	45			R-5		21 50/5"				@45': SANDSTONE, yellow-brown, very dense, very moist, predominantly medium to coarse sand, some silt, grading finer with depth, with some pale grey silty SHALE laminations.	
390											
	50			S-5		6 10 21			SILT-STONE/	@50': Interbedded SANDSTONE and SILTSTONE; SANDSTONE, reddish brown, dense, slightly moist, very fine to fine sand, some silt, with laminations of grey SANDSTONE with trace silt; SILTSTONE, mottled brown and grey, hard, slightlt moist, thinly laminated, MnO streaking along bedding planes, and carbonate stringers, lenses and veins.	
385										Total Depth: 51.5 feet bgs Perched groundwater at 23 feet bgs Boring backfilled with soil cuttings and patched with cold-patch A/C upon completion of drilling.	
	55										
380											
	60										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-2

Project No.	12080.001	**Date Drilled**	7-25-18
Project	Barlow Respiratory Hospital	**Logged By**	KMD
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	439'
Location	2000 Stadium Way, Los Angeles	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N S)	PID	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
										This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0									@0': 3-inches asphalt concrete over 4-inches base.	
				B-1	Bulk				SC	**Artificial Fill, undocumented (Afu):** @0.58': Clayey SAND, dark brown, slightly moist to moist, fine to medium sand, fine subangular to subrounded gravels, small brick fragments, some concrete and asphalt debris, trace rootlets and root fragments.	
435	5			S-1	Driven	1 2 3				@5': Clayey SAND, dark brown, loose, slightly moist to moist, fine to medium sand, fine subangular to subrounded gravels, small brick fragments, some concrete and asphalt debris, trace rootlets and root fragments.	
									CLs	**Quaternary Alluvium (Qal):** @6.5': Sandy CLAY, dark brown, slightly moist to moist, firm, very fine to fine sand.	
430	10			R-1	Driven	3 5 9			SC-CLs	@10': Clayey SAND to sandy CLAY, brown, loose/firm, moist, predominantly fine sand, few medium sand, some oxidation spotting, MnO spotting.	
425	15			S-2	Driven	1 2 2				@15': Clayey SAND to sandy CLAY, brown, very loose/soft, very moist, very fine to fine sand, few medium sand, some silt, MnO streaks, slightly micaceous.	
420	20			R-2	Driven	2 2 3				@20': Clayey SAND to sandy CLAY, brown, very loose/soft, wet, fine to medium sand.	
415	25			S-3	Driven	Push Push 2			SC	@25': Clayey SAND, dark yellowy brown, very loose, wet, very fine sand, grading with depth to medium sand, with FeO and MnO staining.	
410	30										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG LB-2

Project No.	12080.001	**Date Drilled**	7-25-18
Project	Barlow Respiratory Hospital	**Logged By**	KMD
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	439'
Location	2000 Stadium Way, Los Angeles	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N / S)	PID	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30			R-3		4 5 6			SC-CLs	@30': Sandy CLAY to clayey SAND, dark yellowy brown, loose/firm, very moist, predominantly very fine to fine sand, some medium sand, trace coarse sand, heavily oxidized streaks.	
										Total Depth: 31.5 feet bgs Perched groundwater at 16.15 feet bgs Boring backfilled with soil cuttings and patched with cold-patch A/C upon completion of drilling.	
405											
	35										
400											
	40										
395											
	45										
390											
	50										
385											
	55										
380											
	60										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG LB-3

Project No.	12080.001	**Date Drilled**	7-25-18
Project	Barlow Respiratory Hospital	**Logged By**	KMD
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	436'
Location	2000 Stadium Way, Los Angeles	**Sampled By**	KMD

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	PID	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0									@0': ~ 4-inches of mulch.	
435				B-1	Bulk				SC-CLs	**Artificial Fill, undocumented (Afu):** @0.3': Sandy CLAY to clayey SAND, dark brown, slightly moist, predominantly fine sand, some medium to coarse sand, some fine subangular to subrounded gravels, roots, bark, organic odor.	
430	5			R-1	Driven	5 7 9			SC	**Quaternary Alluvium (Qal):** @5': Clayey SAND, dark brown, medium dense, slightly moist to moist, predominantly very fine sand, some fine sand, trace medium sand, trace root material.	
425	10			S-1	Driven	2 2 3			SC-CLs	@10': Sandy CLAY to clayey SAND, yellowy brown, loose/firm, slightly moist to moist, very fine to fine sand, trace medium sand, very fine red siltstone chips, , few oxidation blebs.	
420	15			R-2	Driven	2 2 2				@15': Sandy CLAY to clayey SAND, orangey brown, soft/very loose, moist, some fine sand, few medium to coarse sand, few fine-gravel-sized white siltstone chips, oxidation staining, very moist to wet at 16.5 feet.	
415	20			S-2	Driven	Push 1 2				@20': Sandy CLAY to clayey SAND, orangey brown, soft/very loose, wet, few small pockets of quartz sand, trace fine red siltstone chips.	
410	25			R-3	Driven	2 3 4			CLs	@25': Sandy CLAY, very dark brown, firm, wet, predominantly fine sand, few medium sand, trace coarse sand, trace MnO spotting.	
	30										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-3

Project No.	12080.001	**Date Drilled**	7-25-18
Project	Barlow Respiratory Hospital	**Logged By**	KMD
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	436'
Location	2000 Stadium Way, Los Angeles	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N S)	PID	Sample No.	Bulk / Driven	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
										This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	30			S-3		3 6 7			SM-ML	@30': Sandy SILT to silty SAND, mottled greyish brown and reddish brown, very moist, stiff/medium dense, very fine sand, trace fine sand, distinct oxidation bands, few medium to coarse sand, trace clay, coarsening with depth to silty SAND with fine sand.	
405											
										Total Depth: 31.5 feet bgs Perched groundwater at 23.6 feet bgs Boring backfilled with soil cuttings upon completion of drilling.	
	35										
400											
	40										
395											
	45										
390											
	50										
385											
	55										
380											
	60										

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

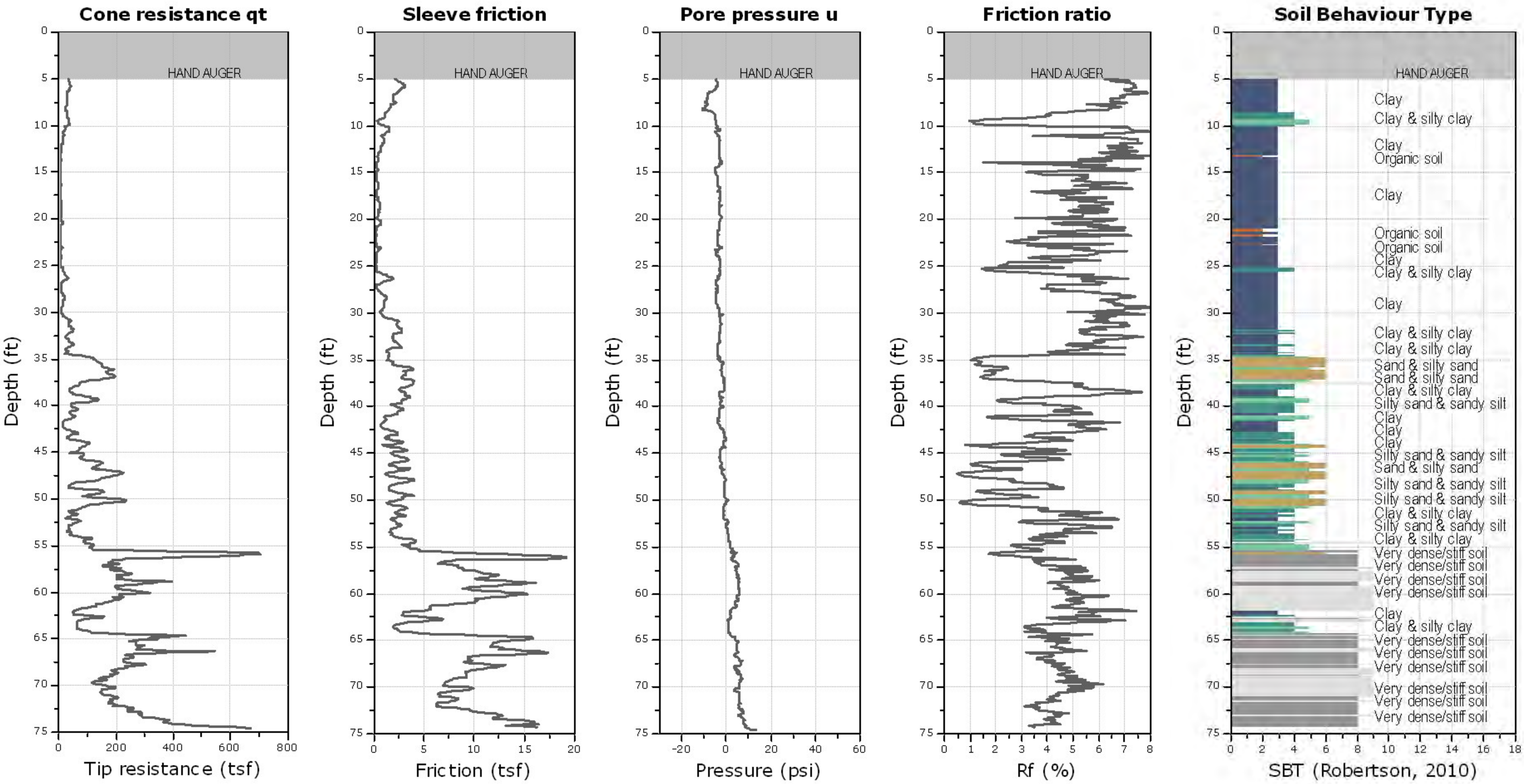
TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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

CPT-1

Project: Leighton Consulting/Barlow Respiratory Hospital
Location: 2000 Stadium Way Los Angeles, CA

Total depth: 74.61 ft, Date: 7/28/2017
Cone Type: Vertek



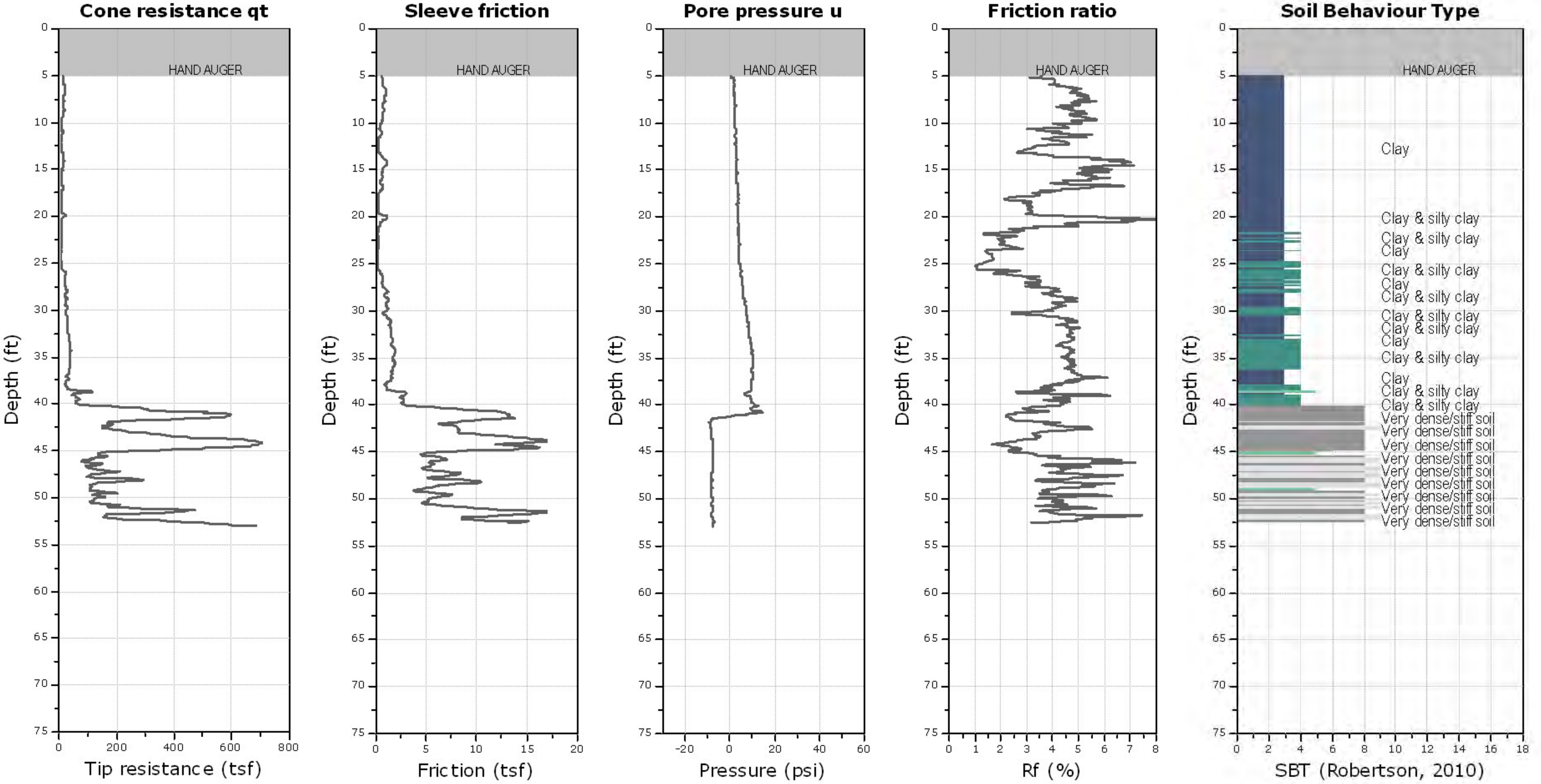
CPeT-IT v.2.0.1.55 - CPTU data presentation & interpretation software - Report created on: 7/31/2017, 11:25:23 AM
Project file: C:\LeightonLosAngeles7-17\Plot Data\Plots w-ha.cpt

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

CPT-2

Project: Leighton Consulting/Barlow Respiratory Hospital
Location: 2000 Stadium Way Los Angeles, CA

Total depth: 52.97 ft, Date: 7/28/2017
Cone Type: Vertek

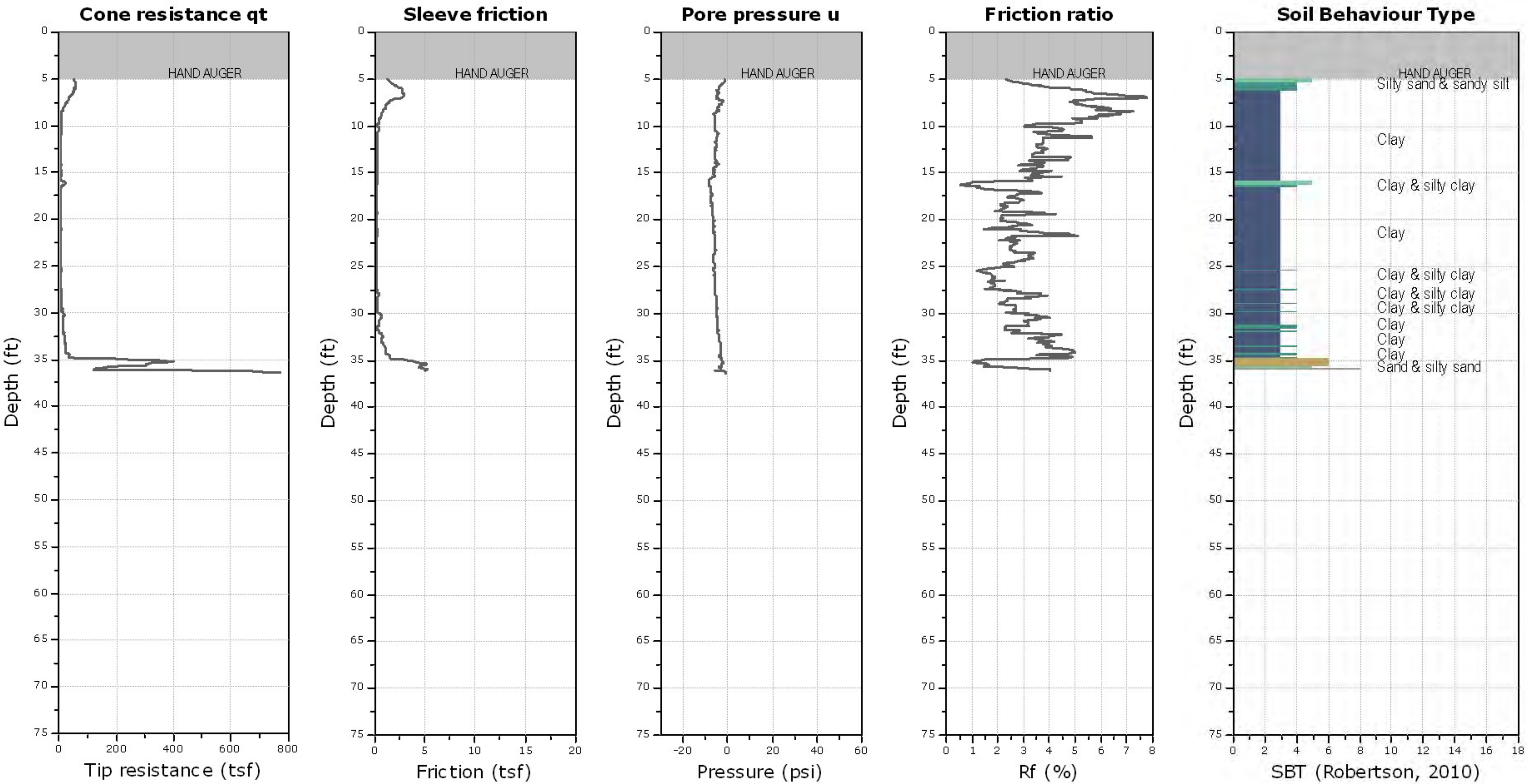


Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT-3

Project: **Leighton Consulting/Barlow Respiratory Hospital**
Location: **2000 Stadium Way Los Angeles, CA**

