

Appendix H

Geotechnical Investigation and Paleontological Resources Memorandum

**GEOTECHNICAL INVESTIGATION
PROPOSED WAREHOUSE**

825 Lexington-Gallatin Road
El Monte, California

for
Magellan Value Partners, LLC



**SOUTHERN
CALIFORNIA
GEOTECHNICAL**
A California Corporation

May 16, 2023
(Revised July 3, 2025)



**SOUTHERN
CALIFORNIA
GEOTECHNICAL**
A California Corporation

Magellan Value Partners, LLC
1900 Avenue of the Stars, Suite 2470
Los Angeles, CA 90067

Attention: Mr. Somy Mukherjee
Managing Director

Project No.: **23G130-1R**

Subject: **Geotechnical Investigation**
Proposed Warehouse
825 Lexington-Gallatin Road
El Monte, California

Mr. Mukherjee:

In accordance with your request, we have conducted a geotechnical investigation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation. This report has been revised to address the review comments generated by Ninyo and Moore following their review of the project geotechnical report.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Handwritten signature of Joseph Lozano Leon in blue ink.

Joseph Lozano Leon
Staff Engineer

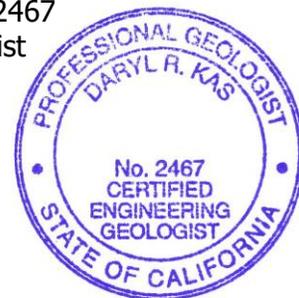
Handwritten signature of Robert G. Trazo in blue ink.

Robert G. Trazo, GE 2655
Principal Engineer



Handwritten signature of Daryl Kas in blue ink.

Daryl Kas, CEG 2467
Principal Geologist



Distribution: (1) Addressee

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1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Geotechnical Design Considerations

- The subject site is located within an area mapped as a liquefaction hazard zone by the state of California.
- Four (4) Cone Penetration Test (CPT) soundings were advanced to depths of 39 to 50± feet at the site as part of our site-specific liquefaction evaluation, supplemented by (2) two 50±-foot-deep borings. Potentially liquefiable soils were encountered at all of the CPT locations.
- The historic high groundwater depth for this site is 2 feet below the ground surface, based on maps published by the state of California. The liquefaction evaluation has identified potentially liquefiable soil layers located at various depths between 2 and 50± feet below the existing site grades.
- The potential liquefaction-induced settlements at the CPT locations range between 3.64 and 5.37± inches. Based on the presence of potentially liquefiable shallow soil layers, some mitigation of the potentially liquefiable soils will be necessary in order to support the proposed structure on conventional shallow foundations. The consequences of liquefaction occurring in shallow soil layers that are influenced by foundations can include excessive settlements and loss of bearing capacity.
- All of the borings encountered artificial fill soils, extending to depths of 2½ to 5½± feet below the finished surface of the existing site grades. The fill soils possess variable strengths and compositions, and are not considered suitable, in their present condition, to support the foundations of the proposed building. The fill soils are underlain by native alluvium consisting of variable strengths silty sands, sandy silts, and sands within the upper 8½ to 22± feet from the ground surface. Two of the borings encountered a stratum consisting of loose sands at depths of 8½ and 9± feet.
- Remedial grading is recommended to remove the undocumented artificial fill soils and a portion of the near-surface alluvial soils from the proposed building pad area. The depth of overexcavation discussed below, should be sufficient to remove any soils disturbed during stripping and demolition and to remove the potentially liquefiable soils from within the foundation influence zones. The overexcavation and recompaction of these soils as structural fill will provide more consistent support characteristics for the proposed structure and help to mitigate against potential surface manifestations due to liquefaction.

Site Preparation

- The proposed development will require demolition of the remnants of previous structures still present within the subject site. Additionally, any existing improvements that will not remain in place for use with the new development should be removed in their entirety.
- Initial site preparation should include stripping of any surficial vegetation. The surficial vegetation, and any organic soils should be properly disposed of off-site.
- Remedial grading is recommended to be performed within the new building pad area to remove the existing fill soils in their entirety and to remove most of the potentially liquefiable soils from within the foundation influence zones of the new foundations. Additionally, the

overexcavation should extend to a depth of 9 feet below existing grade and to a depth of at least 9 feet below proposed pad grade, whichever is greater, and in foundation areas to a depth equal to at least 2 times the footing width below the foundation bearing grades.

- The overexcavation areas should extend at least 5 feet beyond the building and foundation perimeters, and to an extent equal to the depth of fill placed below the foundation bearing grade, whichever is greater.
- After overexcavation has been completed, the resulting subgrade soils should be evaluated by the geotechnical engineer to identify any additional soils that should be overexcavated, moisture conditioned (or air dried), and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.
- The new parking area subgrade soils are recommended to be scarified to a depth of 12± inches, thoroughly moisture conditioned and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density.

Building Foundations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 3,000 lbs/ft² maximum allowable soil bearing pressure.
- Reinforcement consisting of at least six (6) No. 5 rebars (3 top and 3 bottom) in strip footings, due to the presence of potentially liquefiable soils. Additional reinforcement may be necessary for structural considerations.

Building Floor Slab

- Conventional Slab-on-Grade, 6 inches thick.
- Modulus of Subgrade Reaction: k = 100 psi/in.
- Minimum slab reinforcement: Reinforcement of the floor slab should consist of No. 3 bars at 18-inches on center in both directions due to the presence of potentially liquefiable soils. The actual floor slab reinforcement should be determined by the structural engineer, based upon the imposed loading.

Pavements

ASPHALT PAVEMENTS (R=30)					
Materials	Thickness (inches)				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	6	8	10	11	13
Compacted Subgrade	12	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS (R = 30)				
Materials	Thickness (inches)			
	Autos and Light Truck Traffic (TI = 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	5½	6½	8
Compacted Subgrade (95% minimum compaction)	12	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 23P163 dated February 22, 2023, and Change Order No. 23G130-CO dated March 17, 2025. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. Based on the location of this site, this investigation also included a site-specific liquefaction evaluation. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The overall site is located on the northwest side of Lexington-Gallatin Road, approximately 625 feet northeast of Santa Anita Avenue in El Monte, California. The site is referenced by the street address of 825 Lexington-Gallatin Road. The site is bounded to the north and northwest by Santa Anita Avenue, to the south by a Southern California Municipal Athletic institute, to the east by Lexington-Gallatin Road, and to the northeast by a construction yard. However, the subject site of this report is the eastern-southeastern portion of the overall site. The general location of the subject site is illustrated on the Site Location Map, enclosed as Plate 1 in Appendix A of this report.

The site consists of several irregular-shaped parcels, 23± acres in size. The majority of the site is vacant and undeveloped. Remnants of a previously existing structure, such as a 2,300± ft² building including a concrete floor slab and surrounding concrete flatwork, are located in the south-central area of the site. The ground surface cover throughout the site consists of native grass and weed growth with areas of exposed soil. Based on our review of readily available historical aerial photographs from <https://www.historicaerials.com/viewer#>, previous radio towers were located in the central area of the project site. The previous towers were generally demolished between the years of 1972 and 1980. Few remnants of the previous towers, what appear to be column footings or pile caps, are still present in isolated areas of the site.

Detailed topographic information was obtained from the project conceptual grading plan prepared by Kimley-Horn and Associates, Inc. Based on this plan, the site topography generally ranges from 220± feet mean sea level (msl) in the west corner of the subject site to 226± feet msl in the eastern corner. The site topography slopes downward to the west at a gradient of less than 1 percent.

3.2 Proposed Development

The conceptual grading plan for the proposed development was provided to our office by the client. Based on this plan, the subject site will be developed with a 211,810± ft² warehouse, located in the western area of the subject site. Dock-high doors will be constructed along a portion of the southeast building wall. The proposed building is expected to be surrounded by asphaltic concrete (AC) pavements in the parking and drive areas, Portland cement concrete (PCC) pavements in the loading dock area, and concrete flatwork and landscaped planters throughout the site.

Detailed structural information has not been provided. It is assumed that the new building will be a single-story structure of tilt-up concrete construction, typically supported on conventional shallow foundations with a concrete slab-on-grade floor. Based on the assumed construction,

maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively.

No significant amounts of below-grade construction, such as crawl spaces or new basements, will be included in the proposed development. Based on the conceptual grading plan, fills of 3½ to 8± feet are expected to be necessary to achieve the expected building pad grade of 228± ft msl.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration conducted for this project consisted of eight (8) borings (identified as Boring Nos. B-1 through B-8) advanced to depths of 10 to 50± feet below presently existing site grades. All of the borings were logged during drilling by a member of our staff. In addition to the borings, four (4) Cone Penetration Test (CPT) soundings (identified as CPT-1 through CPT-4) were advanced to depths of 39 to 50± feet at the site as part of the liquefaction evaluation. It should be noted that CPT-1, CPT-3 and CPT-4 were terminated at depths shallower than 50 feet due to refusal on very dense soil.

Hollow Stem Auger Borings

The borings were advanced with hollow-stem augers, by a conventional truck-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed soil samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. Standard penetration test (SPT) samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows using a 140-pound automatic hammer falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory. The energy correction factor (energy transfer rate of hammer/E60) is assumed to be about 1.3.

Cone Penetration Test (CPT) Soundings

The CPT soundings were performed by Kehoe Testing and Engineering (KTE) under the observation of one our geologist. The cone system used for this project was manufactured by Vertek. The CPT soundings were performed in general accordance with ASTM standards (D-5778). The cone penetrometers were pushed using 30-ton CPT rig. The cones used during the program recorded the cone resistance, sleeve friction, and dynamic core pressure at 2.5-centimeter depth intervals. The CPT soundings were expected to advance to depths of 50± feet. As previously indicated, CPT-1, CPT-3 and CPT-4 were terminated at depths shallower than 50 feet due to refusal on very dense soil. A more complete description of the CPT program as well as the results of the data interpretation prepared by KTE are enclosed in Appendix F of this report. The CPT soundings do not result in any recovered soil samples. However, correlations have been developed that utilize the cone resistance and the sleeve friction to estimate the soil type that is present at each 2.5-centimeter interval in the subsurface profile. These soil classifications are presented graphically on the CPT output forms enclosed in Appendix F.

The raw data generated by the cone penetrometer equipment has been reduced using CPeT-IT, V.2.3.1.9, published by Geologismiki Geotechnical Software. The CPeT-IT program output as well as more details regarding the interpretation procedure are presented a report prepared by KTE, which is provided in Appendix F of this report.

General

The approximate locations of the borings and CPT soundings are indicated on the Boring and CPT Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Topsoil/Rootmat

All of the borings encountered a surficial layer of topsoil, extending to a depth of 2± inches below the ground surface.

Artificial Fill

Artificial fill soils were encountered at the ground surface at all of the boring locations, extending to depths of 2½ to 5½± feet below the existing site grades. The fill soils generally consist of very loose to loose sandy silts with varying clay content and occasional silty sands. The fill soils possess a mottled and disturbed appearance resulting in their classification as artificial fill.

Alluvium

Native alluvial soils were encountered beneath the fill soils at all of the boring locations. The near-surface alluvial soils within the upper 8½ to 22± feet from the ground surface generally consist of loose to medium dense silty sands, sandy silts, and sands with varying clay, silt and fine gravel content. At greater depths and extending to the maximum depths explored of 50± feet below the existing grades, the alluvium generally consists of medium dense to very dense sandy silts, silty sands and sands with varying fine gravel content. Boring No. B-1 encountered a stratum consisting of very dense gravelly sands at a depth of 48½± feet. Boring Nos. B-3 and B-6 encountered a stratum consisting of loose sands at a depth of 9 and 8½± feet, respectively. Boring No. B-4 encountered a stratum consisting of medium dense silts with little clay and fine sand content at a depth of 33½± feet.

Groundwater

Free water was encountered at Boring Nos. B-1 and B-4 at depths of 33½ and 38½± feet below existing site grades, respectively. Up to 45 minutes after the completion of drilling, the water levels were measured within the inside of the hollow stem augers. Based on the conditions encountered during drilling, the static groundwater is considered to have existed at a depth of 33½ and 38½± feet at the time of the subsurface exploration. In addition, two (2) pore pressure dissipation tests were taken at CPT-1 and CPT-4. Based on the test results, ground water levels

of 33½ and 30± feet (below the ground surface) were correlated at CPT-1 and CPT-4, respectively.

As part of our research, we reviewed available groundwater data in order to determine the historic high groundwater level for the site. One reference used to determine the historic groundwater depths in this area is the California Geological Survey (CGS) Open File Report 98-15, from the Seismic Hazard Zone Report for the El Monte 7.5-Minute Quadrangle, Los Angeles County, California (SHZR 024), which indicates that the historic high groundwater level for the site is 2± feet below the ground surface.

We also attempted to determine more recent high groundwater levels near the vicinity of the site using readily available well data from the California Department of Water Resources, Water Data Library Station Map, website, <https://wdl.water.ca.gov/waterdatalibrary/>. One monitoring well on record (identified as Local Well Name: BIG RED) is located as close as 2,350 feet southeast of the site. Water level readings within this monitoring well indicate a high groundwater level of 19± feet below the ground surface in January 2012.

4.3 Geologic Conditions

Regional geologic conditions were obtained from the Geologic Map of the El Monte 7.5' Quadrangle, Los Angeles County, California, by Siang S. Tan, 1997. The geologic map indicates that the site is underlain by younger alluvial fan and valley deposits (Map Symbol Qyf). A portion of this map indicating the location of the subject site is included as Plate 3 in Appendix A.

Based on the conditions encountered at the boring locations, the subject site is generally underlain by artificial fill soils extending to depths of 2½ to 5½± feet below the existing site grades. These fill soils are underlain by native alluvial soils which extend to at least the maximum depth explored of 50± feet. The alluvial soils within the upper 8½ to 22± feet from the ground surface generally consist of loose to medium dense silty sands, sandy silts, and sands with varying clay, silt and fine gravel content. At greater depths and extending to the maximum depths explored of 50± feet, the alluvium generally consists of medium dense to very dense sandy silts, silty sands and sands with varying fine gravel content. The alluvial soils encountered at the boring locations are consistent with the mapped geologic conditions.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

Recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. Field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples have been tested to determine their consolidation potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-3 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

A representative bulk sample has been tested for its maximum dry density and optimum moisture content. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557 and are presented on Plate C-4 in Appendix C of this report. This test is generally used to compare the in-situ densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil types or soil mixes may be necessary at a later date.

Direct Shear

Direct shear tests were performed on representative samples of the near-surface soils to determine its shear strength parameters in accordance with ASTM D-3080. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. For tests on remolded soils, three samples of the same soil are prepared

by remolding them to 90± percent compaction and near optimum moisture. Each of the three samples are then loaded with different normal loads and the resulting shear strength is determined for that particular normal load. The shearing of the samples is performed at a rate slow enough to permit the dissipation of excess pore water pressure. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The results of the direct shear test are presented on Plate C-5 in Appendix C of this report.

Expansion Index (EI)

The expansion potential of the on-site soils was determined in general accordance with ASTM D-4829. The testing apparatus is designed to accept a 4-inch diameter, 1-in high, remolded sample. The sample is initially remolded to 50± 1 percent saturation and then loaded with a surcharge equivalent to 144 pounds per square foot. The sample is then inundated with water, and allowed to swell against the surcharge. The resultant swell or consolidation is recorded after a 24-hour period. The results of the EI testing are as follows:

<u>Sample Identification</u>	<u>Expansion Index</u>	<u>Expansive Potential</u>
B-3 @ 1 to 5 feet	5	Very Low
B-4 @ 1 to 5 feet	1	Very Low

Soluble Sulfates

Representative samples of the near-surface soils were submitted to a subcontracted analytical laboratory for determination of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete which comes into contact with these soils. The results of the soluble sulfate testing are presented below, and are discussed further in a subsequent section of this report.

<u>Sample Identification</u>	<u>Soluble Sulfates (%)</u>	<u>Severity</u>	<u>Class</u>
B-2 @ 1 to 5 feet	0.0038	Not Applicable	S0
B-3 @ 1 to 5 feet	0.0021	Not Applicable	S0

Corrosivity Testing

Representative bulk samples of the near-surface soils were submitted to a subcontracted corrosion engineering laboratory for determination of electrical resistivity, pH, and chloride concentrations. The resistivity of the soils is a measure of their potential to attack buried metal improvements such as utility lines. The results of some of these tests are presented below.

<u>Sample Identification</u>	<u>Saturated Resistivity (ohm-cm)</u>	<u>pH</u>	<u>Chlorides (mg/kg)</u>	<u>Nitrates (mg/kg)</u>	<u>Sulfides (mg/kg)</u>	<u>Redox Potential (mV)</u>
B-2 @ 1 to 5 feet	6,499	7.9	22.9	36.0	0.2	151
B-3 @ 1 to 5 feet	7,370	8.0	10.3	26.9	0.2	161

Grain Size Analysis

Limited grain size analyses have been performed on selected samples, in accordance with ASTM D-1140. These samples were washed over a #200 sieve to evaluate the percentage of fine-grained material in each sample, which is defined as the material which passes the #200 sieve. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these laboratory tests are shown on the attached Boring Logs.

Atterberg Limits

Atterberg Limits testing (ASTM D-4318) was performed on a selected sample encountered at the site. This test is used to determine the Liquid Limit and Plastic Limit of the soil. The Plasticity Index (PI) is the difference between the two limits. Plasticity Index is a general indicator of the expansive potential of the soil, with higher numbers indicating higher expansive potential. Soils with a PI greater than 25 are considered to have a high plasticity, and a high expansion potential. Soils with a PI greater than 18 are not considered to be susceptible to liquefaction. Soils with a PI between 12 and 18 may possess a moderate susceptibility to liquefaction. The result of the Atterberg Limits testing is presented on the log for Boring No. B-4.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our review, field exploration, laboratory testing and geotechnical analysis, the proposed development is considered feasible from a geotechnical standpoint. The recommendations contained in this report should be taken into the design, construction, and grading considerations.

The recommendations are contingent upon all grading and foundation construction activities being monitored by the geotechnical engineer of record. The recommendations are provided with the assumption that an adequate program of client consultation, construction monitoring, and testing will be performed during the final design and construction phases to verify compliance with these recommendations. Maintaining Southern California Geotechnical, Inc., (SCG) as the geotechnical consultant from the beginning to the end of the project will provide continuity of services. The geotechnical engineering firm providing testing and observation services shall assume the responsibility of Geotechnical Engineer of Record.

The Grading Guide Specifications, included as Appendix D, should be considered part of this report, and should be incorporated into the project specifications. The contractor and/or owner of the development should bring to the attention of the geotechnical engineer any conditions that differ from those stated in this report, or which may be detrimental for the development.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structure should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of the Earthquake Zones of Required Investigation, El Monte Quadrangle, published by the CGS, indicates that the site is not located within an Alquist-Priolo Earthquake Fault Zone. A portion of this map indicating the location of the subject site is included as Plate 4 in Appendix A. Furthermore, SCG did not identify any evidence of faulting during the geotechnical investigation. Therefore, the possibility of significant fault rupture on the site is considered to be low.

The potential for other geologic hazards such as seismically induced settlement, lateral spreading, tsunamis, inundation, seiches, flooding, and subsidence affecting the site is considered low. Liquefaction is a potential geologic hazard for this site and is discussed below.

Seismic Design Parameters

The 2022 California Building Code (CBC) provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site. Based on the adoption of the 2022 CBC on January 1, 2023, we expect that the proposed development will be designed in accordance with the 2022 CBC.

The 2022 CBC Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool, a web-based software application available at the website www.seismicmaps.org. This software application calculates seismic design parameters in accordance with several building code reference documents, including ASCE 7-16, upon which the 2022 CBC is based. The application utilizes a database of risk-targeted maximum considered earthquake (MCE_R) site accelerations at 0.01-degree intervals for each of the code documents. The table below was created using data obtained from the application. The output generated from this program is attached to this letter.

The 2022 CBC states that for Site Class D sites with a mapped S_1 value greater than 0.2, a site-specific ground motion analysis may be required in accordance with Section 11.4.8 of ASCE 7-16. Supplement 3 to ASCE 7-16, modifies Section 11.4.8 of ASCE 7-16 and states that “a ground motion hazard analysis is not required where the value of the parameter SM_1 determined by Eq. (11.4-2) is increased by 50% for all applications of SM_1 in this Standard. The resulting value of the parameter SD_1 determined by Eq. (11.4-4) shall be used for all applications of SD_1 in this Standard.”

The seismic design parameters presented in the table below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2022 CBC. It should be noted that the site coefficient F_v and the parameters SM_1 and SD_1 were not included in the SEAOC/OSHPD Seismic Design Maps Tool output for the ASCE 7-16 standard. We calculated these parameters-based on Table 1613.2.3(2) in Section 16.4.4 of the 2022 CBC using the value of S_1 obtained from the Seismic Design Maps Tool. The values of SM_1 and SD_1 tabulated below were determined using equations 11.4-2 and 11.4-4 of ASCE 7-16 (Equations 16-20 and 16-23, respectively, of the 2022 CBC) and **do not include a 50 percent increase**. As discussed above, if a site-specific analysis has not been performed, SM_1 and SD_1 must be increased by 50 percent for all applications with respect to the ASCE 7-16 standard.

2022 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_s	1.890
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.677
Site Class	---	D ¹
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	1.890
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	1.151 ²
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.260
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.767 ²

¹Note: 2022 CBC requires that Site Class F be assigned to any profile containing soils vulnerable to potential failure or collapse under seismic loading, such as liquefiable soils. For Site Class F, the site *coefficients* are to be determined in accordance with Section 11.4.7 ASCE 7-16. However, Section 20.3.1 of ASCE 7-16 indicates that for sites with structures having a fundamental period of vibration equal to or less than 0.5 seconds, the site coefficient factors (F_a and F_v) may be determined using the standard procedures. Based on the proposed construction, we expect that the proposed building will possess a fundamental period of vibration less than 0.5 seconds. The seismic design parameters tabulated above were calculated using the site coefficient factors for Site Class D, assuming that the fundamental period of the structure is less than 0.5 seconds. However, the results of the liquefaction evaluation indicate that the subject site is underlain by potentially liquefiable soils. Therefore, if the proposed structure has a fundamental period greater than 0.5 seconds, a site-specific seismic hazards analysis will be required and additional subsurface exploration will be necessary.

²Note: These values must be increased by 50 percent if a site-specific ground motion hazard analysis has not been performed. However, this increase is not expected to affect the design of the structure type proposed for this site. This assumption should be verified by the project structural engineer. The values tabulated above do not include a 50-percent increase.

Ground Motion Parameters

For the liquefaction evaluation, we utilized a site acceleration consistent with maximum considered earthquake ground motions, as required by the 2022 CBC. The peak ground acceleration (PGA_M) was determined in accordance with Section 11.8.3 of ASCE 7-16. The parameter PGA_M is the maximum considered earthquake geometric mean (MCE_G) PGA, multiplied by the appropriate site coefficient from Table 11.8-1 of ASCE 7-16. The web-based software application SEAOC/OSHPD Seismic Design Maps Tool (described in the previous section) was used to determine PGA_M , based on ASCE 7-16 as the building code reference document. A portion of the program output is included as Plate E-1 in Appendix E of this report. As indicated on Plate E-1, the PGA_M for this site is 0.896g. An associated earthquake magnitude was obtained from the USGS Unified Hazard Tool, Interactive Deaggregation application available on the USGS website. The deaggregated mean magnitude is 6.89, based on the peak ground acceleration and Soil Classification D for a target return period of about 2,500 years.

Liquefaction

Research of the Earthquake Zones of Required Investigation, El Monte Quadrangle, published by the CGS, indicates that the site is located in a designated liquefaction hazard zone. Therefore, the scope of this investigation included a detailed liquefaction analysis in order to evaluate the site-specific liquefaction potential.

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater

table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 (Bray and Sancio, 2006) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The liquefaction analysis was conducted in accordance with the requirements of Special Publication 117A (CDMG, 2008), and currently accepted practice (SCEC, 1997). The liquefaction potential of the subject site was evaluated using the empirical method developed by Boulanger and Idriss (Boulanger and Idriss, 2008, 2014). This method predicts the earthquake-induced liquefaction potential of the site based on a given design earthquake magnitude and peak ground acceleration at the subject site. This procedure essentially compares the cyclic resistance ratio (CRR) [the cyclic stress ratio required to induce liquefaction for a cohesionless soil stratum at a given depth] with the earthquake-induced cyclic stress ratio (CSR) at that depth from a specified design earthquake (defined by a peak ground surface acceleration and an associated earthquake moment magnitude). CRR is determined as a function of the corrected CPT tip stress, q_{c1N-cs} . The factor of safety against liquefaction is defined as CRR/CSR. Based on Special Publication 117A, a factor of safety of at least 1.3 is required in order to demonstrate that a given soil stratum is non-liquefiable. Additionally, in accordance with Special Publication 117A, clayey soils which do not meet the criteria for liquefiable soils defined by Bray and Sancio (2006), loose soils with a plasticity index (PI) less than 12 and moisture content greater than 85 percent of the liquid limit, are considered to be insusceptible to liquefaction. Non-sensitive soils with a PI greater than 18 are also considered non-liquefiable.

As part of the liquefaction evaluation, Boring Nos. B-1 and B-4, and one of the four CPT soundings were advanced to depths of $50 \pm$ feet. As previously indicated, CPT-1, CPT-3 and CPT-4 were terminated at depths shallower than 50 feet due to refusal on very dense soil. The two borings were each drilled in close proximity to two of the CPT locations in order to provide physical samples for laboratory testing and correlation with the CPT data. The liquefaction potential for the on-site soils was evaluated the computer program CLiq V.3.5.2.17, which was developed by Geologismiki, for all four (4) of the CPT locations. The analysis method is based on Boulanger and Idriss, 2014. The liquefaction potential for the on-site soils was evaluated using data obtained at the four CPT locations. The liquefaction potential of the site was analyzed utilizing a PGA_M of 0.90 for a magnitude 6.89 seismic event. A copy of the program output is presented in Appendix G of this report.

Conclusions and Recommendations

The results of the liquefaction analysis have identified potentially liquefiable soils at all four (4) of the CPT soundings performed at the site. Soils which are located above the historic groundwater table or possess factors of safety of at least 1.3 are considered non-liquefiable. Several clayey strata, encountered at various depths throughout the upper $50 \pm$ feet, are also considered to be non-liquefiable due to their cohesive characteristics and the results of the Atterberg limits testing with respect to the criteria of Bray and Sancio (2006). Settlement analyses were conducted for

each of the potentially liquefiable strata. The results of the dynamic settlement analyses (also tabulated in the CLiq program output in Appendix G) are presented below:

- CPT-1: 3.64± inches
- CPT-2: 3.93± inches
- CPT-3: 4.23± inches
- CPT-4: 5.37± inches

Based on these total settlements, differential settlements of up to 3.6± inches should be expected to occur during a liquefaction inducing seismic event. The estimated differential settlement could be assumed to occur across a distance of 100 feet, indicating a maximum angular distortion of about 0.003 inches per inch.

Shallow Liquefiable Layers

The results of the liquefaction analysis indicate that potentially liquefiable soils are present at all of the CPT locations. Based on current geotechnical standards of practice, and Special Publication 117A, liquefaction potential is analyzed with respect to the historic high groundwater level. Mapping performed by the California Geologic Survey indicates that the historic high ground water level for this site is located at a depth of approximately 2 feet below the ground surface. Therefore, the results of our analysis indicate that potentially liquefiable soils will be present within the influence zones of new foundations. The zone of significant influence is considered to be to a depth equal to approximately two times the footing width below the foundation bearing grade.

The consequences of soil liquefaction occurring within the zone of influence of a foundation can result in the loss of bearing capacity and/or punching failure. An isolated column footing with typical structural loads could settle rapidly during a liquefaction inducing seismic event. The magnitude of the settlement below a loaded column can be much higher than the dynamic settlements presented above for free-field conditions. Additionally, based on Ishihara's criteria, liquefaction of the near-surface soils could result in surface manifestations, including sand boils.

Based on the potential for liquefaction of the near-surface soils, we do not recommend that the new building be supported on conventional shallow foundations without mitigation of the near-surface liquefaction potential of the soils within the building area. Therefore, this report provides recommendations to perform remedial grading of the soils that will be significantly influenced by the foundations of the proposed structure. The resulting layer of compacted structural fill below the foundations will provide increased strengths and a reduction of the liquefaction potential of the near surface soils, as well as a reduction in the potential for surface manifestations, and other localized reduction of bearing capacity that could occur during a liquefaction-inducing seismic event. Additional details regarding the recommended remedial grading are presented in Section 6.3 of this report. **Following the completion of the recommended remedial grading, potential liquefaction-induced total dynamic settlements are expected to be reduced to:**

- **CPT-1: 1.5± inches**
- **CPT-2: 2.2± inches**
- **CPT-3: 2± inches**

- **CPT-4: 2.7± inches**

Post-remedial grading dynamic settlements are expected to be on the order of 1.8 inches. Assuming that these settlements occur over a distance of 100 feet, an angular distortion of about 0.0015 inches per inch would result.

Other structural options are also available, including the use of a mat foundation or specialized ground improvement techniques. If detailed recommendations regarding these other options are desired, they can be provided at the owner's request.

Lateral Spreading

No significant slopes or free faces are present within several hundred feet from the proposed structure. Therefore, lateral spreading is not considered to be a significant design concern for this project.

6.2 Geotechnical Design Considerations

General

All of the borings encountered artificial fill soils, extending to depths of 2½ to 5½± feet below the existing site grades at the boring locations. These soils possess variable strengths and compositions, as well as a disturbed and mottled appearance. No documentation regarding the placement and compaction of these soils has been provided to our office. The fill soils are therefore considered to be undocumented fill. The fill soils are underlain by native alluvium consisting of variable strengths silty sands, sandy silts, and sands within the upper 8½ to 22± feet from the ground surface. Two of the borings encountered a stratum consisting of loose sands at depths of 8½ and 9± feet. Based on these conditions, the artificial fill materials and some of the near-surface alluvium, in their present condition, are not considered suitable for support of the foundations and floor slab of the new structure. Remedial grading will be necessary within the proposed building area to remove the artificial fill soils in their entirety, as well as a portion of the near-surface alluvium, and to replace these soils as compacted structural fill.

In order to support the building on conventional shallow foundations, it is recommended that the soils present throughout most of the foundation influence zones of the structure be overexcavated and recompacted as structural fill. The consequences of excessive liquefaction occurring in the foundation influence zone of the footings could result in localized loss of bearing capacity and greater settlements than those projected during the liquefaction evaluation for "free field" conditions. Recompanying most of the soils in the foundation influence zones will significantly reduce the potential for liquefaction-induced settlements, as well as reduce the potential for localized ground failures due to surface manifestations or loss of bearing capacity.

Static Settlement

The recommended remedial grading will remove the existing fill soils as well as a portion of the variable strength alluvium from the new building area, and replace these materials as compacted structural fill. The native soils that will remain in place below the recommended depth of

overexcavation will not be subject to significant load increases from the foundations of the new structure. Provided that the recommended remedial grading is completed, the post-construction settlements are expected to be within tolerable limits.

Soluble Sulfates

The results of the soluble sulfate testing, discussed in Section 5.0 of this report, indicate soluble sulfate concentrations of up to 0.0038 percent. These concentrations are considered to be negligible or "not applicable" with respect to the American Concrete Institute (ACI) Publication 318-05 Building Code Requirements for Structural Concrete and Commentary, Section 4.3. Therefore, specialized concrete mix designs are not considered to be necessary, with regard to sulfate protection purposes. It is, however, recommended that additional soluble sulfate testing be conducted at the completion of rough grading to verify the soluble sulfate concentrations of the soils which are present at the proposed building pad grade.

Corrosion Potential

The results of laboratory testing indicate that the on-site soils possess saturated resistivities of 6,499 and 7,370 ohm-cm, and pH values of 7.9 and 8.0. The soils possess redox potentials of 151 and 161 mV and sulfide concentrations of 0.2 mg/kg. These test results have been evaluated in accordance with guidelines published by the Ductile Iron Pipe Research Association (DIPRA). The DIPRA guidelines consist of a point system by which characteristics of the soils are used to quantify the corrosivity characteristics of the site. Resistivity, pH, sulfide concentration, redox potential, and moisture content are the five factors that enter into the evaluation procedure. Based on these factors, the on-site soils are considered to be mildly corrosive to ferrous pipes. Therefore, corrosion protection is expected to be required for cast iron or ductile iron pipes.

Based on American Concrete Institute (ACI) Publication 318 Building Code Requirements for Structural Concrete and Commentary, reinforced concrete that is exposed to external sources of chlorides requires corrosion protection for the steel reinforcement contained within the concrete. ACI 318 defines concrete exposed to moisture and an external source of chlorides as "severe" or exposure category C2. ACI 318 does not clearly define a specific chloride concentration at which contact with the adjacent soil will constitute a "C2" or severe exposure. However, the Caltrans Memo to Designers 10-5, Protection of Reinforcement Against Corrosion Due to Chlorides, Acids and Sulfates, dated June 2010, indicates that soils possessing chloride concentrations greater than 500 mg/kg are considered to be corrosive to reinforced concrete. The results of the laboratory testing indicate chloride concentrations of 10.3 and 22.9 mg/kg. Although the soils contain some chlorides, we do not expect that the chloride concentrations of the tested soils are high enough to constitute a "severe" or C2 chloride exposure. Therefore, a chloride exposure category of C1 is considered appropriate for this site.

Nitrates present in soil can be corrosive to copper tubing at concentrations greater than 50 mg/kg. The tested samples possess nitrate concentrations of 26.9 and 36.0 mg/kg. Based on the test results, the on-site soils are not considered to be corrosive to copper pipe.

It should be noted that SCG does not practice in the field of corrosion engineering. Therefore, the client may wish to contact a corrosion engineer to provide a more thorough evaluation.

Expansion

The near-surface soils consist of sandy silts and silty sands with occasional clay content. Laboratory testing performed on representative samples of the near-surface soils indicates that the test samples possess very low expansion potentials (EI = 1, and 5). Therefore, no design considerations related to expansive soils are considered warranted for this.

Shrinkage/Subsidence

Removal and recompaction of the near-surface native fill soils is estimated to result in an average shrinkage of 12 to 19 percent. However, the estimated shrinkage of the individual soil layers at the site is highly variable, locally ranging from 8 to 22 percent shrinkage. It should be noted that the potential shrinkage estimate is based on dry density testing performed on small-diameter samples taken at the boring locations. If a more accurate and precise shrinkage estimate is desired, SCG can perform a shrinkage study involving several excavated test-pits where in-place densities are determined using in-situ testing methods instead of laboratory density testing on small-diameter samples. Please contact SCG for details and a cost estimate regarding a shrinkage study, if desired.

Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be 0.15± feet.

These estimates are based on previous experience and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Grading and Foundation Plan Review

Detailed grading and foundation plans were unavailable at the time of this report. It is therefore recommended that we be provided with copies of the preliminary grading and foundation plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Demolition and Site Stripping

The proposed development will require demolition of the remnants of previous structures still present within the subject site. Additionally, any existing improvements that will not remain in place for use with the new development should be removed in their entirety. Debris resultant from demolition should be disposed of off-site. All applicable federal, state and local specifications

and regulations should be followed in demolition, abandonment, and disposal of the resulting debris.

As previously indicated, few remnants of the previous radio towers, what appear to be column footings or pile caps, are still present in isolated areas of the site. Detailed structural information regarding the previous structures has not been provided to our office. Therefore, the foundation systems supporting the existing structures are generally unknown by SCG. We expect that the previous radio towers could have been supported on deep foundations. Therefore, existing piles or drilled piers located within the proposed building area should be cut off at a depth of at least 2 feet below the bottom of the planned overexcavation. Where drilled pier or pile foundations are encountered within proposed pavement areas, they should be cut off at a depth of at least 2 feet below the proposed pavement subgrade or at a depth of at least 1 foot below the bottom of any planned utilities.

Initial site stripping should include removal of any surficial vegetation, as well as any underlying topsoil or other organic materials. This should include any weeds, grasses, shrubs, and trees. Root systems associated with the trees should be removed in their entirety, and the resultant excavations should be backfilled with compacted structural fill soils. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered. These materials should be disposed of off-site.

Treatment of Existing Soils: Building Pad

Remedial grading should be performed within the new building pad area to remove all of the undocumented fill soils and a portion of the near-surface native alluvium. Based on the presence of shallow potentially liquefiable soils, we recommend that most of the existing soils that will be significantly influenced by the proposed building foundations be removed and recompacted as structural fill. At a minimum, we recommend that the near-surface soils within the upper 9 feet below the existing site grades and 9 feet below the proposed building pad grade be overexcavated, whichever is greater. Additionally, the overexcavation should also extend to a depth equal to at least 2 times the foundation width below the proposed foundation bearing grades.

The overexcavation areas should extend at least 5 feet beyond the building and foundation perimeters, and to an extent equal to the depth of fill placed below the foundation bearing grade, whichever is greater. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the area of overexcavation should also encompass these areas.

Following completion of the overexcavation, the subgrade soils within the building area should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling and probing to identify any soft, loose or otherwise unstable soils that must be removed. Some localized areas of deeper excavation may be required if additional fill materials or loose, porous, or low density native soils are encountered at the base of the overexcavation.

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches and moisture conditioned to raise the moisture content of the

underlying soils to at least 0 to 4 percent above optimum moisture content. The subgrade soils should then be recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The building pad areas may then be raised to grade with previously excavated soils or imported structural fill.

Treatment of Existing Soils: Cut and Fill Slopes

Based on the conceptual grading plan, new cut slopes, and possibly fill slopes, will likely be constructed around the perimeter of the subject site. All slopes should be at an inclination of 2h:1v (horizontal to vertical) or flatter. A keyway should be excavated at the toe of new fill slopes which are not located in fill areas. The keyway should be at least 15 feet wide and 3 feet deep. The recommended width of the keyway is based on 1.5 times the width of typical grading equipment. If smaller equipment is utilized, a smaller keyway may be suitable, at the discretion of the geotechnical engineer. The base of the keyway should slope at least 1 foot downward into the slope. Following completion of the keyway cut, the subgrade soils should be evaluated by the geotechnical engineer to verify that the keyway is founded into competent materials. The resulting subgrade soils should then be scarified to a depth of 10 to 12 inches, moisture conditioned to 0 to 4 percent above optimum moisture content and recompacted. During construction of the new fill slope, the existing slope should be benched in accordance with the detail presented on Plate D-4. Benches less than 4 feet in height may be used at the discretion of the geotechnical engineer.

Cut slopes may be undercut and replaced as stability fills. Stability fills for cut slopes will provide a more uniform appearance and allow landscaping on the slope. Should a stability fill for cut slope be necessary, the recommendations for the stability fill will be the same as the recommendations for the fill slopes, mentioned above.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of proposed retaining and non-retaining site walls should be overexcavated to a depth of at least 3 feet below foundation bearing grade and replaced as compacted structural fill as discussed above for the proposed building pad. Any undocumented fill soils within any of these foundation areas should be removed in their entirety. The overexcavation areas should extend at least 5 feet beyond the foundation perimeters, and to an extent equal to the depth of fill below the new foundations. Erection pads are considered to be part of the foundation system, and therefore these overexcavation recommendations apply to erection pads also. The overexcavation subgrade soils should be evaluated by the geotechnical engineer prior to scarifying, moisture conditioning, and recompacting the upper 12 inches of exposed subgrade soils, as discussed for the building area. The previously excavated soils may then be replaced as compacted structural fill.

If the full lateral extent of overexcavation is not achievable for the proposed walls, foundation elements must be redesigned using a lower bearing pressure. The geotechnical engineer of record should be contacted for recommendations pertaining to this type of condition.

Treatment of Existing Soils: Flatwork, Parking and Drive Areas

Based on economic considerations, overexcavation of the existing near-surface existing soils in the new flatwork, parking and drive areas is not considered warranted, with the exception of areas where lower strength or unstable soils are identified by the geotechnical engineer during grading. Subgrade preparation in the new flatwork, parking and drive areas should initially consist of removal of all soils disturbed during stripping and demolition operations.

The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. Any such materials should be removed to a level of firm and unyielding soil. The exposed subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 0 to 4 percent above the optimum moisture content, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of variable strength surficial soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

The grading recommendations presented above for the proposed flatwork, parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within these areas. The grading recommendations presented above do not mitigate the extent of undocumented fill or lower strength native alluvium in the flatwork, parking and drive areas. As such, some settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction. If the owner cannot tolerate the risk of such settlements, the flatwork, parking and drive areas should be overexcavated to a depth of 2 feet below proposed pavement subgrade elevation, with the resulting soils replaced as compacted structural fill.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 0 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer.
- All grading and fill placement activities should be completed in accordance with the requirements of the 2022 CBC and the grading code of the city of El Monte.
- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Imported Structural Fill

All imported structural fill should consist of very low expansive ($EI < 20$), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the city of El Monte. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

Any soils used to backfill voids around subsurface utility structures, such as manholes or vaults, should be placed as compacted structural fill. If it is not practical to place compacted fill in these areas, then such void spaces may be backfilled with lean concrete slurry. Uncompacted pea gravel or sand is not recommended for backfilling these voids since these materials have a potential to settle and thereby cause distress of pavements placed around these subterranean structures.

6.4 Construction Considerations

Excavation Considerations

The near-surface soils generally consist of sands, sandy silts and silty sands. Some of these materials will be subject to moderate caving within shallow excavations. Where caving does occur, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, the inclination of temporary slopes should not exceed 2h:1v. Deeper excavations may require some form of external stabilization such as shoring or bracing. Maintaining adequate moisture content within the near-surface soils will improve excavation stability. All excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Moisture Sensitive Subgrade Soils

Some of the near-surface soils possess appreciable silt content and may become unstable if exposed to significant moisture infiltration or disturbance by construction traffic. In addition, based on their granular content, some of the on-site soils will also be susceptible to erosion. The site should, therefore, be graded to prevent ponding of surface water and to prevent water from running into excavations.

Groundwater

Based on the conditions encountered in the borings and the pore pressure dissipation tests taken at CPT-1 and CPT-4, the groundwater table is considered to have been present at a depth of 30 to 38½± feet at the time of subsurface exploration. Therefore, based on the current groundwater depth, we do not expect that groundwater will affect excavations for the new foundations or utilities. However, it should be noted that the mapped historic high groundwater level for this site is 2± feet below the existing site grades.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pad will be underlain by structural fill soils extending to a depth of at least 9 feet and to a depth equal to at least 2 times the foundation width below foundation bearing grade, underlain by 1± foot of additional soil that has been densified and moisture conditioned in place. Based on this subsurface profile, and based on the design considerations presented in Section 6.1 of this report, the proposed structure may be supported on conventional shallow foundations.

Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 3,000 lbs/ft².
- Reduced net allowable soil bearing pressure: 1,000 to 2,000 lbs/ft² if the full recommended extent of remedial grading cannot be achieved, typically for new footings along the property lines.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: Six (6) No. 5 rebars (3 top and 3 bottom), due to the potential for liquefaction-induced settlement.
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent exterior grade. Interior column footings may be placed immediately beneath the floor slab.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by one-third when considering short duration wind loads. However, based on the presence of potentially liquefiable soil layers that will remain at elevations located below the proposed overexcavation depth, we do not recommend that the bearing pressure be increased with respect to seismic loads. The minimum steel reinforcement recommended above is based on standard geotechnical practice. Additional rigidity may be necessary for structural considerations, or to resist the effects of the liquefaction-induced differential settlements, as discussed in Section 6.1. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Soils suitable for direct foundation support should consist of newly placed structural fill compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should

be removed to a depth of suitable bearing compacted structural fill, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavation.

The foundation subgrade soils should also be properly moisture conditioned to 0 to 4 percent above the Modified Proctor (ASTM D-1557) optimum, to a depth of at least 12 inches below bearing grade. Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process.

Estimated Foundation Settlements

Post-construction total and differential static settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively, under static conditions. Differential movements are expected to occur over a 50-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch. **These settlements are in addition to the liquefaction-induced settlements previously discussed in Section 6.1 of this report.** The static settlements are expected to occur in a relatively short period of time after the building loads being applied to the foundations, during and immediately subsequent to construction. It should be noted that the projected potential dynamic settlement is related to a major seismic event and a conservative historic high groundwater level.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slab and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 275 lbs/ft³
- Friction Coefficient: 0.28

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against compacted structural fill. The maximum allowable passive pressure is 2,500 lbs/ft².

6.6 Floor Slab Design and Construction

Subgrades which will support the new floor slab should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, and based on the design considerations presented in Section 6.1 of this report, the floor of the proposed structure may be constructed as a conventional slab-on-grade supported on newly-placed structural fill, extending to a depth of at least 9 feet below finished pad grade. Based on geotechnical considerations, the floor slab may be designed as follows:

- Minimum slab thickness: 6 inches.
- Modulus of Subgrade Reaction: 100 psi/in.
- Minimum slab reinforcement: No. 3 bars at 18-inches on-center, in both directions, due to presence of potentially liquefiable soils. The actual floor slab reinforcement should be determined by the structural engineer, based upon the imposed loading, and the potential liquefaction-induced settlements.
- Slab underlayment: If moisture sensitive floor coverings will be used then minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire slab area where such moisture sensitive floor coverings are expected. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. A polyolefin material such as a 15 mil. Stego® Wrap Vapor Barrier or equivalent will meet these specifications. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview. Where moisture sensitive floor coverings are not anticipated, the vapor barrier may be eliminated.
- Moisture condition the floor slab subgrade soils to 0 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 12 inches. The moisture content of the floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.
- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement.

6.7 Exterior Flatwork Design and Construction

Subgrades which will support new exterior slabs-on-grade for sidewalks, patios, and other concrete flatwork, should be prepared in accordance with the recommendations contained in the ***Grading Recommendations*** section of this report. Based on geotechnical considerations, exterior slabs on grade may be designed as follows:

- Minimum slab thickness: 4½ inches.
- Minimum slab reinforcement: No. 3 bars at 24 inches on center, in both directions.