Total depth: 36.42 ft, Date: 7/28/2017
Cone Type: Vertek



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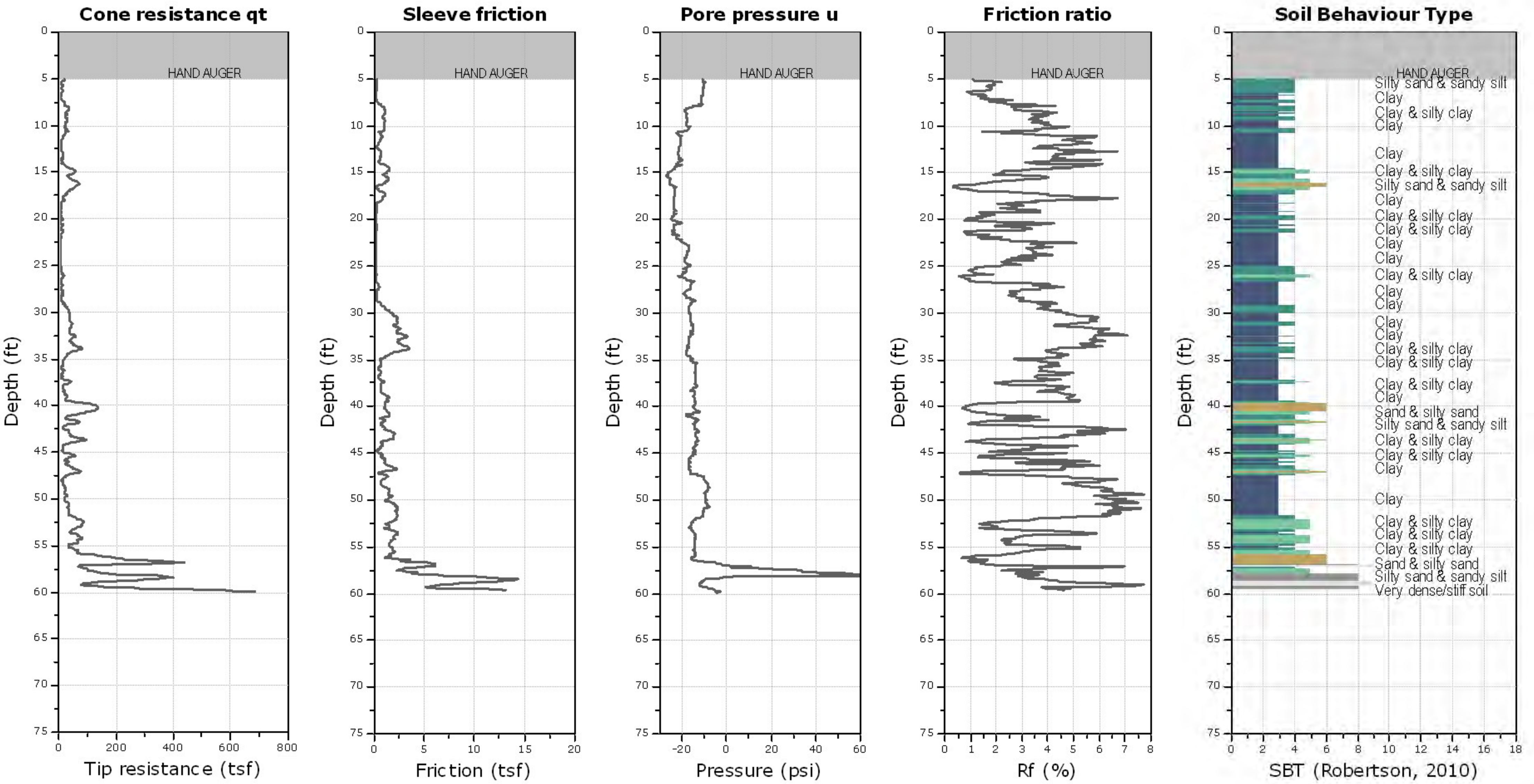
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT-4

Project: **Leighton Consulting/Barlow Respiratory Hospital**
Location: **2000 Stadium Way Los Angeles, CA**

Total depth: 59.98 ft, Date: 7/28/2017
Cone Type: Vertek



2000 Stadium Way
Los Angeles, CA

CPT Shear Wave Measurements

CPT-1

Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
5.12	4.12	6.48	8.44	767.63	
10.07	9.07	10.36	14.88	696.03	602.19
15.19	14.19	15.05	20.44	736.06	843.21
20.01	19.01	19.66	26.00	756.02	829.39
25.10	24.10	24.61	33.84	727.34	632.23
30.18	29.18	29.61	42.60	694.96	569.87
35.17	34.17	34.53	48.48	712.33	838.20
40.09	39.09	39.41	54.04	729.25	876.73
45.11	44.11	44.39	59.96	740.37	841.89
50.56	49.56	49.81	64.88	767.75	1101.44
55.09	54.09	54.32	68.96	787.71	1105.15
60.27	59.27	59.48	73.24	812.13	1205.59
65.12	64.12	64.31	76.00	846.25	1751.49
70.05	69.05	69.23	79.88	866.68	1267.05
74.57	73.57	73.74	82.88	889.72	1502.97

CPT-3

5.12	4.12	6.48	11.64	556.59	
10.10	9.10	10.38	20.44	507.98	443.68
15.42	14.42	15.26	27.20	561.11	721.76
20.24	19.24	19.88	34.48	576.54	634.18
25.36	24.36	24.87	41.00	606.53	765.15
30.12	29.12	29.55	48.80	605.45	599.78
35.01	34.01	34.38	56.32	610.36	642.21

Shear Wave Source Offset = 5 ft

S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival
Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

PROJECT NO. A8644-06-01

BORING 1

ELEV. (MSL.) 438 DATE COMPLETED 9/23/08

EQUIPMENT TRUCK HOLLOW STEM AUGER BY: HHD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)*	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					ASPHALT: 4" BASE: 3"			
					FILL			
2				ML	Silty Sand, medium dense, slightly moist, brown, fine- to medium-grained with trace coarse-grained, trace fine-gravel (½")			
	B1@2.5'				**ALLUVIUM**	25	125.0	10.7
				SP	Sandy Silt, stiff, slightly moist, brown to dark brown, fine-grained			
4	B1@5'				Sand, poorly graded, loose, slightly moist, brown, medium-grained	9	---	15.2
				ML	Interbedded Silt and Clay with Sand, firm, slightly moist, dark brown, fine-grained, high plasticity			
6								
8	B1@7.5'					25	112.3	14.8
	B1@10'					7	---	16.8
10					-Increase in sand content, soft -Decrease in sand content, moist			
12					-Firm			
	B1@12.5'					20	111.1	19.7
14	B1@15'				-Very soft, increase in sand	2	---	22.6
16								
					-Sandy Silt, soft, wet, brown, fine-grained			
18	B1@17.5'					6	105.9	22.0
	B1@20'				-Very soft	Push	---	25.4
20					-Groundwater at 20' feet			
22					Silt with Sand, soft, saturated, dark brown, fine-grained			
	B1@22.5'					7	106.2	21.6
24	B1@25'				-Dark brown to dark olive brown	3	---	28.7
26								
28	B1@27.5'				-Firm -Soft	12	112.2	20.5
	B1@30'				-Dark olive brown, wet	7	---	22.2

Figure A-1,
Log of Boring 1, Page 1 of 2

A8644-06-01 BORING LOGS A1-A8.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING 1

ELEV. (MSL.) 438 DATE COMPLETED 9/23/08

EQUIPMENT TRUCK HOLLOW STEM AUGER BY: HHD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)*	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32					Sandy Silt, firm, wet, dark olive brown, fine-grained			
	B1@32.5'					14	102.0	24.3
34	B1@35'				-Olive brown	10	---	22.1
36					-Stiff			
38	B1@37.5'					22	105.8	21.7
	B1@40'				-Firm	12	---	21.4
40								
42					-Stiff			
	B1@42.5'					21	106.7	21.6
44	B1@45'				-Firm	12	---	24.5
					-Trace coarse-grained			
46					**PUENTE FORMATION** Interbedded Sandstone and Siltstone, well bedded, thinly bedded, moderately weathered, slightly fractured, soft, slightly moist, yellowish brown, fine-grained			
48	B1@47.5'				-Light Gray to yellowish brown	50(5")	109.7	18.2
	B1@50'					21	---	41.4
50								
52								
54	B1@55'					54	---	30.5

End at 55.5 feet
Fill to 1 foot
Groundwater between 20' - 45'
Backfilled and tamped with soil cutting
Patched with asphalt

*Penetration resistance for 140 pound hammer falling 30 inches

Figure A-1,
Log of Boring 1, Page 2 of 2

A8644-06-01 BORING LOGS A1-A8.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. A8644-06-01

BORING 2

ELEV. (MSL.) 442 DATE COMPLETED 9/24/08

EQUIPMENT BUCKET AUGER BY: HHD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)*	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					BASE: 2" ASPHALT: 2" **FILL** Silty Sand, medium dense, slightly moist, brown to light brown, medium- to coarse-grained, trace fine-grained, trace fine-gravel (¼ - ½"), trace asphalt debris			
4	B2@4'			SM	**ALLUVIUM** Silty Sand, loose, slightly moist, brown to reddish brown, fine- to medium-grained, moderately porous, some rootlets	Push	99.3	6.7
6					-Increase in silt content			
8	B2@8'					2	109.0	9.6
12	B2@12'			ML	Sandy Silt, very soft, moist, brown to reddish brown, fine-grained	Push	110.9	15.4
13					Silt with Sand, very soft, saturated, brown, fine-grained			
16	B2@16'					Push	89.9	28.9
19					-Trace rootlets, trace porosity, trace fine gravel (¼")			
20	B2@20'					Push	110.5	20.4
24					-Some fine-gravel (¼ - ¾"), yellowish brown			
25	B2@25'				**PUENTE FORMATION** Sandy Siltstone, well bedded, thinly bedded, moderately weathered, slightly fractured, soft, slightly moist, yellowish brown, fine-grained		63.7	58.1
					End at 25.5 feet Fill to 2 feet Groundwater encountered at 13' feet Backfilled and tamped with soil cuttings/Patched with asphalt			

Figure A-2,
Log of Boring 2, Page 1 of 2

A8644-06-01 BORING LOGS A1-A8.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING 2 ELEV. (MSL.) 442 DATE COMPLETED 9/24/08 EQUIPMENT BUCKET AUGER BY: HHD	PENETRATION RESISTANCE (BLOWS/FT.)*	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
					*Penetration resistance for a 2150 pound hammer falling 12 inches (0-25 feet), 1350 pound falling12 inches (25-42 feet), 650 pound falling 12 inches (42-65 feet)			

Figure A-2,
Log of Boring 2, Page 2 of 2

A8644-06-01 BORING LOGS A1-A8.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

(PRIOR INVESTIGATION L92364.AEO)

BORING 1

DATE DRILLED: January 5, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
ELEVATION 432.5 **

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.	USCS	DESCRIPTION
							ML	CLAYEY SILT - few rootlets, brown
			24.0	100	4	■		
430							CL	SILTY CLAY - some Sand, few rootlets, brown
	5		14.9	112	14	■		
425			18.4	109	10	■		
	10						ML	CLAYEY SILT - some Sand, brown
		7						
420								
			27.1	97	4	■		
	15							
		4						
415							SC	CLAYEY SAND - fine, brown (LL = 30, PI = 11)
	20		28.4	94	3	■		
410		2						
	25						ML	SANDY SILT - dark grey (53.3 % PASSING NO. 200 SIEVE)
			25.5	98	4	■		
405		10						
	30							
400			20.1	106	8	■		Grey
	35	10						
							SM	SILTY SAND - fine, some organics, dark brown (LL = 20, PI = 1)
395			22.7	100	7	■		
	40							

* Penetration resistance for 400 pound hammer falling 24 inches.

** Elevations refer to datum of reference plan.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92364.AEO DATE 1/20/93 F.T. GMC DR. nh O.E. JB W.P. nh CHKD JJK

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

FIGURE A - 1.1a

BORING 1 (Continued)

DATE DRILLED: January 5, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.	DESCRIPTION
		20					
390			19.0	107	40	■	SANDSTONE - highly weathered, light yellowish brown
	45						SILTSTONE - highly weathered, light yellowish brown
385		100 (8" pen)					SANDSTONE - highly weathered, light yellowish brown
	50		21.8	105	107	■	
380							
	55		18.7	110	90	■	
375							
	60		23.6	103	90	■	Light brown
370							INTERBEDDED SANDSTONE and SILTSTONE - light brown and grey
	65		21.1	104	72	■	
365							SANDSTONE - light brown
	70		23.7	98	72	■	
360							16" - layer of cement
	75		20.5	108	100	■	

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level measured at 10' 20 minutes after completion of drilling. Boring grouted with cement.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92364.AEO DATE 1/20/93 F.T. GMC DR. nh O.E. JB W.P. nh CHKD JJK

LOG OF BORING

LAW/CRANDALL, INC.

FIGURE A - 1.1b

(PRIOR INVESTIGATION L92364.AEO)

BORING 2

DATE DRILLED: January 4, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION 432

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		DESCRIPTION
								3" - Asphaltic Paving
							ML	7" - Brick Fragments
430			14.3	97	3	■		FILL - SANDY SILT - brown
							ML	SURFACE OF NATURAL SOIL CLAYEY SILT - some Sand, brown
	5		13.9	114	6	■		
425							ML	SANDY SILT - brown
		7						
	10		18.8	108	6	■		
420								
		5						
	15							
415			—	—	5	□		
			—	—	4	□		
								Some Clay
	20		30.8	91	4	■		
410								
		7						
	25		18.9	110	6	■		(LL = 21, PI = 2)
405								
		18						Light brown
	30							
400			17.0	107	22	■		
	35	16						
395			27.7	96	10	■		(54.7% PASSING NO. 200 SIEVE)
	40							

* Penetration resistance for 400 pound hammer falling 24 inches.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

L A W / C R A N D A L L, I N C.

FIGURE A - 1.2a

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92364.AEO DATE 1/20/93 F.T. GMC DR. nh O.E. JB W.P. nh CHKD JJK

BORING 2 (Continued)

DATE DRILLED: January 4, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		Description
390		16						
	45		17.6	107	25	■	SP SM	SAND - fine to medium, some Silt, light brown
385								
							ML	SANDY SILT - some shale fragments, brown
	50	20						
380								
							SM	SILTY SAND - fine, some shale fragments, light brown
	55		18.1	109	30	■		
375								
								INTERBEDDED SILTSTONE and SANDSTONE - light brown and grey
	60		23.5	102	113	■		

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level measured at 9' 15 minutes after completion of drilling. Boring grouted with cement.

JOB L92364.AEO DATE 1/20/93 F.T. GMC DR. nh O.E. JB W.P. nh CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

FIGURE A - 1.2b

(PRIOR INVESTIGATION L92364.AEO)

BORING 3

DATE DRILLED: January 4, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION 431.5

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
430			15.3	111	9	■
	5		13.1	108	11	■
425			18.3	110	10	■
	10		20.8	105	4	■
420			21.6	102	3	■
	15		20.8	106	4	■
415					2	■
	20					
410			40.2	80	4	■
	25		17.9	111	18	■
405			21.7	103	8	■
	30		26.0	98	8	■
400			21.7	104	10	■
	35					
395						
	40		16.6	107	15	■

- 3" - Asphaltic Paving
- 7" - Brick Fragments
- ML — CLAYEY SILT - some Sand, dark brown
  - Few rootlets, black
- CL — SILTY CLAY - some Sand, brown
- ML — CLAYEY SILT - some Sand, brown
- ML — SANDY SILT - brown
- CL — SILTY CLAY - dark brown
- SM — SILTY SAND - fine, some Clay, dark brown
- CL — SANDY CLAY - some Silt, brownish grey
  - (LL = 30, PI = 12)
  - Layers of Silty Sand
- SM — SILTY SAND - fine to medium, dark grey

* Penetration resistance for 400 pound hammer falling 24 inches.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92364.AEO DATE 1/20/93 F.T. GMC DR. nh O.E. JB W.P. nh CHKD

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

FIGURE A - 1.3a

BORING 3 (Continued)

DATE DRILLED: January 4, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		DESCRIPTION
390								
	45		16.1	110	12	■		Fine to coarse, brown and grey
385								
	50		18.4	110	12	■		
380								
							ML	SANDY SILT - dark grey
	55		27.7	98	7	■		SILTSTONE - weathered, grey and brown
								SANDSTONE - weathered, yellowish brown
375								
	60		13.2	119	113	■		
370								
	65		15.5	101	60	■		
365								SILTSTONE - some Sandstone interbeds, light brown and light grey
	70		22.1	92	35	■		
360								
	75		21.4	103	60	■		

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level measured at 9-1/2' 20 minutes after completion of drilling. Boring grouted with cement.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92364.AEO DATE 1/20/93 F.T. GMC DR. nh O.E. JB W.P. nh CHKD

LOG OF BORING

LAW/CRANDALL, INC.

FIGURE A - 1.3b

BORING 1

DATE DRILLED: August 3, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 434.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	DESCRIPTION
	0					CL — COLLUVIUM/ALLUVIUM (Q_c/Q_{al}) SILTY CLAY - light brown
			7.3	103	14	
430	5		9.7	116	14	
						CL — SANDY CLAY - some Silt, light brown
		9				
425	10					PUENTE FORMATION (T_p) SANDSTONE - fine grained, some Siltstone interbeds, weathered, light brown
			17.8	102	50/10"	
420	15	44				
			16.5	108	50/9½"	
415	20	65 for 6"				
						SILTSTONE - thinly bedded, light greyish brown
410	25		25.6		40	
						SANDSTONE - fine grained, some cemented beds, light brown
405	30	60 for 6"				
400	35		10.7	113	50/6"	
						SILTSTONE - thinly bedded, light greyish brown
395	40	66				

* Number of blows required to drive the Crandall sampler 12 inches using a 340 pound hammer falling 24 inches.

** Elevations refer to datum of reference survey; see Figure 1.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: GMC
Prepared By: MM
Checked By: MM

B12SOIL CRANDALL 00256.GPJ LAW CRAN.GDT 11/30/01

BORING 1 (Continued)

DATE DRILLED: August 3, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 434.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	DESCRIPTION
							Some Sandstone interbeds
390	45		21.9		50/8"		
385	50	65 for 6"					END OF BORING AT 50'
380	55						
375	60						
370	65						
365	70						
360	75						
355	80						

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 14', 5 hours after removal of mud.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: GMC
Prepared By: MM
Checked By: KW

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING

Project: 70131-0-0256 Figure: A-1.1b

BORING 2

DATE DRILLED: August 7, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 427.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0						CL	2" Asphaltic Paving ALLUVIUM (Q_{al}) SANDY CLAY - some Silt, brown
425			7.8	106	5	▩		
	5		14.0		4	▩		
420		8				☒	ML	SANDY SILT - light brown
	10		16.7	104	1½	▩		
415		2				☒	ML	CLAYEY SILT - some Sand, dark brown
	15							Light brown
410			17.8		3	▩		(LL = 22; PI = 2)
							ML	SANDY SILT - light brown
	20	16				☒		
405			19.9	103	8	▩	ML	CLAYEY SILT - some Sand
	25	14				☒		
400							ML	SANDY SILT - light brown
			15.2	106	9	▩		
	30						ML	CLAYEY SILT - some Sand, light greyish brown
395		25				☒		
							CL	SILTY CLAY - some Sand, light greyish brown
	35		21.0	98	16	▩		
390		14				☒		
								PUENTE FORMATION (T_p) SANDSTONE - fine grained, some cemented beds, light brown
	40		1.3		100/2½"	▩		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL

Field Tech: GMC
Prepared By: MM
Checked By: MA

(CONTINUED ON FOLLOWING FIGURE)

BORING 2 (Continued)

DATE DRILLED: August 7, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 427.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	DESCRIPTION
385							
	45	75 for 4"				⊠	Cemented bed below 45½'
380							
	50				100/2"	○	Sample not recovered
375							END OF BORING AT 52½'
	55						
370							
	60						
365							
	65						
360							
	70						
355							
	75						
350							
	80						

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 6', 15 minutes after removal of mud.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: GMC
Prepared By: MM
Checked By: [signature]

BORING 3

DATE DRILLED: August 3, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 425.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
							ML	2½" of Asphaltic Paving ARTIFICIAL FILL (Af) SANDY SILT - brown
			14.3	104	2	⊠		
							ML	ALLUVIUM (Q_{al}) CLAYEY SILT - some roots, brown
							CL	SANDY CLAY - some Silt, brown
			18.0	102	1	⊠		
420	5							
		4				⊠		
415	10							
					4	⊠		
							ML	SANDY SILT - some Clay, brown
		15				⊠		
410	15							
			19.8	98	1	⊠		
							CL	SILTY CLAY - brown
405	20	22				⊠		
			15.2	109	15	⊠		
400	25						SC	CLAYEY SAND - fine, brown (LL = 24; PI = 5) Layer of Silty Sand
		17				⊠		
			18.4		18	⊠		
395	30						SM	SILTY SAND - fine, some Clay, light brown
		17				⊠		
							CL	SILTY CLAY - some Sand, light brownish grey
390	35		33.2	86	9	⊠		
								Lenses of Sandy Silt
		16				⊠		
								PUENTE FORMATION (T_p) SANDSTONE - fine grained, light brown
	40							

Field Tech: GMC
Prepared By: MM
Checked By: [signature]

(CONTINUED ON FOLLOWING FIGURE)

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING 3 (Continued)

DATE DRILLED: August 3, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 425.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	DESCRIPTION
			14.1	113	50/8"	▣	Cemented beds between 42½' and 45½'
380	45	54 for 6"				☒	SILTSTONE - thinly bedded, light greyish brown
375	50		22.0		50/9"	▣	
370	55	60 for 6"				☒	
365	60		22.3		55/9"	▣	Grey
360	65	95 for 10"				☒	END OF BORING AT 68'
355	70						
350	75						
	80						

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 5' after removal of mud.

Field Tech: GMC
Prepared By: MM
Checked By: MJS

B12SOIL_CRANDALL 00256.GPJ LAW_CRAN.GDT 11/30/01

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.3b

BORING 4

DATE DRILLED: August 2, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 427.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
						SM	3" Asphaltic Paving ARTIFICIAL FILL (Af) SILTY SAND - fine, some pieces of brick, brown
			10.0	97	4		
425							
						ML	ALLUVIUM (Q_{al}) CLAYEY SILT - some Sand, dark brown
			18.3	98	2		
	5						
420							
		9					
						CL	SILTY CLAY - brown
	10						
			15.3	106	7		
415							Some Sand
		9					
	15						
						SM	SILTY SAND - light brown
			20.2	99	4		
410							
	20	11					
405							
		31					
	25					ML	CLAYEY SILT - some Sand, dark brown
					2		
400							
		10					(LL = 22; PI = 4)
	30						
			16.1	105	7		
395							
						SC	CLAYEY SAND - fine, dark brown
	35	15					
390							
			10.3		12	SM	SILTY SAND - fine, light brown
	40						

Field Tech: GMC
Prepared By: MM
Checked By: [signature]

(CONTINUED ON FOLLOWING FIGURE)

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING 4 (Continued)

DATE DRILLED: August 2, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 427.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
		29				☒
385						
			16.3	107	17	▩
	45					
		19				☒
380						
			28.7	93	10	▩
	50					
375						
		26				☒
	55					
			13.6	105	20	▩
370						
		21				☒
	60					
365			17.5	104	18	▩
		44				☒
	65					
360						
			9.4		70/9"	▩
	70					
355						
	75					
350						
	80					

ML — SANDY SILT - brown

SM — SILTY SAND - fine, grey

ML — SANDY SILT - light brown

SM — SILTY SAND - fine to medium, light brown

PUENTE FORMATION (T_p)
SANDSTONE - fine grained, some cemented beds, light brown

END OF BORING AT 70'

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 7', 6 hours after removal of mud.

Field Tech: GMC
Prepared By: MM
Checked By: MS

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.4b

B12SOIL_CRANDALL 00256.GPJ LAW_CRAN.GDT 11/30/01

BORING 5

DATE DRILLED: August 2, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 425.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
425	0					CL	3" Asphaltic Paving ARTIFICIAL FILL (Af) SILTY CLAY - some bedrock fragments, mottled brown
			13.4	110	11		
							Some pieces of brick
420	5		19.8	96	4	CL	ALLUVIUM (Q_{al}) SANDY CLAY - dark brown
		0					
						ML	CLAYEY SILT - some Sand, brown
415	10		16.7	109	10		
						CL	SANDY CLAY - light brown (LL = 28; PI = 9)
		10					
410	15				5		
405	20	9					
						SM	SILTY SAND - fine, light brown
			15.1	108	21		
						CL	SANDY CLAY - brown
400	25	6					
			17.0	103	9		
395	30	13					(LL = 32; PI = 6) Layer of Silty Sand
390	35		14.7	105	11		
		15					
	40						

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: GMC
Prepared By: MM
Checked By:

BORING 5 (Continued)

DATE DRILLED: August 2, 2000
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 425.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
			16.7	109	15		
		30				ML	CLAYEY SILT - light grey
380	45						
			16.7	98	12		
375	50	27					
			18.7		19		
370	55	27					
			11.3	110	20		
365	60						
		28					Layer of Silty Sand
						CL	SANDY CLAY - light grey
360	65		18.7	104	17		
							PUENTE FORMATION (T_p) SANDSTONE - fine grained, weathered, some cemented beds, light grey
355	70	60 for 6"					
350	75		6.9	117	60/6"		
							END OF BORING AT 80'
	80		9.9		75/5"		

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 6' after removal of mud.

Field Tech: GMC
Prepared By: MM
Checked By:

BORING 6

DATE DRILLED: October 27, 2001
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 427.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
427.0	0							2" Asphaltic Paving - 3" Base Course
							ML	ALLUVIUM (Q_{al}) CLAYEY SILT - dark brown
	5		22.4	98	2	⊠		
								Brown
	~14						CL	SANDY CLAY - some Silt, light brown
	15	4				⊠		
	25	7				⊠		
	~34						ML	CLAYEY SILT - some Sand, brown
	35		20.1	105	10	⊠		
	~39						SM	SILTY SAND - fine, brown
	40							

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: GMC
Prepared By: MM
Checked By:

(CONTINUED ON FOLLOWING FIGURE)

BORING 6 (Continued)

DATE DRILLED: October 27, 2001
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 427.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
			19.7	105	14	
		17				
			27.7	93	18	
		34				
		20				
		50 for 4"				
			18.9	109	50/7"	

Elevation scale (ft): 385, 380, 375, 370, 365, 360, 355, 350
Depth scale (ft): 45, 50, 55, 60, 65, 70, 75, 80

CL — SILTY CLAY - some bedrock fragments, brown

SM — SILTY SAND - fine, brown

ML — CLAYEY SILT - some Sand, grey

CL — SILTY CLAY - light grey

Some Sand

PUENTE FORMATION (T_p)
SANDSTONE - fine grained, some cemented beds, light grey

END OF BORING AT 79'

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 8' 15 minutes after removal of mud.

Field Tech: GMC
Prepared By: MM
Checked By: MS

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.6b

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING 7

DATE DRILLED: October 27, 2001
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 425.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0							2" Asphaltic Paving - 6" Base Course
							SM	ARTIFICIAL FILL (Af) SILTY SAND - fine, some Gravel and pieces of asphaltic paving, brown
							ML	ALLUVIUM (Q_{al}) SANDY SILT - dark brown
420	5		19.9	107	3	⊠		
								Light brown
415	10						ML	CLAYEY SILT - light brown
							CL	SANDY CLAY - some Silt, light brown
410	15	6				☒		
								Some bedrock fragments
405	20							
400	25	9				☒		
395	30							
							ML	SANDY SILT - some Clay and bedrock fragments, brown
390	35	19				☒		
	40							

Field Tech: GMC
Prepared By: MM
Checked By: MJ

(CONTINUED ON FOLLOWING FIGURE)

B125OIL CRANDALL 00256.GPJ LAW CRAN.GDT 12/3/01

BORING 7 (Continued)

DATE DRILLED: October 27, 2001
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 425.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
								Grey
380	45		30.6	96	7	▩		
375	50							
							SP	SAND - fine, lenses of Silty Sand, grey
370	55	47				☒		
								Thin layers of Sandy Silt
365	60		24.5	98	8	▩		
								PUENTE FORMATION (T_p) SANDSTONE - fine grained, weathered, greyish brown
								Some Siltstone interbeds
360	65	60 for 6"				☒		Grey
355	70		19.0	110	50/9"	▩		
350	75		17.2	119	50/7"	▩		
								END OF BORING AT 76'
	80							

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level was measured at a depth of 7' 15 minutes after removal of mud.

Field Tech: GMC
Prepared By: MM
Checked By: NB

BORING 8

DATE DRILLED: October 29, 2001
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION: 444.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
444	0						SM	ARTIFICIAL FILL (Af) SILTY SAND and BEDROCK FRAGMENTS - fine, pieces of asphaltic paving, light brown
440	5		6.3	101	64/4"	⊠		
435	10		14.3	107	85/6"	⊠		
430	15		9.3	101	43	⊠		More pieces of asphaltic paving (possible old roadway)
425	20		15.3	87	47	⊠		More Bedrock fragments
420	25		28.1	93	65	⊠		SAND and DEBRIS (including large pieces of Concrete and brick), some Gravel, dark grey
415	30		30.2	71	41	⊠		Predominantly debris, some pieces of wood
410	35		15.4	117	60	⊠		PUENTE FORMATION (T_p) SANDSTONE - fine grained, some Siltstone interbeds, highly weathered, light brown
405	40					⊠		

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

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: GMC
Prepared By: MM
Checked By: Mb

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.8a

B12SOIL_CRANDALL 00256.GPJ LAW_CRAN.GDT 11/30/01

BORING 8 (Continued)

DATE DRILLED: October 29, 2001
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION: 444.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
			27.4	102	75	
400						
	45		29.1	88	74/9"	
395	50					
390	55					
385	60					
380	65					
375	70					
370	75					
365	80					

END OF BORING AT 46'

NOTE: Water level measured at a depth of 25' after completion of drilling. Caving and ravelling from 25' to 33'.

Field Tech: GMC
Prepared By: MM
Checked By: [signature]

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.8b

B12SOIL CRANDALL 00256.GPJ LAW CRAN.GDT 11/30/01

BORING 9

DATE DRILLED: October 27, 2001
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5
ELEVATION: 426.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
	0							3" Asphaltic Paving - 4" Base Course
425							ML	ALLUVIUM (Q_{al}) CLAYEY SILT - some Sand, light brown
420	5		19.2	110	3	⊠		
415	10						CL	SANDY CLAY - some Silt, light brown
410	15	2				⊠		
405	20							
400	25	31				⊠		PUENTE FORMATION (T_p) SANDSTONE - fine grained, light brown Some cemented beds
395	30		17.2	113	50/9"	⊠		SILTSTONE - light brown Some cemented beds
390	35	50 for 2"				⊠		END OF BORING AT 36'
	40							

* Number of blows required to drive the Crandall sampler 12 inches using a 340 pound hammer falling 24 inches.