- The flatwork at building entry areas should be structurally connected to the perimeter foundation that is recommended to span across the door opening. This recommendation is designed to reduce the potential for differential movement at this joint.
- Moisture condition the flatwork subgrade soils to 0 to 4 percent of optimum moisture content, to a depth of at least 12 inches. Adequate moisture conditioning should be verified by the geotechnical engineer 24 hours prior to concrete placement.
- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.
- Control joints should be provided at a maximum spacing of 8 feet on center in two directions for slabs and at 6 feet on center for sidewalks. Control joints are intended to direct cracking. Minor cracking of exterior concrete slabs on grade should be expected.
- Where flatwork is immediately adjacent to landscape planters, a thickened edge should be utilized. This edge should extend to a depth of at least 12 inches and incorporate longitudinal reinforcement consisting of at least two No. 4 bars.
- Expansion or felt joints should be used at the interface of exterior slabs on grade and any fixed structures to permit relative movement.

6.8 Retaining Wall Design and Construction

Although not indicated on the site plan, some small (less than 6 feet in height) retaining walls may be required to facilitate the new site grades and in the dock-high areas of the building. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. The following parameters assume that only the on-site soils will be utilized for retaining wall backfill. The near-surface soils generally consist of sands, silty sands and sandy silts. Based on the results of laboratory testing, the native on-site soils possess a friction angle of at least 30 degrees.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

RETAINING WALL DESIGN PARAMETERS

Design Parameter		Soil Type
		On-site Silty Sands and Sandy Silts
Internal Friction Angle (ϕ)		30°
Unit Weight		128 lbs/ft ³
Equivalent Fluid Pressure:	Active Condition (level backfill)	43 lbs/ft ³
	Active Condition (2h:1v backfill)	69 lbs/ft ³
	At-Rest Condition (level backfill)	64 lbs/ft ³

The walls should be designed using a soil-footing coefficient of friction of 0.28 and an equivalent passive pressure of 275 lbs/ft³. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Seismic Lateral Earth Pressures

In accordance with the 2022 CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Retaining Wall Foundation Design

The retaining wall foundations should be supported within newly placed compacted structural fill, extending to a depth of at least 2 feet below proposed foundation bearing grade. Foundations to support new retaining walls should be designed in accordance with the general Foundation Design Parameters presented in a previous section of this report.

Backfill Material

On-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back wall face should have a particle size no greater than 3 inches. The retaining wall backfill materials should be well graded.

It is recommended that a minimum 1-foot thick layer of free-draining granular material (less than 5 percent passing the No. 200 sieve) be placed against the face of the retaining walls. This material should extend from the top of the retaining wall footing to within 1 foot of the ground surface on the back side of the retaining wall. This material should be approved by the geotechnical engineer. In lieu of the 1-foot thick layer of free-draining material, a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls, may be used. If the layer of free-draining material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The layer of free draining granular material should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557-91). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 2-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 10-foot on-center spacing. Alternatively, 4-inch diameter holes at an approximate 20-foot on-center spacing can be used for this type of drainage system. In addition, the weep holes should include a 2 cubic foot pocket of open graded gravel, surrounded by an approved geotextile fabric, at each weep hole location.
- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system. The actual design of this type of system should be determined by the civil engineer to verify that the drainage system possesses the adequate capacity and slope for its intended use.

Weep holes or a footing drain will not be required for building stem walls.

6.9 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these

designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The near-surface soils generally consist of sandy silts with varying clay content and silty sands. These soils are generally considered to possess fair to good pavement support characteristics with estimated R-values of 25 to 45. R-value testing was outside the scope of services. The subsequent pavement design is therefore based upon an assumed R-value of 30. It is recommended that R-value testing be performed after completion of rough grading to verify that the pavement design recommendations presented herein are valid.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20-year design life, assuming six operational traffic days per week.

Traffic Index	No. of Heavy Trucks per Day
4.0	0
5.0	1
6.0	3
7.0	11
8.0	35
9.0	93

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R=30)					
Materials	Thickness (inches)				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	6	8	10	11	13
Compacted Subgrade	12	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the batch plant-reported maximum density. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS (R = 30)				
Materials	Thickness (inches)			
	Autos and Light Truck Traffic (TI = 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	5½	6½	8
Compacted Subgrade (95% minimum compaction)	12	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness. Any reinforcement within the PCC pavements should be determined by the project structural engineer.

7.0 GENERAL COMMENTS

This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring and CPT locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

8.0 REFERENCES

California Division of Mines and Geology (CDMG), "Guidelines for Evaluating and Mitigating Seismic Hazards in California," State of California, Department of Conservation, Division of Mines and Geology, Special Publication 117A, 2008.

Idriss, I. M. and Boulanger, R.W., "Soil Liquefaction During Earthquakes", Earthquake Engineering Research Institute, 2008.

Boulanger, R.W., Idriss, I. M., "CPT and SPT Based Liquefaction Triggering Procedures", Report No. UCD/CGM-14/01, Center of Geotechnical Modeling, University of California, Davis, California, 2014.

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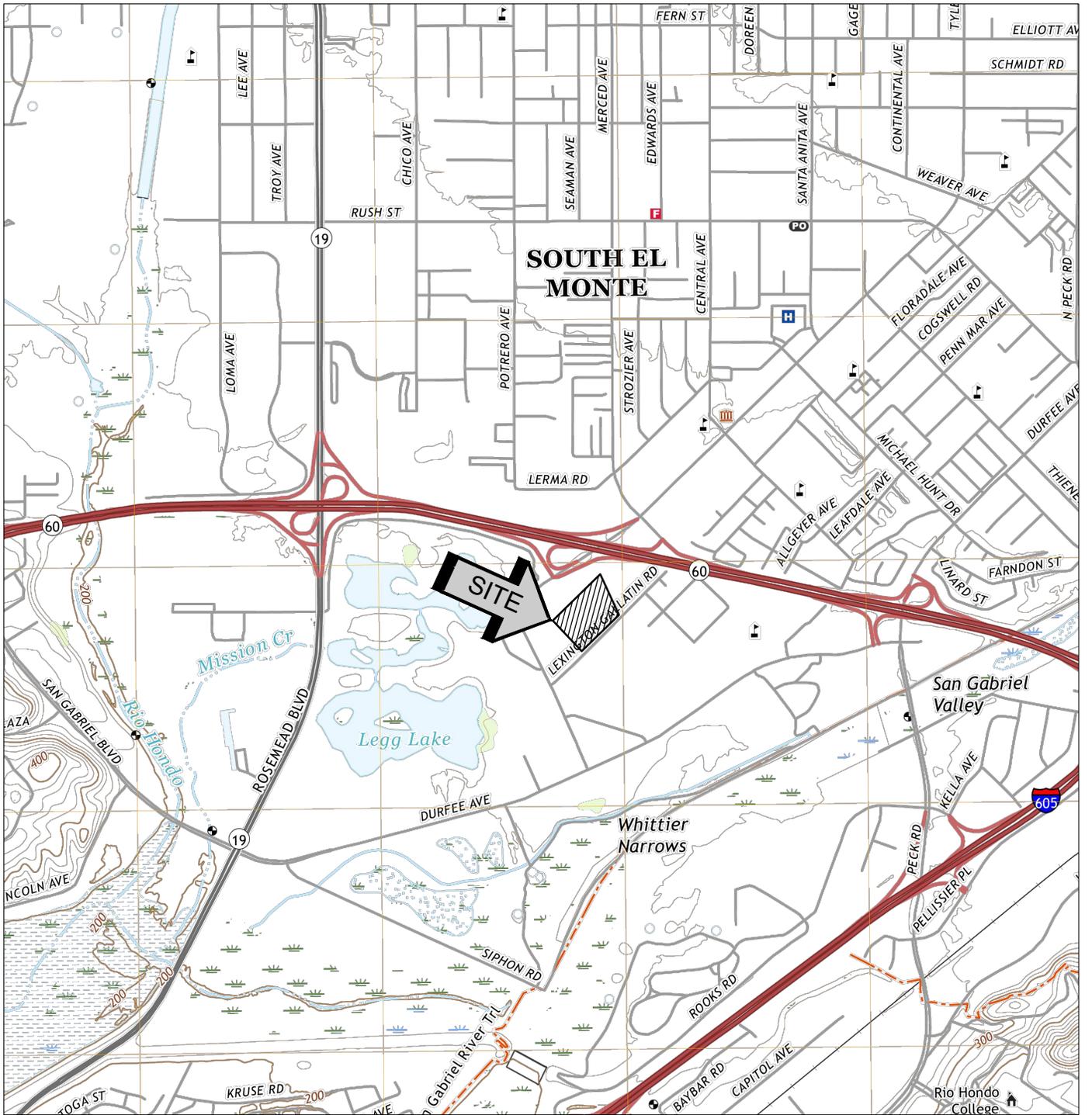
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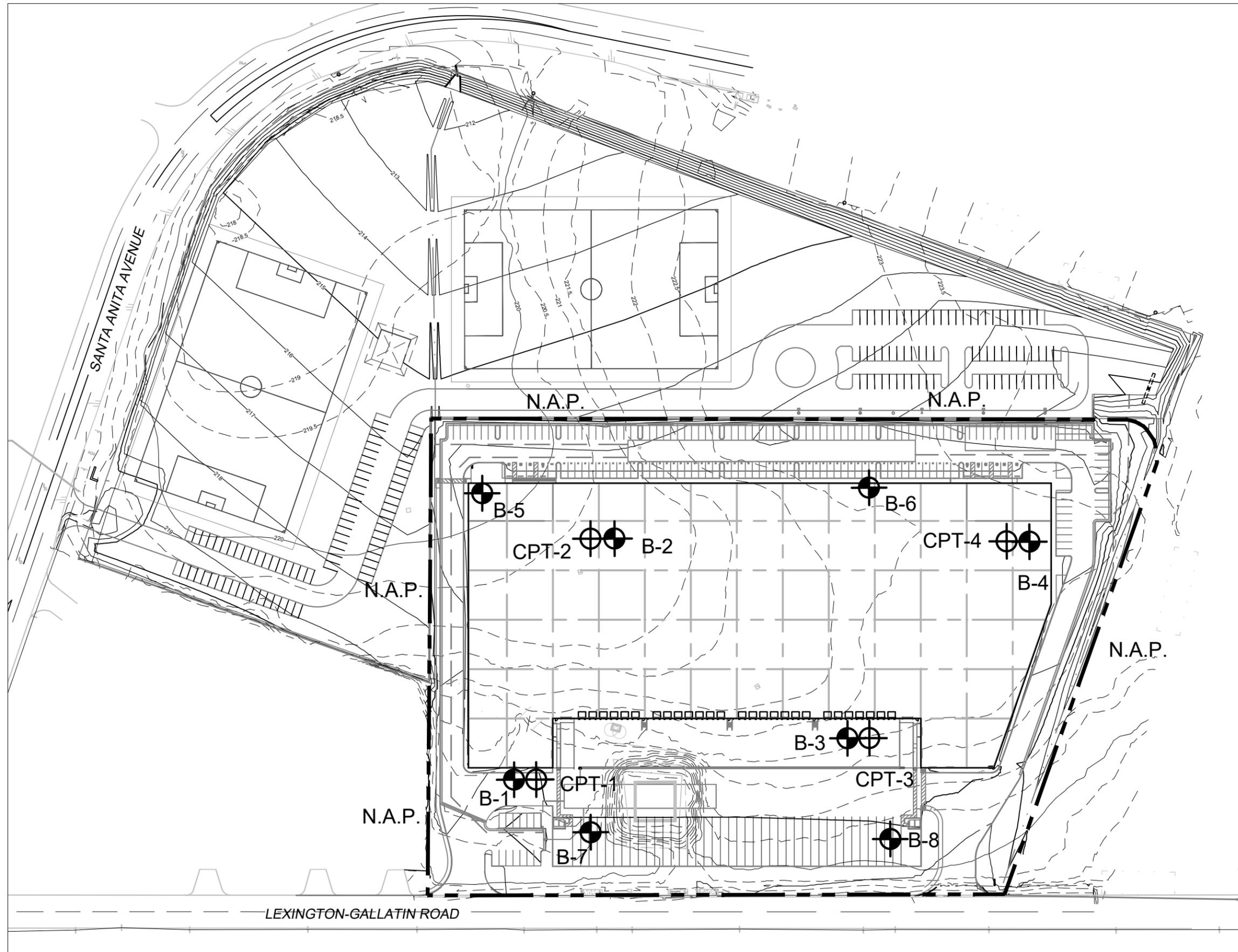
APPENDIX A



SOURCE: USGS TOPOGRAPHIC MAPS OF THE EL MONTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA, 2022.



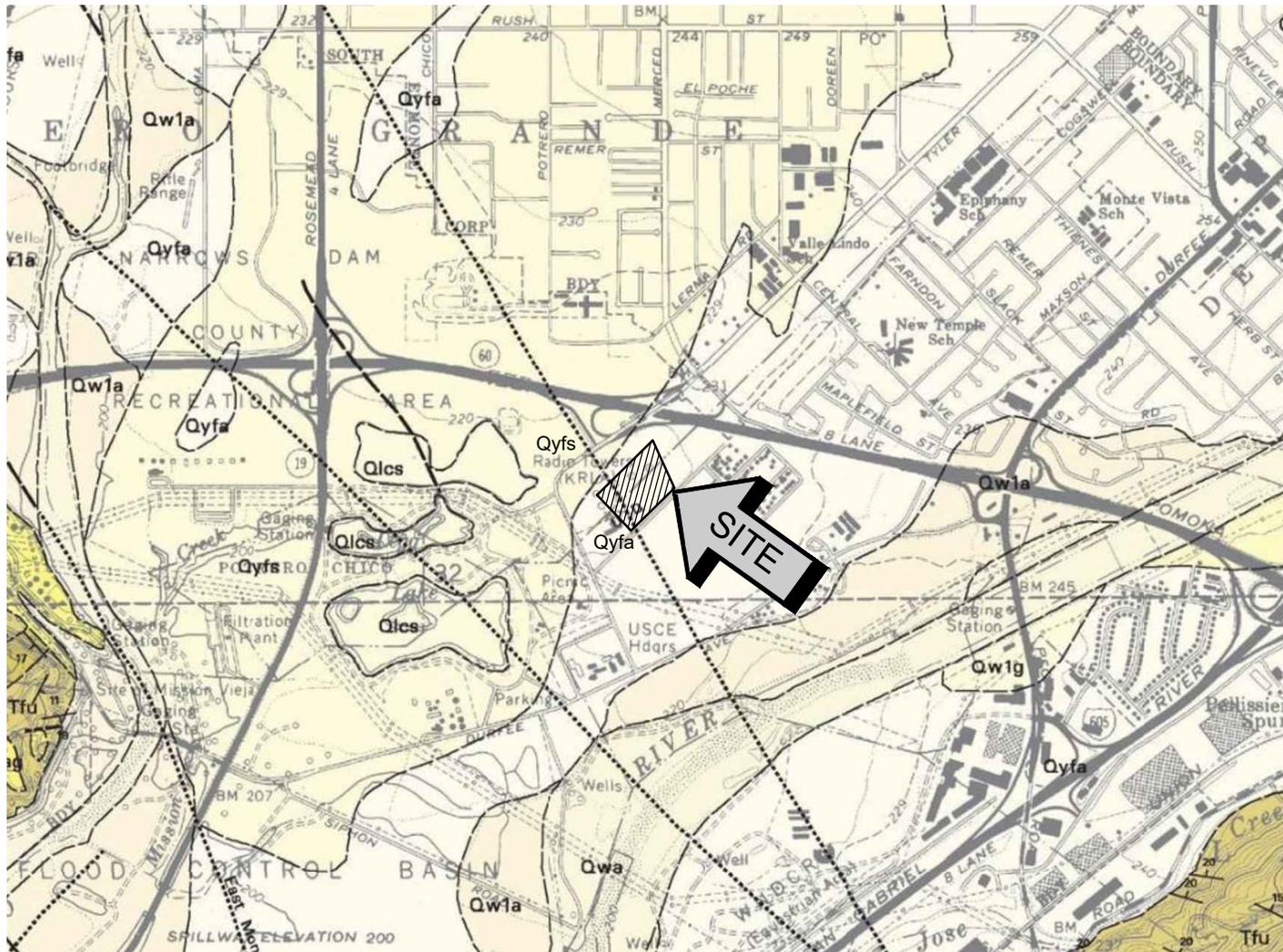
SITE LOCATION MAP	
PROPOSED WAREHOUSE	
EL MONTE, CALIFORNIA	
SCALE: 1" = 2000'	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JLL	
CHKD: RGT	
SCG PROJECT 23G130-1R	
PLATE 1	



- GEOTECHNICAL LEGEND**
- APPROXIMATE BORING LOCATION
 - APPROXIMATE CPT SOUNDING LOCATION

NOTE: SITE PLAN PREPARED BY KIMLEY-HORN AND ASSOCIATES, INC.

BORING AND CPT LOCATION PLAN	
PROPOSED WAREHOUSE	
EL MONTE, CALIFORNIA	
SCALE: 1" = 120'	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JLL	
CHKD: RGT	
SCG PROJECT 23G130-1R	
PLATE 2	



EXPLANATION OF MAP UNITS

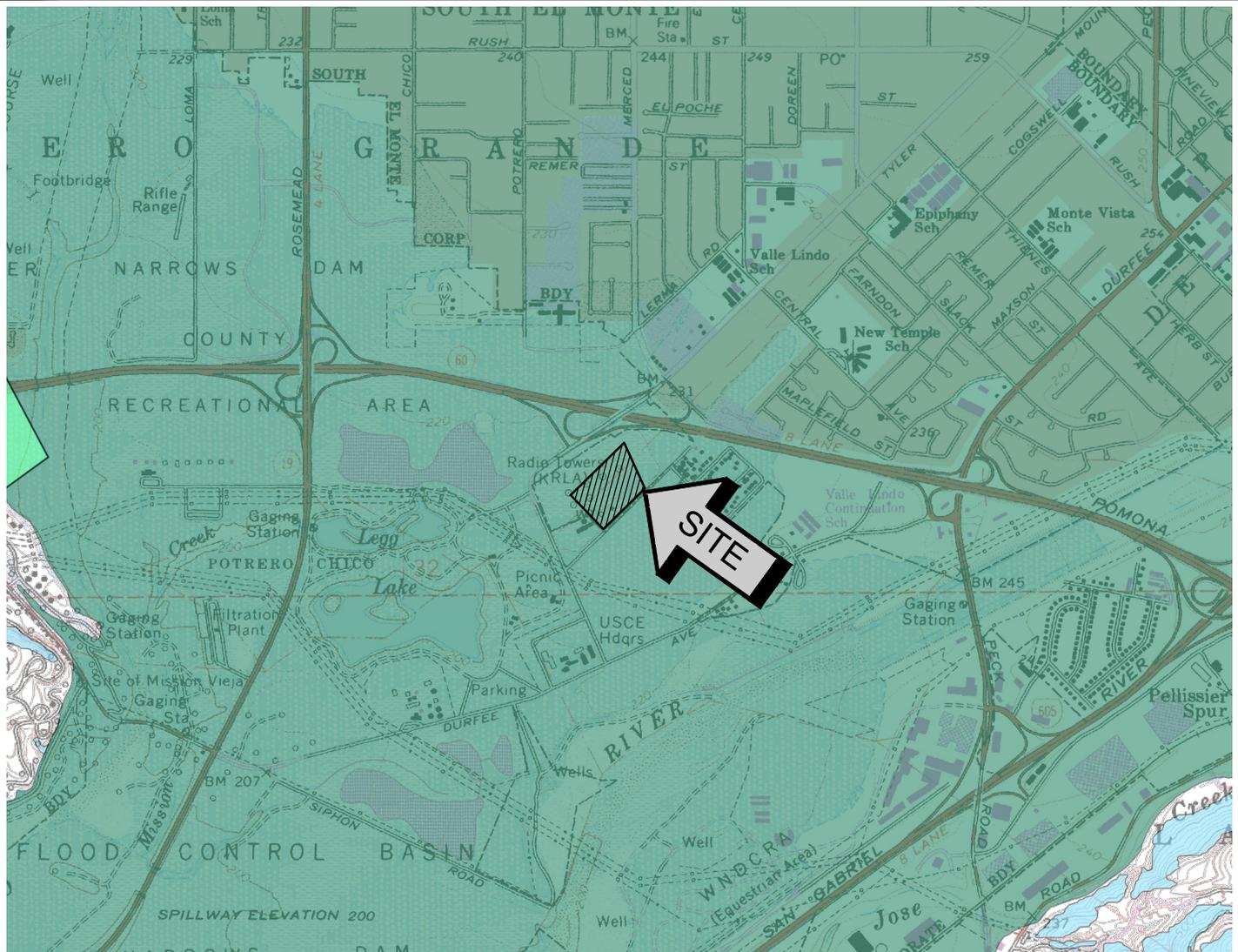
- Qw Active channel and wash deposits, unconsolidated silt and coarser material, mostly artificially channelized; a = sand, g = gravel.
 - Ql Active lacustrine deposits, unconsolidated, submerged; c = clay, s = silt, g = gravel.
 - Qw1 Modern river sediments prior to the artificial channelization of river, unconsolidated; a = sand, g = gravel.
 - Qyf Younger (Holocene) undivided alluvial fan and valley deposits, unconsolidated; c = clay, s = silt, a = sand, g = gravel.
 - Qls Landslide deposits; landslide, broken-up and weathered material; queried where existence is uncertain. It is subject to renewed slope failure.
 - Qof Older (Pleistocene) undivided alluvial fan and valley deposits, moderately to well-consolidated; s = silt, a = sand, g = gravel, numbers 1 to 4 indicate relative levels of terraces with 1 being the highest and oldest.
- Fernando Formation (Pliocene)**
- Tfu Upper Member; massive, friable silty and pebbly sandstone, with interbedded thin beds of siltstone.
 - Tfuc Upper Member; conglomerate and pebbly sandstone, interbedded with Tfu.
 - Tfuf Upper Member; similar Tfu lithology with some fossiliferous sandstones.
 - Tfl Lower Member; massive silty sandstone, with interbedded pebbly sandstone and conglomerate.
 - Tflc Lower Member; conglomerate and pebbly sandstone, interbedded with Tfl.
- Puente Formation (late Miocene)**
- Tpsc Sycamore Canyon Member; sandstone, with interbedded pebble-cobble conglomerate and sandy siltstone.



**GEOLOGIC MAP OF THE
EL MONTE 7.5' QUADRANGLE
LOS ANGELES COUNTY, CALIFORNIA:
A DIGITAL DATABASE**

BY
SIANG S. TAN
Digitized by Kelly R. Ruppert
and Jason D. Little, 1997.

GEOLOGIC MAP	
PROPOSED WAREHOUSE	
EL MONTE, CALIFORNIA	
SCALE: 1" = 2000' DRAWN: JLL CHKD: RGT SCG PROJECT 23G130-1R PLATE 3	 SOUTHERN CALIFORNIA GEOTECHNICAL

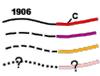


Earthquake Zones of Required Investigation El Monte Quadrangle California Geological Survey

This Map Shows Both Alquist-Priolo Earthquake Fault Zones And
Seismic Hazard Zones Issued For The El Monte Quadrangle

MAP EXPLANATION

EARTHQUAKE FAULT ZONES

-  **Earthquake Fault Zones**
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.
-  **Active Fault Traces**
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

-  **Liquefaction Zones**
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.
-  **Earthquake-Induced Landslide Zones**
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.
-  **Overlapping Liquefaction and Earthquake-Induced Landslide Zones**
Areas that lie within zones of required investigation for both liquefaction and earthquake-induced landslides.



EL MONTE QUADRANGLE

EARTHQUAKE FAULT ZONES

Delineated in compliance with
Chapter 7.5 Division 2 of the California Public Resources Code
(Alquist-Priolo Earthquake Fault Zoning Act)

REVISED OFFICIAL MAP

Released: June 15, 2017

SEISMIC HAZARD ZONES

Delineated in compliance with
Chapter 7.8 Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

OFFICIAL MAP

Released: March 25, 1999

EARTHQUAKE ZONES OF REQUIRED INVESTIGATION MAP

PROPOSED WAREHOUSE

EL MONTE, CALIFORNIA

SCALE: 1" = 2000'

DRAWN: JLL

CHKD: RGT

SCG PROJECT

23G130-1R

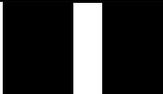
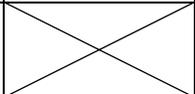
PLATE 4



SOUTHERN
CALIFORNIA
GEOTECHNICAL

APPENDIX B

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH:

Distance in feet below the ground surface.

SAMPLE:

Sample Type as depicted above.

BLOW COUNT:

Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.:

Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG:

Graphic Soil Symbol as depicted on the following page.

DRY DENSITY:

Dry density of an undisturbed or relatively undisturbed sample in lbs/ft³.

MOISTURE CONTENT:

Moisture content of a soil sample, expressed as a percentage of the dry weight.

LIQUID LIMIT:

The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT:

The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE:

The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR:

The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS		
			GRAPH	LETTER			
<p>COARSE GRAINED SOILS</p> <p>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE</p>	<p>GRAVEL AND GRAVELLY SOILS</p>	<p>CLEAN GRAVELS</p> <p>(LITTLE OR NO FINES)</p>		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		<p>GRAVELS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		<p>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</p>	<p>CLEAN SANDS</p> <p>(LITTLE OR NO FINES)</p>		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	
			<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES	
	<p>SAND AND SANDY SOILS</p>	<p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>	<p>CLEAN SANDS</p> <p>(LITTLE OR NO FINES)</p>		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
			<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES	
		<p>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE</p>	<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT LESS THAN 50</p>	<p>CLEAN SANDS</p> <p>(LITTLE OR NO FINES)</p>		SM	SILTY SANDS, SAND - SILT MIXTURES
				<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
			<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT GREATER THAN 50</p>	<p>LIQUID LIMIT LESS THAN 50</p>		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				<p>LIQUID LIMIT LESS THAN 50</p>		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
<p>LIQUID LIMIT LESS THAN 50</p>		OL		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY			
<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT GREATER THAN 50</p>	<p>LIQUID LIMIT GREATER THAN 50</p>		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS			
			CH	INORGANIC CLAYS OF HIGH PLASTICITY			
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS			
<p>HIGHLY ORGANIC SOILS</p>				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS		

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: 33.5 feet
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 31 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: 45 Min After Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 223.7 feet MSL												
				2± inches of Rootmat								
		6		FILL: Gray fine Sandy Silt, trace Silt, loose-very moist		33						
		12		FILL: Gray Brown fine Sand, little medium Sand, little Silt, loose-damp		5						
5		17		ALLUVIUM: Gray Brown fine to medium Sand, trace coarse Sand, trace fine Gravel, trace Silt, little Iron Oxide staining, medium dense-dry to damp		3						
		22		@ 6 feet, little coarse Sand, trace to little fine Gravel		3			2			
10		29				3						
15		34		@ 18½ feet, dense		3						
20		44		Light Gray Brown fine Sand, dense-dry to damp		3						
25		24		Dark Gray Silty fine Sand to fine Sandy Silt, trace Clay, medium dense-very moist		20			44			
30		60		Gray Brown fine to medium Sand, trace coarse Sand, little fine Gravel, little Silt, trace Iron Oxide staining, very dense-wet		13						

TBL 23G130-1R.GPJ_SOCALGEO.GDT 7/2/25



JOB NO.: 23G130-1R DRILLING DATE: 4/11/23 WATER DEPTH: 33.5 feet
 PROJECT: Proposed Warehouse DRILLING METHOD: Hollow Stem Auger CAVE DEPTH: 31 feet
 LOCATION: El Monte, California LOGGED BY: Michelle Krizek READING TAKEN: 45 Min After Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
(Continued)												
40		89/11"			Gray Brown fine to medium Sand, trace coarse Sand, little fine Gravel, little Silt, trace Iron Oxide staining, very dense-wet		12					
45		50/5"			Gray Brown fine to coarse Sand, little fine Gravel, little Silt, trace Iron Oxide staining, very dense-wet							
45		50/5"			Gray Brown Silty fine to coarse Sand, trace fine Gravel, very dense-wet		19					
50		66			Gray Brown Gravelly fine to coarse Sand, trace to little Silt, very dense-wet		10					
Boring Terminated at 50 feet												

TBL_23G130-1R.GPJ_SOCALGEO_GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: Dry
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 20 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 220.7 feet MSL												
				2± inches of Rootmat								
	X	20		FILL: Dark Gray Brown fine Sandy Silt, trace Clay, trace coarse Sand, trace fine root fibers, medium dense-moist to very moist	93	16						
	X	14		ALLUVIUM: Gray Brown Silty fine Sand and fine Sandy Silt, thinly interbedded, little Iron Oxide staining loose-moist to very moist	94	13						
5	X	13			93	18						
	X	18		Gray fine Sand, little medium Sand, trace coarse Sand, trace fine Gravel, medium dense-dry to damp	99	3						
10	X	47		Light Gray fine to medium Sand, trace to little Silt, trace fine Gravel, dense-dry	103	1						
	X	31		Dark Gray Brown fine Sandy Silt with 2-inch Silty fine Sand lenses, trace Clay, medium dense-very moist	102	20						
	X	23		Gray Silty fine Sand, little Clay, trace Iron Oxide staining, medium dense-very moist	96	17						
	X	50		Light Gray Brown fine Sand, trace to little medium to coarse Sand, trace fine Gravel, trace Iron Oxide staining, dense-dry	100	1						
25				Boring Terminated at 25 feet								

TBL_23G130-1R.GPJ_SOCALGEO_GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: Dry
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 19 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 222.8 feet MSL												
				2± inches of Rootmat								
	X	10		FILL: Dark Gray Brown fine Sandy Silt, little Clay, trace medium to coarse Sand, loose-moist to very moist	95	18						El = 5 @ 1 to 5 feet
	X	15		FILL: Gray Brown Silty fine Sand, little Iron Oxide staining, loose-very moist	92	5						
5	X	14		ALLUVIUM: Gray Brown Silty fine Sand, abundant Iron Oxide staining, loose to medium dense-damp	96	9						
	X	18		Gray Brown fine Sand, trace to little medium Sand, little Silt, little Iron Oxide staining, loose to medium dense-damp	96	6						
10	X	10				4						@ 9 feet, Disturbed Sample.
	X	21		@ 14 feet, dry	101	2						
	X	22		Gray Brown fine Sandy Silt, trace Clay, trace to little Iron Oxide staining, medium dense-dry to very moist								
	X	54		Light Gray Brown fine Sand, trace medium Sand, dense-dry	110	2						
25				Boring Terminated at 25 feet								

TBL 23G130-1R.GPJ_SOCALGEO_GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: 38.5 feet
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 26 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS					COMMENTS	
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)		ORGANIC CONTENT (%)
SURFACE ELEVATION: 222.7 feet MSL												
				2± inches of Rootmat								
		5		FILL: Brown fine Sandy Silt, trace Clay, little Iron Oxide staining, trace fine root fibers, loose-very moist		25						El = 1 @ 1 to 5 feet
		8		ALLUVIUM: Gray Brown Silty fine Sand, trace Iron Oxide staining, loose-very moist		15			24			
5		15		Gray Silty fine to medium Sand, trace to little coarse Sand, trace to little fine Gravel, medium dense-damp		4						
		22				2						
10		24				5			25			
		32		Gray fine to coarse Sand, little Silt, little fine Gravel, dense-dry		2						
20		43		Light Brown fine Sand, trace medium Sand, trace Silt, dense-damp		3						
		56		Light Gray Brown fine to coarse Sand, little fine Gravel, trace coarse Gravel, trace Silt, very dense-damp		3						
30		16		Dark Gray Brown Silt, little fine Sand, little Clay, trace Iron Oxide staining, medium dense-very moist		31	34	23	88			

TBL 23G130-1R.GPJ_SOCALGEO.GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: 38.5 feet
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 26 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
(Continued)												
				Dark Gray Brown Silt, little fine Sand, little Clay, trace Iron Oxide staining, medium dense-very moist								
40	X	71		Gray Brown fine to coarse Sand, little fine Gravel, trace coarse Gravel, trace to little Silt, trace Iron Oxide staining, very dense-wet		15						
45	X	58										
50	X	68/10*										
Boring Terminated at 50 feet												

TBL_23G130-1R.GPJ_SOCALGEO.GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: Dry
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 7 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 219.5 feet MSL												
				2± inches of Rootmat								
	X	2		FILL: Dark Gray Brown fine Sandy Silt, trace fine root fibers, very loose-very moist		31						
5	X	11		ALLUVIUM: Gray Brown fine Sand, little Silt, little Iron Oxide staining, loose to medium dense-damp to very moist		7						
	X	6				16						
	X	16				12						
10					Boring Terminated at 10 feet							

TBL_23G130-1R.GPJ_SOCALGEO_GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: Dry
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 5.5 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 222.6 feet MSL												
				2± inches of Rootmat								
	X	4		[Symbol]	<u>FILL:</u> Dark Gray Brown fine Sandy Silt, little Iron Oxide staining, trace fine root fibers, loose-very moist		34					
	X	3		[Symbol]	<u>FILL:</u> Gray Brown Silty fine Sand, little Iron Oxide staining, very loose-moist		10					
5	X			[Symbol]								
	X	10		[Symbol]	<u>ALLUVIUM:</u> Gray Brown fine Sand, trace to little medium to coarse Sand, little Silt, loose to medium dense-damp		3					
	X	7		[Symbol]			4					
10					Boring Terminated at 10 feet							

TBL_23G130-1R.GPJ_SOCALGEO.GDT 7/2/25



JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: Dry
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 7.5 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 224.5 feet MSL												
				2± inches of Rootmat								
	X	3		[Symbol]	<u>FILL</u> : Gray Brown Silty fine Sand, trace coarse Sand, trace fine root fibers, very loose-moist to very moist	13						
5	X	8		[Symbol]	<u>ALLUVIUM</u> : Gray Brown fine Sand, trace to little medium to coarse Sand, little Silt, trace Iron Oxide staining, loose to medium dense-damp to moist	11						
	X	14		[Symbol]		5						
	X	27		[Symbol]		5						
10					Boring Terminated at 10 feet							

TBL_23G130-1R.GPJ_SOCALGEO_GDT_7/2/25



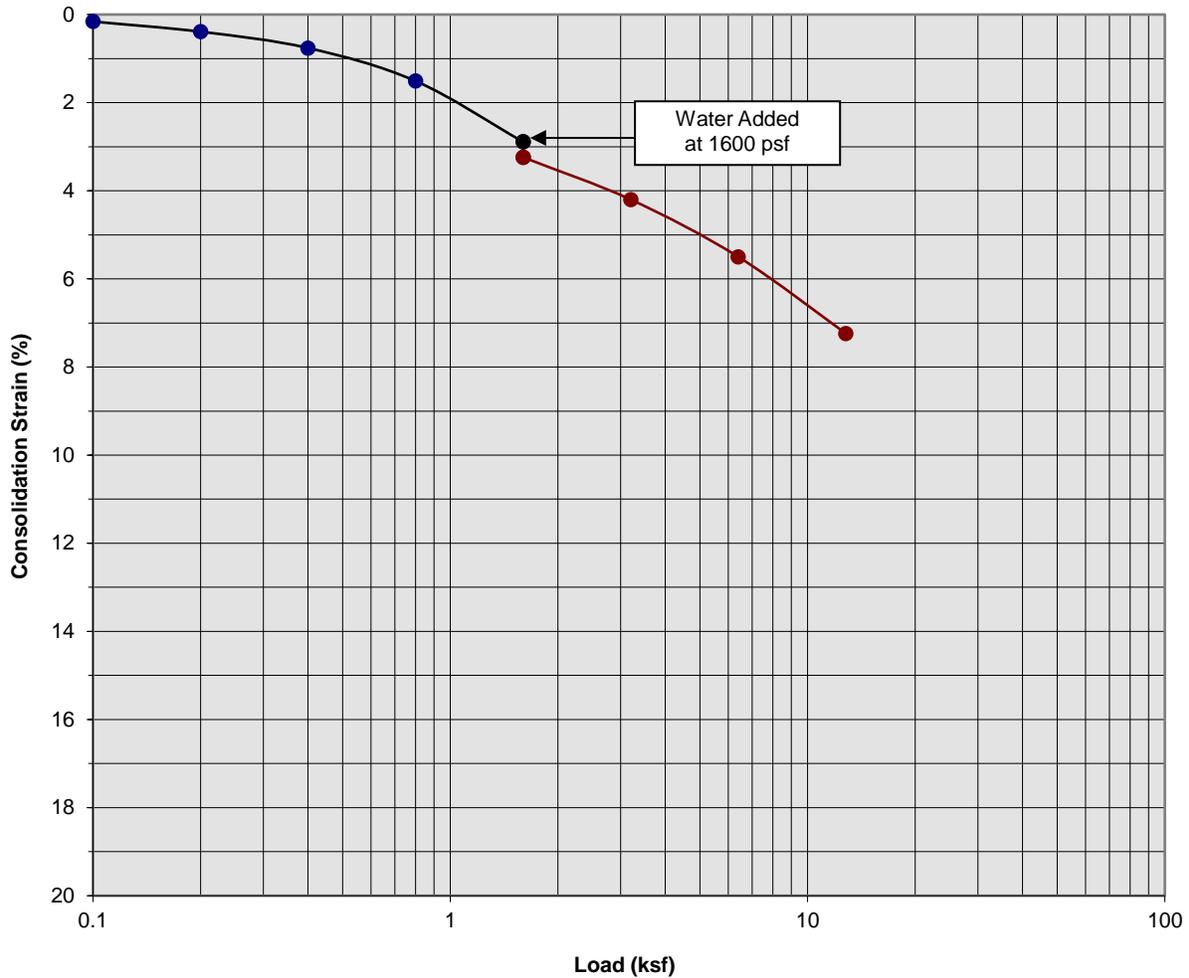
JOB NO.: 23G130-1R	DRILLING DATE: 4/11/23	WATER DEPTH: Dry
PROJECT: Proposed Warehouse	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 8 feet
LOCATION: El Monte, California	LOGGED BY: Michelle Krizek	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	
SURFACE ELEVATION: 224.8 feet MSL												
		2			2± inches of Rootmat							
		7			<u>FILL</u> : Dark Gray Brown fine Sandy Silt, trace Clay, very loose-very moist	30						
5					<u>ALLUVIUM</u> : Gray Brown fine Sand, trace medium Sand, little Silt, trace to little Iron Oxide staining, loose to medium dense-damp to moist	8						
		8			@ 6 feet, trace coarse Sand, trace fine Gravel	6						
		15			7							
10					Boring Terminated at 10 feet							

TBL_23G130-1R.GPJ_SOCALGEO_GDT 7/2/25

A P P E N D I X C

Consolidation/Collapse Test Results



Classification: Gray Brown Silty fine Sand

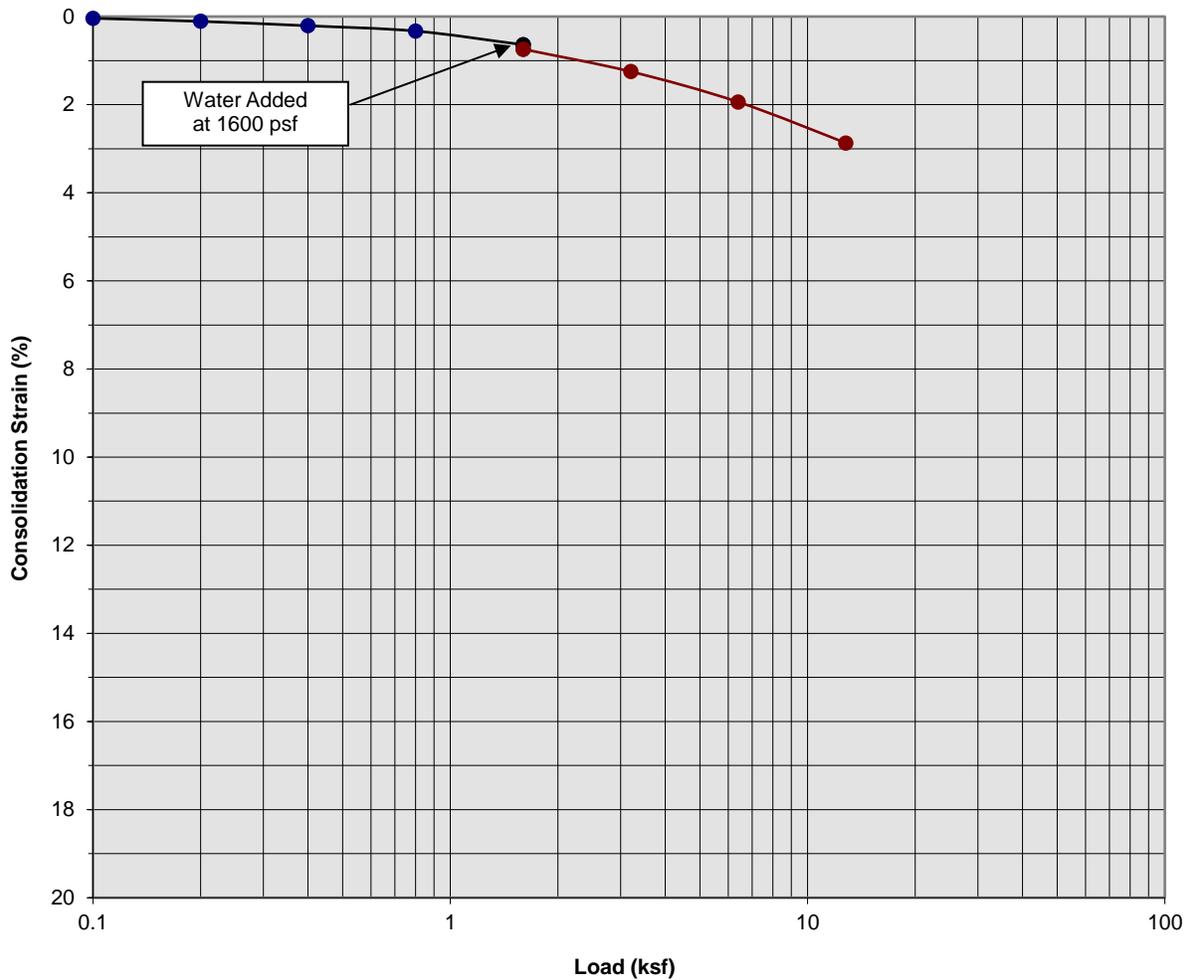
Boring Number:	B-3	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	25
Depth (ft)	3 to 4	Initial Dry Density (pcf)	92.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	98.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.35

Proposed Warehouse
 El Monte, California
 Project No. 23G130-1
PLATE C- 1



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Consolidation/Collapse Test Results



Classification: Gray Brown Silty fine Sand

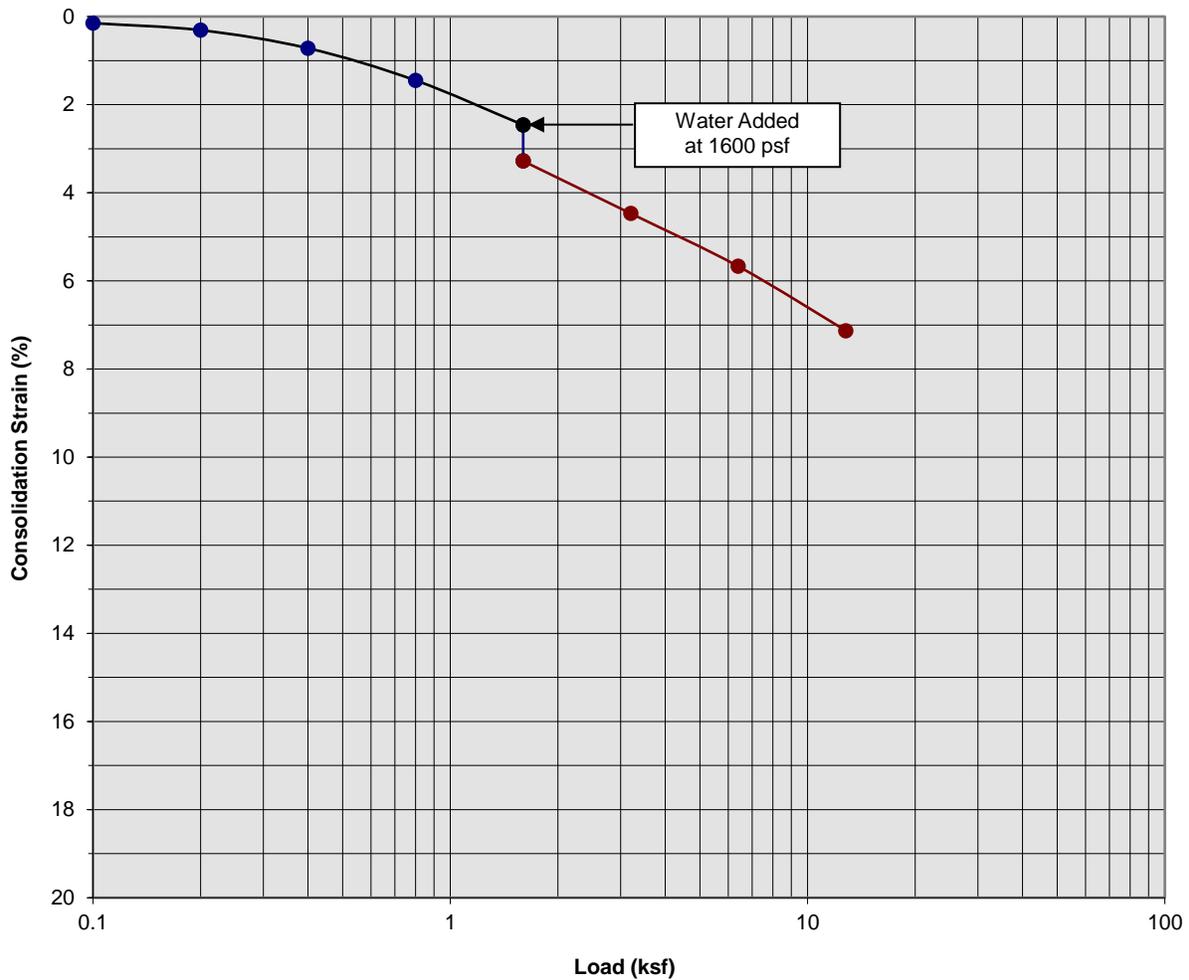
Boring Number:	B-3	Initial Moisture Content (%)	9
Sample Number:	---	Final Moisture Content (%)	23
Depth (ft)	5 to 6	Initial Dry Density (pcf)	96.1
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	99.2
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.10