NOTE: Drilling mud used in the drilling process. Mud removed after completion of drilling. Water level was meausred at a depth of 7', 15 minutes after removal of mud.

Field Tech: GMC
Prepared By: MM
Checked By: MJ

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.9

BORING 10

DATE DRILLED: October 29, 2001
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION: 456.0 **

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. 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	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
455	0						SM	ARTIFICIAL FILL (Af) SILTY SAND and BEDROCK FRAGMENTS - fine, mottled light brown
450	5		6.9	102	85/9"	⊠		
445	10		10.0	105	81	⊠		
440	15		9.0	120	64	⊠		Pieces of brick; Pieces of asphaltic paving; Some Clay
435	20		13.4	113	34	⊠		
430	25		26.4	93	52	⊠		More pieces of brick, dark brown
425	30		25.5	95	34	⊠		
	34						SP	SAND - fine to medium, some pieces of brick, light brown
420	35		18.0	109	27	⊠		Large amounts of brick
	38							PUENTE FORMATION (T_p) SANDSTONE - fine grained, thinly bedded, light brown
	40							

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

Field Tech: GMC
Prepared By: MM
Checked By:

(CONTINUED ON FOLLOWING FIGURE)

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.10a

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL

BORING 10 (Continued)

DATE DRILLED: October 29, 2001
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8
ELEVATION: 456.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
415			17.3	107	65/8"	▩
	45					
410			22.0	105	100/9"	▩
405	50					
400	55					
395	60					
390	65					
385	70					
380	75					
	80					

END OF BORING AT 47'

NOTE: Water level was meausred at a depth of 39', 20 minutes after completion of drilling. Caving from 34' to 38'.

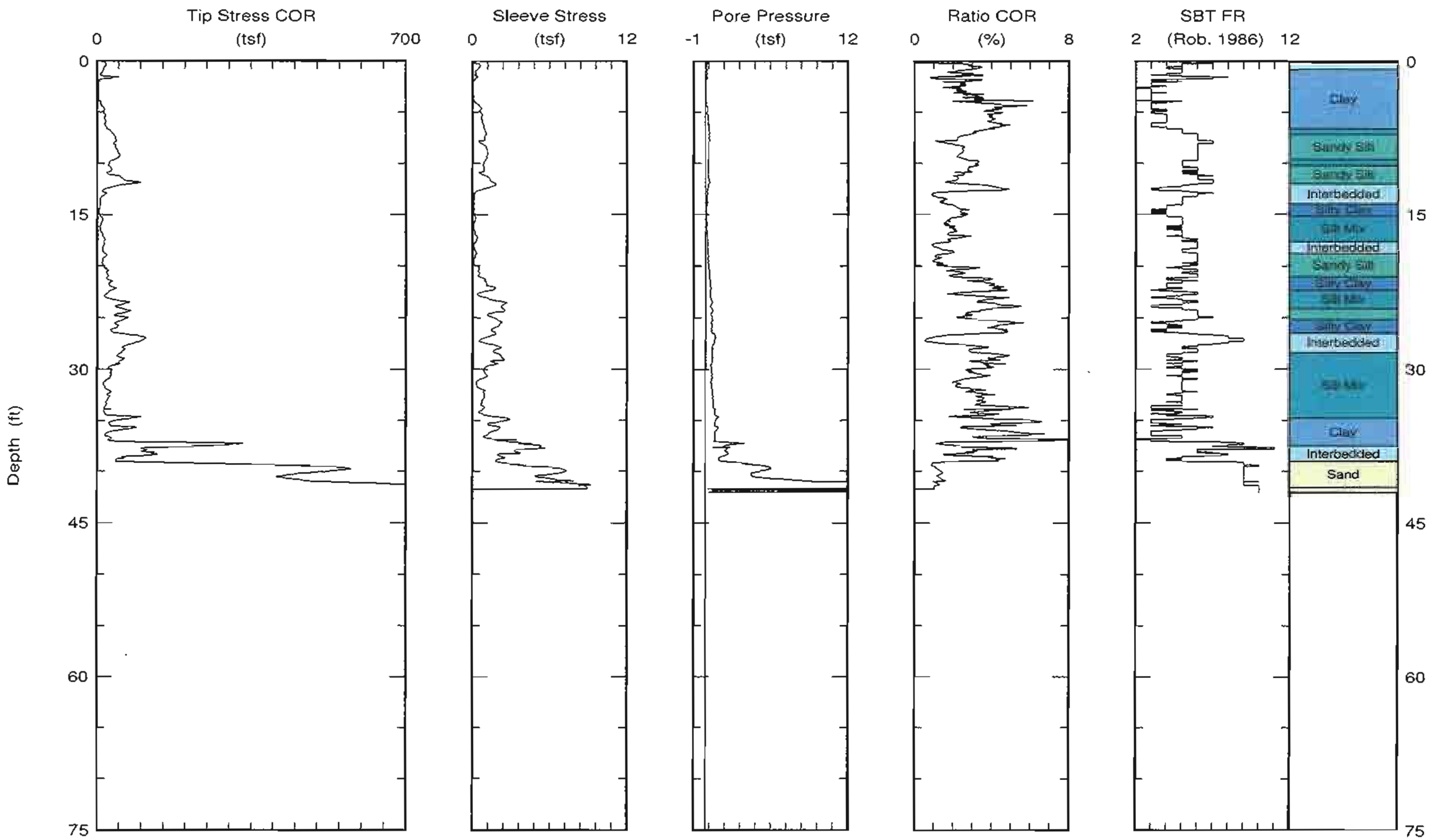
Field Tech: GMC
Prepared By: MM
Checked By: MU

Barlow Respiratory Hospital
Los Angeles, California

LAW Crandall
LAWGIBB Group Member

LOG OF BORING
Project: 70131-0-0256 Figure: A-1.10b

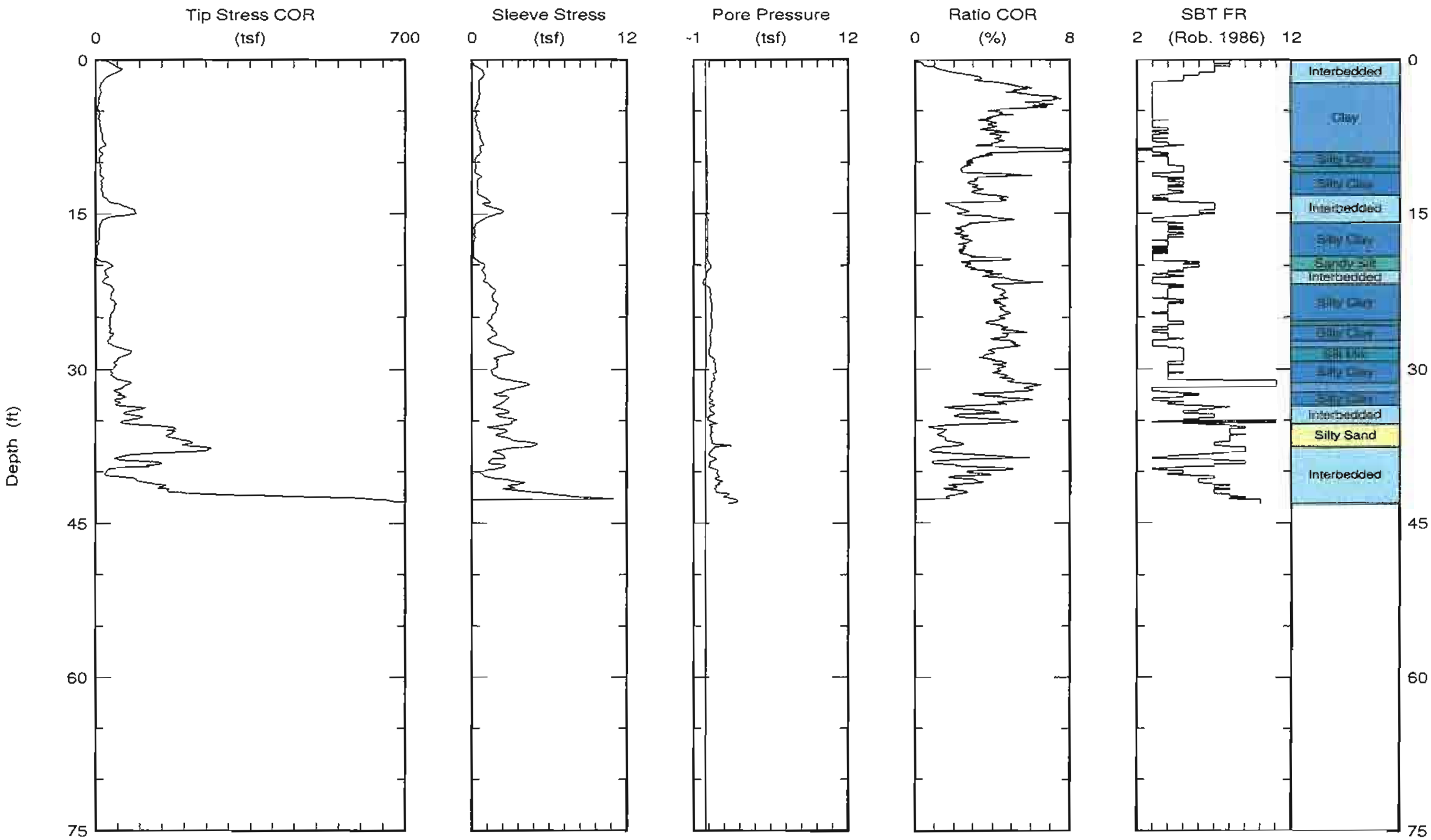
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com skehoe@msn.com	CPT Data 30 ton rig	Date: 08/Sep/2008 Test ID: CPT-2 Project: LosAngeles
	Client: MACTEC Job Site: Barlow Hospital	



Maximum depth: 42.10 (ft)

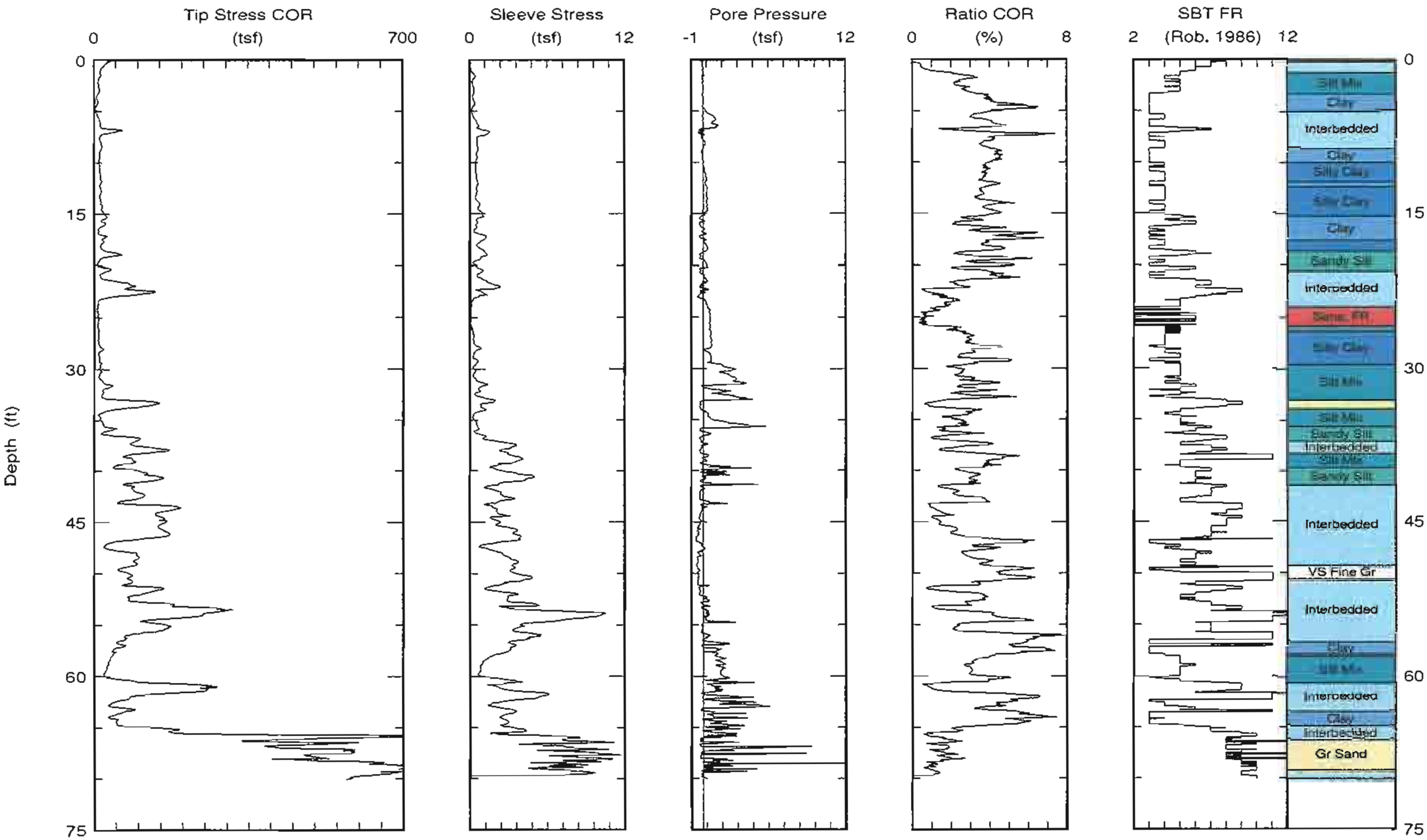
Test ID: Cl

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com skehoe@msn.com	CPT Data 30 ton rig	Date: 08/Sep/2008 Test ID: CPT-3 Project: LosAngeles
	Client: MACTEC Job Site: Barlow Hospital	



Maximum depth: 43.13 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com skehoe@msn.com	CPT Data 30 ton rig	Date: 08/Sep/2008 Test ID: CPT-4 Project: LosAngeles
	Client: MACTEC Job Site: Barlow Hospital	



Maximum depth: 70.10 (ft)