Proposed Warehouse
 El Monte, California
 Project No. 23G130-1
PLATE C- 2



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Consolidation/Collapse Test Results



Classification: Gray Brown fine Sand, trace to little medium Sand, little Silt

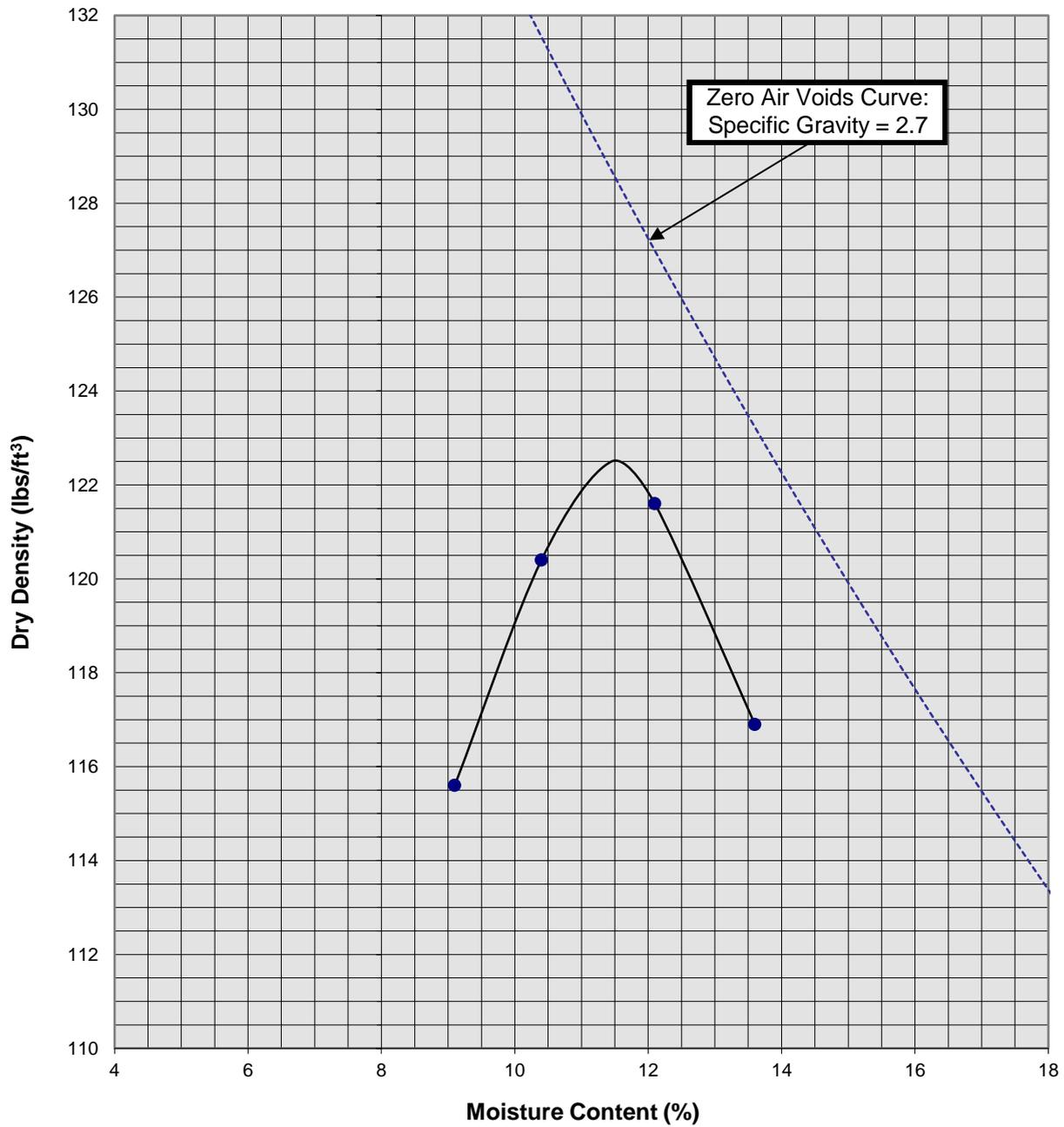
Boring Number:	B-3	Initial Moisture Content (%)	2
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	14 to 14½	Initial Dry Density (pcf)	100.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	107.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.82

Proposed Warehouse
 El Monte, California
 Project No. 23G130-1
PLATE C- 3



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Moisture/Density Relationship ASTM D-1557



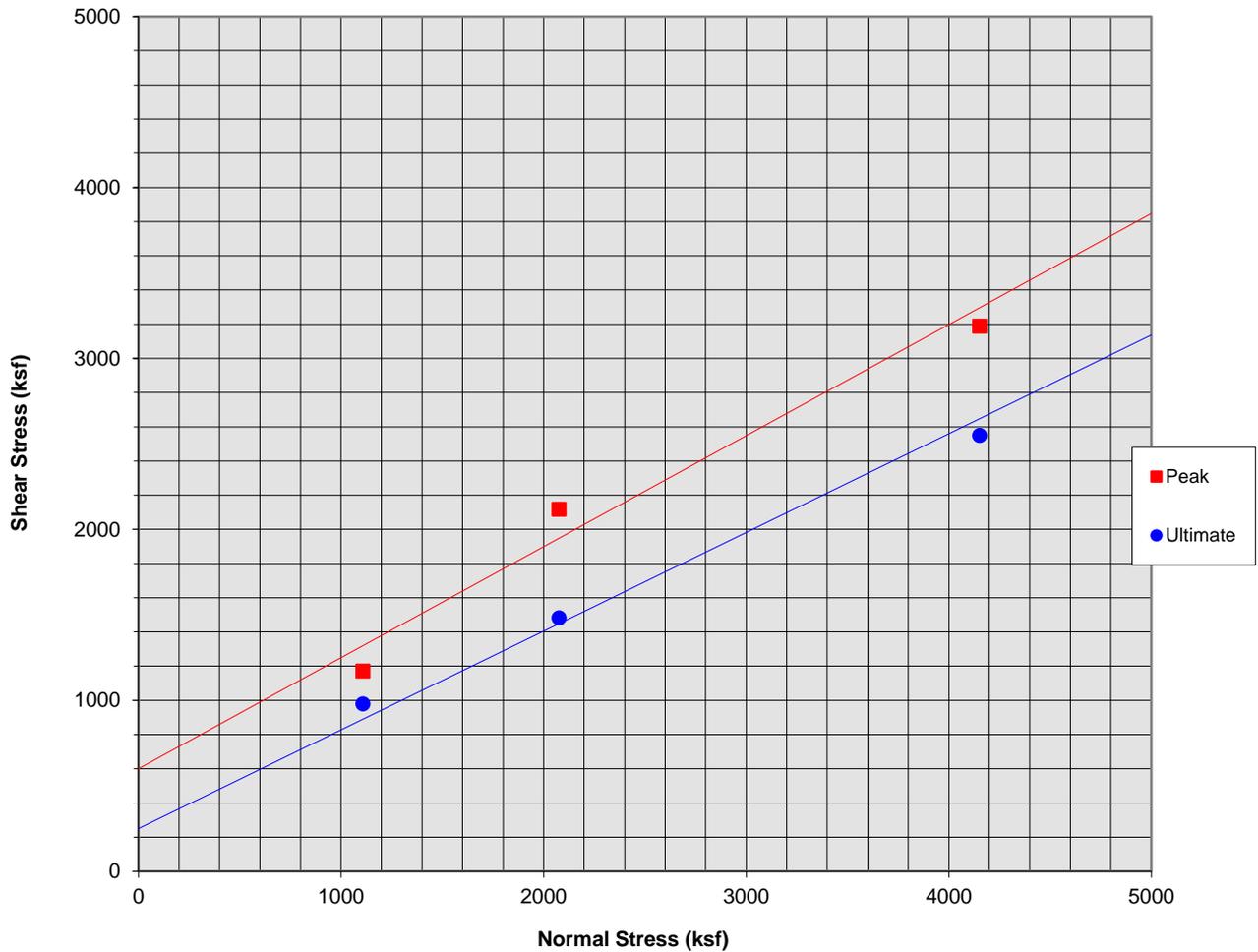
Soil ID Number	B-2 @ 1-5'
Optimum Moisture (%)	11.5
Maximum Dry Density (pcf)	122.5
Soil Classification	Gray Brown fine Sandy Silt, trace coarse Sand

Proposed Warehouse
 El Monte, California
 Project No. 23G130-1
PLATE C- 4



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Direct Shear Test Results (Undisturbed)



Sample Description: B-2 @ 5 to 6 feet

Classification: Gray Brown Silty fine Sand and fine Sandy Silt, thinly interbedded

Sample Data

Initial Moisture Content	18.0
Final Moisture Content	27.0
Initial Dry Density	93.0
Final Dry Density	--
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

Test Results

	Peak	Ultimate
ϕ (°)	33.0	30.0
C (psf)	600	250

Proposed Warehouse
El Monte, California
Project No. 23G130-1

PLATE C- 5



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APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.
- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.
- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.
- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.
- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.
- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.
- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.
- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.
- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.
- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.
- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted
- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as "contaminated," and shall be very low to non-expansive with a maximum expansion index (EI) of 20. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.
- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.
- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.
- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:
 - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.
 - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or

concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

- Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.
- To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.
- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.
- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.
- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.
- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.
- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.
- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.
- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.
- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.
- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a 1/2 horizontal to 1 vertical (0.5:1) inclination.
- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.
- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core
- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.
- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.
- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).
- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.
- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

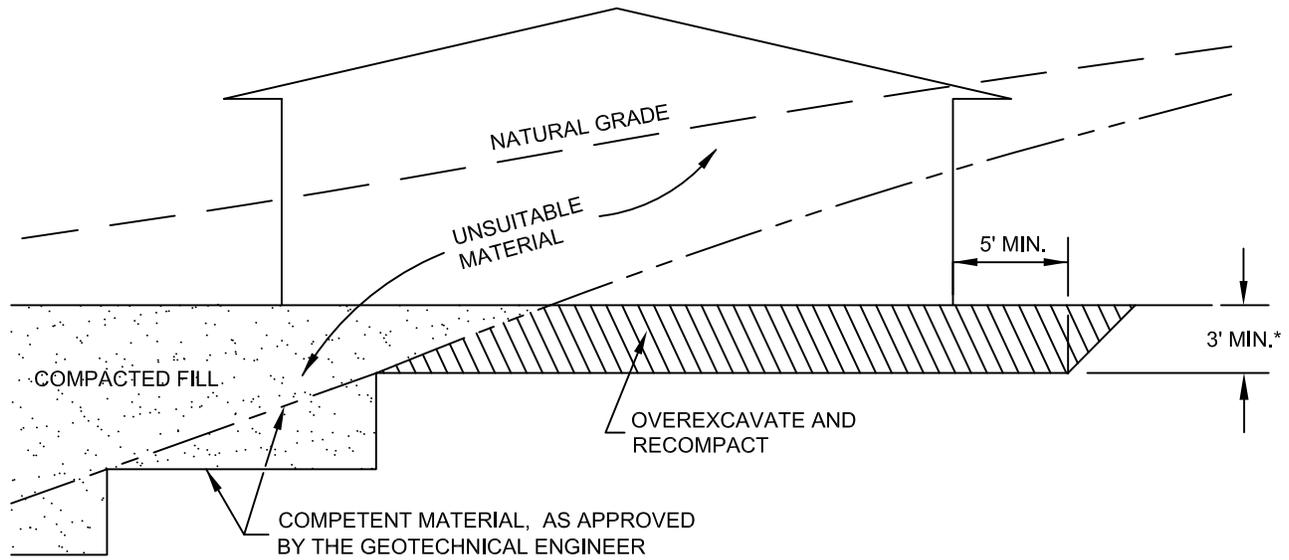
- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.
- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.
- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

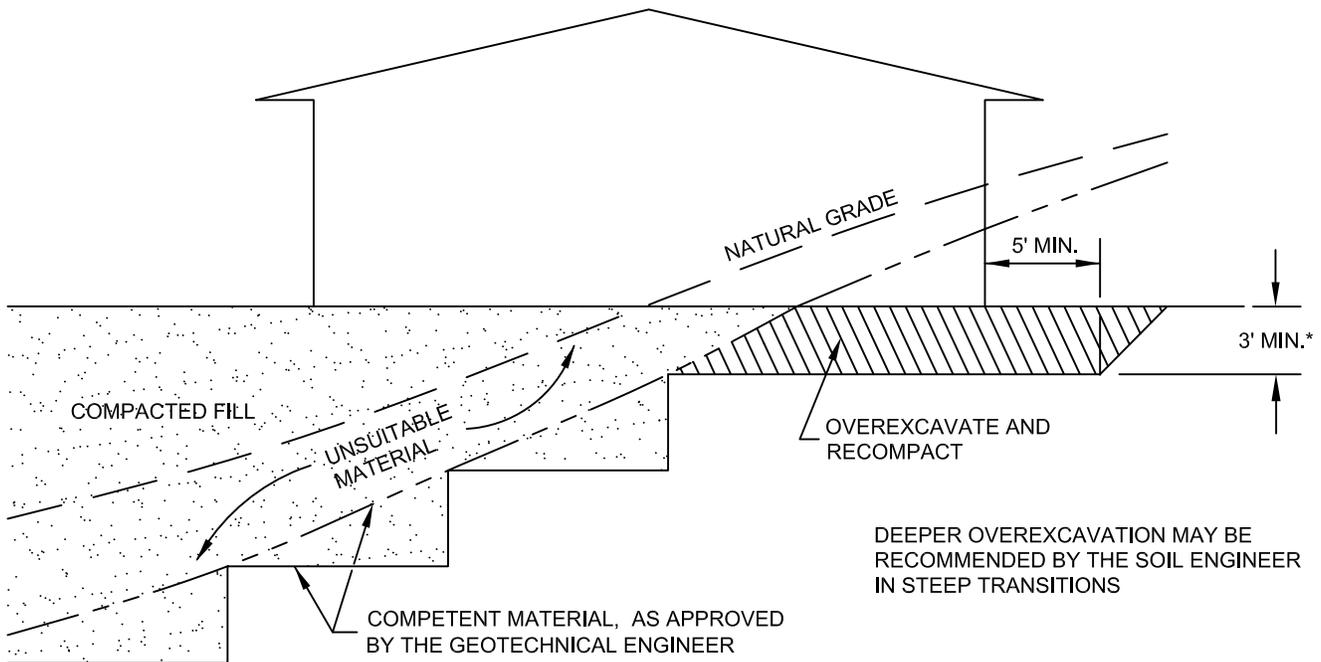
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.
- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean $\frac{3}{4}$ -inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT

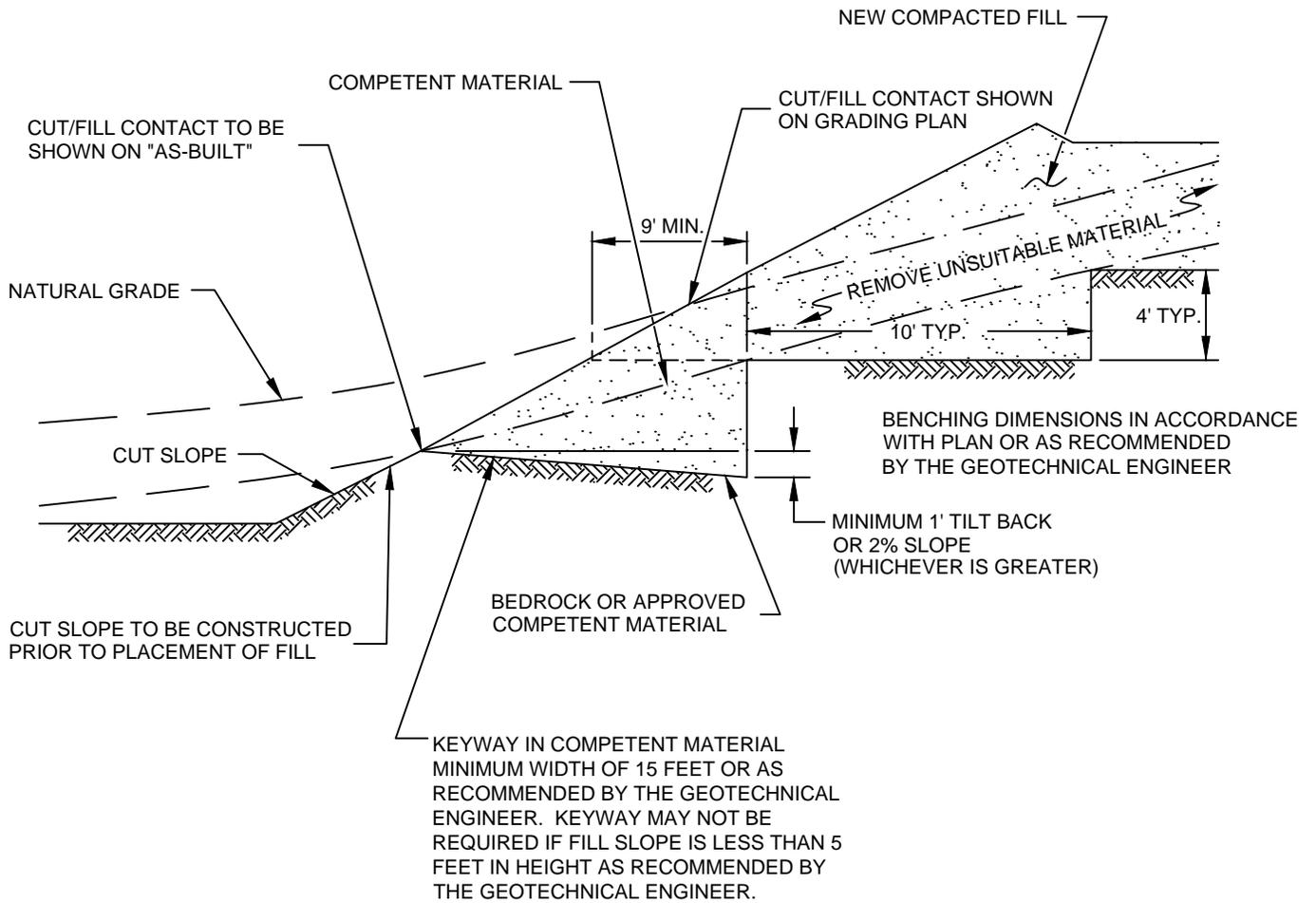


CUT/FILL LOT (TRANSITION)

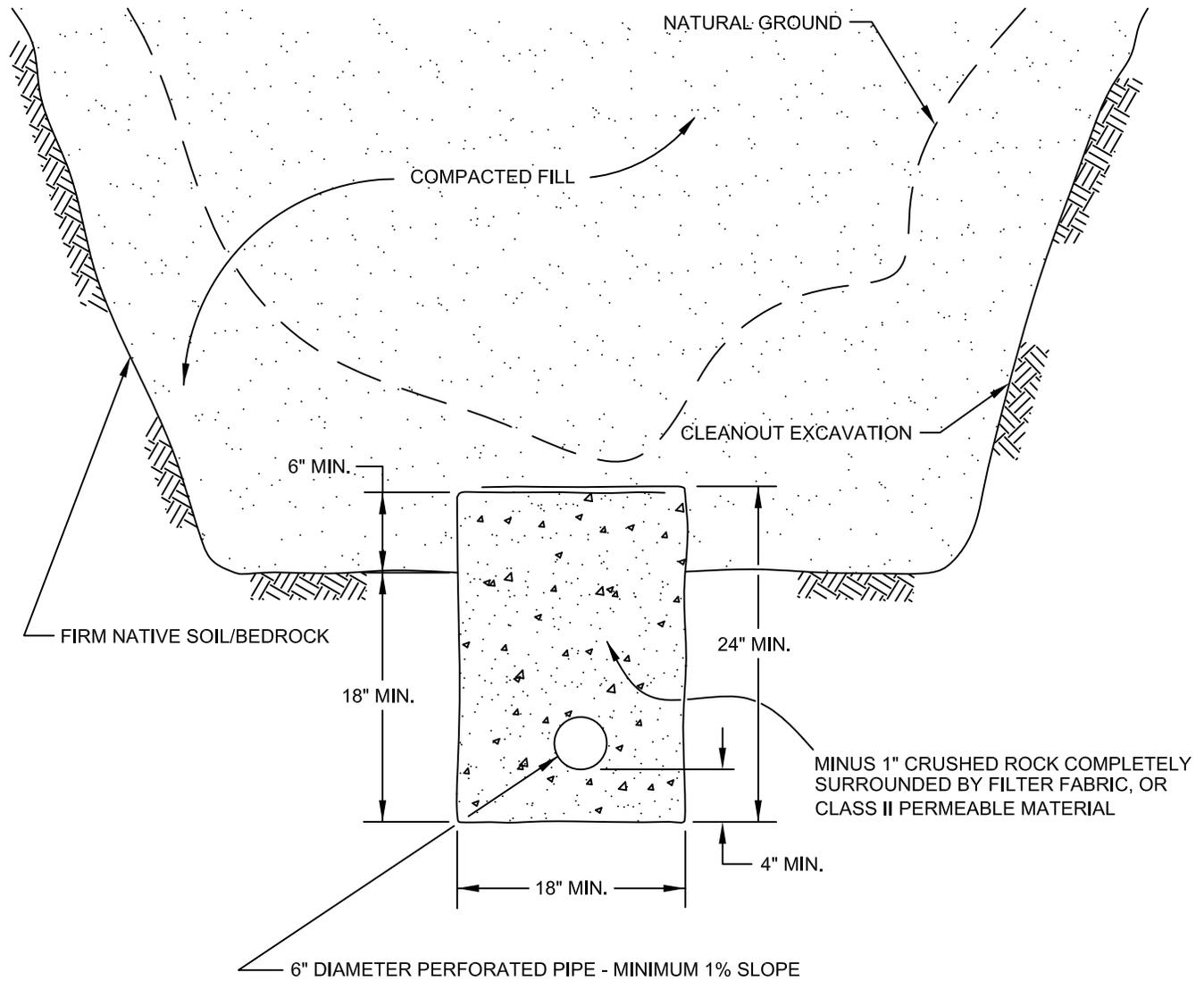


*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION. ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-1	



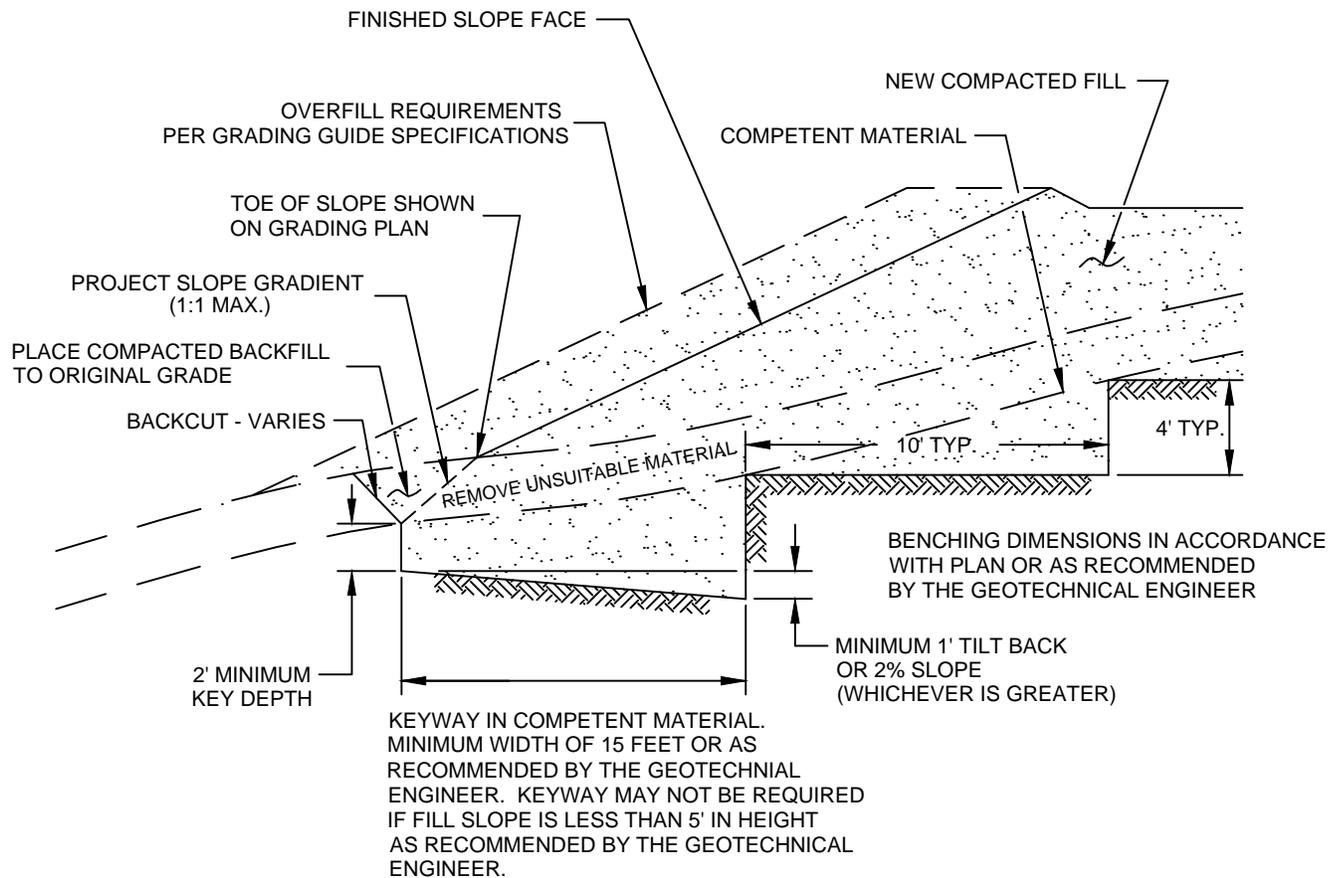
FILL ABOVE CUT SLOPE DETAIL	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-2	



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

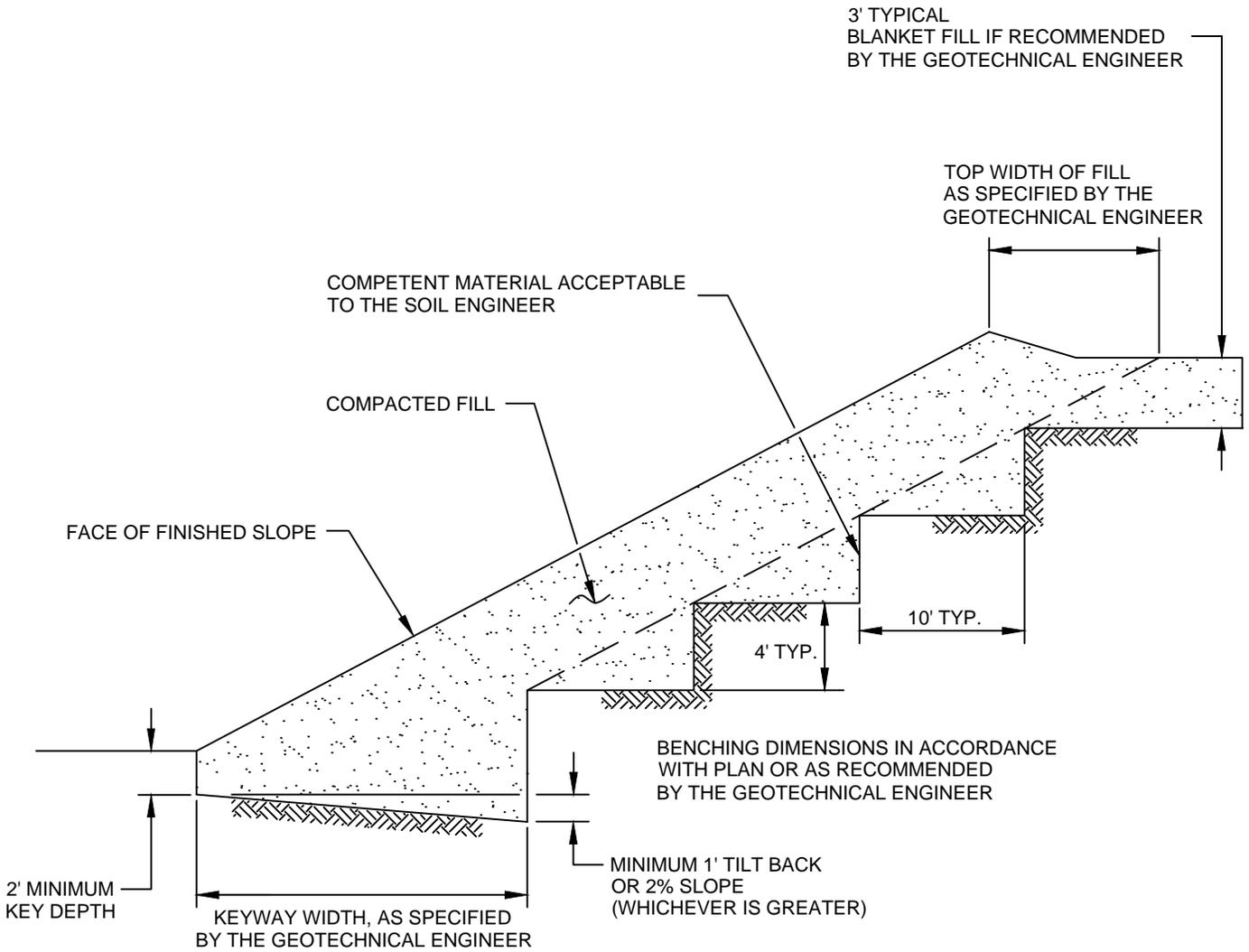
**SCHEMATIC ONLY
NOT TO SCALE**

CANYON SUBDRAIN DETAIL	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-3	

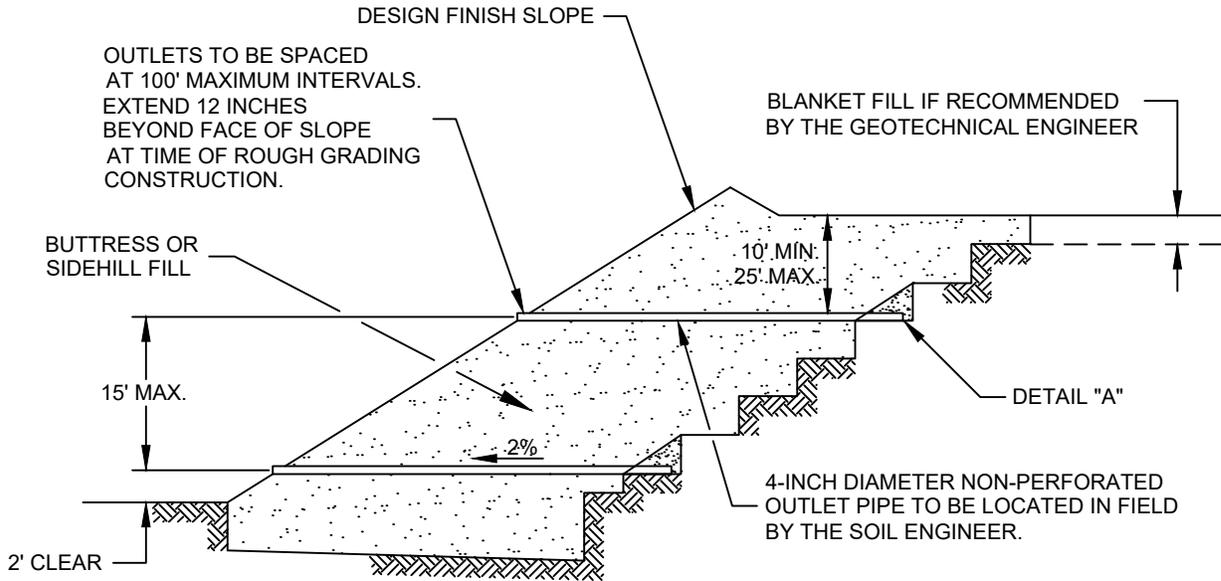


NOTE:
 BENCHING SHALL BE REQUIRED
 WHEN NATURAL SLOPES ARE
 EQUAL TO OR STEEPER THAN 5:1
 OR WHEN RECOMMENDED BY
 THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-4	



STABILIZATION FILL DETAIL	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-5	



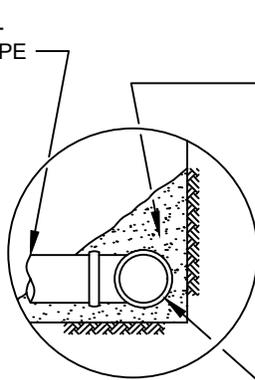
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE 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

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8
SAND EQUIVALENT = MINIMUM OF 50	

OUTLET PIPE TO BE CONNECTED TO SUBDRAIN PIPE WITH TEE OR ELBOW



DETAIL "A"

FILTER MATERIAL - MINIMUM OF FIVE CUBIC FEET PER FOOT OF PIPE. SEE ABOVE FOR FILTER MATERIAL SPECIFICATION.

ALTERNATIVE: IN LIEU OF FILTER MATERIAL FIVE CUBIC FEET OF GRAVEL PER FOOT OF PIPE MAY BE ENCASED IN FILTER FABRIC. SEE ABOVE FOR GRAVEL SPECIFICATION.

FILTER FABRIC SHALL BE MIRAFI 140 OR EQUIVALENT. FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 12 INCHES ON ALL JOINTS.

MINIMUM 4-INCH DIAMETER PVC SCH 40 OR ABS CLASS SDR 35 WITH A CRUSHING STRENGTH OF AT LEAST 1,000 POUNDS, WITH A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

NOTES:

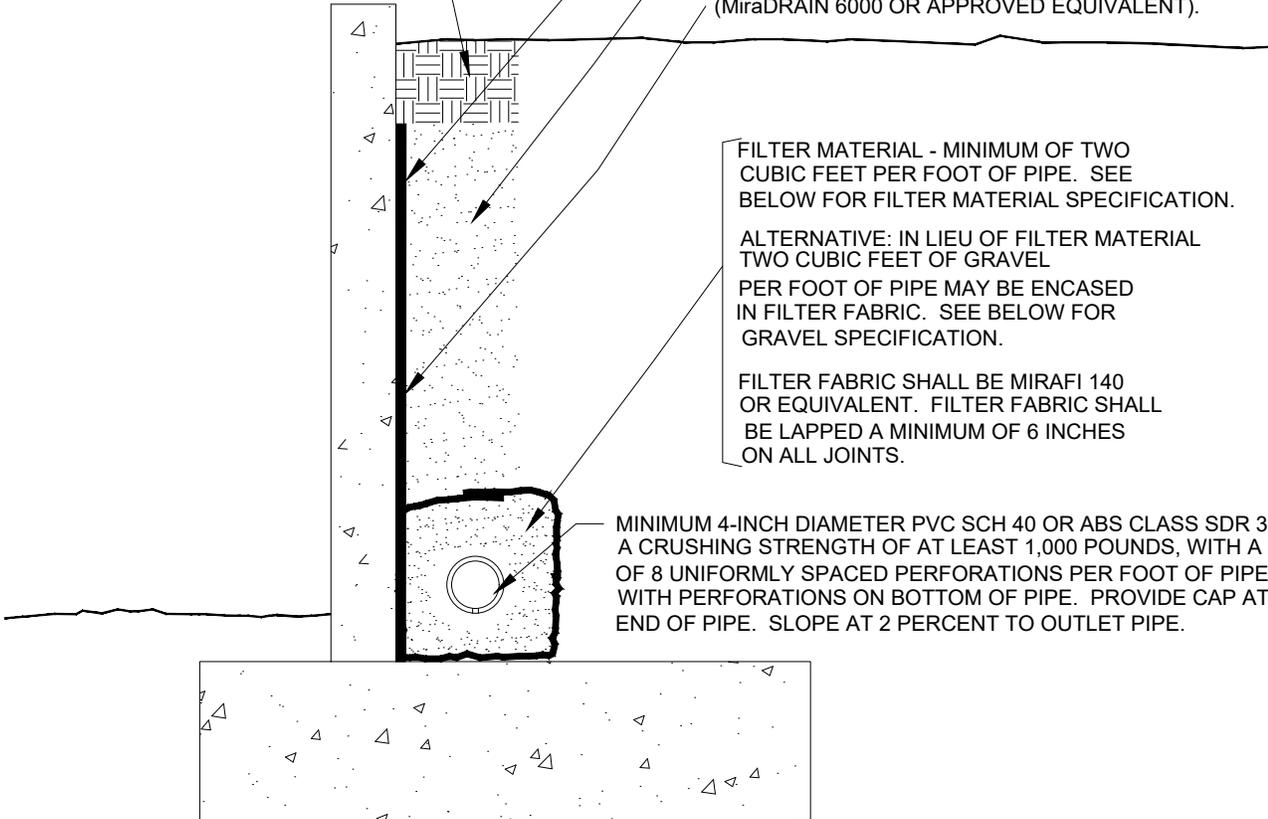
- TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-6	

MINIMUM ONE FOOT THICK LAYER OF LOW PERMEABILITY SOIL IF NOT COVERED WITH AN IMPERMEABLE SURFACE

WATERPROOFING AT FACE OF WALL IN ACCORDANCE WITH ARCHITECTURAL AND/OR STRUCTURAL DETAILS

MINIMUM ONE FOOT WIDE LAYER OF FREE DRAINING MATERIAL (LESS THAN 5% PASSING THE #200 SIEVE) OR PROPERLY INSTALLED PREFABRICATED DRAINAGE COMPOSITE (MiraDRAIN 6000 OR APPROVED EQUIVALENT).



FILTER MATERIAL - MINIMUM OF TWO CUBIC FEET PER FOOT OF PIPE. SEE BELOW FOR FILTER MATERIAL SPECIFICATION.

ALTERNATIVE: IN LIEU OF FILTER MATERIAL TWO CUBIC FEET OF GRAVEL PER FOOT OF PIPE MAY BE ENCASED IN FILTER FABRIC. SEE BELOW FOR GRAVEL SPECIFICATION.

FILTER FABRIC SHALL BE MIRAFI 140 OR EQUIVALENT. FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 6 INCHES ON ALL JOINTS.

MINIMUM 4-INCH DIAMETER PVC SCH 40 OR ABS CLASS SDR 35 WITH A CRUSHING STRENGTH OF AT LEAST 1,000 POUNDS, WITH A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

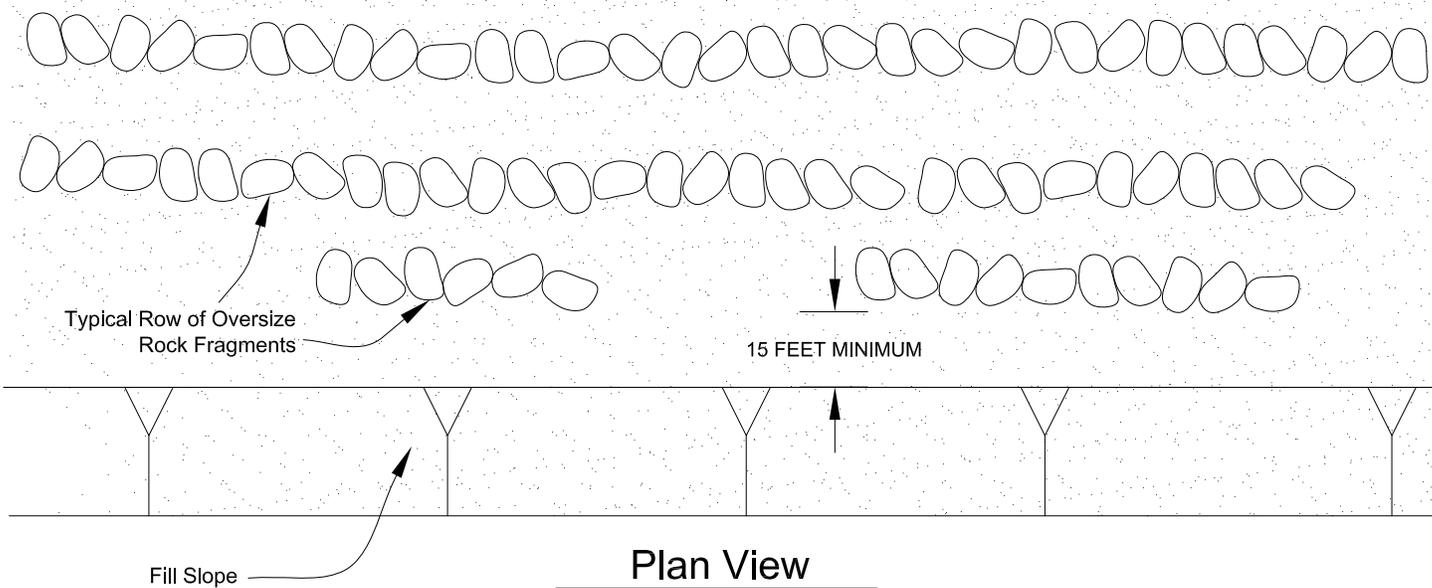
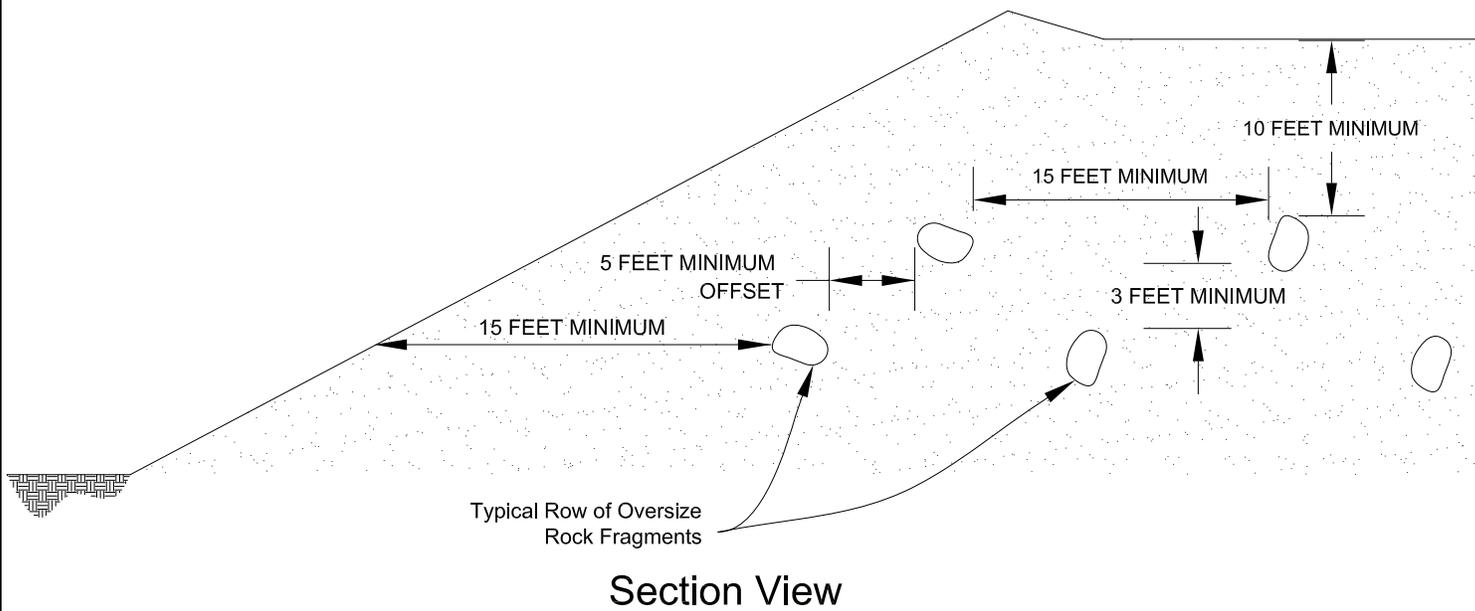
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE 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

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8
SAND EQUIVALENT = MINIMUM OF 50	

RETAINING WALL BACKDRAINS	
GRADING GUIDE SPECIFICATIONS	
NOT TO SCALE	 SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: JAS CHKD: GKM	
PLATE D-7	



**PLACEMENT OF OVERSIZED MATERIAL
GRADING GUIDE SPECIFICATIONS**

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8



**SOUTHERN
CALIFORNIA
GEOTECHNICAL**

APPENDIX E



Latitude, Longitude: 34.03724217, -118.05156087



Date	4/12/2023, 3:33:00 PM
Design Code Reference Document	ASCE7-16
Risk Category	III
Site Class	D - Stiff Soil

Type	Value	Description
S _S	1.89	MCE _R ground motion. (for 0.2 second period)
S ₁	0.677	MCE _R ground motion. (for 1.0s period)
S _{MS}	1.89	Site-modified spectral acceleration value
S _{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S _{DS}	1.26	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	0.815	MCE _G peak ground acceleration
F _{PGA}	1.1	Site amplification factor at PGA
PGA _M	0.896	Site modified peak ground acceleration
T _L	8	Long-period transition period in seconds
SsRT	1.89	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.108	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.32	Factored deterministic acceleration value. (0.2 second)
S1RT	0.677	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.756	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.832	Factored deterministic acceleration value. (1.0 second)
PGAd	0.93	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA _{UH}	0.815	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.896	Mapped value of the risk coefficient at short periods
C _{R1}	0.896	Mapped value of the risk coefficient at a period of 1 s
C _V	1.478	Vertical coefficient

SOURCE: SEAOC/OSHPD Seismic Design Maps Tool
<https://seismicmaps.org/>



SEISMIC DESIGN PARAMETERS - 2022 CBC

PROPOSED WAREHOUSE

EL MONTE, CALIFORNIA

DRAWN: MK
 CHKD: RGT
 SCG PROJECT
 23G130-1
PLATE E-1



SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX

SUMMARY
OF
CONE PENETRATION TEST DATA

Project:

**825 Lexington-Gallatin Road
El Monte, CA
April 17, 2023**

Prepared for:

**Mr. Daryl Kas
Southern California Geotechnical, Inc.
22885 E. Savi Ranch Parkway, Ste E
Yorba Linda, CA 92887
Office (714) 685-1115 / Fax (714) 685-1118**

Prepared by:



KEHOE TESTING & ENGINEERING

5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289
www.kehoetesting.com

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- 1. INTRODUCTION**
- 2. SUMMARY OF FIELD WORK**
- 3. FIELD EQUIPMENT & PROCEDURES**
- 4. CONE PENETRATION TEST DATA & INTERPRETATION**

APPENDIX

- CPT Plots
- CPT Classification/Soil Behavior Chart
- Pore Pressure Dissipation Graphs
- CPT Data Files (sent via email)

SUMMARY OF CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the project located at 825 Lexington-Gallatin Road in El Monte, California. The work was performed by Kehoe Testing & Engineering (KTE) on April 17, 2023. The scope of work was performed as directed by Southern California Geotechnical, Inc. personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at four locations to determine the soil lithology. A summary is provided in **TABLE 2.1**.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	46	Refusal
CPT-2	50	
CPT-3	39	Refusal
CPT-4	45	Refusal

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm² cone with a cone net area ratio of 0.83. The following parameters were recorded at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed
- Pore Pressure Dissipation (at selected depths)

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for up to 2 years for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil behavior type on the CPT plots is derived from the attached CPT SBT plot (Robertson, "Interpretation of Cone Penetration Test...", 2009) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (q_c), sleeve friction (f_s), and penetration pore pressure (u). The friction ratio (R_f), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

The CPT data files have also been provided. These files can be imported in CPeT-IT (software by GeoLogismiki) and other programs to calculate various geotechnical parameters.

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

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

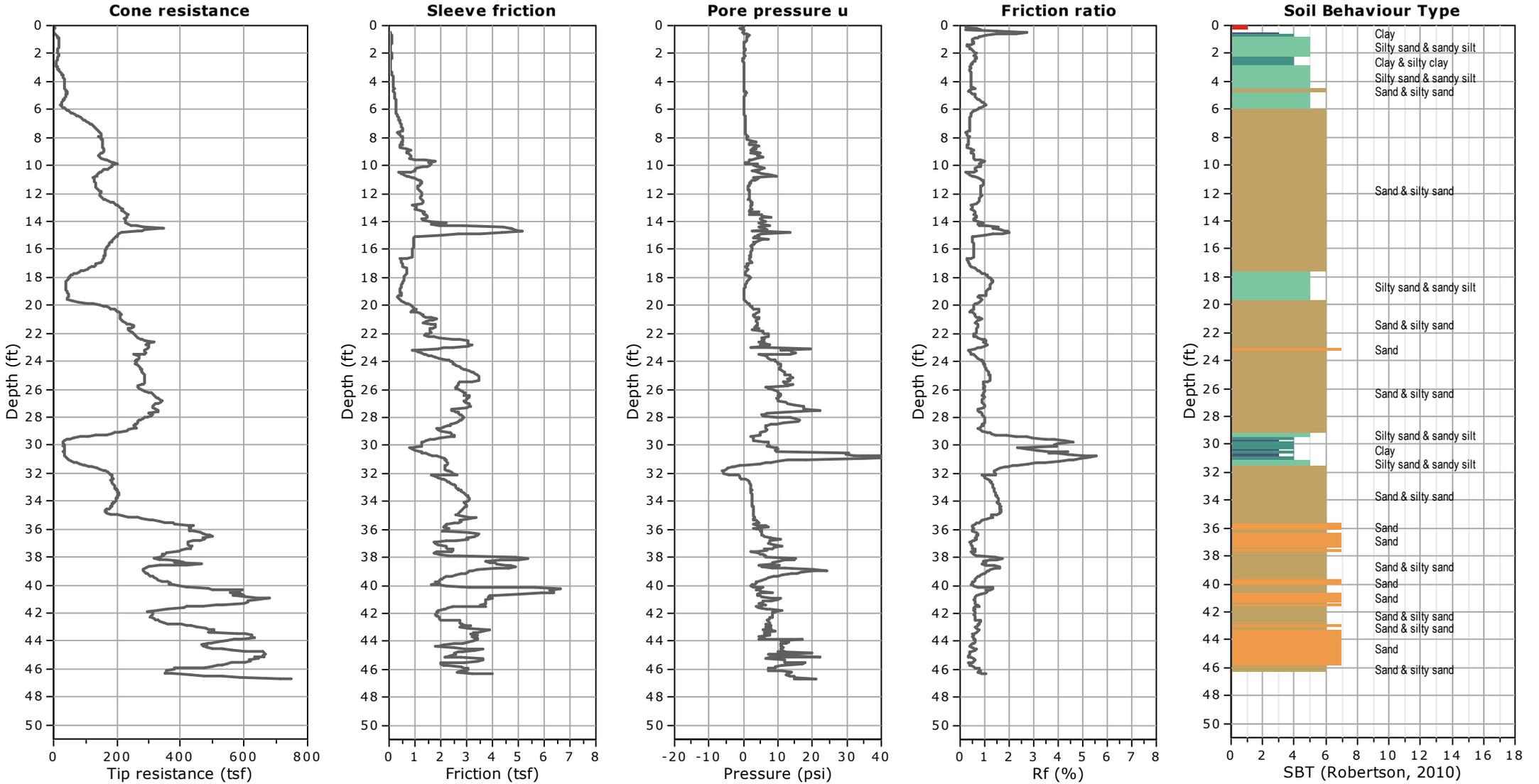
Sincerely,

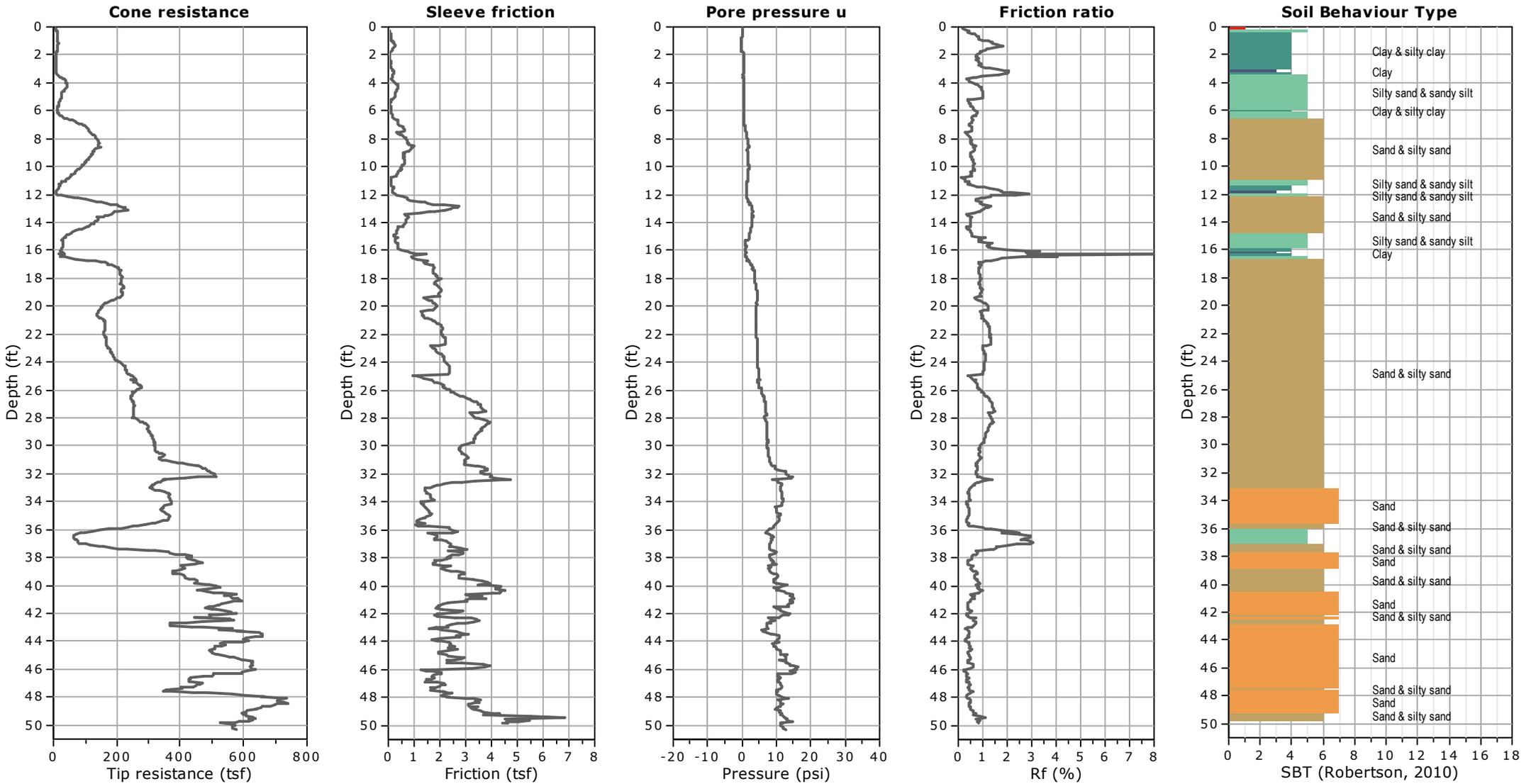
KEHOE TESTING & ENGINEERING

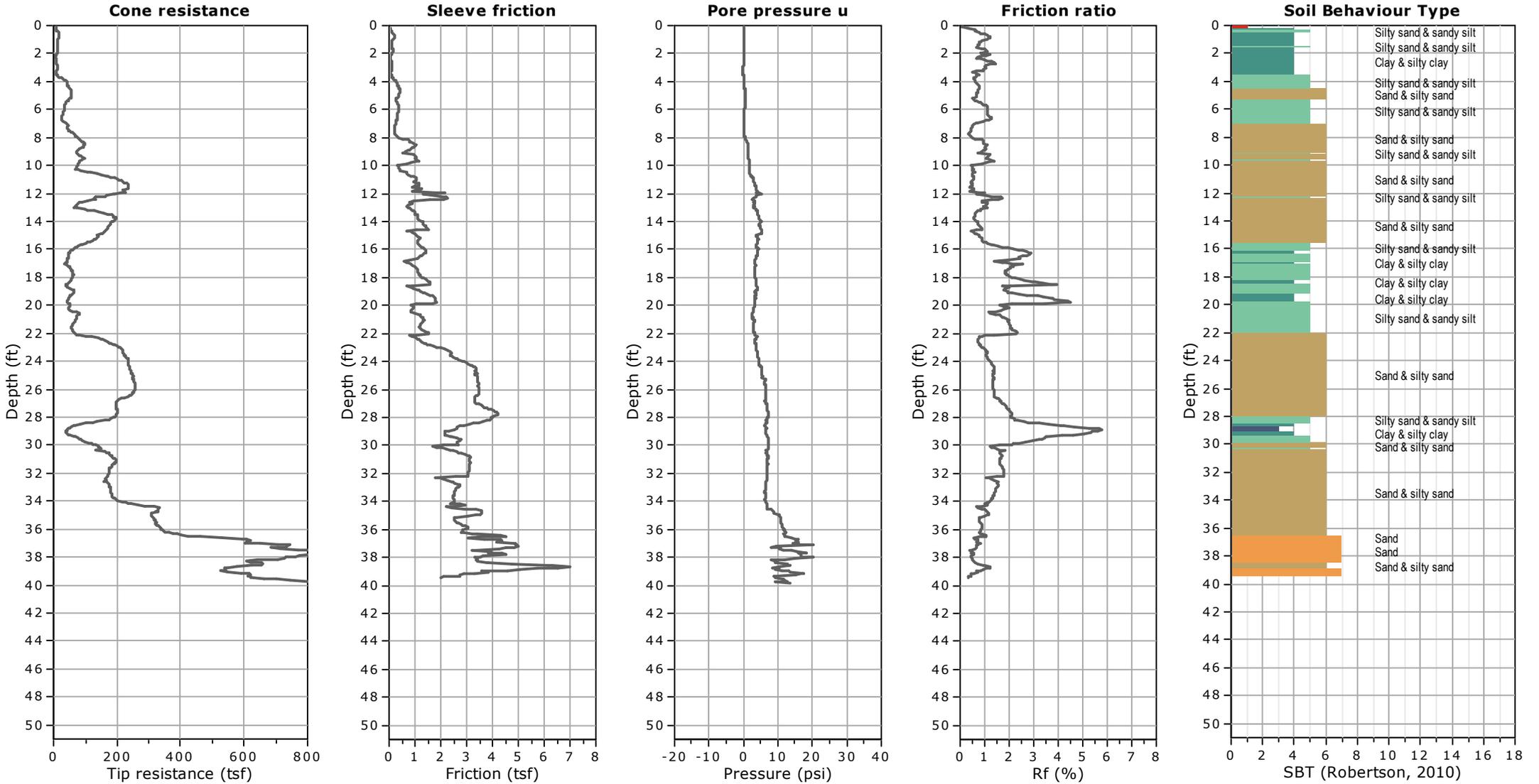


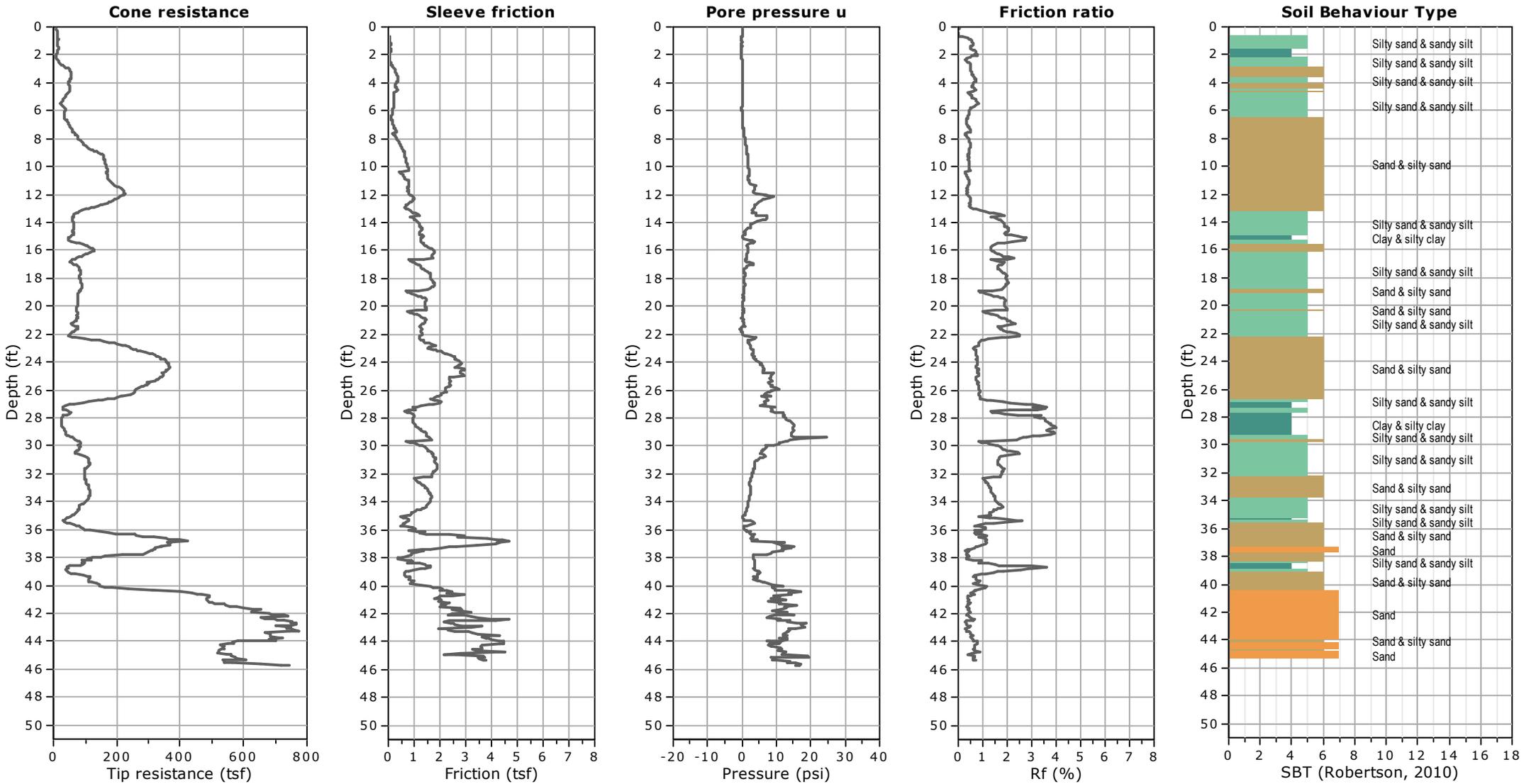
Steven P. Kehoe
President

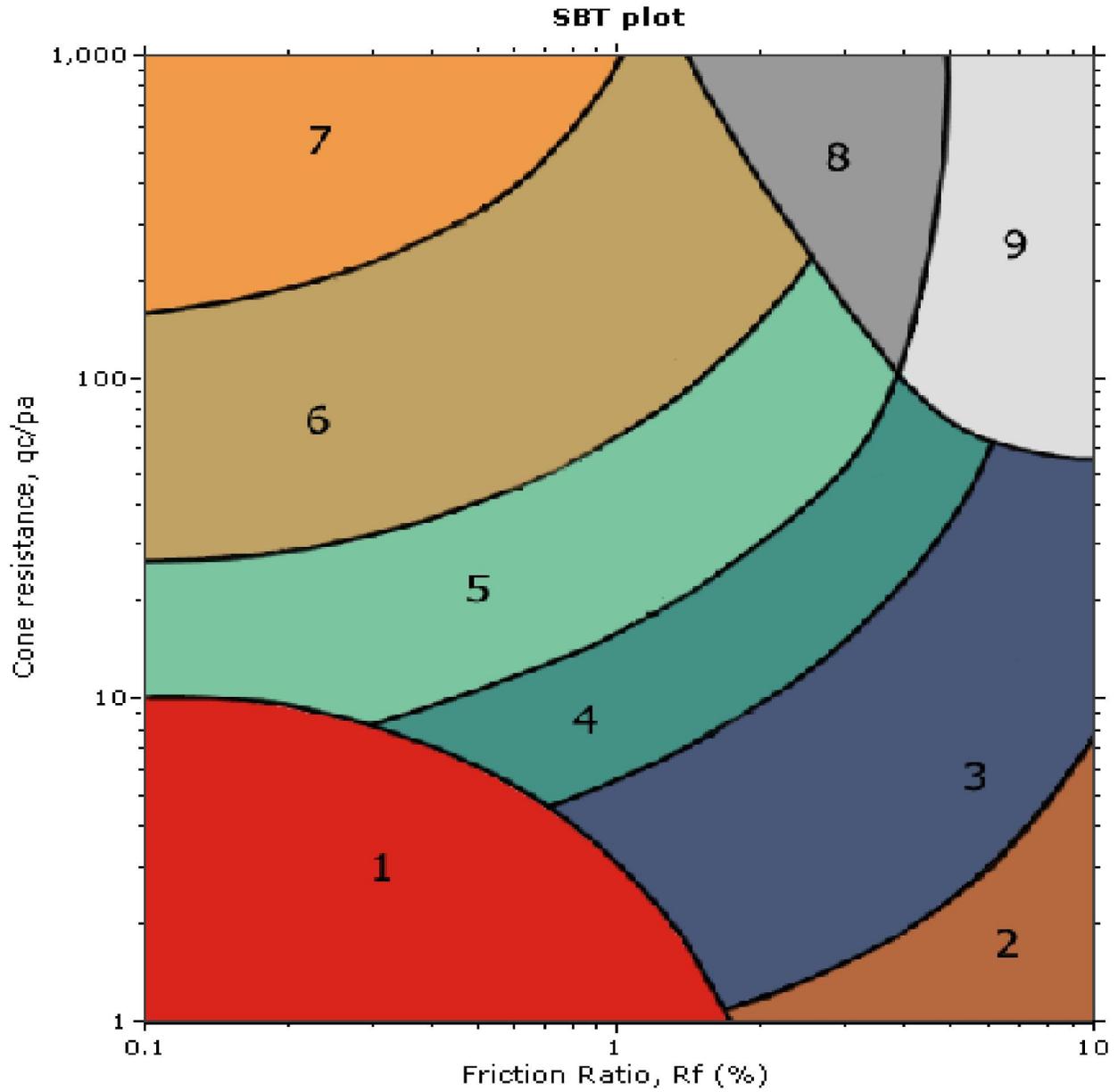
APPENDIX







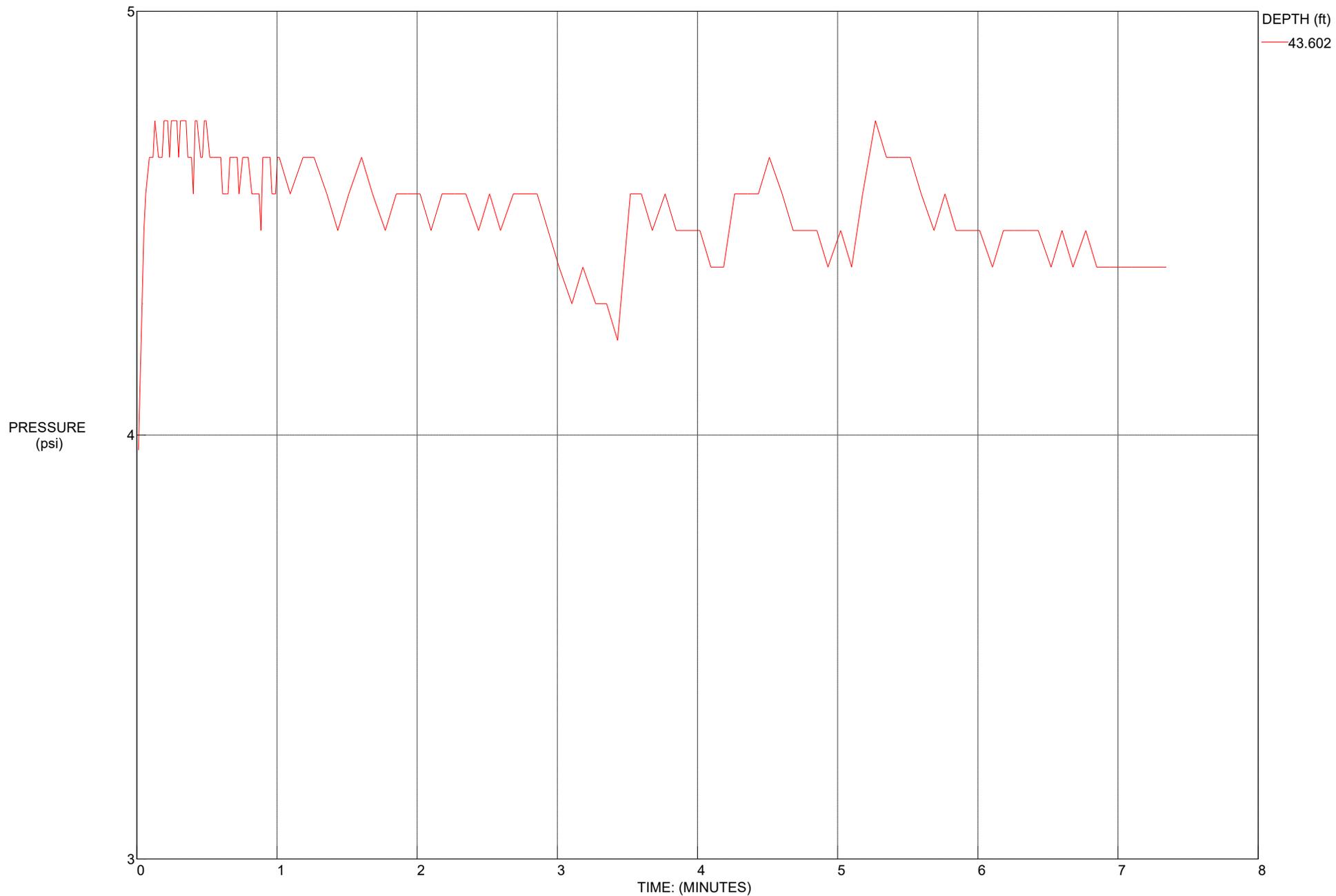




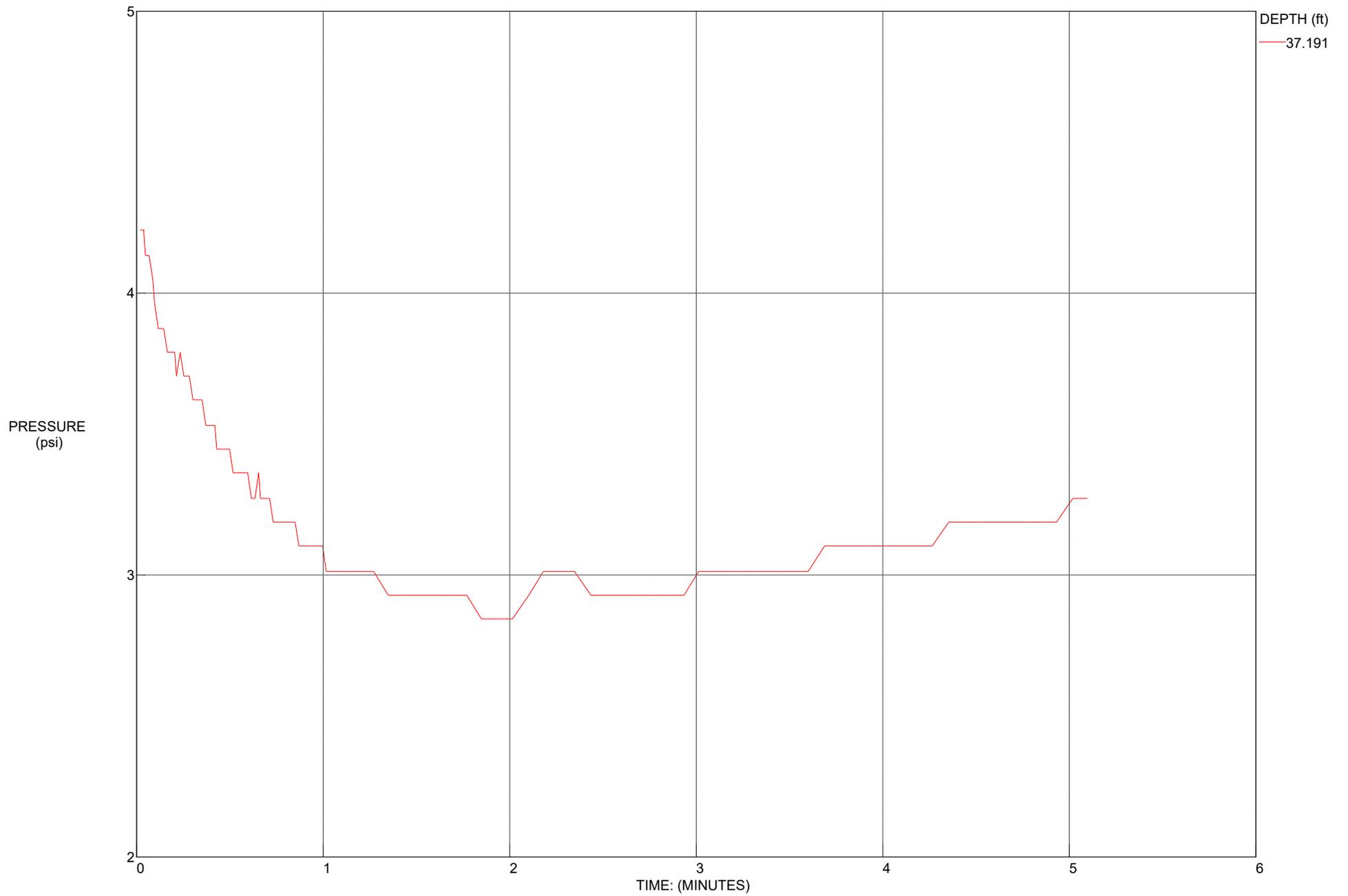
SBT legend

- | | | |
|---------------------------|------------------------------|-----------------------------------|
| 1. Sensitive fine grained | 4. Clayey silt to silty clay | 7. Gravely sand to sand |
| 2. Organic material | 5. Silty sand to sandy silt | 8. Very stiff sand to clayey sand |
| 3. Clay to silty clay | 6. Clean sand to silty sand | 9. Very stiff fine grained |

TEST ID: CPT-1



TEST ID: CPT-4



APPENDIX G

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CPT-1 results	
Summary data report	1
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Vertical settlements summary report	31
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LIQUEFACTION ANALYSIS REPORT

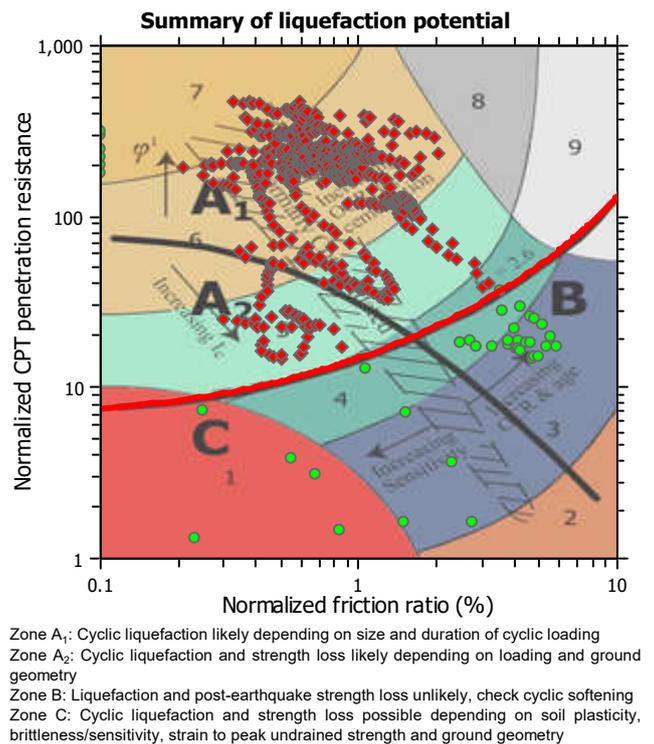
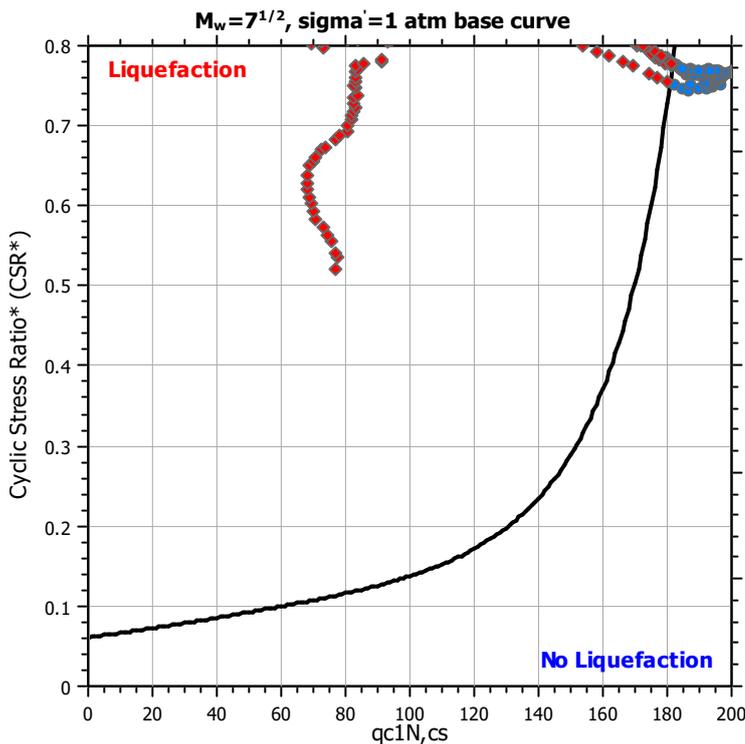
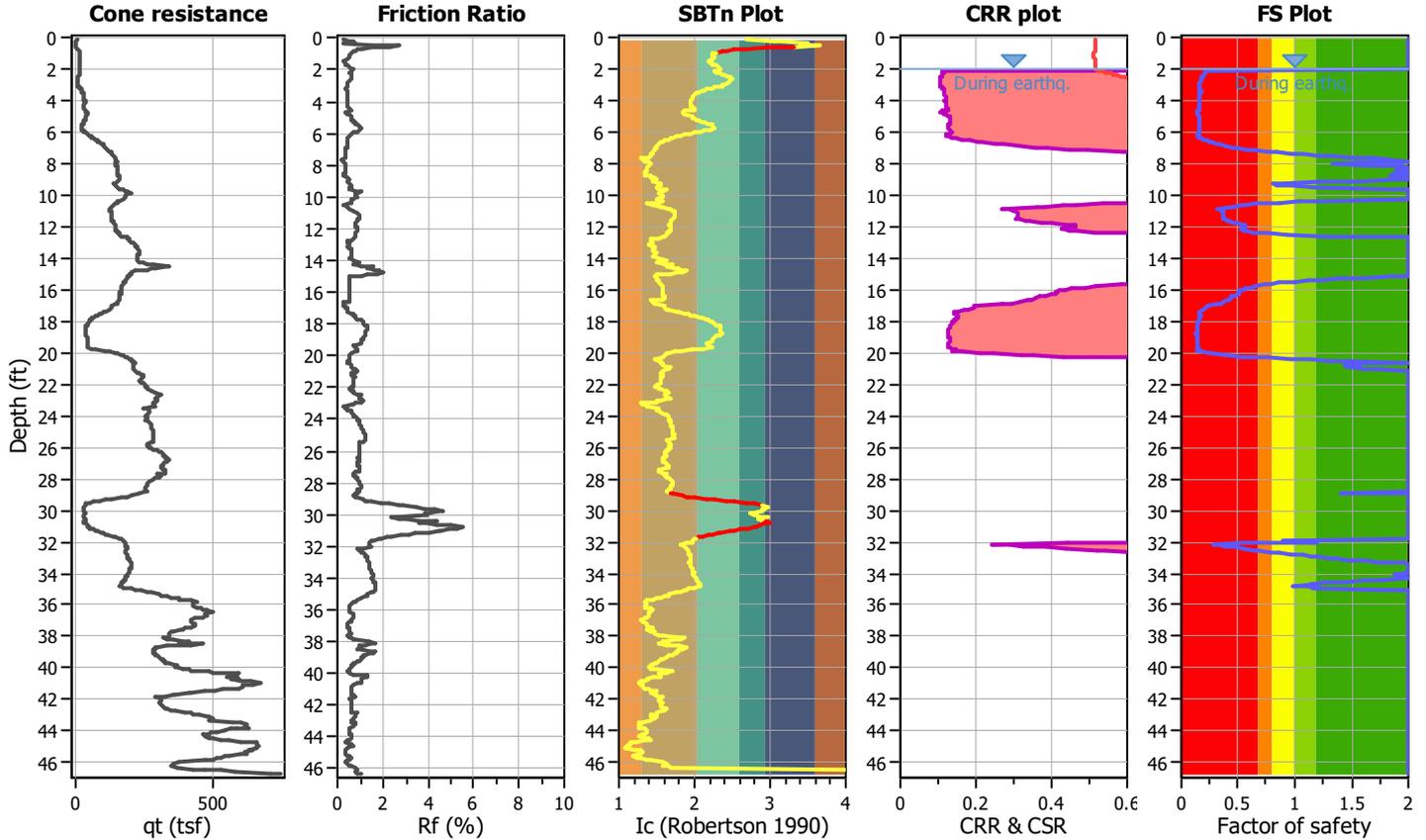
Project title : Proposed Warehouse

Location : El Monte, CA

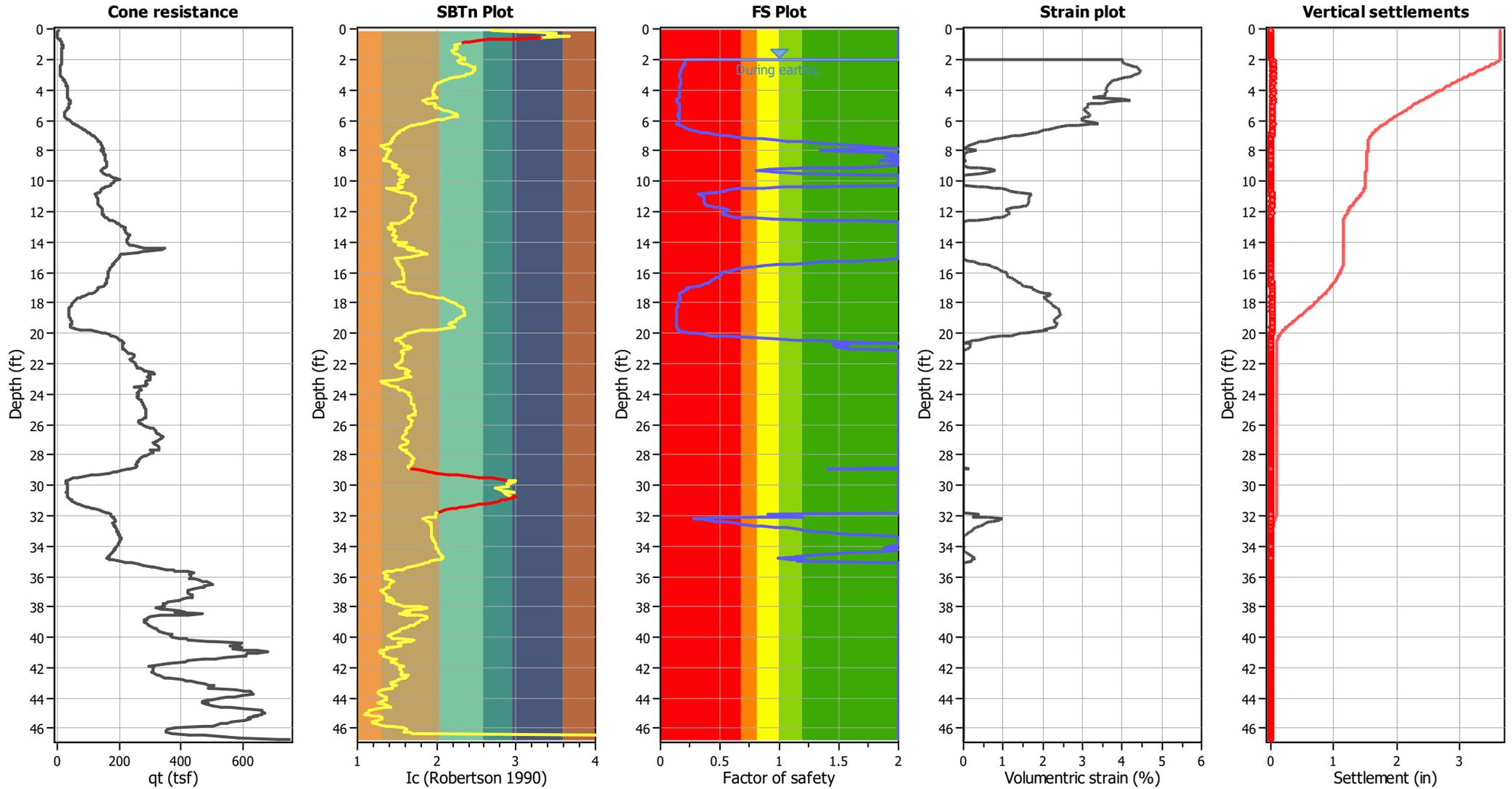
CPT file : CPT-1

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w :	6.89	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Estimation of post-earthquake settlements