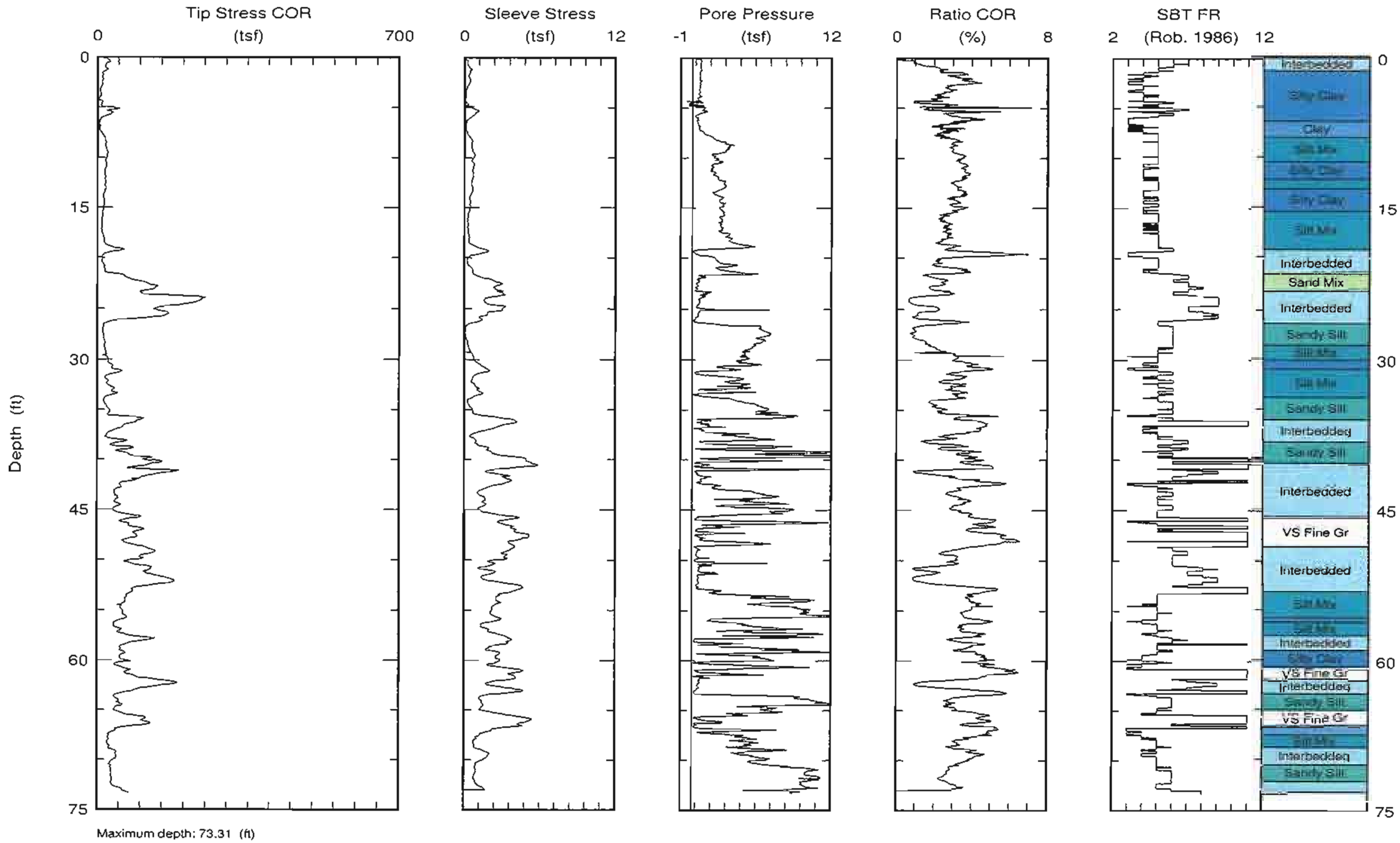
Test ID: CI

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
skehoe@msn.com

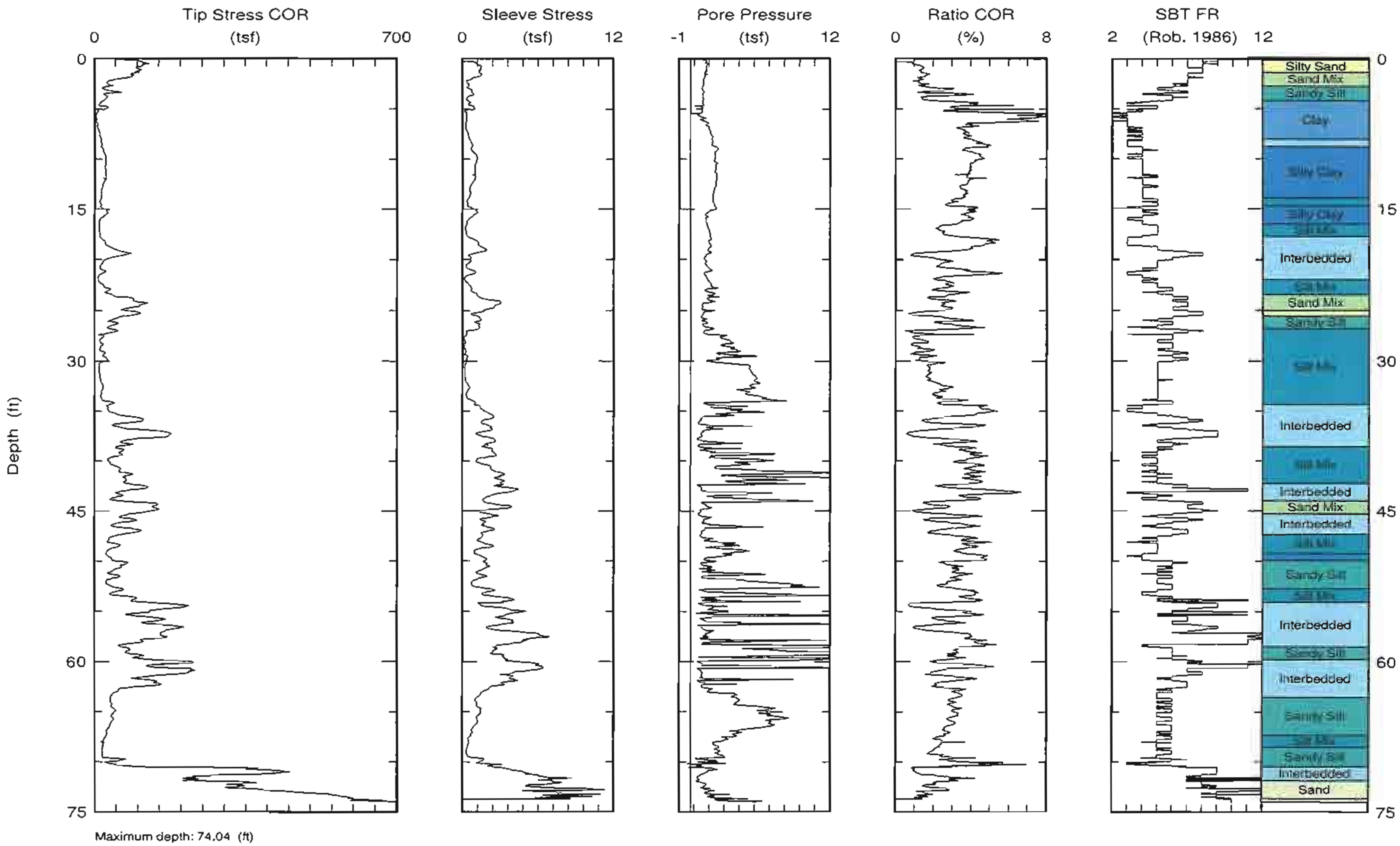
CPT Data
30 ton rig

Date: 08/Sep/2008
Test ID: CPT-5
Project: LosAngeles

Client: MACTEC
Job Site: Barlow Hospital



Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com skehoe@msn.com	CPT Data 30 ton rig Client: MACTEC Job Site: Barlow Hospital	Date: 08/Sep/2008 Test ID: CPT-6 Project: LosAngeles

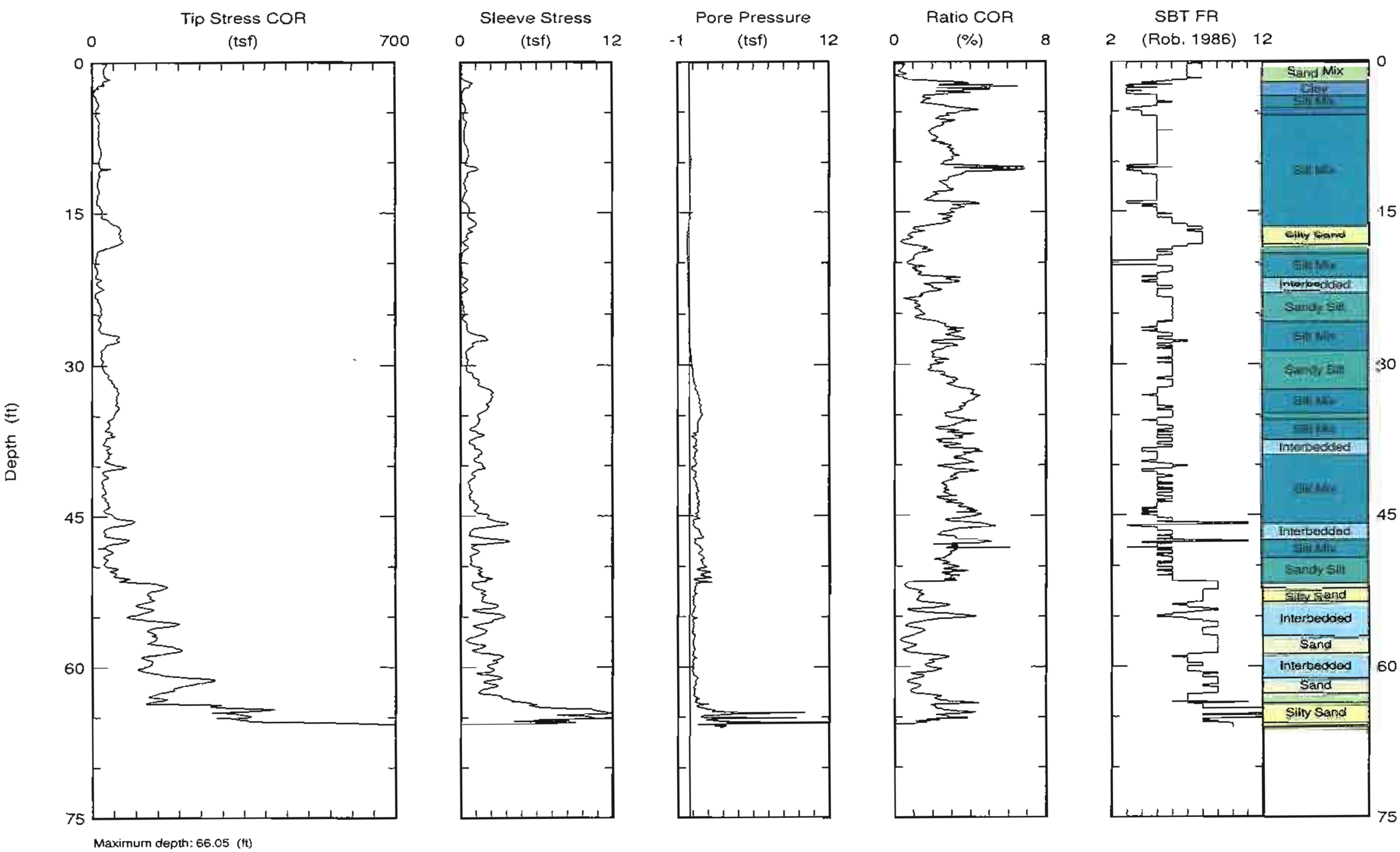


Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
skehoe@msn.com

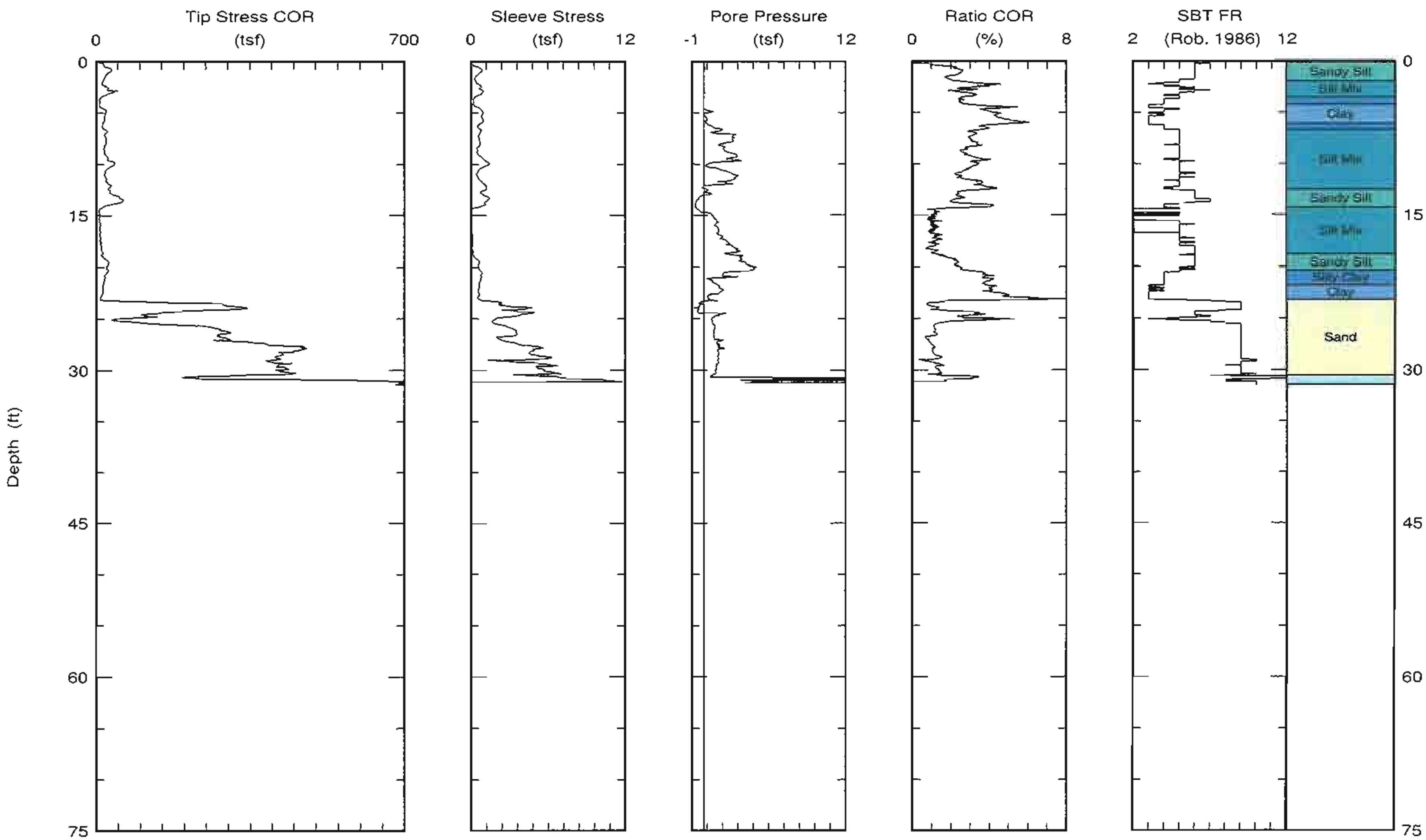
CPT Data
30 ton rig

Date: 08/Sep/2008
Test ID: CPT-7
Project: LosAngeles

Client: MACTEC
Job Site: Barlow Hospital



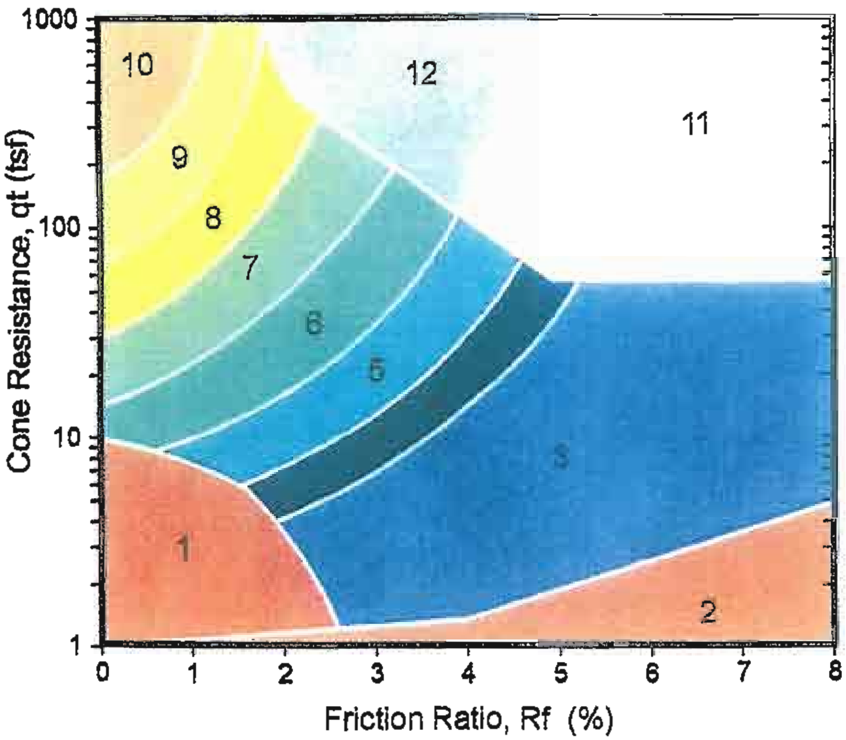
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com skehoe@msn.com	CPT Data 30 ton rig	Date: 08/Sep/2008 Test ID: CPT-9 Project: LosAngeles
	Client: MACTEC Job Site: Barlow Hospital	



Maximum depth: 31.48 (ft)

CPT Classification Chart

(after Robertson and Campanella, 1988)



Zone	q_t / N	Soil Behavior Type	UCSCS
1	2	sensitive fine grained	OL-OH
2	1	organic material	Pt-OH
3	1	clay	CH
4	1.5	silty clay to clay	CL-CH
5	2	clayey silt to silty clay	ML-CL
6	2.5	sandy silt to clayey silt	MH-ML
7	3	silty sand to sandy silt	SM-ML
8	4	sand to silty sand	SP-SM
9	5	sand	SP
10	6	gravelly sand to sand	SW-SP
11	1	very stiff fine grained *	CL-MH
12	2	sand to clayey sand *	SP-SC