Abbreviations

- qt: Total cone resistance (cone resistance q_c corrected for pore water effects)
- I_c: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement due to soil liquefaction ::											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
2.04	76.73	0.22	4.03	0.97	0.03	2.13	77.22	0.21	4.00	0.96	0.04
2.17	76.99	0.21	4.01	0.96	0.02	2.26	75.83	0.20	4.06	0.96	0.05
2.31	74.65	0.20	4.11	0.96	0.03	2.37	72.90	0.19	4.20	0.96	0.03
2.45	70.88	0.19	4.31	0.96	0.04	2.50	69.71	0.18	4.37	0.96	0.03
2.58	69.16	0.18	4.40	0.96	0.04	2.63	68.69	0.17	4.42	0.96	0.03
2.71	68.07	0.17	4.45	0.95	0.04	2.76	68.09	0.17	4.45	0.95	0.03
2.85	68.41	0.17	4.42	0.95	0.05	2.93	68.94	0.16	4.38	0.95	0.05
2.98	69.84	0.16	4.33	0.95	0.02	3.03	70.38	0.16	4.29	0.95	0.03
3.11	72.71	0.16	4.16	0.95	0.04	3.15	74.04	0.16	4.09	0.95	0.02
3.25	76.89	0.17	3.93	0.94	0.04	3.30	78.43	0.17	3.86	0.94	0.02
3.35	80.33	0.17	3.77	0.94	0.03	3.43	80.86	0.17	3.74	0.94	0.03
3.52	81.67	0.17	3.70	0.94	0.04	3.56	81.97	0.17	3.68	0.94	0.02
3.63	82.56	0.16	3.65	0.94	0.03	3.70	82.97	0.16	3.63	0.94	0.03
3.75	82.75	0.16	3.63	0.94	0.02	3.83	82.79	0.16	3.63	0.94	0.03
3.88	83.57	0.16	3.59	0.93	0.02	3.97	83.20	0.16	3.60	0.93	0.04
4.01	82.58	0.16	3.62	0.93	0.02	4.09	82.91	0.16	3.60	0.93	0.03
4.13	83.35	0.16	3.58	0.93	0.02	4.23	83.25	0.16	3.58	0.93	0.04
4.28	83.71	0.16	3.56	0.93	0.02	4.36	83.18	0.15	3.58	0.93	0.03
4.41	85.82	0.16	3.46	0.93	0.02	4.50	91.48	0.16	3.25	0.92	0.03
4.54	90.99	0.16	3.26	0.92	0.02	4.62	72.99	0.14	4.03	0.92	0.04
4.67	69.60	0.13	4.21	0.92	0.03	4.72	72.70	0.14	4.04	0.92	0.02
4.81	80.46	0.14	3.66	0.92	0.04	4.86	83.61	0.15	3.52	0.92	0.02
4.93	92.91	0.16	3.17	0.92	0.03	4.99	94.52	0.16	3.11	0.92	0.02
5.08	93.64	0.16	3.14	0.91	0.03	5.12	94.63	0.16	3.10	0.91	0.02
5.21	95.44	0.16	3.07	0.91	0.03	5.26	96.16	0.16	3.05	0.91	0.02
5.32	96.24	0.16	3.04	0.91	0.02	5.38	95.09	0.16	3.07	0.91	0.02
5.47	93.39	0.16	3.12	0.91	0.03	5.53	92.58	0.15	3.15	0.91	0.02
5.59	91.43	0.15	3.18	0.91	0.02	5.66	91.20	0.15	3.19	0.90	0.03
5.71	91.47	0.15	3.18	0.90	0.02	5.79	93.21	0.15	3.11	0.90	0.03
5.88	96.09	0.16	3.01	0.90	0.03	5.91	97.40	0.16	2.97	0.90	0.01
5.97	97.70	0.16	2.96	0.90	0.02	6.06	94.72	0.15	3.05	0.90	0.03
6.11	88.00	0.14	3.27	0.90	0.02	6.20	84.61	0.14	3.40	0.89	0.04
6.24	89.75	0.14	3.20	0.89	0.02	6.30	98.79	0.16	2.91	0.89	0.02
6.37	107.85	0.17	2.65	0.89	0.02	6.45	116.93	0.19	2.43	0.89	0.02
6.51	125.11	0.22	2.26	0.89	0.02	6.58	131.74	0.24	2.13	0.89	0.02
6.63	135.49	0.26	2.06	0.89	0.01	6.73	143.68	0.31	1.93	0.89	0.02
6.77	147.75	0.34	1.87	0.89	0.01	6.84	153.62	0.39	1.79	0.88	0.01
6.91	158.36	0.45	1.61	0.88	0.01	6.96	161.64	0.49	1.44	0.88	0.01
7.04	166.28	0.57	1.23	0.88	0.01	7.09	169.37	0.64	1.10	0.88	0.01
7.18	174.55	0.77	0.92	0.88	0.01	7.23	177.01	0.85	0.84	0.88	0.00
7.30	180.21	0.97	0.68	0.88	0.01	7.36	182.28	1.06	0.56	0.88	0.00
7.42	185.26	1.22	0.41	0.87	0.00	7.49	186.84	1.31	0.34	0.87	0.00
7.55	189.90	1.50	0.21	0.87	0.00	7.62	192.26	1.68	0.12	0.87	0.00
7.72	194.06	1.84	0.06	0.87	0.00	7.75	193.98	1.83	0.06	0.87	0.00
7.83	196.99	2.00	0.00	0.87	0.00	7.89	192.97	1.74	0.10	0.87	0.00
7.95	187.56	1.34	0.32	0.87	0.00	8.05	191.73	1.63	0.15	0.86	0.00
8.10	192.99	1.73	0.10	0.86	0.00	8.14	195.28	1.95	0.02	0.86	0.00
8.21	195.17	1.93	0.02	0.86	0.00	8.28	196.39	2.00	0.00	0.86	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
8.36	194.76	1.89	0.04	0.86	0.00	8.40	195.88	2.00	0.00	0.86	0.00
8.48	196.96	2.00	0.00	0.86	0.00	8.53	196.27	2.00	0.00	0.86	0.00
8.62	194.80	1.88	0.04	0.85	0.00	8.67	194.40	1.84	0.06	0.85	0.00
8.76	197.41	2.00	0.00	0.85	0.00	8.80	196.86	2.00	0.00	0.85	0.00
8.89	196.23	2.00	0.00	0.85	0.00	8.93	195.97	2.00	0.00	0.85	0.00
9.00	194.63	1.86	0.05	0.85	0.00	9.07	191.71	1.60	0.16	0.85	0.00
9.12	186.13	1.23	0.38	0.85	0.00	9.20	179.60	0.92	0.72	0.84	0.01
9.27	176.40	0.80	0.82	0.84	0.01	9.34	177.69	0.85	0.78	0.84	0.01
9.40	181.14	0.98	0.64	0.84	0.00	9.47	185.05	1.17	0.44	0.84	0.00
9.56	194.77	1.86	0.05	0.84	0.00	9.60	201.03	2.00	0.00	0.84	0.00
9.66	207.93	2.00	0.00	0.84	0.00	9.74	214.59	2.00	0.00	0.83	0.00
9.78	219.03	2.00	0.00	0.83	0.00	9.85	232.90	2.00	0.00	0.83	0.00
9.92	229.39	2.00	0.00	0.83	0.00	9.99	213.11	2.00	0.00	0.83	0.00
10.05	215.04	2.00	0.00	0.83	0.00	10.11	211.89	2.00	0.00	0.83	0.00
10.19	204.58	2.00	0.00	0.83	0.00	10.27	200.55	2.00	0.00	0.83	0.00
10.32	186.55	1.25	0.36	0.83	0.00	10.37	182.42	1.03	0.56	0.82	0.00
10.44	178.17	0.86	0.75	0.82	0.01	10.50	171.85	0.67	0.94	0.82	0.01
10.56	167.23	0.57	1.11	0.82	0.01	10.63	165.32	0.53	1.18	0.82	0.01
10.72	160.74	0.46	1.38	0.82	0.01	10.77	159.34	0.44	1.44	0.82	0.01
10.85	147.02	0.32	1.73	0.82	0.02	10.90	150.33	0.34	1.69	0.82	0.01
10.97	151.68	0.36	1.67	0.81	0.01	11.04	152.55	0.36	1.65	0.81	0.01
11.10	152.99	0.37	1.65	0.81	0.01	11.17	153.20	0.37	1.64	0.81	0.01
11.26	153.25	0.37	1.64	0.81	0.02	11.30	153.05	0.37	1.64	0.81	0.01
11.35	152.77	0.37	1.64	0.81	0.01	11.43	152.66	0.36	1.64	0.81	0.01
11.49	154.05	0.38	1.62	0.81	0.01	11.57	155.69	0.40	1.60	0.80	0.02
11.62	157.16	0.41	1.53	0.80	0.01	11.71	160.09	0.45	1.38	0.80	0.01
11.75	162.40	0.48	1.27	0.80	0.01	11.82	165.67	0.54	1.14	0.80	0.01
11.89	167.38	0.57	1.07	0.80	0.01	11.95	167.36	0.57	1.07	0.80	0.01
12.02	165.78	0.54	1.13	0.80	0.01	12.10	164.76	0.52	1.17	0.79	0.01
12.16	165.32	0.53	1.14	0.79	0.01	12.21	166.32	0.55	1.10	0.79	0.01
12.28	167.65	0.57	1.05	0.79	0.01	12.34	170.61	0.64	0.95	0.79	0.01
12.42	175.24	0.76	0.80	0.79	0.01	12.47	180.30	0.94	0.65	0.79	0.00
12.56	187.44	1.30	0.31	0.79	0.00	12.60	193.30	1.72	0.10	0.79	0.00
12.67	201.81	2.00	0.00	0.79	0.00	12.74	207.45	2.00	0.00	0.78	0.00
12.80	211.54	2.00	0.00	0.78	0.00	12.87	214.22	2.00	0.00	0.78	0.00
12.94	219.00	2.00	0.00	0.78	0.00	13.00	223.57	2.00	0.00	0.78	0.00
13.08	232.00	2.00	0.00	0.78	0.00	13.13	229.71	2.00	0.00	0.78	0.00
13.19	227.35	2.00	0.00	0.78	0.00	13.26	233.52	2.00	0.00	0.78	0.00
13.33	232.75	2.00	0.00	0.77	0.00	13.40	237.30	2.00	0.00	0.77	0.00
13.49	244.03	2.00	0.00	0.77	0.00	13.53	244.31	2.00	0.00	0.77	0.00
13.61	239.25	2.00	0.00	0.77	0.00	13.67	238.30	2.00	0.00	0.77	0.00
13.73	237.99	2.00	0.00	0.77	0.00	13.79	231.00	2.00	0.00	0.77	0.00
13.85	234.77	2.00	0.00	0.77	0.00	13.93	232.52	2.00	0.00	0.76	0.00
13.99	232.32	2.00	0.00	0.76	0.00	14.06	232.03	2.00	0.00	0.76	0.00
14.12	234.99	2.00	0.00	0.76	0.00	14.19	240.36	2.00	0.00	0.76	0.00
14.25	250.12	2.00	0.00	0.76	0.00	14.31	266.11	2.00	0.00	0.76	0.00
14.37	287.79	2.00	0.00	0.76	0.00	14.44	349.01	2.00	0.00	0.76	0.00
14.52	339.84	2.00	0.00	0.75	0.00	14.59	291.32	2.00	0.00	0.75	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
14.64	283.02	2.00	0.00	0.75	0.00	14.70	273.33	2.00	0.00	0.75	0.00
14.78	243.88	2.00	0.00	0.75	0.00	14.83	219.48	2.00	0.00	0.75	0.00
14.90	207.03	2.00	0.00	0.75	0.00	14.96	205.66	2.00	0.00	0.75	0.00
15.03	202.15	2.00	0.00	0.75	0.00	15.09	199.66	2.00	0.00	0.74	0.00
15.17	194.61	1.85	0.05	0.74	0.00	15.23	192.06	1.62	0.13	0.74	0.00
15.31	188.87	1.39	0.24	0.74	0.00	15.37	186.55	1.25	0.32	0.74	0.00
15.43	184.15	1.12	0.42	0.74	0.00	15.50	181.53	1.00	0.54	0.74	0.00
15.56	177.98	0.86	0.68	0.74	0.00	15.64	175.88	0.79	0.73	0.73	0.01
15.68	174.34	0.74	0.77	0.73	0.00	15.76	170.80	0.65	0.87	0.73	0.01
15.82	169.23	0.61	0.92	0.73	0.01	15.90	166.77	0.56	1.00	0.73	0.01
15.95	165.58	0.54	1.04	0.73	0.01	16.02	164.21	0.52	1.09	0.73	0.01
16.09	163.51	0.50	1.11	0.73	0.01	16.17	163.79	0.51	1.10	0.73	0.01
16.21	163.54	0.50	1.11	0.73	0.00	16.29	162.78	0.49	1.14	0.72	0.01
16.36	161.10	0.47	1.20	0.72	0.01	16.41	159.66	0.45	1.26	0.72	0.01
16.48	158.40	0.43	1.31	0.72	0.01	16.58	157.31	0.42	1.36	0.72	0.02
16.61	157.18	0.42	1.36	0.72	0.01	16.67	156.08	0.40	1.41	0.72	0.01
16.75	153.55	0.38	1.45	0.72	0.01	16.82	151.19	0.35	1.47	0.71	0.01
16.89	148.01	0.33	1.50	0.71	0.01	16.93	146.25	0.31	1.52	0.71	0.01
17.01	128.94	0.22	1.75	0.71	0.02	17.06	130.71	0.23	1.72	0.71	0.01
17.13	128.27	0.22	1.75	0.71	0.01	17.20	123.49	0.20	1.82	0.71	0.02
17.26	118.76	0.19	1.90	0.71	0.01	17.35	108.90	0.16	2.08	0.71	0.02
17.40	103.51	0.15	2.19	0.71	0.01	17.48	103.58	0.15	2.18	0.70	0.02
17.54	107.38	0.16	2.10	0.70	0.01	17.59	108.89	0.16	2.07	0.70	0.01
17.67	111.32	0.17	2.01	0.70	0.02	17.72	109.96	0.17	2.04	0.70	0.01
17.79	108.01	0.16	2.07	0.70	0.02	17.86	105.73	0.16	2.12	0.70	0.02
17.94	102.69	0.15	2.18	0.70	0.02	17.98	102.07	0.15	2.19	0.70	0.01
18.06	100.64	0.15	2.22	0.69	0.02	18.12	99.15	0.15	2.25	0.69	0.02
18.21	96.92	0.14	2.29	0.69	0.02	18.24	95.98	0.14	2.31	0.69	0.01
18.31	94.28	0.14	2.35	0.69	0.02	18.39	93.09	0.14	2.38	0.69	0.02
18.48	92.13	0.13	2.40	0.69	0.03	18.51	91.92	0.13	2.40	0.69	0.01
18.57	91.31	0.13	2.41	0.69	0.02	18.66	90.41	0.13	2.43	0.68	0.03
18.70	89.98	0.13	2.44	0.68	0.01	18.78	89.85	0.13	2.44	0.68	0.02
18.84	90.36	0.13	2.42	0.68	0.01	18.92	91.72	0.13	2.38	0.68	0.02
18.98	92.71	0.14	2.35	0.68	0.02	19.05	93.81	0.14	2.32	0.68	0.02
19.10	94.69	0.14	2.30	0.68	0.02	19.17	95.64	0.14	2.27	0.68	0.02
19.24	96.24	0.14	2.25	0.67	0.02	19.33	92.54	0.13	2.34	0.67	0.03
19.37	91.01	0.13	2.37	0.67	0.01	19.44	91.93	0.13	2.35	0.67	0.02
19.51	92.16	0.13	2.34	0.67	0.02	19.59	92.48	0.13	2.32	0.67	0.02
19.62	93.20	0.14	2.30	0.67	0.01	19.71	100.67	0.15	2.13	0.67	0.02
19.76	105.49	0.15	2.02	0.67	0.01	19.83	100.31	0.15	2.13	0.66	0.02
19.88	114.74	0.17	1.85	0.66	0.01	19.96	134.22	0.24	1.56	0.66	0.01
20.02	142.89	0.29	1.45	0.66	0.01	20.09	154.24	0.38	1.33	0.66	0.01
20.15	158.34	0.43	1.20	0.66	0.01	20.22	165.10	0.53	0.95	0.66	0.01
20.31	175.10	0.76	0.67	0.66	0.01	20.36	180.98	0.97	0.50	0.65	0.00
20.43	184.36	1.13	0.36	0.65	0.00	20.49	187.70	1.32	0.25	0.65	0.00
20.55	190.37	1.50	0.16	0.65	0.00	20.65	196.17	2.00	0.00	0.65	0.00
20.67	189.88	1.47	0.18	0.65	0.00	20.74	189.59	1.45	0.18	0.65	0.00
20.81	191.41	1.58	0.13	0.65	0.00	20.88	189.78	1.46	0.18	0.65	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
20.94	190.52	1.51	0.15	0.65	0.00	21.03	191.67	1.60	0.12	0.64	0.00
21.07	193.34	1.74	0.07	0.64	0.00	21.14	197.96	2.00	0.00	0.64	0.00
21.21	202.91	2.00	0.00	0.64	0.00	21.30	207.37	2.00	0.00	0.64	0.00
21.33	214.72	2.00	0.00	0.64	0.00	21.39	226.25	2.00	0.00	0.64	0.00
21.47	222.72	2.00	0.00	0.64	0.00	21.54	226.16	2.00	0.00	0.63	0.00
21.61	218.14	2.00	0.00	0.63	0.00	21.67	212.80	2.00	0.00	0.63	0.00
21.75	211.75	2.00	0.00	0.63	0.00	21.83	213.53	2.00	0.00	0.63	0.00
21.85	213.64	2.00	0.00	0.63	0.00	21.92	220.77	2.00	0.00	0.63	0.00
22.02	225.31	2.00	0.00	0.63	0.00	22.06	226.29	2.00	0.00	0.63	0.00
22.11	227.96	2.00	0.00	0.63	0.00	22.19	231.98	2.00	0.00	0.62	0.00
22.26	231.55	2.00	0.00	0.62	0.00	22.33	236.89	2.00	0.00	0.62	0.00
22.42	245.59	2.00	0.00	0.62	0.00	22.44	250.15	2.00	0.00	0.62	0.00
22.51	257.33	2.00	0.00	0.62	0.00	22.60	277.20	2.00	0.00	0.62	0.00
22.65	281.05	2.00	0.00	0.62	0.00	22.72	263.88	2.00	0.00	0.61	0.00
22.77	267.74	2.00	0.00	0.61	0.00	22.84	257.29	2.00	0.00	0.61	0.00
22.91	266.21	2.00	0.00	0.61	0.00	22.99	264.93	2.00	0.00	0.61	0.00
23.04	266.71	2.00	0.00	0.61	0.00	23.10	260.43	2.00	0.00	0.61	0.00
23.18	253.17	2.00	0.00	0.61	0.00	23.23	254.70	2.00	0.00	0.61	0.00
23.32	254.11	2.00	0.00	0.60	0.00	23.38	255.53	2.00	0.00	0.60	0.00
23.44	253.87	2.00	0.00	0.60	0.00	23.51	219.10	2.00	0.00	0.60	0.00
23.57	232.04	2.00	0.00	0.60	0.00	23.63	235.00	2.00	0.00	0.60	0.00
23.70	236.41	2.00	0.00	0.60	0.00	23.77	234.68	2.00	0.00	0.60	0.00
23.84	231.31	2.00	0.00	0.60	0.00	23.89	227.49	2.00	0.00	0.60	0.00
23.97	223.11	2.00	0.00	0.59	0.00	24.02	227.26	2.00	0.00	0.59	0.00
24.11	225.76	2.00	0.00	0.59	0.00	24.15	227.02	2.00	0.00	0.59	0.00
24.22	222.46	2.00	0.00	0.59	0.00	24.28	229.30	2.00	0.00	0.59	0.00
24.38	234.31	2.00	0.00	0.59	0.00	24.42	235.22	2.00	0.00	0.59	0.00
24.48	237.02	2.00	0.00	0.59	0.00	24.56	239.29	2.00	0.00	0.58	0.00
24.61	239.83	2.00	0.00	0.58	0.00	24.69	240.51	2.00	0.00	0.58	0.00
24.74	240.62	2.00	0.00	0.58	0.00	24.80	242.59	2.00	0.00	0.58	0.00
24.87	244.56	2.00	0.00	0.58	0.00	24.96	247.26	2.00	0.00	0.58	0.00
25.01	247.71	2.00	0.00	0.58	0.00	25.10	247.50	2.00	0.00	0.57	0.00
25.14	247.61	2.00	0.00	0.57	0.00	25.23	247.23	2.00	0.00	0.57	0.00
25.27	247.26	2.00	0.00	0.57	0.00	25.34	246.06	2.00	0.00	0.57	0.00
25.41	245.29	2.00	0.00	0.57	0.00	25.47	245.00	2.00	0.00	0.57	0.00
25.54	244.70	2.00	0.00	0.57	0.00	25.61	241.66	2.00	0.00	0.57	0.00
25.68	238.29	2.00	0.00	0.56	0.00	25.74	224.70	2.00	0.00	0.56	0.00
25.81	224.22	2.00	0.00	0.56	0.00	25.86	223.80	2.00	0.00	0.56	0.00
25.94	227.62	2.00	0.00	0.56	0.00	25.99	229.06	2.00	0.00	0.56	0.00
26.07	236.83	2.00	0.00	0.56	0.00	26.12	244.94	2.00	0.00	0.56	0.00
26.20	255.71	2.00	0.00	0.56	0.00	26.26	263.60	2.00	0.00	0.55	0.00
26.32	267.78	2.00	0.00	0.55	0.00	26.39	270.72	2.00	0.00	0.55	0.00
26.48	271.55	2.00	0.00	0.55	0.00	26.53	272.74	2.00	0.00	0.55	0.00
26.59	276.56	2.00	0.00	0.55	0.00	26.65	278.75	2.00	0.00	0.55	0.00
26.72	284.51	2.00	0.00	0.55	0.00	26.79	290.33	2.00	0.00	0.55	0.00
26.84	285.55	2.00	0.00	0.55	0.00	26.91	286.74	2.00	0.00	0.54	0.00
26.97	279.65	2.00	0.00	0.54	0.00	27.06	273.56	2.00	0.00	0.54	0.00
27.11	268.96	2.00	0.00	0.54	0.00	27.19	263.80	2.00	0.00	0.54	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
27.24	263.10	2.00	0.00	0.54	0.00	27.30	264.89	2.00	0.00	0.54	0.00
27.36	272.28	2.00	0.00	0.54	0.00	27.46	277.93	2.00	0.00	0.53	0.00
27.51	277.40	2.00	0.00	0.53	0.00	27.57	277.53	2.00	0.00	0.53	0.00
27.65	274.27	2.00	0.00	0.53	0.00	27.69	251.38	2.00	0.00	0.53	0.00
27.76	259.56	2.00	0.00	0.53	0.00	27.82	261.09	2.00	0.00	0.53	0.00
27.91	256.82	2.00	0.00	0.53	0.00	27.96	245.52	2.00	0.00	0.53	0.00
28.04	238.36	2.00	0.00	0.52	0.00	28.09	234.81	2.00	0.00	0.52	0.00
28.18	224.83	2.00	0.00	0.52	0.00	28.22	220.68	2.00	0.00	0.52	0.00
28.30	217.33	2.00	0.00	0.52	0.00	28.36	215.24	2.00	0.00	0.52	0.00
28.44	212.75	2.00	0.00	0.52	0.00	28.49	210.19	2.00	0.00	0.52	0.00
28.58	208.74	2.00	0.00	0.52	0.00	28.62	206.28	2.00	0.00	0.51	0.00
28.69	207.54	2.00	0.00	0.51	0.00	28.76	210.45	2.00	0.00	0.51	0.00
28.82	203.39	2.00	0.00	0.51	0.00	28.89	188.96	1.41	0.16	0.51	0.00
28.94	184.10	2.00	0.00	0.51	0.00	29.04	170.50	2.00	0.00	0.51	0.00
29.12	175.41	2.00	0.00	0.51	0.00	29.16	178.39	2.00	0.00	0.51	0.00
29.22	179.02	2.00	0.00	0.50	0.00	29.30	165.97	2.00	0.00	0.50	0.00
29.34	152.35	2.00	0.00	0.50	0.00	29.41	132.60	2.00	0.00	0.50	0.00
29.47	113.44	2.00	0.00	0.50	0.00	29.53	36.57	2.00	0.00	0.50	0.00
29.60	29.49	2.00	0.00	0.50	0.00	29.66	24.25	2.00	0.00	0.50	0.00
29.74	20.31	2.00	0.00	0.50	0.00	29.79	20.08	2.00	0.00	0.50	0.00
29.87	22.10	2.00	0.00	0.49	0.00	29.92	23.03	2.00	0.00	0.49	0.00
30.01	22.65	2.00	0.00	0.49	0.00	30.05	22.92	2.00	0.00	0.49	0.00
30.15	24.92	2.00	0.00	0.49	0.00	30.19	24.28	2.00	0.00	0.49	0.00
30.26	23.19	2.00	0.00	0.49	0.00	30.32	23.26	2.00	0.00	0.49	0.00
30.41	23.73	2.00	0.00	0.48	0.00	30.46	20.13	2.00	0.00	0.48	0.00
30.51	24.94	2.00	0.00	0.48	0.00	30.59	25.13	2.00	0.00	0.48	0.00
30.64	24.72	2.00	0.00	0.48	0.00	30.72	23.34	2.00	0.00	0.48	0.00
30.78	22.85	2.00	0.00	0.48	0.00	30.85	26.26	2.00	0.00	0.48	0.00
30.94	30.86	2.00	0.00	0.48	0.00	30.99	33.77	2.00	0.00	0.47	0.00
31.04	35.29	2.00	0.00	0.47	0.00	31.11	39.47	2.00	0.00	0.47	0.00
31.21	47.99	2.00	0.00	0.47	0.00	31.26	118.68	2.00	0.00	0.47	0.00
31.30	125.46	2.00	0.00	0.47	0.00	31.39	136.29	2.00	0.00	0.47	0.00
31.44	140.18	2.00	0.00	0.47	0.00	31.50	147.16	2.00	0.00	0.47	0.00
31.57	152.32	2.00	0.00	0.46	0.00	31.66	161.53	2.00	0.00	0.46	0.00
31.70	165.02	2.00	0.00	0.46	0.00	31.79	171.42	2.00	0.00	0.46	0.00
31.84	174.39	2.00	0.00	0.46	0.00	31.93	179.25	0.90	0.40	0.46	0.00
31.97	181.78	1.00	0.33	0.46	0.00	32.06	185.56	1.20	0.22	0.46	0.00
32.11	166.07	0.55	0.64	0.46	0.00	32.15	141.98	0.28	1.00	0.46	0.01
32.24	149.71	0.34	0.94	0.45	0.01	32.29	154.84	0.39	0.91	0.45	0.01
32.36	161.27	0.47	0.75	0.45	0.01	32.42	165.65	0.54	0.64	0.45	0.00
32.51	170.89	0.65	0.53	0.45	0.01	32.55	172.28	0.68	0.51	0.45	0.00
32.64	176.07	0.79	0.44	0.45	0.00	32.68	178.01	0.85	0.41	0.45	0.00
32.75	180.90	0.97	0.35	0.44	0.00	32.82	183.03	1.06	0.28	0.44	0.00
32.88	184.73	1.15	0.24	0.44	0.00	32.96	185.89	1.21	0.21	0.44	0.00
33.04	187.75	1.32	0.17	0.44	0.00	33.08	188.48	1.37	0.15	0.44	0.00
33.16	190.05	1.47	0.12	0.44	0.00	33.23	192.07	1.62	0.08	0.44	0.00
33.27	193.34	1.73	0.05	0.44	0.00	33.35	195.84	1.97	0.01	0.43	0.00
33.40	197.30	2.00	0.00	0.43	0.00	33.47	199.37	2.00	0.00	0.43	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
33.54	200.54	2.00	0.00	0.43	0.00	33.62	201.41	2.00	0.00	0.43	0.00
33.67	202.03	2.00	0.00	0.43	0.00	33.73	202.48	2.00	0.00	0.43	0.00
33.80	202.66	2.00	0.00	0.43	0.00	33.89	201.88	2.00	0.00	0.43	0.00
33.94	201.03	2.00	0.00	0.42	0.00	34.03	195.31	1.91	0.01	0.42	0.00
34.08	194.98	1.88	0.02	0.42	0.00	34.17	195.82	1.97	0.01	0.42	0.00
34.21	196.03	1.99	0.00	0.42	0.00	34.26	196.30	2.00	0.00	0.42	0.00
34.32	195.81	1.96	0.01	0.42	0.00	34.40	193.56	1.75	0.05	0.42	0.00
34.46	191.90	1.61	0.08	0.42	0.00	34.53	189.80	1.45	0.12	0.41	0.00
34.60	186.90	1.27	0.17	0.41	0.00	34.66	184.56	1.14	0.23	0.41	0.00
34.72	185.50	1.19	0.20	0.41	0.00	34.78	181.43	0.99	0.30	0.41	0.00
34.84	183.79	1.10	0.24	0.41	0.00	34.91	185.86	1.21	0.19	0.41	0.00
34.98	184.76	1.15	0.22	0.41	0.00	35.05	194.00	1.79	0.04	0.41	0.00
35.11	202.11	2.00	0.00	0.40	0.00	35.18	211.18	2.00	0.00	0.40	0.00
35.25	217.96	2.00	0.00	0.40	0.00	35.34	241.90	2.00	0.00	0.40	0.00
35.38	248.88	2.00	0.00	0.40	0.00	35.47	268.26	2.00	0.00	0.40	0.00
35.52	280.95	2.00	0.00	0.40	0.00	35.57	300.90	2.00	0.00	0.40	0.00
35.63	304.52	2.00	0.00	0.40	0.00	35.70	338.94	2.00	0.00	0.39	0.00
35.78	354.09	2.00	0.00	0.39	0.00	35.83	342.08	2.00	0.00	0.39	0.00
35.90	343.30	2.00	0.00	0.39	0.00	35.96	344.69	2.00	0.00	0.39	0.00
36.05	342.92	2.00	0.00	0.39	0.00	36.10	342.70	2.00	0.00	0.39	0.00
36.16	352.66	2.00	0.00	0.39	0.00	36.22	368.07	2.00	0.00	0.39	0.00
36.29	374.53	2.00	0.00	0.38	0.00	36.37	385.10	2.00	0.00	0.38	0.00
36.43	392.16	2.00	0.00	0.38	0.00	36.50	398.89	2.00	0.00	0.38	0.00
36.59	376.44	2.00	0.00	0.38	0.00	36.63	381.75	2.00	0.00	0.38	0.00
36.70	377.87	2.00	0.00	0.38	0.00	36.77	368.68	2.00	0.00	0.38	0.00
36.81	350.03	2.00	0.00	0.38	0.00	36.90	336.27	2.00	0.00	0.37	0.00
36.94	336.39	2.00	0.00	0.37	0.00	37.03	336.26	2.00	0.00	0.37	0.00
37.07	336.38	2.00	0.00	0.37	0.00	37.17	341.32	2.00	0.00	0.37	0.00
37.21	346.33	2.00	0.00	0.37	0.00	37.28	345.12	2.00	0.00	0.37	0.00
37.35	344.86	2.00	0.00	0.37	0.00	37.44	333.86	2.00	0.00	0.37	0.00
37.47	319.91	2.00	0.00	0.36	0.00	37.54	311.58	2.00	0.00	0.36	0.00
37.62	308.25	2.00	0.00	0.36	0.00	37.69	281.28	2.00	0.00	0.36	0.00
37.74	278.72	2.00	0.00	0.36	0.00	37.80	270.58	2.00	0.00	0.36	0.00
37.88	270.77	2.00	0.00	0.36	0.00	37.93	273.44	2.00	0.00	0.36	0.00
38.02	271.48	2.00	0.00	0.36	0.00	38.07	277.71	2.00	0.00	0.35	0.00
38.14	270.82	2.00	0.00	0.35	0.00	38.20	279.61	2.00	0.00	0.35	0.00
38.29	312.72	2.00	0.00	0.35	0.00	38.33	326.35	2.00	0.00	0.35	0.00
38.39	302.04	2.00	0.00	0.35	0.00	38.45	368.76	2.00	0.00	0.35	0.00
38.54	332.49	2.00	0.00	0.35	0.00	38.59	265.99	2.00	0.00	0.35	0.00
38.66	264.65	2.00	0.00	0.34	0.00	38.72	256.97	2.00	0.00	0.34	0.00
38.79	240.23	2.00	0.00	0.34	0.00	38.86	218.11	2.00	0.00	0.34	0.00
38.93	215.15	2.00	0.00	0.34	0.00	38.98	215.08	2.00	0.00	0.34	0.00
39.05	219.19	2.00	0.00	0.34	0.00	39.13	222.05	2.00	0.00	0.34	0.00
39.20	226.06	2.00	0.00	0.34	0.00	39.26	229.84	2.00	0.00	0.33	0.00
39.31	234.63	2.00	0.00	0.33	0.00	39.40	244.65	2.00	0.00	0.33	0.00
39.44	249.34	2.00	0.00	0.33	0.00	39.53	254.89	2.00	0.00	0.33	0.00
39.57	257.30	2.00	0.00	0.33	0.00	39.65	259.62	2.00	0.00	0.33	0.00
39.70	269.45	2.00	0.00	0.33	0.00	39.79	283.54	2.00	0.00	0.33	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
39.83	289.38	2.00	0.00	0.32	0.00	39.90	286.82	2.00	0.00	0.32	0.00
39.97	292.20	2.00	0.00	0.32	0.00	40.04	310.42	2.00	0.00	0.32	0.00
40.10	327.85	2.00	0.00	0.32	0.00	40.17	332.60	2.00	0.00	0.32	0.00
40.24	383.67	2.00	0.00	0.32	0.00	40.29	394.26	2.00	0.00	0.32	0.00
40.36	468.15	2.00	0.00	0.32	0.00	40.42	457.55	2.00	0.00	0.31	0.00
40.50	460.68	2.00	0.00	0.31	0.00	40.56	435.67	2.00	0.00	0.31	0.00
40.62	463.74	2.00	0.00	0.31	0.00	40.69	467.65	2.00	0.00	0.31	0.00
40.76	443.46	2.00	0.00	0.31	0.00	40.82	471.44	2.00	0.00	0.31	0.00
40.88	501.92	2.00	0.00	0.31	0.00	40.95	530.99	2.00	0.00	0.31	0.00
41.02	503.99	2.00	0.00	0.30	0.00	41.08	478.11	2.00	0.00	0.30	0.00
41.14	477.03	2.00	0.00	0.30	0.00	41.21	477.48	2.00	0.00	0.30	0.00
41.28	468.15	2.00	0.00	0.30	0.00	41.36	418.94	2.00	0.00	0.30	0.00
41.41	399.78	2.00	0.00	0.30	0.00	41.47	368.85	2.00	0.00	0.30	0.00
41.54	327.60	2.00	0.00	0.30	0.00	41.60	321.38	2.00	0.00	0.29	0.00
41.69	281.95	2.00	0.00	0.29	0.00	41.74	279.96	2.00	0.00	0.29	0.00
41.81	255.28	2.00	0.00	0.29	0.00	41.87	222.79	2.00	0.00	0.29	0.00
41.94	240.10	2.00	0.00	0.29	0.00	42.00	239.58	2.00	0.00	0.29	0.00
42.06	239.14	2.00	0.00	0.29	0.00	42.15	235.38	2.00	0.00	0.29	0.00
42.19	235.68	2.00	0.00	0.28	0.00	42.26	232.41	2.00	0.00	0.28	0.00
42.33	237.37	2.00	0.00	0.28	0.00	42.39	242.37	2.00	0.00	0.28	0.00
42.46	248.75	2.00	0.00	0.28	0.00	42.52	256.07	2.00	0.00	0.28	0.00
42.59	260.59	2.00	0.00	0.28	0.00	42.66	270.00	2.00	0.00	0.28	0.00
42.73	280.56	2.00	0.00	0.28	0.00	42.82	311.91	2.00	0.00	0.27	0.00
42.87	325.13	2.00	0.00	0.27	0.00	42.91	335.90	2.00	0.00	0.27	0.00
43.00	349.77	2.00	0.00	0.27	0.00	43.05	371.78	2.00	0.00	0.27	0.00
43.14	379.18	2.00	0.00	0.27	0.00	43.18	391.01	2.00	0.00	0.27	0.00
43.26	390.09	2.00	0.00	0.27	0.00	43.33	384.07	2.00	0.00	0.27	0.00
43.38	378.08	2.00	0.00	0.26	0.00	43.44	447.37	2.00	0.00	0.26	0.00
43.50	468.15	2.00	0.00	0.26	0.00	43.57	483.55	2.00	0.00	0.26	0.00
43.64	484.63	2.00	0.00	0.26	0.00	43.71	480.47	2.00	0.00	0.26	0.00
43.78	489.21	2.00	0.00	0.26	0.00	43.86	458.09	2.00	0.00	0.26	0.00
43.90	440.57	2.00	0.00	0.26	0.00	43.97	421.71	2.00	0.00	0.25	0.00
44.05	400.79	2.00	0.00	0.25	0.00	44.12	383.04	2.00	0.00	0.25	0.00
44.17	375.25	2.00	0.00	0.25	0.00	44.23	360.53	2.00	0.00	0.25	0.00
44.29	374.21	2.00	0.00	0.25	0.00	44.36	362.91	2.00	0.00	0.25	0.00
44.46	373.11	2.00	0.00	0.25	0.00	44.50	384.53	2.00	0.00	0.25	0.00
44.57	408.29	2.00	0.00	0.24	0.00	44.63	430.49	2.00	0.00	0.24	0.00
44.69	464.52	2.00	0.00	0.24	0.00	44.76	508.97	2.00	0.00	0.24	0.00
44.83	509.48	2.00	0.00	0.24	0.00	44.89	509.06	2.00	0.00	0.24	0.00
44.95	515.28	2.00	0.00	0.24	0.00	45.03	507.64	2.00	0.00	0.24	0.00
45.08	509.24	2.00	0.00	0.24	0.00	45.16	485.26	2.00	0.00	0.23	0.00
45.21	497.87	2.00	0.00	0.23	0.00	45.29	476.03	2.00	0.00	0.23	0.00
45.35	472.58	2.00	0.00	0.23	0.00	45.42	478.05	2.00	0.00	0.23	0.00
45.49	464.22	2.00	0.00	0.23	0.00	45.56	431.21	2.00	0.00	0.23	0.00
45.62	420.90	2.00	0.00	0.23	0.00	45.70	407.21	2.00	0.00	0.23	0.00
45.74	396.08	2.00	0.00	0.22	0.00	45.81	383.55	2.00	0.00	0.22	0.00
45.87	364.18	2.00	0.00	0.22	0.00	45.93	291.14	2.00	0.00	0.22	0.00
46.00	292.27	2.00	0.00	0.22	0.00	46.07	272.49	2.00	0.00	0.22	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
46.14	270.65	2.00	0.00	0.22	0.00	46.19	270.59	2.00	0.00	0.22	0.00
46.28	268.72	2.00	0.00	0.22	0.00	46.33	284.88	2.00	0.00	0.21	0.00
46.42	325.97	2.00	0.00	0.21	0.00	46.46	362.18	2.00	0.00	0.21	0.00
46.53	404.74	2.00	0.00	0.21	0.00	46.60	447.23	2.00	0.00	0.21	0.00
46.68	545.37	2.00	0.00	0.21	0.00	46.72	572.78	2.00	0.00	0.21	0.00

Total estimated settlement: 3.64**Abbreviations**

$Q_{tn,cs}$:	Equivalent clean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumetric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement



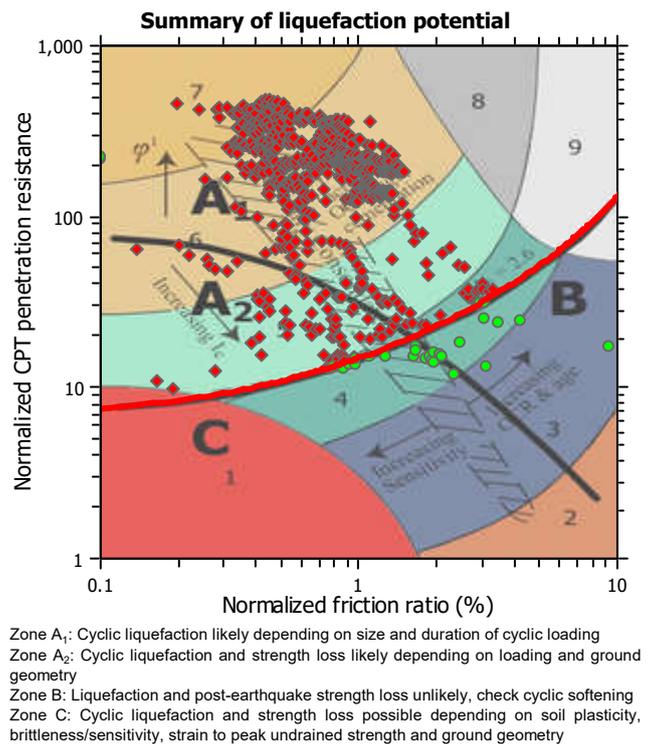
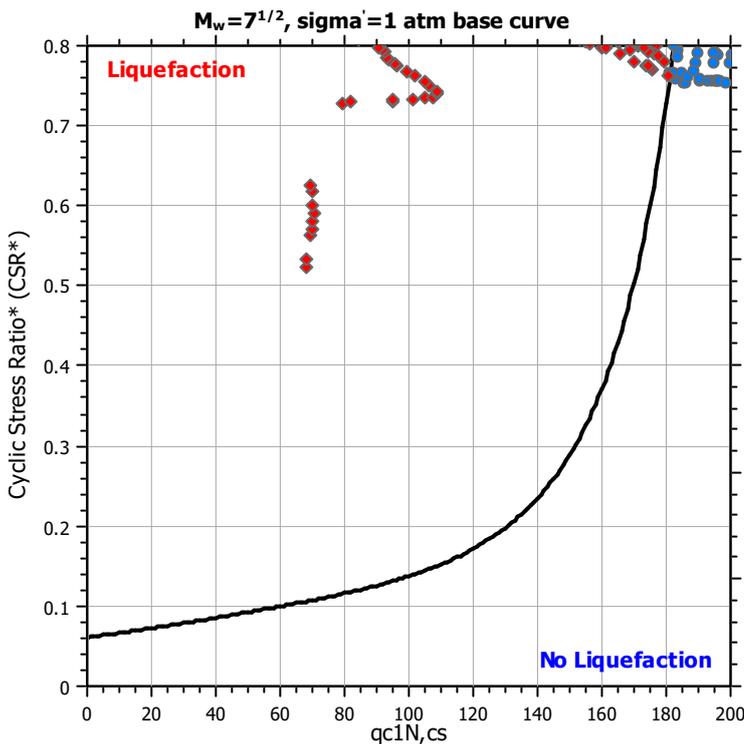
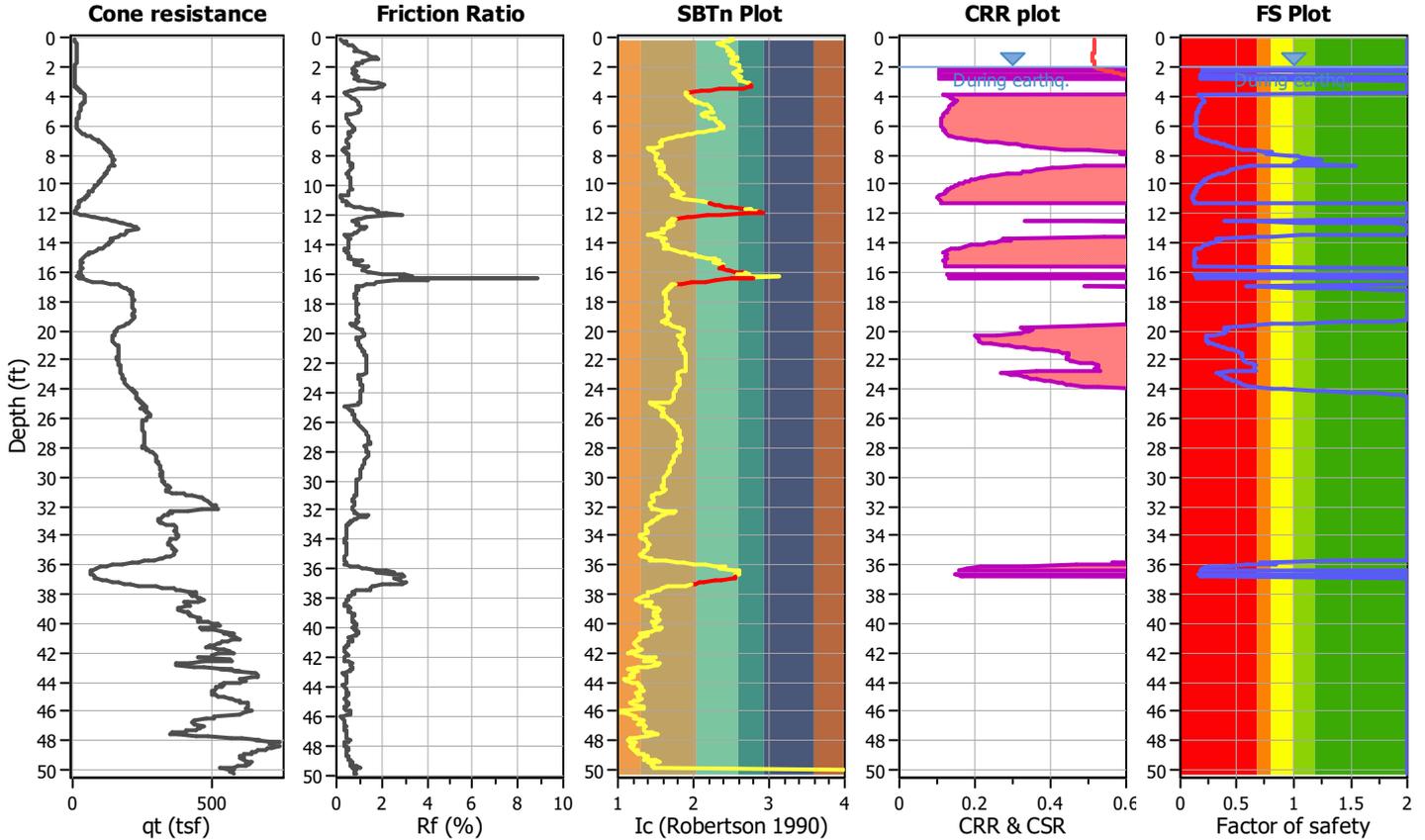
LIQUEFACTION ANALYSIS REPORT

Project title : Proposed Warehouse
CPT file : CPT-2

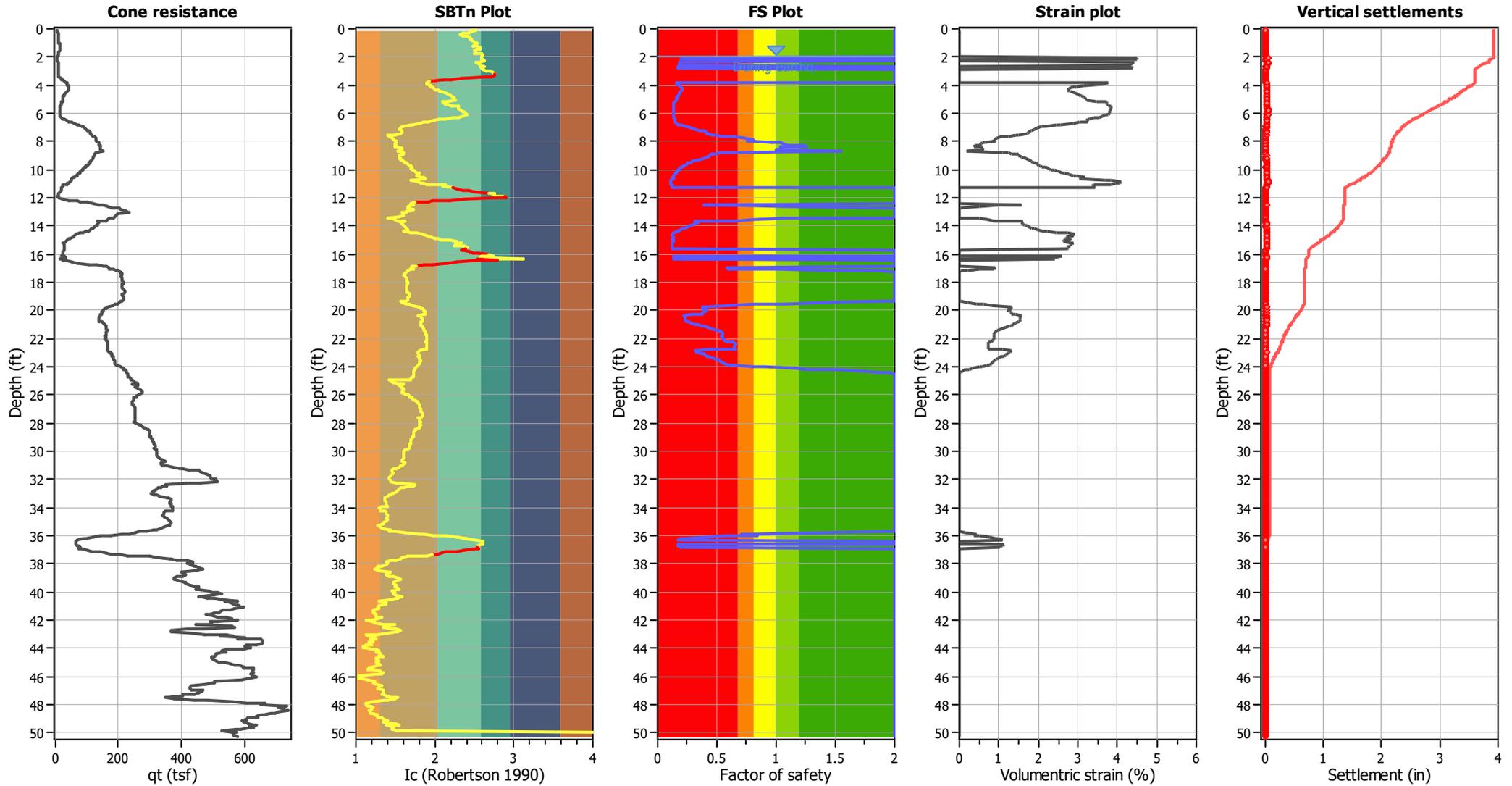
Location : El Monte, CA

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	33.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w :	6.89	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Estimation of post-earthquake settlements



Abbreviations

- q_c: Total cone resistance (cone resistance q_c corrected for pore water effects)
- I_c: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement due to soil liquefaction ::											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
2.05	67.94	0.20	4.51	0.97	0.05	2.11	67.95	0.20	4.51	0.96	0.03
2.19	13.37	2.00	0.00	0.96	0.00	2.23	13.08	2.00	0.00	0.96	0.00
2.31	69.13	0.19	4.42	0.96	0.04	2.36	69.83	0.19	4.38	0.96	0.03
2.43	70.20	0.19	4.35	0.96	0.04	2.50	70.32	0.18	4.34	0.96	0.04
2.57	69.95	0.18	4.35	0.96	0.04	2.64	13.67	2.00	0.00	0.96	0.00
2.71	69.69	0.17	4.36	0.95	0.04	2.78	69.32	0.17	4.37	0.95	0.03
2.86	14.85	2.00	0.00	0.95	0.00	2.91	15.30	2.00	0.00	0.95	0.00
2.95	15.44	2.00	0.00	0.95	0.00	3.02	15.44	2.00	0.00	0.95	0.00
3.09	15.44	2.00	0.00	0.95	0.00	3.17	15.52	2.00	0.00	0.95	0.00
3.22	15.60	2.00	0.00	0.95	0.00	3.31	15.60	2.00	0.00	0.94	0.00
3.35	16.19	2.00	0.00	0.94	0.00	3.42	17.53	2.00	0.00	0.94	0.00
3.49	82.47	2.00	0.00	0.94	0.00	3.58	85.94	2.00	0.00	0.94	0.00
3.62	87.32	2.00	0.00	0.94	0.00	3.70	72.27	2.00	0.00	0.94	0.00
3.76	71.52	2.00	0.00	0.94	0.00	3.84	79.40	0.16	3.77	0.93	0.04
3.88	82.04	0.16	3.66	0.93	0.02	3.98	94.74	0.18	3.17	0.93	0.04
4.02	95.29	0.18	3.14	0.93	0.02	4.10	101.22	0.19	2.95	0.93	0.03
4.16	104.94	0.20	2.84	0.93	0.02	4.21	107.67	0.20	2.77	0.93	0.02
4.29	108.85	0.20	2.73	0.93	0.03	4.34	108.64	0.20	2.73	0.93	0.02
4.43	106.15	0.19	2.79	0.92	0.03	4.47	104.75	0.19	2.83	0.92	0.01
4.55	101.85	0.18	2.91	0.92	0.03	4.60	99.35	0.18	2.98	0.92	0.02
4.70	96.30	0.17	3.07	0.92	0.04	4.74	95.38	0.17	3.10	0.92	0.01
4.81	93.92	0.17	3.14	0.92	0.03	4.86	93.23	0.16	3.16	0.92	0.02
4.96	92.30	0.16	3.19	0.92	0.04	4.99	91.77	0.16	3.21	0.92	0.01
5.06	90.93	0.16	3.23	0.91	0.03	5.14	84.36	0.15	3.48	0.91	0.03
5.19	78.57	0.14	3.72	0.91	0.02	5.27	77.99	0.14	3.74	0.91	0.04
5.32	77.85	0.14	3.74	0.91	0.02	5.39	77.42	0.14	3.76	0.91	0.03
5.45	76.75	0.14	3.79	0.91	0.03	5.52	75.23	0.13	3.85	0.91	0.03
5.59	75.29	0.13	3.85	0.91	0.03	5.67	75.18	0.13	3.85	0.90	0.04
5.72	75.28	0.13	3.84	0.90	0.02	5.80	75.78	0.13	3.81	0.90	0.04
5.85	75.85	0.13	3.80	0.90	0.02	5.93	75.44	0.13	3.81	0.90	0.04
5.97	75.58	0.13	3.80	0.90	0.02	6.06	76.20	0.13	3.77	0.90	0.04
6.12	77.41	0.13	3.71	0.90	0.03	6.19	79.35	0.13	3.62	0.90	0.03
6.25	81.23	0.14	3.53	0.89	0.03	6.32	83.97	0.14	3.42	0.89	0.03
6.39	86.99	0.14	3.29	0.89	0.03	6.44	87.58	0.14	3.27	0.89	0.02
6.52	88.86	0.14	3.22	0.89	0.03	6.56	88.23	0.14	3.24	0.89	0.02
6.65	93.76	0.15	3.04	0.89	0.03	6.70	98.48	0.16	2.89	0.89	0.02
6.78	109.91	0.18	2.58	0.89	0.03	6.83	115.50	0.19	2.45	0.88	0.01
6.92	127.49	0.23	2.20	0.88	0.02	6.96	132.97	0.25	2.09	0.88	0.01
7.05	139.20	0.28	1.99	0.88	0.02	7.09	144.57	0.31	1.90	0.88	0.01
7.18	150.03	0.36	1.82	0.88	0.02	7.23	153.06	0.38	1.78	0.88	0.01
7.32	155.46	0.41	1.75	0.88	0.02	7.36	155.26	0.41	1.75	0.88	0.01
7.41	156.33	0.42	1.71	0.87	0.01	7.51	159.98	0.47	1.51	0.87	0.02
7.55	161.32	0.48	1.44	0.87	0.01	7.62	165.40	0.55	1.25	0.87	0.01
7.69	169.91	0.64	1.07	0.87	0.01	7.77	173.49	0.73	0.94	0.87	0.01
7.82	175.76	0.80	0.87	0.87	0.00	7.90	175.00	0.78	0.89	0.87	0.01
7.95	174.18	0.75	0.91	0.87	0.00	8.01	180.34	0.97	0.67	0.86	0.00
8.08	182.04	1.04	0.58	0.86	0.01	8.17	182.54	1.06	0.56	0.86	0.01
8.21	183.22	1.09	0.52	0.86	0.00	8.30	185.86	1.24	0.39	0.86	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
8.35	186.19	1.25	0.38	0.86	0.00	8.40	182.07	1.04	0.58	0.86	0.00
8.49	182.45	1.05	0.56	0.86	0.01	8.53	181.36	1.00	0.62	0.86	0.00
8.61	182.34	1.05	0.57	0.85	0.01	8.66	190.77	1.55	0.19	0.85	0.00
8.73	168.99	0.61	1.08	0.85	0.01	8.80	164.74	0.53	1.25	0.85	0.01
8.86	163.12	0.50	1.32	0.85	0.01	8.93	159.51	0.45	1.49	0.85	0.01
9.01	158.91	0.44	1.52	0.85	0.01	9.06	157.62	0.42	1.58	0.85	0.01
9.15	155.07	0.39	1.69	0.84	0.02	9.20	154.39	0.39	1.70	0.84	0.01
9.28	150.29	0.35	1.74	0.84	0.02	9.32	149.06	0.34	1.76	0.84	0.01
9.39	143.37	0.29	1.84	0.84	0.01	9.45	141.17	0.28	1.87	0.84	0.02
9.52	136.94	0.26	1.93	0.84	0.02	9.59	134.82	0.25	1.96	0.84	0.02
9.67	130.64	0.23	2.02	0.84	0.02	9.73	128.13	0.22	2.07	0.84	0.02
9.78	126.24	0.21	2.10	0.83	0.01	9.86	120.88	0.20	2.19	0.83	0.02
9.92	117.48	0.19	2.26	0.83	0.02	9.98	114.35	0.18	2.32	0.83	0.02
10.06	109.35	0.17	2.43	0.83	0.02	10.13	105.30	0.16	2.52	0.83	0.02
10.18	102.61	0.15	2.59	0.83	0.01	10.27	99.04	0.15	2.68	0.83	0.03
10.31	94.96	0.14	2.79	0.83	0.01	10.39	91.24	0.14	2.90	0.82	0.03
10.44	88.81	0.13	2.98	0.82	0.02	10.54	83.18	0.13	3.17	0.82	0.04
10.58	83.99	0.13	3.14	0.82	0.02	10.63	86.64	0.13	3.04	0.82	0.02
10.72	70.51	0.11	3.70	0.82	0.04	10.76	67.34	0.11	3.85	0.82	0.02
10.85	62.55	0.11	4.12	0.82	0.04	10.90	63.13	0.11	4.08	0.82	0.03
10.99	64.90	0.11	3.97	0.81	0.04	11.02	67.49	0.11	3.83	0.81	0.02
11.09	76.31	0.12	3.41	0.81	0.03	11.16	76.80	0.12	3.38	0.81	0.03
11.24	75.32	0.12	3.44	0.81	0.03	11.29	72.74	2.00	0.00	0.81	0.00
11.36	76.32	2.00	0.00	0.81	0.00	11.43	75.72	2.00	0.00	0.81	0.00
11.50	76.76	2.00	0.00	0.81	0.00	11.56	76.50	2.00	0.00	0.80	0.00
11.65	14.52	2.00	0.00	0.80	0.00	11.70	12.52	2.00	0.00	0.80	0.00
11.75	13.18	2.00	0.00	0.80	0.00	11.83	12.33	2.00	0.00	0.80	0.00
11.88	10.45	2.00	0.00	0.80	0.00	11.96	11.44	2.00	0.00	0.80	0.00
12.01	16.08	2.00	0.00	0.80	0.00	12.07	84.75	2.00	0.00	0.80	0.00
12.14	104.15	2.00	0.00	0.79	0.00	12.24	118.35	2.00	0.00	0.79	0.00
12.28	116.89	2.00	0.00	0.79	0.00	12.35	119.59	2.00	0.00	0.79	0.00
12.42	137.34	2.00	0.00	0.79	0.00	12.50	155.73	0.39	1.57	0.79	0.02
12.55	169.45	0.60	0.98	0.79	0.01	12.60	183.62	1.06	0.50	0.79	0.00
12.68	195.68	1.90	0.03	0.79	0.00	12.76	217.26	2.00	0.00	0.78	0.00
12.82	220.50	2.00	0.00	0.78	0.00	12.87	233.84	2.00	0.00	0.78	0.00
12.95	240.21	2.00	0.00	0.78	0.00	13.00	237.03	2.00	0.00	0.78	0.00
13.07	246.05	2.00	0.00	0.78	0.00	13.17	213.73	2.00	0.00	0.78	0.00
13.22	207.23	2.00	0.00	0.78	0.00	13.26	207.37	2.00	0.00	0.78	0.00
13.32	200.69	2.00	0.00	0.77	0.00	13.40	196.55	1.99	0.00	0.77	0.00
13.48	183.58	1.06	0.49	0.77	0.00	13.53	176.97	0.80	0.74	0.77	0.00
13.60	172.07	0.66	0.88	0.77	0.01	13.65	147.68	0.31	1.62	0.77	0.01
13.72	151.07	0.34	1.58	0.77	0.01	13.79	151.05	0.34	1.58	0.77	0.01
13.88	146.97	0.31	1.62	0.76	0.02	13.92	144.07	0.29	1.66	0.76	0.01
13.99	140.62	0.27	1.70	0.76	0.01	14.05	137.21	0.25	1.75	0.76	0.01
14.11	132.03	0.23	1.82	0.76	0.01	14.18	127.45	0.21	1.89	0.76	0.02
14.24	121.21	0.19	1.99	0.76	0.01	14.32	114.27	0.17	2.12	0.76	0.02
14.39	108.00	0.16	2.24	0.76	0.02	14.45	98.59	0.14	2.46	0.76	0.02
14.52	88.76	0.13	2.73	0.75	0.02	14.59	82.50	0.12	2.93	0.75	0.03

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
14.64	85.28	0.13	2.83	0.75	0.02	14.72	83.25	0.12	2.90	0.75	0.03
14.77	88.45	0.13	2.72	0.75	0.02	14.84	89.03	0.13	2.70	0.75	0.02
14.90	85.74	0.13	2.80	0.75	0.02	14.99	85.38	0.13	2.81	0.75	0.03
15.04	90.56	0.13	2.65	0.75	0.02	15.11	90.41	0.13	2.65	0.74	0.02
15.16	84.27	0.12	2.83	0.74	0.02	15.23	82.15	0.12	2.90	0.74	0.03
15.31	84.81	0.12	2.81	0.74	0.02	15.36	84.90	0.12	2.80	0.74	0.02
15.44	85.26	0.12	2.78	0.74	0.03	15.51	86.09	0.13	2.75	0.74	0.02
15.56	86.10	0.13	2.75	0.74	0.02	15.62	85.61	0.12	2.76	0.74	0.02
15.71	87.50	2.00	0.00	0.73	0.00	15.75	86.46	2.00	0.00	0.73	0.00
15.83	84.23	2.00	0.00	0.73	0.00	15.89	83.46	2.00	0.00	0.73	0.00
15.95	83.40	2.00	0.00	0.73	0.00	16.01	24.52	2.00	0.00	0.73	0.00
16.10	22.92	2.00	0.00	0.73	0.00	16.15	90.07	0.13	2.59	0.73	0.02
16.22	96.93	0.14	2.40	0.73	0.02	16.28	16.97	2.00	0.00	0.72	0.00
16.35	96.38	0.14	2.41	0.72	0.02	16.42	23.60	2.00	0.00	0.72	0.00
16.47	96.08	2.00	0.00	0.72	0.00	16.55	110.37	2.00	0.00	0.72	0.00
16.62	125.58	2.00	0.00	0.72	0.00	16.71	146.86	2.00	0.00	0.72	0.00
16.75	144.67	2.00	0.00	0.72	0.00	16.81	150.76	2.00	0.00	0.72	0.00
16.87	160.77	2.00	0.00	0.71	0.00	16.93	169.06	0.59	0.90	0.71	0.01
17.01	169.72	0.60	0.88	0.71	0.01	17.06	182.50	1.01	0.51	0.71	0.00
17.13	189.79	1.41	0.22	0.71	0.00	17.20	195.23	1.85	0.04	0.71	0.00
17.26	202.47	2.00	0.00	0.71	0.00	17.34	202.22	2.00	0.00	0.71	0.00
17.39	205.59	2.00	0.00	0.71	0.00	17.47	207.28	2.00	0.00	0.70	0.00
17.55	202.29	2.00	0.00	0.70	0.00	17.59	202.99	2.00	0.00	0.70	0.00
17.68	203.59	2.00	0.00	0.70	0.00	17.72	203.58	2.00	0.00	0.70	0.00
17.79	205.29	2.00	0.00	0.70	0.00	17.86	206.61	2.00	0.00	0.70	0.00
17.94	209.16	2.00	0.00	0.70	0.00	17.99	206.91	2.00	0.00	0.70	0.00
18.04	206.77	2.00	0.00	0.69	0.00	18.13	203.70	2.00	0.00	0.69	0.00
18.18	203.44	2.00	0.00	0.69	0.00	18.27	203.04	2.00	0.00	0.69	0.00
18.32	202.84	2.00	0.00	0.69	0.00	18.40	201.39	2.00	0.00	0.69	0.00
18.45	203.10	2.00	0.00	0.69	0.00	18.51	207.22	2.00	0.00	0.69	0.00
18.58	210.42	2.00	0.00	0.69	0.00	18.66	210.28	2.00	0.00	0.68	0.00
18.71	208.31	2.00	0.00	0.68	0.00	18.78	204.12	2.00	0.00	0.68	0.00
18.84	201.76	2.00	0.00	0.68	0.00	18.93	201.49	2.00	0.00	0.68	0.00
18.99	202.85	2.00	0.00	0.68	0.00	19.03	204.16	2.00	0.00	0.68	0.00
19.12	204.93	2.00	0.00	0.68	0.00	19.17	204.40	2.00	0.00	0.68	0.00
19.25	202.41	2.00	0.00	0.67	0.00	19.30	199.85	2.00	0.00	0.67	0.00
19.36	195.19	1.87	0.03	0.67	0.00	19.43	189.43	1.41	0.21	0.67	0.00
19.49	183.45	1.07	0.42	0.67	0.00	19.57	176.99	0.81	0.64	0.67	0.01
19.63	169.82	0.61	0.82	0.67	0.01	19.73	155.03	0.39	1.33	0.67	0.02
19.76	154.83	0.38	1.33	0.67	0.01	19.82	154.53	0.38	1.33	0.66	0.01
19.89	155.65	0.39	1.32	0.66	0.01	19.98	157.92	0.42	1.22	0.66	0.01
20.04	156.77	0.41	1.27	0.66	0.01	20.08	155.95	0.40	1.31	0.66	0.01
20.17	154.59	0.38	1.32	0.66	0.01	20.22	154.02	0.38	1.32	0.66	0.01
20.29	144.56	0.30	1.42	0.66	0.01	20.35	131.49	0.23	1.57	0.66	0.01
20.41	131.62	0.23	1.57	0.65	0.01	20.49	132.87	0.23	1.55	0.65	0.01
20.56	133.54	0.23	1.54	0.65	0.01	20.61	133.65	0.23	1.54	0.65	0.01
20.69	134.18	0.24	1.53	0.65	0.02	20.74	134.56	0.24	1.52	0.65	0.01
20.80	137.02	0.25	1.49	0.65	0.01	20.88	142.11	0.28	1.43	0.65	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
20.96	147.68	0.32	1.36	0.64	0.01	21.00	149.93	0.34	1.34	0.64	0.01
21.09	153.04	0.37	1.30	0.64	0.01	21.14	155.49	0.39	1.28	0.64	0.01
21.20	158.17	0.42	1.18	0.64	0.01	21.27	160.67	0.46	1.08	0.64	0.01
21.37	163.34	0.50	0.98	0.64	0.01	21.41	164.19	0.51	0.95	0.64	0.00
21.48	165.12	0.53	0.92	0.64	0.01	21.54	165.83	0.54	0.90	0.63	0.01
21.59	166.29	0.55	0.88	0.63	0.00	21.67	166.31	0.55	0.88	0.63	0.01
21.72	166.28	0.55	0.88	0.63	0.00	21.79	165.88	0.54	0.89	0.63	0.01
21.86	165.78	0.54	0.89	0.63	0.01	21.93	166.04	0.54	0.88	0.63	0.01
21.99	166.30	0.55	0.87	0.63	0.01	22.05	166.67	0.56	0.86	0.63	0.01
22.12	167.01	0.56	0.85	0.63	0.01	22.19	168.29	0.59	0.81	0.62	0.01
22.26	170.49	0.64	0.75	0.62	0.01	22.34	171.33	0.66	0.73	0.62	0.01
22.39	171.36	0.66	0.72	0.62	0.00	22.46	171.26	0.66	0.72	0.62	0.01
22.53	171.01	0.65	0.73	0.62	0.01	22.57	170.73	0.64	0.74	0.62	0.00
22.64	170.87	0.65	0.73	0.62	0.01	22.71	171.44	0.66	0.72	0.62	0.01
22.79	158.98	0.43	1.10	0.61	0.01	22.84	147.03	0.31	1.30	0.61	0.01
22.93	148.85	0.33	1.28	0.61	0.01	22.98	151.16	0.35	1.26	0.61	0.01
23.05	153.65	0.37	1.23	0.61	0.01	23.11	155.63	0.39	1.21	0.61	0.01
23.17	156.53	0.40	1.18	0.61	0.01	23.26	157.26	0.41	1.15	0.61	0.01
23.31	159.03	0.43	1.08	0.60	0.01	23.39	161.27	0.46	1.00	0.60	0.01
23.44	162.72	0.49	0.95	0.60	0.01	23.50	164.26	0.51	0.90	0.60	0.01
23.57	165.16	0.53	0.87	0.60	0.01	23.63	166.04	0.54	0.84	0.60	0.01
23.70	166.54	0.55	0.83	0.60	0.01	23.75	166.78	0.56	0.82	0.60	0.01
23.84	169.18	0.61	0.75	0.60	0.01	23.89	171.26	0.65	0.70	0.60	0.00
23.98	176.46	0.80	0.58	0.59	0.01	24.03	179.26	0.90	0.52	0.59	0.00
24.11	184.73	1.16	0.31	0.59	0.00	24.16	186.68	1.27	0.25	0.59	0.00
24.23	190.37	1.51	0.14	0.59	0.00	24.30	192.90	1.72	0.07	0.59	0.00
24.38	194.61	1.87	0.03	0.59	0.00	24.42	195.41	1.95	0.01	0.59	0.00
24.50	196.00	2.00	0.00	0.58	0.00	24.55	195.83	2.00	0.00	0.58	0.00
24.62	196.40	2.00	0.00	0.58	0.00	24.68	196.89	2.00	0.00	0.58	0.00
24.75	198.91	2.00	0.00	0.58	0.00	24.83	202.86	2.00	0.00	0.58	0.00
24.87	205.64	2.00	0.00	0.58	0.00	24.95	210.57	2.00	0.00	0.58	0.00
25.01	213.69	2.00	0.00	0.58	0.00	25.09	217.14	2.00	0.00	0.57	0.00
25.14	221.09	2.00	0.00	0.57	0.00	25.23	223.67	2.00	0.00	0.57	0.00
25.27	206.13	2.00	0.00	0.57	0.00	25.35	223.02	2.00	0.00	0.57	0.00
25.41	217.10	2.00	0.00	0.57	0.00	25.49	222.29	2.00	0.00	0.57	0.00
25.54	224.84	2.00	0.00	0.57	0.00	25.62	231.21	2.00	0.00	0.57	0.00
25.67	233.48	2.00	0.00	0.56	0.00	25.75	236.38	2.00	0.00	0.56	0.00
25.81	238.40	2.00	0.00	0.56	0.00	25.86	234.63	2.00	0.00	0.56	0.00
25.92	229.02	2.00	0.00	0.56	0.00	25.99	225.67	2.00	0.00	0.56	0.00
26.06	219.61	2.00	0.00	0.56	0.00	26.12	215.96	2.00	0.00	0.56	0.00
26.18	210.47	2.00	0.00	0.56	0.00	26.25	210.69	2.00	0.00	0.56	0.00
26.32	208.48	2.00	0.00	0.55	0.00	26.39	207.93	2.00	0.00	0.55	0.00
26.46	205.70	2.00	0.00	0.55	0.00	26.52	204.77	2.00	0.00	0.55	0.00
26.60	205.93	2.00	0.00	0.55	0.00	26.66	207.04	2.00	0.00	0.55	0.00
26.73	209.86	2.00	0.00	0.55	0.00	26.79	211.79	2.00	0.00	0.55	0.00
26.87	214.36	2.00	0.00	0.54	0.00	26.93	215.67	2.00	0.00	0.54	0.00
26.97	217.03	2.00	0.00	0.54	0.00	27.06	218.39	2.00	0.00	0.54	0.00
27.10	218.70	2.00	0.00	0.54	0.00	27.19	218.06	2.00	0.00	0.54	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
27.24	218.13	2.00	0.00	0.54	0.00	27.32	219.70	2.00	0.00	0.54	0.00
27.37	221.00	2.00	0.00	0.54	0.00	27.43	221.83	2.00	0.00	0.54	0.00
27.50	224.43	2.00	0.00	0.53	0.00	27.57	215.08	2.00	0.00	0.53	0.00
27.64	209.47	2.00	0.00	0.53	0.00	27.73	210.41	2.00	0.00	0.53	0.00
27.76	210.39	2.00	0.00	0.53	0.00	27.83	211.30	2.00	0.00	0.53	0.00
27.90	210.83	2.00	0.00	0.53	0.00	27.95	211.38	2.00	0.00	0.53	0.00
28.04	217.34	2.00	0.00	0.52	0.00	28.11	223.97	2.00	0.00	0.52	0.00
28.17	228.51	2.00	0.00	0.52	0.00	28.24	232.16	2.00	0.00	0.52	0.00
28.31	235.58	2.00	0.00	0.52	0.00	28.35	238.07	2.00	0.00	0.52	0.00
28.42	242.80	2.00	0.00	0.52	0.00	28.49	246.83	2.00	0.00	0.52	0.00
28.55	248.31	2.00	0.00	0.52	0.00	28.65	247.74	2.00	0.00	0.51	0.00
28.68	247.83	2.00	0.00	0.51	0.00	28.75	246.97	2.00	0.00	0.51	0.00
28.81	246.64	2.00	0.00	0.51	0.00	28.88	247.47	2.00	0.00	0.51	0.00
28.97	248.87	2.00	0.00	0.51	0.00	29.01	250.99	2.00	0.00	0.51	0.00
29.10	254.25	2.00	0.00	0.51	0.00	29.15	254.92	2.00	0.00	0.51	0.00
29.24	257.27	2.00	0.00	0.50	0.00	29.28	257.56	2.00	0.00	0.50	0.00
29.33	257.73	2.00	0.00	0.50	0.00	29.42	258.03	2.00	0.00	0.50	0.00
29.47	259.82	2.00	0.00	0.50	0.00	29.55	260.91	2.00	0.00	0.50	0.00
29.61	261.77	2.00	0.00	0.50	0.00	29.67	262.60	2.00	0.00	0.50	0.00
29.74	263.56	2.00	0.00	0.50	0.00	29.80	259.84	2.00	0.00	0.49	0.00
29.87	263.72	2.00	0.00	0.49	0.00	29.94	259.92	2.00	0.00	0.49	0.00
30.01	263.85	2.00	0.00	0.49	0.00	30.05	264.18	2.00	0.00	0.49	0.00
30.14	263.51	2.00	0.00	0.49	0.00	30.19	264.52	2.00	0.00	0.49	0.00
30.27	264.23	2.00	0.00	0.49	0.00	30.32	264.88	2.00	0.00	0.49	0.00
30.40	266.79	2.00	0.00	0.48	0.00	30.45	269.23	2.00	0.00	0.48	0.00
30.52	273.08	2.00	0.00	0.48	0.00	30.59	279.72	2.00	0.00	0.48	0.00
30.68	285.83	2.00	0.00	0.48	0.00	30.72	284.97	2.00	0.00	0.48	0.00
30.81	277.08	2.00	0.00	0.48	0.00	30.84	274.43	2.00	0.00	0.48	0.00
30.95	274.07	2.00	0.00	0.48	0.00	30.99	278.34	2.00	0.00	0.47	0.00
31.06	290.44	2.00	0.00	0.47	0.00	31.11	302.06	2.00	0.00	0.47	0.00
31.18	320.99	2.00	0.00	0.47	0.00	31.26	330.55	2.00	0.00	0.47	0.00
31.30	343.72	2.00	0.00	0.47	0.00	31.38	369.17	2.00	0.00	0.47	0.00
31.44	373.57	2.00	0.00	0.47	0.00	31.53	378.87	2.00	0.00	0.47	0.00
31.58	380.46	2.00	0.00	0.46	0.00	31.66	390.23	2.00	0.00	0.46	0.00
31.70	392.51	2.00	0.00	0.46	0.00	31.79	396.56	2.00	0.00	0.46	0.00
31.83	397.69	2.00	0.00	0.46	0.00	31.93	401.60	2.00	0.00	0.46	0.00
31.98	411.81	2.00	0.00	0.46	0.00	32.04	406.57	2.00	0.00	0.46	0.00
32.10	410.15	2.00	0.00	0.46	0.00	32.17	415.38	2.00	0.00	0.45	0.00
32.24	370.61	2.00	0.00	0.45	0.00	32.29	334.00	2.00	0.00	0.45	0.00
32.36	279.86	2.00	0.00	0.45	0.00	32.43	286.52	2.00	0.00	0.45	0.00
32.50	274.96	2.00	0.00	0.45	0.00	32.55	270.88	2.00	0.00	0.45	0.00
32.62	263.96	2.00	0.00	0.45	0.00	32.71	258.03	2.00	0.00	0.45	0.00
32.76	253.55	2.00	0.00	0.44	0.00	32.81	248.84	2.00	0.00	0.44	0.00
32.88	244.29	2.00	0.00	0.44	0.00	32.94	248.14	2.00	0.00	0.44	0.00
33.03	241.97	2.00	0.00	0.44	0.00	33.07	247.52	2.00	0.00	0.44	0.00
33.14	257.22	2.00	0.00	0.44	0.00	33.21	265.74	2.00	0.00	0.44	0.00
33.30	281.98	2.00	0.00	0.44	0.00	33.34	286.60	2.00	0.00	0.43	0.00
33.40	292.21	2.00	0.00	0.43	0.00	33.48	292.71	2.00	0.00	0.43	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
33.56	291.78	2.00	0.00	0.43	0.00	33.61	291.05	2.00	0.00	0.43	0.00
33.69	291.70	2.00	0.00	0.43	0.00	33.74	293.11	2.00	0.00	0.43	0.00
33.82	294.19	2.00	0.00	0.43	0.00	33.88	295.08	2.00	0.00	0.43	0.00
33.97	296.14	2.00	0.00	0.42	0.00	34.00	297.06	2.00	0.00	0.42	0.00
34.06	297.29	2.00	0.00	0.42	0.00	34.12	296.83	2.00	0.00	0.42	0.00
34.19	296.01	2.00	0.00	0.42	0.00	34.27	278.02	2.00	0.00	0.42	0.00
34.34	274.98	2.00	0.00	0.42	0.00	34.41	276.08	2.00	0.00	0.42	0.00
34.45	273.02	2.00	0.00	0.42	0.00	34.54	269.68	2.00	0.00	0.41	0.00
34.59	269.91	2.00	0.00	0.41	0.00	34.65	273.67	2.00	0.00	0.41	0.00
34.72	280.34	2.00	0.00	0.41	0.00	34.81	283.25	2.00	0.00	0.41	0.00
34.85	283.13	2.00	0.00	0.41	0.00	34.94	288.02	2.00	0.00	0.41	0.00
34.99	289.06	2.00	0.00	0.41	0.00	35.06	290.80	2.00	0.00	0.41	0.00
35.12	288.02	2.00	0.00	0.40	0.00	35.18	287.88	2.00	0.00	0.40	0.00
35.26	287.49	2.00	0.00	0.40	0.00	35.30	284.43	2.00	0.00	0.40	0.00
35.37	274.89	2.00	0.00	0.40	0.00	35.44	265.00	2.00	0.00	0.40	0.00
35.53	254.92	2.00	0.00	0.40	0.00	35.57	245.09	2.00	0.00	0.40	0.00
35.66	223.85	2.00	0.00	0.40	0.00	35.71	202.88	2.00	0.00	0.39	0.00
35.76	188.59	1.37	0.13	0.39	0.00	35.84	174.59	0.75	0.41	0.39	0.00
35.89	173.12	0.70	0.43	0.39	0.00	35.97	177.59	0.84	0.36	0.39	0.00
36.04	167.67	0.58	0.52	0.39	0.00	36.10	155.99	0.40	0.77	0.39	0.01
36.17	135.10	0.25	0.90	0.39	0.01	36.24	122.28	0.20	1.00	0.39	0.01
36.31	113.17	0.18	1.09	0.38	0.01	36.37	44.23	2.00	0.00	0.38	0.00
36.44	43.88	2.00	0.00	0.38	0.00	36.49	43.86	2.00	0.00	0.38	0.00
36.59	43.47	2.00	0.00	0.38	0.00	36.62	108.14	0.17	1.12	0.38	0.00
36.68	110.64	0.17	1.09	0.38	0.01	36.75	115.54	0.18	1.04	0.38	0.01
36.82	118.62	0.19	1.01	0.38	0.01	36.90	117.92	2.00	0.00	0.37	0.00
36.96	122.87	2.00	0.00	0.37	0.00	37.04	138.49	2.00	0.00	0.37	0.00
37.08	148.74	2.00	0.00	0.37	0.00	37.15	165.93	2.00	0.00	0.37	0.00
37.22	175.32	2.00	0.00	0.37	0.00	37.29	189.66	2.00	0.00	0.37	0.00
37.36	201.72	2.00	0.00	0.37	0.00	37.40	201.77	2.00	0.00	0.37	0.00
37.49	231.83	2.00	0.00	0.36	0.00	37.54	252.46	2.00	0.00	0.36	0.00
37.62	286.16	2.00	0.00	0.36	0.00	37.67	290.02	2.00	0.00	0.36	0.00
37.74	301.48	2.00	0.00	0.36	0.00	37.80	326.37	2.00	0.00	0.36	0.00
37.88	342.73	2.00	0.00	0.36	0.00	37.94	329.16	2.00	0.00	0.36	0.00
38.01	343.42	2.00	0.00	0.36	0.00	38.07	333.83	2.00	0.00	0.35	0.00
38.16	344.08	2.00	0.00	0.35	0.00	38.20	348.95	2.00	0.00	0.35	0.00
38.27	355.94	2.00	0.00	0.35	0.00	38.34	367.79	2.00	0.00	0.35	0.00
38.41	364.43	2.00	0.00	0.35	0.00	38.47	348.63	2.00	0.00	0.35	0.00
38.53	313.15	2.00	0.00	0.35	0.00	38.59	321.96	2.00	0.00	0.35	0.00
38.68	316.72	2.00	0.00	0.34	0.00	38.73	320.70	2.00	0.00	0.34	0.00
38.80	324.66	2.00	0.00	0.34	0.00	38.85	314.53	2.00	0.00	0.34	0.00
38.92	300.93	2.00	0.00	0.34	0.00	38.99	293.05	2.00	0.00	0.34	0.00
39.08	292.65	2.00	0.00	0.34	0.00	39.11	295.35	2.00	0.00	0.34	0.00
39.18	309.34	2.00	0.00	0.34	0.00	39.26	320.20	2.00	0.00	0.33	0.00
39.31	323.96	2.00	0.00	0.33	0.00	39.40	322.68	2.00	0.00	0.33	0.00
39.44	323.64	2.00	0.00	0.33	0.00	39.51	332.18	2.00	0.00	0.33	0.00
39.57	346.36	2.00	0.00	0.33	0.00	39.65	353.10	2.00	0.00	0.33	0.00
39.71	352.35	2.00	0.00	0.33	0.00	39.80	346.60	2.00	0.00	0.33	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
39.85	349.55	2.00	0.00	0.32	0.00	39.93	377.33	2.00	0.00	0.32	0.00
39.98	384.02	2.00	0.00	0.32	0.00	40.06	400.63	2.00	0.00	0.32	0.00
40.11	409.03	2.00	0.00	0.32	0.00	40.16	405.20	2.00	0.00	0.32	0.00
40.23	381.33	2.00	0.00	0.32	0.00	40.29	353.76	2.00	0.00	0.32	0.00
40.38	358.94	2.00	0.00	0.32	0.00	40.42	374.80	2.00	0.00	0.31	0.00
40.49	390.91	2.00	0.00	0.31	0.00	40.56	411.88	2.00	0.00	0.31	0.00
40.64	446.75	2.00	0.00	0.31	0.00	40.69	417.68	2.00	0.00	0.31	0.00
40.75	429.61	2.00	0.00	0.31	0.00	40.82	435.79	2.00	0.00	0.31	0.00
40.88	437.41	2.00	0.00	0.31	0.00	40.95	452.10	2.00	0.00	0.31	0.00
41.01	452.48	2.00	0.00	0.30	0.00	41.09	461.92	2.00	0.00	0.30	0.00
41.15	441.49	2.00	0.00	0.30	0.00	41.22	427.91	2.00	0.00	0.30	0.00
41.28	411.07	2.00	0.00	0.30	0.00	41.36	404.72	2.00	0.00	0.30	0.00
41.43	401.60	2.00	0.00	0.30	0.00	41.49	390.65	2.00	0.00	0.30	0.00
41.54	380.28	2.00	0.00	0.30	0.00	41.61	369.89	2.00	0.00	0.29	0.00
41.69	385.70	2.00	0.00	0.29	0.00	41.74	398.05	2.00	0.00	0.29	0.00
41.81	416.49	2.00	0.00	0.29	0.00	41.87	431.73	2.00	0.00	0.29	0.00
41.95	426.59	2.00	0.00	0.29	0.00	42.00	446.05	2.00	0.00	0.29	0.00
42.08	397.92	2.00	0.00	0.29	0.00	42.13	380.31	2.00	0.00	0.29	0.00
42.20	383.13	2.00	0.00	0.28	0.00	42.27	379.96	2.00	0.00	0.28	0.00
42.33	342.47	2.00	0.00	0.28	0.00	42.40	429.54	2.00	0.00	0.28	0.00
42.47	433.33	2.00	0.00	0.28	0.00	42.53	438.40	2.00	0.00	0.28	0.00
42.60	361.01	2.00	0.00	0.28	0.00	42.66	323.94	2.00	0.00	0.28	0.00
42.73	282.39	2.00	0.00	0.28	0.00	42.80	282.99	2.00	0.00	0.27	0.00
42.86	283.60	2.00	0.00	0.27	0.00	42.92	334.90	2.00	0.00	0.27	0.00
42.98	362.03	2.00	0.00	0.27	0.00	43.06	415.83	2.00	0.00	0.27	0.00
43.11	433.64	2.00	0.00	0.27	0.00	43.18	401.23	2.00	0.00	0.27	0.00
43.26	460.15	2.00	0.00	0.27	0.00	43.31	442.03	2.00	0.00	0.27	0.00
43.38	499.36	2.00	0.00	0.26	0.00	43.45	502.21	2.00	0.00	0.26	0.00
43.51	503.64	2.00	0.00	0.26	0.00	43.59	503.48	2.00	0.00	0.26	0.00
43.66	503.33	2.00	0.00	0.26	0.00	43.70	486.80	2.00	0.00	0.26	0.00
43.79	464.13	2.00	0.00	0.26	0.00	43.84	459.16	2.00	0.00	0.26	0.00
43.91	473.04	2.00	0.00	0.26	0.00	43.96	468.77	2.00	0.00	0.25	0.00
44.05	456.86	2.00	0.00	0.25	0.00	44.09	412.80	2.00	0.00	0.25	0.00
44.17	402.00	2.00	0.00	0.25	0.00	44.23	414.84	2.00	0.00	0.25	0.00
44.30	407.03	2.00	0.00	0.25	0.00	44.36	388.98	2.00	0.00	0.25	0.00
44.43	387.67	2.00	0.00	0.25	0.00	44.49	387.58	2.00	0.00	0.25	0.00
44.56	386.28	2.00	0.00	0.24	0.00	44.63	377.00	2.00	0.00	0.24	0.00
44.70	378.79	2.00	0.00	0.24	0.00	44.76	382.32	2.00	0.00	0.24	0.00
44.82	380.53	2.00	0.00	0.24	0.00	44.90	390.15	2.00	0.00	0.24	0.00
44.96	394.22	2.00	0.00	0.24	0.00	45.03	409.75	2.00	0.00	0.24	0.00
45.09	424.66	2.00	0.00	0.24	0.00	45.15	433.37	2.00	0.00	0.23	0.00
45.22	444.11	2.00	0.00	0.23	0.00	45.28	454.01	2.00	0.00	0.23	0.00
45.36	455.48	2.00	0.00	0.23	0.00	45.41	477.83	2.00	0.00	0.23	0.00
45.48	474.98	2.00	0.00	0.23	0.00	45.54	477.53	2.00	0.00	0.23	0.00
45.62	475.47	2.00	0.00	0.23	0.00	45.69	477.18	2.00	0.00	0.23	0.00
45.74	475.59	2.00	0.00	0.22	0.00	45.81	470.98	2.00	0.00	0.22	0.00
45.87	473.17	2.00	0.00	0.22	0.00	45.96	473.79	2.00	0.00	0.22	0.00
46.00	483.90	2.00	0.00	0.22	0.00	46.09	465.28	2.00	0.00	0.22	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
46.14	463.73	2.00	0.00	0.22	0.00	46.21	449.99	2.00	0.00	0.22	0.00
46.27	450.04	2.00	0.00	0.22	0.00	46.34	382.61	2.00	0.00	0.21	0.00
46.41	383.77	2.00	0.00	0.21	0.00	46.46	380.55	2.00	0.00	0.21	0.00
46.54	360.67	2.00	0.00	0.21	0.00	46.61	327.86	2.00	0.00	0.21	0.00
46.66	328.29	2.00	0.00	0.21	0.00	46.72	324.23	2.00	0.00	0.21	0.00
46.81	324.90	2.00	0.00	0.21	0.00	46.86	324.84	2.00	0.00	0.21	0.00
46.92	325.54	2.00	0.00	0.20	0.00	46.98	354.57	2.00	0.00	0.20	0.00
47.05	349.79	2.00	0.00	0.20	0.00	47.12	343.13	2.00	0.00	0.20	0.00
47.19	339.83	2.00	0.00	0.20	0.00	47.26	332.19	2.00	0.00	0.20	0.00
47.31	304.74	2.00	0.00	0.20	0.00	47.39	305.92	2.00	0.00	0.20	0.00
47.45	267.58	2.00	0.00	0.20	0.00	47.53	262.33	2.00	0.00	0.19	0.00
47.58	283.23	2.00	0.00	0.19	0.00	47.65	332.00	2.00	0.00	0.19	0.00
47.71	365.01	2.00	0.00	0.19	0.00	47.78	427.08	2.00	0.00	0.19	0.00
47.85	455.28	2.00	0.00	0.19	0.00	47.94	501.78	2.00	0.00	0.19	0.00
47.97	492.38	2.00	0.00	0.19	0.00	48.06	541.75	2.00	0.00	0.19	0.00
48.10	553.86	2.00	0.00	0.18	0.00	48.17	536.35	2.00	0.00	0.18	0.00
48.25	530.99	2.00	0.00	0.18	0.00	48.32	546.36	2.00	0.00	0.18	0.00
48.37	547.17	2.00	0.00	0.18	0.00	48.43	555.67	2.00	0.00	0.18	0.00
48.50	531.53	2.00	0.00	0.18	0.00	48.57	524.57	2.00	0.00	0.18	0.00
48.62	515.27	2.00	0.00	0.18	0.00	48.69	496.17	2.00	0.00	0.17	0.00
48.76	491.31	2.00	0.00	0.17	0.00	48.83	480.35	2.00	0.00	0.17	0.00
48.89	482.38	2.00	0.00	0.17	0.00	48.96	458.35	2.00	0.00	0.17	0.00
49.02	456.45	2.00	0.00	0.17	0.00	49.09	445.92	2.00	0.00	0.17	0.00
49.15	455.88	2.00	0.00	0.17	0.00	49.23	448.93	2.00	0.00	0.17	0.00
49.28	455.30	2.00	0.00	0.16	0.00	49.37	456.67	2.00	0.00	0.16	0.00
49.41	470.33	2.00	0.00	0.16	0.00	49.49	477.32	2.00	0.00	0.16	0.00
49.54	462.32	2.00	0.00	0.16	0.00	49.64	472.41	2.00	0.00	0.16	0.00
49.68	461.94	2.00	0.00	0.16	0.00	49.76	440.19	2.00	0.00	0.16	0.00
49.80	429.32	2.00	0.00	0.16	0.00	49.87	394.47	2.00	0.00	0.15	0.00
49.95	418.38	2.00	0.00	0.15	0.00	50.00	430.39	2.00	0.00	0.15	0.00
50.07	423.50	2.00	0.00	0.15	0.00	50.14	421.18	2.00	0.00	0.15	0.00
50.20	422.39	2.00	0.00	0.15	0.00	50.27	430.86	2.00	0.00	0.15	0.00

Total estimated settlement: 3.93

Abbreviations

- Q_{tn,cs}: Equivalent clean sand normalized cone resistance
- FS: Factor of safety against liquefaction
- e_v (%): Post-liquefaction volumetric strain
- DF: e_v depth weighting factor
- Settlement: Calculated settlement



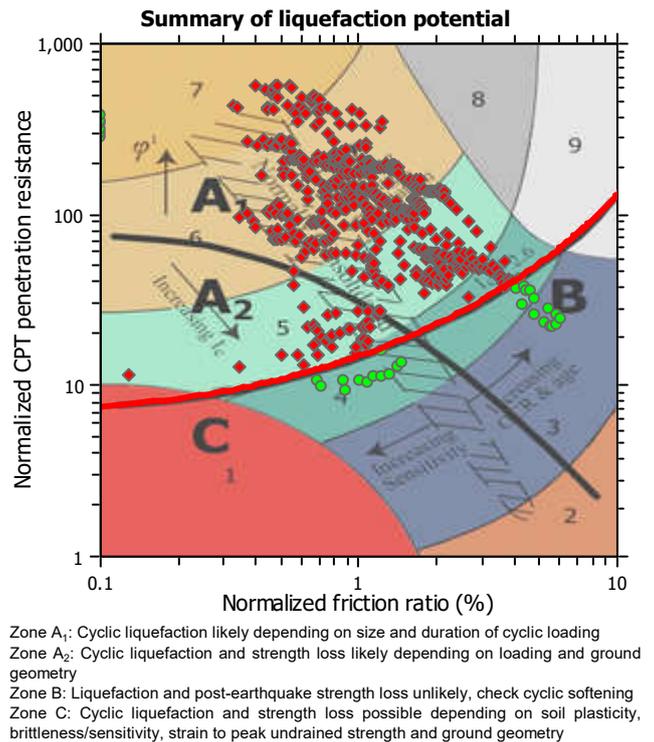
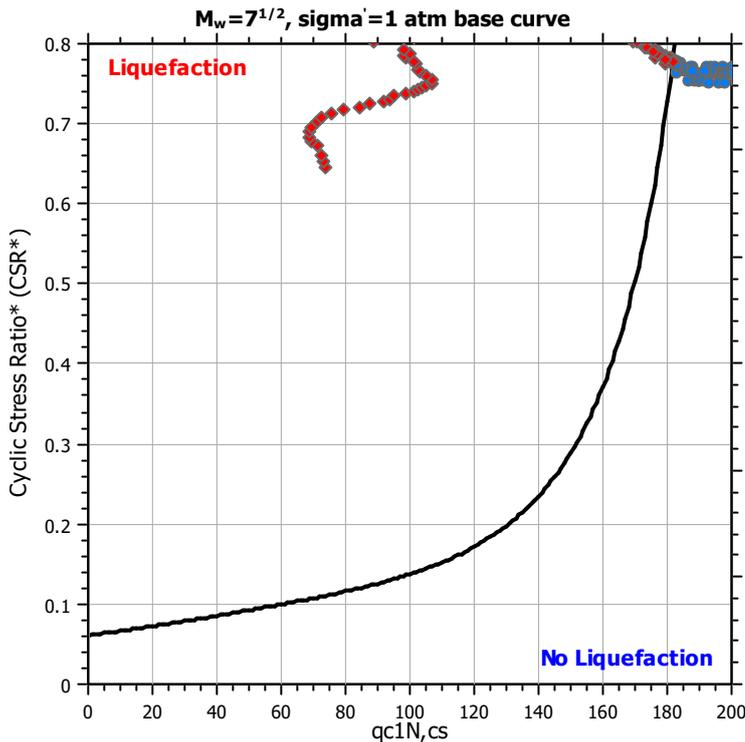
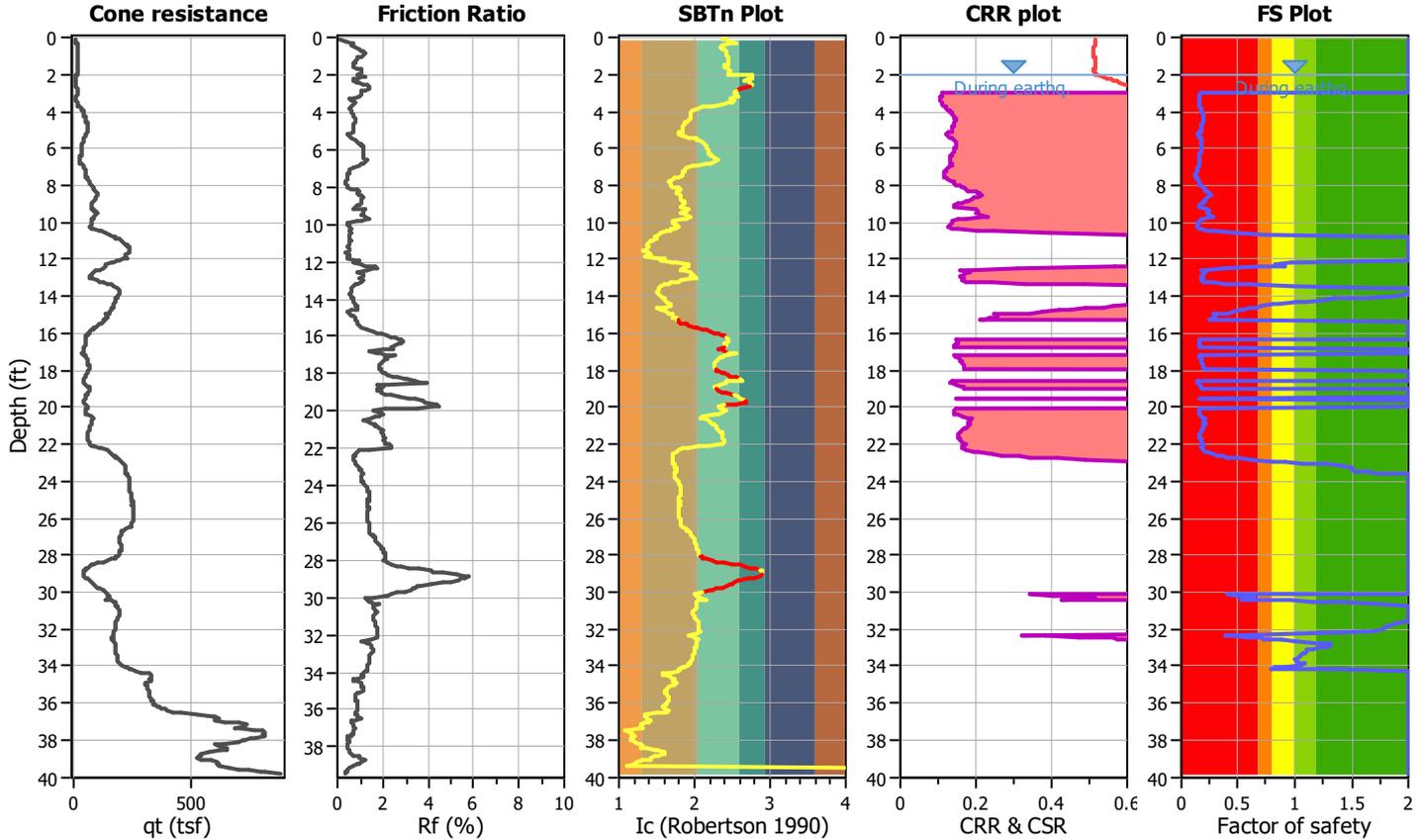
LIQUEFACTION ANALYSIS REPORT