* overconsolidated or cemented

JOB 2661.20899.0002 DATE 8/25/93 DR. lk CHKD JB

(PRIOR INVESTIGATION 2661.20899.0002)

LOG OF TEST PIT NO. 1

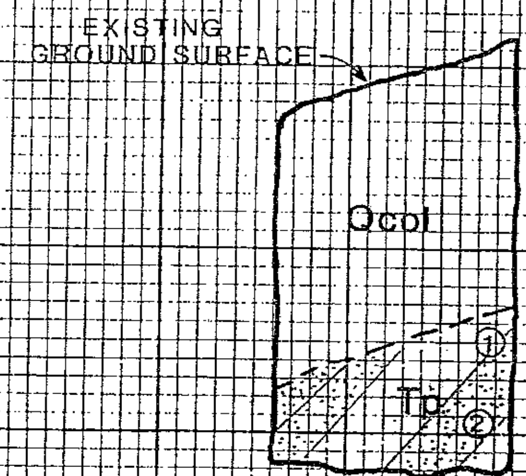
Project:	BARLOW RESPIRATORY HOSPITAL
Job No: 2661.20899.0002	Geologist: GAK

Description	Attitudes
TOPSOIL/COLLUVIUM (Qcol) SILTY SAND - fine, dense, porous, slightly moist, abundant roots and rootlets, brown **PUENTE FORMATION (Tp)** INTERBEDDED SILTSTONE and SANDSTONE - well bedded, soft to moderately hard, upper 1' highly weathered, abundant caliche, light brownish grey and light reddish brown	1. Bedding: N60W, 55SW 2. Bedding: N54W, 52SW

Scale: 1" = 2'

GRAPHIC REPRESENTATION

Trend: N65E →



LAW / CRANDALL, INC. FIGURE A-2.1

JOB 2661.20899.0002 DATE 8/25/93 DR. lk CHKD [illegible]

(PRIOR INVESTIGATION 2661.20899.0002)

LOG OF TEST PIT NO. 2

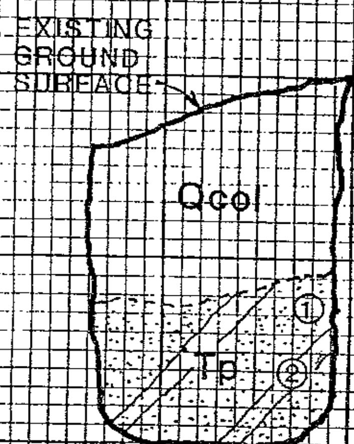
Project: BARLOW RESPIRATORY HOSPITAL	
Job No: 2661.20899.0002	Geologist: GAK

Description	Attitudes
TOPSOIL/COLLUVIUM (Qcol) CLAYEY SAND - fine, dense, porous, dry, scattered rootlets, scattered Bedrock clasts, brown **PUENTE FORMATION (Tp)** SANDSTONE with minor SILTSTONE Interbeds - well bedded, soft to moderately hard, moderately weathered, light reddish brown	1. Bedding: N60W, 45SW 2. Bedding: N51W, 51SW

Scale: 1" = 2'

GRAPHIC REPRESENTATION

Trend: N60E →



JOB 2661.20899.0002 DATE 8/25/93 DR. lk CHKD GB

(PRIOR INVESTIGATION 2661.20899.0002)

LOG OF TEST PIT NO. 3

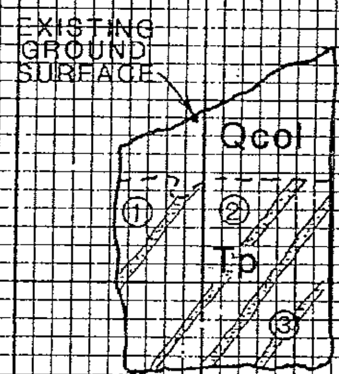
Project: BARLOW RESPIRATORY HOSPITAL	
Job No: 2661.20899.0002	Geologist: GAK

Description	Attitudes
TOPSOIL/COLLUVIUM (Qcol) CLAYEY SAND - fine, dense, porous, dry, abundant roots, abundant Bedrock clasts (to 4" in size), brown **PUENTE FORMATION (Tp)** SILTSTONE with minor SANDSTONE Interbeds - well bedded, soft to moderately hard, weathered, abundant caliche, light greenish grey	1. Bedding: N56W, 52SW 2. Bedding: N46W, 54SW 3. Bedding: N52W, 49SW

Scale: 1" = 2'

GRAPHIC REPRESENTATION

Trend: N43E →



LAW / CRANDALL, INC. FIGURE A-2.3

JOB 2661.20899.0002 DATE 8/25/93 DR. lk CHKD RB

(PRIOR INVESTIGATION 2661.20899.0002)

LOG OF TEST PIT NO. 4

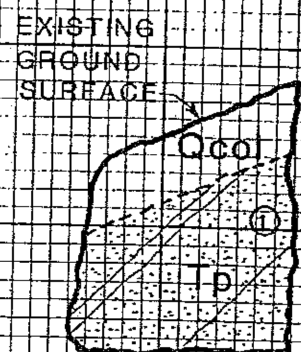
Project: BARLOW RESPIRATORY HOSPITAL	
Job No: 2661.20899.0002	Geologist: GAK

Description	Attitudes
TOPSOIL/COLLUVIUM (Qcol) SILTY SAND - fine, dense, porous, dry, scattered rootlets, brown **PUENTE FORMATION (Tp)** SANDSTONE with minor SILTSTONE Interbeds - poorly bedded, moderately hard, moderately weathered, yellowish brown	1. Bedding: N55W, 47SW

Scale: 1" = 2'

GRAPHIC REPRESENTATION

Trend: N52E →



LAW / CRANDALL, INC. FIGURE A-2.4

JOB 2661.20899.0002 DATE 8/25/93 DR. lk CHKD [handwritten initials]

(PRIOR INVESTIGATION 2661.20899.0002)

LOG OF TEST PIT NO. 5

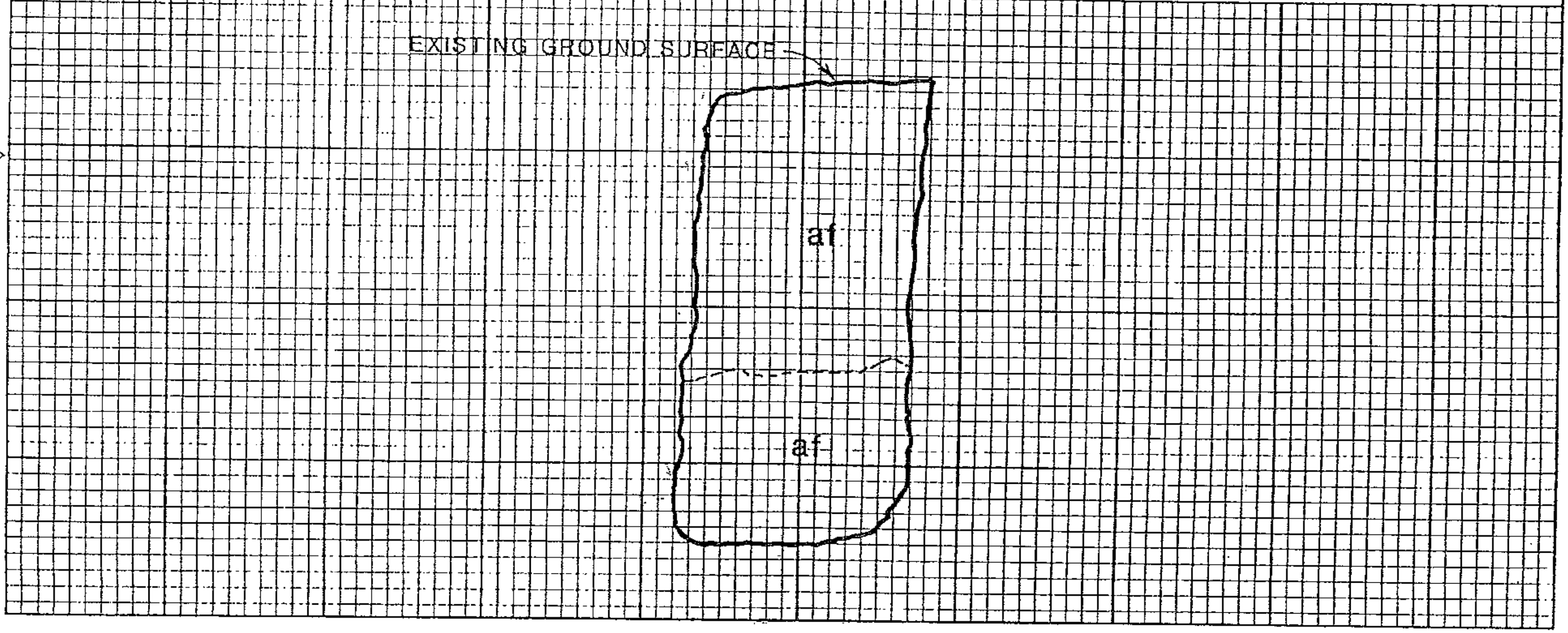
Project:	BARLOW RESPIRATORY HOSPITAL
Job No: 2661.20899.0002	Geologist: GAK

Description	Attitudes
FILL (af) - SANDY SILT - some Clay, highly porous, moist, scattered debris, brown	
FILL (af) - SAND - some Silt, fine, slightly porous, dry, scattered rootlets, light reddish brown	

Scale: 1" = 2'

GRAPHIC REPRESENTATION

Trend: N50E →



LAW / CRANDALL, INC. FIGURE A-2.5

JOB 2661.20899.0002 DATE 8/25/93 DR. lk CHKD [initials]

(PRIOR INVESTIGATION 2661.20899.0002)

LOG OF TEST PIT NO. 6

Project: BARLOW RESPIRATORY HOSPITAL

Job No: 2661.20899.0002

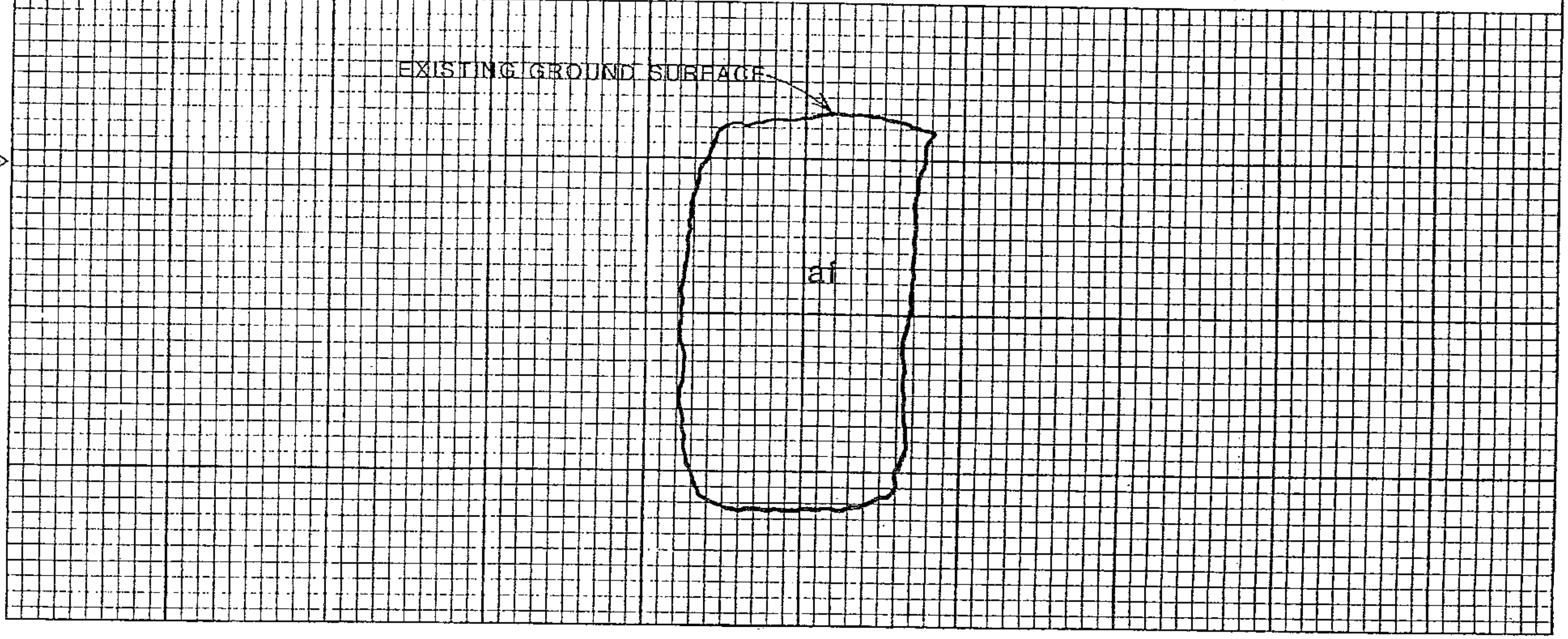
Geologist: GAK

Description	Attitudes
<u>FILL (af) -</u> SANDY SILT - some Clay, porous, scattered debris, scattered rootlets, brown	

Scale: 1" = 2'

GRAPHIC REPRESENTATION

Trend: N20E →



LAW / CRANDALL, INC.

FIGURE A-2.6

APPENDIX C

Previous Laboratory Tests

Leighton

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Leighton

Project Name:	Barlow Respiratory Hospital	Tested By : G. Berdy	Date: 08/10/18
Project No. :	12080.001	Data Input By: J. Ward	Date: 08/21/18

Boring No.	LB-3			
Sample No.	B-1			
Sample Depth (ft)	0-5			
Soil Identification:	Dark brown SC			
Wet Weight of Soil + Container (g)	199.16			
Dry Weight of Soil + Container (g)	190.54			
Weight of Container (g)	39.33			
Moisture Content (%)	5.70			
Weight of Soaked Soil (g)	100.23			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	301			
Crucible No.	12			
Furnace Temperature (°C)	860			
Time In / Time Out	9:15/10:00			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	22.6942			
Wt. of Crucible (g)	22.6914			
Wt. of Residue (g) (A)	0.0028			
PPM of Sulfate (A) x 41150	115.22			
PPM of Sulfate, Dry Weight Basis	**122**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO3 Soln. Used in Titration (C)	0.6			
PPM of Chloride (C -0.2) * 100 * 30 / B	40			
PPM of Chloride, Dry Wt. Basis	**42**			

pH TEST, DOT California Test 643

pH Value	**7.84**			
Temperature °C	23.1			

SOIL RESISTIVITY TEST

DOT CA TEST 643

Leighton

Project Name: Barlow Respiratory Hospital | Tested By : G. Berdy | Date: 08/16/18

Project No. : 12080.001 | Data Input By: J. Ward | Date: 08/21/18

Boring No.: LB-3 | Depth (ft.) : 0-5

Sample No. : B-1

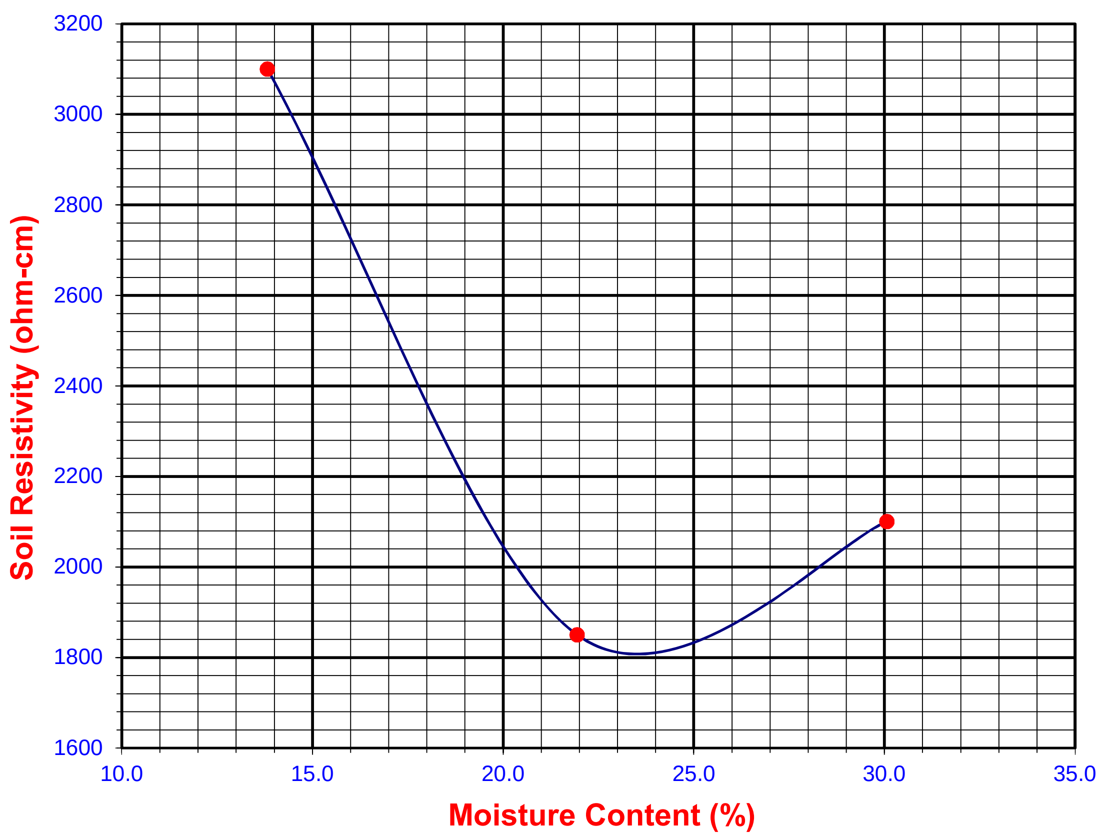
Soil Identification:* Dark brown SC

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	10	13.82	3100	3100
2	20	21.94	1850	1850
3	30	30.07	2100	2100
4				
5				

Moisture Content (%) (MCi)	5.70
Wet Wt. of Soil + Cont. (g)	199.16
Dry Wt. of Soil + Cont. (g)	190.54
Wt. of Container (g)	39.33
Container No.	
Initial Soil Wt. (g) (Wt)	130.14
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
1800	**23.5**	**122**	**42**	**7.84**	**23.1**



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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Barlow Respiratory Hospital	Tested By:	G. Berdy	Date:	08/20/18
Project No.:	12080.001	Checked By:	J. Ward	Date:	08/21/18
Boring No.:	LB-3	Depth (ft.):	0-5		
Sample No.:	B-1				
Soil Identification:	Dark brown clayey sand (SC)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0310
Wt. Comp. Soil + Mold	(g)	597.10	426.42
Wt. of Mold	(g)	205.70	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	782.00	632.12
Dry Wt. of Soil + Cont.	(g)	705.80	558.95
Wt. of Container	(g)	0.00	205.70
Moisture Content	(%)	10.80	20.71
Wet Density	(pcf)	118.1	124.8
Dry Density	(pcf)	106.6	103.4
Void Ratio		0.582	0.631
Total Porosity		0.368	0.387
Pore Volume	(cc)	76.2	82.6
Degree of Saturation (%) [S_{meas}]		**50.1**	88.6

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
08/20/18	11:52	1.0	0	0.1075
08/20/18	12:02	1.0	10	0.1065
Add Distilled Water to the Specimen				
08/20/18	12:43	1.0	41	0.1325
08/21/18	6:15	1.0	1093	0.1385
08/21/18	10:03	1.0	1321	0.1385

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**32**

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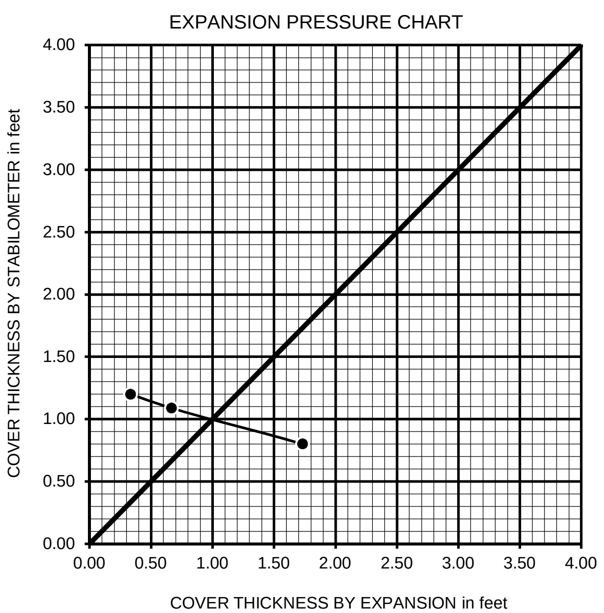
R-VALUE TEST RESULTS

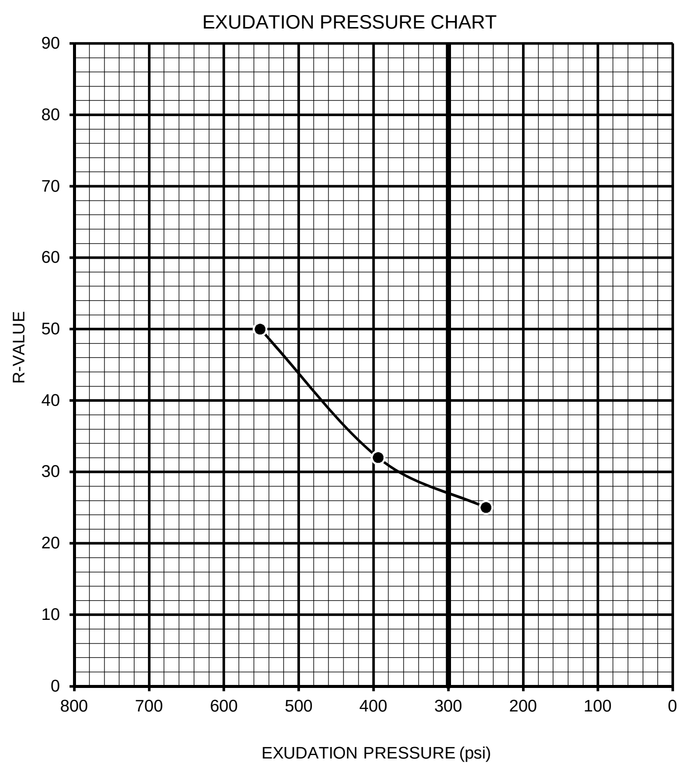
DOT CA Test 301

PROJECT NAME:	Barlow Respiratory Hospital	PROJECT NUMBER:	12080.001
BORING NUMBER:	LB-3	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	S. Felter
SAMPLE DESCRIPTION:	Dark brown clayey sand (SC)	DATE COMPLETED:	8/14/2018

TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	14.2	14.9	15.6
HEIGHT OF SAMPLE, Inches	2.65	2.41	2.49
DRY DENSITY, pcf	114.6	111.7	109.9
COMPACTOR PRESSURE, psi	100	50	50
EXUDATION PRESSURE, psi	552	394	249
EXPANSION, Inches x 10exp-4	52	20	10
STABILITY Ph 2,000 lbs (160 psi)	76	93	106
TURNS DISPLACEMENT	3.25	3.50	3.74
R-VALUE UNCORRECTED	46	34	25
R-VALUE CORRECTED	50	32	25

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.80	1.09	1.20
EXPANSION PRESSURE THICKNESS, ft.	1.73	0.67	0.33





R-VALUE BY EXPANSION:	38
R-VALUE BY EXUDATION:	27
EQUILIBRIUM R-VALUE:	27

APPENDIX D

Seismic Design

Leighton

Barlow SNF

Latitude, Longitude: 34.074149, -118.247417

Date	11/19/2020, 3:11:34 PM
Design Code Reference Document	ASCE7-16
Risk Category	IV
Site Class	D - Stiff Soil

Type	Value	Description
S_S	2.039	MCE_R ground motion. (for 0.2 second period)
S_1	0.728	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.039	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.359	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.877	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.965	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.039	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.285	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.48	Factored deterministic acceleration value. (0.2 second)
S1RT	0.728	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.815	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.776	Factored deterministic acceleration value. (1.0 second)
PGAd	0.998	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.892	Mapped value of the risk coefficient at short periods
C_{R1}	0.894	Mapped value of the risk coefficient at a period of 1 s

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APPENDIX E

Liquefaction Analysis

Leighton

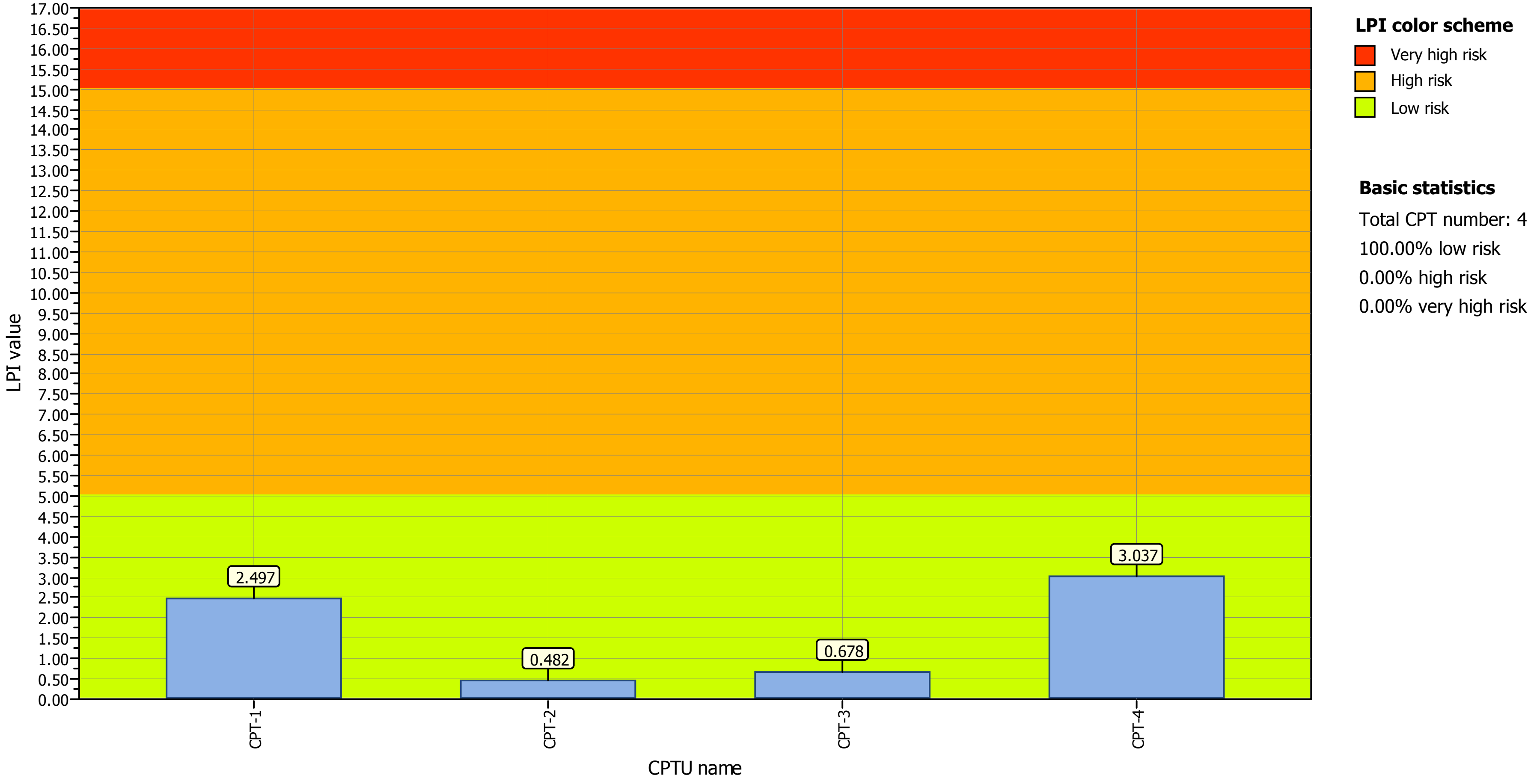
Leighton Consulting, Inc.

Leighton Consulting, Inc.
Geotechnical Engineers
17781 Cowan
Irvine, CA 92614

Project title : Barlow Respiratory Hospital

Location : 2000 Stadium Way, Los Angeles, CA

Overall Liquefaction Potential Index report



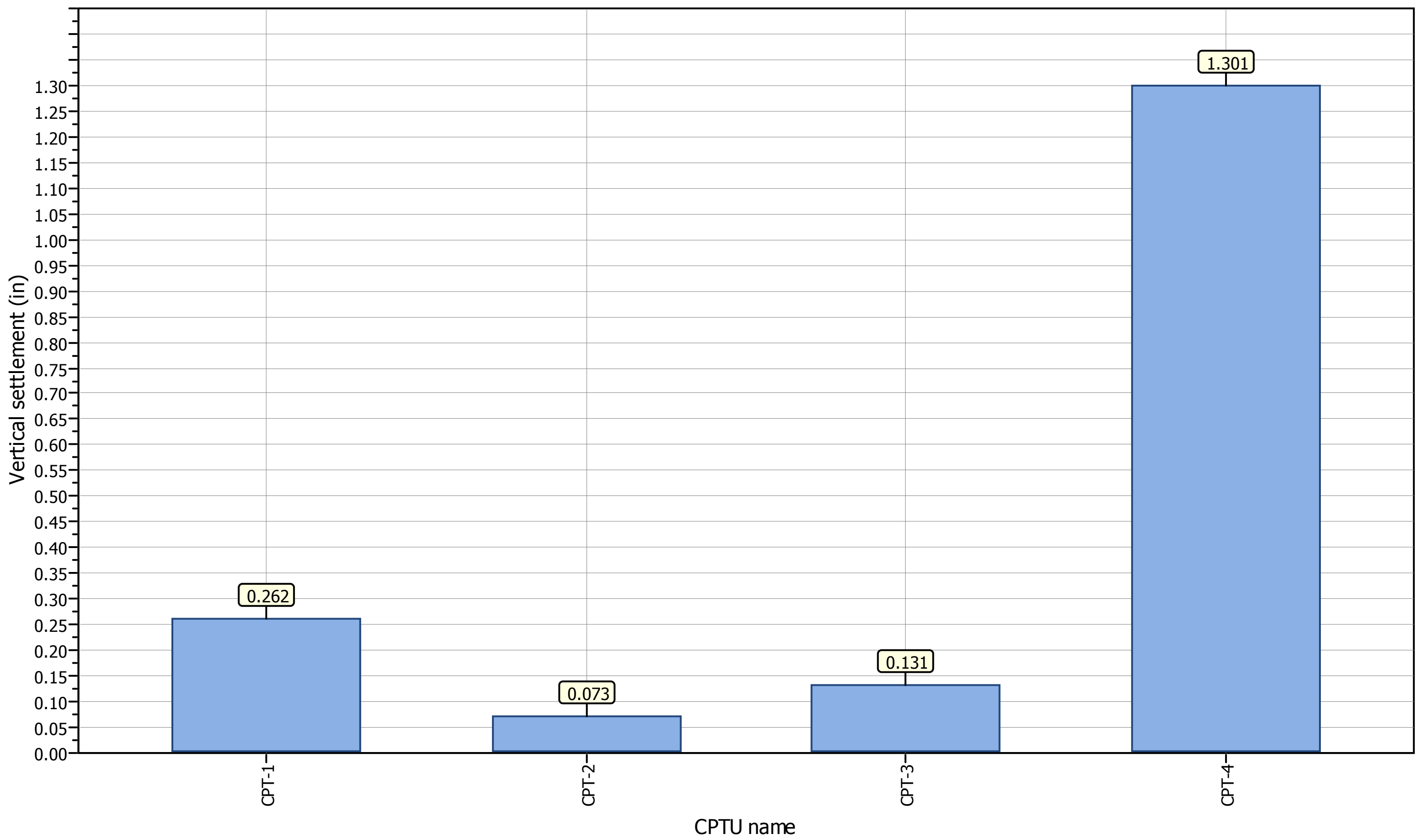
Basic statistics

Total CPT number: 4
100.00% low risk
0.00% high risk
0.00% very high risk

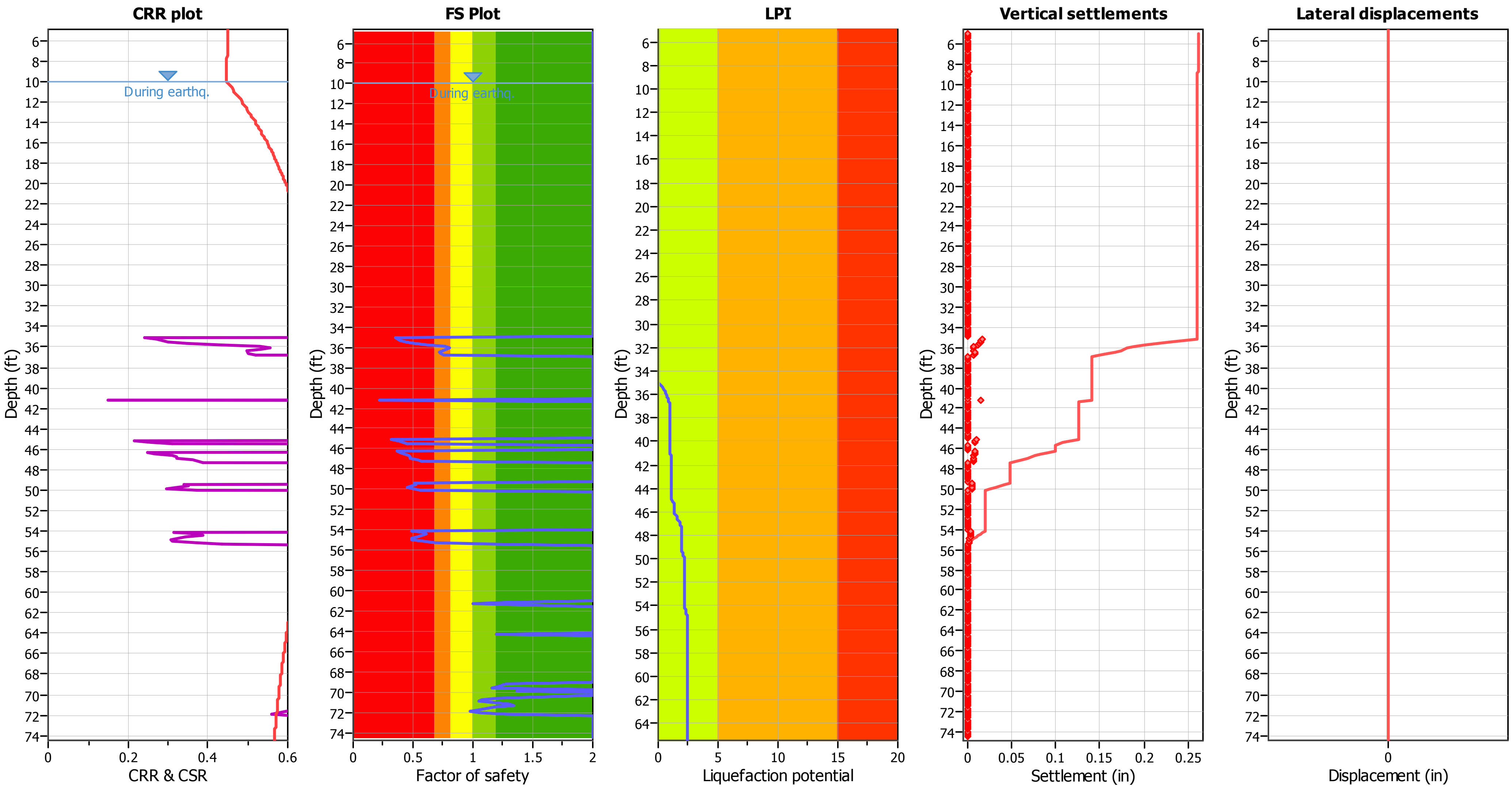
Project title : Barlow Respiratory Hospital

Location : 2000 Stadium Way, Los Angeles, CA

Overall vertical settlements report



Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	1.01	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

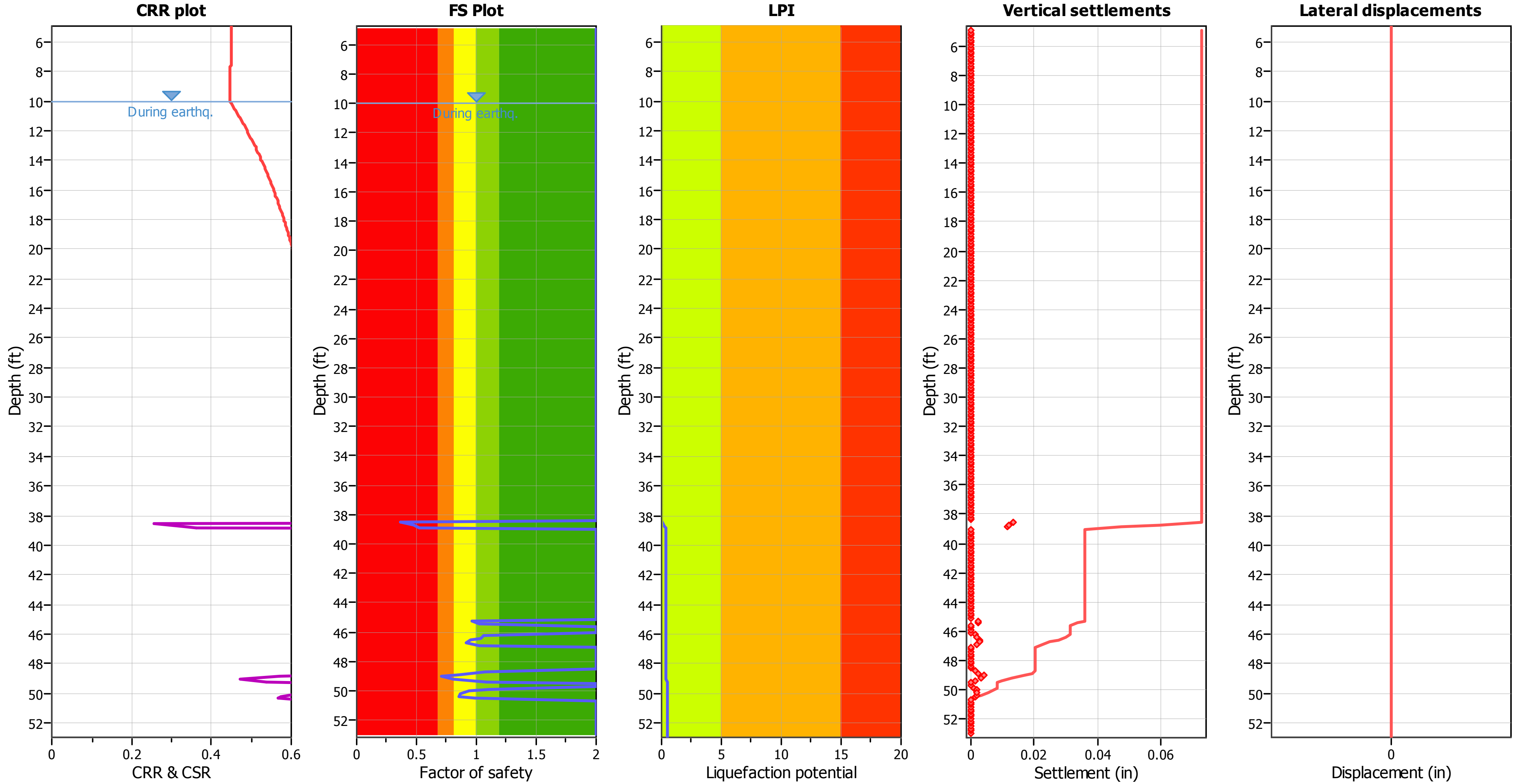
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	1.01	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

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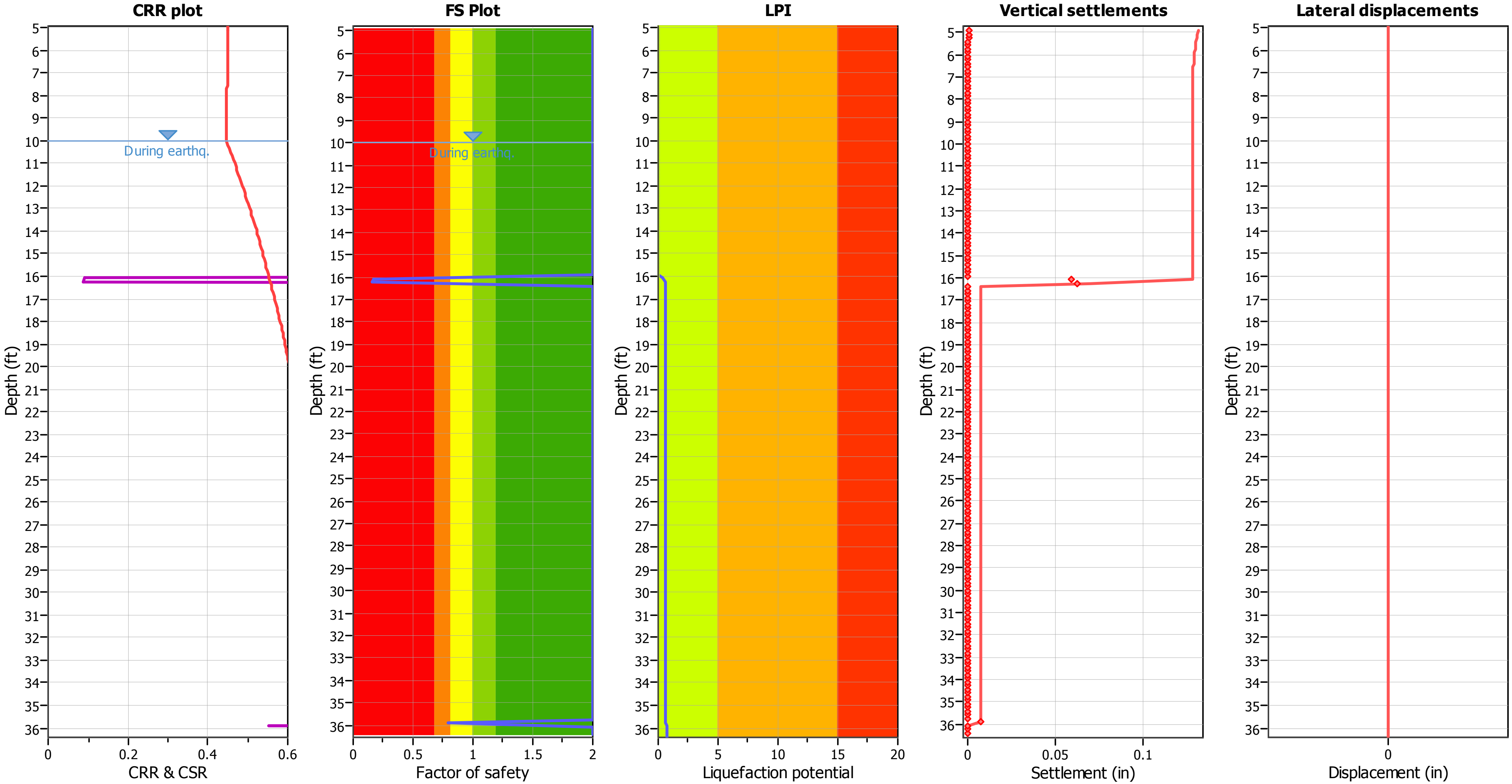
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	1.01	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

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LPI color scheme

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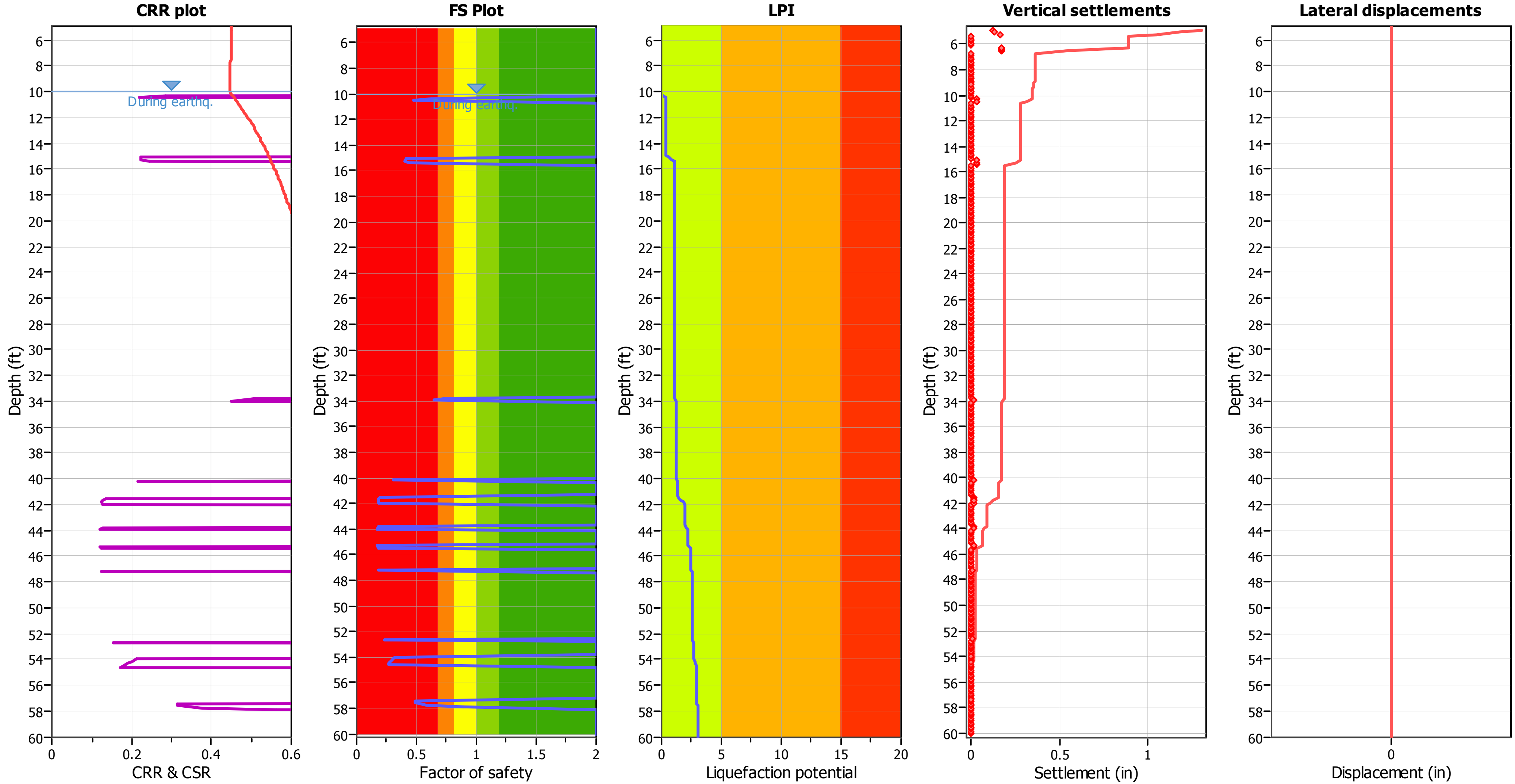
Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	1.01	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	20.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

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LPI color scheme

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- High risk
- Low risk

APPENDIX F

Earthwork Grading Guide Specifications

Leighton

APPENDIX F

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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F-1.0 GENERAL

F-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

F-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

F-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide

Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

F-2.0 PREPARATION OF AREAS TO BE FILLED

F-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

F-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be over-excavated as specified in the following Section F-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

F-2.3 Overexcavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

F-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

F-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys and benches.

F-3.0 FILL MATERIAL

F-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

F-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

F-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section F-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (≤) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

F-4.0 FILL PLACEMENT AND COMPACTION

F-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section F-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

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F-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

F-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, each layer shall be uniformly compacted to not-less-than (≥) 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. In some cases, structural fill may be specified (see project-specific geotechnical report) to be uniformly compacted to at-least (≥) 95 percent of the ASTM D 1557 modified Proctor laboratory maximum dry density. For fills thicker than (>) 15 feet (4.5 m), the portion of fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

F-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by back rolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

F-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

F-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton

Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

F-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, then observed and reviewed by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

F-6.0 TRENCH BACKFILLS

F-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2009 Edition or more current (see also: http://www.dir.ca.gov/title8/sb4a6.html).

F-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2018 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe-bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2018 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

F-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.