Project title : Proposed Warehouse
CPT file : CPT-3

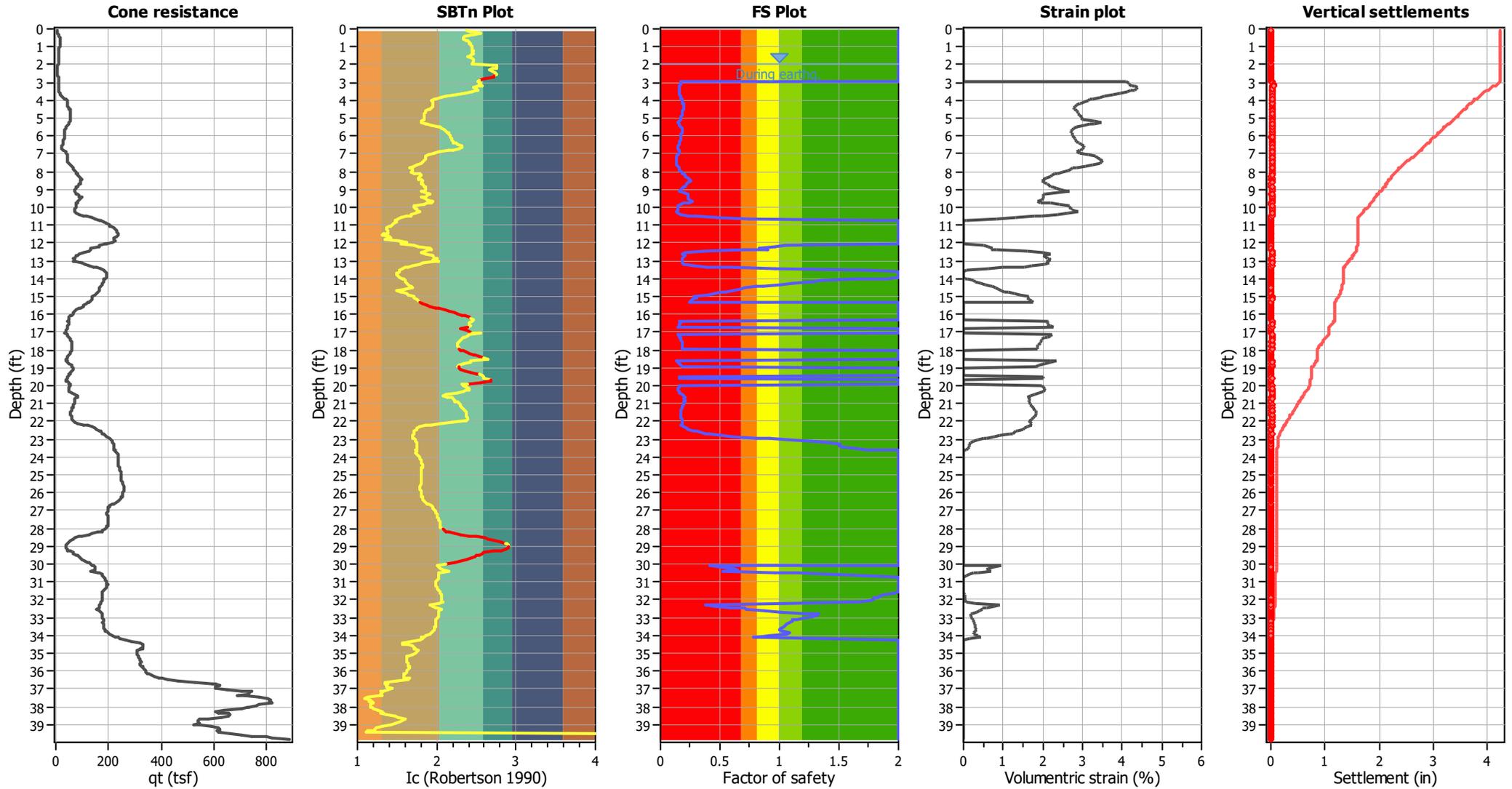
Location : El Monte, CA

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	37.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w :	6.89	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_G applied:	Yes		



Estimation of post-earthquake settlements



Abbreviations

- qt: Total cone resistance (cone resistance q_c corrected for pore water effects)
- I_c: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement due to soil liquefaction ::											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
2.05	11.29	2.00	0.00	0.97	0.00	2.11	10.56	2.00	0.00	0.96	0.00
2.19	9.37	2.00	0.00	0.96	0.00	2.25	10.11	2.00	0.00	0.96	0.00
2.30	10.84	2.00	0.00	0.96	0.00	2.38	10.84	2.00	0.00	0.96	0.00
2.43	10.84	2.00	0.00	0.96	0.00	2.52	11.58	2.00	0.00	0.96	0.00
2.56	11.74	2.00	0.00	0.96	0.00	2.63	13.22	2.00	0.00	0.96	0.00
2.70	13.82	2.00	0.00	0.95	0.00	2.79	16.34	2.00	0.00	0.95	0.00
2.85	73.57	2.00	0.00	0.95	0.00	2.92	74.26	2.00	0.00	0.95	0.00
2.97	73.98	0.17	4.10	0.95	0.02	3.02	72.94	0.17	4.15	0.95	0.02
3.10	72.24	0.17	4.18	0.95	0.04	3.19	70.96	0.16	4.25	0.95	0.05
3.23	69.55	0.16	4.33	0.95	0.02	3.29	68.58	0.16	4.38	0.94	0.03
3.36	69.05	0.15	4.34	0.94	0.04	3.42	69.58	0.15	4.31	0.94	0.03
3.48	71.25	0.15	4.21	0.94	0.03	3.55	72.78	0.15	4.12	0.94	0.03
3.62	75.87	0.16	3.96	0.94	0.03	3.68	79.61	0.16	3.78	0.94	0.03
3.75	84.44	0.17	3.56	0.94	0.03	3.82	87.53	0.17	3.43	0.94	0.03
3.91	91.78	0.18	3.27	0.93	0.03	3.95	93.84	0.18	3.20	0.93	0.02
4.02	95.21	0.18	3.15	0.93	0.02	4.08	98.46	0.18	3.04	0.93	0.02
4.17	101.18	0.19	2.95	0.93	0.03	4.22	102.24	0.19	2.92	0.93	0.02
4.29	103.84	0.19	2.87	0.93	0.03	4.34	105.25	0.19	2.82	0.93	0.02
4.40	106.97	0.20	2.77	0.93	0.02	4.49	106.71	0.19	2.78	0.92	0.03
4.53	105.19	0.19	2.82	0.92	0.01	4.63	103.19	0.19	2.87	0.92	0.03
4.67	102.81	0.18	2.88	0.92	0.01	4.76	101.76	0.18	2.90	0.92	0.03
4.81	101.03	0.18	2.92	0.92	0.02	4.88	98.99	0.17	2.98	0.92	0.03
4.93	98.42	0.17	2.99	0.92	0.02	4.99	99.85	0.17	2.95	0.92	0.02
5.07	98.10	0.17	3.00	0.91	0.03	5.14	88.89	0.16	3.30	0.91	0.03
5.21	84.30	0.15	3.47	0.91	0.03	5.30	88.44	0.15	3.31	0.91	0.03
5.34	91.61	0.16	3.19	0.91	0.02	5.40	96.61	0.16	3.02	0.91	0.02
5.47	101.49	0.17	2.87	0.91	0.02	5.51	102.62	0.17	2.84	0.91	0.02
5.58	104.41	0.18	2.78	0.91	0.02	5.65	105.46	0.18	2.75	0.90	0.02
5.71	106.41	0.18	2.72	0.90	0.02	5.78	106.39	0.18	2.72	0.90	0.02
5.85	105.92	0.18	2.73	0.90	0.02	5.91	105.52	0.18	2.74	0.90	0.02
5.98	104.91	0.17	2.75	0.90	0.02	6.07	104.03	0.17	2.77	0.90	0.03
6.11	103.68	0.17	2.78	0.90	0.01	6.19	102.47	0.17	2.80	0.90	0.03
6.25	101.50	0.17	2.83	0.89	0.02	6.30	100.28	0.16	2.86	0.89	0.02
6.37	99.00	0.16	2.90	0.89	0.02	6.43	97.31	0.16	2.94	0.89	0.02
6.51	96.04	0.16	2.98	0.89	0.03	6.57	94.24	0.15	3.03	0.89	0.02
6.65	93.69	0.15	3.05	0.89	0.03	6.72	94.56	0.15	3.01	0.89	0.02
6.78	96.25	0.15	2.96	0.89	0.02	6.83	97.68	0.16	2.91	0.88	0.02
6.92	99.13	0.16	2.86	0.88	0.03	6.96	97.22	0.15	2.92	0.88	0.01
7.03	89.90	0.14	3.15	0.88	0.03	7.10	84.96	0.14	3.33	0.88	0.03
7.18	83.84	0.14	3.37	0.88	0.03	7.23	83.31	0.13	3.38	0.88	0.02
7.29	82.21	0.13	3.42	0.88	0.02	7.36	81.09	0.13	3.46	0.88	0.03
7.42	80.02	0.13	3.50	0.87	0.02	7.50	80.99	0.13	3.46	0.87	0.04
7.56	81.54	0.13	3.43	0.87	0.02	7.62	85.74	0.14	3.26	0.87	0.02
7.68	90.75	0.14	3.08	0.87	0.02	7.77	98.30	0.15	2.84	0.87	0.03
7.81	102.04	0.16	2.73	0.87	0.02	7.90	102.65	0.16	2.71	0.87	0.03
7.95	105.60	0.16	2.63	0.87	0.01	8.02	111.89	0.18	2.47	0.86	0.02
8.08	115.65	0.19	2.38	0.86	0.02	8.15	118.54	0.19	2.32	0.86	0.02
8.23	121.98	0.20	2.24	0.86	0.02	8.28	124.22	0.21	2.20	0.86	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
8.35	130.44	0.23	2.08	0.86	0.02	8.42	134.33	0.25	2.01	0.86	0.02
8.47	133.04	0.24	2.03	0.86	0.01	8.55	135.71	0.26	1.99	0.86	0.02
8.63	131.68	0.24	2.05	0.85	0.02	8.68	128.73	0.22	2.10	0.85	0.01
8.73	126.48	0.22	2.14	0.85	0.01	8.82	123.21	0.21	2.19	0.85	0.02
8.87	121.60	0.20	2.22	0.85	0.01	8.93	116.23	0.19	2.33	0.85	0.02
9.00	110.61	0.17	2.45	0.85	0.02	9.07	104.81	0.16	2.59	0.85	0.02
9.13	102.11	0.16	2.66	0.85	0.02	9.23	131.18	0.23	2.03	0.84	0.02
9.27	131.36	0.23	2.03	0.84	0.01	9.34	132.45	0.24	2.01	0.84	0.02
9.41	131.95	0.24	2.01	0.84	0.02	9.47	131.17	0.23	2.02	0.84	0.02
9.52	131.93	0.24	2.01	0.84	0.01	9.58	134.41	0.25	1.97	0.84	0.01
9.67	139.58	0.27	1.88	0.84	0.02	9.72	134.97	0.25	1.95	0.84	0.01
9.80	121.89	0.20	2.18	0.83	0.02	9.84	111.23	0.17	2.40	0.83	0.01
9.94	99.83	0.15	2.68	0.83	0.03	9.98	99.63	0.15	2.68	0.83	0.01
10.05	98.41	0.15	2.71	0.83	0.02	10.11	96.87	0.15	2.75	0.83	0.02
10.18	97.11	0.15	2.74	0.83	0.02	10.24	92.33	0.14	2.88	0.83	0.02
10.32	100.75	0.15	2.63	0.83	0.02	10.38	111.06	0.17	2.38	0.82	0.02
10.47	131.65	0.23	1.98	0.82	0.02	10.50	143.04	0.29	1.80	0.82	0.01
10.58	161.97	0.48	1.32	0.82	0.01	10.64	174.49	0.74	0.86	0.82	0.01
10.73	194.36	1.82	0.06	0.82	0.00	10.76	199.13	2.00	0.00	0.82	0.00
10.83	206.24	2.00	0.00	0.82	0.00	10.91	216.88	2.00	0.00	0.82	0.00
11.00	225.34	2.00	0.00	0.81	0.00	11.03	229.53	2.00	0.00	0.81	0.00
11.10	234.85	2.00	0.00	0.81	0.00	11.18	240.23	2.00	0.00	0.81	0.00
11.23	245.79	2.00	0.00	0.81	0.00	11.29	253.24	2.00	0.00	0.81	0.00
11.36	254.51	2.00	0.00	0.81	0.00	11.44	256.67	2.00	0.00	0.81	0.00
11.50	255.18	2.00	0.00	0.81	0.00	11.55	254.23	2.00	0.00	0.80	0.00
11.63	252.18	2.00	0.00	0.80	0.00	11.71	241.59	2.00	0.00	0.80	0.00
11.77	239.05	2.00	0.00	0.80	0.00	11.81	240.29	2.00	0.00	0.80	0.00
11.90	245.34	2.00	0.00	0.80	0.00	11.95	233.12	2.00	0.00	0.80	0.00
12.02	209.89	2.00	0.00	0.80	0.00	12.08	206.03	2.00	0.00	0.80	0.00
12.17	182.83	1.05	0.52	0.79	0.01	12.21	181.01	0.97	0.61	0.79	0.00
12.28	177.28	0.83	0.75	0.79	0.01	12.34	179.46	0.91	0.69	0.79	0.01
12.40	173.36	0.71	0.86	0.79	0.01	12.48	152.84	0.37	1.60	0.79	0.01
12.56	124.02	0.20	2.02	0.79	0.02	12.61	114.48	0.18	2.19	0.79	0.01
12.67	124.65	0.21	2.00	0.79	0.01	12.75	124.17	0.20	2.01	0.78	0.02
12.84	117.77	0.19	2.12	0.78	0.02	12.88	116.05	0.18	2.15	0.78	0.01
12.93	114.59	0.18	2.18	0.78	0.01	13.00	116.65	0.18	2.13	0.78	0.02
13.06	118.86	0.19	2.09	0.78	0.02	13.15	115.73	0.18	2.14	0.78	0.02
13.20	121.66	0.20	2.03	0.78	0.01	13.26	141.69	0.28	1.72	0.78	0.01
13.33	155.54	0.39	1.54	0.77	0.01	13.39	168.79	0.60	0.99	0.77	0.01
13.47	180.80	0.96	0.61	0.77	0.01	13.55	193.49	1.73	0.09	0.77	0.00
13.60	197.55	2.00	0.00	0.77	0.00	13.66	200.32	2.00	0.00	0.77	0.00
13.73	204.59	2.00	0.00	0.77	0.00	13.78	204.26	2.00	0.00	0.77	0.00
13.87	201.41	2.00	0.00	0.76	0.00	13.91	200.67	2.00	0.00	0.76	0.00
14.00	195.25	1.90	0.03	0.76	0.00	14.04	192.43	1.65	0.12	0.76	0.00
14.11	188.42	1.36	0.27	0.76	0.00	14.18	187.21	1.28	0.31	0.76	0.00
14.26	184.14	1.11	0.44	0.76	0.00	14.32	182.04	1.01	0.54	0.76	0.00
14.40	178.35	0.86	0.69	0.76	0.01	14.44	176.44	0.80	0.74	0.76	0.00
14.54	173.24	0.70	0.82	0.75	0.01	14.58	171.77	0.67	0.87	0.75	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
14.65	169.06	0.60	0.95	0.75	0.01	14.72	166.40	0.55	1.04	0.75	0.01
14.76	164.12	0.51	1.12	0.75	0.01	14.84	160.06	0.45	1.29	0.75	0.01
14.90	156.67	0.41	1.44	0.75	0.01	14.97	142.56	0.29	1.64	0.75	0.01
15.06	145.04	0.30	1.61	0.74	0.02	15.11	144.28	0.30	1.61	0.74	0.01
15.19	140.13	0.27	1.66	0.74	0.02	15.24	136.65	0.25	1.71	0.74	0.01
15.30	133.35	0.24	1.75	0.74	0.01	15.36	128.94	2.00	0.00	0.74	0.00
15.42	126.48	2.00	0.00	0.74	0.00	15.51	130.66	2.00	0.00	0.74	0.00
15.55	131.45	2.00	0.00	0.74	0.00	15.64	135.13	2.00	0.00	0.73	0.00
15.69	134.85	2.00	0.00	0.73	0.00	15.75	132.51	2.00	0.00	0.73	0.00
15.82	130.69	2.00	0.00	0.73	0.00	15.89	127.82	2.00	0.00	0.73	0.00
15.96	124.97	2.00	0.00	0.73	0.00	16.03	120.81	2.00	0.00	0.73	0.00
16.09	118.49	2.00	0.00	0.73	0.00	16.15	114.85	2.00	0.00	0.73	0.00
16.22	112.12	2.00	0.00	0.73	0.00	16.29	109.37	2.00	0.00	0.72	0.00
16.36	108.66	0.16	2.13	0.72	0.02	16.43	109.06	0.16	2.12	0.72	0.02
16.49	109.22	0.16	2.11	0.72	0.02	16.58	107.91	0.16	2.14	0.72	0.02
16.63	106.42	0.16	2.16	0.72	0.01	16.67	104.80	0.16	2.20	0.72	0.01
16.74	101.80	0.15	2.26	0.72	0.02	16.81	97.87	2.00	0.00	0.72	0.00
16.89	98.20	2.00	0.00	0.71	0.00	16.94	97.84	2.00	0.00	0.71	0.00
17.03	97.99	2.00	0.00	0.71	0.00	17.06	92.79	2.00	0.00	0.71	0.00
17.13	101.71	0.15	2.24	0.71	0.02	17.20	104.20	0.15	2.18	0.71	0.02
17.26	107.74	0.16	2.10	0.71	0.01	17.33	110.78	0.17	2.04	0.71	0.02
17.39	113.19	0.17	1.99	0.71	0.01	17.47	114.02	0.17	1.97	0.70	0.02
17.52	115.24	0.18	1.95	0.70	0.01	17.59	116.48	0.18	1.92	0.70	0.02
17.68	117.92	0.18	1.89	0.70	0.02	17.74	118.61	0.19	1.88	0.70	0.01
17.79	118.77	0.19	1.87	0.70	0.01	17.85	118.74	0.19	1.87	0.70	0.01
17.92	119.03	0.19	1.86	0.70	0.01	18.00	118.86	2.00	0.00	0.69	0.00
18.05	118.00	2.00	0.00	0.69	0.00	18.13	116.63	2.00	0.00	0.69	0.00
18.19	115.33	2.00	0.00	0.69	0.00	18.27	112.46	2.00	0.00	0.69	0.00
18.31	110.79	2.00	0.00	0.69	0.00	18.40	106.76	2.00	0.00	0.69	0.00
18.46	102.89	2.00	0.00	0.69	0.00	18.54	37.36	2.00	0.00	0.69	0.00
18.59	99.58	0.15	2.21	0.68	0.02	18.64	94.08	0.14	2.34	0.68	0.01
18.72	99.22	0.15	2.21	0.68	0.02	18.77	106.88	0.16	2.05	0.68	0.01
18.86	115.19	0.18	1.89	0.68	0.02	18.90	117.94	0.18	1.84	0.68	0.01
18.97	117.64	0.18	1.84	0.68	0.01	19.05	120.95	2.00	0.00	0.68	0.00
19.10	120.52	2.00	0.00	0.68	0.00	19.18	118.69	2.00	0.00	0.67	0.00
19.24	115.41	2.00	0.00	0.67	0.00	19.32	112.18	2.00	0.00	0.67	0.00
19.36	109.87	2.00	0.00	0.67	0.00	19.45	106.94	2.00	0.00	0.67	0.00
19.50	106.18	0.16	2.02	0.67	0.01	19.56	106.07	0.16	2.02	0.67	0.01
19.64	38.02	2.00	0.00	0.67	0.00	19.73	37.58	2.00	0.00	0.67	0.00
19.77	39.40	2.00	0.00	0.66	0.00	19.86	106.65	2.00	0.00	0.66	0.00
19.91	106.35	2.00	0.00	0.66	0.00	19.95	106.04	2.00	0.00	0.66	0.00
20.04	106.90	0.16	1.98	0.66	0.02	20.08	105.42	0.16	2.01	0.66	0.01
20.17	102.50	0.15	2.06	0.66	0.02	20.21	102.64	0.15	2.06	0.66	0.01
20.28	102.15	0.15	2.06	0.66	0.02	20.34	104.68	0.15	2.01	0.66	0.02
20.42	109.56	0.16	1.91	0.65	0.02	20.48	116.36	0.18	1.79	0.65	0.01
20.55	123.27	0.20	1.68	0.65	0.01	20.62	126.78	0.21	1.63	0.65	0.01
20.68	124.39	0.20	1.66	0.65	0.01	20.77	123.53	0.20	1.67	0.65	0.02
20.82	124.61	0.20	1.65	0.65	0.01	20.87	125.05	0.20	1.64	0.65	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
20.94	123.58	0.20	1.66	0.65	0.01	21.00	122.17	0.19	1.68	0.64	0.01
21.09	120.46	0.19	1.70	0.64	0.02	21.14	119.26	0.19	1.72	0.64	0.01
21.22	116.79	0.18	1.75	0.64	0.02	21.26	116.15	0.18	1.76	0.64	0.01
21.36	113.64	0.17	1.80	0.64	0.02	21.40	112.55	0.17	1.81	0.64	0.01
21.48	111.22	0.17	1.83	0.64	0.02	21.54	110.61	0.16	1.84	0.63	0.01
21.63	110.56	0.16	1.83	0.63	0.02	21.66	110.72	0.17	1.83	0.63	0.01
21.72	112.16	0.17	1.80	0.63	0.01	21.81	114.29	0.17	1.76	0.63	0.02
21.89	116.75	0.18	1.72	0.63	0.02	21.94	118.24	0.18	1.69	0.63	0.01
21.98	120.26	0.19	1.66	0.63	0.01	22.07	119.37	0.19	1.67	0.63	0.02
22.11	115.98	0.18	1.72	0.63	0.01	22.20	118.52	0.18	1.68	0.62	0.02
22.25	115.51	0.18	1.72	0.62	0.01	22.33	121.86	0.19	1.62	0.62	0.01
22.39	129.25	0.22	1.52	0.62	0.01	22.45	132.00	0.23	1.48	0.62	0.01
22.52	142.07	0.28	1.36	0.62	0.01	22.58	146.53	0.31	1.32	0.62	0.01
22.67	153.87	0.38	1.24	0.62	0.01	22.71	157.14	0.41	1.17	0.62	0.01
22.78	163.81	0.51	0.93	0.61	0.01	22.84	169.24	0.61	0.77	0.61	0.01
22.92	176.48	0.81	0.60	0.61	0.01	22.97	179.49	0.92	0.52	0.61	0.00
23.04	183.02	1.08	0.38	0.61	0.00	23.11	186.57	1.27	0.25	0.61	0.00
23.17	188.83	1.41	0.19	0.61	0.00	23.25	190.01	1.50	0.15	0.61	0.00
23.30	190.29	1.52	0.14	0.61	0.00	23.36	190.10	1.50	0.15	0.60	0.00
23.44	190.43	1.53	0.14	0.60	0.00	23.50	191.95	1.65	0.10	0.60	0.00
23.57	193.02	1.74	0.07	0.60	0.00	23.63	196.08	2.00	0.00	0.60	0.00
23.70	197.85	2.00	0.00	0.60	0.00	23.76	201.86	2.00	0.00	0.60	0.00
23.83	203.19	2.00	0.00	0.60	0.00	23.89	203.43	2.00	0.00	0.60	0.00
23.96	203.40	2.00	0.00	0.59	0.00	24.02	203.23	2.00	0.00	0.59	0.00
24.11	204.36	2.00	0.00	0.59	0.00	24.16	204.49	2.00	0.00	0.59	0.00
24.24	205.77	2.00	0.00	0.59	0.00	24.29	207.29	2.00	0.00	0.59	0.00
24.36	209.13	2.00	0.00	0.59	0.00	24.42	210.84	2.00	0.00	0.59	0.00
24.48	212.05	2.00	0.00	0.59	0.00	24.55	212.27	2.00	0.00	0.58	0.00
24.63	211.94	2.00	0.00	0.58	0.00	24.69	211.98	2.00	0.00	0.58	0.00
24.76	213.29	2.00	0.00	0.58	0.00	24.82	214.62	2.00	0.00	0.58	0.00
24.87	213.03	2.00	0.00	0.58	0.00	24.96	214.30	2.00	0.00	0.58	0.00
25.00	214.30	2.00	0.00	0.58	0.00	25.09	215.88	2.00	0.00	0.57	0.00
25.14	215.21	2.00	0.00	0.57	0.00	25.21	215.85	2.00	0.00	0.57	0.00
25.28	214.37	2.00	0.00	0.57	0.00	25.34	215.72	2.00	0.00	0.57	0.00
25.41	217.14	2.00	0.00	0.57	0.00	25.46	217.97	2.00	0.00	0.57	0.00
25.53	218.80	2.00	0.00	0.57	0.00	25.62	219.25	2.00	0.00	0.57	0.00
25.66	219.24	2.00	0.00	0.57	0.00	25.72	219.00	2.00	0.00	0.56	0.00
25.80	219.35	2.00	0.00	0.56	0.00	25.88	219.55	2.00	0.00	0.56	0.00
25.93	218.96	2.00	0.00	0.56	0.00	26.00	218.38	2.00	0.00	0.56	0.00
26.07	218.08	2.00	0.00	0.56	0.00	26.12	217.37	2.00	0.00	0.56	0.00
26.19	216.30	2.00	0.00	0.56	0.00	26.25	215.07	2.00	0.00	0.56	0.00
26.32	214.32	2.00	0.00	0.55	0.00	26.43	211.95	2.00	0.00	0.55	0.00
26.46	210.10	2.00	0.00	0.55	0.00	26.51	208.82	2.00	0.00	0.55	0.00
26.61	209.76	2.00	0.00	0.55	0.00	26.65	210.22	2.00	0.00	0.55	0.00
26.73	210.19	2.00	0.00	0.55	0.00	26.78	210.10	2.00	0.00	0.55	0.00
26.84	209.81	2.00	0.00	0.55	0.00	26.92	209.61	2.00	0.00	0.54	0.00
26.97	210.72	2.00	0.00	0.54	0.00	27.05	213.32	2.00	0.00	0.54	0.00
27.13	215.00	2.00	0.00	0.54	0.00	27.18	215.89	2.00	0.00	0.54	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
27.27	217.84	2.00	0.00	0.54	0.00	27.32	219.28	2.00	0.00	0.54	0.00
27.37	220.85	2.00	0.00	0.54	0.00	27.43	223.25	2.00	0.00	0.54	0.00
27.50	225.58	2.00	0.00	0.53	0.00	27.56	226.94	2.00	0.00	0.53	0.00
27.63	227.71	2.00	0.00	0.53	0.00	27.72	227.67	2.00	0.00	0.53	0.00
27.77	226.93	2.00	0.00	0.53	0.00	27.85	225.97	2.00	0.00	0.53	0.00
27.90	223.02	2.00	0.00	0.53	0.00	27.97	220.31	2.00	0.00	0.53	0.00
28.03	217.27	2.00	0.00	0.52	0.00	28.12	212.30	2.00	0.00	0.52	0.00
28.16	208.44	2.00	0.00	0.52	0.00	28.22	198.76	2.00	0.00	0.52	0.00
28.29	181.28	2.00	0.00	0.52	0.00	28.35	168.93	2.00	0.00	0.52	0.00
28.42	149.07	2.00	0.00	0.52	0.00	28.48	134.87	2.00	0.00	0.52	0.00
28.55	53.63	2.00	0.00	0.52	0.00	28.61	48.83	2.00	0.00	0.52	0.00
28.69	41.86	2.00	0.00	0.51	0.00	28.74	36.75	2.00	0.00	0.51	0.00
28.82	34.19	2.00	0.00	0.51	0.00	28.87	32.59	2.00	0.00	0.51	0.00
28.96	30.18	2.00	0.00	0.51	0.00	29.01	29.36	2.00	0.00	0.51	0.00
29.08	29.32	2.00	0.00	0.51	0.00	29.16	31.11	2.00	0.00	0.51	0.00
29.22	34.27	2.00	0.00	0.50	0.00	29.27	39.15	2.00	0.00	0.50	0.00
29.36	114.10	2.00	0.00	0.50	0.00	29.40	117.02	2.00	0.00	0.50	0.00
29.49	123.94	2.00	0.00	0.50	0.00	29.54	128.36	2.00	0.00	0.50	0.00
29.59	132.53	2.00	0.00	0.50	0.00	29.67	136.82	2.00	0.00	0.50	0.00
29.75	143.07	2.00	0.00	0.50	0.00	29.82	151.63	2.00	0.00	0.49	0.00
29.90	159.51	2.00	0.00	0.49	0.00	29.94	162.71	2.00	0.00	0.49	0.00
30.00	159.87	2.00	0.00	0.49	0.00	30.07	151.46	2.00	0.00	0.49	0.00
30.12	156.97	0.41	0.94	0.49	0.01	30.19	163.13	0.50	0.76	0.49	0.01
30.26	169.10	0.61	0.61	0.49	0.01	30.33	170.70	0.64	0.58	0.49	0.00
30.38	164.80	0.52	0.71	0.49	0.00	30.46	180.80	0.96	0.38	0.48	0.00
30.52	184.87	1.16	0.26	0.48	0.00	30.58	189.17	1.42	0.15	0.48	0.00
30.65	193.15	1.72	0.06	0.48	0.00	30.73	197.27	2.00	0.00	0.48	0.00
30.78	198.95	2.00	0.00	0.48	0.00	30.84	200.50	2.00	0.00	0.48	0.00
30.92	201.17	2.00	0.00	0.48	0.00	30.98	201.90	2.00	0.00	0.47	0.00
31.06	202.71	2.00	0.00	0.47	0.00	31.11	202.54	2.00	0.00	0.47	0.00
31.18	203.10	2.00	0.00	0.47	0.00	31.24	202.80	2.00	0.00	0.47	0.00
31.31	201.54	2.00	0.00	0.47	0.00	31.37	200.39	2.00	0.00	0.47	0.00
31.46	198.29	2.00	0.00	0.47	0.00	31.50	197.69	2.00	0.00	0.47	0.00
31.58	196.53	2.00	0.00	0.46	0.00	31.64	195.77	1.97	0.01	0.46	0.00
31.69	194.82	1.87	0.02	0.46	0.00	31.77	194.51	1.84	0.03	0.46	0.00
31.86	194.35	1.83	0.03	0.46	0.00	31.91	194.01	1.80	0.04	0.46	0.00
31.98	194.02	1.80	0.04	0.46	0.00	32.03	193.72	1.77	0.05	0.46	0.00
32.12	192.43	1.66	0.07	0.46	0.00	32.17	191.96	1.62	0.08	0.45	0.00
32.22	182.64	1.05	0.30	0.45	0.00	32.31	154.20	0.38	0.91	0.45	0.01
32.35	161.03	0.46	0.75	0.45	0.00	32.42	168.01	0.58	0.59	0.45	0.00
32.49	173.28	0.71	0.49	0.45	0.00	32.55	173.67	0.72	0.48	0.45	0.00
32.62	178.77	0.88	0.40	0.45	0.00	32.68	181.89	1.01	0.32	0.45	0.00
32.76	185.90	1.22	0.21	0.44	0.00	32.81	187.74	1.32	0.17	0.44	0.00
32.90	187.69	1.32	0.17	0.44	0.00	32.95	187.04	1.28	0.18	0.44	0.00
33.02	185.81	1.21	0.21	0.44	0.00	33.08	184.70	1.15	0.24	0.44	0.00
33.14	183.95	1.11	0.26	0.44	0.00	33.21	183.83	1.10	0.26	0.44	0.00
33.27	183.39	1.08	0.27	0.44	0.00	33.34	183.08	1.07	0.28	0.43	0.00
33.42	182.67	1.05	0.29	0.43	0.00	33.49	182.54	1.04	0.29	0.43	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
33.54	182.54	1.04	0.29	0.43	0.00	33.61	182.01	1.02	0.30	0.43	0.00
33.66	181.57	1.00	0.31	0.43	0.00	33.75	182.06	1.02	0.30	0.43	0.00
33.80	182.53	1.04	0.29	0.43	0.00	33.89	183.37	1.08	0.26	0.43	0.00
33.93	182.92	1.06	0.27	0.42	0.00	34.02	179.53	0.91	0.37	0.42	0.00
34.07	176.96	0.82	0.40	0.42	0.00	34.13	175.74	0.78	0.42	0.42	0.00
34.19	188.33	1.36	0.15	0.42	0.00	34.26	202.94	2.00	0.00	0.42	0.00
34.33	219.44	2.00	0.00	0.42	0.00	34.40	251.02	2.00	0.00	0.42	0.00
34.47	262.31	2.00	0.00	0.42	0.00	34.52	261.65	2.00	0.00	0.41	0.00
34.58	261.51	2.00	0.00	0.41	0.00	34.66	260.80	2.00	0.00	0.41	0.00
34.74	253.64	2.00	0.00	0.41	0.00	34.79	259.70	2.00	0.00	0.41	0.00
34.87	238.18	2.00	0.00	0.41	0.00	34.92	237.88	2.00	0.00	0.41	0.00
34.98	237.59	2.00	0.00	0.41	0.00	35.06	240.59	2.00	0.00	0.41	0.00
35.14	242.43	2.00	0.00	0.40	0.00	35.19	243.54	2.00	0.00	0.40	0.00
35.24	246.27	2.00	0.00	0.40	0.00	35.31	248.52	2.00	0.00	0.40	0.00
35.37	250.25	2.00	0.00	0.40	0.00	35.46	252.36	2.00	0.00	0.40	0.00
35.51	252.60	2.00	0.00	0.40	0.00	35.57	250.54	2.00	0.00	0.40	0.00
35.64	250.89	2.00	0.00	0.40	0.00	35.70	254.09	2.00	0.00	0.39	0.00
35.77	256.69	2.00	0.00	0.39	0.00	35.84	260.24	2.00	0.00	0.39	0.00
35.91	263.35	2.00	0.00	0.39	0.00	36.00	264.75	2.00	0.00	0.39	0.00
36.05	265.72	2.00	0.00	0.39	0.00	36.11	269.05	2.00	0.00	0.39	0.00
36.17	274.91	2.00	0.00	0.39	0.00	36.24	283.04	2.00	0.00	0.39	0.00
36.31	293.03	2.00	0.00	0.38	0.00	36.35	302.50	2.00	0.00	0.38	0.00
36.43	312.59	2.00	0.00	0.38	0.00	36.49	328.27	2.00	0.00	0.38	0.00
36.55	359.22	2.00	0.00	0.38	0.00	36.63	410.64	2.00	0.00	0.38	0.00
36.72	460.64	2.00	0.00	0.38	0.00	36.76	471.55	2.00	0.00	0.38	0.00
36.83	481.23	2.00	0.00	0.38	0.00	36.88	470.12	2.00	0.00	0.37	0.00
36.96	468.84	2.00	0.00	0.37	0.00	37.01	503.46	2.00	0.00	0.37	0.00
37.09	544.93	2.00	0.00	0.37	0.00	37.14	576.01	2.00	0.00	0.37	0.00
37.21	567.61	2.00	0.00	0.37	0.00	37.27	566.61	2.00	0.00	0.37	0.00
37.34	530.56	2.00	0.00	0.37	0.00	37.41	551.70	2.00	0.00	0.37	0.00
37.48	595.90	2.00	0.00	0.36	0.00	37.53	622.98	2.00	0.00	0.36	0.00
37.60	629.08	2.00	0.00	0.36	0.00	37.67	626.96	2.00	0.00	0.36	0.00
37.73	630.80	2.00	0.00	0.36	0.00	37.80	631.83	2.00	0.00	0.36	0.00
37.86	595.99	2.00	0.00	0.36	0.00	37.94	587.67	2.00	0.00	0.36	0.00
38.00	564.99	2.00	0.00	0.36	0.00	38.06	561.29	2.00	0.00	0.35	0.00
38.13	545.08	2.00	0.00	0.35	0.00	38.20	494.00	2.00	0.00	0.35	0.00
38.26	466.24	2.00	0.00	0.35	0.00	38.33	476.78	2.00	0.00	0.35	0.00
38.40	503.70	2.00	0.00	0.35	0.00	38.45	506.99	2.00	0.00	0.35	0.00
38.52	504.21	2.00	0.00	0.35	0.00	38.60	481.72	2.00	0.00	0.35	0.00
38.66	443.92	2.00	0.00	0.34	0.00	38.73	419.26	2.00	0.00	0.34	0.00
38.78	415.25	2.00	0.00	0.34	0.00	38.86	414.18	2.00	0.00	0.34	0.00
38.91	417.47	2.00	0.00	0.34	0.00	38.98	403.76	2.00	0.00	0.34	0.00
39.04	419.70	2.00	0.00	0.34	0.00	39.13	453.31	2.00	0.00	0.34	0.00
39.18	473.30	2.00	0.00	0.34	0.00	39.27	475.96	2.00	0.00	0.33	0.00
39.32	468.01	2.00	0.00	0.33	0.00	39.38	475.23	2.00	0.00	0.33	0.00
39.44	474.60	2.00	0.00	0.33	0.00	39.52	507.21	2.00	0.00	0.33	0.00
39.57	538.84	2.00	0.00	0.33	0.00	39.64	571.30	2.00	0.00	0.33	0.00
39.70	612.91	2.00	0.00	0.33	0.00	39.76	627.38	2.00	0.00	0.33	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
39.83	679.09	2.00	0.00	0.32	0.00						

Total estimated settlement: 4.23**Abbreviations**

$Q_{tn,cs}$:	Equivalent clean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumetric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement



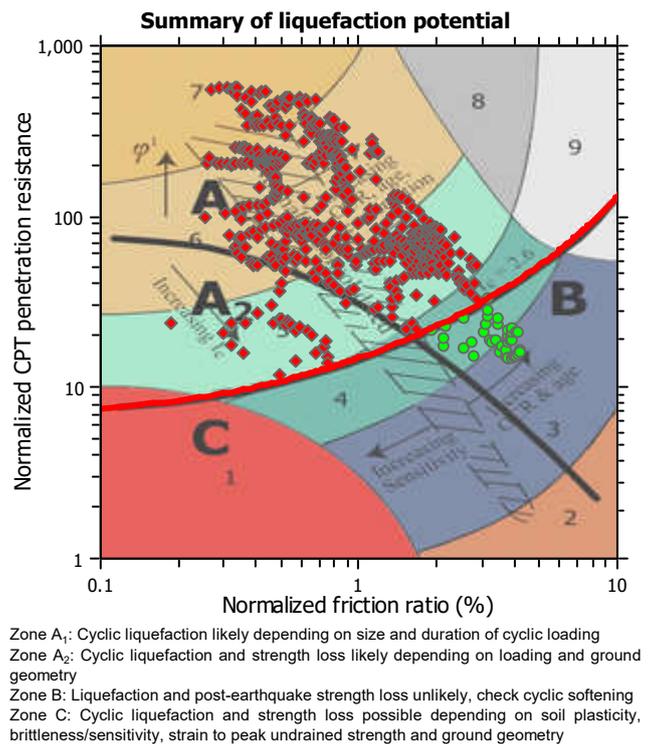
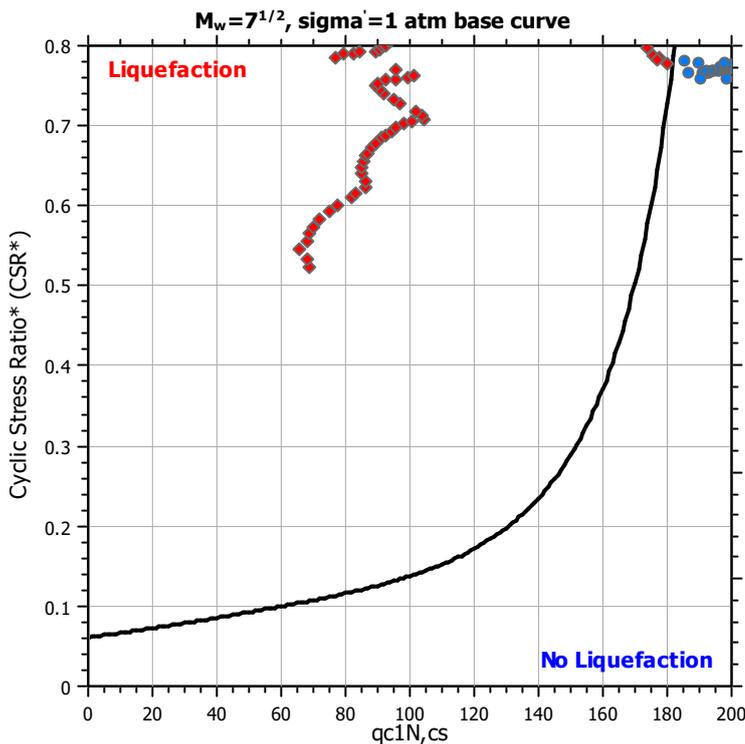
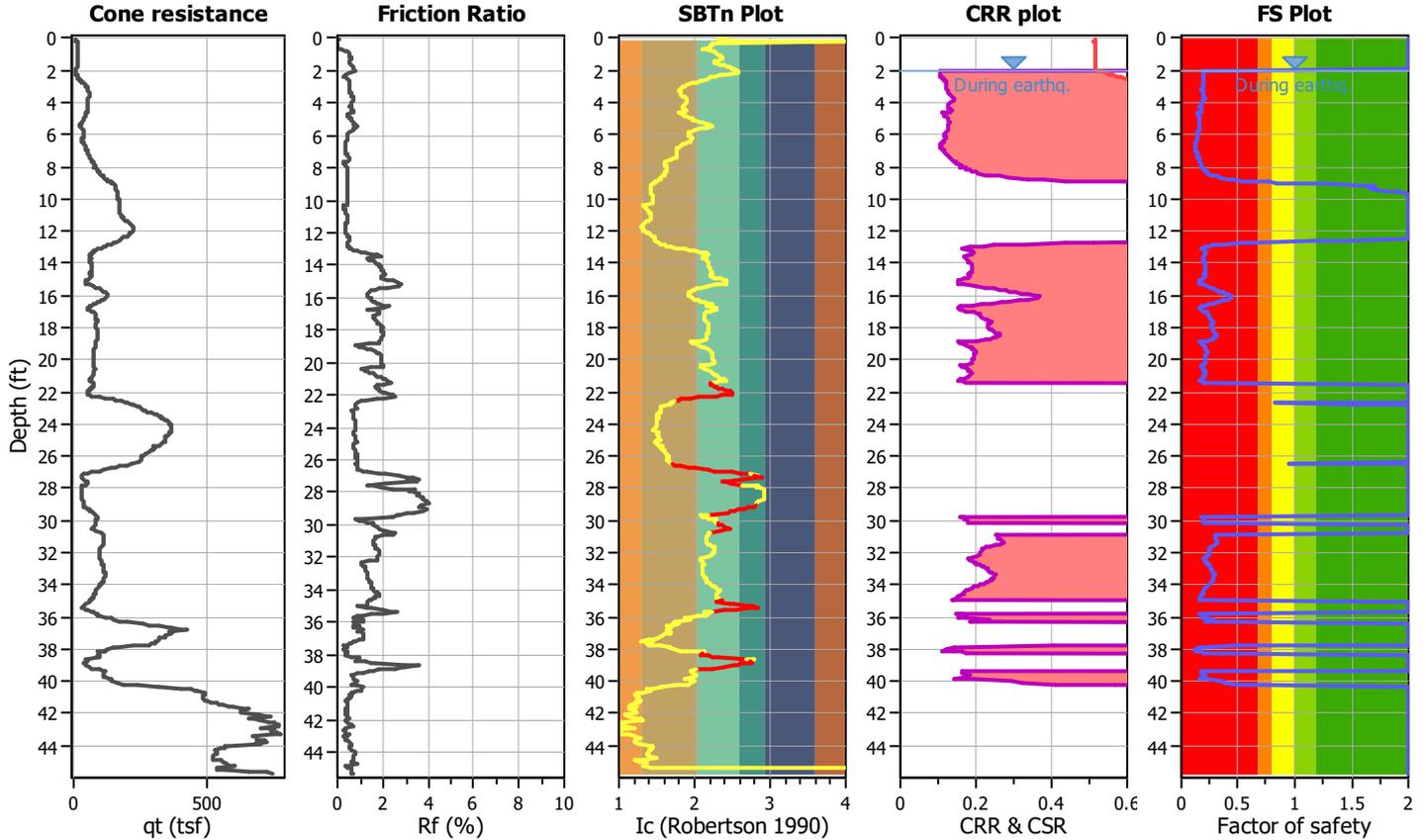
LIQUEFACTION ANALYSIS REPORT

Project title : Proposed Warehouse
CPT file : CPT-4

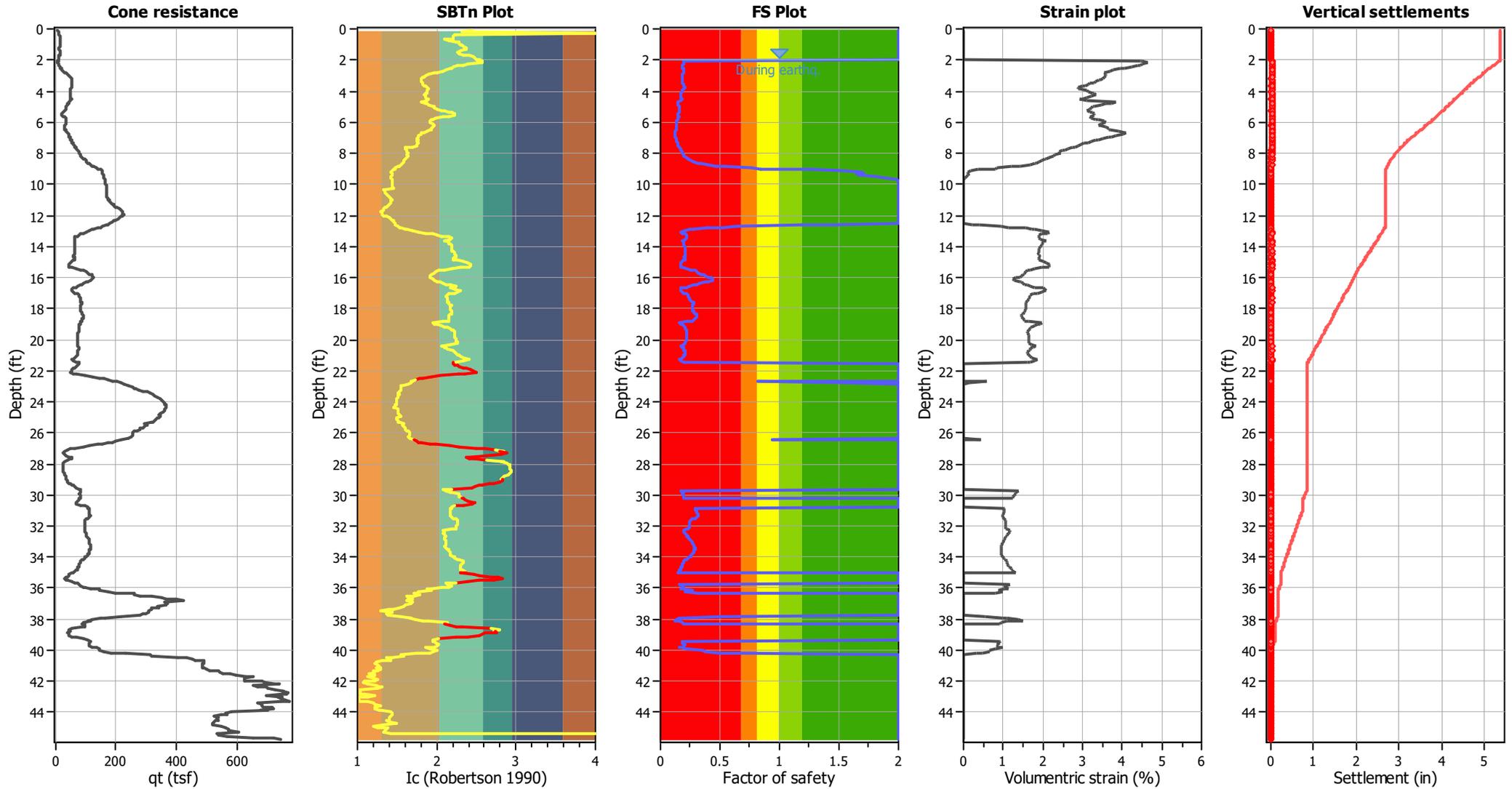
Location : El Monte, CA

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	29.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w :	6.89	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Estimation of post-earthquake settlements



Abbreviations

- qt: Total cone resistance (cone resistance q_c corrected for pore water effects)
- I_c: Soil Behaviour Type Index
- FS: Calculated Factor of Safety against liquefaction
- Volumetric strain: Post-liquefaction volumetric strain

:: Post-earthquake settlement due to soil liquefaction ::											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
2.04	68.62	0.20	4.47	0.97	0.03	2.10	68.09	0.20	4.50	0.96	0.03
2.18	65.68	0.19	4.65	0.96	0.04	2.24	67.95	0.19	4.50	0.96	0.03
2.30	68.69	0.19	4.45	0.96	0.04	2.36	69.90	0.19	4.37	0.96	0.03
2.43	71.92	0.19	4.25	0.96	0.04	2.51	75.15	0.19	4.07	0.96	0.04
2.57	77.74	0.19	3.94	0.96	0.03	2.66	81.69	0.19	3.75	0.95	0.04
2.69	83.32	0.19	3.68	0.95	0.02	2.78	86.05	0.20	3.56	0.95	0.03
2.83	86.52	0.19	3.54	0.95	0.02	2.91	84.97	0.19	3.60	0.95	0.03
2.97	84.74	0.19	3.60	0.95	0.03	3.06	85.45	0.18	3.57	0.95	0.04
3.12	86.02	0.18	3.54	0.95	0.02	3.15	86.73	0.18	3.51	0.95	0.02
3.24	88.35	0.18	3.44	0.95	0.03	3.29	89.37	0.18	3.40	0.94	0.02
3.38	91.52	0.19	3.31	0.94	0.03	3.42	92.47	0.19	3.28	0.94	0.02
3.51	94.59	0.19	3.20	0.94	0.03	3.55	95.50	0.19	3.16	0.94	0.02
3.65	98.40	0.19	3.06	0.94	0.03	3.69	100.37	0.20	3.00	0.94	0.02
3.76	104.17	0.20	2.88	0.94	0.02	3.81	103.64	0.20	2.90	0.94	0.02
3.88	101.95	0.20	2.94	0.93	0.02	3.96	96.90	0.18	3.09	0.93	0.03
4.01	94.98	0.18	3.16	0.93	0.02	4.10	92.01	0.17	3.25	0.93	0.04
4.14	90.75	0.17	3.29	0.93	0.02	4.20	89.30	0.17	3.34	0.93	0.02
4.27	89.85	0.17	3.32	0.93	0.03	4.34	92.64	0.17	3.22	0.93	0.03
4.41	95.82	0.17	3.10	0.93	0.02	4.50	99.40	0.18	2.99	0.92	0.03
4.54	101.07	0.18	2.93	0.92	0.02	4.60	95.45	0.17	3.11	0.92	0.02
4.67	76.66	0.14	3.85	0.92	0.03	4.76	79.26	0.15	3.72	0.92	0.04
4.81	82.38	0.15	3.58	0.92	0.02	4.87	84.49	0.15	3.49	0.92	0.03
4.94	89.38	0.16	3.30	0.92	0.03	4.99	90.71	0.16	3.24	0.92	0.02
5.06	90.98	0.16	3.23	0.91	0.03	5.12	92.62	0.16	3.17	0.91	0.02
5.21	93.93	0.16	3.12	0.91	0.03	5.26	93.48	0.16	3.13	0.91	0.02
5.34	91.39	0.16	3.20	0.91	0.03	5.39	89.85	0.15	3.25	0.91	0.02
5.48	88.24	0.15	3.31	0.91	0.03	5.52	88.41	0.15	3.30	0.91	0.02
5.60	90.13	0.15	3.23	0.91	0.03	5.66	91.29	0.15	3.18	0.90	0.02
5.75	89.83	0.15	3.23	0.90	0.03	5.80	86.97	0.15	3.33	0.90	0.02
5.84	85.47	0.14	3.39	0.90	0.02	5.93	81.74	0.14	3.53	0.90	0.04
5.97	80.72	0.14	3.57	0.90	0.02	6.05	81.51	0.14	3.53	0.90	0.03
6.11	83.23	0.14	3.46	0.90	0.02	6.19	84.15	0.14	3.42	0.90	0.04
6.23	83.54	0.14	3.44	0.89	0.02	6.32	79.51	0.13	3.60	0.89	0.04
6.37	78.19	0.13	3.66	0.89	0.02	6.44	78.27	0.13	3.65	0.89	0.03
6.51	76.72	0.13	3.71	0.89	0.03	6.59	72.12	0.12	3.93	0.89	0.04
6.65	69.51	0.12	4.06	0.89	0.03	6.70	68.77	0.12	4.10	0.89	0.03
6.78	70.38	0.12	4.01	0.89	0.04	6.86	73.77	0.12	3.83	0.88	0.04
6.91	76.04	0.13	3.72	0.88	0.02	6.96	77.23	0.13	3.66	0.88	0.02
7.05	80.34	0.13	3.52	0.88	0.04	7.10	82.57	0.13	3.42	0.88	0.02
7.17	84.37	0.13	3.34	0.88	0.03	7.22	87.47	0.14	3.23	0.88	0.02
7.29	89.41	0.14	3.15	0.88	0.02	7.36	92.52	0.14	3.04	0.88	0.03
7.42	94.91	0.15	2.96	0.87	0.02	7.49	97.40	0.15	2.88	0.87	0.02
7.57	99.53	0.15	2.81	0.87	0.03	7.63	102.44	0.16	2.73	0.87	0.02
7.71	106.28	0.17	2.62	0.87	0.02	7.76	108.07	0.17	2.58	0.87	0.01
7.83	111.65	0.18	2.49	0.87	0.02	7.90	115.13	0.18	2.40	0.87	0.02
7.97	114.20	0.18	2.42	0.86	0.02	8.01	113.44	0.18	2.44	0.86	0.01
8.10	120.19	0.20	2.29	0.86	0.03	8.15	121.55	0.20	2.26	0.86	0.01
8.24	126.08	0.21	2.17	0.86	0.02	8.27	126.83	0.22	2.15	0.86	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
8.35	130.20	0.23	2.09	0.86	0.02	8.40	132.16	0.24	2.05	0.86	0.01
8.50	137.55	0.26	1.96	0.86	0.02	8.55	140.57	0.28	1.91	0.86	0.01
8.61	145.82	0.31	1.83	0.85	0.01	8.66	148.94	0.34	1.78	0.85	0.01
8.77	156.23	0.41	1.67	0.85	0.02	8.81	160.72	0.46	1.43	0.85	0.01
8.86	165.54	0.54	1.21	0.85	0.01	8.95	175.39	0.77	0.86	0.85	0.01
8.99	177.54	0.84	0.79	0.85	0.00	9.07	186.59	1.26	0.37	0.85	0.00
9.12	190.96	1.54	0.19	0.85	0.00	9.19	192.89	1.69	0.11	0.84	0.00
9.26	192.99	1.70	0.11	0.84	0.00	9.34	192.27	1.64	0.14	0.84	0.00
9.39	192.71	1.68	0.12	0.84	0.00	9.48	194.26	1.81	0.07	0.84	0.00
9.53	194.36	1.82	0.06	0.84	0.00	9.59	195.08	1.89	0.04	0.84	0.00
9.66	196.04	1.98	0.01	0.84	0.00	9.74	196.45	2.00	0.00	0.83	0.00
9.80	196.83	2.00	0.00	0.83	0.00	9.84	196.93	2.00	0.00	0.83	0.00
9.92	196.93	2.00	0.00	0.83	0.00	9.98	197.49	2.00	0.00	0.83	0.00
10.07	198.41	2.00	0.00	0.83	0.00	10.15	199.41	2.00	0.00	0.83	0.00
10.18	199.78	2.00	0.00	0.83	0.00	10.25	199.35	2.00	0.00	0.83	0.00
10.35	198.28	2.00	0.00	0.82	0.00	10.38	197.65	2.00	0.00	0.82	0.00
10.47	197.13	2.00	0.00	0.82	0.00	10.50	196.95	2.00	0.00	0.82	0.00
10.60	198.20	2.00	0.00	0.82	0.00	10.64	198.69	2.00	0.00	0.82	0.00
10.72	198.54	2.00	0.00	0.82	0.00	10.78	198.17	2.00	0.00	0.82	0.00
10.84	198.09	2.00	0.00	0.82	0.00	10.92	199.77	2.00	0.00	0.81	0.00
10.96	201.43	2.00	0.00	0.81	0.00	11.03	202.96	2.00	0.00	0.81	0.00
11.09	205.50	2.00	0.00	0.81	0.00	11.18	208.36	2.00	0.00	0.81	0.00
11.24	210.56	2.00	0.00	0.81	0.00	11.32	214.89	2.00	0.00	0.81	0.00
11.36	217.16	2.00	0.00	0.81	0.00	11.43	221.50	2.00	0.00	0.81	0.00
11.49	226.51	2.00	0.00	0.81	0.00	11.58	233.95	2.00	0.00	0.80	0.00
11.62	237.56	2.00	0.00	0.80	0.00	11.72	242.10	2.00	0.00	0.80	0.00
11.76	242.85	2.00	0.00	0.80	0.00	11.83	242.32	2.00	0.00	0.80	0.00
11.90	242.85	2.00	0.00	0.80	0.00	11.94	243.33	2.00	0.00	0.80	0.00
12.01	238.38	2.00	0.00	0.80	0.00	12.08	235.70	2.00	0.00	0.80	0.00
12.16	228.23	2.00	0.00	0.79	0.00	12.21	224.17	2.00	0.00	0.79	0.00
12.30	214.22	2.00	0.00	0.79	0.00	12.34	211.01	2.00	0.00	0.79	0.00
12.41	204.35	2.00	0.00	0.79	0.00	12.48	198.11	2.00	0.00	0.79	0.00
12.57	190.04	1.45	0.22	0.79	0.00	12.61	185.54	1.18	0.40	0.79	0.00
12.71	170.51	0.63	0.94	0.78	0.01	12.75	165.42	0.53	1.12	0.78	0.01
12.83	155.64	0.39	1.56	0.78	0.02	12.89	142.35	0.28	1.72	0.78	0.01
12.93	136.41	0.25	1.80	0.78	0.01	13.00	125.94	0.21	1.97	0.78	0.02
13.06	114.85	0.18	2.17	0.78	0.02	13.15	116.19	0.18	2.14	0.78	0.02
13.21	124.96	0.20	1.97	0.78	0.01	13.27	128.12	0.21	1.92	0.78	0.01
13.33	129.13	0.22	1.90	0.77	0.01	13.40	127.88	0.21	1.92	0.77	0.02
13.46	127.84	0.21	1.91	0.77	0.01	13.52	125.21	0.20	1.96	0.77	0.01
13.59	118.61	0.19	2.07	0.77	0.02	13.65	121.06	0.19	2.02	0.77	0.01
13.73	121.98	0.19	2.00	0.77	0.02	13.78	122.64	0.20	1.99	0.77	0.01
13.85	123.10	0.20	1.98	0.77	0.02	13.93	123.62	0.20	1.96	0.76	0.02
13.99	125.56	0.21	1.93	0.76	0.02	14.06	126.52	0.21	1.91	0.76	0.02
14.12	127.65	0.21	1.89	0.76	0.01	14.18	127.32	0.21	1.89	0.76	0.01
14.26	126.96	0.21	1.89	0.76	0.02	14.32	126.40	0.21	1.90	0.76	0.01
14.37	126.88	0.21	1.89	0.76	0.01	14.44	127.30	0.21	1.88	0.76	0.01
14.51	126.67	0.21	1.89	0.75	0.02	14.57	124.62	0.20	1.92	0.75	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
14.64	123.44	0.20	1.94	0.75	0.02	14.71	124.67	0.20	1.91	0.75	0.02
14.77	125.81	0.21	1.89	0.75	0.01	14.83	125.41	0.21	1.90	0.75	0.01
14.91	124.03	0.20	1.91	0.75	0.02	14.98	119.27	0.19	1.99	0.75	0.02
15.04	113.87	0.17	2.09	0.75	0.02	15.11	110.05	0.17	2.16	0.74	0.02
15.18	109.98	0.17	2.16	0.74	0.02	15.27	109.80	0.17	2.16	0.74	0.02
15.31	109.90	0.17	2.16	0.74	0.01	15.36	119.10	0.19	1.98	0.74	0.01
15.44	130.71	0.22	1.79	0.74	0.02	15.49	138.54	0.26	1.67	0.74	0.01
15.57	143.20	0.29	1.61	0.74	0.01	15.62	145.52	0.30	1.58	0.74	0.01
15.70	148.05	0.32	1.55	0.73	0.01	15.76	149.88	0.34	1.52	0.73	0.01
15.84	152.67	0.36	1.49	0.73	0.01	15.89	154.70	0.38	1.46	0.73	0.01
15.95	156.52	0.40	1.42	0.73	0.01	16.02	158.92	0.43	1.30	0.73	0.01
16.08	159.88	0.44	1.26	0.73	0.01	16.16	159.40	0.44	1.28	0.73	0.01
16.25	156.41	0.40	1.41	0.72	0.01	16.29	153.99	0.38	1.46	0.72	0.01
16.36	149.37	0.33	1.51	0.72	0.01	16.42	146.25	0.31	1.54	0.72	0.01
16.48	141.33	0.28	1.60	0.72	0.01	16.56	135.73	0.25	1.67	0.72	0.02
16.61	128.15	0.22	1.78	0.72	0.01	16.69	113.53	0.17	2.02	0.72	0.02
16.74	111.45	0.17	2.06	0.72	0.01	16.80	110.53	0.17	2.07	0.72	0.02
16.87	111.91	0.17	2.04	0.71	0.02	16.94	115.95	0.18	1.96	0.71	0.02
17.00	121.62	0.19	1.86	0.71	0.01	17.07	129.22	0.22	1.74	0.71	0.01
17.14	132.38	0.23	1.69	0.71	0.01	17.20	133.33	0.24	1.68	0.71	0.01
17.30	134.54	0.24	1.66	0.71	0.02	17.34	135.24	0.25	1.65	0.71	0.01
17.39	136.04	0.25	1.63	0.71	0.01	17.45	137.58	0.26	1.61	0.70	0.01
17.56	139.81	0.27	1.58	0.70	0.02	17.61	140.76	0.27	1.56	0.70	0.01
17.66	141.09	0.28	1.56	0.70	0.01	17.74	140.34	0.27	1.56	0.70	0.02
17.79	139.68	0.27	1.57	0.70	0.01	17.88	139.21	0.27	1.57	0.70	0.02
17.92	139.02	0.26	1.57	0.70	0.01	18.01	138.84	0.26	1.57	0.69	0.02
18.05	139.11	0.27	1.57	0.69	0.01	18.13	140.64	0.27	1.55	0.69	0.02
18.18	141.56	0.28	1.53	0.69	0.01	18.27	142.46	0.29	1.52	0.69	0.02
18.32	143.47	0.29	1.50	0.69	0.01	18.38	145.31	0.30	1.48	0.69	0.01
18.44	145.85	0.31	1.47	0.69	0.01	18.51	145.61	0.31	1.47	0.69	0.01
18.59	144.22	0.30	1.49	0.68	0.02	18.64	142.96	0.29	1.50	0.68	0.01
18.70	140.79	0.28	1.52	0.68	0.01	18.77	138.59	0.26	1.55	0.68	0.01
18.85	129.98	0.22	1.66	0.68	0.01	18.90	109.83	0.16	1.98	0.68	0.01
18.97	112.77	0.17	1.92	0.68	0.02	19.03	116.84	0.18	1.85	0.68	0.01
19.10	120.85	0.19	1.78	0.68	0.01	19.17	124.86	0.20	1.72	0.68	0.02
19.24	126.88	0.21	1.68	0.67	0.01	19.31	127.59	0.21	1.67	0.67	0.01
19.37	129.16	0.22	1.65	0.67	0.01	19.43	130.27	0.22	1.63	0.67	0.01
19.50	130.56	0.22	1.62	0.67	0.01	19.58	129.99	0.22	1.63	0.67	0.02
19.62	129.50	0.22	1.63	0.67	0.01	19.69	129.16	0.22	1.63	0.67	0.01
19.76	128.93	0.22	1.63	0.67	0.01	19.82	128.52	0.22	1.64	0.66	0.01
19.89	128.30	0.21	1.64	0.66	0.01	19.96	128.26	0.21	1.63	0.66	0.01
20.02	127.99	0.21	1.64	0.66	0.01	20.11	127.30	0.21	1.64	0.66	0.02
20.16	126.66	0.21	1.65	0.66	0.01	20.24	126.31	0.21	1.65	0.66	0.02
20.29	121.70	0.19	1.72	0.66	0.01	20.38	113.75	0.17	1.84	0.65	0.02
20.42	116.59	0.18	1.79	0.65	0.01	20.47	119.49	0.19	1.74	0.65	0.01
20.55	122.70	0.20	1.69	0.65	0.02	20.60	124.13	0.20	1.67	0.65	0.01
20.69	123.59	0.20	1.67	0.65	0.02	20.74	124.97	0.20	1.65	0.65	0.01
20.82	126.68	0.21	1.62	0.65	0.02	20.87	126.88	0.21	1.62	0.65	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
20.95	125.67	0.20	1.63	0.64	0.02	21.00	124.56	0.20	1.64	0.64	0.01
21.06	122.29	0.19	1.67	0.64	0.01	21.13	119.06	0.18	1.72	0.64	0.01
21.22	112.56	0.17	1.82	0.64	0.02	21.28	110.68	0.16	1.85	0.64	0.01
21.36	114.74	0.17	1.78	0.64	0.02	21.41	121.17	0.19	1.67	0.64	0.01
21.46	124.81	0.20	1.62	0.64	0.01	21.54	125.89	2.00	0.00	0.63	0.00
21.60	124.94	2.00	0.00	0.63	0.00	21.67	122.27	2.00	0.00	0.63	0.00
21.72	119.79	2.00	0.00	0.63	0.00	21.81	115.97	2.00	0.00	0.63	0.00
21.85	113.32	2.00	0.00	0.63	0.00	21.94	109.35	2.00	0.00	0.63	0.00
21.98	106.72	2.00	0.00	0.63	0.00	22.08	102.79	2.00	0.00	0.63	0.00
22.12	102.40	2.00	0.00	0.63	0.00	22.22	112.53	2.00	0.00	0.62	0.00
22.25	118.43	2.00	0.00	0.62	0.00	22.32	133.93	2.00	0.00	0.62	0.00
22.38	136.06	2.00	0.00	0.62	0.00	22.45	132.48	2.00	0.00	0.62	0.00
22.51	138.54	2.00	0.00	0.62	0.00	22.57	152.62	2.00	0.00	0.62	0.00
22.66	166.81	2.00	0.00	0.62	0.00	22.70	176.73	0.82	0.59	0.62	0.00
22.79	190.85	1.55	0.13	0.61	0.00	22.84	198.86	2.00	0.00	0.61	0.00
22.93	210.78	2.00	0.00	0.61	0.00	22.97	213.76	2.00	0.00	0.61	0.00
23.06	224.49	2.00	0.00	0.61	0.00	23.11	231.44	2.00	0.00	0.61	0.00
23.17	235.02	2.00	0.00	0.61	0.00	23.25	243.14	2.00	0.00	0.61	0.00
23.30	258.27	2.00	0.00	0.61	0.00	23.38	268.47	2.00	0.00	0.60	0.00
23.43	276.56	2.00	0.00	0.60	0.00	23.51	284.37	2.00	0.00	0.60	0.00
23.56	286.32	2.00	0.00	0.60	0.00	23.63	291.62	2.00	0.00	0.60	0.00
23.69	297.18	2.00	0.00	0.60	0.00	23.75	299.32	2.00	0.00	0.60	0.00
23.83	307.10	2.00	0.00	0.60	0.00	23.92	311.22	2.00	0.00	0.59	0.00
23.96	313.97	2.00	0.00	0.59	0.00	24.05	317.53	2.00	0.00	0.59	0.00
24.10	316.68	2.00	0.00	0.59	0.00	24.16	318.93	2.00	0.00	0.59	0.00
24.22	319.36	2.00	0.00	0.59	0.00	24.28	319.85	2.00	0.00	0.59	0.00
24.36	321.95	2.00	0.00	0.59	0.00	24.41	321.52	2.00	0.00	0.59	0.00
24.50	317.47	2.00	0.00	0.58	0.00	24.55	313.81	2.00	0.00	0.58	0.00
24.62	309.75	2.00	0.00	0.58	0.00	24.67	309.13	2.00	0.00	0.58	0.00
24.74	301.55	2.00	0.00	0.58	0.00	24.81	298.09	2.00	0.00	0.58	0.00
24.88	300.34	2.00	0.00	0.58	0.00	24.94	299.79	2.00	0.00	0.58	0.00
25.03	297.93	2.00	0.00	0.58	0.00	25.08	294.26	2.00	0.00	0.57	0.00
25.13	289.41	2.00	0.00	0.57	0.00	25.22	284.09	2.00	0.00	0.57	0.00
25.27	280.14	2.00	0.00	0.57	0.00	25.35	275.90	2.00	0.00	0.57	0.00
25.41	255.51	2.00	0.00	0.57	0.00	25.47	260.83	2.00	0.00	0.57	0.00
25.52	259.40	2.00	0.00	0.57	0.00	25.61	254.76	2.00	0.00	0.57	0.00
25.66	248.42	2.00	0.00	0.57	0.00	25.73	241.68	2.00	0.00	0.56	0.00
25.79	238.75	2.00	0.00	0.56	0.00	25.88	227.88	2.00	0.00	0.56	0.00
25.93	220.86	2.00	0.00	0.56	0.00	26.00	215.69	2.00	0.00	0.56	0.00
26.06	215.50	2.00	0.00	0.56	0.00	26.15	215.20	2.00	0.00	0.56	0.00
26.18	215.10	2.00	0.00	0.56	0.00	26.25	211.54	2.00	0.00	0.56	0.00
26.32	202.51	2.00	0.00	0.55	0.00	26.42	180.25	0.94	0.45	0.55	0.00
26.45	177.46	2.00	0.00	0.55	0.00	26.55	162.72	2.00	0.00	0.55	0.00
26.59	154.49	2.00	0.00	0.55	0.00	26.64	142.43	2.00	0.00	0.55	0.00
26.72	154.28	2.00	0.00	0.55	0.00	26.77	159.03	2.00	0.00	0.55	0.00
26.86	150.68	2.00	0.00	0.54	0.00	26.90	138.49	2.00	0.00	0.54	0.00
27.00	112.60	2.00	0.00	0.54	0.00	27.04	40.22	2.00	0.00	0.54	0.00
27.13	29.33	2.00	0.00	0.54	0.00	27.18	23.23	2.00	0.00	0.54	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
27.23	23.55	2.00	0.00	0.54	0.00	27.31	21.01	2.00	0.00	0.54	0.00
27.37	23.84	2.00	0.00	0.54	0.00	27.45	27.65	2.00	0.00	0.53	0.00
27.53	92.88	2.00	0.00	0.53	0.00	27.58	98.30	2.00	0.00	0.53	0.00
27.63	99.92	2.00	0.00	0.53	0.00	27.70	98.56	2.00	0.00	0.53	0.00
27.77	31.60	2.00	0.00	0.53	0.00	27.83	22.49	2.00	0.00	0.53	0.00
27.89	23.38	2.00	0.00	0.53	0.00	27.98	20.52	2.00	0.00	0.53	0.00
28.02	19.51	2.00	0.00	0.53	0.00	28.08	19.21	2.00	0.00	0.52	0.00
28.16	19.24	2.00	0.00	0.52	0.00	28.24	19.36	2.00	0.00	0.52	0.00
28.29	19.34	2.00	0.00	0.52	0.00	28.35	19.45	2.00	0.00	0.52	0.00
28.42	19.57	2.00	0.00	0.52	0.00	28.48	19.68	2.00	0.00	0.52	0.00
28.56	20.01	2.00	0.00	0.52	0.00	28.64	20.67	2.00	0.00	0.51	0.00
28.69	21.63	2.00	0.00	0.51	0.00	28.79	24.17	2.00	0.00	0.51	0.00
28.82	24.72	2.00	0.00	0.51	0.00	28.87	25.75	2.00	0.00	0.51	0.00
28.96	26.97	2.00	0.00	0.51	0.00	29.01	27.24	2.00	0.00	0.51	0.00
29.10	27.65	2.00	0.00	0.51	0.00	29.14	28.62	2.00	0.00	0.51	0.00
29.22	32.21	2.00	0.00	0.50	0.00	29.28	35.89	2.00	0.00	0.50	0.00
29.35	104.58	2.00	0.00	0.50	0.00	29.40	107.57	2.00	0.00	0.50	0.00
29.47	112.02	2.00	0.00	0.50	0.00	29.54	116.01	2.00	0.00	0.50	0.00
29.62	113.50	2.00	0.00	0.50	0.00	29.67	108.28	2.00	0.00	0.50	0.00
29.73	114.22	0.17	1.39	0.50	0.01	29.80	118.70	0.18	1.33	0.49	0.01
29.86	120.95	0.19	1.30	0.49	0.01	29.92	118.88	0.19	1.32	0.49	0.01
29.99	122.31	0.20	1.28	0.49	0.01	30.08	123.96	0.20	1.26	0.49	0.01
30.12	124.04	0.20	1.25	0.49	0.01	30.20	123.59	0.20	1.26	0.49	0.01
30.26	122.56	2.00	0.00	0.49	0.00	30.34	120.43	2.00	0.00	0.49	0.00
30.39	118.56	2.00	0.00	0.48	0.00	30.48	114.45	2.00	0.00	0.48	0.00
30.52	113.64	2.00	0.00	0.48	0.00	30.58	116.42	2.00	0.00	0.48	0.00
30.66	126.50	2.00	0.00	0.48	0.00	30.71	137.01	2.00	0.00	0.48	0.00
30.79	141.58	2.00	0.00	0.48	0.00	30.88	143.74	0.29	1.04	0.48	0.01
30.91	144.50	0.30	1.03	0.48	0.00	30.98	144.82	0.30	1.03	0.47	0.01
31.06	145.04	0.30	1.02	0.47	0.01	31.10	145.02	0.30	1.02	0.47	0.01
31.18	145.75	0.30	1.01	0.47	0.01	31.24	146.79	0.31	1.00	0.47	0.01
31.32	147.27	0.32	0.99	0.47	0.01	31.37	147.26	0.32	0.99	0.47	0.01
31.45	145.72	0.30	1.00	0.47	0.01	31.51	143.78	0.29	1.01	0.47	0.01
31.57	140.06	0.27	1.04	0.46	0.01	31.64	137.97	0.26	1.06	0.46	0.01
31.72	136.12	0.25	1.07	0.46	0.01	31.78	135.49	0.25	1.07	0.46	0.01
31.86	135.14	0.24	1.07	0.46	0.01	31.91	134.68	0.24	1.08	0.46	0.01
31.96	134.42	0.24	1.08	0.46	0.01	32.04	134.36	0.24	1.07	0.46	0.01
32.11	134.02	0.24	1.07	0.46	0.01	32.17	133.56	0.24	1.07	0.45	0.01
32.22	130.28	0.22	1.10	0.45	0.01	32.31	123.07	0.20	1.17	0.45	0.01
32.35	123.78	0.20	1.16	0.45	0.01	32.44	125.85	0.21	1.14	0.45	0.01
32.49	126.86	0.21	1.12	0.45	0.01	32.55	128.73	0.22	1.10	0.45	0.01
32.62	130.32	0.22	1.09	0.45	0.01	32.68	131.16	0.23	1.08	0.45	0.01
32.75	133.72	0.24	1.05	0.44	0.01	32.82	135.78	0.25	1.03	0.44	0.01
32.91	137.15	0.25	1.01	0.44	0.01	32.95	137.71	0.26	1.01	0.44	0.01
33.03	139.01	0.26	1.00	0.44	0.01	33.09	139.67	0.27	0.99	0.44	0.01
33.17	140.60	0.27	0.98	0.44	0.01	33.22	141.56	0.28	0.97	0.44	0.01
33.30	142.55	0.28	0.96	0.44	0.01	33.37	143.20	0.29	0.95	0.43	0.01
33.40	143.40	0.29	0.95	0.43	0.00	33.49	143.08	0.29	0.95	0.43	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
33.53	142.69	0.29	0.95	0.43	0.01	33.62	141.77	0.28	0.95	0.43	0.01
33.67	141.28	0.28	0.95	0.43	0.01	33.74	140.44	0.27	0.96	0.43	0.01
33.83	139.35	0.27	0.96	0.43	0.01	33.87	138.66	0.26	0.97	0.43	0.00
33.93	136.98	0.25	0.98	0.42	0.01	34.02	133.91	0.24	1.00	0.42	0.01
34.07	132.29	0.23	1.01	0.42	0.01	34.13	129.49	0.22	1.03	0.42	0.01
34.20	126.33	0.21	1.06	0.42	0.01	34.29	122.18	0.20	1.09	0.42	0.01
34.33	120.72	0.19	1.10	0.42	0.01	34.42	119.46	0.19	1.11	0.42	0.01
34.47	118.93	0.19	1.11	0.42	0.01	34.51	118.00	0.19	1.12	0.42	0.01
34.60	115.09	0.18	1.15	0.41	0.01	34.65	112.83	0.17	1.17	0.41	0.01
34.73	110.35	0.17	1.19	0.41	0.01	34.78	109.18	0.17	1.20	0.41	0.01
34.87	106.86	0.16	1.23	0.41	0.01	34.92	104.18	0.16	1.26	0.41	0.01
34.98	100.26	0.15	1.30	0.41	0.01	35.05	93.48	2.00	0.00	0.41	0.00
35.14	91.02	2.00	0.00	0.40	0.00	35.18	90.06	2.00	0.00	0.40	0.00
35.27	26.43	2.00	0.00	0.40	0.00	35.32	23.38	2.00	0.00	0.40	0.00
35.38	21.26	2.00	0.00	0.40	0.00	35.45	23.74	2.00	0.00	0.40	0.00
35.50	87.75	2.00	0.00	0.40	0.00	35.58	93.60	2.00	0.00	0.40	0.00
35.63	99.79	2.00	0.00	0.40	0.00	35.71	99.10	2.00	0.00	0.39	0.00
35.77	106.71	0.16	1.18	0.39	0.01	35.84	116.39	0.18	1.08	0.39	0.01
35.93	121.02	0.19	1.03	0.39	0.01	35.98	118.12	0.19	1.05	0.39	0.01
36.02	110.94	0.17	1.12	0.39	0.01	36.09	122.06	0.20	1.01	0.39	0.01
36.16	140.49	0.27	0.86	0.39	0.01	36.25	125.42	0.21	0.98	0.39	0.01
36.29	146.53	0.31	0.82	0.38	0.00	36.36	200.35	2.00	0.00	0.38	0.00
36.42	201.88	2.00	0.00	0.38	0.00	36.50	222.40	2.00	0.00	0.38	0.00
36.56	255.51	2.00	0.00	0.38	0.00	36.62	284.53	2.00	0.00	0.38	0.00
36.69	293.42	2.00	0.00	0.38	0.00	36.75	320.57	2.00	0.00	0.38	0.00
36.83	340.06	2.00	0.00	0.38	0.00	36.88	289.29	2.00	0.00	0.37	0.00
36.95	297.73	2.00	0.00	0.37	0.00	37.03	293.83	2.00	0.00	0.37	0.00
37.09	294.49	2.00	0.00	0.37	0.00	37.17	271.66	2.00	0.00	0.37	0.00
37.23	274.04	2.00	0.00	0.37	0.00	37.28	256.84	2.00	0.00	0.37	0.00
37.36	257.27	2.00	0.00	0.37	0.00	37.41	254.67	2.00	0.00	0.37	0.00
37.47	247.53	2.00	0.00	0.36	0.00	37.54	245.38	2.00	0.00	0.36	0.00
37.60	238.99	2.00	0.00	0.36	0.00	37.68	226.99	2.00	0.00	0.36	0.00
37.74	219.94	2.00	0.00	0.36	0.00	37.81	163.21	0.50	0.56	0.36	0.00
37.89	115.79	0.18	0.99	0.36	0.01	37.94	105.05	0.16	1.09	0.36	0.01
38.01	83.19	0.13	1.37	0.36	0.01	38.08	76.10	0.12	1.49	0.35	0.01
38.15	102.56	0.15	1.11	0.35	0.01	38.20	116.56	0.18	0.97	0.35	0.01
38.28	120.26	0.19	0.93	0.35	0.01	38.35	111.55	2.00	0.00	0.35	0.00
38.42	125.44	2.00	0.00	0.35	0.00	38.48	128.27	2.00	0.00	0.35	0.00
38.52	122.93	2.00	0.00	0.35	0.00	38.61	36.62	2.00	0.00	0.35	0.00
38.66	30.48	2.00	0.00	0.34	0.00	38.74	32.64	2.00	0.00	0.34	0.00
38.79	29.98	2.00	0.00	0.34	0.00	38.85	26.37	2.00	0.00	0.34	0.00
38.91	29.45	2.00	0.00	0.34	0.00	39.01	88.98	2.00	0.00	0.34	0.00
39.05	89.35	2.00	0.00	0.34	0.00	39.14	95.67	2.00	0.00	0.34	0.00
39.19	101.99	2.00	0.00	0.34	0.00	39.26	107.31	2.00	0.00	0.33	0.00
39.31	105.52	2.00	0.00	0.33	0.00	39.39	114.89	0.18	0.92	0.33	0.01
39.45	115.53	0.18	0.92	0.33	0.01	39.51	115.43	0.18	0.91	0.33	0.01
39.60	122.21	0.20	0.86	0.33	0.01	39.65	124.41	0.21	0.84	0.33	0.01
39.72	120.88	0.20	0.86	0.33	0.01	39.77	121.36	0.20	0.85	0.33	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)											
Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)	Depth (ft)	q _{c1N,cs}	FS	e _v (%)	DF	Settlement (in)
39.83	105.19	0.16	0.99	0.32	0.01	39.90	129.14	0.22	0.79	0.32	0.01
39.99	150.76	0.35	0.66	0.32	0.01	40.04	150.68	0.35	0.66	0.32	0.00
40.10	154.20	0.38	0.64	0.32	0.00	40.17	163.51	0.50	0.49	0.32	0.00
40.23	173.59	0.72	0.34	0.32	0.00	40.31	247.62	2.00	0.00	0.32	0.00
40.36	250.61	2.00	0.00	0.32	0.00	40.44	320.14	2.00	0.00	0.31	0.00
40.49	345.04	2.00	0.00	0.31	0.00	40.58	359.99	2.00	0.00	0.31	0.00
40.62	368.05	2.00	0.00	0.31	0.00	40.68	389.31	2.00	0.00	0.31	0.00
40.76	388.10	2.00	0.00	0.31	0.00	40.84	388.10	2.00	0.00	0.31	0.00
40.89	383.19	2.00	0.00	0.31	0.00	40.95	383.05	2.00	0.00	0.31	0.00
41.01	382.91	2.00	0.00	0.30	0.00	41.09	385.20	2.00	0.00	0.30	0.00
41.16	387.56	2.00	0.00	0.30	0.00	41.24	395.02	2.00	0.00	0.30	0.00
41.28	403.34	2.00	0.00	0.30	0.00	41.34	424.04	2.00	0.00	0.30	0.00
41.41	427.71	2.00	0.00	0.30	0.00	41.49	437.71	2.00	0.00	0.30	0.00
41.54	456.41	2.00	0.00	0.30	0.00	41.61	470.71	2.00	0.00	0.29	0.00
41.68	497.08	2.00	0.00	0.29	0.00	41.74	514.66	2.00	0.00	0.29	0.00
41.80	494.05	2.00	0.00	0.29	0.00	41.89	491.08	2.00	0.00	0.29	0.00
41.94	492.59	2.00	0.00	0.29	0.00	42.02	536.58	2.00	0.00	0.29	0.00
42.07	543.52	2.00	0.00	0.29	0.00	42.14	570.84	2.00	0.00	0.29	0.00
42.20	582.54	2.00	0.00	0.28	0.00	42.27	516.29	2.00	0.00	0.28	0.00
42.34	523.89	2.00	0.00	0.28	0.00	42.40	549.02	2.00	0.00	0.28	0.00
42.46	553.58	2.00	0.00	0.28	0.00	42.52	572.10	2.00	0.00	0.28	0.00
42.61	592.21	2.00	0.00	0.28	0.00	42.65	587.52	2.00	0.00	0.28	0.00
42.72	602.37	2.00	0.00	0.28	0.00	42.79	599.86	2.00	0.00	0.27	0.00
42.85	587.80	2.00	0.00	0.27	0.00	42.92	548.49	2.00	0.00	0.27	0.00
42.98	586.56	2.00	0.00	0.27	0.00	43.05	575.34	2.00	0.00	0.27	0.00
43.11	585.33	2.00	0.00	0.27	0.00	43.19	593.46	2.00	0.00	0.27	0.00
43.25	606.32	2.00	0.00	0.27	0.00	43.31	583.45	2.00	0.00	0.27	0.00
43.37	522.52	2.00	0.00	0.26	0.00	43.45	535.52	2.00	0.00	0.26	0.00
43.53	536.09	2.00	0.00	0.26	0.00	43.59	535.95	2.00	0.00	0.26	0.00
43.66	536.59	2.00	0.00	0.26	0.00	43.71	558.56	2.00	0.00	0.26	0.00
43.77	564.63	2.00	0.00	0.26	0.00	43.84	530.44	2.00	0.00	0.26	0.00
43.90	547.77	2.00	0.00	0.26	0.00	43.97	454.55	2.00	0.00	0.25	0.00
44.03	439.70	2.00	0.00	0.25	0.00	44.10	442.16	2.00	0.00	0.25	0.00
44.16	429.14	2.00	0.00	0.25	0.00	44.24	409.11	2.00	0.00	0.25	0.00
44.32	416.47	2.00	0.00	0.25	0.00	44.37	418.39	2.00	0.00	0.25	0.00
44.43	417.85	2.00	0.00	0.25	0.00	44.50	418.51	2.00	0.00	0.25	0.00
44.56	412.64	2.00	0.00	0.24	0.00	44.63	406.62	2.00	0.00	0.24	0.00
44.72	404.54	2.00	0.00	0.24	0.00	44.75	404.49	2.00	0.00	0.24	0.00
44.84	402.43	2.00	0.00	0.24	0.00	44.90	426.48	2.00	0.00	0.24	0.00
44.95	435.94	2.00	0.00	0.24	0.00	45.02	436.38	2.00	0.00	0.24	0.00
45.08	444.67	2.00	0.00	0.24	0.00	45.15	446.52	2.00	0.00	0.23	0.00
45.23	448.34	2.00	0.00	0.23	0.00	45.28	470.25	2.00	0.00	0.23	0.00
45.34	415.56	2.00	0.00	0.23	0.00	45.41	417.60	2.00	0.00	0.23	0.00
45.49	417.19	2.00	0.00	0.23	0.00	45.54	438.95	2.00	0.00	0.23	0.00
45.62	508.44	2.00	0.00	0.23	0.00	45.67	558.07	2.00	0.00	0.23	0.00
45.75	577.43	2.00	0.00	0.22	0.00						

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
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Total estimated settlement: 5.37**Abbreviations**

$Q_{tn,cs}$:	Equivalent clean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumetric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement

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Research & Collections

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November 10, 2024

Kimley-Horn
Attn: Eric Wang

re: Expedited paleontological resources records search for the South El Monte Athletic Fields and Business Park Project

Dear Eric:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the South El Monte Athletic Fields and Business Park project area as outlined on the portion of the El Monte USGS topographic quadrangle map that you sent to me via e-mail on November 4, 2024. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that may occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
VPLACM6350-6362; LACM IP 16968-16991	Puente Hills Landfill	Fernando Formation; Repetto Member (massive clayey siltstone)	Herring (<i>Ganolytes</i>), hake (<i>Merluccius</i>), rattail (<i>Coelorhynchus</i>), lanternfish (<i>Lampanyctus</i> , <i>Diaphus</i>), white shark (<i>Charcharodon carcharias</i>); marine mammals (Cetacea); Invertebrates (unspecified)	unknown
LACM VP 3347	11204 Bluefield; Whittier	La Habra Formation (lacustrine silt with caliche and plant detritus)	Horse (<i>Equus</i>)	2 feet bgs
LACM VP 3363	W of Monterey Pass Road in Coyote Pass; E of the Long Beach Freeway & S of the N boundary of Section 32; Monterey Park	Unknown Formation (Pleistocene; sand and silt)	Horse (<i>Equus</i>)	unknown
LACM VP	Intersection of 26th	Unknown	Fish (<i>Gasterosteus</i>); Snake	30 ft bgs

Locality Number	Location	Formation	Taxa	Depth
7701-7702	St and Atlantic Blvd, Bell Gardens	Formation (Pleistocene; silt)	(Colubridae), Rodents (<i>Thomomys</i> , <i>Microtus</i> , <i>Reithrodontomys</i>); Rabbit (<i>Sylvilagus</i>)	

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Federal (43 Code of Federal Regulations Part 49.110) or Society of Vertebrate Paleontology standards.

Sincerely,



Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice