Appendix F
Geology Report

CITY OF LOS ANGELES
INTER-DEPARTMENTAL CORRESPONDENCE

GEOLOGY AND SOILS REPORT APPROVAL LETTER

September 20, 2018

LOG # 103763-01
SOILS/GEOLOGY FILE - 2
LIQ

To: Vincent P. Bertoni, AICP, Deputy Advisory Agency
c/o planning.expedited@lacity.org
Department of City Planning
200 N. Spring Street, 7th Floor, Room 750

From: Jesus Adolfo Acosta, Grading Division Chief
Department of Building and Safety

PROPOSED LEGAL: Vesting Tentative Tract Map VTT-82227, Lots 1 through 5
CURRENT LEGAL: Lots 6, 7, 8, 9 and 10 of BROADWAY TRACT (MP 16-8)
LOCATION: 942 N. Broadway

CURRENT REFERENCE REPORT/LETTER	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Preliminary Soils Report	21545	07/24/2018	Geotechnologies, Inc.

PREVIOUS REFERENCE REPORT/LETTER	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Dept. Review Letter	103763	06/25/2018	LADBS
Soils Report	4953-17-1001	09/01/2017	Amec Foster Wheeler

The Grading Division of the Department of Building and Safety has reviewed the revised map for Vesting Tentative Tract VTT-82227 with Los Angeles Department of City Planning stamp dated 07/24/2018 and the referenced reports that provide liquefaction analysis and preliminary recommendations for the proposed 32-story (27 above grade and 5 subterranean) mixed-use structure. The proposed structure is estimated to be 291 feet above ground and 60 feet below grade.

The earth materials at the subsurface exploration locations consist of up to 17.5 feet of uncertified fill underlain by alluvium and Puente Formation siltstone bedrock. The consultants recommend to support the proposed structures on mat-type and/or drilled-pile foundations bearing on non-liquefiable native undisturbed soils.

The site is located in a designated liquefaction hazard zone as shown on the Seismic Hazard Zones map issued by the State of California. According to the consultants, the soils between 50 to 60 feet (elevations 251 to 261 feet) are susceptible to liquefaction with potential settlement on the order of 2.9 inches. The consultants recommend to mitigate the liquefaction hazard by extending the foundations into the non-liquefiable soils and support the proposed structures on mat-type and/or drilled-pile foundations bearing on native undisturbed soils.

The Liquefaction study included as a part of the reports demonstrates that the site soils are subject to liquefaction. To mitigate the earthquake induced settlements it is proposed to use a mat or pile foundation. The requirements of the 2017 City of Los Angeles Building Code have been satisfied.

The Vesting Tentative Tract No. 82227 and the referenced reports are acceptable for evaluation and mitigation of the liquefaction hazard at the site and allow the Department of City Planning case to continue, provided the following conditions are complied with:

1. Prior to the issuance of any building or grading permits, a soils report, in accordance with P/BC 2017-113 Information Bulletin, providing design level geotechnical recommendations and calculations for the proposed grading/construction shall be submitted to the Grading Division for review and approval.

2. All foundations shall derive entire support from non-liquefiable native undisturbed soils below an elevation of 251 feet, as recommended.

AD

CLJ/AD:clj/ad
Log No. 103763-01
213-482-0480

cc: TF Broadway LP, Owner
Alex Irvine, Jeff Allen, Applicant
Geotechnologies, Inc., Project Consultant
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September 14, 2018
File Number 21545

TF Broadway LP
11400 West Olympic Boulevard, Suite 850
Los Angeles, California 90064

Subject: Geotechnical Engineering Investigation
Proposed Mixed-Use Development
942 North Broadway, Los Angeles, California

References: *Reports by Geotechnologies, Inc:*
Preliminary Geotechnical Engineering Investigation, dated April 17, 2018;
Environmental Impact Report, Soils and Geology Issues, dated July 20, 2018, updated July 24, 2018.

Ladies and Gentlemen:

This letter transmits the Geotechnical Engineering Investigation for the subject site prepared by Geotechnologies, Inc. This report provides geotechnical recommendations for the development of the site, including earthwork, seismic design, retaining walls, excavations, shoring and foundation design. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result due to the building department review process.

This report includes additional subsurface investigation and analysis to address the geotechnical issues identified in the previous report.

The validity of the recommendations presented herein is dependent upon review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations or which may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

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GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
942 NORTH BROADWAY
LOS ANGELES, CALIFORNIA

INTRODUCTION

This report presents the results of the geotechnical engineering investigation performed on the subject site. The purpose of this investigation was to identify the distribution and engineering properties of the geologic materials underlying the site, and to provide geotechnical recommendations for the design of the proposed development.

As part of this investigation, two borings were drilled using a hollowstem auger to depths of 125 and 75 feet (Boring B-5 and B6, respectively). Two cone penetration tests were sounded as well to depths of 73 and 100 feet (CPT1 and CPT2, respectively).

The preliminary investigation included four exploratory excavations, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, and the preparation of this report. The exploratory excavation locations are shown on the enclosed Plot Plan - Existing Development. The results of the exploration and the laboratory testing are presented in the Appendix of this report.

PROPOSED DEVELOPMENT

Information concerning the proposed development was furnished by the client. The proposed development consists of the construction of a mixed-use structure. The proposed structure is anticipated to be 27-stories in height with 5-levels of subterranean parking, resulting in an estimated total height above ground of 291 feet.

It is anticipated that the finish floor elevation of the subterranean garage will be at elevation 258 feet above mean sea level. It is anticipated that grading will consist of excavations to a depth of 60 feet below the existing grade for construction of the proposed subterranean garage and foundation elements.

The primary building periods are 2.96 seconds in and east-west orientation and 2.57 seconds in a north-south orientation. Column loads are estimated to be between 1,100 kips and 5,900 kips. Wall loads are estimated to be between 20 and 40 kips per lineal foot. The proposed structure is illustrated in the Plot Plan – Proposed Development.

Any changes in the design of the project or location of the structure, as outlined in this report, should be reviewed by this office. The recommendations contained in this report should not be considered valid until reviewed and modified or reaffirmed, in writing, subsequent to such review.

SITE CONDITIONS

The site is located at 942 North Broadway in the City of Los Angeles, California. The site is roughly square in shape and is estimated to be 0.68 acres in size. The site is bounded by a paved driveway followed by a single-story commercial structure to the north, a three and four-story commercial structure to the east, a five-story mixed-use structure to the south, and North Broadway to the west. The structure to the east has an estimated finish floor elevation of 296 feet and the structure to the south has a finish floor elevation of 277 feet. The site is shown relative to site boundaries on the attached Plot Plan - Existing Development and on Cross Sections A-A' and B-B'.

The site is currently occupied by two and three-story commercial structures and a paved parking lot. The site is generally flat in the paved parking lot area, near elevation 311 feet above mean sea level, but steps approximately 8 feet lower to the east to an irregular-shaped backyard along the eastern property line. The adjacent property to the east steps down to elevation 296 feet. A retain wall separates the two properties.

Vegetation is limited to planters around the parking lot and in the rear, backyard area. Drainage across the site appears to be by sheetflow to the southeast on the front half of the site. It is not known where water from the east portion of the site is directed.

The neighboring developments consist of commercial and residential structures ranging from a single-story to five stories in height.

Alameda Street Storm Drain

The Alameda Street Storm Drain System cuts across the northeast corner of the site. The easement is approximately 10 feet wide and is illustrated on both Plot Plans. The storm drain pipe is approximately 3½ feet in diameter (inside) with an estimated invert elevation within the site of 282 feet above mean sea level (Los Angeles Department of Public Works, http://navigatela.lacity.org/navigatela/). The approximate location of the storm drain pipe is indicated on the attached Cross Section B-B'.

The subterranean levels of the proposed structure will bisect the storm drain pipe. The subterranean portion of the proposed structure will be faceted so that the pipe will not be surcharged or bisected. A survey will be required to accurately locate the pipe.

Zanja Madre

The Zanja Madre is a historic irrigation ditch that is part of a now-abandoned water system also located at the northeast corner of the site. The system consisted of a series of historic drainage ditches connecting the Los Angeles River to the early city of Los Angeles. Zanja Madre is considered a cultural and historical landmark. The project shall include in its design a five-foot-wide setback on each side of the conduit. The location of Zanja Madre is shown on both of the Attached Plot Plans.

LOCAL GEOLOGY

The site is located in the Elysian Park Hills which form the northeast border of the Los Angeles Basin. The Elysian Park Hills are composed primarily of upper Miocene and Pliocene-age sedimentary rocks. The localized region is likely underlain by the upper Puente Formation that is composed well bedded siltstone, clayey siltstone, and sandstone. Structurally, the Elysian Park Hills are located on the southern limb of the Elysian Park Anticline. Bedding within the general site vicinity dips to the south and southwest at slight to moderate inclinations of 40 to 55 degrees (Lamar, 1970 and Dibblee, 1989). The geology of the site vicinity is presented on the Local Geologic Maps - Dibblee, Lamar and Yerkes included in this report.

The Los Angeles River is located approximately 3,000 feet to the east of the site. Currently the river is constrained by concrete channel walls. Prior to channelization, the Los Angeles River meandered between the Elysian Park Hills on the west and the Repetto Hills on the east. An ancient meander edge was likely defined by a former riverbank aligned with North Broadway. The Los Angeles River is the source of the alluvium that underlies the site.

Local Faults

Geologic mapping as illustrated by Yerkes, et. al. (1977) indicates an unnamed fault located approximately 500 feet north of the site. The fault trends in a northwest-southwest direction. This fault is not shown on the geologic map by either Lamar (1971), Dibblee (1989), or on the Earthquake Fault Zone map (CGS, 2017). Based on the mapping by Yerkes et. al, (1977), the evidence for the fault appear to be abrupt difference in the bedrock surface contours. If the fault exists, it is not considered active and therefore is not considered a seismic risk to the site. The unnamed fault is shown on the attached Local Geologic Map-Yerkes.

BACKGROUND RESEARCH

AMEC Environment and Infrastructure, Inc., dated March 1, 2013, Report of Geotechnical Investigation, Proposed Chinatown Blossom Plaza Project, 900 North Broadway, Los Angeles, California, Project No. 4953-13-0061.

This firm reviewed the permit files available for the adjacent site to the south, located at 900 North Broadway. The above-referenced report was obtained. AMEC also performed earlier investigations in 2004 and 2008 as predecessor firms. In total, 17 borings were drilled to depth of up 65 ½ feet below the ground surface. Twelve Cone Penetration Tests were also performed to depths of 70 ½ feet. Additional borings were drilled to assess methane and groundwater issues. The borings identified fill soils ranging in depth for 3 to 19 feet underlain by alluvial soil consisting of sandy silt, clay sandy clay and clayey sand. Bedrock was claimed to be encountered at depth of 45 to 62 feet. Ground water was identified at depth of 33 to 49 feet.

Liquefaction settlement was identified to be up to 2 ½ inches in the western portion of the site while the eastern portion was estimated to be "several inches". Ground improvement was recommended in the eastern portion of the site with a mat foundation. The western portion of the site was recommended to be supported on a mat foundation, but ground improvement was not needed on the west side of the site. The liquefiable layer was identified between elevations of 270 to 235 feet. The report was approved the City of Los Angeles Department of Building and Safety in a letter dated April 11, 2013 (LOG No. 79917).

Borings drilled by AMEC that appear within the limits of the attached Plot Plan are shown. The boring and CPT logs are included in the Appendix of this report.

AMEC Environment and Infrastructure, Inc., dated March 26, 2013, Supplemental Geotechnical Investigation, Proposed Chinatown Blossom Plaza Project, 900 North Broadway, Los Angeles, California, Project No. 4953-13-0061.

The purpose of this investigation was to re-evaluate liquefaction potential at the site. Three additional borings were drilled to depths ranging from 60 to 118 feet. Based on laboratory data obtained from soil samples taken at depths from 25 to 35 feet and 50 to 60 feet, liquefaction settlement was estimated to range from 1 to 2 ½ inches. Static plus seismic settlement was estimated to be about 3 inches with 1 ½ inches of differential settlement. The report recommended that ground improvement was no longer required. The letter and the report described above were approved by the City of Los Angeles in a letter dated April 11, 2013 (LOG No. 79917).

Boring 103 was drilled within 15 feet distance of the southern property line of the subject site to a depth of 118 feet. Bedrock consisting of Sandy Siltstone was identified at a depth of 114 feet.

Geosyntec Consultants, Report dated May 4, 2016, Addendum No. 1, Final Compaction Report and Record of Related Geotechnical Observations - Blossom Plaza, Project No. HL1442.

The plan included in the report indicates that the finish floor elevation is 277 feet. The plan also indicates the northern wall (coincident with the southern wall of the subject site) was supported with a raker system. The report does not indicate that soil improvement was performed on the property.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was initially explored on January 8 and February 6, 2018 by excavating four borings. The excavations varied in depth between 30 to 90 feet below the existing site grade. The borings were advanced with the aid of a truck-mounted drilling machine using 8-inch diameter hollowstem augers.

On June 21 and June 25, two additional borings (Borings B5 and B6) were drilled to depths of 125 and 75 feet below the ground surface using 8-inch diameter hollowstem augers.

Two CPT soundings were also performed on June 21, 2018. Due to the Gravelly and cobbley composition of the upper 30 feet of soil, the soundings were predrilled using the 8-inch diameter hollowstem auger to a depth of 30 feet. The CPT soundings were performed at the bottom the hole and extended to depth of 73 feet (CPT1) and 100 feet (CPT2). The boring and CPT locations are shown on the attached Plot Plans and the geologic materials encountered are logged on Plates A-1 through A-6. The CPT results and analysis are included in the Appendix. The attached Cross Sections A-A' and B-B' show the subsurface distribution of the geologic materials below the site.

The locations of the exploratory excavations were measured from hardscape features shown on the attached Plot Plans. The elevations were interpolated from elevation contours shown on the City of Los Angeles, topographic map, 2006 contours (City of Los Angeles, 2018). The locations of the exploratory excavations should be considered accurate only to the degree implied by the method used.

Geologic Materials

Fill soil was encountered in all exploratory excavations to depths of up to 8 feet below the existing site grade. The fill encountered in the borings consists of silty sand to clayey silt. The fill was observed to be dark brown in color, moist, medium dense, stiff, and fine grained.

The fill is underlain by alluvial soil, consisting of interlayered mixtures of silty clay to clayey sand and silty sand to gravelly sand. The alluvium ranges in color from yellowish or grayish brown to dark brown, and is slightly moist to wet, medium dense to very dense, stiff, and fine to medium grained with occasional gravel.

The alluvium can be divided into several layers that are depicted on the attached Cross Sections A-A' and B-B'. Notable layers include 1) a cobbley sand that occurs between 12 and 25 feet. This layer may have large cobbles and boulders that could create difficulties during drilling. 2) A silty clay and clayey silt layer was identified at 43 and 50 feet. This layer is relatively soft and is not considered suitable for foundation support, and 3) a moderately dense sand that is liquefiable to a depth of 60 feet or elevation 250 feet. This layer was identified by this firm and the consultant on the adjacent site to be liquefiable. 4) Sand and silty sand that is dense to very dense. The proposed foundation should bear on this layer.

Sandstone bedrock of the Puente Formation consists of well bedded, siltstone and sandstone (Lamar, 1970). The rock is moderately hard and dips to the south at an inclination of 30 to 50 degrees. The bedrock was encountered in Boring 5 at a depth of 115 feet (elevation 193 feet). Boring Log B-103 located 15 feet south of the site, the depth to bedrock is 114 feet (elevation 196 feet).

The attached Local Geologic Map–Yerkes, provides contours at the top of the bedrock surface. The map indicates the depth to bedrock beneath the site is approximately 85 feet. The depth to rock was found approximately 30 feet deeper, the bedrock surface likely descends to the east, towards the LA River.

The boring location are shown on the attached Plot Plans and the subsurface distribution of the geologic materials is shown on the attached Cross Sections A-A' and B-B'. The boring log is included in the Appendix. More detailed descriptions of the geologic materials encountered may be obtained from individual logs of the subsurface excavations.

Groundwater

Groundwater was encountered in Boring B3 and Boring B4 at depths of 55 feet and 47½ feet, which correlate to elevations of 255 and 259.5 feet, respectively. The recently drilled Borings

B5 and B6 identified water at a depth of 45 feet below the ground surface which correlate to elevations of 263 and 255 feet, respectively.

The report prepared by AMEC in 2013 included readings from several monitoring wells installed by the City of Los Angeles on the adjacent site to the south. Eleven monitoring wells were read between December 2004 and February 2005. A Plot Plan showing the location of all the borings by AMEC is included in the Appendix. The two nearest wells to the site, Monitoring Wells MW-1 and MW-2, are shown on the Attached Plot Plan - Existing Development and Plot Plan - Proposed Development. The highest water elevation indicated by the wells was 265.95 feet during the monitoring period. The elevation of the water surface is shown on the attached Cross Sections.

The California Geological Survey Seismic Hazard Evaluation for the Los Angeles Quadrangle indicates the historic high groundwater level to be at a depth of 20 feet below the ground surface. Due to the sloping ground surface that descends to the west, the groundwater surface is anticipated to descend to the east as well. The historically highest ground water elevation ranges from 289 feet on the west side of the site to 281 on the east side of the site. A copy of this plate is included in the Appendix as Historically Highest Groundwater Levels Map.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving

Caving could not be directly observed during drilling due to the continuously-cased design of a hollow-stem auger. However, based on the experience of this firm, large diameter excavations that encounter granular, cohesionless soils, and excavations below the groundwater table, will most likely encounter caving.

LOS ANGELES CITY OIL FIELD AND OIL WELLS

The site is located within the Los Angeles City Oil Field as indicated by the Division of Oil Gas and Geothermal Resources (DOGGR), 2018, Well Finder Website. A number of wells are located in near proximity but not on the subject site or the adjacent properties. The wells are shown on the attached Oil Well Location Map. The wells identified near the site are designated with a "plugged" or "buried" status.

METHANE ZONES

Based on review of the City of Los Angeles Methane and Methane Buffer Zones map (City of Los Angeles, 2003), the site is located within a Methane Buffer Zone. A qualified methane consultant should be retained to consider the requirements and implications of the City's Methane Buffer Zone designation. A copy of the portion of the map covering the project site is included herein.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject site is located in the Los Angeles Basin. The Los Angeles Basin is located at the northern end of the Peninsular Ranges Geomorphic Province. The basin is bounded by the east and southeast by the Santa Ana Mountains and San Joaquin Hills, to the northwest by the Santa Monica Mountains. Over 22 million years ago the Los Angeles basin was a deep marine basin formed by tectonic forces between the North American and Pacific plates. Since that time, over 5 miles of marine and non-marine sedimentary rock as well as intrusive and extrusive igneous rocks have filled the basin. During the last 2 million years, defined by the Pleistocene and Holocene epochs, the Los Angeles basin and surrounding mountain ranges have been uplifted to form the present day landscape. Erosion of the surrounding mountains has resulted in deposition of unconsolidated sediments in low-lying areas by rivers such as the Los Angeles River. Areas that have experienced subtle uplift have been eroded with gullies.

REGIONAL FAULTING

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

SEISMIC HAZARDS AND DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. The potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

Surface Rupture

Surface rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. The CGS published and map entitled “Earthquake Zone of Required Investigation” that shows the locations of Alquist-Priolo Earthquake Fault Zones. The subject site is not located within an Alquist-Priolo Earthquake Fault Zone. The nearest fault zone is located approximately 3.4 miles to the north and is associated with the Raymond Fault Zone. Accordingly, the potential for surface rupture at the subject site is considered to be low. A copy of this map may be found in the Appendix of this report.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

According to the Earthquake Zones of Required Investigation Map (CGS, 2017) the site is located within a potentially liquefiable area. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake.

A site-specific liquefaction analysis was performed based on the SPT results of Borings B4, B5 and B6 which were drilled to depths of 90, 125 and 75 feet, respectively. The sampling followed the Recommended Procedures for Implementation of the California Geologic Survey Special Publication 117A, Guidelines for Analyzing and Mitigating Seismic Hazards in California (CGS, 2008), and the EERI Monograph (MNO-12) by Idriss and Boulanger (2008). This semi-empirical method is based on a correlation between measured values of Standard Penetration Test (SPT) resistance and field performance data.

Groundwater was encountered during exploration at depths of 47½ and 45 feet below the ground surface. According to the Seismic Hazard Zone Report for the Los Angeles 7½-Minute Quadrangle (CDMG, 1998, Revised 2006), the historic-high groundwater level for the site is estimated at a depth of 20 feet below the ground surface.

The peak ground acceleration (PGA) and modal magnitude were obtained from the USGS websites, using the Probabilistic Seismic Hazard Deaggregation program (USGS, 2014) and the U.S. Seismic Design Maps tool (USGS, 2018). A Site Class "D" (Stiff Soil Profile) and an estimated shear wave velocity of 259 meters per second were utilized for Vs30 (Tinsley and Fumal, 1985) in the USGS seismic programs. A modal magnitude (M_W) of 6.9 was obtained using the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2014). A peak ground acceleration of 0.97g (2% exceedance in 50 years) was obtained using the U.S. Seismic Design Maps tool. The peak ground acceleration for a seismic event of 10% exceedance in 50 years was estimated my multiplying 0.97g by 2/3 for a result of 0.65g. These parameters are used in the enclosed liquefaction analyses.

Standard Penetration Test (SPT) data from Borings B4, B5 and B6 were collected at 5-foot intervals. Samples of the collected materials were conveyed to the laboratory for testing and analysis. The percent of material passing through a Number 200 sieve, Atterberg Limits, and the plasticity index (PI) of representative samples of the soils encountered in the exploratory boring are presented on the enclosed E and F-Plates. Based on CGS Special Publication 117A (CDMG, 2008), the vast majority of liquefaction hazards are associated with sandy soil and silty soil of low plasticity. Furthermore, cohesive soils with PI between 7 and 12 and moisture content greater than 85 percent of the liquid limit are susceptible to liquefaction.

The procedure presented in the SP117A guidelines was followed in analyzing the liquefaction potential of the subject site. The SP117A guidelines were developed based on a paper titled, "Assessment of the Liquefaction Susceptibility of Fine-Grained Soils", by Bray and Sancio (2006). According to the SP117A, soils having a Plastic Index greater than 18 exhibit clay-like behavior, and the liquefaction potential of these soils are considered to be low. Therefore, where the results of Atterberg Limits testing showed a Plastic Index greater than 18, the soils would be considered non-liquefiable, and the analysis of these soil layers was turned off in the liquefaction susceptibility column.

Below is a summary table of the finding of the liquefaction Analysis:

SUMMARY OF LIQUEFACTION ANALYSES USING SPT DATA			
Shaking Condition	**Boring B4 (Total Depth 90')**	**Boring B5 (Total Depth 125')**	**Boring B6 (Total Depth 75 feet)**
2% Exceedence in 50 Years, 2475 recurrence Interval	2.87 inches between depth of 50 and 59 feet, (elev. 259 and 250'). Non liquefiable below 59 feet.	Non Liquefiable	Non Liquefiable
10% Exceedence in 50 Years, 475 year Recurrence Interval	2.87 inches between depth of 50 and 59 feet, (elev. 259 and 250'). Non liquefiable below 59 feet	Non Liquefiable	Non Liquefiable

The soil layers between 50 and 59 feet in Boring B4 were identified to be liquefiable as a result of seismic events with 2475 and 475 recurrence intervals. This layer is identified on the attached Cross Sections A-A' and B-B' as a lightly shaded zone. AMEC identified that same soil layer to be liquefiable in their report dated March 1, 2013. The underlying dense sand layer is not liquefiable and may be used to support the structure. It must be noted, however, that the seismic base of the structure should be taken at the base of the liquefiable layer.

CPT Analysis

The cone penetration test data was also analyzed to identify liquefaction potential using the computer program CLiq (version 1.7.6.34) by Geologismiki Geotechnical Software. The same earthquake parameters described above were input into the program. A summary of the findings is presented below:

SUMMARY OF LIQUEFACTION ANALYSES USING CPT DATA		
Shaking Condition	**CPT1 (Total Depth 74')**	**CPT2 (Total Depth 100')**
2% Exceedence in 50 Years, 2475 recurrence Interval	6.2 inches from 30 to 70 feet, 0.25 inch below depth of 60 feet (elevation 250) where settlement occurs in layer from 69 to 70 feet	4 inches of settlement from 30 to 100 feet. 1.7 inches below a depth of 60 feet where settlement occurs in layers 82 to 86 feet and 92 to 100 feet.
10% Exceedence in 50 Years, 475 year Recurrence Interval	Same as above	3 inches of settlement from 30 to 100 feet. 1 inch below a depth of 60 feet where settlement occurs in layers 82 to 86 feet and 92 to 100 feet.

Liquefaction Settlement

SPT Methodology

The anticipated liquefaction settlement of 2.9 inches is predicted to occur during a design based and maximum considered seismic event in layers above the moderately dense sand between depths of 50 to 59 feet (equivalent to elevations 241 to 250 feet). However, since the proposed excavation (including the foundation elements) will extend to elevation 250 feet, the liquefiable layers will be removed, the removing the risk of seismic settlement.

CPT Methodology

Total liquefaction settlement occurs in the CPT soundings CPT 1 and CPT2 ranging from 4 to 6.2 inches where shaking is equivalent to an event with a 2% probability of exceedance in 50 years. However most of the predicted settlement occurs above the depth of 59 feet that will be removed for the proposed structure. Below this depth, the settlement is estimated to be on the order of 0.25 inch and 1.7 inches. The for the earthquake with a 10% chance of exceedance in 50 years the settlement ranges from 0.25 inch to 1 inch within the 100 foot depth interval. In both cases, the base of the foundation will be separated by at least 9 feet of non-liquefiable soils.

Summary

Both methods of analysis, The SPT and CPT confirm the soils with the greatest liquefaction settlement is present from the depth of 52 to 59 feet. However, the two methods do not agree with potential for liquefaction below that depth. It is the opinion of this firm that the potential for liquefaction below the depth of 60 feet is very low. However as a precaution, the lower bound settlement of 0.25 inch, below the depth of 60 feet, as determined by the CPT analysis, should be considered in design.

Surface Manifestation

It has been shown in recent studies by O'Rourke and Pease (1997) and Youd and Garris (1995), building upon work by Ishihara (1985), that the visible effects of liquefaction on the ground surface are only manifested if the relative and absolute thicknesses of liquefiable soils to overlying non-liquefiable surface material fall within a certain range.

The study by Ishihara (1985) presents data from three separate earthquakes where subsurface information was available regarding the absolute and relative thicknesses of liquefiable earth materials and overlying non-liquefiable materials. Information was obtained from sites where the surface effects of liquefaction were observed, and from sites where there were no visible surface effects. From this data, Ishihara (1985) graphs the liquefiable soil thickness vs. the overlying non-liquefiable thickness, and presents bounds identifying a zone within which surface effects of liquefaction were observed.

Youd and Garris (1995) build upon the work by Ishihara (1985), compiling data from 308 borings taken at sites shaken by 15 different earthquakes, ranging in magnitude from 5.3 to 8.0. They find that the boundaries presented by Ishihara relating the thicknesses of non-liquefiable surface layers to underlying potentially liquefiable layers remain valid for this extensive set of data, with very few exceptions. The particular site conditions which contributed to the few exceptional cases are not present on the subject site.

O'Rourke and Pease (1997) also compare the liquefiable vs. non-liquefiable thickness bounds initially proposed by Ishihara (1985) with data obtained from areas of San Francisco where the surface effects of liquefaction were observed during the 1989 Loma Prieta earthquake. They find general agreement with the previous findings of Ishihara (1985) and Youd and Garris (1995).

On the subject site, given the close proximity of the liquefiable layer to the deepest subterranean level, the relative thicknesses of liquefiable soils to overlying non-liquefiable surface material fall within the bounds wherein surface effects of liquefaction have been observed during past earthquakes. As a result, it is conceivably possible that surface effects of liquefaction or bearing capacity failure could occur within the subject site. It is the recommendation of Geotechnologies, Inc. that the foundation system for the proposed development should bear upon soil strata that is below the layer that is susceptible to liquefaction.

Lateral Spreading

Lateral spreading is the most pervasive type of liquefaction-induced ground failure. During lateral spread, blocks of mostly intact, surficial soil displace downslope or towards a free face along a shear zone that has formed within the liquefied sediment. According to the procedure provided by Bartlett, Hansen, and Youd, "Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement", ASCE, Journal of Geotechnical Engineering, Vol. 128, No. 12, December 2002, when the saturated cohesionless sediments with $(N_1)_{60} > 15$, significant displacement is not likely for $M < 8$ earthquakes.

The saturated cohesionless sediments underlying the subject site have corrected $(N_1)_{60}$ value greater than 15. And, as provided by the Seismic Hazard Zone Report for the Los Angeles 7.5-Minute Quadrangles, Los Angeles County, California, (OFR 98-19) by CDMG, the Raymond Fault, which contributes the majority of the ground motion to the site, has a predominant earthquake magnitude, M_w, of 6.9. Therefore, the potential for lateral spread is considered to be remote for the subject site.

Dynamic Dry Settlement

Seismically-induced settlement or compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Significant dynamic dry settlement is not expected occur due to the existence of high groundwater underlying the proposed development. Some seismically-induced dry settlement of the proposed structures should be expected as a result of strong ground-shaking, however, due to the uniform properties of the underlying geologic materials, excessive differential settlements are not expected to occur.

Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. The site is high enough and far enough from the ocean to preclude being prone to hazards of a tsunami.

Review of the County of Los Angeles Flood and Inundation Hazards Map, Leighton (1990), indicates the site does not lie within the potential mapped inundation boundaries due to a seiche or a breached upgradient reservoir.

Landsliding

The site will be supported with retaining walls; no soil faces will be left exposed. As a result, the potential for seismically-induced landslides is considered to be negligible.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the finding of Geotechnologies, Inc. that construction of the proposed mixed-use structure is considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

The site is underlain by fill that consists of silty sand to clayey silt that extends to a depth of 8 feet below the ground surface. The existing fill soil is considered to be unsuitable for support of foundations, floor slabs, or additional fill soil. The deepest fill will be located along the eastern property line as backfill and above a Storm drain line located at the northeast corner of the site. With the exception of the fill overlying the storm drain, the existing fill will be removed for the construction of the proposed subterranean garage levels.

The fill is underlain by alluvium consisting of interlayered mixtures of silt, clay and sand, gravel and cobbles. Notable layers include 1) a gravelly and cobbley sand from 10 to 30 feet; 2) Silty moderately dense silty sand and Sand from 30 to 45 feet; 3) silty clay and clay that is variable in thickness but varies from 40 to 60 feet and; 4) Sand that is moderately dense from 50 to 60 feet and dense sand and silty sand from 60 to 115 feet.

Siltstone and Sandstone bedrock of the Puente Formation underlies the site. Boring B5 for this investigation identified rock at a depth of 115 feet. A boring drilled on the adjacent site to the south by another consultant (MACTEC, 2013) encountered bedrock at a depth of 114 feet below the ground surface.

Groundwater was observed at depths between 45 to 55 feet below the ground surface, which is equivalent to elevations 265 and 257 feet, respectively. Monitoring wells located on the adjacent site to the south identified ground water below a depth of 43 feet (near elevation 266 feet) in 2004 and 2005. The historically highest groundwater level is estimated at 20 feet below ground surface but is manifested as an easterly-descending surface ranging in elevation from 289 feet to 282 feet above mean sea level. The structure will be required to withstand the hydrostatic pressures consistent with the historically highest groundwater level.

Based on the attached SPT and CPT liquefaction analyses, the soils are liquefiable. However, according to the SPT analysis, the settlement is limited to the soils above the elevation 250 feet. The CPT analysis indicates settlement may occur in layers as deep as 100 feet. However, the two methods do not agree with potential for liquefaction below that depth. It is the opinion of this firm that the potential for liquefaction below the depth of 60 feet is very low since SPT blow count below this depth exceeded 30 blows per foot. However as a precaution, the lower bound settlement of 0.25 inch below the depth of 60 feet, as determined by the CPT analysis, should be considered in design.

Total settlement of the mat foundation from both static and seismic sources should be 1.25 inches. Since liquefaction settlement of the surrounding area may be as much as 3 inches, utility connection tying into the structure should be designed with flexible connections.

The site may be classified as Site Class D. It must be noted that the seismic base of the structure must be taken at the base of the liquefiable soils. The estimated building period of the proposed structure is on the order of 2.5 seconds. A site specific response spectrum analysis will be required for the site.

Based on the available geotechnical findings, the structure should be supported on a mat foundation that bears on the dense to very dense sand found near elevation 250 feet. It must be noted that current ground water was identified at a depth of 47 feet (elevation 265 feet) therefore, temporary construction dewatering measures will be necessary. The expected number and depths of well-points, expected flow rates, and expected pre-pumping time frames should be determined during a dewatering test program conducted by a qualified dewatering consultant. Once the temporary construction dewatering is discontinued, the water table will likely return to its current elevation.

Dewatering will occur between the elevation of 264 and 250 feet above mean sea elevation. The layer to be dewatered is a silty clay and clayey silt. Dewatering will occur from dense silty sand and sand below the elevation of 250 feet. Due to the different finish floor elevation of the adjacent structures as well as the different loads for each structure the dewatering settlement was calculated for each adjacent property. The dewatering settlement will vary from 0.2 to 0.4 inches. Differential settlement is anticipated to be 0.1 inch. In the opinion of this firm such settlement will not be manifested on the structures. As a precaution, the adjacent structures should have a distress inventory performed prior to construction of the subject site. In addition, the adjacent structures should have survey monuments installed to verify the property elevations prior and after building completion.

The site is not underlain by the surface trace of any active faults. The site is located in the City of Los Angeles Oil Filed, however not wells are indicated to have been drilled on the subject site or adjacent properties. The site is located in a City of Los Angeles Methane Buffer Zone. A methane consultant will be needed to identify appropriate methane mitigation measures.

Stormwater infiltration into onsite soils is not considered feasible. Some other means of stormwater disposal, such as flow-through planters, will be necessary.

Based on review of a report prepared for the existing structure to the south, the retaining wall was constructed using raker-braced shoring. No tiebacks extend onto the subject site.

Storm Drain and Zanja Madre

A storm drain, the Alameda Street Storm Drain System, is located near eastern corner of the site near elevation 285 feet as indicated on Cross-Section B-B’. Zanja Madre is a historically important water- conveyance feature located near the drain. It is the understanding of this firm that the proposed structure will be designed to avoid contact with two features.

The validity of the conclusions and design recommendations presented herein is dependent upon review of the geotechnical aspects of the proposed construction by this firm. The subsurface conditions described herein have been projected from borings on the site as indicated and should in no way be construed to reflect any variations which may occur between these borings or which may result from changes in subsurface conditions. Any changes in the design or location of any structure, as outlined in this report, should be reviewed by this office. The recommendations contained herein should not be considered valid until reviewed and modified or reaffirmed subsequent to such review.

SEISMIC DESIGN CONSIDERATION

2016 California Building Code Seismic Parameters

If the structure is supported on a Mat Foundation bearing on the non-liquefiable soils, according to Table 20.3-1 presented in ASCE 7-10, the Site Class is D which corresponds to a "Stiff Soil" Profile, according to Table 20.3-1 of ASCE 7-10. This information and the site coordinates were input into the USGS U.S. Seismic Design Maps tool (Version 3.1.0) to calculate the ground motions for the site.

2016 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	2.557g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	2.557g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.705g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.898g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.347g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.898g

It is recommended that the seismic design values be determined as part of a site-specific ground motion study.

FILL MATERIALS

As much as 8 feet of fill materials were encountered during exploration. It is anticipated that the fill will be removed during excavation of the proposed subterranean parking levels. At the northwest corner of the site, where the Storm Drain and Zanja Madre are located, the fill above these features will be left in place.

WATER-SOLUBLE SULFATES

The Portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually the two most common sources of exposure are from soil and marine environments.

The source of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite geologic materials was tested by California Test 417. The water-soluble sulfate content was determined to be less than 0.1% percentage by weight for the soils tested. Based on American Concrete Institute (ACI) Standard 318, the sulfate exposure is considered to be negligible for geologic materials with less than 0.1% and Type I cement may be utilized for concrete foundations in contact with the site soils.

GRADING GUIDELINES

The following guidelines are provided for any miscellaneous compaction that may be required, such as retaining wall backfill or subgrade preparation.

Site Preparation

- A thorough search should be made for possible underground utilities and/or structures. Any existing or abandoned utilities or structures located within the footprint of the proposed grading should be removed or relocated as appropriate.
- All vegetation, existing fill, and soft or disturbed geologic materials should be removed from the areas to receive controlled fill. All existing fill materials and any disturbed geologic materials resulting from grading operations shall be completely removed and properly recompacted prior to foundation excavation.
- Any vegetation or associated root system located within the footprint of the proposed structures should be removed during grading.
- Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.
- The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

Compaction

The City of Los Angeles Department of Building and Safety requires a minimum comparative compaction of 95 percent of the laboratory maximum density where the soils to be utilized in the fill have less than 15 percent finer than 0.005 millimeters. Most of the soils tested by this firm would require the 95 percent compaction requirement.

All fill should be mechanically compacted in layers not more than 8 inches thick. All fill shall be compacted to at least 95 percent of the maximum laboratory density for the materials used.

The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. using the test method described in the most recent revision of ASTM D 1557.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until a minimum of 95 percent compaction is obtained.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills as long as any debris and/or organic matter is removed.

Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines so as to be relatively impermeable and result in a stable subgrade when compacted. Any required import materials should consist of geologic materials with an expansion index of less than 20. The water-soluble sulfate content of the import materials should be less than 0.1% percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained in order to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted to 95 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in accordance with the most recent revision of ASTM D-1557.

Wet Soils

Water was encountered in the borings at elevations ranging from 255 to 263 feet above mean sea level. The proposed excavation (including foundation elements) will extend to an elevation of 250 feet. The soil which will be exposed at the bottom of the excavation were above optimum moisture content - particularly below the depths that water was observed. It is anticipated that if any excavated material from the bottom of the excavation is to be placed as compacted fill, the soil will require significant drying and aeration prior to recompaction.

Pumping (yielding or vertical deflection) of the high-moisture content soils at the bottom of the excavation is not anticipated since relatively clean sand will be exposed at the bottom of the excavation. If pumping is encountered, angular minimum ¾-inch gravel and/or crushed concrete should be placed and worked into the subgrade. The exact thickness of the gravel would be a trial and error procedure, and would be determined in the field. It would likely be on the order of 1 to 2 feet thick.

The gravel will help to densify the subgrade as well as function as a stabilization material upon which heavy equipment may operate. It is not recommended that rubber tire construction equipment attempt to operate directly on the pumping subgrade soils prior to placing the gravel. Direct operation of rubber tire equipment on the soft subgrade soils will likely result in excessive disturbance to the soils, which in turn will result in a delay to the construction schedule since those disturbed soils would then have to be removed and properly recompacted. Extreme care should be utilized to place gravel as the subgrade becomes exposed.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between 5 and 10 percent should be anticipated when excavating and recompacting the existing fill and underlying native geologic materials on the site to an average comparative compaction of 92 percent.

Weather Related Grading Considerations

When rain is forecast all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping due to inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall, once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are considered to be a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by representatives of Geotechnologies, Inc. during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

FOUNDATION DESIGN

The proposed mixed-use structure may be supported on a mat foundation as long as the liquefiable soils are removed and the mat is supported on the dense, non-liquefiable soils found near the elevation of 250 feet. If silt or clay layers are identified at the base of the excavation, the excavation should be deepened to remove these layers.

It is anticipated that the mat foundation will have an average bearing pressure of 5,400 pounds per square foot with locally higher pressures needed. An average bearing capacity of 7,000 psf may be used with the maximum not exceeding 10,000 psf. The mat foundation may be designed utilizing a modulus of subgrade reaction of 350 pounds per cubic inch. This value is a unit value for use with a one-foot square footing. The modulus should be reduced in accordance with the following equation when used with larger foundations.

$$K = K_1 * [(B + 1) / (2 * B)]^2$$

where K = Reduced Subgrade Modulus
K_1 = Unit Subgrade Modulus
B = Foundation Width (feet)

Lateral Design for Mat Foundation

Resistance to lateral loading may be provided by soil friction, and by the passive resistance of the soils. A coefficient of friction of 0.4 may be used with the dead load forces between footings and the underlying supporting soils.

Passive earth pressure for the sides of footings poured against undisturbed soil may be computed as an equivalent fluid having a density of 500 pounds per cubic foot, with a maximum earth pressure of 5,000 pounds per square foot. When combining passive and friction for lateral resistance, the passive component should be reduced by one third. A one-third increase in the passive value may be used for wind or seismic loads. A minimum safety factor of 2 has been utilized in determining the allowable passive pressure.

Uplift Resistance

The mat foundation must be design to resist uplift caused by the historically highest groundwater table which may rise to an elevation 289 feet at its highest point on the site. Since the finish floor elevation will be near elevation 258 feet, a head of 31 feet should be considered in the design. If the building will be designed as entirely hydrostatic from the ground surface to the Finish Floor Elevation, the head should be on the order of 52 feet.

Mat Foundation Settlement

The majority of the foundation settlement is expected to occur on initial application of loading. The maximum initial settlement is not expected to exceed approximately 0.3 inch and will occur below the most heavily loaded area of the mat foundation. Differential settlement is not expected to exceed 0.5 inches.

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory geologic materials, if necessary. Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

RETAINING WALL DESIGN

Cantilever Retaining Walls

Cantilever retaining walls supporting a level backslope may be designed utilizing a triangular distribution of active earth pressure. Cantilever retaining walls may be designed utilizing the following tables:

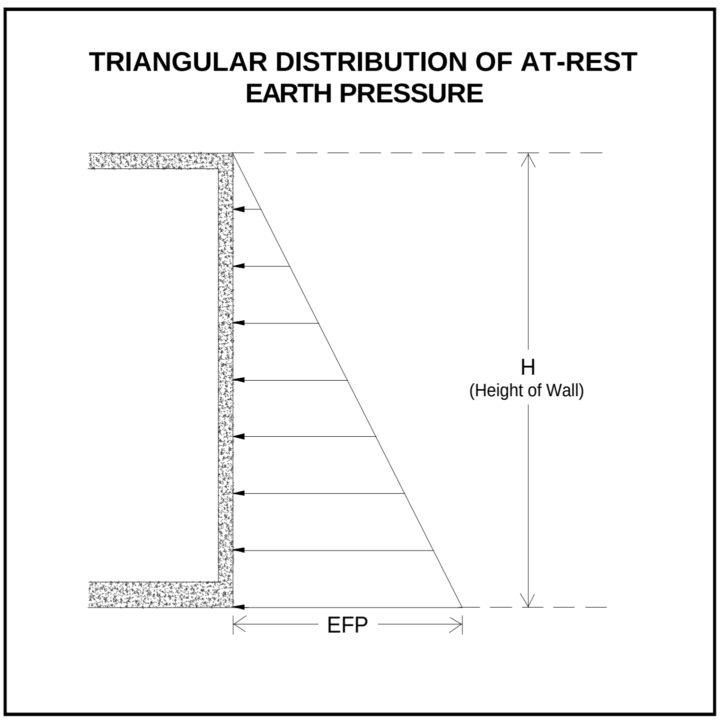
Total Height of Retaining Wall (H)	Cantilever Retaining Wall Above the Historically Highest Groundwater Level **with** Wall Subdrain System Triangular Distribution of Earth Pressure
H < = 10 feet	31 pcf
10 feet < H < = 20 feet	37 pcf

Total Height of Retaining Wall (H)	Cantilever Retaining Wall Below the Historically Highest Groundwater Level **without** Wall Subdrain System Triangular Distribution of Earth Pressure
20 feet < H < = 60 feet	21.1 pcf soil + 62.4 hydrostatic = 84 pcf

For this equivalent fluid pressure to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made. Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures. It should be noted that if the entire wall is not drained, then the hydrostatic pressure must be taken from the ground surface.

Restrained Drained Retaining Walls

Restrained retaining walls extending less than 20 feet below ground surface may be designed to resist a triangular pressure distribution of at-rest earth pressure as indicated in the diagram below. The at-rest pressure for design purposes is 45 pounds per cubic foot. Additional earth pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures.



In addition to the recommended earth pressure, the upper ten feet of the retaining wall adjacent to streets, driveways or parking areas should be designed to resist a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot surcharge behind the walls due to normal street traffic. If the traffic is kept back at least ten feet from the retaining walls, the traffic surcharge may be neglected.

The lateral earth pressures recommended above for retaining walls assume that a permanent drainage system will be installed so that external water pressure will not be developed against the walls. Also, where necessary, the retaining walls should be designed to accommodate any surcharge pressures that may be imposed by existing buildings on the adjacent property.

Retaining Wall Drainage

Retaining walls extending less than 20 feet below ground surface should be provided with a subdrain covered with a minimum of 12 inches of gravel, and a compacted fill blanket or other seal at the surface. The onsite geologic materials are acceptable for use as retaining wall backfill as long as they are compacted to a minimum of 95 percent of the maximum density as determined by the most recent revision of ASTM D 1557.

Certain types of subdrain pipe are not acceptable to the various municipal agencies. It is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

Where retaining walls are to be constructed adjacent to property lines there is usually not enough space for emplacement of a standard pipe and gravel drainage system. Under these circumstances, the use of a flat drainage product is acceptable. The City of Los Angeles permits the use of flat-drainage products only in addition to a conventional rock pocket and pipe collection system.

Where shoring will not allow the installation of a standard subdrainage system, outside-the-wall rock pockets may be utilized. The rock pockets with should drain through the wall. The pockets should be a minimum of 12 inches in length, width and depth. The pocket should be filled with gravel. The rock pockets should be spaced no more than 8 feet on center. It should be noted, subterranean car ramp walls should be connected to the drainage system.

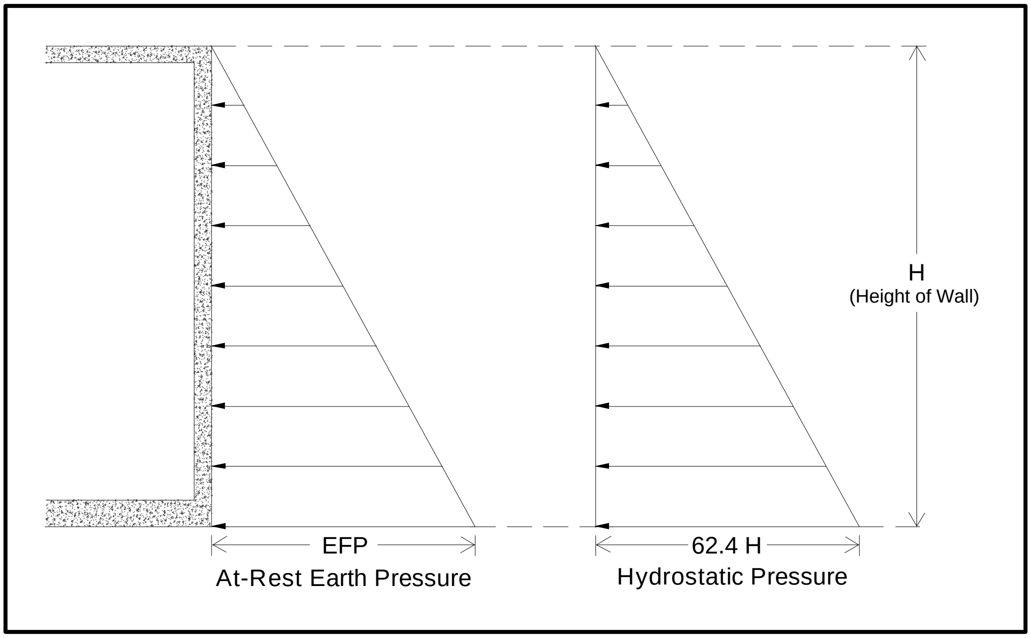
Sump Pump Design

The purpose of the recommended retaining wall backdrainage system is to relieve hydrostatic pressure. Groundwater was encountered during exploration at a depth of 47½ to 55 feet below grade and the historically highest groundwater is estimated at a depth of 20 feet below the ground surface.

For retaining walls extending a total length less than 20 feet below the ground surface, the water anticipated from the wall drainage system will be from rainfall, watering and leaky pipes. A pump capacity of 5 gallons per minute is considered sufficient.

Restrained Undrained Retaining Walls

Restrained retaining walls extending deeper than 20 feet below ground surface shall be designed to resist a triangular pressure distribution of at-rest earth pressure and hydrostatic pressure as indicated in the diagram below. The at-rest soils pressure for design purposes is 87 pounds per cubic foot which includes lateral hydrostatic pressure. Additional earth pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures.



In addition to the recommended earth pressure, the upper ten feet of the retaining wall adjacent to streets, driveways or parking areas should be designed to resist a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot surcharge behind the walls due to normal street traffic. If the traffic is kept back at least ten feet from the retaining walls, the traffic surcharge may be neglected.

The lateral earth pressures recommended above for undrained retaining walls assume that a permanent drainage system will not be provided. Where necessary, the retaining walls should be designed to accommodate any surcharge pressures that may be imposed by existing buildings on the adjacent property.

Dynamic (Seismic) Earth Pressure

Retaining walls exceeding 6 feet in height shall be designed to resist the additional earth pressure caused by seismic ground shaking. A triangular pressure distribution should be utilized for the additional seismic loads, with an equivalent fluid pressure of 27.3 pounds per cubic foot. When using the load combination equations from the building code, the seismic earth pressure should be combined with the lateral active earth pressure for analyses of restrained basement walls under seismic loading condition.

Surcharge from Adjacent Structures

As indicated herein, additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures for retaining walls and shoring design. The adjacent structures to the north and east of the site will, likely, apply a surcharge pressure.

The following surcharge equation provided in the LADBS Information Bulletin Document No. P/BC 2011-83, may be utilized to determine the surcharge loads on basement walls and shoring system for existing structures located within the 1:1 (h:v) surcharge influence zone of the excavation and basement.

Resultant lateral force: $R = (0.3*P*h^2)/(x^2+h^2)$

Location of lateral resultant: $d = x*[(x^2/h^2+1)*\tan^{-1}(h/x)-(x/h)]$

where:

R	=	resultant lateral force measured in pounds per foot of wall width.
P	=	resultant surcharge loads of continuous or isolated footings measured in pounds per foot of length parallel to the wall.
x	=	distance of resultant load from back face of wall measured in feet.
h	=	depth below point of application of surcharge loading to top of wall footing measured in feet.
d	=	depth of lateral resultant below point of application of surcharge loading measure in feet.
$\tan^{-1}(h/x)$	=	the angle in radians whose tangent is equal to h/x.

The structural engineer and shoring engineer may use this equation to determine the surcharge loads based on the loading of the adjacent structures located within the surcharge influence zone.

Waterproofing

Moisture affecting retaining walls is one of the most common post construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water inside the building. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

It is recommended that retaining walls be waterproofed. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Backfill

Any required backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 95 percent of the maximum density obtainable by the most recent revision of ASTM D 1557 method of compaction. Flooding should not be permitted. Compaction within 5 feet, measured horizontally, behind a retaining structure should be achieved by use of light weight, hand operated compaction equipment.

Proper compaction of the backfill will be necessary to reduce settlement of overlying walks and paving. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accept differential settlement, particularly at the points of entry to the structure.

TEMPORARY EXCAVATIONS

Depending on the foundation type selected, excavations may range from 50 to 65 feet in depth for construction of the subterranean garage levels, structural slab and foundation elements. The excavations are expected to expose fill and dense native soils, which are suitable for vertical excavations up to 5 feet where not surcharged by adjacent traffic or structures. Excavations which will be surcharged by adjacent traffic or structures should be shored.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 slope gradient to a maximum vertical height of 27 feet. A uniform sloped excavation is sloped from bottom to top and does not have a vertical component.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are strongly recommended along the tops of the slopes to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Temporary Dewatering

Currently it is proposed that the structure will extend to a depth up to 60 feet below existing site grades or elevation 250. Groundwater and perched groundwater is anticipated at a depth as shallow as 47½ feet (elevation 264 feet). As a result, up to 14 feet of dewatering is anticipated. A dewatering consultant should be retained for recommendations regarding temporary dewatering methods during construction. No estimate of the dewatering rate has presented in this report.

Where the exposed subgrade is wet, pumping may be encountered. Under these conditions please refer to the "Wet Soils" section of this report.

Dewatering Settlement

Dewatering will occur between elevation 264 to elevation 250 feet above mean sea level. The layer to be dewatered consists of stiff clayey silt that varies from elevation to 270 feet to 250 feet above mean sea level.

Structures whose underlying soils will be dewatered are located on the north, east and south sides of the site. The structures are described as follows:

North (950 North Broadway)

This is an at-grades 1-story high structure with and asphalt-paved parking lot on the east side of the site. The building appears to be constructed of wood and stucco and supported on convention spread footings. The finish floor elevation of the structure is approximately 312 feet above mean sea level.

East (1231 North Spring Street)

A 3 and 4-story high brick building occupies the western side of this property. The structure is likely supported on conventional spread footings. The eastern side and northern side are improved with at-grade paved parking. The site elevation is approximately 301 feet and the finish floor elevation of the structure is approximately 296 feet above mean sea level. The structure is composed of brick and built circa 1920's to 1930's. The structure has been recently remodeled and seismically retrofitted.

South (900 North Broadway "Blossom Plaza")

This is a 5-story, Type V, residential structure with a 3-level basement. The structure was completed around 2016. The structure is supported on ** conventional spread footings. The finish flor of the basement is approximately elevation 277 feet.

Settlement was calculated by assuming the dewatering will occur on the lower portion of the clayey silt layer. The water level of the site vicinity this has been at elevation 250 feet in historic times. It is assumed in the calculation that the settlement of the entire soil above the dewatered layer is complete. The dense sand below the elevation of 250 feet will not settle appreciably. The following settlement due to dewatering is anticipated:

BUILDING	DEWATERING SETTLEMENT (INCHES)	
	TOTAL	DIFFERNTIAL
North (950 North Broadway)	0.2	0.1
East (1231 North Spring Street)	0.2	0.1
South (900 North Broadway “Blossom Plaza”)	0.4	0.2

Excavation Observations

It is critical that the soils exposed in the cut slopes are observed by a representative of Geotechnologies, Inc. during excavation so that modifications of the slopes can be made if variations in the geologic material conditions occur. Many building officials require that temporary excavations should be made during the continuous observations of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

SHORING DESIGN

The following information on the design and installation of the shoring is as complete as possible at this time. It is suggested that Geotechnologies, Inc. review the final shoring plans and specifications prior to bidding or negotiating with a shoring contractor.

One method of shoring would consist of steel soldier piles, placed in drilled holes and backfilled with concrete. The soldier piles may be designed as cantilevers or laterally braced utilizing drilled tied-back anchors or raker braces.

Soldier Piles – Drilled and Poured

Drilled cast-in-place soldier piles should be placed no closer than 2 diameters on center. The minimum diameter of the piles is 18 inches. Structural concrete should be used for the soldier piles below the excavation; lean-mix concrete may be employed above that level. As an alternative, lean-mix concrete may be used throughout the pile where the reinforcing consists of a wideflange section. The slurry must be of sufficient strength to impart the lateral bearing pressure developed by the wideflange section to the geologic materials. For design purposes, an allowable passive value for the geologic materials below the bottom plane of excavation may be assumed to be 500 pounds per square foot per foot. To develop the full lateral value, provisions should be implemented to assure firm contact between the soldier piles and the undisturbed geologic materials.

Groundwater was encountered during exploration at a depth of 47½ feet below grade. Shoring piles will encounter water. Piles placed below the water level require the use of a tremie to place the concrete into the bottom of the hole. A tremie shall consist of a water-tight tube having a diameter of not less than 4 inches connected to a concrete pump. The tube shall be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie shall be supported so as to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of the work to prevent water entering the tube and shall be entirely sealed at all times, except when the concrete is being placed. The tremie tube shall be kept full of concrete. The flow shall be continuous until the work is completed and the resulting concrete seal shall be monolithic and homogeneous. The tip of the tremie tube shall always be kept about five feet below the surface of the concrete and definite steps and safeguards should be taken to insure that the tip of the tremie tube is never raised above the surface of the concrete.

A special concrete mix should be used for concrete to be placed below water. The design shall provide for concrete with a strength p.s.i. of 1,000 over the initial job specification. An admixture that reduces the problem of segregation of paste/aggregates and dilution of paste shall be included. The slump shall be commensurate to any research report for the admixture, provided that it shall also be the minimum for a reasonable consistency for placing when water is present.

Casing may be required should caving be experienced in the granular (saturated) geologic materials. If casing is used, extreme care should be employed so that the pile is not pulled apart as the casing is withdrawn. At no time should the distance between the surface of the concrete and the bottom of the casing be less than 5 feet.

The use of drilling polymer may also be utilized for mitigation of groundwater and caving during the drilling of soldier piles. If drilling polymer is utilized during construction, concrete should be tremied into the hole to displace the polymer fluid during the concrete pouring operation. At no time should the distance between the end of the tremie pipe and the top of the concrete be less than 5 feet.

The frictional resistance between the soldier piles and retained geologic material may be used to resist the vertical component of the anchor load. The coefficient of friction may be taken as 0.35 based on uniform contact between the steel beam and lean-mix concrete and retained earth. The portion of soldier piles below the plane of excavation may also be employed to resist the downward loads. The downward capacity may be determined using a frictional resistance of 450 pounds per square foot. The minimum depth of embedment for shoring piles is 5 feet below the bottom of the footing excavation or 7 feet below the bottom of excavated plane whichever is deeper.

Lagging

Soldier piles and anchors should be designed for the full anticipated pressures. Due to arching in the geologic materials, the pressure on the lagging will be less. It is recommended that the lagging should be designed for the full design pressure but be limited to a maximum of 400 pounds per square foot. It is recommended that a representative of this firm observe the installation of lagging to insure uniform support of the excavated embankment.

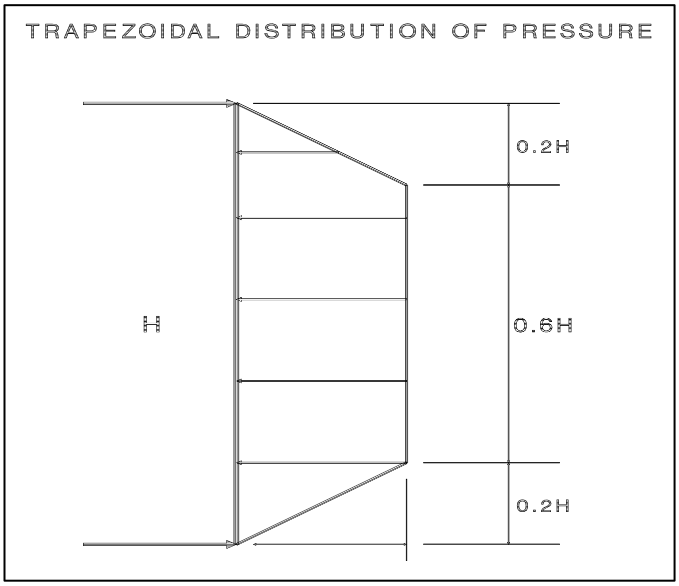
Lateral Pressures

Cantilevered shoring supporting a level backslope may be designed utilizing a triangular distribution of pressure as indicated in the following table:

HEIGHT OF SHORING "H" (feet)	EQUIVALENT FLUID PRESSURE (pounds per cubic foot)
less than 30	31
30 to 40	32
40 to 50	33
50 to 70	34

Where a combination of sloped embankment and shoring is utilized, the pressure will be greater and must be determined for each combination. Additional active pressure should be applied where the shoring will be surcharged by adjacent traffic or structures. Where a combination of sloped embankment and shoring is utilized, the pressure will be greater and must be determined for each combination.

A trapezoidal distribution of lateral earth pressure would be appropriate where shoring is to be restrained at the top by bracing or tie backs, with the trapezoidal distribution as shown in the diagram below.



Restrained shoring supporting a level backslope may be designed utilizing a trapezoidal distribution of pressure as indicated in the following table:

HEIGHT OF SHORING "H" (feet)	DESIGN SHORING FOR (Where H is the height of the wall)
Less than 30	20H
30 to 40	21H
40 to 50	21H
50 to 70	22H

Where a combination of sloped embankment and shoring is utilized, the pressure will be greater and must be determined for each combination. Additional active pressure should be applied where the shoring will be surcharged by adjacent traffic or structures. Where a combination of sloped embankment and shoring is utilized, the pressure will be greater and must be determined for each combination.

Tied-Back Anchors

Tied-back anchors may be used to resist lateral loads. Friction anchors are recommended. For design purposes, it may be assumed that the active wedge adjacent to the shoring is defined by a plane drawn 35 degrees with the vertical through the bottom plane of the excavation. Friction anchors should extend a minimum of 20 feet beyond the potentially active wedge. Anchors should be placed at least 6 feet on center to be considered isolated.

Drilled friction anchors may be designed for a skin friction of 550 pounds per square foot. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads. Where belled anchors are utilized, the capacity of belled anchors may be designed by applying the skin friction over the surface area of the bonded anchor shaft. The diameter of the bell may be utilized as the diameter of the bonded anchor shaft when determining the surface area. This implies that in order for the belled anchor to fail, the entire parallel soil column must also fail.

Depending on the techniques utilized, and the experience of the contractor performing the installation, it is anticipated that a skin friction of 2,500 pounds per square foot could be utilized for post-grouted anchors. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads.

Anchor Installation

Tied-back anchors may be installed between 20 and 40 degrees below the horizontal. Caving of the anchor shafts, particularly within saturated sand deposits, should be anticipated and the following provisions should be implemented in order to minimize such caving. The anchor shafts should be filled with concrete by pumping from the tip out, and the concrete should extend from the tip of the anchor to the active wedge. In order to minimize the chances of caving, it is recommended that the portion of the anchor shaft within the active wedge be backfilled with sand before testing the anchor. This portion of the shaft should be filled tightly and flush with the face of the excavation. The sand backfill should be placed by pumping; the sand may contain a small amount of cement to facilitate pumping.

Tieback Anchor Testing

At least 10 percent of the anchors should be selected for "quick", 200 percent tests. It is recommended that at least three anchors be selected for 24-hour, 200 percent tests. It is recommended that the 24-hour tests be performed prior to installation of additional tiebacks. The purpose of the 200 percent tests is to verify the friction value assumed in design. The anchors should be tested to develop twice the assumed friction value. Where satisfactory tests are not achieved on these initial anchors, the anchor diameter and/or length should be increased until satisfactory test results are obtained.

The total deflection during the 24-hour 200 percent test should not exceed 12 inches. During the 24-hour tests, the anchor deflection should not exceed 0.75 inches measured after the 200 percent test load is applied.

For the "quick" 200 percent tests, the 200 percent test load should be maintained for 30 minutes. The total deflection of the anchor during the 200 percent quick tests should not exceed 12 inches; the deflection after the 200 percent load has been applied should not exceed 0.25 inch during the 30-minute period.

All of the remaining anchors should be tested to at least 150 percent of design load. The total deflection during the 150 percent test should not exceed 12 inches. The rate of creep under the 150 percent test load should not exceed 0.1 inch over a 15 minute period in order for the anchor to be approved for the design loading.

After a satisfactory test, each anchor should be locked-off at the design load. This should be verified by rechecking the load in the anchor. The load should be within 10 percent of the design load. Where satisfactory tests are not attained, the anchor diameter and/or length should be increased or additional anchors installed until satisfactory test results are obtained. Where post-grouted anchors are utilized, additional post-grouting may be required. The installation and testing of the anchors should be observed by a representative of the soils engineer.

Raker Brace Foundations

An allowable bearing pressure of 3,000 pounds per square foot may be used for the design a raker foundations embedded in granular soil deeper than 60 feet below ground surface. This bearing pressure is based on a raker foundation a minimum of 4 feet in width and length as well as 4 feet in depth. The base of the raker foundations should be horizontal. Care should be employed in the positioning of raker foundations so that they do not interfere with the foundations for the proposed structure.

Deflection

It is difficult to accurately predict the amount of deflection of a shored embankment. It should be realized that some deflection will occur. It is estimated that the deflection could be on the order of ½ inch at the top of the shored embankment. If greater deflection occurs during construction, additional bracing may be necessary to minimize settlement of adjacent buildings and utilities in adjacent street and alleys. If desired to reduce the deflection, a greater active pressure could be used in the shoring design.

The City of Los Angeles Department of Building and Safety requires limiting shoring deflection to ½ inch at the top of the shored embankment where a structure is within a 1:1 plane projected up from the base of the excavation. A maximum deflection of 1-inch is allowed provided there are no structures within a 1:1 plane drawn upward from the base of the excavation.

Monitoring

Because of the depth of the excavation, some mean of monitoring the performance of the shoring system is suggested. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of all soldier piles and the lateral movement along the entire lengths of selected soldier piles. Also, some means of periodically checking the load on selected anchors will be necessary, where applicable.

Some movement of the shored embankments should be anticipated as a result of the relatively deep excavation. It is recommended that photographs of the existing buildings on the adjacent properties be made during construction to record any movements for use in the event of a dispute.

Shoring Observations

It is critical that the installation of shoring is observed by a representative of Geotechnologies, Inc. Many building officials require that shoring installation should be performed during continuous observation of a representative of the geotechnical engineer. The observations insure that the recommendations of the geotechnical report are implemented and so that modifications of the recommendations can be made if variations in the geologic material or groundwater conditions warrant. The observations will allow for a report to be prepared on the installation of shoring for the use of the local building official, where necessary.

OUTDOOR CONCRETE FLATWORK

Outdoor concrete flatwork should be a minimum of 4 inches in thickness. Outdoor concrete flatwork should be cast over undisturbed alluvial soils or properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 95 percent of the maximum dry density.

Concrete Crack Control

For standard control of concrete cracking, a maximum crack control joint spacing of 10 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soils beneath outdoor flatwork such as walkways or patio areas, is not required, however, due to the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. In order to provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to 95 percent relative compaction.

Flatwork Reinforcing

Outdoor flatwork should be reinforced with a minimum of #3 steel bars on 18-inch centers each way.

PAVEMENTS

Prior to placing paving, the existing grade should be scarified to a depth of 12 inches, moistened as required to obtain optimum moisture content, and recompacted to 90 percent of the maximum density as determined by the most recent revision of ASTM D 1557. The client should be aware that removal of all existing fill in the area of new paving is not required, however, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs.

Due to a wide variation which may occur during the grading process, it is recommended that R-value tests be performed near the completion of grading in order to ascertain the subgrade conditions prior to paving. The recommended paving sections shall be considered preliminary and are subject revision. For preliminary design purposes, an R-value of 30 was assumed. A preliminary paving section is provided in the following table for traffic indexes of 4, 6, and 8:

Service	**Asphalt Pavement Thickness Inches**	**Base Course Inches**
Passenger Cars (TI=4)	3	5
Moderate Truck (TI=6)	4	8
Heavy Trucks (TI=8)	5	11

Aggregate base should be compacted to a minimum of 95 percent of the most recent revision of ASTM D 1557 laboratory maximum dry density. Base materials should consist of Crushed Aggregate Base in conformance with Section 200-2.2 of the most recent edition of “Standard Specifications for Public Works Construction”, (Green Book). Crushed Misc. Base is addressed in Section 200-2.4.

Concrete paving may be used on the project. Based on the highway design manual for Traffic Index of 6, concrete paving should be 6 inches of concrete over 4 inches of compacted base. A subgrade modulus of 150 pounds per cubic inch may be assumed for design of concrete paving. For standard control of concrete cracking, a maximum crack control joint spacing of 10 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Concrete paving should be reinforced with a minimum of #4 steel bars on 16-inch centers each way. Construction joints should be designed by a structural engineer.

The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

The performance of pavement is highly dependent upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade materials and subsequent pavement distress. If planter islands are planned, the perimeter curb should extend a minimum of 12 inches below the bottom of the aggregate base.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage, with the exception of any required to disposed of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices. The proposed structure should be provided with roof drainage. Discharge from downspouts, roof drains and scuppers should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

STORMWATER DISPOSAL

Introduction

Recently regulatory agencies have been requiring the disposal of a certain amount of stormwater generated on a site by infiltration into the site soils. Increasing the moisture content of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. This means that any overlying structure, including buildings, pavements and concrete flatwork, could sustain damage due to saturation of the subgrade soils. Structures serviced by subterranean levels could be adversely impacted by stormwater disposal by increasing the design fluid pressures on retaining walls and causing leaks in the walls. Proper site drainage is critical to the performance of any structure in the built environment.

Infiltration of stormwater into onsite soils is not considered feasible by this firm. Where percolation of stormwater into the subgrade soils is not advisable, most Building Officials have allowed the stormwater to be filtered through soils in planter areas. Once the water has been filtered through a planter it may be released into the storm drain system. It is recommended that overflow pipes are incorporated into the design of the discharge system in the planters to prevent flooding. In addition, the planters shall be sealed and waterproofed to prevent leakage. Please be advised that adverse impact to landscaping and periodic maintenance may result due to excessive water and contaminants discharged into the planters.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review provides assistance to the design team by providing specific recommendations for particular cases, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein are satisfied.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction are considered to be a continuation of the geotechnical investigation. It is critical that this firm review the geotechnical aspects of the project during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise Geotechnologies, Inc. at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify Geotechnologies, Inc. immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

EXCAVATION CHARACTERISTICS

The exploration performed for this investigation is limited to the geotechnical excavations described. Direct exploration of the entire site would not be economically feasible. The owner, design team and contractor must understand that differing excavation and drilling conditions may be encountered based on boulders, gravel, oversize materials, groundwater and many other conditions. Fill materials, especially when they were placed without benefit of modern grading codes, regularly contain materials which could impede efficient grading and drilling. Excavation and drilling in these areas may require full size equipment and coring capability. The contractor should be familiar with the site and the geologic materials in the vicinity.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology and were prepared in accordance with generally accepted geotechnical engineering practice. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the geologic conditions do not deviate from those disclosed in the investigation. If any variations are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geotechnologies, Inc. should be notified so that supplemental recommendations can be prepared.

This report is issued with the understanding that it is the responsibility of the owner, or the owner's representatives, to ensure that the information and recommendations contained herein are brought to the attention of the project architect and engineer and are incorporated into the plans. The owner is also responsible to see that the contractor and subcontractors carry out the geotechnical recommendations during construction.

The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside control of this firm. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Geotechnical observations and testing during construction is considered to be a continuation of the geotechnical investigation. It is, therefore, most prudent to employ the consultant performing the initial investigative work to provide observation and testing services during construction. This practice enables the project to flow smoothly from the planning stages through to completion.

Should another geotechnical firm be selected to provide the testing and observation services during construction, that firm should prepare a letter indicating their assumption of the responsibilities of geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for review. The letter should acknowledge the concurrence of the new geotechnical engineer with the recommendations presented in this report.

The City of Los Angeles does not require corrosion testing. However, if corrosion sensitive improvements are planned, it is recommended that a comprehensive corrosion study should be commissioned. The study will develop recommendations to avoid premature corrosion of buried pipes and concrete structures in direct contact with the soils.

EXCLUSIONS

Geotechnologies, Inc. does not practice in the fields of methane gas, radon gas, environmental engineering, waterproofing, dewatering organic substances or the presence of corrosive soils or wetlands which could affect the proposed development including mold and toxic mold. Nothing in this report is intended to address these issues and/or their potential effect on the proposed development. A competent professional consultant should be retained in order to address environmental issues, waterproofing, organic substances and wetlands which might affect the proposed development.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification system. The field classification is verified in the laboratory, also in accordance with the Unified Soil Classification System. Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the excavation logs.

Samples of the geologic materials encountered in the exploratory excavations were collected and transported to the laboratory. Undisturbed samples of soil are obtained at frequent intervals. Unless noted on the excavation logs as an SPT sample, samples acquired while utilizing a hollow-stem auger drill rig are obtained by driving a thin-walled, California Modified Sampler with successive 30-inch drops of a 140-pound hammer. The soil is retained in brass rings of 2.50 inches outside diameter and 1.00 inch in height. The central portion of the samples are stored in close fitting, waterproof containers for transportation to the laboratory. Samples noted on the excavation logs as SPT samples are obtained in accordance with the most recent revision of ASTM D 1586. Samples are retained for 30 days after the date of the geotechnical report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples by the most recent revision of ASTM D 4959 or ASTM D 4643. This information is useful in providing a gross picture of the soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the “Excavation Logs”, A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed by the most recent revision of ASTM D 3080 with a strain controlled, direct shear machine manufactured by Soil Test, Inc. or a Direct Shear Apparatus manufactured by GeoMatic, Inc. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagram," B-Plates.

The most recent revision of ASTM 3080 limits the particle size to 10 percent of the diameter of the direct shear test specimen. The sheared sample is inspected by the laboratory technician running the test. The inspection is performed by splitting the sample along the sheared plane and observing the soils exposed on both sides. Where oversize particles are observed in the shear plane, the results are discarded and the test run again with a fresh sample.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made on the basis of the consolidation tests using the most recent revision of ASTM D 2435. The consolidation apparatus is designed to receive a single one-inch high ring. Loads are applied in several increments in a geometric progression, and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. Samples are generally tested at increased moisture content to determine the effects of water on the bearing soil. The normal pressure at which the water is added is noted on the drawing. Results are plotted on the "Consolidation Test," C-Plates.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined by use of the most recent revision of ASTM D 1557. A soil at a selected moisture content is placed in five layers into as mold of given dimensions, with each layer compacted by 25 blows of a 10 pound hammer dropped from a distance of 18 inches subjecting the soil to a total compactive effort of about 56,000 pounds per cubic foot. The resulting dry unit weight is determined. The procedure is repeated for a sufficient number of moisture contents to establish a relationship between the dry unit weight and the water content of the soil. The data when plotted represent a curvilinear relationship known as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve. Results are presented in Plate D of this report.

Expansion Index Testing

The expansion tests performed on the remolded samples are in accordance with the Expansion Index testing procedures, as described in the most recent revision of ASTM D4829. The soil sample is compacted into a metal ring at a saturation degree of 50 percent. The ring sample is then placed in a consolidometer, under a vertical confining pressure of 1 lbf/square inch and inundated with distilled water. The deformation of the specimen is recorded for a period of 24 hour or until the rate of deformation becomes less than 0.0002 inches/hour, whichever occurs first. The expansion index, EI, is determined by dividing the difference between final and initial height of the ring sample by the initial height, and multiplied by 1,000. Results are presented in Plate D of this report.

Grain Size Distribution

These tests cover the quantitative determination of the distribution of particle sizes in soils. Sieve analysis is used to determine the grain size distribution of the soil larger than the Number 200 sieve. The most recent revision of ASTM D 422 is used to determine particle sizes smaller than the Number 200 sieve. Results from the Number 200 sieve test are presented in Plate E of this report.

Atterberg Limits

ASTM D 4318 is used to determine the liquid limits, plastic limits, and plasticity index of a soil. These test methods are used to characterize the fine grained fractions of the soil. Results from Atterberg Limits tests are presented in Plate F of this report.

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U.S. Department of the Interior, U.S. Geological Survey, Preliminary Geologic Map of the Los Angeles 30' x 60' Quadrangle, Southern California, Version 1.0, 2005, Compiled by Robert F. Yerkes and Russell H. Campbell.

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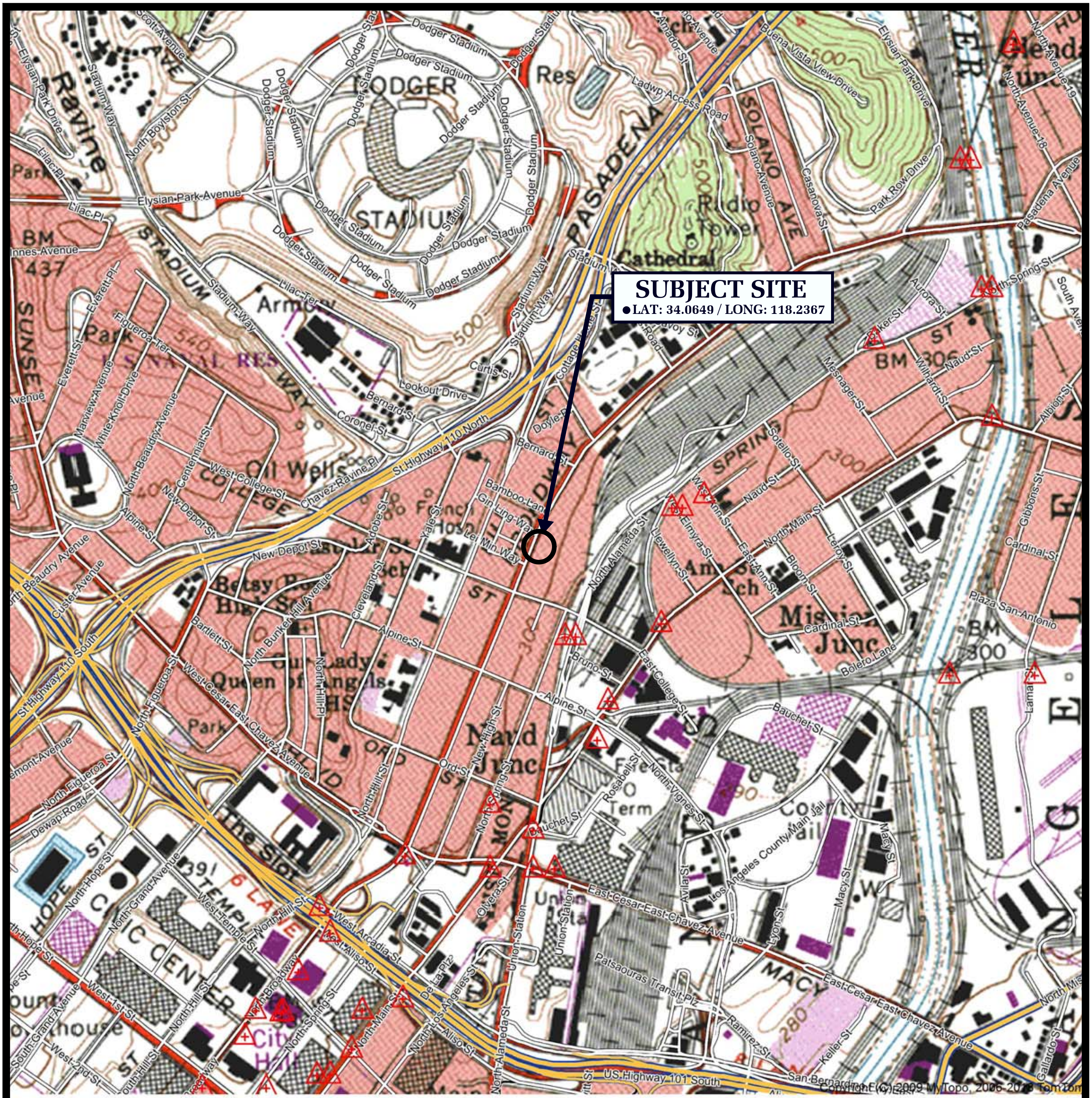


SCALE 1:12000

0.0 0.1 0.2 0.3 0.4 0.5 0.6
MILES

0 1000 2000 3000
FFFT

N

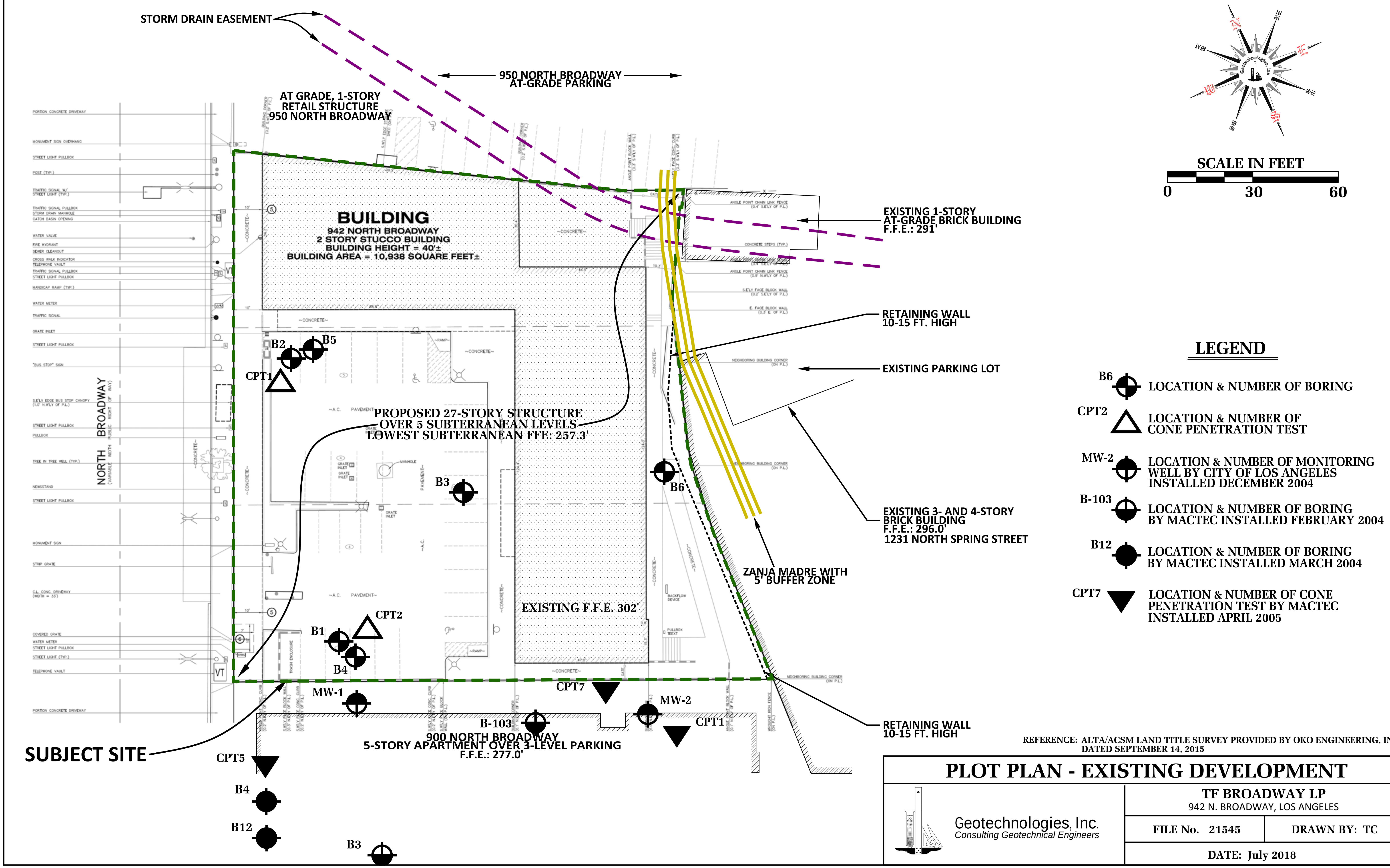
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES, BALDWIN PARK, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



REFERENCE: ALTA/ACSM LAND TITLE SURVEY PROVIDED BY OKO ENGINEERING, INC. DATED SEPTEMBER 14, 2015

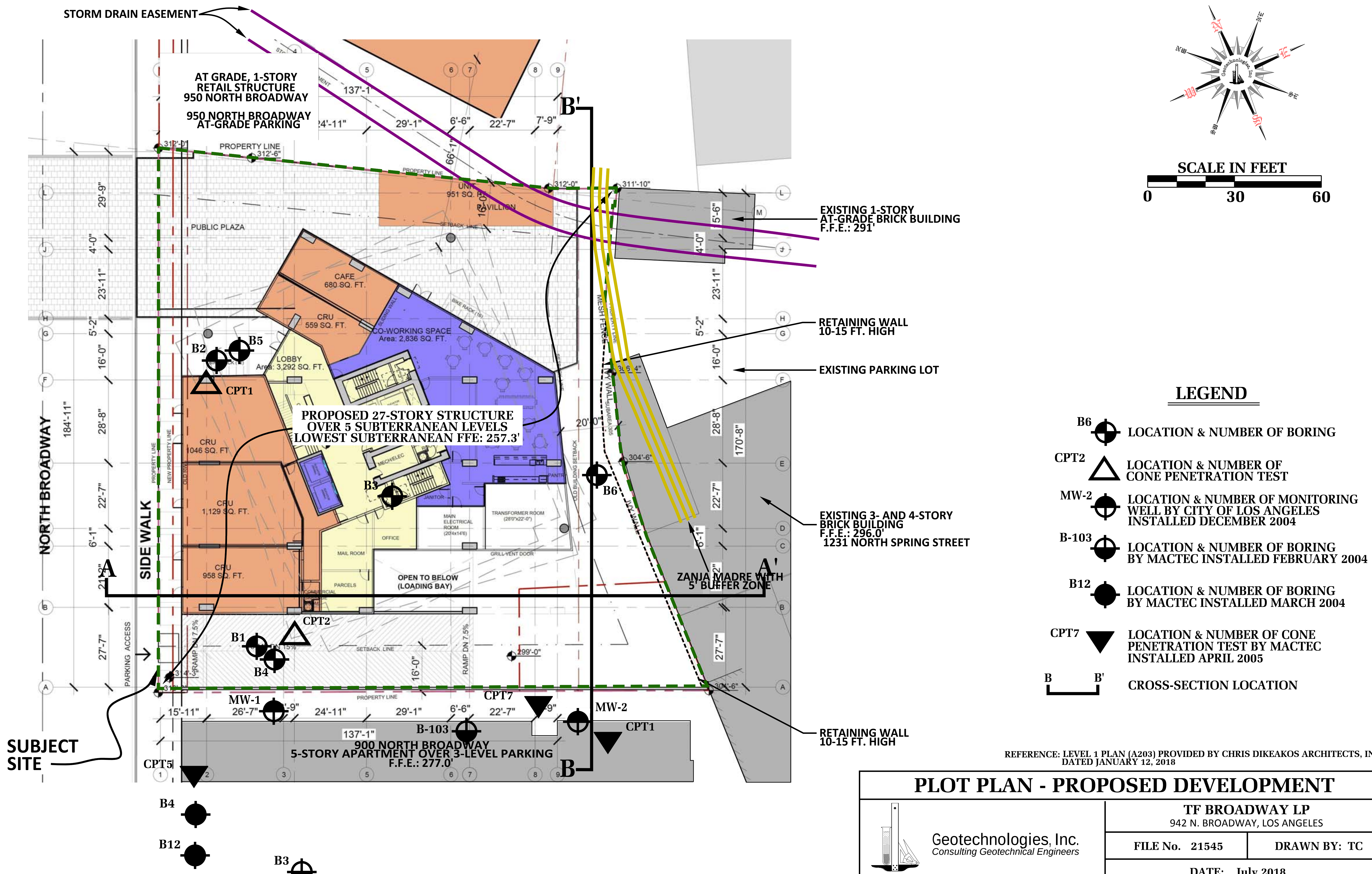
PLOT PLAN - EXISTING DEVELOPMENT

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE No. 21545 | DRAWN BY: TC

DATE: July 2018



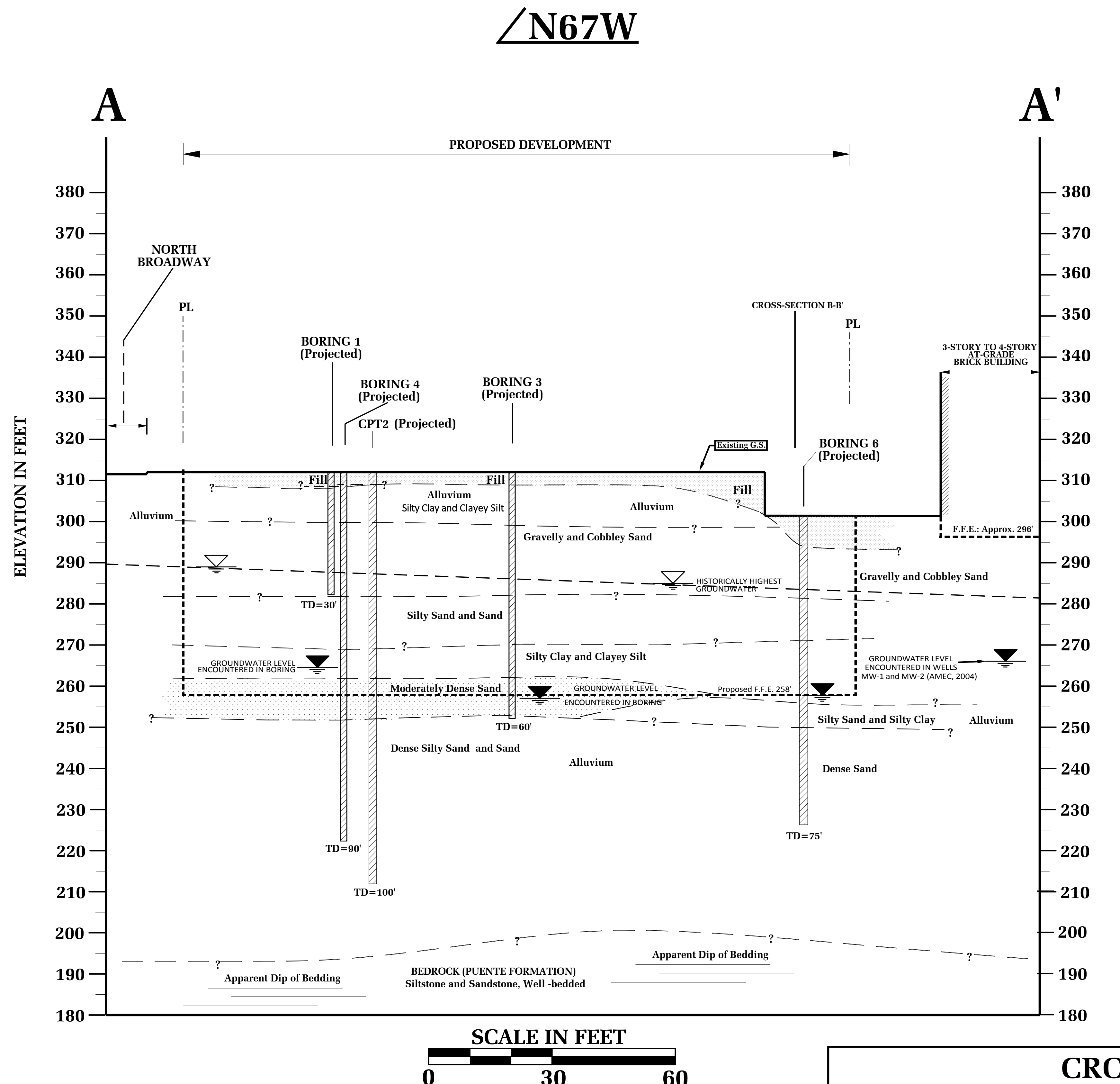
REFERENCE: LEVEL 1 PLAN (A203) PROVIDED BY CHRIS DIKEAKOS ARCHITECTS, INC. DATED JANUARY 12, 2018

PLOT PLAN - PROPOSED DEVELOPMENT

Geotechnologies, Inc.
Consulting Geotechnical Engineers

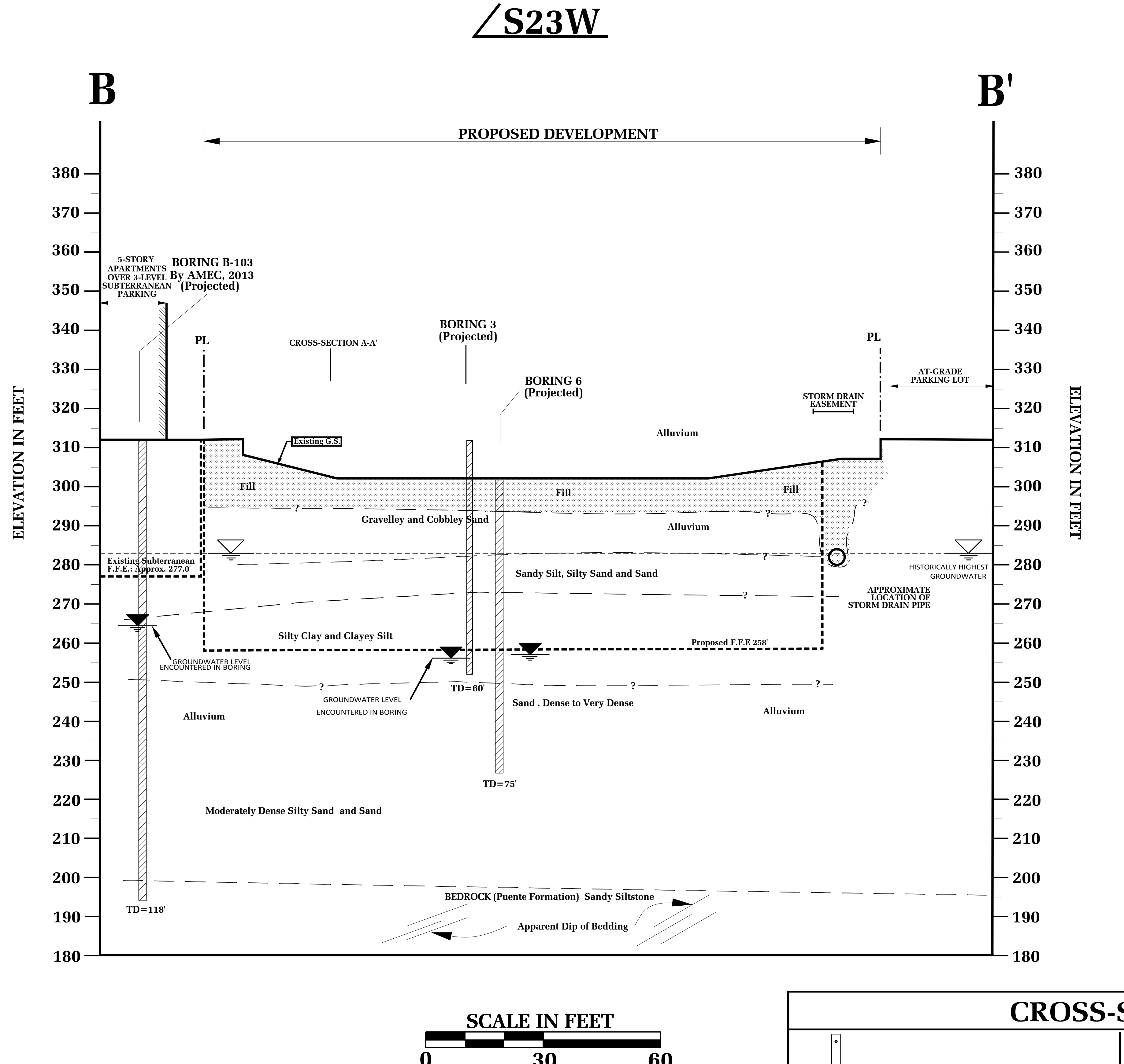
TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE No. 21545	DRAWN BY: TC
DATE: July 2018	



REFERENCE: LEVEL 1 PLAN (A203) PROVIDED BY CHRIS DIKEAKOS ARCHITECTS, INC.
DATED JANUARY 12, 2018

CROSS-SECTION A-A'		
Geotechnologies, Inc. Consulting Geotechnical Engineers	TF BROADWAY LP 942 N. BROADWAY, LOS ANGELES	
	FILE No. 21545	DRAWN BY: TC
	DATE: April 2018	



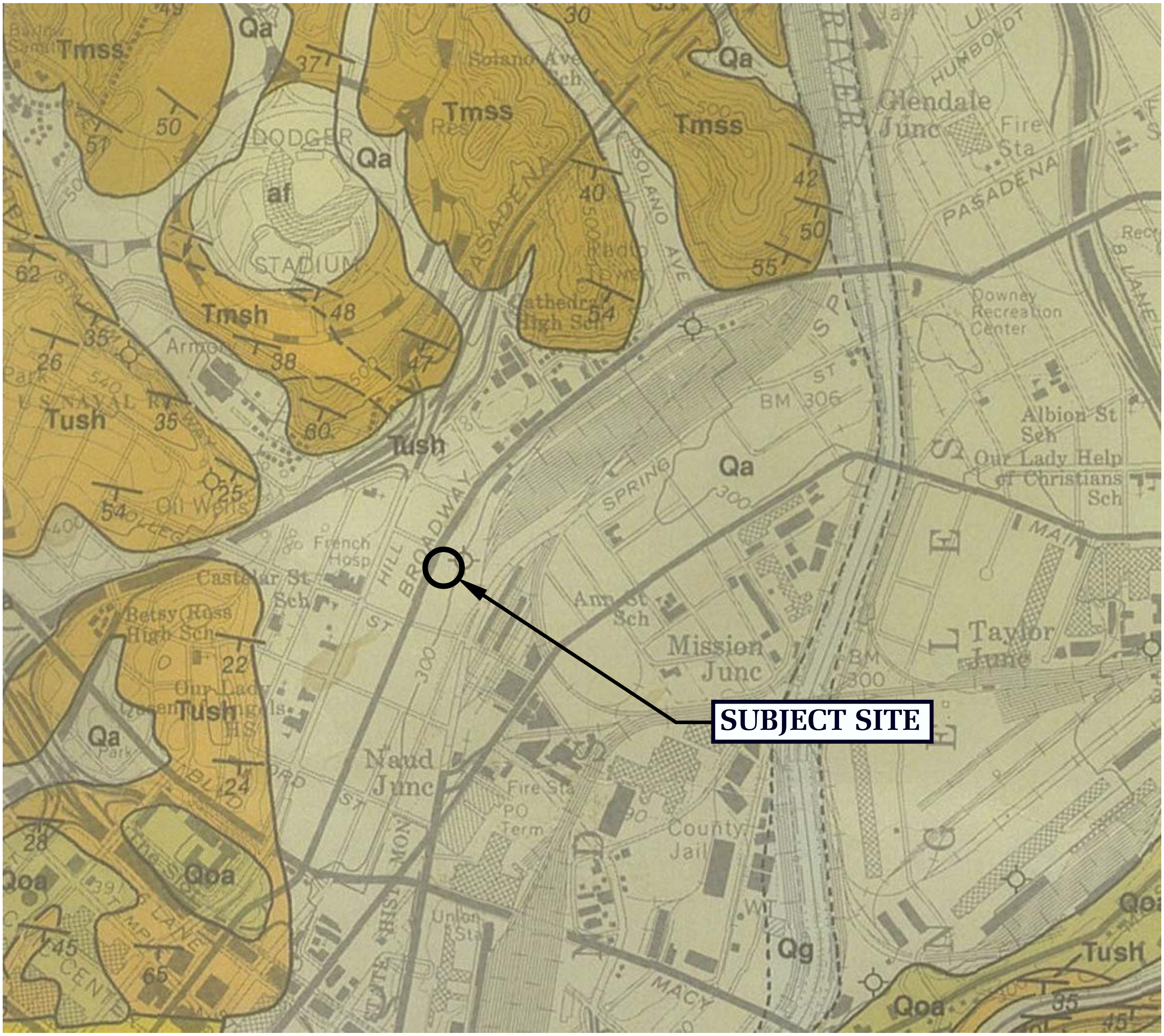
REFERENCE: LEVEL 1 PLAN (A203) PROVIDED BY CHRIS DIKEAKOS ARCHITECTS, INC.
DATED JANUARY 12, 2018

CROSS-SECTION B-B'

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE No. 21545	DRAWN BY: TC
DATE: April 2018	



SCALE IN FEET

0 500 1000 2000

LEGEND

af: Surficial Sediments: artificial cut & fill
Qa: Surficial Sediments: alluvium, unconsolidated floodplain deposits of silt, sand and gravel
Qg: Surficial Sediments: stream channel deposits of gravel, sand and silt
Qoa: Older Dissected Surficial Sediments: remanants of older weakly consolidated alluvial deposits of gravel, sand and silt
Tmsh: Monterey Formation: white-weathering, thin bedded, platy, siliceous shale, locally porcelaneous and silty; Mohnian Stage
Tmss: Monterey Formation: tan to light gray semi-friable arkosic sandstone; includes some interbedded silty shale
Tush: Unnamed Shale: gray to light brown, thin bedded, silty clay shale, locally contains scattered large calcareous nodules; in places contains thin lenses of light tan, platy, semi-siliceous or diatomaceous shale

N

REFERENCE: DIBBLEE, T.W., (1989) GEOLOGIC MAP OF THE LOS ANGELES QUADRANGLES (#DF-22)

LOCAL GEOLOGIC MAP - DIBBLEE

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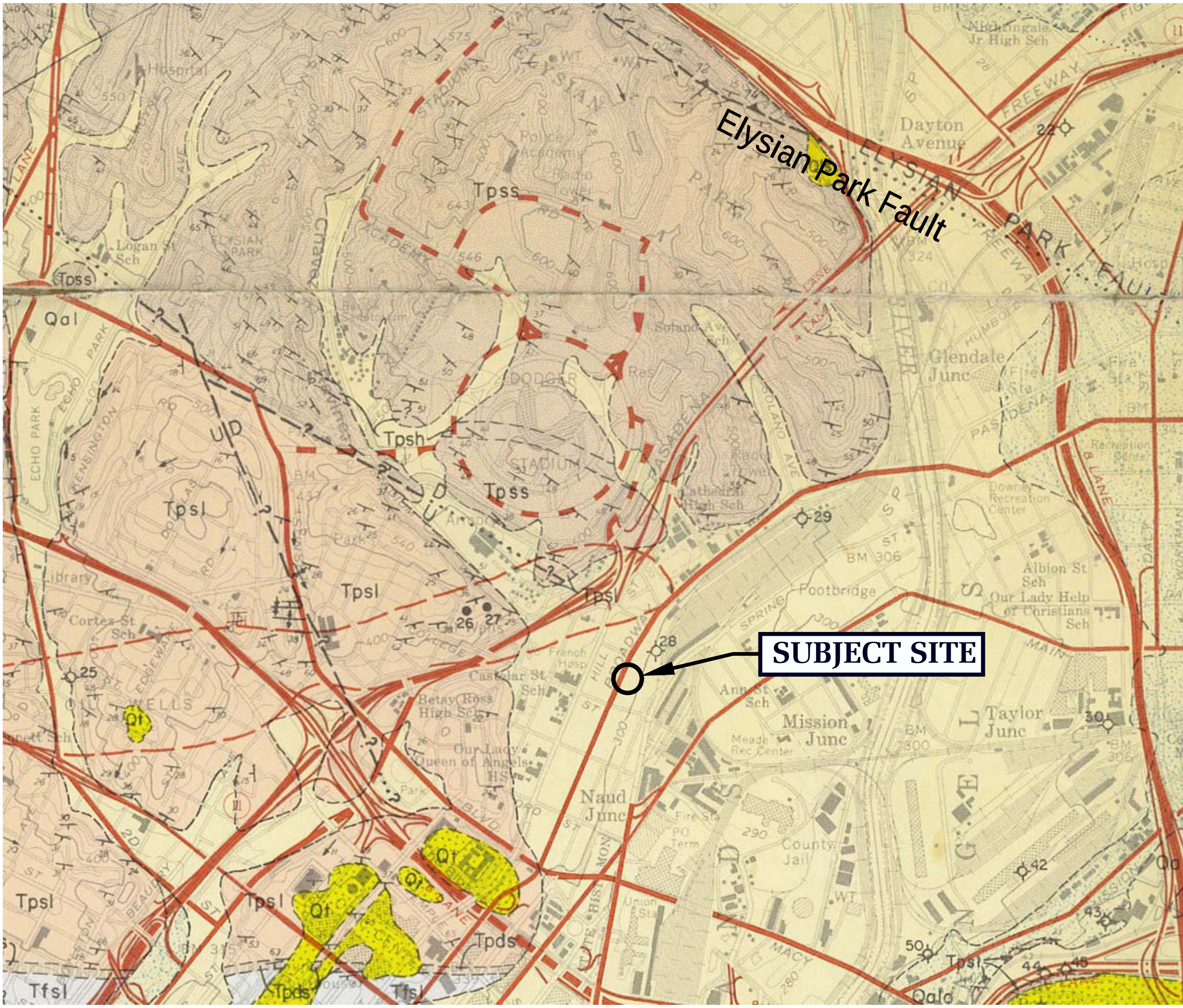
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



SCALE IN FEET

0 500 1000 2000

LEGEND

Qal: Alluvial - silt, sand & gravel

Qalo: Old Alluvium - silt, sand & gravel forming dissected alluvial plain and alluvial terrace deposits

Qt: Terrace Deposits - silt, sand & gravel forming alluvial terrace and dissected alluvial plain deposits

Tpsl: Puente Formation - siltstone, well bedded, light brown & light gray

Tpsh: Puente Formaiton - shale, well bedded, light gray, siliceous

Tpds: Puente Formation - diatomaceous shale, punky, dull white

Tpss: Puente Formation - sandstone, well bedded, medium- to coarse-grained, light borwn to gray

Folds - arrow on axial trace of fold indicates direction of plunge

Fault - dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful

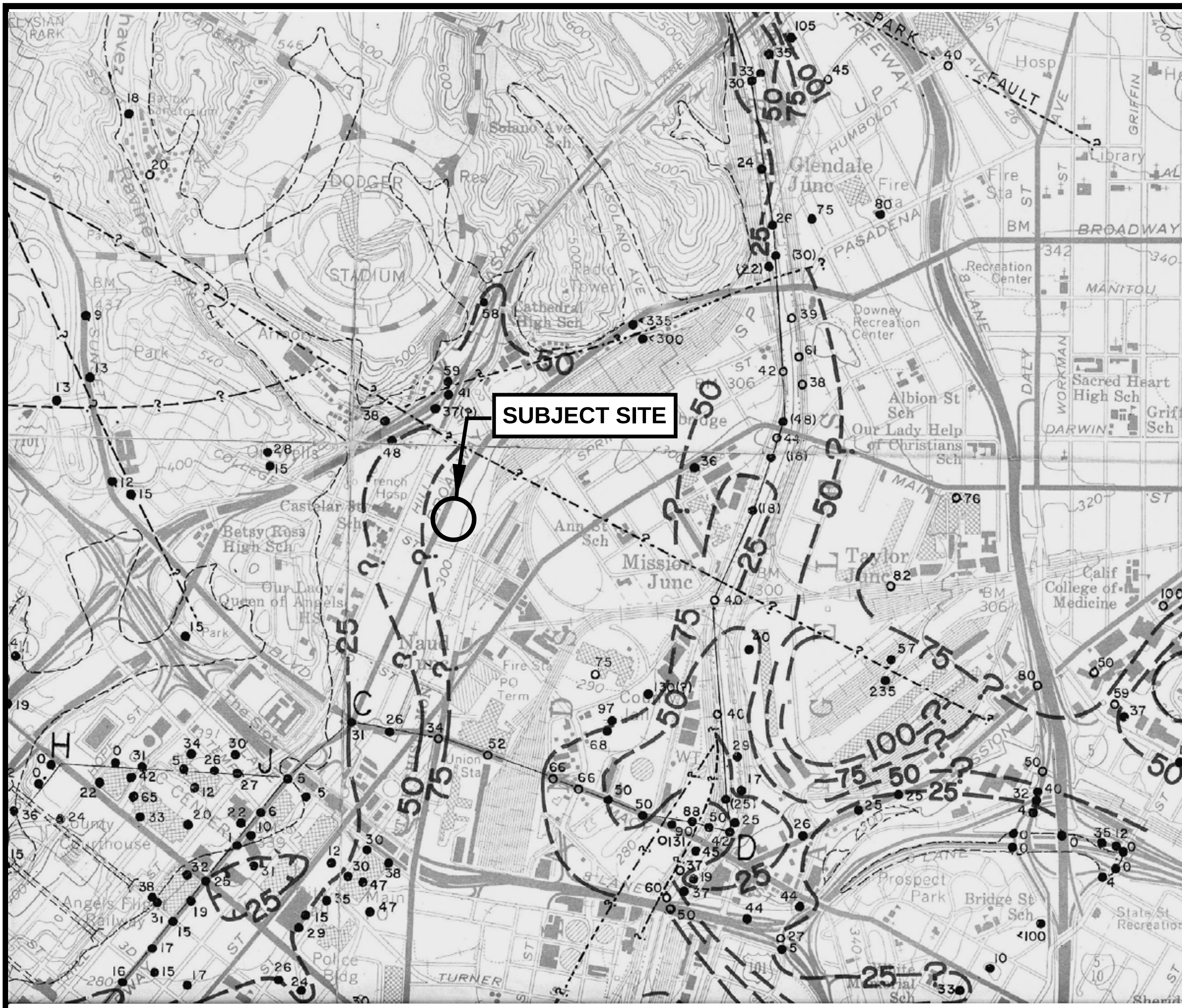
REFERENCE: DIBBLEE, T.W., (1989) GEOLOGIC MAP OF THE LOS ANGELES QUADRANGLES (#DF-22)

LOCAL GEOLOGIC MAP - LAMAR

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



SCALE IN FEET

0 500 1000 2000

LEGEND

Qal: Alluvium - Silt, Sand and Gravel

Qalo: Old alluvium - terrace deposits

Tpss: Sandstone, hard and well cemented

Oil field

—·—·—? Unamed fault, queried where location doubtful

REFERENCE: YERKES, TINSLEY, WILLIAMS, McMANUS; ASPECTS OF TUNNELING (DEPTH OF BEDROCK), 1977 (USCG MF-866, SHEET 2 OF 5)

LOCAL GEOLOGIC MAP - YERKES

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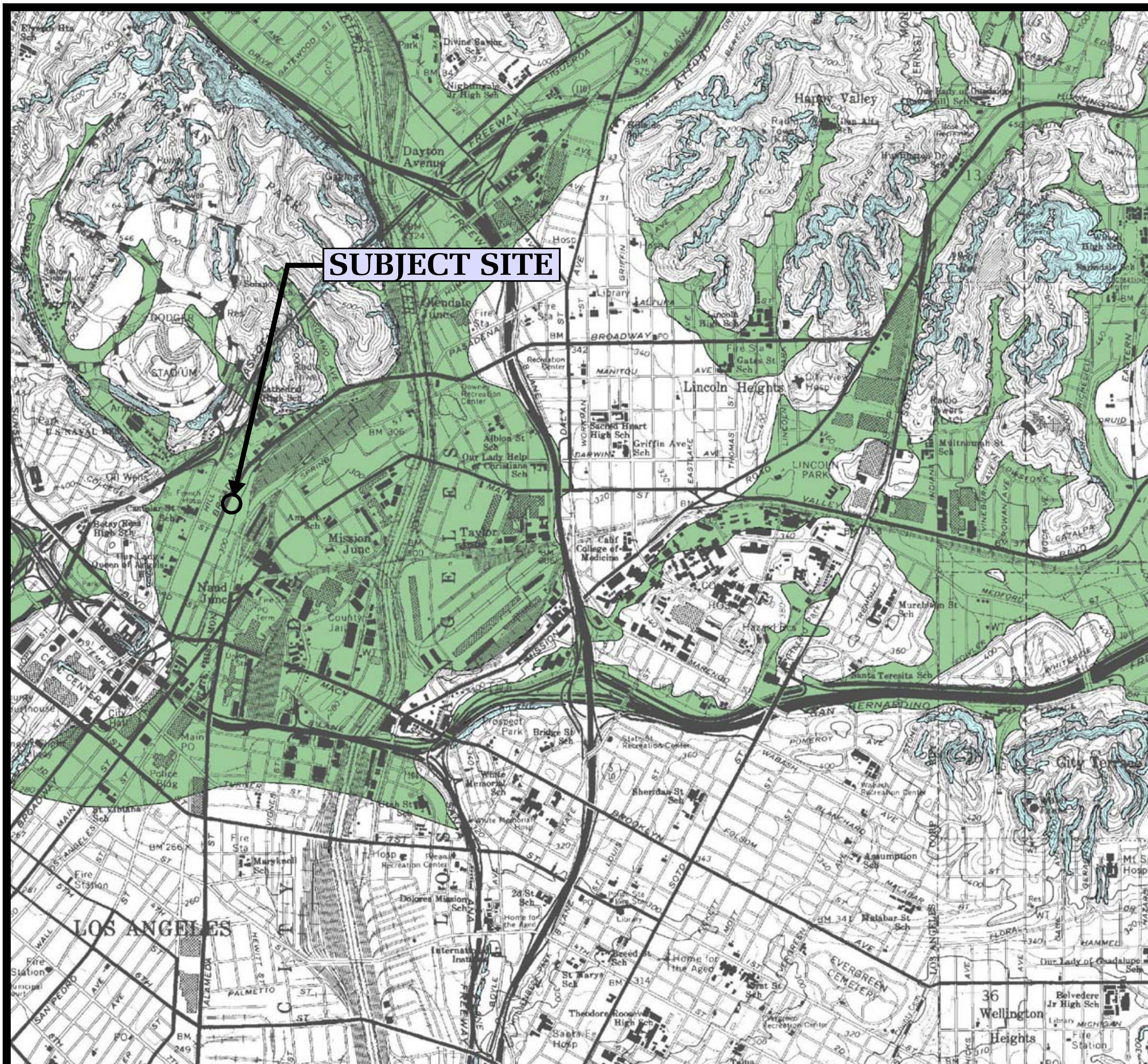
TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



SCALE 1:24,000

1 .5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

N

LIQUEFACTION AREA

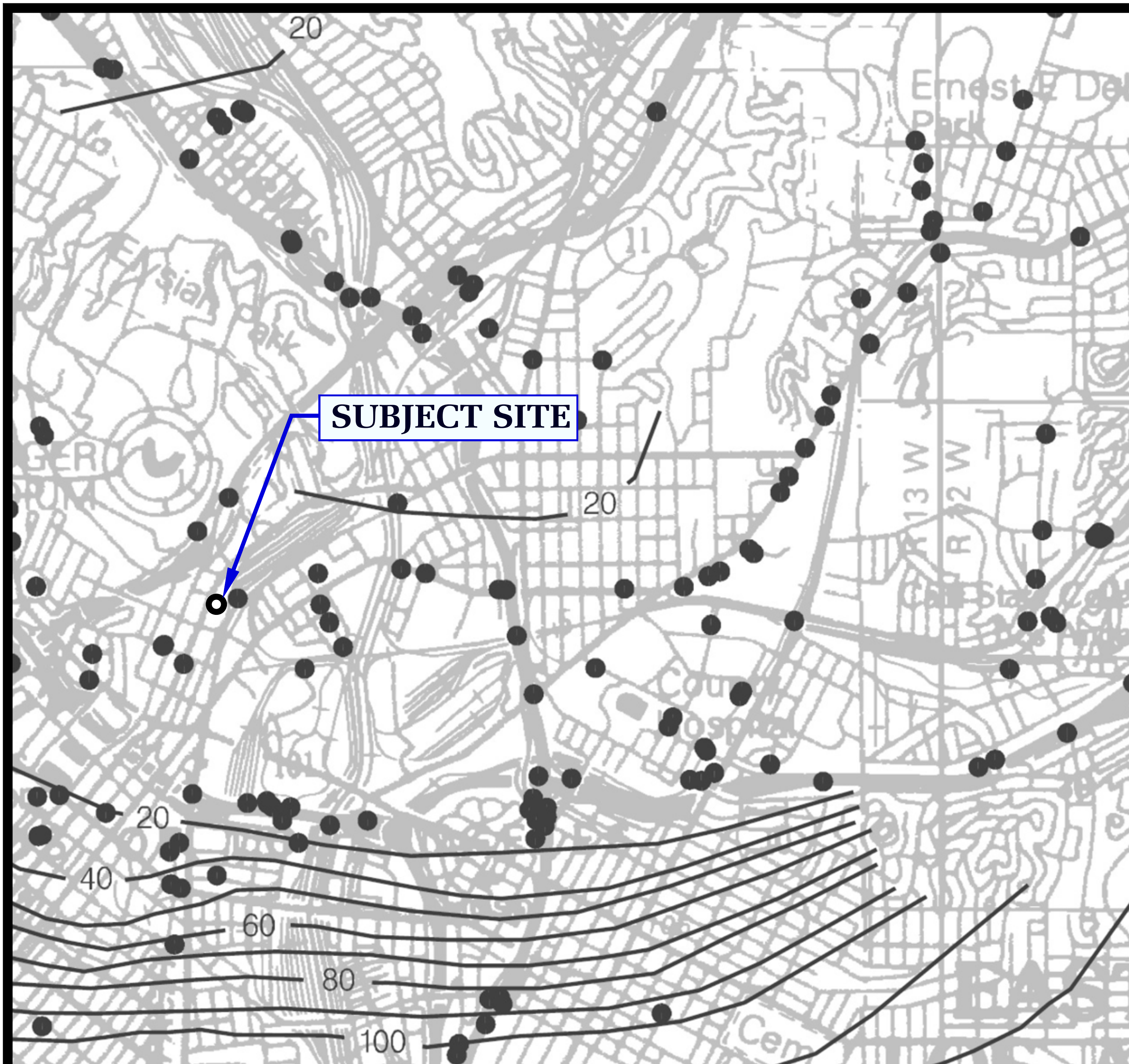
REFERENCE: **SEISMIC HAZARD ZONES, LOS ANGELES QUADRANGLE OFFICIAL MAP (CDMG, 1999)**

SEISMIC HAZARD ZONE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



ONE MILE

SCALE

20 Depth to groundwater in feet

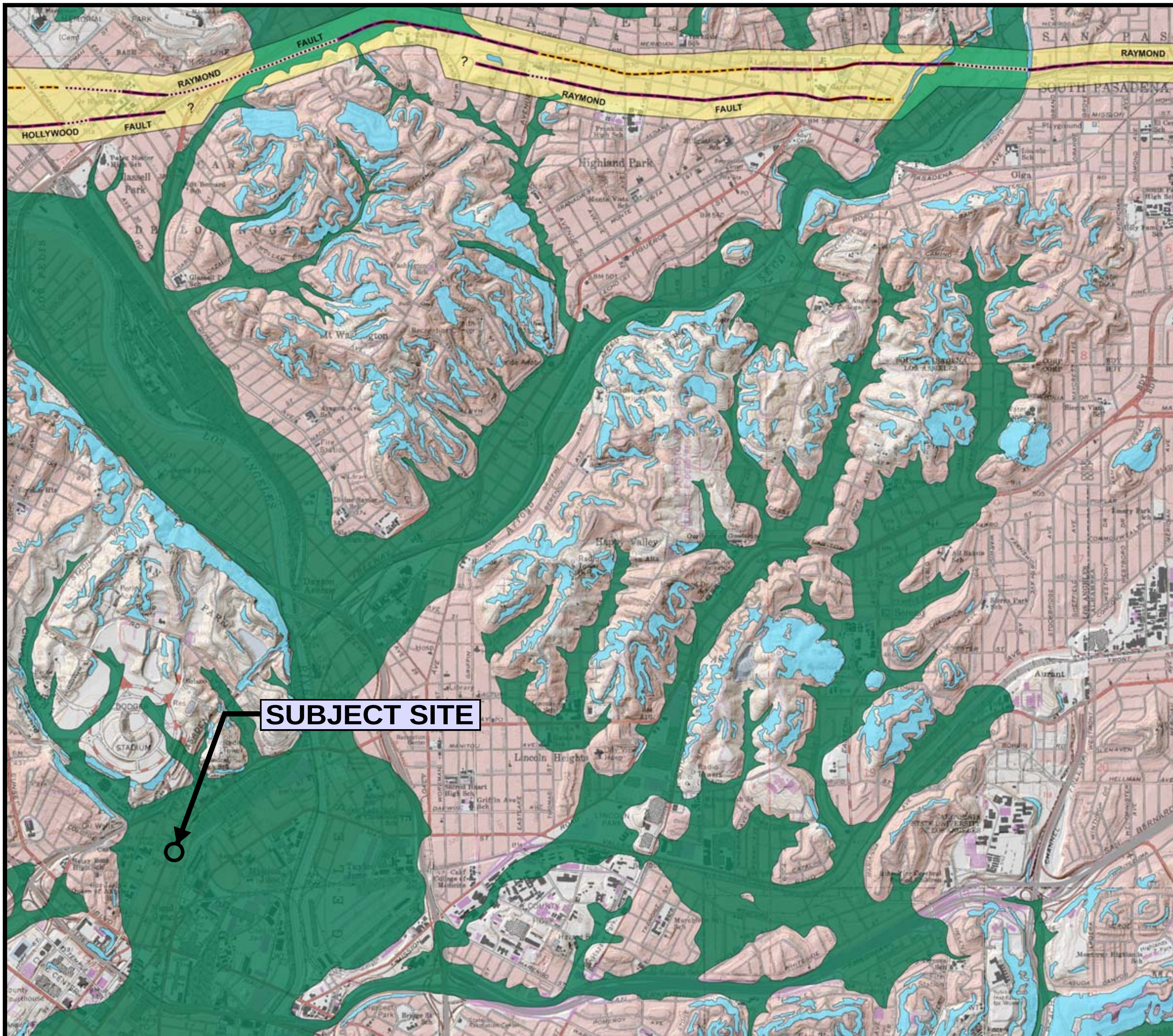
REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 029
LOS ANGELES 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

N

Geotechnologies, Inc

HISTORICALLY HIGHEST GROUNDWATER LEVELS

Geotechnologies, Inc. *Consulting Geotechnical Engineers*	**TF BROADWAY LP** 942 N. BROADWAY, LOS ANGELES
	FILE NO. 21545



Scale 1: 24000

1 0.5 0 1 2 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 Feet

1 0.5 0 1 2 Kilometers

1000 500 0 1000 2000 Meters

Contour Interval 20 Feet

N

Liquefaction Zones

Earthquake Fault Zones

Alquist-Priolo Earthquake Fault Zone

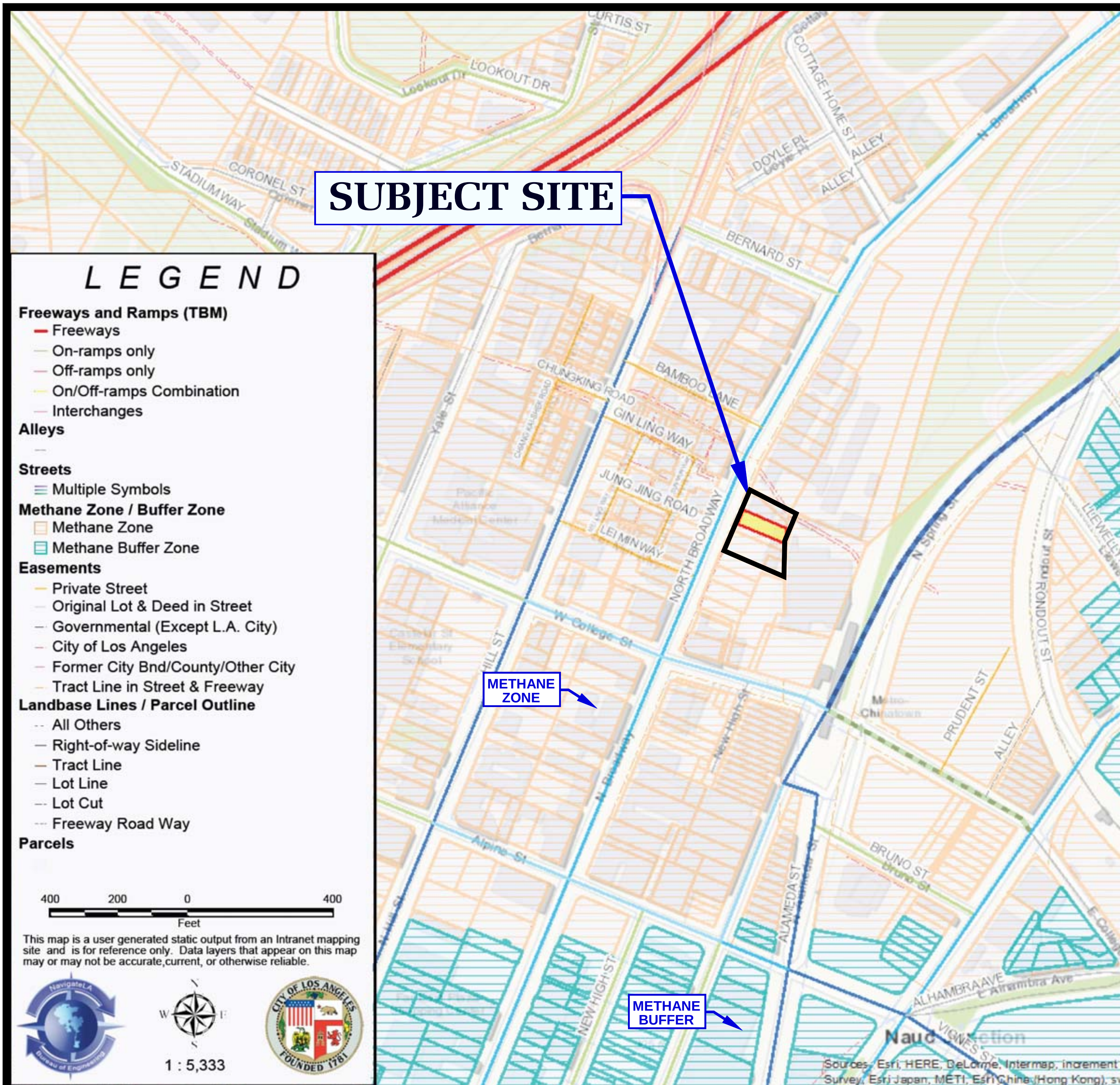
REFERENCE: EARTHQUAKE ZONES OF REQUIRED INVESTIGATION, LOS ANGELES QUADRANGLE, CALIFORNIA GEOLOGICAL SURVEY, JUNE 2017

EARTHQUAKE FAULT ZONE

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



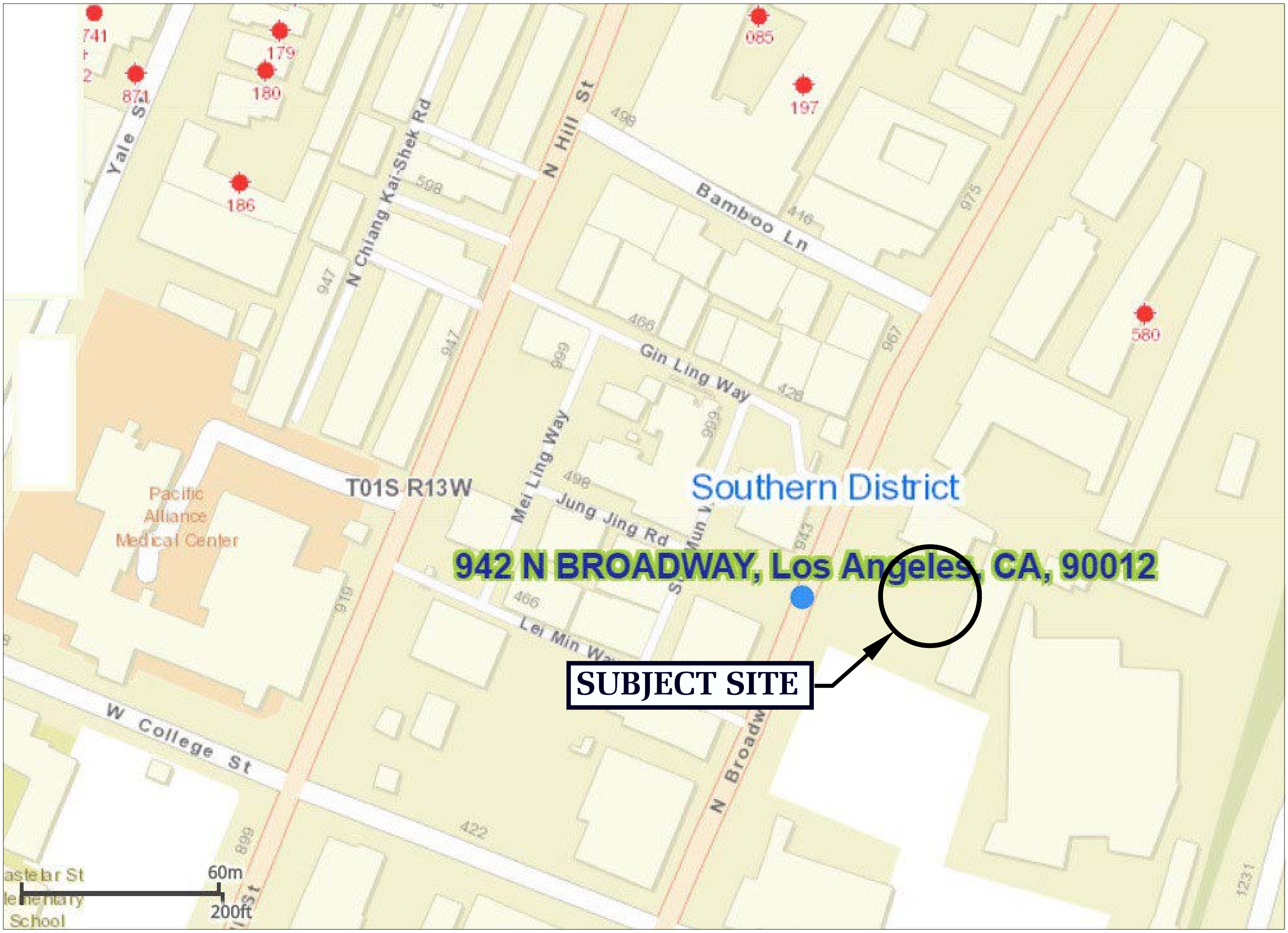
REFERENCE: http://navigatela.lacity.org/NavigateLA/

METHANE ZONE RISK MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545



OIL WELL LEGEND

API NO.	OPERATOR, WELL NO.	API NO.	OPERATOR, WELL NO.
580	Paul F. McKenzie, #T-2	097	C.C. Harris Oil Co., #8
197	E. A. Doran Oil Co.., #5-1	186	E.A. Duran Oil Co., #1
854	Victor Bavario, #1		
085	Nate Bray (G. N.), #10		
098	C.C. Harris Oil Co., #9		

N

REFERENCE: DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES WELL FINDER, STATE OF CALIFORNIA, 2014

OIL WELL LOCATION MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545

BORING LOG NUMBER 1

TF Broadway, L.P. | **Date: 01/08/18** | **Elevation: 309'***

File No. 21545 | **Method: 8-inch diameter Hollow Stem Auger**

ae/km | *Reference: City of LA NavigateLA Website, 2006 contour lines.

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt Parking Lot
				0 --		FILL: Silty Sand to Sandy Clay, dark brown, moist, medium dense, fine grained, stiff
				-		
				1 --		
				-		
				2 --		
2.5	32	21.2	108.7	-		
				3 --		
				-		
				4 --	CL	ALLUVIUM: Silty Clay, dark brown, moist, stiff
				-		
5	32	16.9	111.3	5 --		
				-	CL/ML	Clay to Clayey Silt
				6 --		
				-		
				7 --		
				-		
				8 --		
				-		
				9 --		
				-		
10	59	5.1	133.9	10 --		
				-	SM/SP	Silty Sand to Sand, dark yellowish brown, medium dense to dense, fine to medium grained, minor gravel
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	67	2.4	133.1	15 --		
				-	SP/SW	Sand to Gravelly Sand, dark brown, dense, fine to coarse grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	100/9"	2.4	111.1	20 --		
				-		
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
25	88	3.6	126.2	25 --		
				-	SP	Sand, dark yellowish brown, moist, very dense, fine to medium grained, minor gravel

BORING LOG NUMBER 1

TF Broadway, L.P.

File No. 21545

ae/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-	SC/SM	Clayey Sand to Silty Sand with gravel, very dense, fine grained
30	50/5"	11.1	117.7	30 --		
	80/5"			-		Total Depth 30 feet
				31 --		No Water
				-		Fill to 3½ feet
				32 --		
				-		
				33 --		NOTE: The stratification lines represent the approximate
				-		boundary between earth types; the transition may be gradual.
				34 --		
				-		Used 8-inch diameter Hollow-Stem Auger
				35 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted
				36 --		
				-		
				37 --		
				-		
				38 --		
				-		
				39 --		
				-		
				40 --		
				-		
				41 --		
				-		
				42 --		
				-		
				43 --		
				-		
				44 --		
				-		
				45 --		
				-		
				46 --		
				-		
				47 --		
				-		
				48 --		
				-		
				49 --		
				-		
				50 --		
				-		

BORING LOG NUMBER 2

TF Broadway, L.P. **Date: 01/08/18** **Elevation: 308'***

File No. 21545 **Method: 8-inch diameter Hollow Stem Auger**

ae/km ***Reference: City of LA NavigateLA Website, 2006 contour lines.**

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt Parking Lot
				0 --		2½-inch Asphalt over 3½-inch Base
				-		
				1 --		FILL: Clayey to Silty Sand, reddish brown, dense, fine grained
				-		
				2 --		
				-		
				3 --		
				-		
				4 --		
				-		Silty Sand, dark brown, moist, medium dense, fine grained
5	40	17.3	106.0	5 --		
				-		
				6 --	CL/ML	ALLUVIUM: Silty Clay to Clayey Silt, dark brown, moist, stiff
				-		
				7 --		
7.5	72	10.6	125.7	-		
				8 --	SM/SP	Silty Sand to Sand, dark yellowish brown, dense, fine to medium grained, minor gravel
				-		
				9 --		
				-		
10	80/11"	1.8	118.9	10 --		
				-	SW	Cobbley Sand, dark brown, very dense, fine to coarse grained
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	90	1.1	128.7	15 --		
				-		
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	100/9"	2.7	121.1	20 --		
				-		
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
25	100/9"	3.6	127.2	25 --		
				-	SP/SW	Sand to Cobbley Sand, dark yellowish brown, very dense, fine to coarse grained

BORING LOG NUMBER 2

TF Broadway, L.P.

File No. 21545

ae/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
				28		
				29	SW/ML	Cobbley Sand to Sandy Silt, dark grayish brown, very dense, fine to coarse grained, stiff
30	95/9"	4.1	115.7	30		
				31		Total Depth 30 feet No Water Fill to 5½ feet
				32		
				33		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				34		
				35		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				36		
				37		
				38		
				39		
				40		
				41		
				42		
				43		
				44		
				45		
				46		
				47		
				48		
				49		
				50		

BORING LOG NUMBER 3

TF Broadway, L.P. **Date: 01/08/18** **Elevation: 310'***

File No. 21545 **Method: 8-inch diameter Hollow Stem Auger**

ae/km *Reference: City of LA NavigateLA Website, 2006 contour lines.

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt Parking Lot
				0 --		3-inch Asphalt over 5-inch Base
				-		
				1 --		FILL: Silty to Sandy Clay, dark brown, moist, stiff, fine grained
				-		
				2 --		
2.5	31	20.4	106.7	-		
				3 --		
				-	ML/CL	ALLUVIUM: Clayey Silt to Silty Clay, dark brown, moist, stiff
				4 --		
				-		
5	13	16.5	SPT	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	23	18.6	111.2	-		
				8 --	SM/ML	Silty Sand to Sandy Silt, medium dense, fine grained, stiff
				-		
				9 --		
				-		
10	23	1.8	SPT	10 --		
				-	SP	Sand, dark yellowish brown, medium dense, fine to medium grained, minor gravel
				11 --		
				-		
				12 --		
12.5	66	2.7	119.0	-		
				13 --	SP/SW	Sand to Cobbley Sand, dense, fine to coarse grained
				-		
				14 --		
				-		
15	78	1.6	SPT	15 --		
				-	SW	Gravelly Sand, very dense, fine to coarse grained
				16 --		
				-		
				17 --		
17.5	100/9"	2.5	123.8	-		
				18 --		
				-		
				19 --		
				-		
20	95/7"	2.1	SPT	20 --		
				-		
				21 --		
				-		
				22 --		
22.5	76	8.2	114.1	-		
				23 --	SP/ML	Sand to Sandy Silt, dark gray, very dense, fine to medium grained, minor gravel, very stiff
				-		
				24 --		
				-		
25	35	12.0	SPT	25 --		
				-	SM/SP	Silty Sand to Sand, dark to yellowish brown, medium dense, fine to medium grained, minor gravel

BORING LOG NUMBER 3

TF Broadway, L.P.

File No. 21545

ae/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				26 --		
				-		
				27 --		
27.5	80/11"	4.6	107.6	-		
				28 --	SP	Sand, dark yellowish brown, very dense, fine to medium grained
				-		
				29 --		
				-		
30	57	4.5	SPT	30 --		
				-	SP/SW	Sand to Gravelly Sand, dense, fine to coarse grained
				31 --		
				-		
				32 --		
32.5	85/11"	3.6	110.9	-		
				33 --	SP	Sand, very dense, fine to medium grained, minor gravel
				-		
				34 --		
				-		
35	57	5.2	SPT	35 --		
				-		Sand, dense, fine to medium grained
				36 --		
				-		
				37 --		
37.5	90/11"	2.8	114.7	-		
				38 --		Sand, very dense, fine to medium grained, minor gravel
				-		
				39 --		
				-		
40	38	4.2	SPT	40 --		
				-	CL/ML	Silty Clay to Clayey Silt, dark brown to gray, moist, medium dense, fine to medium grained, stiff
				41 --		
				-		
				42 --		
42.5	44	27.2	99.2	-		
				43 --		
				-		
				44 --		
				-		
45	22	28.0	SPT	45 --		
				-		
				46 --		
				-		
				47 --		
47.5	77	23.5	105.7	-		
				48 --		
				-		
				49 --		
				-		
50	30	24.6	SPT	50 --		
				-	SM/ML	Sandy Silt to Silty Sand, medium dense, fine grained, stiff

BORING LOG NUMBER 3

TF Broadway, L.P.

File No. 21545

ae/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				51		
				52		
52.5	86	23.2	99.2			
				53	SM/SP	Silty Sand to Sand, gray to dark gray, very dense, fine grained
				54		
55	38	29.5	SPT	55		
					SM	Silty Sand, dark gray, medium dense, fine grained
				56		
				57		
57.5	85	27.4	99.2			
				58	CL/ML	Silty Clay to Clayey Silt, gray, very dense, fine grained, very stiff
				59		
60	35	30.8	SPT	60		
						Total Depth 60 feet
				61		Water at 55 feet
						Fill to 3 feet
				62		
				63		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				64		
						Used 8-inch diameter Hollow-Stem Auger
				65		140-lb. Automatic Hammer, 30-inch drop
						Modified California Sampler used unless otherwise noted
				66		
						SPT=Standard Penetration Test
				67		
				68		
				69		
				70		
				71		
				72		
				73		
				74		
				75		

BORING LOG NUMBER 4

TF Broadway, L.P. **Date: 02/06/18** **Elevation: 309'***

File No. 21545 **Method: 8-inch diameter Hollow Stem Auger**

km *Reference: City of LA NavigateLA Website, 2006 contour lines.

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking Lot
				0 --		3-inch Asphalt over 5-inch Base
				-		
				1 --		FILL: Silty Clay, dark brown, moist, stiff, fine grained
				-		
				2 --		
2.5	33	21.1	103.8	-		
				3 --		
				-	CL	ALLUVIUM: Silty Clay, dark brown, moist, stiff
				4 --		
				-		
5	11	18.0	SPT	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	29	17.2	110.7	-		
				8 --		
				-		
				9 --		
				-		
10	12	17.3	SPT	10 --		
				-	CL/ML	Silty Clay to Clayey Silt, dark brown, moist, stiff, fine grained
				11 --		
				-		
				12 --		
12.5	62	3.3	126.4	-		
				13 --	SP/SW	Sand to Cobbley Sand, dark brown, moist, dense, fine to coarse grained
				-		
				14 --		
				-		
15	36	2.7	SPT	15 --		
				-		
				16 --		
				-		
				17 --		
17.5	59 50/2"	3.1	133.6	-		
				18 --		
				-		
				19 --		
				-		
20	30	6.6	SPT	20 --		
				-		
				21 --		
				-		
				22 --		
22.5	100/8"	No Recovery		-		
				23 --		
				-		
				24 --		
				-		
25	21	13.8	SPT	25 --		
				-	SM/SP	Silty Sand to Sand, dark and yellowish brown, moist, medium dense, fine to medium grained, minor cobbles

BORING LOG NUMBER 4

TF Broadway, L.P.

File No. 21545

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				26 --		
				-		
				27 --		
27.5	50	19.5	114.2	-		
				28 --		
				-		
				29 --		
				-		
30	32	7.8	SPT	30 --		
				-		
				31 --		
				-		
				32 --		
32.5	80	10.3	114.8	-		
				33 --		
				-		
				34 --		
				-		
35	32	4.7	SPT	35 --		
				-	SP	Sand, dark brown, moist, medium dense, fine to medium grained
				36 --		
				-		
				37 --		
37.5	32	23.3	104.3	-		
				38 --	SM/ML	Sandy Silt to Silty Sand, dark and grayish brown, moist, medium dense, fine grained, stiff
				-		
				39 --		
				-		
40	23	23.6	SPT	40 --		
				-		
				41 --		
				-		
				42 --		
42.5	35	29.7	95.9	-		
				43 --	CL/ML	Silty Clay to Clayey Silt, dark and gray, moist, stiff
				-		
				44 --		
				-		
45	13	28.1	SPT	45 --		
				-		
				46 --		
				-		
				47 --		
47.5	45	24.6	102.0	-		
				48 --		
				-		
				49 --		
				-		
50	16	27.0	SPT	50 --		
				-		Sandy Silt, gray, moist, stiff

BORING LOG NUMBER 4

TF Broadway, L.P.

File No. 21545

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				51 --		
				-		
				52 --		
52.5	53	20.2	106.3	-		
				53 --	SM/ML	Silty Sand to Sandy Silt, gray to dark gray, moist, medium dense, fine grained, stiff
				-		
				54 --		
				-		
55	14	31.9	SPT	55 --		
				-	CL/ML	Silty Clay to Clayey Silt, gray, moist to wet, stiff
				56 --		
				-		
				57 --		
57.5	44	41.5	81.5	-		
				58 --		
				-		
				59 --		
				-		
60	32	15.9	SPT	60 --		
				-	SM/SP	Silty Sand to Sand, gray, wet, medium dense, fine grained
				61 --		
				-		
				62 --		
62.5	73	18.2	112.5	-		
				63 --	SP	Sand, gray, wet, very dense, fine to medium grained
				-		
				64 --		
				-		
65	70	13.4	SPT	65 --		
				-		
				66 --		
				-		
				67 --		
67.5	100/6"	14.5	117.8	-		
				68 --		
				-		
				69 --		
				-		
70	45	15.3	SPT	70 --		
				-		
				71 --		
				-		
				72 --		
72.5	53	18.4	115.4	-		
	50/4"			73 --		
				-		
				74 --		
				-		
75	50	10.7	SPT	75 --		
				-		

BORING LOG NUMBER 4

TF Broadway, L.P.

File No. 21545

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				76		
				77		
77.5	75/10"	8.9	119.8			
				78		
				79		
80	37	11.7	SPT	80		
				81		
				82		
82.5	100/10"	15.2	115.8			
				83		Sand, gray, wet, very dense, fine to medium grained
				84		
85	67	11.9	SPT	85		
				86		
				87		
87.5	100/5"	8.0	136.9			
				88		
				89		
90	50/6"	10.4	SPT	90		
						Total Depth 90 feet Water at 47½ feet Fill to 3 feet
				91		
				92		
				93		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				94		
				95		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				96		SPT=Standard Penetration Test
				97		
				98		
				99		
				100		

BORING LOG NUMBER 5

TF Broadway LP **Date: 06/21/18** **Elevation: 308'***

File No. 21545 **Method: 8-inch Diameter Hollow Stem Auger**

nk/km *Reference: City of LA Navigate LA website, 2006

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt
				0 --		3-inch Asphalt over 4-inch Base
				-		
				1 --		FILL: Sandy Silt, dark brown, moist, stiff
				-		
				2 --		
2.5	9	16.6	105.2	-		
				3 --		
				-	ML	ALLUVIUM: Sandy Silt, dark brown, moist, stiff
				4 --		
				-		
5	9	17.5	SPT	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	50/5"	18.1	115.4	-		
				8 --	SM/ML	Silty Sand to Sandy Silt, stiff, very dense, fine grained
				-		
				9 --		
				-		
10	52	1.4	SPT	10 --		
				-	SW	Cobbley Sand, dense, fine to coarse grained
				11 --		
				-		
				12 --		
12.5	67	2.5	120.6	-		
				13 --		
				-		
				14 --		
				-		
15	54	2.0	SPT	15 --		
				-		
				16 --		
				-		
				17 --		
17.5	100/9"	3.3	126.7	-		
				18 --	SP/SW	Sand to Gravelly Sand, dark yellowish brown, fine to coarse grained
				-		
				19 --		
				-		
20	50/6"	2.1	SPT	20 --		
				-		
				21 --		
				-		
				22 --		
22.5	100/5"	4.1	105.6	-		
				23 --		
				-		
				24 --		
				-		
25	31	5.2	SPT	25 --		
				-	SP/SM	Sand to Silty Sand, dark grayish brown, fine to medium grained, minor gravel

BORING LOG NUMBER 5

TF Broadway LP

File No.

nk/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				26 --		
				-		
				27 --		
				-		
				28 --		
				-		
				29 --		
				-		
30	58	7.8	SPT	30 --		
				-	SM/SW	Silty Sand to Gravelly Sand, dark gray, fine to coarse grained
				31 --		
				-		
				32 --		
				-		
				33 --		
				-		
				34 --		
				-		
35	65	3.5	SPT	35 --		
				-	SP	Sand, fine to medium grained
				36 --		
				-		
				37 --		
37.5	50/4"	7.5	125.3	-		
				38 --	SW	Gravelly Sand, very dense, fine to coarse grained
				-		
				39 --		
				-		
40	73	3.5	SPT	40 --		
				-	SP	Sand, dark yellowish brown, fine to medium grained, minor gravel
				41 --		
				-		
				42 --		
42.5	100/8"	5.5	126.3	-		
				43 --	SM/SW	Silty Sand to Gravelly Sand, fine grained
				-		
				44 --		
				-		
45	45	9.0	SPT	45 --		
				-	SP	Sand, wet, fine to medium grained
				46 --		
				-		
				47 --		
47.5	27	22.6	98.3	-		
				48 --	SM/ML	Silty Sand to Sandy Silt, gray, moist to wet
				-		
				49 --		
				-		
50	35	23.0	SPT	50 --		
				-	SP/MC	Sand to Clayey Silt, dark gray, medium dense, fine grained, stiff

BORING LOG NUMBER 5

TF Broadway LP

File No.

nk/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
				51 --		
				-		
				52 --		
52.5	85	35.5	88.6	-		
				53 --		
				-		
				54 --		
				-		
55	40	23.8	SPT	55 --		
				-		
				56 --		
				-		
				57 --		
57.5	85	30.4	96.1	-		
				58 --		
				-		
				59 --		
				-		
60	58	24.4	SPT	60 --		
				-		
				61 --		
				-		
				62 --		
62.5	80	16.6	113.5	-		
				63 --	SP	Sand, gray, wet, very dense, fine grained
				-		
				64 --		
				-		
65	43	13.4	SPT	65 --		
				-		
				66 --		
				-		
				67 --		
67.5	50/5"	12.8	103.9	-		
				68 --		
				-		
				69 --		
				-		
70	50/5"	16.0	SPT	70 --		
				-		
				71 --		
				-		
				72 --		
72.5	35	12.5	122.7	-		
				73 --		medium dense, fine to medium grained
				-		
				74 --		
				-		
75	50/3.5"	11.3	SPT	75 --		
				-		very dense

BORING LOG NUMBER 5

TF Broadway LP

File No.

nk/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				- 76 -- - 77 --		
77.5	50/4"	11.3	118.5	- 78 -- - 79 -- -		
80	75	11.3	SPT	80 -- - 81 -- - 82 --		Sand, gray, wet, very dense, fine to medium grained, minor gravel
82.5	50/5"	10.0	129.5	- 83 -- - 84 -- -		Sand, dark gray to gray, dense, and fine to medium grained, minor gravel
85	82	10.8	SPT	85 -- - 86 -- - 87 --		
87.5	50/5"	16.3	118.7	- 88 -- - 89 -- -		
90	50/5"	14.0	SPT	90 -- - 91 -- - 92 --		
92.5	50/5"	14.6	118.2	- 93 -- - 94 -- -		
95	50/5"	12.5	SPT	95 -- - 96 -- -		
97	85	7.6	129.6	97 -- - 98 -- - 99 -- -		
100	50/5"	5.7	SPT	100 -- -		

BORING LOG NUMBER 5

TF Broadway LP

File No.

nk/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				101		
102	100/9"	10.1	124.7	102		Sand, grey to dark gray, very dense, fine to medium grained
				103		
				104		
105	50/5"	10.7	SPT	105		
				106		
				107		
107.5	82	11.0	123.8			
				108		
				109		
110	75	No Recovery		110		
				111		
				112		
112.5	50/5"	15.1	115.7			
				113		
				114		
115	62	21.1	SPT	115		BEROCK (PUENTE FORMATION): Siltstone, dark gray to gray, moist, medium hard, laminated
				116		
				117		
117.5	100/8"	20.4	105.0			
				118		
				119		
120	50/5"	19.7	SPT	120		
				121		
				122		
				123		
				124		
125	100/5"	20.8	102.5	125		Total Depth 125 feet Water at 45 feet Fill to 3 feet

NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.

Used 8-inch diameter Hollow-Stem Auger
140-lb. Automatic Hammer, 30-inch drop
Modified California Sampler used unless otherwise noted

SPT=Standard Penetration Test

BORING LOG NUMBER 6

TF Broadway LP | **Date: 06/25/18** | **Elevation: 300'***

File No. 21545 | **Method: 7-inch diameter Hollow Stem Auger**

NK/km | *Reference: City of LA Navigate LA website, 2006

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Barren ground
				0 --		Fill: Silty Sand to Sandy Silt, dark brown, moist, medium dense, fine grained, stiff
				-		
				1 --		
				-		
2	15	14.5	105.3	2 --		
				-		
				3 --		
				-		
4	9	20.4	81.5	4 --		
				-		Silty Sand with brick fragments, fine grained
				5 --		
				-		
6	5	16.3	104.9	6 --		
				-		
				7 --		
				-		
8	50/5"	6.1	117.6	8 --		
				-	SP/SW	ALLUVIUM: Sand to Gravelly Sand, dark brown, moist, dense to very dense, fine to coarse grained
				9 --		
				-		
				10 --		
				-		
				11 --		
				-		
12	100/5"	7.1	111.3	12 --		
				-	SW	Cobbley Sand, dark gray, very dense, fine grained
				13 --		
				-		
				14 --		
				-		
				15 --		
				-		
16	100/7"	10.7	80.2	16 --		
				-		
				17 --		
				-		
18	100/6"	7.3	Disturbed	18 --		
				-		
				19 --		
				-		
20	74	4.6	SPT	20 --		
				-	SP/ML	Sand to Sandy Silt, dark grayish brown, dense, fine to coarse grained
				21 --		
				-		
				22 --		
22.5	55	32.2	96.5	-		
				23 --		Sand to Sandy Silt, dark gray, medium dense, fine to coarse grained
				-		
				24 --		
				-		
25	25	25.4	SPT	25 --		
				-		

BORING LOG NUMBER 6

TF Broadway LP

File No. 21545

NK/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				-		
26	83	6.9	110.0	26 --		
				-	SP	Sand, dark gray to yellowish brown, moist, very dense, fine to medium grained
				27 --		
				-		
28	55	8.3	SPT	28 --		
				-		
				29 --		
				-		
30	20	26.9	100.8	30 --		
				-	ML/CL	Clayey Silt to Silty Clay, gray to dark gray, stiff
				31 --		
				-		
32	18	29.6	SPT	32 --		
				-	CL	Silty Clay, gray, stiff
				33 --		
				-		
34	47	32.0	91.4	34 --		
				-	MC/CL	Clayey Silt to Silty Clay, gray, stiff
				35 --		
				-		
36	15	23.5	SPT	36 --		
				-	CL/ML	Silty Clay to Clayey Silt, dark brown, stiff
				37 --		
				-		
38	58	25.6	97.1	38 --		
				-	ML	Clayey Silt, gray to dark gray, stiff
				39 --		
				-		
40	28	27.5	SPT	40 --		
				-		
				41 --		
				-		
				42 --		
42.5	48	21.9	106.3	-		
				43 --		Sandy Silt, gray, medium dense, fine grained
				-		
				44 --		
				-		
45	40	24.6	SPT	45 --		
				-	SM/ML	Silty Sand to Sandy Silt, moist to wet, medium dense, fine grained
				46 --		
				-		
				47 --		
47.5	42	32.3	93.5	-		
				48 --		
				-		
				49 --		
				-		
50	20	32.3	SPT	50 --		
				-	ML/CL	Clayey Silt to Silty Clay, gray, moist, stiff

BORING LOG NUMBER 6

TF Broadway LP

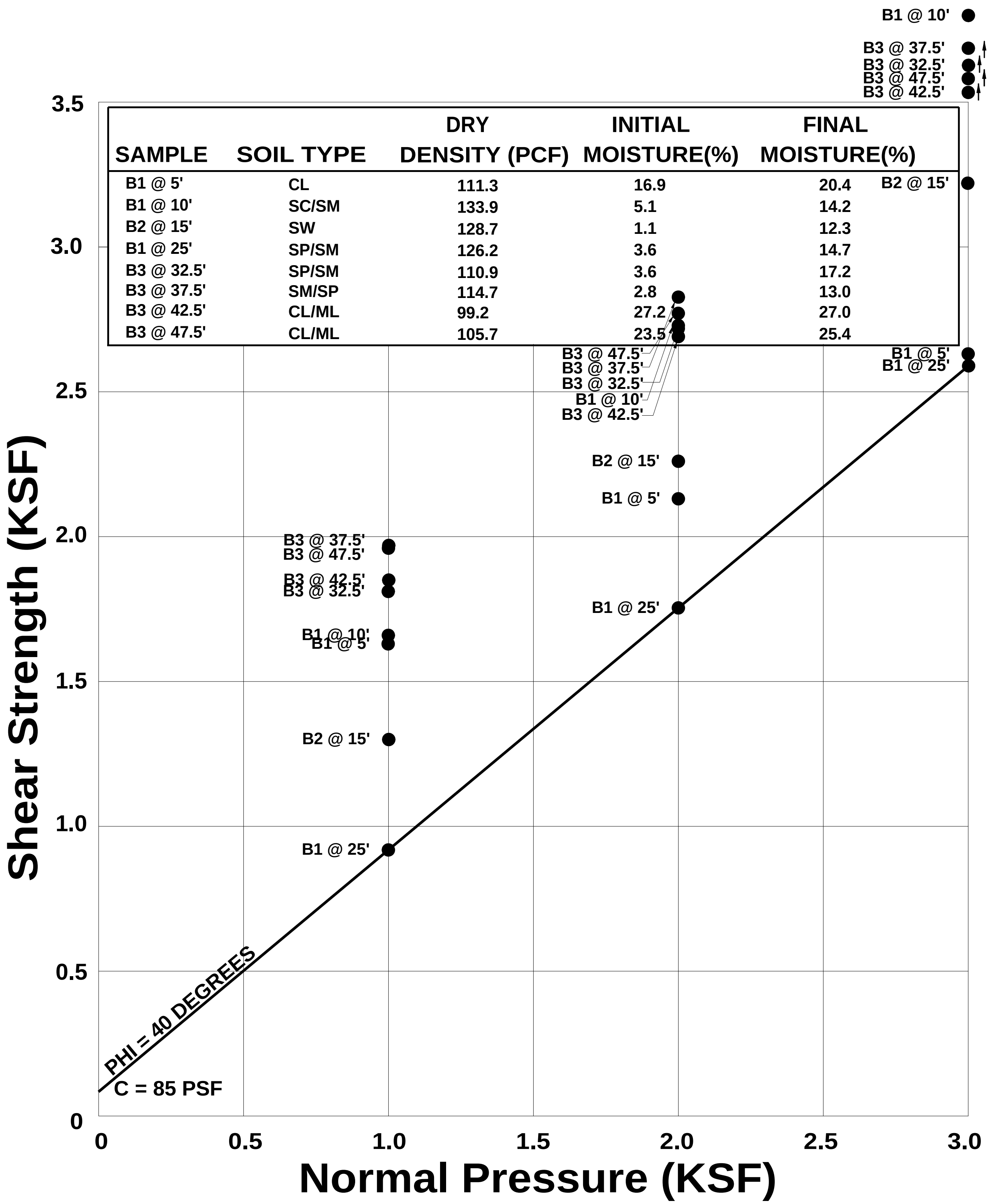
File No. 21545

NK/km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				51		
				52		
52.5	35	17.2	120.0			
				53	SP	Sand, gray to dark gray, wet, dense, fine grained
				54		
55	47	11.8	SPT	55		
				56		
				57		
57.5	150/5"	15.3	119.1			
				58		Sand, very dense, fine to medium grained
				59		
60	53	12.4	SPT	60		
				61		
				62		
62.5	46	No Recovery				
				63		
				64		
65	49	13.9	SPT	65		
						Sand, gray, dense, fine to medium grained
				66		
				67		
67.5	100/6"	No Recovery				
				68		
				69		
70	63	11.8	SPT	70		
						Sand, wet, dense, fine to medium grained
				71		
				72		
72.5	100/6"	NR	NR			
				73		
				74		
75	61	NR	SPT	75		
						Total Depth 75 feet by refusal Water at 45 feet Fill to 8 feet

NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.

Used 7-inch diameter Hollow-Stem Auger
140-lb. Automatic Hammer, 30-inch drop
Modified California Sampler used unless otherwise noted
NR= No Recovery
SPT=Standard Penetration Test



SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B1 @ 5'	CL	111.3	16.9	20.4
B1 @ 10'	SC/SM	133.9	5.1	14.2
B2 @ 15'	SW	128.7	1.1	12.3
B1 @ 25'	SP/SM	126.2	3.6	14.7
B3 @ 32.5'	SP/SM	110.9	3.6	17.2
B3 @ 37.5'	SM/SP	114.7	2.8	13.0
B3 @ 42.5'	CL/ML	99.2	27.2	27.0
B3 @ 47.5'	CL/ML	105.7	23.5	25.4

● Direct Shear, Saturated

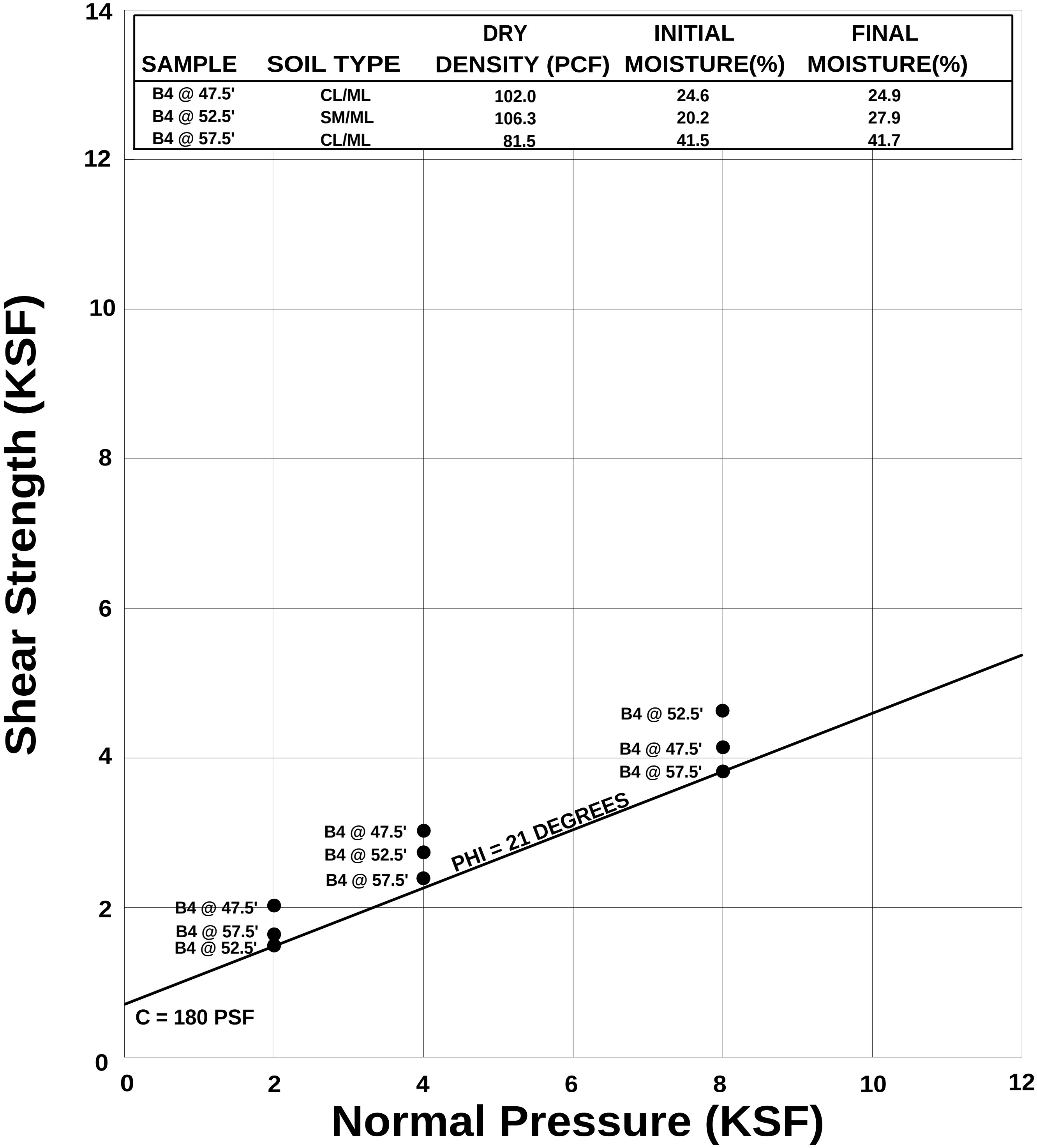
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545 | **PLATE: B-1**

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B4 @ 47.5'	CL/ML	102.0	24.6	24.9
B4 @ 52.5'	SM/ML	106.3	20.2	27.9
B4 @ 57.5'	CL/ML	81.5	41.5	41.7



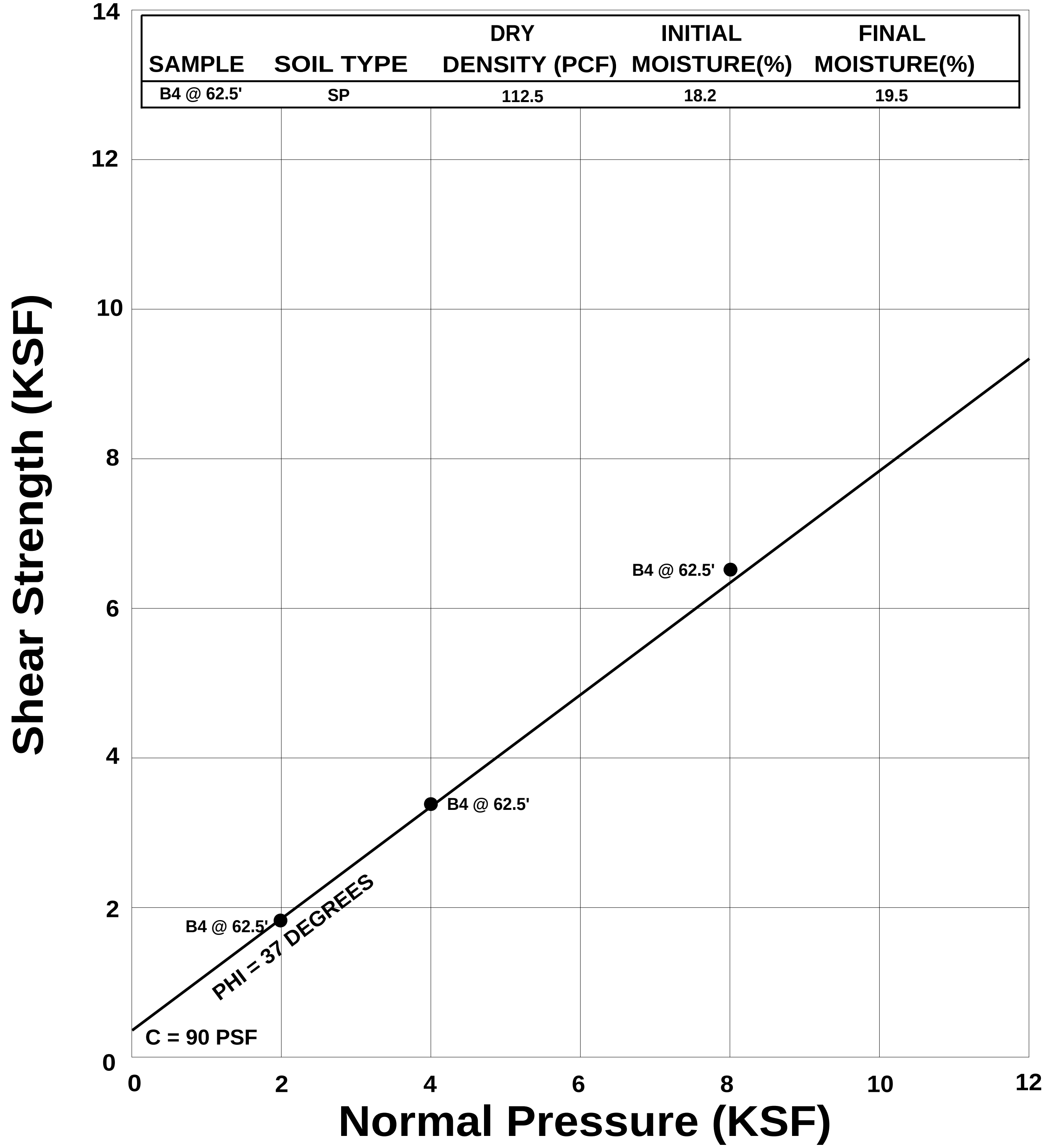
● Direct Shear, Saturated

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP	
FILE NO. 21545	PLATE: B-2

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B4 @ 62.5'	SP	112.5	18.2	19.5

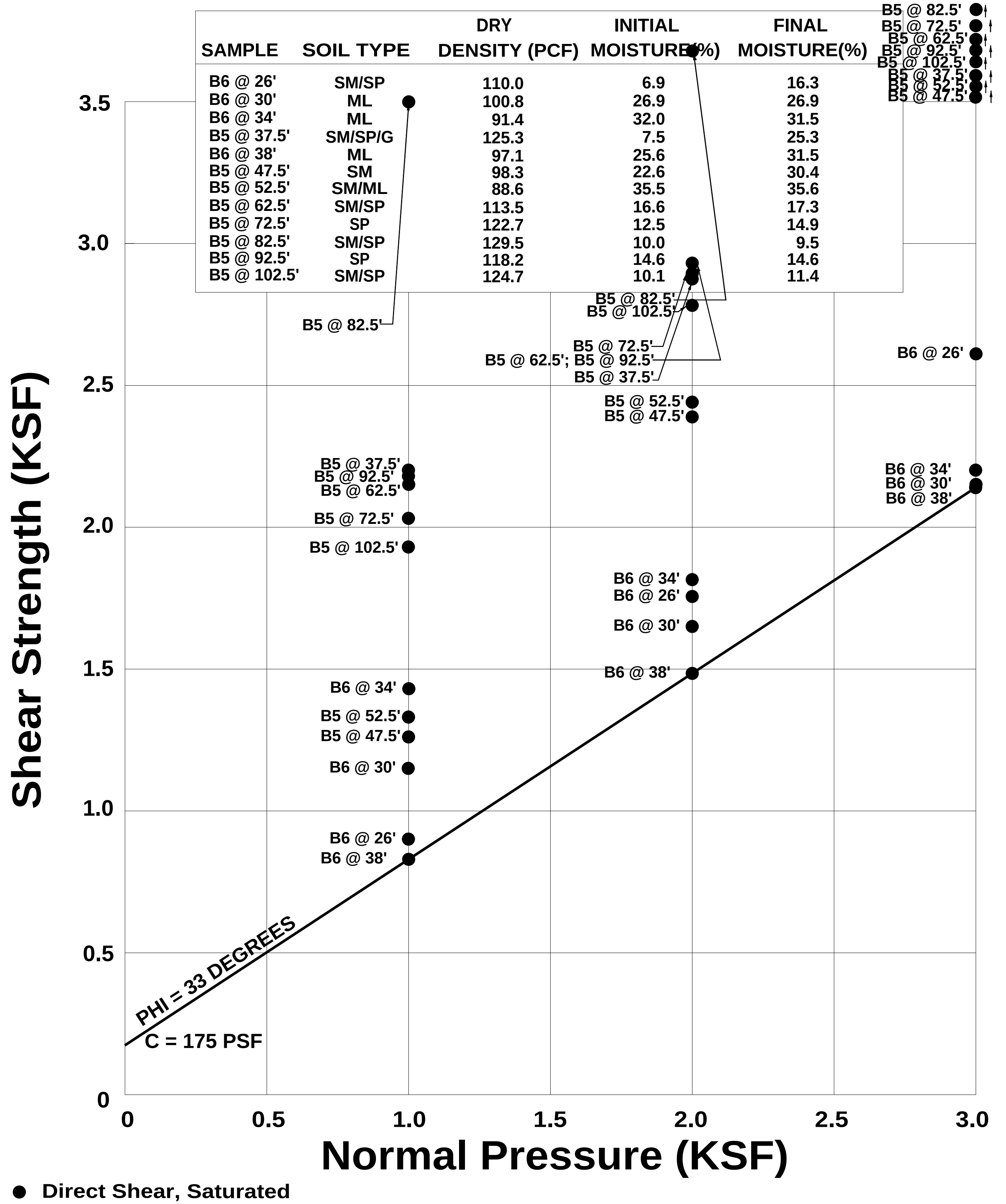


● Direct Shear, Saturated

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP	
FILE NO. 21545	PLATE: B-3



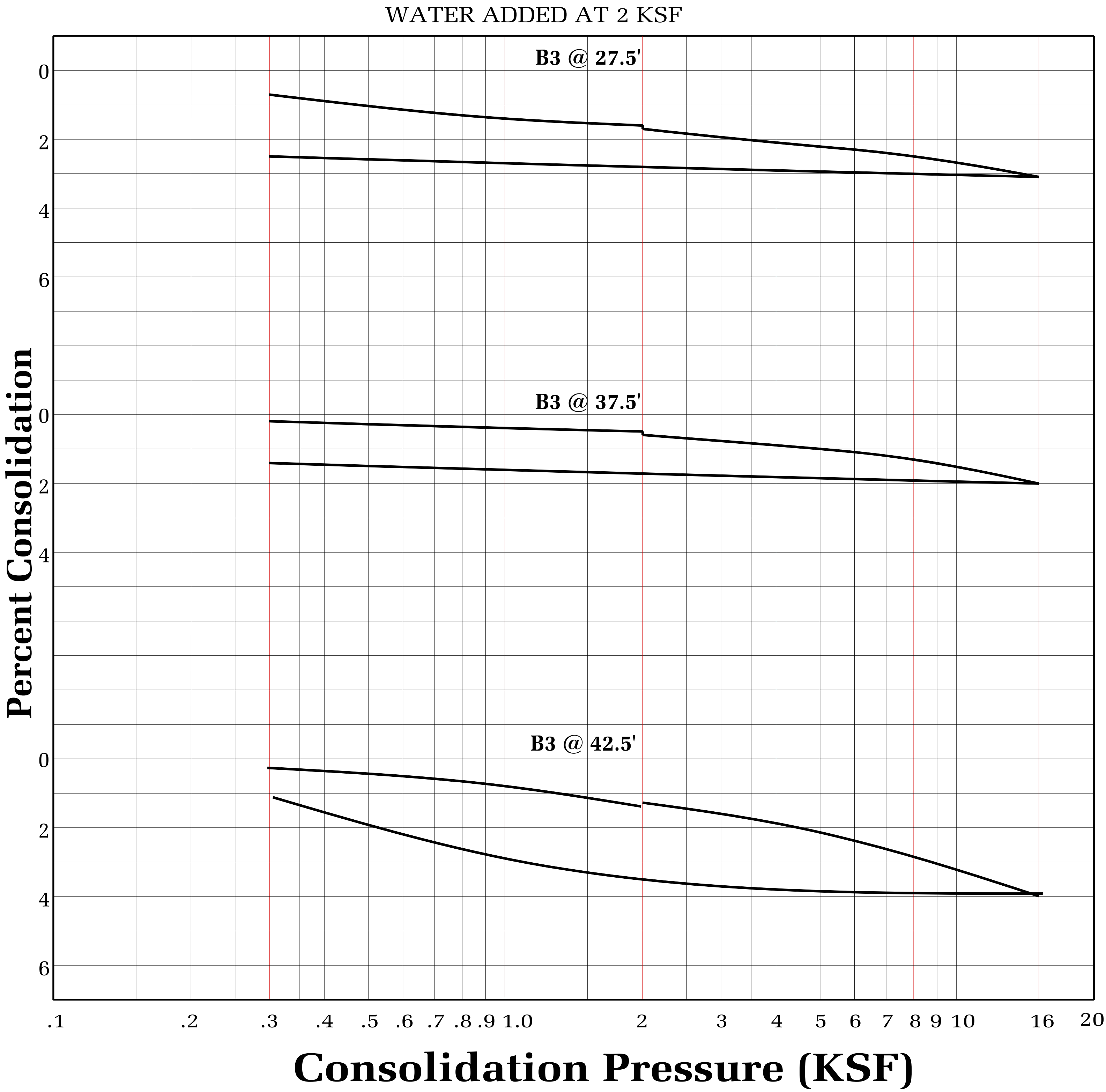
SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B6 @ 26'	SM/SP	110.0	6.9	16.3
B6 @ 30'	ML	100.8	26.9	26.9
B6 @ 34'	ML	91.4	32.0	31.5
B5 @ 37.5'	SM/SP/G	125.3	7.5	25.3
B6 @ 38'	ML	97.1	25.6	31.5
B5 @ 47.5'	SM	98.3	22.6	30.4
B5 @ 52.5'	SM/ML	88.6	35.5	35.6
B5 @ 62.5'	SM/SP	113.5	16.6	17.3
B5 @ 72.5'	SP	122.7	12.5	14.9
B5 @ 82.5'	SM/SP	129.5	10.0	9.5
B5 @ 92.5'	SP	118.2	14.6	14.6
B5 @ 102.5'	SM/SP	124.7	10.1	11.4

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545 | **PLATE: B-4**



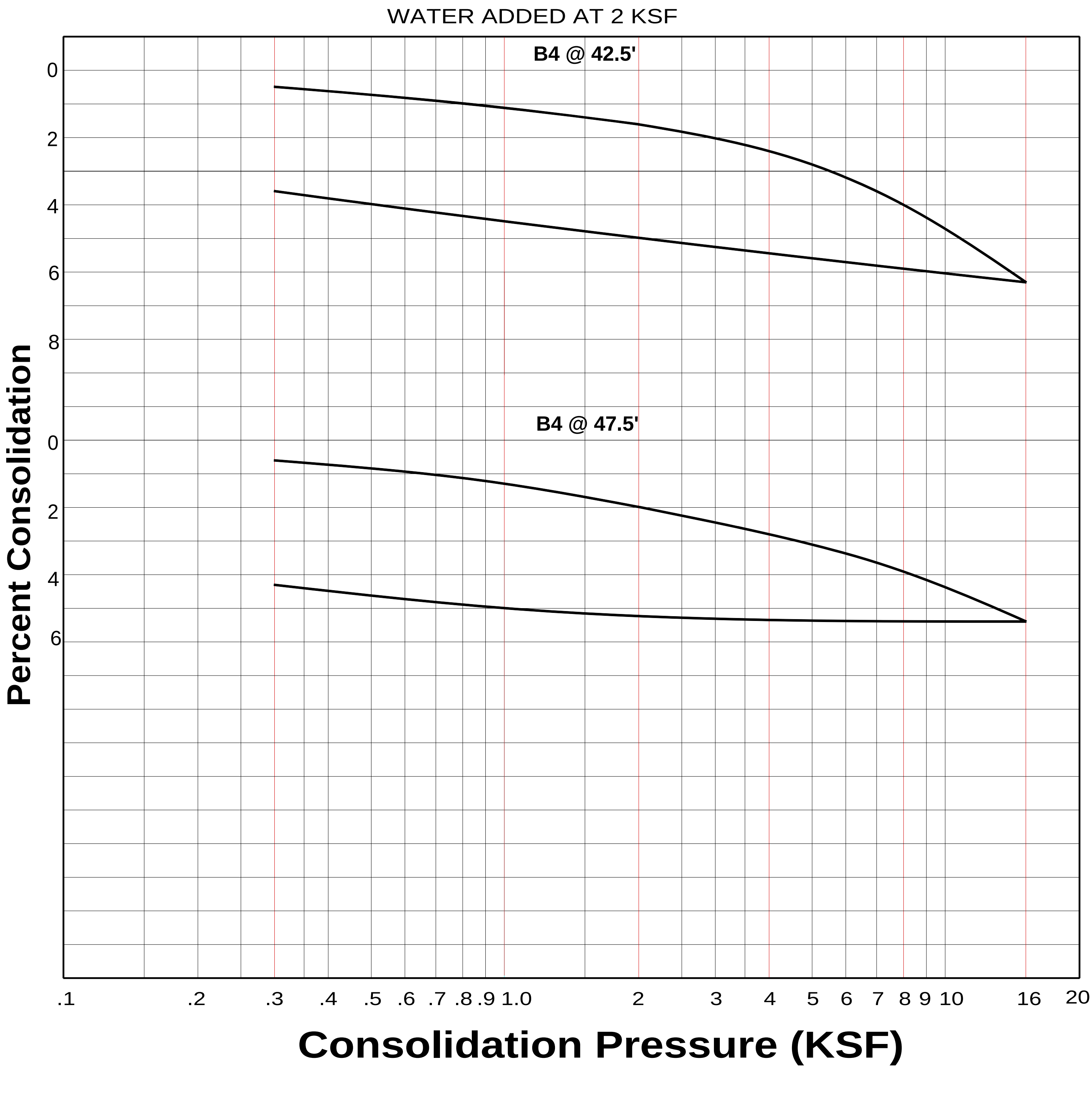
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545

PLATE: C-1

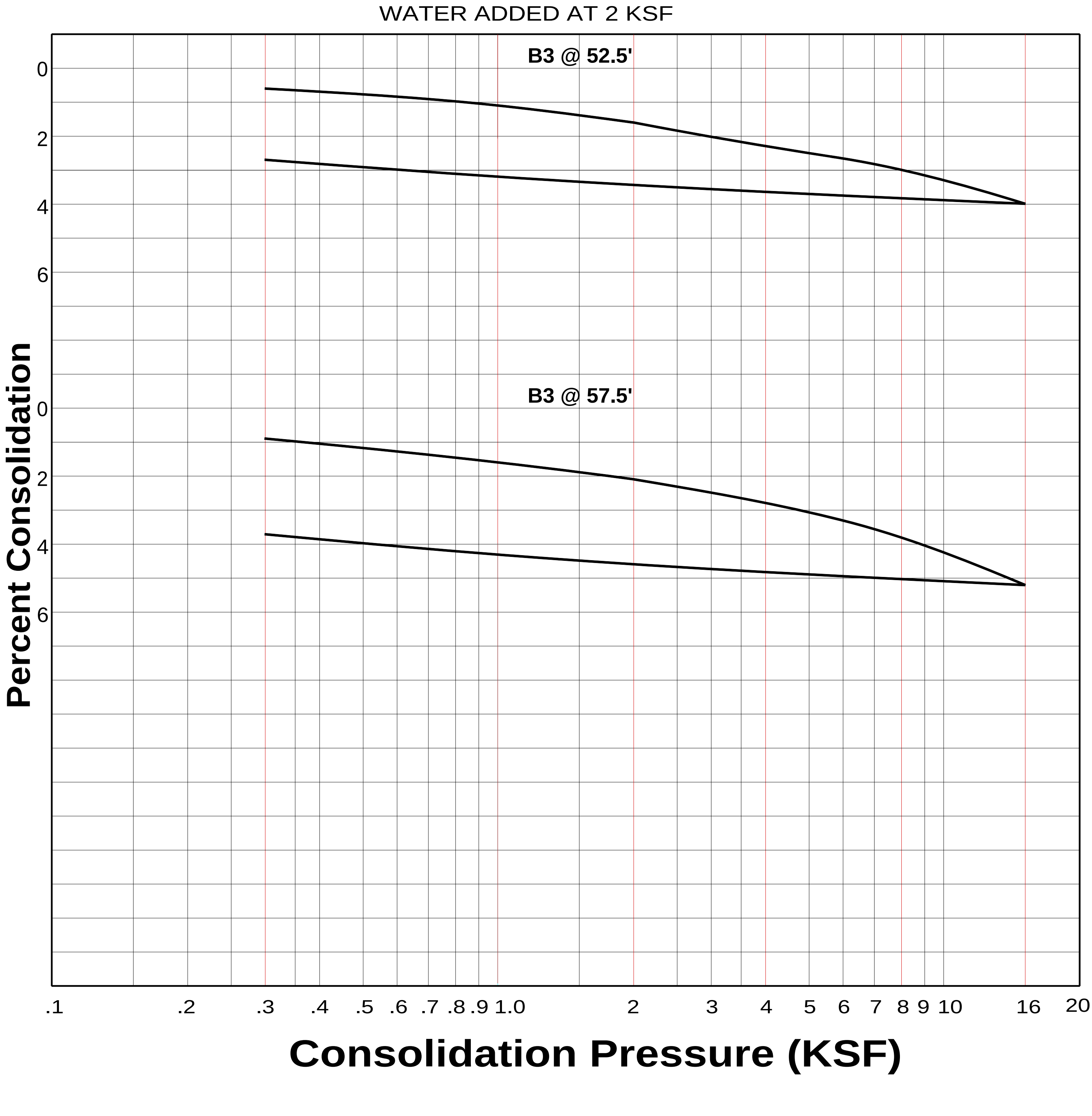


CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP

FILE NO. 21545	**PLATE: C-2**



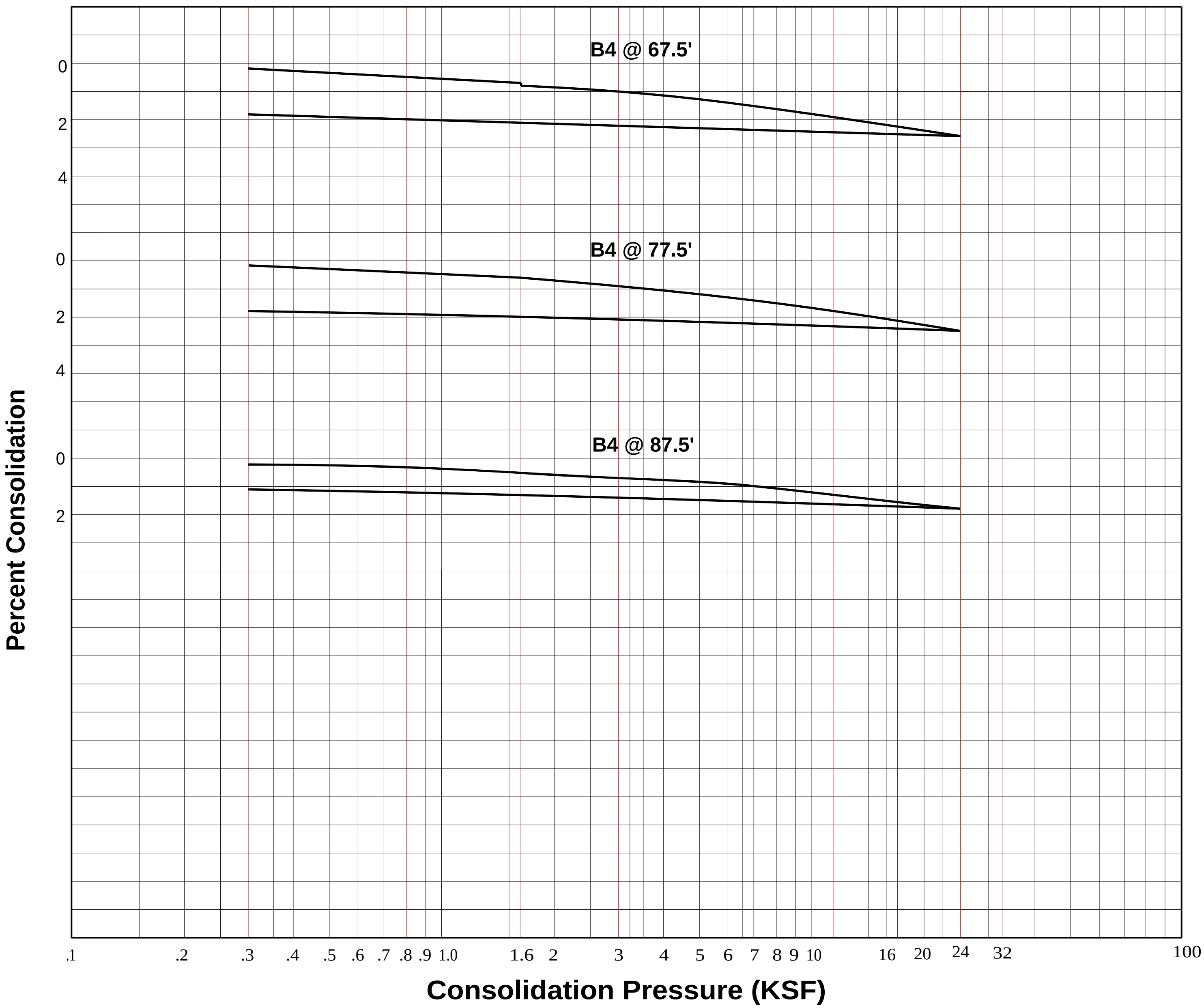
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545	**PLATE: C-3**

(WATER ADDED AT 2 KSF)

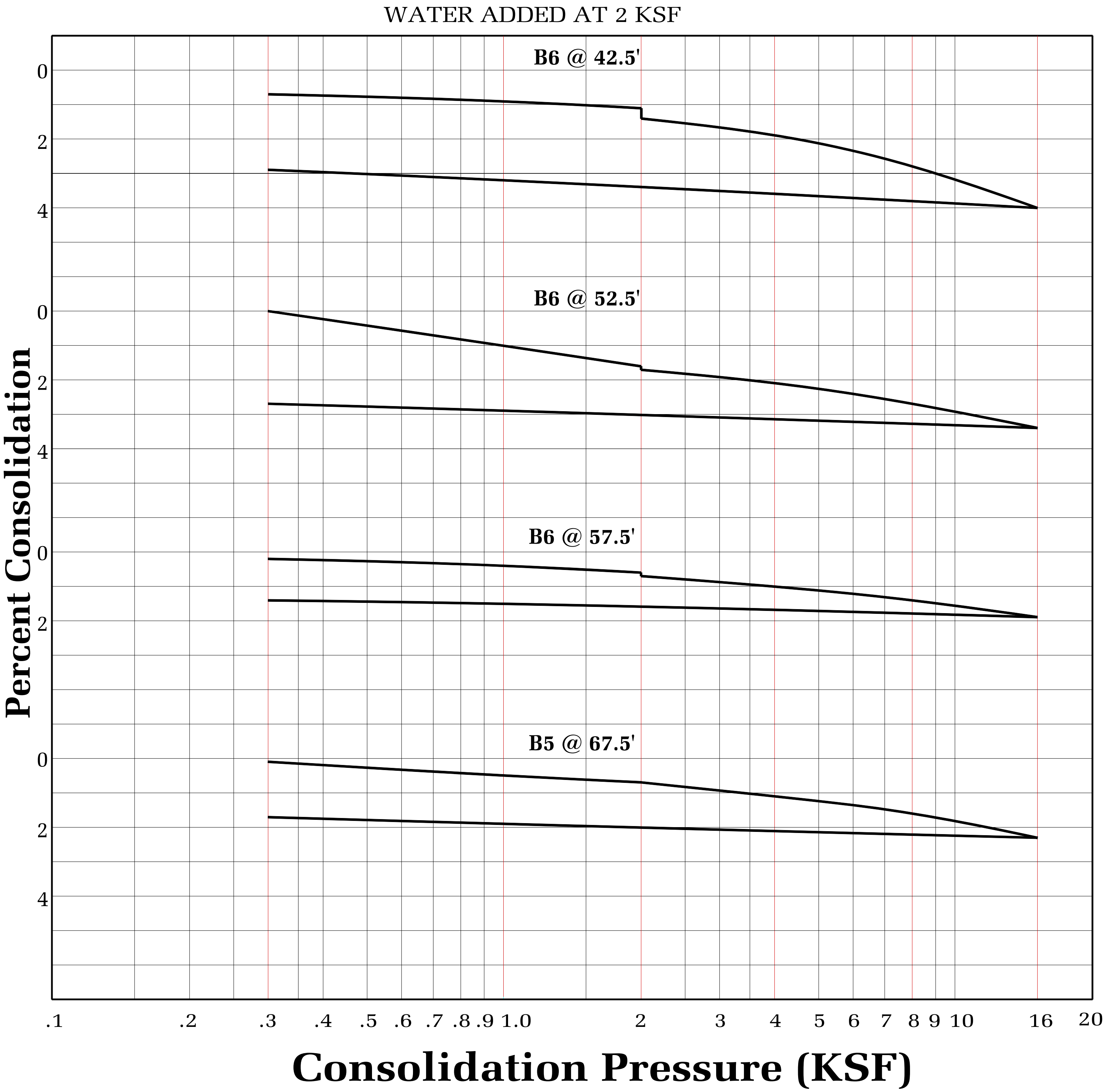


CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP

FILE NO. 21545 | **PLATE: C-4**



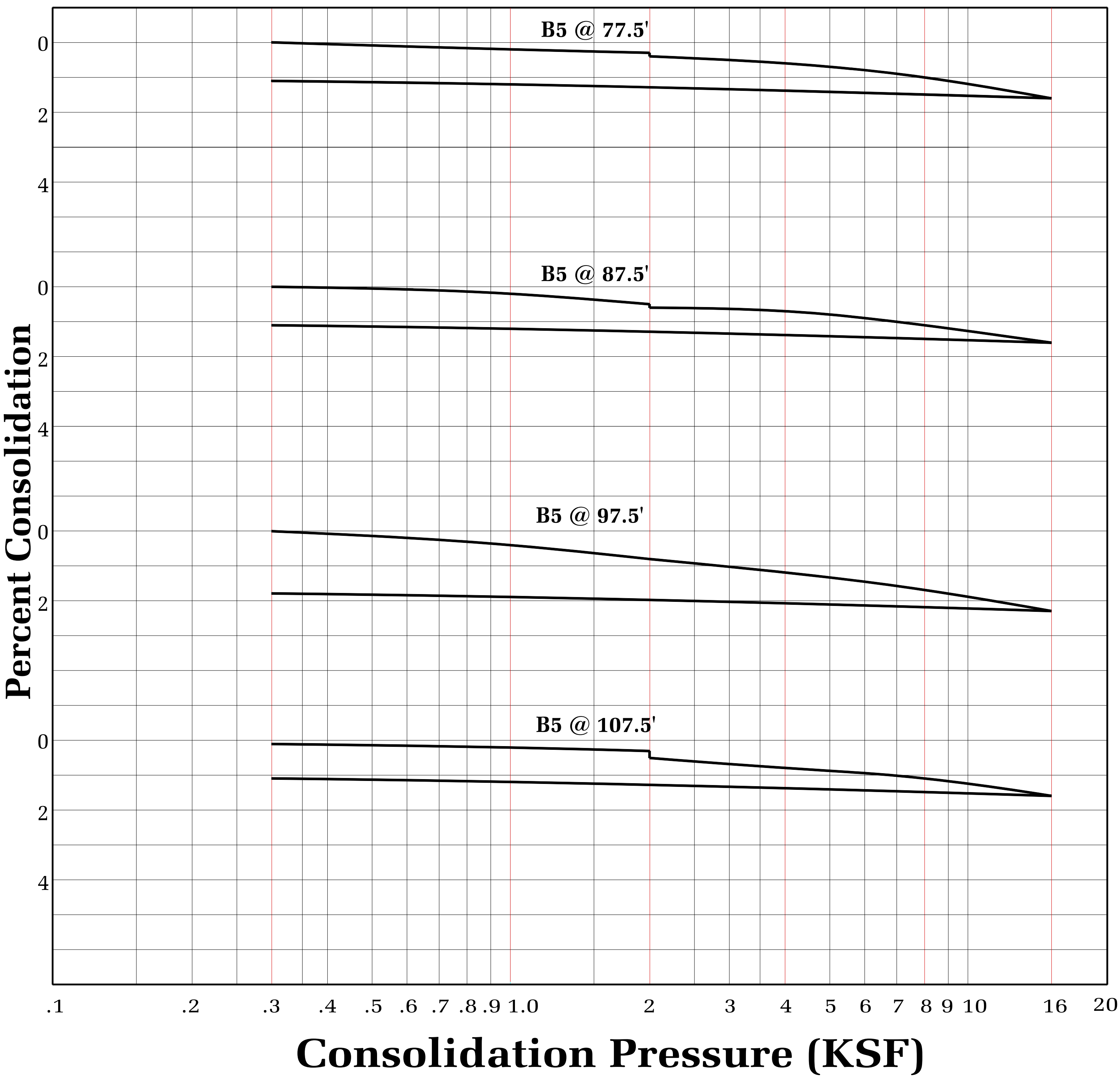
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545 | **PLATE: C-5**

WATER ADDED AT 2 KSF



CONSOLIDATION TEST

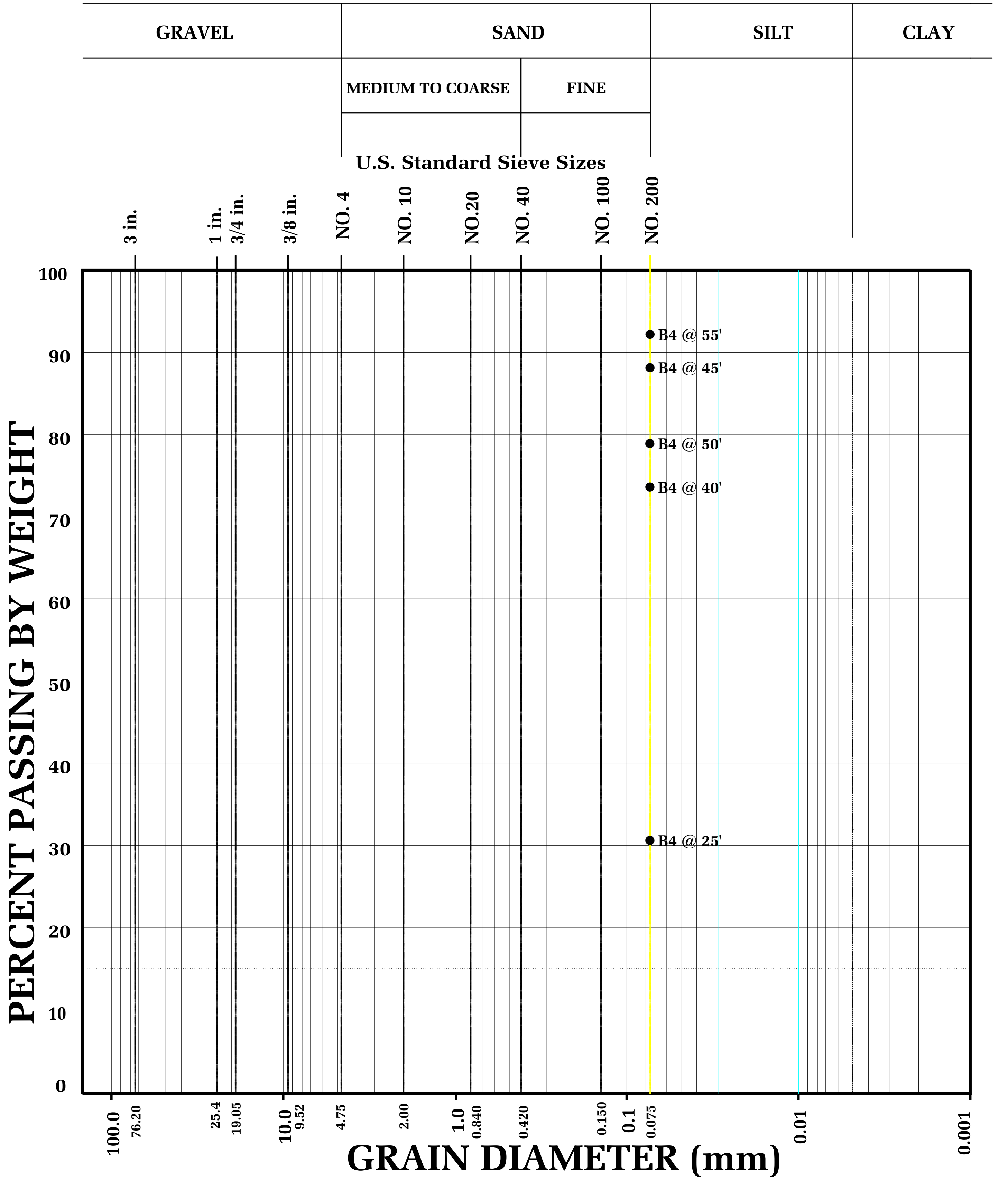
Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545	**PLATE: C-6**

SULFATE CONTENT

SAMPLE	B1 @ 5'	B1 @ 10'	B1 @ 25'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%	< 0.10%



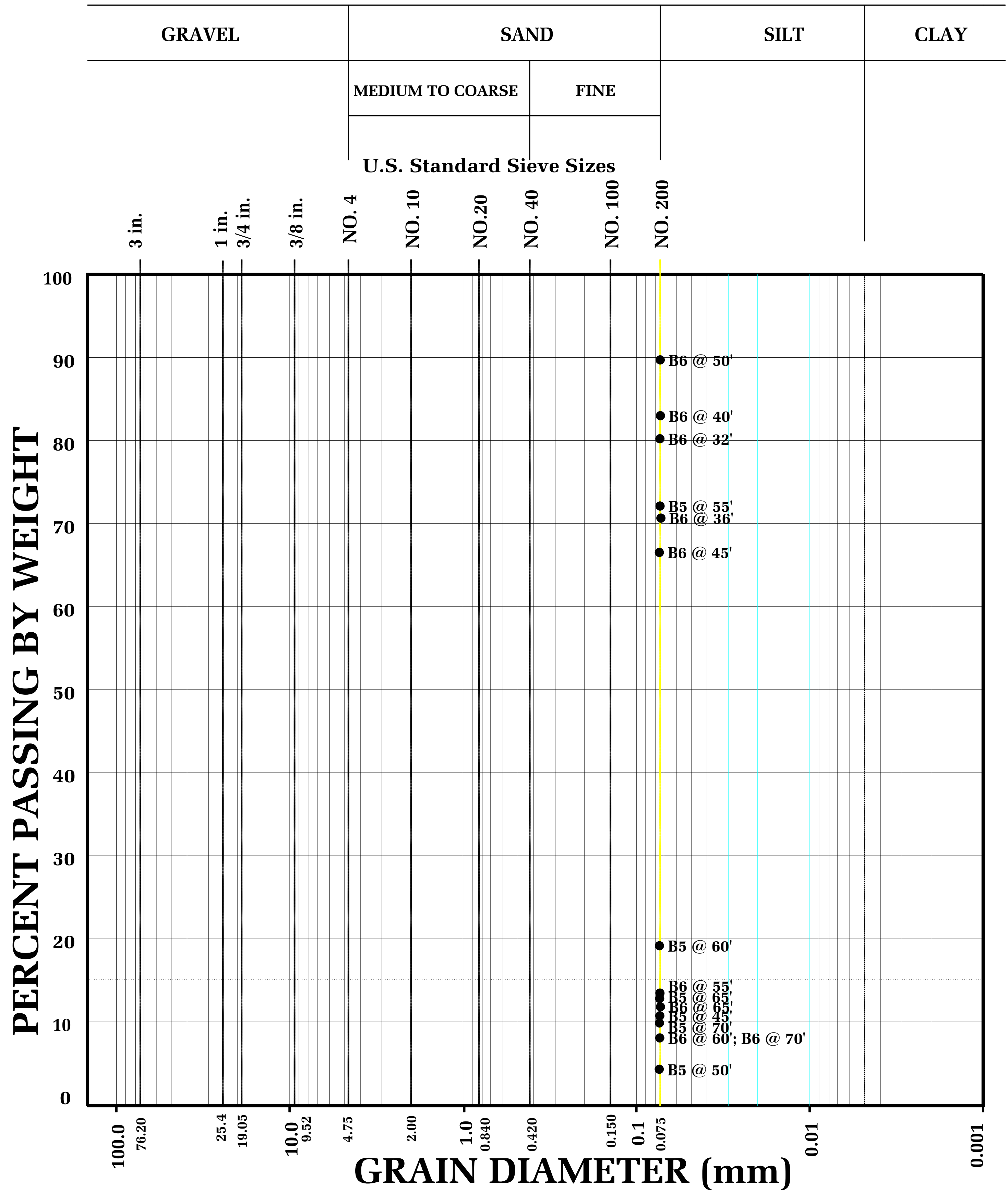
GRAIN SIZE DISTRIBUTION

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP

FILE NO. 21545

PLATE: E

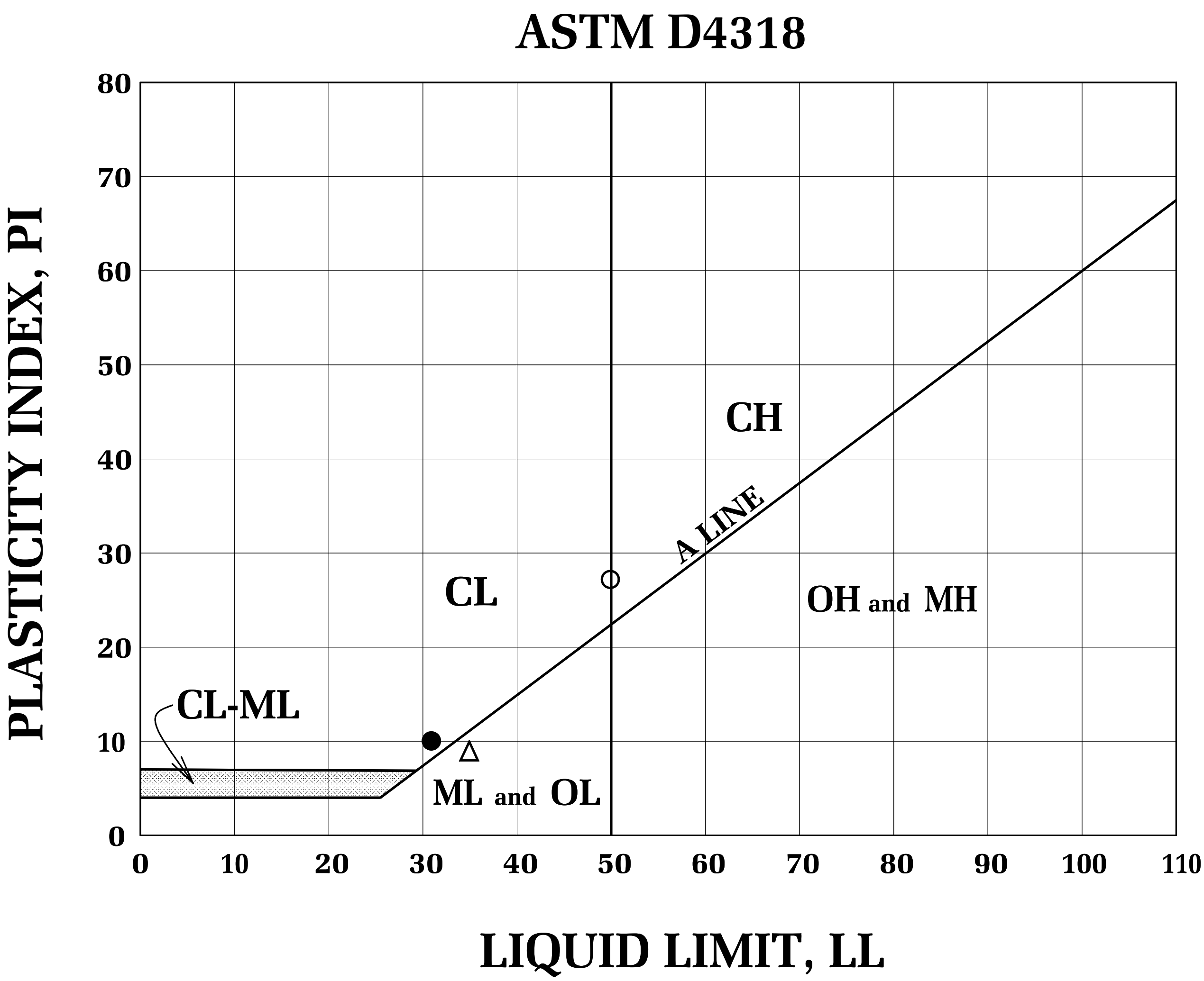


GRAIN SIZE DISTRIBUTION

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545	PLATE: E-2



BORING NUMBER	DEPTH (FEET)	TEST SYMBOL	LL	PL	PI	DESCRIPTION
B4	45	○	50	23	27	CH
B4	50	●	31	21	10	CL
B4	55	△	35	26	9	ML

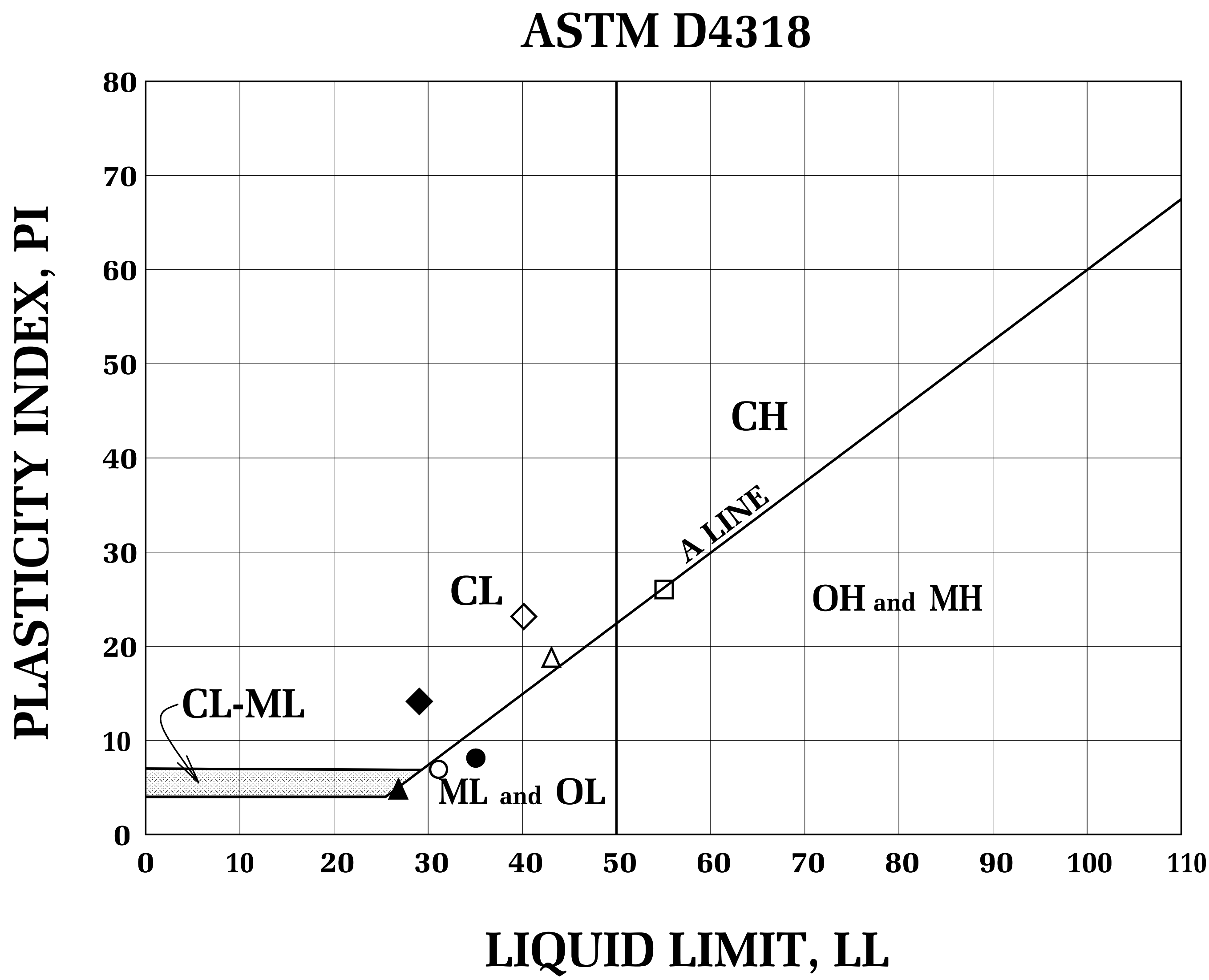
ATTERBERG LIMITS DETERMINATION

Geotechnologies, Inc.
Consulting Geotechnical Engineers

TF BROADWAY, LP

FILE NO. 21545

PLATE: F



BORING NUMBER	DEPTH (FEET)	TEST SYMBOL	LL	PL	PI	DESCRIPTION
B5	50	○	31	24	7	ML
B5	55	●	35	27	8	ML
B6	32	◇	40	17	23	CL
B6	36	◆	29	15	14	CL
B6	40	△	43	26	19	CL
B6	45	▲	27	22	5	ML
B6	50	□	55	29	26	CH

ATTERBERG LIMITS DETERMINATION

Geotechnologies, Inc.
Consulting Geotechnical Engineers

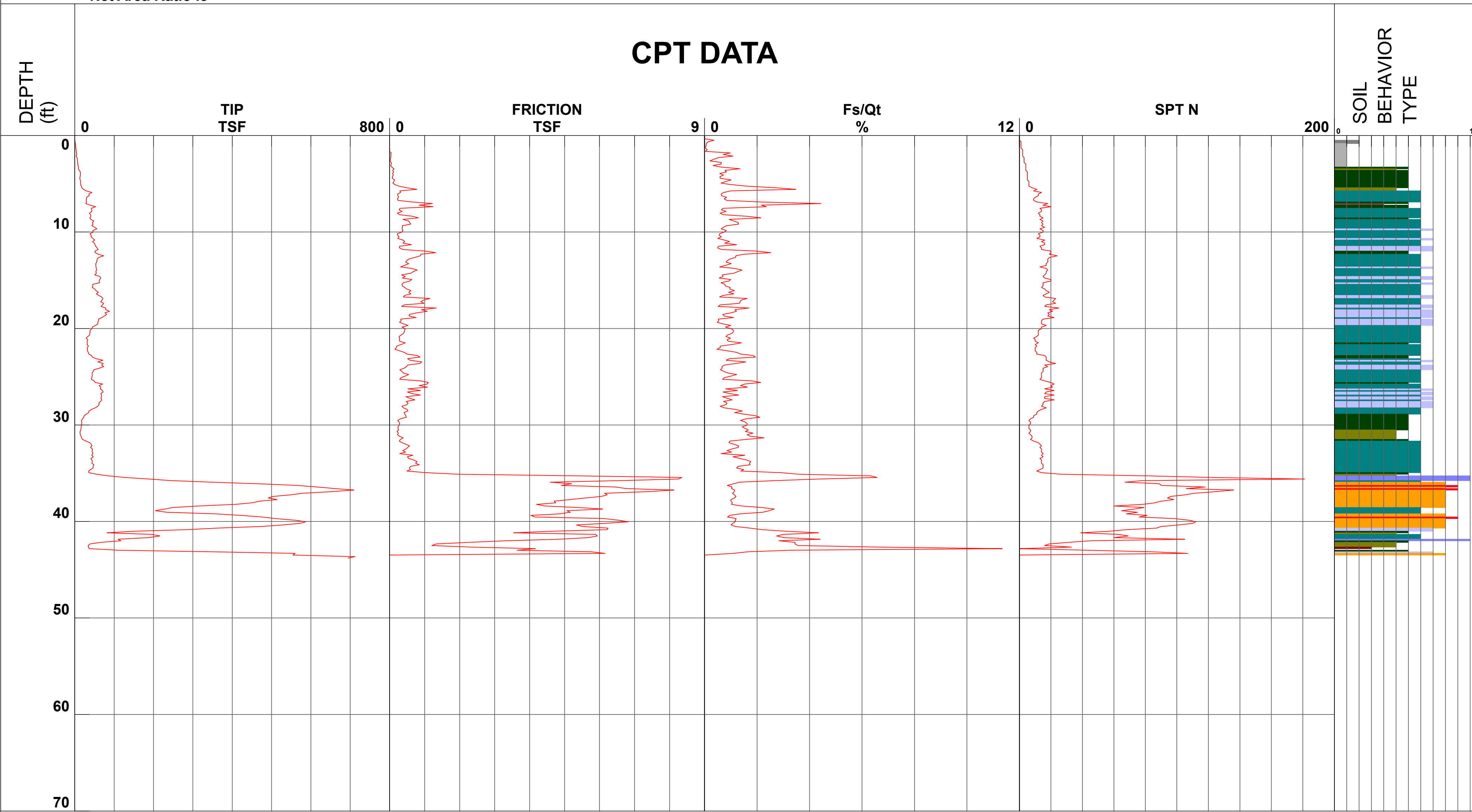
TF BROADWAY LP
942 N. BROADWAY, LOS ANGELES

FILE NO. 21545 | **PLATE: F-2**

Geotechnologies Inc

Project	T.F Broadway	Operator	RC AS	Filename	SDF(924).cpt
Job Number	21545	Cone Number	DDG1448	GPS	
Hole Number	CPT-01	Date and Time	6/21/2018 9:09:40 AM	Maximum Depth	43.80 ft
EST GW Depth During Test		43.80 ft			

Net Area Ratio .8



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

T.F Broadway

Project ID: Geotehnologies
Data File: SDF(924).cpt
CPT Date: 6/21/2018 9:09:40 AM
GW During Test: 80 ft

Sounding ID: CPT-01
Project No: 21545
Cone/Rig: DDG1448

. . Depth ft	. qc PS tsf	* qc1n PS -	. q1ncs PS -	* qt PS tsf	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
0.33	1.1	-0.1	-	1.1	0.0	0.1	0.1	1	sensitive fine SOIL	115	2.0	1	1	1	-	-	0.1	9.9	95	3.48	15
0.49	1.1	0.3	-	1.1	0.0	0.6	0.4	1	sensitive fine SOIL	115	2.0	0	1	0	-	-	0.1	9.9	95	4.11	15
0.66	1.1	1.0	-	1.1	0.0	0.7	0.1	1	sensitive fine SOIL	115	2.0	1	1	0	-	-	0.1	9.3	95	3.50	15
0.82	1.3	2.1	-	1.3	0.0	0.2	0.1	1	sensitive fine SOIL	115	2.0	1	1	1	-	-	0.1	8.9	71	3.17	15
0.98	1.9	3.1	-	1.9	0.0	0.1	0.1	1	sensitive fine SOIL	115	2.0	2	1	1	-	-	0.1	9.9	59	3.01	15
1.15	2.3	3.7	-	2.3	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	2	1	1	-	-	0.2	9.9	53	2.92	15
1.31	2.7	4.4	-	2.7	0.0	0.1	0.1	1	sensitive fine SOIL	115	2.0	2	1	1	-	-	0.2	9.9	49	2.85	15
1.48	3.3	5.2	-	3.3	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	3	2	1	-	-	0.2	9.9	44	2.77	15
1.64	4.0	6.4	-	4.0	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	3	2	2	-	-	0.3	9.9	40	2.69	15
1.80	4.3	6.9	-	4.3	0.0	0.1	1.0	4	clayy SILT to silty CLAY	115	2.0	3	2	2	-	-	0.3	9.9	52	2.91	15
1.97	4.9	7.8	-	4.9	0.0	0.0	0.7	4	clayy SILT to silty CLAY	115	2.0	4	2	2	-	-	0.3	9.9	46	2.81	15
2.13	3.4	5.4	-	3.4	0.0	0.0	1.1	3	silty CLAY to CLAY	115	1.5	4	2	2	-	-	0.2	8.8	61	3.03	15
2.30	5.8	9.3	-	5.8	0.0	-0.1	0.5	4	clayy SILT to silty CLAY	115	2.0	5	3	2	-	-	0.4	9.9	40	2.69	15
2.46	6.1	9.9	-	6.1	0.0	0.1	0.4	5	silty SAND to sandy SILT	120	4.0	2	2	3	5	36	-	-	36	2.61	16
2.62	6.9	11.1	30.3	6.9	0.0	0.1	0.2	5	silty SAND to sandy SILT	120	4.0	3	2	3	5	36	-	-	30	2.49	16
2.79	7.2	11.5	-	7.2	0.0	0.2	0.7	4	clayy SILT to silty CLAY	115	2.0	6	4	3	-	-	0.5	9.9	37	2.63	15
2.95	7.9	12.7	41.2	7.9	0.0	0.2	0.6	5	silty SAND to sandy SILT	120	4.0	3	2	3	5	36	-	-	35	2.59	16
3.12	8.1	13.0	34.7	8.1	0.0	0.1	0.3	5	silty SAND to sandy SILT	120	4.0	3	2	3	5	36	-	-	30	2.48	16
3.28	9.5	15.2	43.4	9.5	0.1	0.2	0.6	5	silty SAND to sandy SILT	120	4.0	4	2	4	5	37	-	-	31	2.52	16
3.45	9.2	14.8	-	9.2	0.1	0.2	1.4	4	clayy SILT to silty CLAY	115	2.0	7	5	4	-	-	0.6	9.9	39	2.68	15
3.61	11.1	17.8	48.6	11.1	0.1	0.2	0.8	5	silty SAND to sandy SILT	120	4.0	4	3	4	10	37	-	-	30	2.49	16
3.77	13.9	22.3	53.3	13.9	0.1	0.2	0.8	5	silty SAND to sandy SILT	120	4.0	6	3	5	18	38	-	-	27	2.42	16
3.94	14.2	22.7	47.4	14.2	0.1	0.5	0.6	5	silty SAND to sandy SILT	120	4.0	6	4	5	18	38	-	-	24	2.34	16
4.10	14.3	22.9	51.1	14.3	0.1	0.3	0.7	5	silty SAND to sandy SILT	120	4.0	6	4	5	18	38	-	-	26	2.38	16
4.27	13.7	21.9	47.1	13.7	0.1	0.3	0.6	5	silty SAND to sandy SILT	120	4.0	5	3	5	17	37	-	-	25	2.36	16
4.43	12.7	20.3	46.4	12.7	0.1	0.2	0.6	5	silty SAND to sandy SILT	120	4.0	5	3	5	14	36	-	-	26	2.39	16
4.59	13.9	22.3	57.4	13.9	0.1	0.3	1.0	5	silty SAND to sandy SILT	120	4.0	6	3	5	17	37	-	-	29	2.46	16
4.76	14.9	23.9	54.2	14.9	0.1	0.2	0.8	5	silty SAND to sandy SILT	120	4.0	6	4	6	20	37	-	-	26	2.39	16
4.92	14.4	23.2	49.1	14.4	0.1	0.3	0.6	5	silty SAND to sandy SILT	120	4.0	6	4	5	19	37	-	-	24	2.35	16
5.09	14.9	24.0	57.7	14.9	0.1	0.1	1.0	5	silty SAND to sandy SILT	120	4.0	6	4	6	20	37	-	-	27	2.42	16
5.25	16.6	26.6	74.7	16.6	0.3	0.2	1.7	5	silty SAND to sandy SILT	120	4.0	7	4	6	23	37	-	-	31	2.51	16
5.41	17.7	28.4	-	17.7	0.5	0.2	2.8	4	clayy SILT to silty CLAY	115	2.0	14	9	7	-	-	1.2	9.9	36	2.62	15
5.58	22.3	35.7	-	22.3	0.8	0.1	3.5	4	clayy SILT to silty CLAY	115	2.0	18	11	9	-	-	1.5	9.9	36	2.61	15
5.74	29.2	46.8	75.9	29.2	0.3	0.4	1.0	5	silty SAND to sandy SILT	120	4.0	12	7	10	42	40	-	-	18	2.18	16
5.91	43.5	69.7	86.9	43.5	0.3	0.2	0.7	6	clean SAND to silty SAND	125	5.0	14	9	13	55	42	-	-	12	1.96	16
6.07	36.0	57.8	74.9	36.0	0.2	0.6	0.6	6	clean SAND to silty SAND	125	5.0	12	7	11	49	41	-	-	13	2.00	16
6.23	36.3	58.2	75.6	36.3	0.2	0.1	0.7	6	clean SAND to silty SAND	125	5.0	12	7	11	49	40	-	-	13	2.00	16
6.40	29.9	47.3	72.1	29.9	0.3	0.3	0.8	5	silty SAND to sandy SILT	120	4.0	12	7	10	42	39	-	-	17	2.14	16
6.56	29.7	46.4	69.0	29.7	0.2	0.5	0.8	5	silty SAND to sandy SILT	120	4.0	12	7	10	42	39	-	-	16	2.12	16
6.73	28.8	44.4	70.2	28.8	0.2	0.4	0.9	5	silty SAND to sandy SILT	120	4.0	11	7	9	40	39	-	-	18	2.16	16
6.89	30.0	45.7	104.9	30.0	0.7	0.3	2.2	5	silty SAND to sandy SILT	120	4.0	11	7	11	41	39	-	-	26	2.40	16
7.05	27.6	44.2	-	27.6	1.2	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	22	14	11	-	-	1.9	9.9	36	2.62	15
7.22	39.2	58.4	116.3	39.2	0.8	0.2	2.2	5	silty SAND to sandy SILT	120	4.0	15	10	13	49	40	-	-	23	2.31	16
7.38	52.7	77.5	139.0	52.7	1.2	0.1	2.4	5	silty SAND to sandy SILT	120	4.0	19	13	17	59	42	-	-	21	2.25	16
7.55	41.9	60.9	79.2	41.9	0.3	0.4	0.7	6	clean SAND to silty SAND	125	5.0	12	8	12	51	40	-	-	13	2.00	16
7.71	42.8	61.5	78.1	42.8	0.3	1.0	0.6	6	clean SAND to silty SAND	125	5.0	12	9	12	51	40	-	-	12	1.98	16
7.87	43.4	61.7	83.0	43.4	0.4	0.9	0.8	6	clean SAND to silty SAND	125	5.0	12	9	12	51	40	-	-	14	2.03	16
8.04	37.1	52.2	69.3	37.1	0.2	0.2	0.6	6	clean SAND to silty SAND	125	5.0	10	7	10	46	39	-	-	14	2.02	16
8.20	40.0	55.7	75.3	40.0	0.3	0.1	0.7	6	clean SAND to silty SAND	125	5.0	11	8	11	48	39	-	-	14	2.04	16
8.37	40.9	56.4	99.8	41.0	0.7	0.4	1.6	5	silty SAND to sandy SILT	120	4.0	14	10	12	48	39	-	-	20	2.24	16
8.53	38.3	52.3	110.4	38.3	0.8	0.5	2.2	5	silty SAND to sandy SILT	120	4.0	13	10	12	46	39	-	-	24	2.35	16
8.69	40.7	54.9	80.7	40.7	0.4	0.2	0.9	5	silty SAND to sandy SILT	120	4.0	14	10	11	47	39	-	-	16	2.11	16
8.86	48.3	64.7	93.4	48.3	0.5	0.5	1.1	5	silty SAND to sandy SILT	120	4.0	16	12	13	53	40	-	-	16	2.09	16
9.02	44.6	59.2	93.3	44.6	0.6	0.9	1.3	5	silty SAND to sandy SILT	120	4.0	15	11	12	50	40	-	-	18	2.16	16
9.19	46.5	61.1	95.5	46.5	0.6	0.1	1.3	5	silty SAND to sandy SILT	120	4.0	15	12	13	51	40	-	-	18	2.15	16
9.35	43.4	56.6	79.3	43.4	0.4	-0.2	0.8	5	silty SAND to sandy SILT	120	4.0	14	11	11	48	39	-	-	15	2.07	16
9.51	50.9	65.7	83.6	50.9	0.4	0.1	0.7	6	clean SAND to silty SAND	125	5.0	13	10	13	53	40	-	-	12	1.98	16
9.68	55.8	71.4	86.2	55.8	0.4	0.5	0.6	6	clean SAND to silty SAND	125	5.0	14	11	14	56	40	-	-	11	1.92	16
9.84	46.0	58.3	80.5	46.0	0.4	0.1	0.8	6	clean SAND to silty SAND	125	5.0	12	9	12	49	39	-	-	15	2.06	16
10.01	46.6	58.6	78.5	46.6	0.3	0.6	0.8	6	clean SAND to silty SAND	125	5.0	12	9	12	49	39	-	-	14	2.03	16
10.17	38.6	48.1	65.9	38.6	0.2	0.7	0.6	6	clean SAND to silty SAND	125	5.0	10	8	10	43	38	-	-	14	2.05	16
10.34	41.3	51.0	67.5	41.3	0.2	0.7	0.6	6	clean SAND to silty SAND	125	5.0	10	8	10	45	38	-	-	13	2.02	16
10.50	41.5	50.9	69.8	41.5	0.3	0.0	0.7	6	clean SAND to silty SAND	125	5.0	10	8	10	45	38	-	-	14	2.05	16
10.66	45.9	55.8	69.9	45.9	0.2	-0.2	0.5	6	clean SAND to silty SAND	125	5.0	11	9	11	48	39	-	-	12	1.96	16
10.83	50.5	60.9	80.7	50.5	0.4	0.9	0.8	6	clean SAND to silty SAND	125	5.0	12	10	12	51	39	-	-	13	2.02	16
10.99	45.1	54.0	80.5	45.1	0.4	-0.1	1.0	5	silty SAND to sandy SILT	120	4.0	14	11	11	47	38	-	-	16	2.12	16
11.16	49.5	58.8	79.3	49.5	0.4	0.2	0.8	6	clean SAND to silty SAND	125	5.0	12	10	12	49	39	-	-	14	2.04	16
11.32	51.3	60.5	92.8	51.3	0.6	-0.2	1.2	5	silty SAND to sandy SILT	120	4.0	15	13	13	50	39	-	-	17	2.14	16
11.48	53.0	62.0	75.7	53.0	0.3	0.7	0.5	6	clean SAND to silty SAND	125	5.0	12	11	12	51	39	-	-	11	1.93	16
11.65	56.5	65.7	77.9	56.6	0.3	0.5	0.5	6	clean SAND to silty SAND	125	5.0	13	11	12	53	39	-	-	10	1.90	16
11.81	59.5	68.6	84.0	59.5	0.4	1.5	0.6	6	clean SAND to silty SAND	125	5.0	14	12	13	55	40	-	-	11	1.94	16
11.98	51.0	58.4	112.1	51.0	1.0	0.5	2.0	5	silty SAND to sandy SILT	120	4.0	15	13	13	49	39	-	-	22	2.29	16
12.14	52.2	59.4	127.0	52.2	1.3	-0.4	2.6	5	silty SAND to sandy SILT	120	4.0	15	13	14	50	39	-	-	25	2.36	16
12.30	59.3	67.1	106.1	59.3	0.9	0.1	1.5	5	silty SAND to sandy SILT	120	4.0	17	15	14	54	39	-	-	18	2.16	16
12.47	73.6	82.6	110.6	73.6	0.9	0.6	1.2	6	clean SAND to silty SAND	125	5.0	17	15	16	61	40	-	-	14	2.03	16
12.63	60.5	67.5	97.7	60.5	0.7	0.3	1.2	5	silty SAND to sandy SILT	120	4.0	17	15	14	54	39	-	-	16	2.10	16
12.80	57.0	63.2	88.1	57.0	0.5	0.3	1.0	5	silty SAND to sandy SILT	120	4.0	16	14	13	52	39	-	-	15	2.06	16
12.96	56.2	61.9	84.9	56.2	0.5	1.1	0.9	6	clean SAND to silty SAND	125	5.0	12	11	12	51	39	-	-	14	2.05	16
13.12	55.5	60.7	82.5	55.6	0.5	0.7	0.8	6	clean SAND to silty SAND	125	5.0	12	11	12	51	39	-	-	14	2.04	16
13.29	53.2	57.8	85.3	53.2	0.5	0.3	1.0	5	silty SAND to sandy SILT	120	4.0	14	13	12	49	38	-	-	16	2.11	16
13.45	53.2	57.4	79.4	53.2	0.4	-0.1	0.8	6	clean SAND to silty SAND	125	5.0	11	11	12	49	38	-	-	15	2.06	16
13.62	54.1	58.0	73.8	54.1	0.3	-0.8	0.6	6	clean SAND to silty SAND	125	5.0	12	11	11	49	38	-	-	12	1.98	16
13.78	54.5	58.1	89.7	54.5	0.6	1.2	1.2	5	silty SAND to sandy SILT	120	4.0	15	14	12	49	38	-	-	17	2.15	16
13.94	55.3	58.6	97.2	55.3	0.8	0.2	1.4	5	silty SAND to sandy SILT	120	4.0	15	14	12	49	38	-	-	19	2.20	16
14.11	53.3	56.2	90.9	53.3	0.7	-0.2	1.3	5	silty SAND to sandy SILT	120	4.0	14	13	12	48	38	-	-	18	2.18	16
14.27	54.7	57.4	87.7	54.7	0.6	0.1	1.1	5	silty SAND to sandy SILT	120	4.0	14	14	12	49	38	-	-	17	2.14	16
14.44	50.3	52.5	72.1	50.3	0.3	-0.8	0.7	6	clean SAND to silty SAND	125	5.0	10	10	11	46	37	-	-	14	2.05	16
14.60	63.5	65.8	83.5	63.5	0.4	0.0	0.7	6	clean SAND to silty SAND	125	5.0	13	13	13	53	39	-	-	12	1.97	16
14.76	65.9	67.9	81.3	65.9	0.4	-0.1	0.6	6	clean SAND to silty SAND	125	5.0	14	13	13	54	39	-	-	11	1.91	16
14.93	63.5	65.1	90.7	63.5	0.6	0.2	1.0	5	silty SAND to sandy SILT	120	4.0	16	16	13	53	39	-	-	15	2.06	16
15.09	62.0	63.2	87.3	62.0	0.6	0.8	0.9	5	silty SAND to sandy SILT	120	4.0	16	16	13	52	38	-	-	15	2.06	16
15.26	62.7	63.5	79.5	62.7	0.4	1.2	0.6	6	clean SAND to silty SAND	125	5.0	13	13	12	52	38	-	-	12	1.96	16
15.42	45.7	46.0	69.7	45.7	0.4	-0.1	0.8	5	silty SAND to sandy SILT	120	4.0	12	11	10	41	36	-	-	17	2.13	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Geotehnologies
Data File: SDF(924).cpt
CPT Date: 6/21/2018 9:09:40 AM
GW During Test: 80 ft

Sounding ID: CPT-01
Project No: 21545
Cone/Rig: DDG1448

. Depth ft	. qc PS tsf	* qc1n PS -	. q1ncs PS -	* qt PS tsf	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
15.58	45.7	45.8	70.0	45.7	0.4	-0.1	0.8	5	silty SAND to sandy SILT	120	4.0	11	11	9	41	36	-	-	17	2.14	16
15.75	44.1	44.0	73.7	44.1	0.4	0.9	1.0	5	silty SAND to sandy SILT	120	4.0	11	11	9	40	36	-	-	19	2.20	16
15.91	50.8	50.4	78.3	50.8	0.5	-0.6	1.0	5	silty SAND to sandy SILT	120	4.0	13	13	11	44	37	-	-	17	2.15	16
16.08	53.7	53.0	85.0	53.7	0.6	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	13	13	11	46	37	-	-	18	2.17	16
16.24	59.8	58.7	83.4	59.8	0.5	1.7	0.9	5	silty SAND to sandy SILT	120	4.0	15	15	12	49	38	-	-	15	2.08	16
16.40	54.7	53.4	84.6	54.7	0.6	-0.6	1.1	5	silty SAND to sandy SILT	120	4.0	13	14	11	46	37	-	-	18	2.16	16
16.57	61.0	59.3	78.1	61.0	0.4	0.0	0.7	6	clean SAND to silty SAND	125	5.0	12	12	12	50	38	-	-	13	2.01	16
16.73	68.2	66.0	80.2	68.2	0.4	0.3	0.6	6	clean SAND to silty SAND	125	5.0	13	14	13	53	38	-	-	11	1.93	16
16.90	71.4	68.7	110.9	71.4	1.2	0.3	1.6	5	silty SAND to sandy SILT	120	4.0	17	18	14	55	39	-	-	18	2.18	16
17.06	69.2	66.3	102.9	69.2	1.0	0.0	1.4	5	silty SAND to sandy SILT	120	4.0	17	17	14	53	38	-	-	17	2.15	16
17.23	65.9	62.8	98.8	65.9	0.9	0.7	1.4	5	silty SAND to sandy SILT	120	4.0	16	16	13	52	38	-	-	18	2.16	16
17.39	73.5	69.8	104.0	73.6	1.0	0.3	1.4	5	silty SAND to sandy SILT	120	4.0	17	18	14	55	39	-	-	16	2.12	16
17.55	70.3	66.4	81.2	70.4	0.4	0.2	0.6	6	clean SAND to silty SAND	125	5.0	13	14	13	53	38	-	-	11	1.93	16
17.72	66.6	62.6	76.0	66.6	0.3	-0.6	0.5	6	clean SAND to silty SAND	125	5.0	13	13	12	52	38	-	-	11	1.93	16
17.88	78.5	73.4	117.2	78.5	1.3	-0.9	1.7	5	silty SAND to sandy SILT	120	4.0	18	20	15	57	39	-	-	18	2.17	16
18.05	78.6	73.1	101.8	78.6	0.9	-0.9	1.2	5	silty SAND to sandy SILT	120	4.0	18	20	15	57	39	-	-	15	2.06	16
18.21	88.2	81.7	110.9	88.2	1.1	-0.6	1.2	5	silty SAND to sandy SILT	120	4.0	20	22	16	60	39	-	-	14	2.04	16
18.37	76.9	70.9	96.0	76.9	0.8	1.0	1.0	6	clean SAND to silty SAND	125	5.0	14	15	14	56	38	-	-	14	2.04	16
18.54	81.1	74.5	90.5	81.1	0.6	0.0	0.7	6	clean SAND to silty SAND	125	5.0	15	16	14	57	39	-	-	11	1.93	16
18.70	75.1	68.7	86.9	75.1	0.6	-0.8	0.8	6	clean SAND to silty SAND	125	5.0	14	15	13	55	38	-	-	12	1.97	16
18.87	68.7	62.5	91.6	68.7	0.8	-0.8	1.1	5	silty SAND to sandy SILT	120	4.0	16	17	13	51	38	-	-	16	2.11	16
19.03	60.7	55.0	70.0	60.7	0.3	-0.9	0.5	6	clean SAND to silty SAND	125	5.0	11	12	11	47	37	-	-	12	1.98	16
19.19	60.5	54.6	70.3	60.6	0.3	0.6	0.6	6	clean SAND to silty SAND	125	5.0	11	12	11	47	37	-	-	13	1.99	16
19.36	58.1	52.2	66.8	58.1	0.3	-0.2	0.5	6	clean SAND to silty SAND	125	5.0	10	12	10	46	37	-	-	12	1.98	16
19.52	58.7	52.5	72.2	58.7	0.4	1.3	0.7	6	clean SAND to silty SAND	125	5.0	11	12	11	46	37	-	-	14	2.05	16
19.69	52.7	47.0	76.6	52.7	0.5	0.1	1.0	5	silty SAND to sandy SILT	120	4.0	12	13	10	42	36	-	-	18	2.19	16
19.85	44.5	39.5	65.7	44.5	0.4	-0.5	0.8	5	silty SAND to sandy SILT	120	4.0	10	11	8	36	35	-	-	19	2.20	16
20.01	43.8	38.7	71.1	43.8	0.4	0.0	1.0	5	silty SAND to sandy SILT	120	4.0	10	11	8	36	35	-	-	21	2.26	16
20.18	38.8	34.2	70.0	38.8	0.4	-1.0	1.1	5	silty SAND to sandy SILT	120	4.0	9	10	8	32	34	-	-	24	2.33	16
20.34	38.4	33.7	69.5	38.4	0.4	-1.3	1.1	5	silty SAND to sandy SILT	120	4.0	8	10	8	31	34	-	-	24	2.33	16
20.51	37.9	33.1	67.8	37.9	0.4	-1.2	1.1	5	silty SAND to sandy SILT	120	4.0	8	9	7	31	34	-	-	24	2.33	16
20.67	37.8	32.9	63.1	37.8	0.3	-0.5	0.9	5	silty SAND to sandy SILT	120	4.0	8	9	7	30	33	-	-	22	2.29	16
20.83	32.9	28.5	58.8	32.9	0.3	-1.0	0.8	5	silty SAND to sandy SILT	120	4.0	7	8	6	26	33	-	-	24	2.33	16
21.00	28.7	24.7	60.5	28.7	0.3	-1.2	1.0	5	silty SAND to sandy SILT	120	4.0	6	7	6	21	32	-	-	28	2.43	16
21.16	32.7	28.1	59.7	32.7	0.3	-1.2	0.9	5	silty SAND to sandy SILT	120	4.0	7	8	6	25	32	-	-	24	2.35	16
21.33	31.4	26.9	59.9	31.4	0.3	-0.9	0.9	5	silty SAND to sandy SILT	120	4.0	7	8	6	24	32	-	-	26	2.38	16
21.49	31.7	27.0	72.0	31.7	0.4	-0.4	1.5	5	silty SAND to sandy SILT	120	4.0	7	8	7	24	32	-	-	30	2.48	16
21.65	31.1	26.4	63.2	31.0	0.3	-1.1	1.1	5	silty SAND to sandy SILT	120	4.0	7	8	6	23	32	-	-	27	2.42	16
21.82	34.5	29.2	53.4	34.4	0.2	-1.3	0.6	5	silty SAND to sandy SILT	120	4.0	7	9	6	26	33	-	-	21	2.26	16
21.98	31.7	26.7	51.7	31.7	0.2	-1.3	0.6	5	silty SAND to sandy SILT	120	4.0	7	8	6	23	32	-	-	22	2.30	16
22.15	31.9	26.8	48.4	31.9	0.2	-1.2	0.5	5	silty SAND to sandy SILT	120	4.0	7	8	6	24	32	-	-	21	2.25	16
22.31	32.4	27.1	59.3	32.3	0.3	-1.4	0.9	5	silty SAND to sandy SILT	120	4.0	7	8	6	24	32	-	-	25	2.37	16
22.47	34.3	28.6	69.1	34.2	0.4	-1.5	1.3	5	silty SAND to sandy SILT	120	4.0	7	9	7	26	32	-	-	27	2.43	16
22.64	35.6	29.6	73.4	35.6	0.5	-1.4	1.4	5	silty SAND to sandy SILT	120	4.0	7	9	7	27	32	-	-	28	2.44	16
22.80	42.4	35.1	89.2	42.4	0.8	-0.9	1.9	5	silty SAND to sandy SILT	120	4.0	9	11	8	32	34	-	-	29	2.45	16
22.97	44.7	36.9	92.7	44.7	0.9	-1.2	2.0	5	silty SAND to sandy SILT	120	4.0	9	11	9	34	34	-	-	28	2.45	16
23.13	53.8	44.2	73.6	53.8	0.5	-1.4	1.0	5	silty SAND to sandy SILT	120	4.0	11	13	9	40	35	-	-	19	2.20	16
23.30	71.1	58.2	80.7	71.1	0.6	-1.1	0.8	6	clean SAND to silty SAND	125	5.0	12	14	12	49	37	-	-	15	2.06	16
23.46	58.6	47.9	92.7	58.6	0.9	-1.2	1.6	5	silty SAND to sandy SILT	120	4.0	12	15	11	43	35	-	-	22	2.30	16
23.62	72.3	58.8	91.4	72.3	0.9	-1.3	1.2	5	silty SAND to sandy SILT	120	4.0	15	18	12	49	37	-	-	17	2.15	16
23.79	68.2	55.3	76.6	68.2	0.5	0.3	0.8	6	clean SAND to silty SAND	125	5.0	11	14	11	47	36	-	-	15	2.06	16
23.95	73.2	59.1	77.1	73.2	0.5	-1.6	0.7	6	clean SAND to silty SAND	125	5.0	12	15	12	50	37	-	-	13	2.00	16
24.12	62.3	50.1	70.2	62.2	0.4	-1.3	0.7	6	clean SAND to silty SAND	125	5.0	10	12	10	44	36	-	-	15	2.07	16
24.28	48.4	38.8	60.2	48.4	0.3	-1.1	0.6	5	silty SAND to sandy SILT	120	4.0	10	12	8	36	34	-	-	17	2.15	16
24.44	46.9	37.5	63.0	46.9	0.3	-0.8	0.8	5	silty SAND to sandy SILT	120	4.0	9	12	8	35	34	-	-	19	2.21	16
24.61	43.9	35.0	65.2	43.9	0.4	-0.8	0.9	5	silty SAND to sandy SILT	120	4.0	9	11	8	32	33	-	-	22	2.27	16
24.77	44.2	35.1	74.0	44.2	0.5	-1.4	1.3	5	silty SAND to sandy SILT	120	4.0	9	11	8	32	33	-	-	24	2.35	16
24.94	44.2	35.0	68.5	44.2	0.4	-0.6	1.0	5	silty SAND to sandy SILT	120	4.0	9	11	8	32	33	-	-	23	2.30	16
25.10	43.0	33.9	61.0	43.0	0.3	-1.2	0.8	5	silty SAND to sandy SILT	120	4.0	8	11	7	31	33	-	-	21	2.25	16
25.26	42.1	33.1	58.5	42.1	0.3	-1.6	0.7	5	silty SAND to sandy SILT	120	4.0	8	11	7	31	33	-	-	20	2.24	16
25.43	49.2	38.5	91.2	49.1	0.9	-1.4	1.9	5	silty SAND to sandy SILT	120	4.0	10	12	9	36	34	-	-	27	2.41	16
25.59	51.8	40.5	100.8	51.8	1.1	-1.5	2.2	5	silty SAND to sandy SILT	120	4.0	10	13	10	37	34	-	-	28	2.44	16
25.76	70.3	54.7	97.4	70.3	1.1	-0.9	1.6	5	silty SAND to sandy SILT	120	4.0	14	18	12	47	36	-	-	20	2.24	16
25.92	61.9	48.1	87.8	61.9	0.8	0.0	1.4	5	silty SAND to sandy SILT	120	4.0	12	15	10	43	35	-	-	21	2.26	16
26.08	66.0	51.1	97.2	66.0	1.1	0.0	1.7	5	silty SAND to sandy SILT	120	4.0	13	17	11	45	36	-	-	22	2.29	16
26.25	64.9	50.1	74.0	64.9	0.5	-0.5	0.8	5	silty SAND to sandy SILT	120	4.0	13	16	10	44	35	-	-	16	2.11	16
26.41	70.0	53.9	89.2	70.0	0.9	-0.6	1.3	5	silty SAND to sandy SILT	120	4.0	13	18	11	47	36	-	-	19	2.20	16
26.58	72.1	55.3	75.4	72.1	0.5	-0.8	0.7	6	clean SAND to silty SAND	125	5.0	11	14	11	47	36	-	-	14	2.04	16
26.74	66.3	50.7	78.7	66.3	0.6	-1.3	1.0	5	silty SAND to sandy SILT	120	4.0	13	17	11	45	35	-	-	17	2.15	16
26.90	67.5	51.5	88.5	67.5	0.9	-1.0	1.3	5	silty SAND to sandy SILT	120	4.0	13	17	11	45	35	-	-	20	2.22	16
27.07	67.7	51.4	71.8	67.7	0.5	-0.9	0.7	6	clean SAND to silty SAND	125	5.0	10	14	10	45	35	-	-	15	2.07	16
27.23	66.5	50.4	76.0	66.5	0.6	-1.5	0.9	5	silty SAND to sandy SILT	120	4.0	13	17	10	44	35	-	-	17	2.13	16
27.40	68.4	51.7	82.0	68.4	0.7	-0.6	1.1	5	silty SAND to sandy SILT	120	4.0	13	17	11	45	35	-	-	18	2.17	16
27.56	65.3	49.1	71.1	65.3	0.5	-1.3	0.7	5	silty SAND to sandy SILT	120	4.0	12	16	10	44	35	-	-	16	2.10	16
27.72	61.4	46.1	72.4	61.4	0.5	-1.0	0.9	5	silty SAND to sandy SILT	120	4.0	12	15	10	41	35	-	-	18	2.16	16
27.89	61.6	46.1	71.2	61.6	0.5	-0.7	0.8	5	silty SAND to sandy SILT	120	4.0	12	15	10	41	35	-	-	17	2.15	16
28.05	58.3	43.5	63.4	58.3	0.3	-1.6	0.6	5	silty SAND to sandy SILT	120	4.0	11	15	9	40	34	-	-	16	2.10	16
28.22	52.1	38.8	64.3	52.1	0.4	-0.7	0.8	5	silty SAND to sandy SILT	120	4.0	10	13	8	36	34	-	-	19	2.20	16
28.38	42.8	31.7	70.5	42.8	0.5	-0.8	1.2	5	silty SAND to sandy SILT	120	4.0	8	11	7	29	32	-	-	25	2.38	16
28.54	36.1	26.7	73.1	36.1	0.5	-1.3	1.5	5	silty SAND to sandy SILT	120	4.0	7	9	6	23	31	-	-	30	2.49	16
28.71	35.5	26.2	66.0	35.5	0.4	-1.4	1.2	5	silty SAND to sandy SILT	120	4.0	7	9	6	23	31	-	-	28	2.45	16
28.87	29.3	16.8	-	29.3	0.4	-1.7	1.6	4	clayy SILT to silty CLAY	115	2.0	8	15	4	-	-	1.9	5.2	39	2.68	15
29.04	23.8	13.6	-	23.8	0.5	-1.2	2.1	4	clayy SILT to silty CLAY	115	2.0	7	12	4	-	-	1.6	4.2	48	2.83	15
29.20	22.8	12.9	-	22.8	0.5	-1.5	2.3	4	clayy SILT to silty CLAY	115	2.0	6	11	4	-	-	1.5	3.9	50	2.87	15
29.36	19.5	11.0	-	19.5	0.3	-1.4	1.7	4	clayy SILT to silty CLAY	115	2.0	5	10	3	-	-	1.3	3.3	50	2.87	15
29.53	16.9	9.5	-	16.9	0.2	-1.5	1.5	4	clayy SILT to silty CLAY	115	2.0	5	8	3	-	-	1.1	2.8	52	2.90	15
29.69	17.2	9.6	-	17.2	0.3	-1.6	1.7	4	clayy SILT to silty CLAY	115	2.0	5	9	3	-	-	1.1	2.8	53	2.92	15
29.86	17.6	9.8	-	17.5	0.3	-1.7	1.8	3	silty CLAY to CLAY	115	1.5	7	12	3	-	-	1.1	2.9	54	2.93	15
30.02	16.6	9.1	-	16.5	0.3	-1.6	1.8	3	silty CLAY to CLAY	115	1.5	6	11	3	-	-	1.0	2.7	56	2.96	15
30.19	16.7	9.2	-	16.7	0.2	-1.7	1.6	4	clayy SILT to silty CLAY	115	2.0	5	8	3	-	-	1.1	2.7	54	2.93	15
30.35	15.6	8.5	-	15.6	0.2	-1.5	1.7	3	silty CLAY to CLAY	115	1.5	6	10	3	-	-	1.0	2.5	57	2.98	15
30.51	15.4	8.4	-	15.4	0.3	-1.6	1.9	3	silty CLAY to CLAY	115	1.5	6	10	3	-	-	1.0	2.4	59	3.00	15
30.68	13.6	7.4	-	13.6	0.2	-1.7	1.8	3	silty CLAY to CLAY	115	1.5	5	9	2	-	-	0.8	2.1	62	3.05	15
30.84	13.5	7.2	-	13.4	0.2	-1.6	2.1	3	silty CLAY to CLAY	115	1.5	5	9	2	-	-	0.8	2.1	65	3.09	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

T.F Broadway

Project ID: Geotehnologies
Data File: SDF(924).cpt
CPT Date: 6/21/2018 9:09:40 AM
GW During Test: 80 ft

Sounding ID: CPT-01
Project No: 21545
Cone/Rig: DDG1448

. . Depth ft	. qc PS tsf	* qc1n PS -	. q1ncs PS -	* qt PS tsf	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
31.01	13.9	7.5	-	13.9	0.2	-1.6	1.9	3	silty CLAY to CLAY	115	1.5	5	9	2	-	-	0.9	2.1	62	3.05	15
31.17	16.0	8.5	-	15.9	0.3	-1.6	2.0	3	silty CLAY to CLAY	115	1.5	6	11	3	-	-	1.0	2.5	59	3.00	15
31.33	17.0	9.0	-	17.0	0.4	-1.5	2.5	3	silty CLAY to CLAY	115	1.5	6	11	3	-	-	1.1	2.7	61	3.04	15
31.50	19.3	10.2	-	19.2	0.3	-1.4	1.8	4	clayy SILT to silty CLAY	115	2.0	5	10	3	-	-	1.2	3.0	52	2.91	15
31.66	28.5	15.0	-	28.5	0.3	-1.5	1.0	4	clayy SILT to silty CLAY	115	2.0	7	14	4	-	-	1.9	4.6	37	2.63	15
31.83	38.0	26.7	61.1	38.0	0.4	-1.5	1.0	5	silty SAND to sandy SILT	120	4.0	7	10	6	23	31	-	-	26	2.39	16
31.99	41.6	29.1	67.3	41.5	0.5	-1.5	1.2	5	silty SAND to sandy SILT	120	4.0	7	10	7	26	31	-	-	26	2.40	16
32.15	43.7	30.5	72.9	43.7	0.6	1.1	1.4	5	silty SAND to sandy SILT	120	4.0	8	11	7	28	32	-	-	27	2.42	16
32.32	40.0	27.9	70.8	40.0	0.5	-1.1	1.4	5	silty SAND to sandy SILT	120	4.0	7	10	7	25	31	-	-	29	2.45	16
32.48	45.0	31.3	67.3	44.9	0.5	-1.4	1.1	5	silty SAND to sandy SILT	120	4.0	8	11	7	29	32	-	-	25	2.36	16
32.65	44.0	30.5	61.7	44.0	0.4	-0.6	0.9	5	silty SAND to sandy SILT	120	4.0	8	11	7	28	31	-	-	23	2.32	16
32.81	44.5	30.8	66.3	44.4	0.5	-0.7	1.1	5	silty SAND to sandy SILT	120	4.0	8	11	7	28	32	-	-	25	2.36	16
32.97	46.0	31.7	56.5	46.0	0.3	-0.3	0.7	5	silty SAND to sandy SILT	120	4.0	8	11	7	29	32	-	-	21	2.24	16
33.14	43.1	29.7	77.9	43.1	0.7	-0.7	1.6	5	silty SAND to sandy SILT	120	4.0	7	11	7	27	31	-	-	29	2.47	16
33.30	46.8	32.1	68.7	46.8	0.5	-0.5	1.1	5	silty SAND to sandy SILT	120	4.0	8	12	7	30	32	-	-	25	2.36	16
33.47	40.9	28.0	72.3	40.8	0.5	-1.2	1.4	5	silty SAND to sandy SILT	120	4.0	7	10	7	25	31	-	-	29	2.46	16
33.63	43.2	29.5	79.5	43.2	0.7	-0.1	1.7	5	silty SAND to sandy SILT	120	4.0	7	11	7	27	31	-	-	30	2.48	16
33.79	44.4	21.9	-	44.4	0.8	-0.4	1.8	4	clayy SILT to silty CLAY	115	2.0	11	22	6	-	-	3.0	6.9	36	2.61	15
33.96	43.4	21.3	-	43.4	0.7	-0.8	1.8	4	clayy SILT to silty CLAY	115	2.0	11	22	5	-	-	2.9	6.7	36	2.62	15
34.12	48.4	32.9	85.3	48.4	0.8	-1.4	1.8	5	silty SAND to sandy SILT	120	4.0	8	12	8	30	32	-	-	29	2.46	16
34.29	46.6	31.5	73.5	46.6	0.6	-0.2	1.3	5	silty SAND to sandy SILT	120	4.0	8	12	7	29	32	-	-	27	2.40	16
34.45	46.3	31.3	71.7	46.3	0.6	-0.3	1.3	5	silty SAND to sandy SILT	120	4.0	8	12	7	29	31	-	-	26	2.40	16
34.61	39.8	19.1	-	39.8	0.6	-1.1	1.6	4	clayy SILT to silty CLAY	115	2.0	10	20	5	-	-	2.7	6.0	37	2.63	15
34.78	35.5	17.0	-	35.4	0.5	-1.4	1.5	4	clayy SILT to silty CLAY	115	2.0	8	18	4	-	-	2.4	5.3	38	2.66	15
34.94	35.6	17.0	-	35.6	1.0	-0.6	3.1	3	silty CLAY to CLAY	115	1.5	11	24	5	-	-	2.4	5.3	48	2.84	15
35.11	54.2	25.7	-	54.2	1.9	-0.7	3.7	4	clayy SILT to silty CLAY	115	2.0	13	27	7	-	-	3.7	8.2	43	2.74	15
35.27	86.0	40.6	-	85.9	5.4	-0.6	6.5	3	silty CLAY to CLAY	115	1.5	27	57	11	-	-	5.9	9.9	44	2.76	15
35.43	127.1	59.7	-	127.1	8.3	3.7	6.7	3	silty CLAY to CLAY	115	1.5	40	85	16	-	-	8.8	9.9	38	2.66	15
35.60	188.6	125.4	252.1	188.8	8.3	5.4	4.4	9	very stiff fine SOIL	120	2.0	63	94	28	74	40	-	-	23	2.32	30
35.76	244.9	162.4	230.8	246.0	6.6	53.8	2.7	5	silty SAND to sandy SILT	120	4.0	41	61	33	83	41	-	-	15	2.08	16
35.93	347.8	230.1	245.4	348.7	4.6	48.4	1.3	6	clean SAND to silty SAND	125	5.0	46	70	41	95	43	-	-	7	1.74	16
36.09	465.9	307.5	307.5	466.1	5.2	10.0	1.1	6	clean SAND to silty SAND	125	5.0	61	93	52	95	44	-	-	5	1.61	16
36.26	566.0	372.7	372.7	566.2	4.9	9.6	0.9	6	clean SAND to silty SAND	125	5.0	75	100	61	95	45	-	-	5	1.47	16
36.42	616.2	404.8	404.8	616.4	6.5	5.8	1.1	6	clean SAND to silty SAND	125	5.0	81	100	67	95	46	-	-	5	1.51	16
36.58	661.1	433.2	433.2	661.3	6.8	11.8	1.0	6	clean SAND to silty SAND	125	5.0	87	100	71	95	46	-	-	5	1.49	16
36.75	709.0	463.5	463.5	709.1	8.1	5.9	1.1	6	clean SAND to silty SAND	125	5.0	93	100	77	95	46	-	-	5	1.51	16
36.91	655.0	427.2	427.2	655.1	7.4	5.0	1.1	6	clean SAND to silty SAND	125	5.0	85	100	71	95	46	-	-	5	1.53	16
37.08	578.2	376.3	376.3	578.3	6.1	1.4	1.1	6	clean SAND to silty SAND	125	5.0	75	100	63	95	45	-	-	5	1.54	16
37.24	548.4	356.0	356.0	548.4	6.2	3.8	1.1	6	clean SAND to silty SAND	125	5.0	71	100	60	95	45	-	-	5	1.57	16
37.40	503.6	326.2	326.2	503.7	6.0	3.2	1.2	6	clean SAND to silty SAND	125	5.0	65	100	56	95	45	-	-	5	1.62	16
37.57	491.3	317.6	317.6	491.4	5.6	1.6	1.1	6	clean SAND to silty SAND	125	5.0	64	98	54	95	44	-	-	5	1.60	16
37.73	513.8	331.3	331.3	513.8	5.2	1.4	1.0	6	clean SAND to silty SAND	125	5.0	66	100	55	95	45	-	-	5	1.55	16
37.90	469.6	302.2	302.2	469.7	4.7	1.7	1.0	6	clean SAND to silty SAND	125	5.0	60	94	51	95	44	-	-	5	1.57	16
38.06	449.8	288.7	288.7	449.8	4.7	0.4	1.1	6	clean SAND to silty SAND	125	5.0	58	90	49	95	44	-	-	5	1.60	16
38.22	407.4	261.0	261.0	407.5	4.2	0.9	1.0	6	clean SAND to silty SAND	125	5.0	52	81	45	95	43	-	-	5	1.63	16
38.39	313.8	200.5	222.7	313.8	4.4	0.4	1.4	6	clean SAND to silty SAND	125	5.0	40	63	37	90	42	-	-	8	1.80	16
38.55	248.0	158.1	209.1	248.0	5.4	0.2	2.2	5	silty SAND to sandy SILT	120	4.0	40	62	31	82	41	-	-	13	2.02	16
38.72	229.2	145.8	213.7	229.4	6.1	9.5	2.7	5	silty SAND to sandy SILT	120	4.0	36	57	30	79	40	-	-	16	2.11	16
38.88	205.1	130.2	192.7	205.2	5.1	3.3	2.5	5	silty SAND to sandy SILT	120	4.0	33	51	27	76	40	-	-	16	2.11	16
39.04	233.7	148.1	200.7	233.8	5.2	6.5	2.2	5	silty SAND to sandy SILT	120	4.0	37	58	30	80	40	-	-	14	2.04	16
39.21	356.9	225.7	243.2	357.2	4.9	13.0	1.4	6	clean SAND to silty SAND	125	5.0	45	71	41	94	43	-	-	7	1.76	16
39.37	422.6	266.7	266.7	422.7	4.0	5.4	1.0	6	clean SAND to silty SAND	125	5.0	53	85	45	95	43	-	-	5	1.59	16
39.54	476.4	299.9	299.9	476.4	4.2	2.9	0.9	6	clean SAND to silty SAND	125	5.0	60	95	50	95	44	-	-	5	1.53	16
39.70	509.4	320.1	320.1	509.5	6.1	2.3	1.2	6	clean SAND to silty SAND	125	5.0	64	100	55	95	44	-	-	5	1.62	16
39.86	561.2	351.8	351.8	561.3	6.6	4.9	1.2	6	clean SAND to silty SAND	125	5.0	70	100	60	95	45	-	-	5	1.59	16
40.03	586.4	366.8	366.8	586.5	6.8	5.0	1.2	6	clean SAND to silty SAND	125	5.0	73	100	62	95	45	-	-	5	1.57	16
40.19	572.1	357.1	357.1	572.2	6.1	6.9	1.1	6	clean SAND to silty SAND	125	5.0	71	100	60	95	45	-	-	5	1.55	16
40.36	528.8	329.4	329.4	528.9	5.3	4.7	1.0	6	clean SAND to silty SAND	125	5.0	66	100	55	95	44	-	-	5	1.55	16
40.52	470.0	292.2	292.2	470.2	5.5	6.8	1.2	6	clean SAND to silty SAND	125	5.0	58	94	50	95	44	-	-	5	1.64	16
40.68	361.3	224.1	255.1	361.4	6.2	6.6	1.7	6	clean SAND to silty SAND	125	5.0	45	72	41	94	43	-	-	9	1.84	16
40.85	283.5	175.5	225.9	283.6	6.2	4.5	2.2	5	silty SAND to sandy SILT	120	4.0	44	71	34	86	41	-	-	13	1.99	16
41.01	148.9	92.0	176.6	148.9	4.6	0.8	3.2	5	silty SAND to sandy SILT	120	4.0	23	37	20	64	38	-	-	22	2.29	16
41.18	81.8	33.0	-	81.9	3.5	5.3	4.5	3	silty CLAY to CLAY	115	1.5	22	55	9	-	-	5.6	9.9	41	2.71	15
41.34	196.2	120.8	201.4	196.6	5.9	16.0	3.0	5	silty SAND to sandy SILT	120	4.0	30	49	26	73	39	-	-	19	2.20	16
41.50	215.9	132.6	204.3	216.2	5.9	15.0	2.8	5	silty SAND to sandy SILT	120	4.0	33	54	28	76	40	-	-	17	2.14	16
41.67	186.7	114.4	196.5	186.7	5.7	1.5	3.1	5	silty SAND to sandy SILT	120	4.0	29	47	25	71	39	-	-	20	2.22	16
41.83	110.0	43.6	-	110.2	4.8	10.9	4.5	4	clayy SILT to silty CLAY	115	2.0	22	55	11	-	-	7.6	9.9	37	2.63	15
42.00	117.1	71.5	148.6	117.3	3.3	11.5	2.9	5	silty SAND to sandy SILT	120	4.0	18	29	16	56	36	-	-	24	2.34	16
42.16	65.3	25.7	-	65.4	2.3	3.0	3.6	4	clayy SILT to silty CLAY	115	2.0	13	33	7	-	-	4.4	8.2	42	2.73	15
42.32	38.7	15.2	-	38.8	1.3	7.1	3.7	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	4.7	54	2.93	15
42.49	33.9	13.3	-	34.1	1.2	8.4	3.8	3	silty CLAY to CLAY	115	1.5	9	23	4	-	-	2.2	4.0	58	2.99	15
42.65	34.8	13.5	-	35.0	2.3	8.3	7.1	3	silty CLAY to CLAY	115	1.5	9	23	5	-	-	2.3	4.1	69	3.15	15
42.82	36.7	14.2	-	36.9	4.2	9.7	9.9	3	silty CLAY to CLAY	115	1.5	9	24	5	-	-	2.4	4.4	75	3.23	15
42.98	111.4	67.3	156.3	111.8	3.6	20.2	3.3	4	clayy SILT to silty CLAY	115	2.0	34	56	16	-	-	7.7	9.9	27	2.40	15
43.15	350.0	211.0	240.2	350.3	5.8	16.4	1.7	6	clean SAND to silty SAND	125	5.0	42	70	39	92	42	-	-	9	1.84	16
43.31	559.9	336.8	336.8	560.1	6.2	11.4	1.1	6	clean SAND to silty SAND	125	5.0	67	100	57	95	44	-	-	5	1.58	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

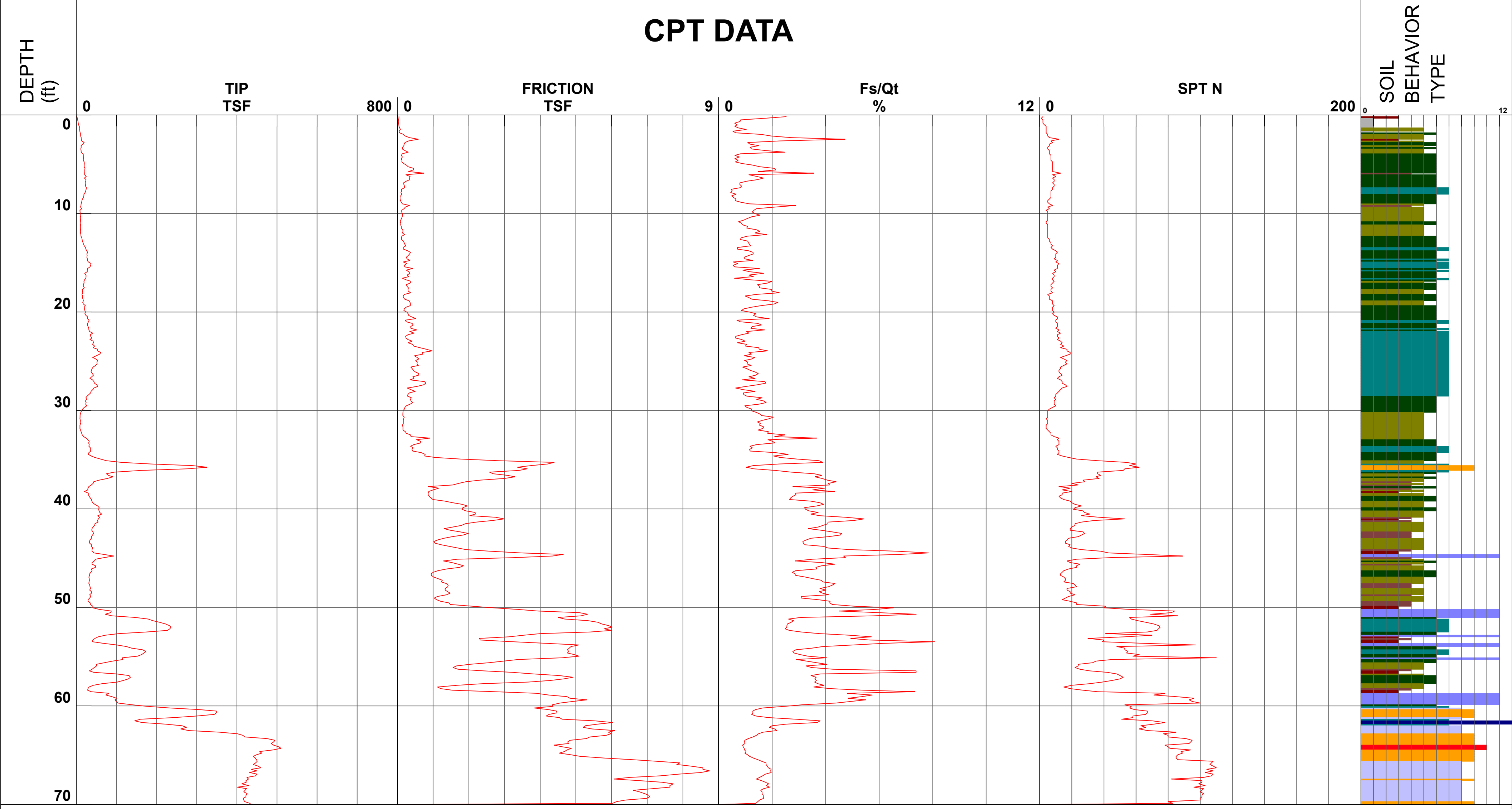
Middle Earth Geo Testing

Geotechnologies Inc

Project	T.F Broadway	Operator	RC AS	Filename	SDF(925).cpt
Job Number	21545	Cone Number	DDG1448	GPS	
Hole Number	CPT-02	Date and Time	6/21/2018 10:16:42 AM	Maximum Depth	70.37 ft
EST GW Depth During Test		70.37 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Project ID: Geotehnologies
Data File: SDF(925).cpt
CPT Date: 6/21/2018 10:16:42 AM
GW During Test: 80 ft

Sounding ID: CPT-02
Project No: 21545
Cone/Rig: DDG1448

. . Depth ft	. qc PS tsf	* qc1n PS -	. q1ncs PS -	* qt PS tsf	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR - -	* Fin Ic %	* Ic SBT Indx	* Nk - -
0.33	2.5	4.1	-	2.6	0.0	1.6	1.8	3	silty CLAY to CLAY	115	1.5	3	2	1	-	-	0.2	9.9	74	3.22	15
0.49	3.4	5.4	-	3.4	0.0	2.5	0.8	4	clayy SILT to silty CLAY	115	2.0	3	2	2	-	-	0.2	9.9	56	2.97	15
0.66	4.2	6.7	-	4.2	0.0	2.7	0.8	4	clayy SILT to silty CLAY	115	2.0	3	2	2	-	-	0.3	9.9	51	2.88	15
0.82	4.9	7.9	-	5.0	0.0	3.0	0.6	4	clayy SILT to silty CLAY	115	2.0	4	2	2	-	-	0.3	9.9	44	2.76	15
0.98	5.7	9.2	-	5.8	0.0	3.1	0.7	4	clayy SILT to silty CLAY	115	2.0	5	3	3	-	-	0.4	9.9	42	2.73	15
1.15	7.3	11.7	-	7.4	0.0	3.3	0.6	4	clayy SILT to silty CLAY	115	2.0	6	4	3	-	-	0.5	9.9	36	2.61	15
1.31	8.6	13.9	44.0	8.7	0.1	2.9	0.7	5	silty SAND to sandy SILT	120	4.0	3	2	3	5	41	-	-	34	2.57	16
1.48	8.4	13.5	-	8.5	0.1	3.2	1.0	4	clayy SILT to silty CLAY	115	2.0	7	4	4	-	-	0.6	9.9	38	2.65	15
1.64	8.8	14.2	40.0	8.9	0.0	3.3	0.5	5	silty SAND to sandy SILT	120	4.0	4	2	3	5	40	-	-	31	2.51	16
1.80	9.7	15.5	43.5	9.7	0.1	3.3	0.7	5	silty SAND to sandy SILT	120	4.0	4	2	4	5	40	-	-	31	2.51	16
1.97	10.9	17.4	-	10.9	0.2	3.5	1.6	4	clayy SILT to silty CLAY	115	2.0	9	5	5	-	-	0.8	9.9	38	2.65	15
2.13	11.0	17.6	-	11.0	0.2	3.3	2.0	4	clayy SILT to silty CLAY	115	2.0	9	5	5	-	-	0.8	9.9	40	2.70	15
2.30	12.5	20.0	-	12.5	0.3	3.6	2.7	4	clayy SILT to silty CLAY	115	2.0	10	6	5	-	-	0.9	9.9	42	2.73	15
2.46	12.4	19.8	-	12.4	0.6	3.5	4.8	3	silty CLAY to CLAY	115	1.5	13	8	6	-	-	0.9	9.9	51	2.89	15
2.62	13.8	22.1	-	13.8	0.3	3.5	2.3	4	clayy SILT to silty CLAY	115	2.0	11	7	6	-	-	1.0	9.9	38	2.65	15
2.79	19.7	31.5	66.1	19.7	0.2	3.6	1.1	5	silty SAND to sandy SILT	120	4.0	8	5	7	29	42	-	-	24	2.34	16
2.95	16.0	25.7	63.5	16.0	0.2	0.2	1.2	5	silty SAND to sandy SILT	120	4.0	6	4	6	22	40	-	-	28	2.44	16
3.12	12.2	19.5	64.7	12.2	0.2	0.4	1.5	4	clayy SILT to silty CLAY	115	2.0	10	6	5	-	-	0.8	9.9	35	2.60	15
3.28	12.4	19.8	58.8	12.4	0.1	0.5	1.2	5	silty SAND to sandy SILT	120	4.0	5	3	5	14	38	-	-	32	2.54	16
3.45	11.2	17.9	58.1	11.2	0.1	0.5	1.3	4	clayy SILT to silty CLAY	115	2.0	9	6	5	-	-	0.8	9.9	35	2.59	15
3.61	12.1	19.4	-	12.1	0.2	0.8	1.8	4	clayy SILT to silty CLAY	115	2.0	10	6	5	-	-	0.8	9.9	37	2.64	15
3.77	12.3	19.7	-	12.3	0.3	0.7	2.5	4	clayy SILT to silty CLAY	115	2.0	10	6	5	-	-	0.9	9.9	42	2.72	15
3.94	16.5	26.5	55.9	16.5	0.1	0.8	0.8	5	silty SAND to sandy SILT	120	4.0	7	4	6	23	39	-	-	24	2.35	16
4.10	18.4	29.6	52.8	18.5	0.1	0.9	0.6	5	silty SAND to sandy SILT	120	4.0	7	5	6	27	39	-	-	21	2.25	16
4.27	18.1	29.1	56.7	18.2	0.1	2.0	0.8	5	silty SAND to sandy SILT	120	4.0	7	5	6	26	39	-	-	23	2.30	16
4.43	17.5	28.1	51.8	17.5	0.1	1.9	0.6	5	silty SAND to sandy SILT	120	4.0	7	4	6	25	38	-	-	21	2.27	16
4.59	17.4	27.8	54.9	17.4	0.1	1.7	0.7	5	silty SAND to sandy SILT	120	4.0	7	4	6	25	38	-	-	23	2.31	16
4.76	19.7	31.5	54.7	19.7	0.1	1.7	0.6	5	silty SAND to sandy SILT	120	4.0	8	5	7	29	39	-	-	20	2.23	16
4.92	20.0	32.0	61.6	20.0	0.2	2.7	0.9	5	silty SAND to sandy SILT	120	4.0	8	5	7	29	38	-	-	22	2.29	16
5.09	19.8	31.8	70.6	19.9	0.2	2.6	1.3	5	silty SAND to sandy SILT	120	4.0	8	5	7	29	38	-	-	25	2.38	16
5.25	19.7	31.6	77.2	19.8	0.3	2.6	1.6	5	silty SAND to sandy SILT	120	4.0	8	5	7	29	38	-	-	28	2.43	16
5.41	21.7	34.8	92.2	21.8	0.5	2.8	2.1	5	silty SAND to sandy SILT	120	4.0	9	5	8	32	38	-	-	30	2.48	16
5.58	21.1	33.8	92.4	21.1	0.5	3.4	2.2	4	clayy SILT to silty CLAY	115	2.0	17	11	8	-	-	1.5	9.9	30	2.49	15
5.74	21.2	34.1	77.9	21.3	0.3	3.1	1.5	5	silty SAND to sandy SILT	120	4.0	9	5	8	31	38	-	-	26	2.39	16
5.91	20.9	33.6	-	21.0	0.7	3.6	3.6	4	clayy SILT to silty CLAY	115	2.0	17	10	9	-	-	1.5	9.9	37	2.64	15
6.07	21.0	33.7	69.4	21.1	0.2	3.5	1.2	5	silty SAND to sandy SILT	120	4.0	8	5	8	31	38	-	-	24	2.33	16
6.23	24.9	39.9	81.8	24.9	0.4	3.1	1.5	5	silty SAND to sandy SILT	120	4.0	10	6	9	37	38	-	-	24	2.33	16
6.40	20.3	32.1	81.1	20.3	0.3	2.8	1.7	5	silty SAND to sandy SILT	120	4.0	8	5	8	30	37	-	-	28	2.45	16
6.56	24.3	38.0	80.4	24.4	0.3	2.6	1.5	5	silty SAND to sandy SILT	120	4.0	10	6	9	35	38	-	-	24	2.35	16
6.73	23.4	36.2	68.9	23.5	0.2	3.3	1.1	5	silty SAND to sandy SILT	120	4.0	9	6	8	33	38	-	-	22	2.29	16
6.89	21.9	33.5	60.8	22.0	0.2	3.1	0.8	5	silty SAND to sandy SILT	120	4.0	8	5	7	31	37	-	-	21	2.26	16
7.05	22.8	34.4	61.4	22.9	0.2	3.3	0.8	5	silty SAND to sandy SILT	120	4.0	9	6	7	32	37	-	-	21	2.25	16
7.22	23.1	34.4	63.1	23.2	0.2	3.5	0.9	5	silty SAND to sandy SILT	120	4.0	9	6	8	32	37	-	-	21	2.26	16
7.38	25.3	37.2	63.8	25.4	0.2	3.4	0.8	5	silty SAND to sandy SILT	120	4.0	9	6	8	34	37	-	-	20	2.22	16
7.55	24.5	35.7	53.6	24.5	0.1	3.3	0.5	5	silty SAND to sandy SILT	120	4.0	9	6	7	33	37	-	-	17	2.13	16
7.71	23.4	33.7	53.3	23.5	0.1	3.3	0.5	5	silty SAND to sandy SILT	120	4.0	8	6	7	31	37	-	-	18	2.16	16
7.87	22.0	31.3	50.1	22.0	0.1	3.1	0.5	5	silty SAND to sandy SILT	120	4.0	8	5	7	29	36	-	-	18	2.17	16
8.04	19.2	27.0	52.7	19.2	0.1	2.1	0.7	5	silty SAND to sandy SILT	120	4.0	7	5	6	24	35	-	-	23	2.30	16
8.20	18.8	26.2	47.8	18.8	0.1	1.8	0.5	5	silty SAND to sandy SILT	120	4.0	7	5	6	23	35	-	-	21	2.26	16
8.37	17.6	24.3	48.4	17.6	0.1	1.9	0.6	5	silty SAND to sandy SILT	120	4.0	6	4	5	20	34	-	-	23	2.31	16
8.53	15.4	21.0	48.8	15.4	0.1	1.9	0.7	5	silty SAND to sandy SILT	120	4.0	5	4	5	16	33	-	-	27	2.40	16
8.69	14.0	18.9	46.7	14.0	0.1	1.9	0.6	5	silty SAND to sandy SILT	120	4.0	5	3	4	12	33	-	-	28	2.44	16
8.86	13.4	18.0	51.1	13.4	0.1	1.8	0.9	5	silty SAND to sandy SILT	120	4.0	5	3	4	10	32	-	-	31	2.51	16
9.02	12.0	18.4	58.8	12.1	0.1	1.5	1.2	4	clayy SILT to silty CLAY	115	2.0	9	6	5	-	-	0.8	7.1	34	2.58	15
9.19	11.8	18.9	-	11.8	0.3	1.4	3.0	4	clayy SILT to silty CLAY	115	2.0	9	6	5	-	-	0.8	6.8	46	2.79	15
9.35	10.7	17.2	-	10.7	0.2	1.4	2.2	4	clayy SILT to silty CLAY	115	2.0	9	5	5	-	-	0.7	6.1	43	2.75	15
9.51	13.3	19.5	-	13.3	0.2	1.9	1.5	4	clayy SILT to silty CLAY	115	2.0	10	7	5	-	-	0.9	7.5	35	2.60	15
9.68	9.1	14.7	-	9.2	0.1	1.7	1.4	4	clayy SILT to silty CLAY	115	2.0	7	5	4	-	-	0.6	5.0	41	2.70	15
9.84	9.5	15.3	-	9.6	0.1	1.5	1.3	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.6	5.1	39	2.68	15
10.01	10.1	16.1	-	10.1	0.1	1.5	1.4	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.7	5.3	39	2.67	15
10.17	9.7	15.5	-	9.7	0.1	1.5	1.7	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.6	5.0	41	2.72	15
10.34	10.9	17.4	-	10.9	0.1	1.5	1.3	4	clayy SILT to silty CLAY	115	2.0	9	5	4	-	-	0.7	5.6	36	2.62	15
10.50	10.9	15.0	-	10.9	0.1	1.6	1.1	4	clayy SILT to silty CLAY	115	2.0	7	5	4	-	-	0.7	5.5	38	2.65	15
10.66	10.3	14.0	-	10.3	0.1	1.6	1.0	4	clayy SILT to silty CLAY	115	2.0	7	5	4	-	-	0.7	5.1	38	2.65	15
10.83	10.9	14.6	47.4	10.9	0.1	1.6	0.8	5	silty SAND to sandy SILT	120	4.0	4	3	4	5	30	-	-	35	2.58	16
10.99	11.1	14.8	-	11.1	0.1	1.6	0.9	4	clayy SILT to silty CLAY	115	2.0	7	6	4	-	-	0.7	5.3	36	2.61	15
11.16	10.4	13.7	-	10.4	0.1	1.5	1.0	4	clayy SILT to silty CLAY	115	2.0	7	5	4	-	-	0.7	4.9	38	2.65	15
11.32	10.1	15.2	-	10.2	0.1	1.5	1.2	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.7	4.7	38	2.65	15
11.48	10.3	15.2	-	10.3	0.1	1.7	1.1	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.7	4.7	38	2.64	15
11.65	10.7	15.7	-	10.8	0.2	1.7	1.5	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.7	4.8	40	2.70	15
11.81	10.1	14.6	-	10.2	0.2	1.7	1.7	4	clayy SILT to silty CLAY	115	2.0	7	5	4	-	-	0.7	4.5	43	2.74	15
11.98	10.7	15.2	-	10.7	0.1	1.7	1.5	4	clayy SILT to silty CLAY	115	2.0	8	5	4	-	-	0.7	4.7	40	2.70	15
12.14	11.4	16.0	-	11.4	0.2	1.8	1.9	4	clayy SILT to silty CLAY	115	2.0	8	6	4	-	-	0.8	5.0	43	2.74	15
12.30	11.8	16.3	-	11.8	0.1	1.7	1.1	4	clayy SILT to silty CLAY	115	2.0	8	6	4	-	-	0.8	5.0	36	2.62	15
12.47	13.7	15.6	50.2	13.8	0.1	1.7	0.9	5	silty SAND to sandy SILT	120	4.0	4	3	4	6	30	-	-	34	2.58	16
12.63	14.6	16.5	50.1	14.6	0.1	1.8	0.9	5	silty SAND to sandy SILT	120	4.0	4	4	4	7	31	-	-	33	2.55	16
12.80	15.1	17.0	56.4	15.2	0.2	1.7	1.1	4	clayy SILT to silty CLAY	115	2.0	8	8	4	-	-	1.0	6.3	35	2.60	15
12.96	16.9	18.9	58.3	17.0	0.2	1.8	1.2	5	silty SAND to sandy SILT	120	4.0	5	4	5	12	31	-	-	33	2.56	16
13.12	18.0	20.0	60.2	18.1	0.2	2.1	1.2	5	silty SAND to sandy SILT	120	4.0	5	5	5	14	32	-	-	33	2.55	16
13.29	19.9	21.9	62.7	19.9	0.2	2.1	1.2	5	silty SAND to sandy SILT	120	4.0	5	5	5	17	32	-	-	32	2.52	16
13.45	22.8	25.0	53.1	22.9	0.2	2.1	0.7	5	silty SAND to sandy SILT	120	4.0	6	6	6	21	33	-	-	25	2.35	16
13.62	24.0	26.1	53.8	24.0	0.2	2.3	0.7	5	silty SAND to sandy SILT	120	4.0	7	6	6	23	33	-	-	24	2.33	16
13.78	25.7	27.7	65.3	25.7	0.3	2.1	1.2	5	silty SAND to sandy SILT	120	4.0	7	6	6	25	34	-	-	27	2.41	16
13.94	28.6	30.7	71.6	28.7	0.4	2.4	1.3	5	silty SAND to sandy SILT	120	4.0	8	7	7	28	34	-	-	27	2.40	16
14.11	26.5	28.2	69.9	26.5	0.3	2.2	1.3	5	silty SAND to sandy SILT	120	4.0	7	7	7	25	34	-	-	28	2.44	16
14.27	27.2	28.8	66.3	27.2	0.3	1.9	1.2	5	silty SAND to sandy SILT	120	4.0	7	7	7	26	34	-	-	26	2.40	16
14.44	26.1	27.5	61.2	26.1	0.2	0.8	1.0	5	silty SAND to sandy SILT	120	4.0	7	7	6	24	34	-	-	26	2.38	16
14.60	27.8	29.1	63.0	27.8	0.3	0.8	1.0	5	silty SAND to sandy SILT	120	4.0	7	7	7	26	34	-	-	25	2.36	16
14.76	27.5	28.6	69.9	27.5	0.4	1.2	1.3	5	silty SAND to sandy SILT	120	4.0	7	7	7	26	34	-	-	28	2.43	16
14.93	30.3	31.4	53.4	30.3	0.2	1.2	0.6	5	silty SAND to sandy SILT	120	4.0	8	8	7	29	34	-	-	19	2.21	16
15.09	36.9	38.0	62.5	37.0	0.3	1.1	0.7	5	silty SAND to sandy SILT	120	4.0	10	9	8	35	35	-	-	19	2.19	16
15.26	35.7	36.6	56.5	35.7	0.2	1.2	0.6	5	silty SAND to sandy SILT	120	4.0	9	9	8	34	35	-	-	17	2.15	16
15.42	34.3	35.0	57.2	34.4	0.2	1.1	0.6	5	silty SAND to sandy SILT	120	4.0	9	9	7	32	35	-	-	19	2.19	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

T.F Broadway

Project ID: Geotehnologies
Data File: SDF(925).cpt
CPT Date: 6/21/2018 10:16:42 AM
GW During Test: 80 ft

Sounding ID: CPT-02
Project No: 21545
Cone/Rig: DDG1448

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
15.58	28.2	28.6	75.6	28.3	0.4	1.3	1.6	5	silty SAND to sandy SILT	120	4.0	7	7	7	26	34	-	-	30	2.47	16
15.75	27.5	27.7	60.1	27.5	0.2	1.1	0.9	5	silty SAND to sandy SILT	120	4.0	7	7	6	25	33	-	-	25	2.36	16
15.91	27.3	27.4	66.0	27.3	0.3	1.2	1.2	5	silty SAND to sandy SILT	120	4.0	7	7	6	24	33	-	-	27	2.42	16
16.08	21.0	21.4	-	21.0	0.4	1.0	1.8	4	clayy SILT to silty CLAY	115	2.0	11	10	5	-	-	1.4	7.0	36	2.61	15
16.24	24.4	24.2	63.2	24.4	0.3	1.0	1.2	5	silty SAND to sandy SILT	120	4.0	6	6	6	20	32	-	-	29	2.47	16
16.40	24.3	24.0	66.9	24.3	0.3	1.2	1.4	5	silty SAND to sandy SILT	120	4.0	6	6	6	20	32	-	-	31	2.50	16
16.57	24.0	23.6	49.6	24.1	0.1	0.9	0.6	5	silty SAND to sandy SILT	120	4.0	6	6	5	19	32	-	-	24	2.34	16
16.73	20.4	20.0	61.8	20.4	0.2	1.1	1.3	4	clayy SILT to silty CLAY	115	2.0	10	10	5	-	-	1.4	6.5	33	2.56	15
16.90	19.1	19.2	-	19.2	0.4	1.0	2.1	4	clayy SILT to silty CLAY	115	2.0	10	10	5	-	-	1.3	6.0	40	2.70	15
17.06	19.6	19.5	-	19.6	0.4	0.9	1.9	4	clayy SILT to silty CLAY	115	2.0	10	10	5	-	-	1.3	6.1	39	2.67	15
17.23	17.4	17.2	-	17.5	0.3	1.0	1.5	4	clayy SILT to silty CLAY	115	2.0	9	9	5	-	-	1.2	5.3	39	2.66	15
17.39	17.8	17.4	-	17.8	0.3	1.4	1.6	4	clayy SILT to silty CLAY	115	2.0	9	9	5	-	-	1.2	5.4	39	2.67	15
17.55	20.2	19.5	-	20.2	0.3	1.0	1.6	4	clayy SILT to silty CLAY	115	2.0	10	10	5	-	-	1.4	6.1	37	2.63	15
17.72	14.9	14.3	-	15.0	0.3	0.8	2.1	4	clayy SILT to silty CLAY	115	2.0	7	7	4	-	-	1.0	4.4	47	2.81	15
17.88	15.3	14.5	-	15.3	0.3	1.5	2.1	4	clayy SILT to silty CLAY	115	2.0	7	8	4	-	-	1.0	4.5	46	2.80	15
18.05	16.3	15.4	-	16.4	0.4	1.6	2.4	4	clayy SILT to silty CLAY	115	2.0	8	8	4	-	-	1.1	4.7	47	2.82	15
18.21	14.0	13.1	-	14.0	0.2	1.3	1.5	4	clayy SILT to silty CLAY	115	2.0	7	7	4	-	-	0.9	4.0	44	2.77	15
18.37	16.3	15.1	-	16.3	0.2	1.3	1.1	4	clayy SILT to silty CLAY	115	2.0	8	8	4	-	-	1.1	4.6	37	2.63	15
18.54	15.2	13.9	-	15.2	0.2	1.5	1.2	4	clayy SILT to silty CLAY	115	2.0	7	8	4	-	-	1.0	4.3	40	2.70	15
18.70	16.8	15.3	-	16.8	0.2	1.4	1.3	4	clayy SILT to silty CLAY	115	2.0	8	8	4	-	-	1.1	4.7	39	2.68	15
18.87	17.5	15.8	-	17.6	0.3	1.4	2.0	4	clayy SILT to silty CLAY	115	2.0	8	9	4	-	-	1.2	4.9	44	2.76	15
19.03	16.0	14.3	-	16.1	0.4	1.2	2.4	4	clayy SILT to silty CLAY	115	2.0	7	8	4	-	-	1.1	4.4	48	2.84	15
19.19	17.7	15.6	-	17.7	0.4	1.6	2.2	4	clayy SILT to silty CLAY	115	2.0	8	9	4	-	-	1.2	4.8	45	2.79	15
19.36	22.6	19.9	-	22.6	0.4	1.1	1.7	4	clayy SILT to silty CLAY	115	2.0	10	11	5	-	-	1.5	6.2	37	2.63	15
19.52	19.9	17.3	-	19.9	0.2	1.0	1.3	4	clayy SILT to silty CLAY	115	2.0	9	10	4	-	-	1.3	5.4	36	2.62	15
19.69	20.2	18.3	55.1	20.3	0.2	1.3	1.0	5	silty SAND to sandy SILT	120	4.0	5	5	5	11	30	-	-	33	2.55	16
19.85	21.4	19.3	53.6	21.5	0.2	1.6	0.9	5	silty SAND to sandy SILT	120	4.0	5	5	5	13	30	-	-	31	2.50	16
20.01	22.8	20.4	61.7	22.8	0.3	1.3	1.2	5	silty SAND to sandy SILT	120	4.0	5	6	5	15	30	-	-	33	2.55	16
20.18	21.5	18.1	-	21.5	0.3	1.2	1.5	4	clayy SILT to silty CLAY	115	2.0	9	11	5	-	-	1.4	5.7	37	2.63	15
20.34	24.0	21.3	65.2	24.0	0.3	1.1	1.4	4	clayy SILT to silty CLAY	115	2.0	11	12	5	-	-	1.6	6.3	33	2.55	15
20.51	28.6	25.3	71.1	28.6	0.4	1.1	1.5	5	silty SAND to sandy SILT	120	4.0	6	7	6	22	32	-	-	31	2.51	16
20.67	27.5	22.6	-	27.5	0.5	1.0	2.0	4	clayy SILT to silty CLAY	115	2.0	11	14	6	-	-	1.9	7.1	36	2.62	15
20.83	32.1	28.2	55.1	32.2	0.2	1.6	0.7	5	silty SAND to sandy SILT	120	4.0	7	8	6	25	33	-	-	23	2.30	16
21.00	30.8	26.9	57.6	30.8	0.2	2.1	0.8	5	silty SAND to sandy SILT	120	4.0	7	8	6	24	32	-	-	25	2.36	16
21.16	28.1	24.5	71.3	28.2	0.4	2.1	1.5	5	silty SAND to sandy SILT	120	4.0	6	7	6	21	32	-	-	32	2.53	16
21.33	27.7	24.0	73.7	27.7	0.4	1.0	1.7	4	clayy SILT to silty CLAY	115	2.0	12	14	6	-	-	1.9	6.9	33	2.56	15
21.49	29.6	25.6	67.5	29.6	0.4	1.0	1.3	5	silty SAND to sandy SILT	120	4.0	6	7	6	22	32	-	-	30	2.47	16
21.65	31.2	26.8	67.3	31.2	0.4	1.7	1.3	5	silty SAND to sandy SILT	120	4.0	7	8	6	24	32	-	-	28	2.45	16
21.82	31.5	27.0	78.9	31.5	0.5	1.6	1.8	4	clayy SILT to silty CLAY	115	2.0	14	16	7	-	-	2.1	7.8	32	2.53	15
21.98	33.0	28.2	64.5	33.0	0.3	1.5	1.1	5	silty SAND to sandy SILT	120	4.0	7	8	7	25	32	-	-	26	2.39	16
22.15	41.1	35.0	71.6	41.1	0.5	2.5	1.2	5	silty SAND to sandy SILT	120	4.0	9	10	8	32	34	-	-	24	2.33	16
22.31	34.9	29.6	60.5	34.9	0.3	1.9	0.9	5	silty SAND to sandy SILT	120	4.0	7	9	7	27	33	-	-	24	2.33	16
22.47	36.0	30.4	55.4	36.0	0.2	1.8	0.7	5	silty SAND to sandy SILT	120	4.0	8	9	7	28	33	-	-	21	2.26	16
22.64	38.5	32.4	56.6	38.5	0.2	1.9	0.7	5	silty SAND to sandy SILT	120	4.0	8	10	7	30	33	-	-	20	2.23	16
22.80	33.9	28.4	60.1	33.9	0.3	1.3	0.9	5	silty SAND to sandy SILT	120	4.0	7	8	6	25	32	-	-	24	2.35	16
22.97	41.7	34.9	67.8	41.7	0.4	0.4	1.0	5	silty SAND to sandy SILT	120	4.0	9	10	8	32	34	-	-	22	2.30	16
23.13	42.8	35.6	60.6	42.8	0.3	0.6	0.7	5	silty SAND to sandy SILT	120	4.0	9	11	8	33	34	-	-	19	2.21	16
23.30	40.5	33.6	68.3	40.5	0.4	0.6	1.1	5	silty SAND to sandy SILT	120	4.0	8	10	8	31	33	-	-	23	2.33	16
23.46	45.6	37.7	70.2	45.6	0.5	0.8	1.0	5	silty SAND to sandy SILT	120	4.0	9	11	8	35	34	-	-	22	2.27	16
23.62	42.1	34.7	80.3	42.1	0.6	1.0	1.5	5	silty SAND to sandy SILT	120	4.0	9	11	8	32	33	-	-	26	2.40	16
23.79	53.3	43.7	88.4	53.3	0.8	1.1	1.6	5	silty SAND to sandy SILT	120	4.0	11	13	10	40	35	-	-	23	2.32	16
23.95	52.9	43.3	96.0	52.9	1.0	1.5	1.9	5	silty SAND to sandy SILT	120	4.0	11	13	10	39	35	-	-	25	2.38	16
24.12	61.0	49.7	82.7	61.1	0.7	1.1	1.2	5	silty SAND to sandy SILT	120	4.0	12	15	11	44	36	-	-	19	2.20	16
24.28	58.5	47.5	83.5	58.5	0.7	0.9	1.3	5	silty SAND to sandy SILT	120	4.0	12	15	10	42	35	-	-	20	2.24	16
24.44	49.7	40.2	70.8	49.7	0.5	1.7	1.0	5	silty SAND to sandy SILT	120	4.0	10	12	9	37	34	-	-	20	2.24	16
24.61	40.8	32.9	75.6	40.8	0.6	0.8	1.4	5	silty SAND to sandy SILT	120	4.0	8	10	8	30	33	-	-	26	2.40	16
24.77	48.4	39.0	77.6	48.5	0.6	0.7	1.3	5	silty SAND to sandy SILT	120	4.0	10	12	9	36	34	-	-	23	2.31	16
24.94	52.9	42.4	72.8	52.9	0.5	0.5	1.0	5	silty SAND to sandy SILT	120	4.0	11	13	9	39	35	-	-	20	2.22	16
25.10	51.3	40.9	75.0	51.3	0.6	0.9	1.1	5	silty SAND to sandy SILT	120	4.0	10	13	9	38	34	-	-	21	2.26	16
25.26	51.9	41.3	74.3	51.9	0.5	1.3	1.1	5	silty SAND to sandy SILT	120	4.0	10	13	9	38	34	-	-	21	2.25	16
25.43	48.3	38.3	76.4	48.4	0.6	1.4	1.3	5	silty SAND to sandy SILT	120	4.0	10	12	9	35	34	-	-	23	2.31	16
25.59	41.9	33.1	64.2	41.9	0.4	1.5	0.9	5	silty SAND to sandy SILT	120	4.0	8	10	7	31	33	-	-	22	2.30	16
25.76	39.5	31.1	66.9	39.5	0.4	1.4	1.1	5	silty SAND to sandy SILT	120	4.0	8	10	7	28	32	-	-	25	2.36	16
25.92	37.9	29.8	69.0	37.9	0.4	1.1	1.2	5	silty SAND to sandy SILT	120	4.0	7	9	7	27	32	-	-	26	2.40	16
26.08	36.9	28.9	72.7	36.9	0.5	1.0	1.4	5	silty SAND to sandy SILT	120	4.0	7	9	7	26	32	-	-	28	2.45	16
26.25	40.3	31.4	77.8	40.3	0.6	1.1	1.5	5	silty SAND to sandy SILT	120	4.0	8	10	7	29	32	-	-	28	2.44	16
26.41	42.8	33.3	76.8	42.8	0.6	1.0	1.4	5	silty SAND to sandy SILT	120	4.0	8	11	8	31	33	-	-	26	2.40	16
26.58	38.4	29.8	68.0	38.4	0.4	1.3	1.2	5	silty SAND to sandy SILT	120	4.0	7	10	7	27	32	-	-	26	2.39	16
26.74	34.1	26.3	71.0	34.1	0.5	1.0	1.4	5	silty SAND to sandy SILT	120	4.0	7	9	6	23	31	-	-	30	2.49	16
26.90	40.5	31.2	62.5	40.5	0.4	0.9	0.9	5	silty SAND to sandy SILT	120	4.0	8	10	7	29	32	-	-	23	2.32	16
27.07	43.9	33.7	85.4	43.9	0.8	0.8	1.8	5	silty SAND to sandy SILT	120	4.0	8	11	8	31	33	-	-	29	2.45	16
27.23	45.4	34.7	87.1	45.4	0.8	0.9	1.8	5	silty SAND to sandy SILT	120	4.0	9	11	8	32	33	-	-	28	2.45	16
27.40	51.1	39.0	82.7	51.1	0.7	1.0	1.5	5	silty SAND to sandy SILT	120	4.0	10	13	9	36	34	-	-	24	2.35	16
27.56	53.3	40.6	73.1	53.3	0.5	1.0	1.1	5	silty SAND to sandy SILT	120	4.0	10	13	9	37	34	-	-	21	2.25	16
27.72	44.0	33.4	57.4	44.0	0.3	1.3	0.7	5	silty SAND to sandy SILT	120	4.0	8	11	7	31	33	-	-	20	2.22	16
27.89	41.1	31.1	63.4	41.1	0.4	1.1	1.0	5	silty SAND to sandy SILT	120	4.0	8	10	7	28	32	-	-	24	2.33	16
28.05	36.8	27.8	72.2	36.8	0.5	1.0	1.4	5	silty SAND to sandy SILT	120	4.0	7	9	7	25	31	-	-	29	2.47	16
28.22	35.7	26.9	61.0	35.7	0.3	0.8	1.0	5	silty SAND to sandy SILT	120	4.0	7	9	6	24	31	-	-	26	2.39	16
28.38	31.4	23.5	59.1	31.4	0.3	0.6	1.0	5	silty SAND to sandy SILT	120	4.0	6	8	6	19	30	-	-	28	2.45	16
28.54	26.9	15.9	-	26.9	0.3	1.3	1.1	4	clayy SILT to silty CLAY	115	2.0	8	13	4	-	-	1.8	4.9	37	2.62	15
28.71	24.0	14.1	-	24.0	0.4	0.8	1.7	4	clayy SILT to silty CLAY	115	2.0	7	12	4	-	-	1.6	4.3	44	2.77	15
28.87	25.6	15.0	-	25.6	0.4	0.9	1.5	4	clayy SILT to silty CLAY	115	2.0	7	13	4	-	-	1.7	4.6	41	2.71	15
29.04	22.8	13.3	-	22.8	0.4	0.9	1.8	4	clayy SILT to silty CLAY	115	2.0	7	11	4	-	-	1.5	4.1	46	2.80	15
29.20	24.5	14.2	-	24.5	0.4	0.8	1.9	4	clayy SILT to silty CLAY	115	2.0	7	12	4	-	-	1.6	4.4	45	2.79	15
29.36	23.6	13.6	-	23.7	0.4	0.6	1.6	4	clayy SILT to silty CLAY	115	2.0	7	12	4	-	-	1.5	4.2	44	2.77	15
29.53	26.1	15.0	-	26.1	0.3	0.6	1.0	4	clayy SILT to silty CLAY	115	2.0	7	13	4	-	-	1.7	4.6	37	2.64	15
29.69	20.0	11.4	-	20.1	0.2	0.6	1.2	4	clayy SILT to silty CLAY	115	2.0	6	10	3	-	-	1.3	3.4	44	2.77	15
29.86	15.7	8.9	-	15.7	0.2	0.5	1.4	4	clayy SILT to silty CLAY	115	2.0	4	8	3	-	-	1.0	2.6	53	2.91	15
30.02	13.1	7.4	-	13.1	0.2	0.4	1.4	3	silty CLAY to CLAY	115	1.5	5	9	2	-	-	0.8	2.1	58	3.00	15
30.19	11.3	6.4	-	11.3	0.2	0.3	1.7	3	silty CLAY to CLAY	115	1.5	4	8	2	-	-	0.7	1.8	65	3.10	15
30.35	9.9	5.5	-	9.9	0.2	0.3	1.9	3	silty CLAY to CLAY	115	1.5	4	7	2	-	-	0.6	1.5	72	3.18	15
30.51	9.5	5.3	-	9.5	0.2	0.3	2.0	3	silty CLAY to CLAY	115	1.5	4	6	2	-	-	0.5	1.4	74	3.22	15
30.68	9.5	5.2	-	9.5	0.2	0.3	2.5	3	silty CLAY to CLAY	115	1.5	3	6	2	-	-	0.5	1.4	79	3.27	15
30.84	9.4	5.2	-	9.4	0.2	0.2	2.3	3	silty CLAY to CLAY	115	1.5	3	6	2	-	-	0.5	1.4	78	3.26	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

T.F Broadway

Project ID: Geotehnologies
Data File: SDF(925).cpt
CPT Date: 6/21/2018 10:16:42 AM
GW During Test: 80 ft

Page: 3
Sounding ID: CPT-02
Project No: 21545
Cone/Rig: DDG1448

. Depth ft	. qc PS tsf	* qc1n PS -	. q1ncs PS -	* qt PS tsf	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
31.01	10.1	5.5	-	10.1	0.2	0.2	2.0	3	silty CLAY to CLAY	115	1.5	4	7	2	-	-	0.6	1.5	73	3.20	15
31.17	11.4	6.2	-	11.4	0.2	0.0	1.7	3	silty CLAY to CLAY	115	1.5	4	8	2	-	-	0.7	1.7	67	3.12	15
31.33	10.7	5.8	-	10.7	0.2	0.1	1.9	3	silty CLAY to CLAY	115	1.5	4	7	2	-	-	0.6	1.6	70	3.16	15
31.50	9.4	5.0	-	9.4	0.1	-0.2	1.9	3	silty CLAY to CLAY	115	1.5	3	6	2	-	-	0.5	1.3	75	3.23	15
31.66	9.3	5.0	-	9.3	0.2	-0.2	2.1	3	silty CLAY to CLAY	115	1.5	3	6	2	-	-	0.5	1.3	78	3.26	15
31.83	9.4	5.0	-	9.4	0.2	-0.3	2.1	3	silty CLAY to CLAY	115	1.5	3	6	2	-	-	0.5	1.3	77	3.25	15
31.99	10.7	5.7	-	10.7	0.2	-0.1	1.8	3	silty CLAY to CLAY	115	1.5	4	7	2	-	-	0.6	1.5	70	3.16	15
32.15	12.1	6.4	-	12.1	0.2	-0.2	2.2	3	silty CLAY to CLAY	115	1.5	4	8	2	-	-	0.7	1.8	69	3.15	15
32.32	13.7	7.2	-	13.7	0.3	-0.2	2.1	3	silty CLAY to CLAY	115	1.5	5	9	2	-	-	0.8	2.0	65	3.09	15
32.48	14.8	7.8	-	14.8	0.4	-0.1	2.8	3	silty CLAY to CLAY	115	1.5	5	10	3	-	-	0.9	2.2	67	3.13	15
32.65	18.2	9.5	-	18.2	0.4	-0.1	2.3	3	silty CLAY to CLAY	115	1.5	6	12	3	-	-	1.2	2.8	58	3.00	15
32.81	24.9	12.9	-	24.9	0.9	0.0	4.0	3	silty CLAY to CLAY	115	1.5	9	17	4	-	-	1.6	3.9	59	3.01	15
32.97	28.9	14.9	-	28.9	0.5	0.1	2.0	4	clayy SILT to silty CLAY	115	2.0	7	14	4	-	-	1.9	4.6	45	2.78	15
33.14	32.2	16.5	-	32.2	0.6	-0.1	2.1	4	clayy SILT to silty CLAY	115	2.0	8	16	5	-	-	2.1	5.1	44	2.76	15
33.30	31.0	15.8	-	31.0	0.7	1.1	2.2	4	clayy SILT to silty CLAY	115	2.0	8	16	4	-	-	2.1	4.9	45	2.78	15
33.47	32.4	16.5	-	32.4	0.5	0.4	1.5	4	clayy SILT to silty CLAY	115	2.0	8	16	4	-	-	2.2	5.1	39	2.67	15
33.63	31.4	15.9	-	31.4	0.4	0.8	1.3	4	clayy SILT to silty CLAY	115	2.0	8	16	4	-	-	2.1	4.9	38	2.65	15
33.79	35.1	17.7	-	35.1	0.4	0.7	1.3	4	clayy SILT to silty CLAY	115	2.0	9	18	5	-	-	2.3	5.5	36	2.62	15
33.96	35.1	17.6	-	35.1	0.4	0.5	1.2	4	clayy SILT to silty CLAY	115	2.0	9	18	4	-	-	2.3	5.5	36	2.60	15
34.12	36.5	25.0	66.2	36.5	0.4	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	6	9	6	21	30	-	-	30	2.48	16
34.29	31.4	15.6	-	31.4	0.7	0.1	2.3	4	clayy SILT to silty CLAY	115	2.0	8	16	4	-	-	2.1	4.8	46	2.80	15
34.45	29.9	14.8	-	29.9	0.8	0.0	2.8	3	silty CLAY to CLAY	115	1.5	10	20	4	-	-	2.0	4.5	50	2.87	15
34.61	37.0	18.2	-	37.0	0.8	-0.1	2.2	4	clayy SILT to silty CLAY	115	2.0	9	18	5	-	-	2.5	5.7	42	2.72	15
34.78	46.1	22.6	-	46.1	1.1	0.0	2.4	4	clayy SILT to silty CLAY	115	2.0	11	23	6	-	-	3.1	7.1	39	2.67	15
34.94	60.4	29.4	-	60.4	1.8	0.6	3.0	4	clayy SILT to silty CLAY	115	2.0	15	30	8	-	-	4.1	9.4	37	2.64	15
35.11	74.9	36.3	-	75.0	2.8	1.2	3.9	4	clayy SILT to silty CLAY	115	2.0	18	37	9	-	-	5.2	9.9	37	2.64	15
35.27	112.7	76.0	182.3	112.7	4.4	2.9	4.0	4	clayy SILT to silty CLAY	115	2.0	38	56	18	-	-	7.8	9.9	27	2.42	15
35.43	186.4	125.5	181.3	186.5	4.2	5.0	2.3	5	silty SAND to sandy SILT	120	4.0	31	47	26	74	40	-	-	16	2.09	16
35.60	289.7	194.5	213.0	289.9	3.7	10.1	1.3	6	clean SAND to silty SAND	125	5.0	39	58	35	89	42	-	-	8	1.78	16
35.76	325.7	218.2	223.2	326.0	3.4	17.3	1.0	6	clean SAND to silty SAND	125	5.0	44	65	38	93	43	-	-	6	1.68	16
35.93	277.0	185.1	205.4	277.2	3.6	7.3	1.3	6	clean SAND to silty SAND	125	5.0	37	55	34	87	42	-	-	8	1.80	16
36.09	161.7	107.8	160.4	161.8	3.4	4.9	2.1	5	silty SAND to sandy SILT	120	4.0	27	40	22	69	39	-	-	16	2.12	16
36.26	95.1	63.2	137.2	95.2	2.6	5.6	2.8	5	silty SAND to sandy SILT	120	4.0	16	24	14	52	36	-	-	25	2.36	16
36.42	75.2	35.1	-	75.3	2.7	7.3	3.7	4	clayy SILT to silty CLAY	115	2.0	18	38	9	-	-	5.2	9.9	37	2.63	15
36.58	80.0	37.2	-	80.1	3.1	6.9	4.0	4	clayy SILT to silty CLAY	115	2.0	19	40	10	-	-	5.5	9.9	37	2.64	15
36.75	91.4	60.4	157.2	91.5	3.3	5.8	3.7	4	clayy SILT to silty CLAY	115	2.0	30	46	14	-	-	6.3	9.9	29	2.47	15
36.91	77.7	35.8	-	77.9	3.0	5.9	4.0	4	clayy SILT to silty CLAY	115	2.0	18	39	9	-	-	5.3	9.9	38	2.65	15
37.08	56.9	26.1	-	57.0	2.3	7.1	4.2	3	silty CLAY to CLAY	115	1.5	17	38	7	-	-	3.9	8.3	45	2.77	15
37.24	43.6	19.9	-	43.7	1.9	6.8	4.6	3	silty CLAY to CLAY	115	1.5	13	29	6	-	-	2.9	6.2	52	2.89	15
37.40	41.8	19.0	-	41.9	1.7	6.7	4.3	3	silty CLAY to CLAY	115	1.5	13	28	6	-	-	2.8	5.9	51	2.89	15
37.57	37.4	16.9	-	37.5	1.5	7.3	4.4	3	silty CLAY to CLAY	115	1.5	11	25	5	-	-	2.5	5.3	54	2.94	15
37.73	31.3	14.1	-	31.5	0.9	6.8	3.0	3	silty CLAY to CLAY	115	1.5	9	21	4	-	-	2.1	4.3	52	2.90	15
37.90	29.3	13.2	-	29.5	1.2	7.5	4.3	3	silty CLAY to CLAY	115	1.5	9	20	4	-	-	1.9	4.0	60	3.02	15
38.06	28.5	12.7	-	28.7	1.0	8.2	3.8	3	silty CLAY to CLAY	115	1.5	8	19	4	-	-	1.9	3.9	59	3.00	15
38.22	20.3	9.0	-	20.5	0.9	9.3	4.9	3	silty CLAY to CLAY	115	1.5	6	14	3	-	-	1.3	2.7	73	3.20	15
38.39	29.9	13.3	-	30.1	0.9	10.9	3.1	3	silty CLAY to CLAY	115	1.5	9	20	4	-	-	2.0	4.0	54	2.93	15
38.55	29.9	13.2	-	30.1	0.9	12.9	3.1	3	silty CLAY to CLAY	115	1.5	9	20	4	-	-	2.0	4.0	54	2.94	15
38.72	32.0	14.0	-	32.2	0.9	14.9	3.0	3	silty CLAY to CLAY	115	1.5	9	21	4	-	-	2.1	4.3	52	2.90	15
38.88	34.8	15.2	-	35.2	0.9	17.7	2.9	3	silty CLAY to CLAY	115	1.5	10	23	4	-	-	2.3	4.7	50	2.86	15
39.04	37.6	16.4	-	38.0	1.0	20.1	2.8	4	clayy SILT to silty CLAY	115	2.0	8	19	5	-	-	2.5	5.1	48	2.83	15
39.21	38.7	16.8	-	39.2	1.3	22.7	3.7	3	silty CLAY to CLAY	115	1.5	11	26	5	-	-	2.6	5.2	51	2.89	15
39.37	40.9	17.7	-	41.4	1.5	25.0	4.0	3	silty CLAY to CLAY	115	1.5	12	27	5	-	-	2.7	5.5	52	2.89	15
39.54	46.2	19.9	-	46.8	1.8	27.0	4.1	3	silty CLAY to CLAY	115	1.5	13	31	6	-	-	3.1	6.2	50	2.86	15
39.70	53.4	22.9	-	53.9	2.0	26.2	3.8	3	silty CLAY to CLAY	115	1.5	15	36	6	-	-	3.6	7.2	45	2.79	15
39.86	57.1	24.4	-	57.6	1.8	27.1	3.4	4	clayy SILT to silty CLAY	115	2.0	12	29	7	-	-	3.9	7.7	42	2.73	15
40.03	55.6	23.6	-	56.0	1.8	21.5	3.4	4	clayy SILT to silty CLAY	115	2.0	12	28	7	-	-	3.8	7.5	43	2.75	15
40.19	56.9	24.1	-	57.4	1.9	27.8	3.5	4	clayy SILT to silty CLAY	115	2.0	12	28	7	-	-	3.9	7.6	43	2.75	15
40.36	58.5	24.7	-	59.1	2.2	30.1	3.9	4	clayy SILT to silty CLAY	115	2.0	12	29	7	-	-	4.0	7.8	44	2.77	15
40.52	63.3	26.6	-	63.9	2.2	31.3	3.6	4	clayy SILT to silty CLAY	115	2.0	13	32	7	-	-	4.3	8.5	42	2.72	15
40.68	53.8	22.5	-	54.4	2.0	30.6	3.9	3	silty CLAY to CLAY	115	1.5	15	36	6	-	-	3.6	7.1	46	2.80	15
40.85	58.0	24.2	-	58.7	2.8	32.9	5.0	3	silty CLAY to CLAY	115	1.5	16	39	7	-	-	3.9	7.7	49	2.85	15
41.01	55.1	22.9	-	55.8	3.0	37.5	5.7	3	silty CLAY to CLAY	115	1.5	15	37	7	-	-	3.7	7.2	52	2.90	15
41.18	52.8	21.8	-	53.5	2.7	36.5	5.3	3	silty CLAY to CLAY	115	1.5	15	35	7	-	-	3.6	6.9	52	2.90	15
41.34	54.1	22.3	-	54.5	2.2	20.3	4.3	3	silty CLAY to CLAY	115	1.5	15	36	6	-	-	3.7	7.0	48	2.83	15
41.50	46.6	19.1	-	47.1	1.9	25.4	4.3	3	silty CLAY to CLAY	115	1.5	13	31	6	-	-	3.1	6.0	51	2.89	15
41.67	46.0	18.8	-	46.6	1.8	28.6	4.1	3	silty CLAY to CLAY	115	1.5	13	31	6	-	-	3.1	5.9	51	2.88	15
41.83	41.6	17.0	-	42.2	1.6	32.2	4.0	3	silty CLAY to CLAY	115	1.5	11	28	5	-	-	2.8	5.3	52	2.91	15
42.00	39.0	15.8	-	39.7	1.3	33.4	3.6	3	silty CLAY to CLAY	115	1.5	11	26	5	-	-	2.6	4.9	52	2.90	15
42.16	38.6	15.6	-	39.4	1.5	38.0	4.1	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	4.8	55	2.94	15
42.32	41.4	16.7	-	42.2	1.8	41.8	4.5	3	silty CLAY to CLAY	115	1.5	11	28	5	-	-	2.8	5.2	55	2.95	15
42.49	43.1	17.3	-	43.9	2.0	40.3	4.9	3	silty CLAY to CLAY	115	1.5	12	29	5	-	-	2.9	5.4	56	2.96	15
42.65	40.5	16.2	-	41.2	1.8	33.9	4.8	3	silty CLAY to CLAY	115	1.5	11	27	5	-	-	2.7	5.0	57	2.98	15
42.82	37.4	14.9	-	38.2	1.5	38.0	4.4	3	silty CLAY to CLAY	115	1.5	10	25	5	-	-	2.5	4.6	57	2.98	15
42.98	37.8	15.0	-	38.6	1.3	40.7	3.7	3	silty CLAY to CLAY	115	1.5	10	25	5	-	-	2.5	4.6	54	2.93	15
43.15	34.5	13.7	-	35.4	1.1	41.0	3.5	3	silty CLAY to CLAY	115	1.5	9	23	4	-	-	2.3	4.2	56	2.96	15
43.31	32.5	12.8	-	33.4	1.0	44.9	3.4	3	silty CLAY to CLAY	115	1.5	9	22	4	-	-	2.1	3.9	57	2.97	15
43.47	33.4	13.1	-	34.4	1.1	51.5	3.4	3	silty CLAY to CLAY	115	1.5	9	22	4	-	-	2.2	4.0	56	2.96	15
43.64	37.9	14.8	-	38.9	1.2	49.7	3.5	3	silty CLAY to CLAY	115	1.5	10	25	5	-	-	2.5	4.6	53	2.92	15
43.80	37.2	14.5	-	38.3	1.5	56.4	4.2	3	silty CLAY to CLAY	115	1.5	10	25	5	-	-	2.4	4.4	57	2.98	15
43.97	41.4	16.1	-	42.6	1.7	58.1	4.4	3	silty CLAY to CLAY	115	1.5	11	28	5	-	-	2.7	5.0	55	2.95	15
44.13	39.3	15.2	-	40.5	1.9	61.9	5.2	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	4.7	60	3.02	15
44.29	38.9	15.0	-	40.1	2.6	59.3	7.1	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	4.6	67	3.11	15
44.46	44.2	17.0	-	45.6	3.5	68.7	8.3	3	silty CLAY to CLAY	115	1.5	11	29	6	-	-	2.9	5.3	67	3.12	15
44.62	68.5	26.2	-	69.1	4.6	30.6	7.1	3	silty CLAY to CLAY	115	1.5	17	46	8	-	-	4.7	8.3	54	2.93	15
44.79	92.9	35.4	-	93.4	4.3	21.7	4.8	3	silty CLAY to CLAY	115	1.5	24	62	10	-	-	6.4	9.9	41	2.71	15
44.95	69.1	26.2	-	69.3	3.3	9.3	4.9	3	silty CLAY to CLAY	115	1.5	17	46	8	-	-	4.7	8.3	47	2.82	15
45.11	47.8	18.1	-	48.0	1.7	9.5	3.7	3	silty CLAY to CLAY	115	1.5	12	32	5	-	-	3.2	5.6	50	2.86	15
45.28	45.1	17.0	-	45.5	1.3	16.3	3.0	3	silty CLAY to CLAY	115	1.5	11	30	5	-	-	3.0	5.3	48	2.83	15
45.44	39.6	14.9	-	40.0	1.5	21.3	4.1	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	4.6	56	2.96	15
45.61	39.1	14.8	-	39.6	1.7	26.2	4.7	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	4.5	59	3.00	15
45.77	48.1	18.2	-	48.7	1.9	28.3	4.1	3	silty CLAY to CLAY	115	1.5	12	32	5	-	-	3.2	5.6	51	2.89	15
45.93	48.0	18.1	-	48.4	1.7	18.3	3.9	3	silty CLAY to CLAY	115	1.5	12	32	5	-	-	3.2	5.6	50	2.87	15
46.10	37.6	14.2	-	37.9	1.4	19.0	4.0	3	silty CLAY to CLAY	115	1.5	9	25	4	-	-	2.5	4.3	57	2.97	15
46.26	39.5	14.9	-	40.0	1.1	22.6	3.1	3	silty CLAY to CLAY	115	1.5	10	26	4	-	-	2.6	4.5	51	2.89	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Geotehnologies
Data File: SDF(925).cpt
CPT Date: 6/21/2018 10:16:42 AM
GW During Test: 80 ft

Sounding ID: CPT-02
Project No: 21545
Cone/Rig: DDG1448

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
46.43	36.4	13.8	-	37.0	1.0	27.5	3.0	3	silty CLAY to CLAY	115	1.5	9	24	4	-	-	2.4	4.1	53	2.91	15
46.59	33.2	12.5	-	33.8	0.9	30.9	3.1	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.2	3.7	56	2.96	15
46.75	33.1	12.5	-	33.8	1.0	34.5	3.1	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.1	3.7	56	2.96	15
46.92	31.5	11.9	-	32.2	1.0	36.6	3.5	3	silty CLAY to CLAY	115	1.5	8	21	4	-	-	2.0	3.5	59	3.01	15
47.08	32.4	12.2	-	33.1	1.1	39.0	3.9	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.1	3.5	60	3.02	15
47.25	32.8	12.4	-	33.6	1.3	41.4	4.2	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.1	3.6	61	3.04	15
47.41	31.7	12.0	-	32.5	1.2	40.9	4.3	3	silty CLAY to CLAY	115	1.5	8	21	4	-	-	2.0	3.4	62	3.06	15
47.57	31.5	11.9	-	32.4	1.4	45.0	4.8	3	silty CLAY to CLAY	115	1.5	8	21	4	-	-	2.0	3.4	65	3.09	15
47.74	33.6	12.7	-	34.4	1.4	44.6	4.6	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.2	3.6	62	3.06	15
47.90	34.3	13.0	-	35.6	1.4	64.5	4.5	3	silty CLAY to CLAY	115	1.5	9	23	4	-	-	2.2	3.7	61	3.04	15
48.07	35.4	13.4	-	36.8	1.3	69.5	4.1	3	silty CLAY to CLAY	115	1.5	9	24	4	-	-	2.3	3.8	59	3.00	15
48.23	33.4	12.6	-	34.9	1.3	81.1	4.4	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.2	3.6	61	3.04	15
48.39	37.5	14.1	-	39.2	1.4	88.0	4.1	3	silty CLAY to CLAY	115	1.5	9	25	4	-	-	2.4	4.0	57	2.98	15
48.56	38.0	14.4	-	39.4	1.5	70.4	4.2	3	silty CLAY to CLAY	115	1.5	10	25	5	-	-	2.5	4.1	57	2.98	15
48.72	33.5	12.6	-	34.5	1.4	50.0	4.5	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.2	3.5	62	3.05	15
48.89	36.4	13.8	-	37.2	1.1	36.8	3.3	3	silty CLAY to CLAY	115	1.5	9	24	4	-	-	2.4	3.9	55	2.94	15
49.05	33.4	12.6	-	34.2	1.0	41.4	3.4	3	silty CLAY to CLAY	115	1.5	8	22	4	-	-	2.2	3.5	57	2.98	15
49.22	29.5	11.1	-	30.4	1.1	46.0	4.1	3	silty CLAY to CLAY	115	1.5	7	20	4	-	-	1.9	3.0	64	3.08	15
49.38	29.1	11.0	-	30.2	1.2	57.5	4.6	3	silty CLAY to CLAY	115	1.5	7	19	4	-	-	1.9	3.0	66	3.11	15
49.54	34.8	13.1	-	35.9	1.4	58.3	4.5	3	silty CLAY to CLAY	115	1.5	9	23	4	-	-	2.3	3.6	61	3.04	15
49.71	35.0	13.2	-	36.3	1.5	66.4	4.6	3	silty CLAY to CLAY	115	1.5	9	23	4	-	-	2.3	3.6	61	3.04	15
49.87	41.3	15.6	-	42.7	2.1	69.8	5.5	3	silty CLAY to CLAY	115	1.5	10	28	5	-	-	2.7	4.3	60	3.03	15
50.04	41.1	15.5	-	42.6	2.7	80.5	7.0	3	silty CLAY to CLAY	115	1.5	10	27	5	-	-	2.7	4.3	66	3.10	15
50.20	57.5	21.7	-	59.4	3.4	96.1	6.2	3	silty CLAY to CLAY	115	1.5	14	38	7	-	-	3.9	6.1	55	2.95	15
50.36	87.3	32.9	-	87.7	3.9	22.1	4.7	3	silty CLAY to CLAY	115	1.5	22	58	9	-	-	6.0	9.5	42	2.73	15
50.53	85.5	32.2	-	85.6	5.1	9.2	6.2	3	silty CLAY to CLAY	115	1.5	21	57	9	-	-	5.8	9.2	47	2.82	15
50.69	72.1	27.2	-	72.3	5.3	11.6	7.7	3	silty CLAY to CLAY	115	1.5	18	48	8	-	-	4.9	7.7	55	2.94	15
50.86	89.1	33.6	-	89.5	5.1	20.6	6.0	3	silty CLAY to CLAY	115	1.5	22	59	10	-	-	6.1	9.6	46	2.80	15
51.02	146.8	82.6	166.5	146.9	4.5	4.0	3.1	5	silty SAND to sandy SILT	120	4.0	21	37	18	61	36	-	-	23	2.32	16
51.18	179.4	100.7	170.0	179.4	4.7	0.8	2.7	5	silty SAND to sandy SILT	120	4.0	25	45	22	67	38	-	-	19	2.21	16
51.35	190.5	106.8	181.8	190.5	5.3	0.6	2.8	5	silty SAND to sandy SILT	120	4.0	27	48	23	69	38	-	-	19	2.21	16
51.51	207.2	115.9	187.5	207.2	5.6	1.1	2.8	5	silty SAND to sandy SILT	120	4.0	29	52	24	72	38	-	-	18	2.18	16
51.68	222.6	124.4	190.9	222.7	5.7	1.3	2.6	5	silty SAND to sandy SILT	120	4.0	31	56	26	74	39	-	-	17	2.14	16
51.84	231.9	129.4	194.9	231.9	5.9	1.3	2.6	5	silty SAND to sandy SILT	120	4.0	32	58	27	75	39	-	-	17	2.13	16
52.00	235.8	131.3	196.6	235.8	6.0	1.7	2.6	5	silty SAND to sandy SILT	120	4.0	33	59	27	76	39	-	-	17	2.12	16
52.17	233.0	129.5	192.9	233.0	5.8	1.5	2.5	5	silty SAND to sandy SILT	120	4.0	32	58	27	76	39	-	-	16	2.12	16
52.33	227.1	126.1	194.8	227.1	6.0	1.4	2.7	5	silty SAND to sandy SILT	120	4.0	32	57	26	75	39	-	-	17	2.15	16
52.50	174.8	96.9	181.2	174.8	5.4	1.1	3.1	5	silty SAND to sandy SILT	120	4.0	24	44	21	66	37	-	-	22	2.27	16
52.66	106.4	40.2	-	106.4	4.0	0.2	3.9	4	clayy SILT to silty CLAY	115	2.0	20	53	10	-	-	7.3	9.9	36	2.61	15
52.82	72.6	27.4	-	72.6	3.5	1.2	5.1	3	silty CLAY to CLAY	115	1.5	18	48	8	-	-	4.9	7.4	47	2.81	15
52.99	54.8	20.7	-	54.9	3.1	6.2	6.0	3	silty CLAY to CLAY	115	1.5	14	37	6	-	-	3.7	5.5	56	2.96	15
53.15	46.6	17.6	-	46.8	2.3	10.4	5.3	3	silty CLAY to CLAY	115	1.5	12	31	6	-	-	3.1	4.6	57	2.98	15
53.32	41.2	15.6	-	41.5	2.3	14.0	6.1	3	silty CLAY to CLAY	115	1.5	10	27	5	-	-	2.7	4.0	63	3.06	15
53.48	40.1	15.1	-	40.4	3.2	16.2	8.8	3	silty CLAY to CLAY	115	1.5	10	27	5	-	-	2.6	3.9	71	3.18	15
53.64	67.8	25.6	-	68.2	4.2	21.7	6.5	3	silty CLAY to CLAY	115	1.5	17	45	8	-	-	4.6	6.8	53	2.91	15
53.81	100.6	38.0	-	101.0	5.1	17.7	5.2	3	silty CLAY to CLAY	115	1.5	25	67	10	-	-	6.9	9.9	41	2.72	15
53.97	125.2	68.4	174.4	125.4	4.9	12.1	4.0	4	clayy SILT to silty CLAY	115	2.0	34	63	16	-	-	8.6	9.9	29	2.45	15
54.14	138.0	75.3	171.2	138.2	4.8	8.4	3.6	4	clayy SILT to silty CLAY	115	2.0	38	69	17	-	-	9.5	9.9	26	2.39	15
54.30	165.1	90.0	168.4	165.2	4.8	5.4	2.9	5	silty SAND to sandy SILT	120	4.0	23	41	20	64	37	-	-	22	2.27	16
54.46	173.3	94.3	169.0	173.4	4.8	4.2	2.8	5	silty SAND to sandy SILT	120	4.0	24	43	20	65	37	-	-	21	2.25	16
54.63	169.0	91.8	168.1	169.1	4.8	3.6	2.9	5	silty SAND to sandy SILT	120	4.0	23	42	20	64	37	-	-	21	2.26	16
54.79	162.7	88.3	171.5	162.8	5.0	2.9	3.1	5	silty SAND to sandy SILT	120	4.0	22	41	20	63	37	-	-	22	2.30	16
54.96	152.6	82.6	174.5	152.6	5.1	1.8	3.4	5	silty SAND to sandy SILT	120	4.0	21	38	19	61	36	-	-	24	2.35	16
55.12	114.4	43.2	-	114.4	4.6	1.5	4.2	4	clayy SILT to silty CLAY	115	2.0	22	57	11	-	-	7.9	9.9	36	2.61	15
55.28	116.2	62.7	142.8	116.2	3.4	0.9	3.0	5	silty SAND to sandy SILT	120	4.0	16	29	15	52	35	-	-	26	2.39	16
55.45	90.6	34.2	-	90.6	3.0	0.8	3.4	4	clayy SILT to silty CLAY	115	2.0	17	45	9	-	-	6.2	8.9	37	2.62	15
55.61	69.8	26.4	-	69.9	2.6	0.9	3.8	4	clayy SILT to silty CLAY	115	2.0	13	35	7	-	-	4.7	6.8	43	2.75	15
55.78	50.1	18.9	-	50.1	2.0	1.9	4.3	3	silty CLAY to CLAY	115	1.5	13	33	6	-	-	3.3	4.7	52	2.90	15
55.94	50.7	19.1	-	50.8	1.7	3.1	3.5	3	silty CLAY to CLAY	115	1.5	13	34	6	-	-	3.4	4.8	48	2.83	15
56.11	44.8	16.9	-	44.9	1.6	3.5	3.7	3	silty CLAY to CLAY	115	1.5	11	30	5	-	-	2.9	4.2	52	2.90	15
56.27	39.6	14.9	-	39.7	1.7	4.2	4.7	3	silty CLAY to CLAY	115	1.5	10	26	5	-	-	2.6	3.6	59	3.00	15
56.43	32.6	12.3	-	32.7	2.4	5.7	8.2	3	silty CLAY to CLAY	115	1.5	8	22	5	-	-	2.1	2.9	75	3.23	15
56.60	43.5	16.4	-	43.7	3.2	7.9	8.0	3	silty CLAY to CLAY	115	1.5	11	29	6	-	-	2.8	4.0	67	3.12	15
56.76	100.3	37.8	-	100.4	3.8	7.7	3.9	4	clayy SILT to silty CLAY	115	2.0	19	50	10	-	-	6.9	9.6	37	2.63	15
56.93	131.3	69.9	164.6	131.4	4.5	4.7	3.5	4	clayy SILT to silty CLAY	115	2.0	35	66	16	-	-	9.0	9.9	27	2.41	15
57.09	135.0	71.8	171.9	135.1	4.9	4.2	3.7	4	clayy SILT to silty CLAY	115	2.0	36	68	17	-	-	9.3	9.9	27	2.42	15
57.25	129.8	68.9	167.3	129.9	4.7	4.2	3.7	4	clayy SILT to silty CLAY	115	2.0	34	65	16	-	-	8.9	9.9	28	2.43	15
57.42	117.0	62.0	161.5	117.1	4.3	3.3	3.8	4	clayy SILT to silty CLAY	115	2.0	31	59	15	-	-	8.0	9.9	29	2.47	15
57.58	102.1	38.5	-	102.2	3.7	3.3	3.7	4	clayy SILT to silty CLAY	115	2.0	19	51	10	-	-	7.0	9.7	36	2.61	15
57.75	64.3	24.3	-	64.3	2.4	2.7	3.9	3	silty CLAY to CLAY	115	1.5	16	43	7	-	-	4.3	6.0	45	2.78	15
57.91	42.6	16.1	-	42.7	1.7	3.7	4.3	3	silty CLAY to CLAY	115	1.5	11	28	5	-	-	2.8	3.8	55	2.95	15
58.07	31.6	11.9	-	31.8	1.1	6.6	4.0	3	silty CLAY to CLAY	115	1.5	8	21	4	-	-	2.0	2.7	62	3.05	15
58.24	29.0	10.9	-	29.2	1.2	9.3	4.7	3	silty CLAY to CLAY	115	1.5	7	19	4	-	-	1.8	2.5	67	3.13	15
58.40	28.4	10.7	-	28.6	1.5	11.1	6.2	3	silty CLAY to CLAY	115	1.5	7	19	4	-	-	1.8	2.4	73	3.20	15
58.57	37.1	14.0	-	37.4	2.7	14.2	8.1	3	silty CLAY to CLAY	115	1.5	9	25	5	-	-	2.4	3.3	72	3.18	15
58.73	81.2	30.6	-	81.6	3.9	21.8	5.0	3	silty CLAY to CLAY	115	1.5	20	54	9	-	-	5.5	7.5	45	2.77	15
58.89	73.8	27.9	-	74.0	4.2	9.0	6.0	3	silty CLAY to CLAY	115	1.5	19	49	8	-	-	5.0	6.7	50	2.86	15
59.06	88.8	33.5	-	89.0	4.8	11.2	5.6	3	silty CLAY to CLAY	115	1.5	22	59	9	-	-	6.0	8.2	45	2.78	15
59.22	99.9	37.7	-	100.1	4.8	7.9	5.0	3	silty CLAY to CLAY	115	1.5	25	67	10	-	-	6.8	9.2	41	2.71	15
59.39	96.5	36.4	-	96.6	5.3	5.3	5.7	3	silty CLAY to CLAY	115	1.5	24	64	10	-	-	6.6	8.8	44	2.76	15
59.55	99.4	37.5	-	99.5	4.9	5.4	5.1	3	silty CLAY to CLAY	115	1.5	25	66	10	-	-	6.8	9.1	41	2.72	15
59.71	104.0	39.2	-	104.1	4.6	5.5	4.5	4	clayy SILT to silty CLAY	115	2.0	20	52	10	-	-	7.1	9.5	39	2.66	15
59.88	139.2	72.3	158.1	139.3	4.3	5.1	3.2	5	silty SAND to sandy SILT	120	4.0	18	35	17	56	35	-	-	25	2.37	16
60.04	177.6	92.1	157.4	177.7	4.4	4.2	2.5	5	silty SAND to sandy SILT	120	4.0	23	44	20	64	37	-	-	20	2.22	16
60.21	233.0	120.7	158.0	233.1	3.8	4.1	1.7	6	clean SAND to silty SAND	125	5.0	24	47	24	73	38	-	-	13	2.01	16
60.37	306.3	158.4	183.7	306.4	4.2	4.7	1.4	6	clean SAND to silty SAND	125	5.0	32	61	30	82	40	-	-	10	1.87	16
60.53	349.1	180.3	200.1	349.2	4.5	4.3	1.3	6	clean SAND to silty SAND	125	5.0	36	70	33	86	40	-	-	8	1.80	16
60.70	349.3	180.1	200.0	349.4	4.5	4.7	1.3	6	clean SAND to silty SAND	125	5.0	36	70	33	86	40	-	-	8	1.81	16
60.86	344.0	177.1	195.9	344.0	4.2	4.2	1.2	6	clean SAND to silty SAND	125	5.0	35	69	32	86	40	-	-	8	1.80	16
61.03	300.3	154.4	180.4	300.4	4.2	3.8	1.4	6	clean SAND to silty SAND	125	5.0	31	60	29	81	40	-	-	10	1.88	16
61.19	242.4	124.4	168.5	242.5	4.5	3.3	1.9	5	silty SAND to sandy SILT	120	4.0	31	61	25	74	38	-	-	14	2.04	16
61.35	160.3	82.2	160.8	160.3	4.6	2.5	2.9	5	silty SAND to sandy SILT	120	4.0	21	40	18	61	36	-	-	23	2.30	16
61.52	145.5	74.5	179.0	145.6	5.5	3.8	3.9	4	clayy SILT to silty CLAY	115	2.0	37	73	17	-	-	10.0	9.9	27	2.42	15
61.68	163.6	83.6	185.9	163.8	6.0	10.9	3.8	4	clayy SILT to silty CLAY	115	2.0	42	82	19	-	-	11.3	9.9	25	2.38	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

T.F Broadway

Project ID: Geotehnologies
Data File: SDF(925).cpt
CPT Date: 6/21/2018 10:16:42 AM
GW During Test: 80 ft

Page: 5
Sounding ID: CPT-02
Project No: 21545
Cone/Rig: DDG1448

. . Depth ft	. qc PS tsf	* qc1n PS -	. q1ncs PS -	* qt PS tsf	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* SPT IcN1 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR -	* Fin Ic %	* Ic SBT Indx	* Nk -
61.85	221.7	113.2	179.3	221.8	5.6	6.5	2.6	5	silty SAND to sandy SILT	120	4.0	28	55	24	71	38	-	-	18	2.16	16
62.01	263.8	134.5	181.6	263.9	5.3	6.2	2.0	5	silty SAND to sandy SILT	120	4.0	34	66	27	77	39	-	-	14	2.04	16
62.17	274.6	139.9	183.2	274.8	5.2	6.0	1.9	5	silty SAND to sandy SILT	120	4.0	35	69	28	78	39	-	-	13	2.01	16
62.34	260.4	132.4	182.8	260.5	5.5	6.1	2.1	5	silty SAND to sandy SILT	120	4.0	33	65	27	76	39	-	-	15	2.06	16
62.50	279.6	142.0	194.5	279.7	6.1	5.5	2.2	5	silty SAND to sandy SILT	120	4.0	36	70	28	79	39	-	-	14	2.05	16
62.67	355.9	180.5	212.9	356.0	5.9	6.7	1.7	6	clean SAND to silty SAND	125	5.0	36	71	34	86	40	-	-	10	1.89	16
62.83	401.3	203.3	227.9	401.5	6.0	7.4	1.5	6	clean SAND to silty SAND	125	5.0	41	80	37	90	41	-	-	9	1.82	16
63.00	415.3	210.0	231.2	415.4	5.8	7.6	1.4	6	clean SAND to silty SAND	125	5.0	42	83	38	91	41	-	-	8	1.79	16
63.16	420.1	212.2	228.5	420.2	5.4	6.9	1.3	6	clean SAND to silty SAND	125	5.0	42	84	38	92	41	-	-	7	1.76	16
63.32	475.2	239.7	244.9	475.3	5.3	7.9	1.1	6	clean SAND to silty SAND	125	5.0	48	95	42	95	42	-	-	6	1.68	16
63.49	495.0	249.3	249.3	495.2	4.8	7.6	1.0	6	clean SAND to silty SAND	125	5.0	50	99	43	95	42	-	-	5	1.62	16
63.65	491.8	247.4	247.4	491.9	4.8	8.1	1.0	6	clean SAND to silty SAND	125	5.0	49	98	42	95	42	-	-	5	1.62	16
63.82	485.3	243.8	243.8	485.5	4.8	7.7	1.0	6	clean SAND to silty SAND	125	5.0	49	97	42	95	42	-	-	5	1.63	16
63.98	491.4	246.5	246.5	491.6	4.4	7.6	0.9	6	clean SAND to silty SAND	125	5.0	49	98	42	95	42	-	-	5	1.60	16
64.14	503.7	252.3	252.3	503.9	4.6	8.1	0.9	6	clean SAND to silty SAND	125	5.0	50	100	43	95	42	-	-	5	1.60	16
64.31	510.4	255.3	255.3	510.5	4.9	8.6	1.0	6	clean SAND to silty SAND	125	5.0	51	100	44	95	42	-	-	5	1.61	16
64.47	490.4	245.0	245.0	490.5	4.8	7.6	1.0	6	clean SAND to silty SAND	125	5.0	49	98	42	95	42	-	-	5	1.62	16
64.64	456.8	227.9	230.9	456.9	4.7	7.8	1.0	6	clean SAND to silty SAND	125	5.0	46	91	40	94	41	-	-	5	1.66	16
64.80	462.1	230.2	230.5	462.3	4.5	7.1	1.0	6	clean SAND to silty SAND	125	5.0	46	92	40	95	42	-	-	5	1.65	16
64.96	449.2	223.5	229.9	449.3	4.9	7.0	1.1	6	clean SAND to silty SAND	125	5.0	45	90	39	94	41	-	-	6	1.69	16
65.13	441.1	219.1	229.8	441.2	5.1	6.9	1.2	6	clean SAND to silty SAND	125	5.0	44	88	39	93	41	-	-	6	1.72	16
65.29	445.8	221.2	237.1	446.0	5.8	7.2	1.3	6	clean SAND to silty SAND	125	5.0	44	89	40	93	41	-	-	7	1.75	16
65.46	449.1	222.5	244.5	449.2	6.6	7.6	1.5	6	clean SAND to silty SAND	125	5.0	45	90	40	93	41	-	-	8	1.79	16
65.62	450.9	223.1	250.2	451.1	7.3	8.3	1.6	6	clean SAND to silty SAND	125	5.0	45	90	41	93	41	-	-	9	1.82	16
65.78	446.8	220.8	253.9	447.0	7.9	8.8	1.8	6	clean SAND to silty SAND	125	5.0	44	89	41	93	41	-	-	9	1.86	16
65.95	440.9	217.6	251.0	441.0	7.8	8.5	1.8	6	clean SAND to silty SAND	125	5.0	44	88	41	93	41	-	-	9	1.86	16
66.11	452.7	223.1	257.6	452.8	8.2	8.8	1.8	6	clean SAND to silty SAND	125	5.0	45	91	42	93	41	-	-	9	1.86	16
66.28	460.2	226.6	262.4	460.4	8.6	9.0	1.9	6	clean SAND to silty SAND	125	5.0	45	92	42	94	41	-	-	10	1.87	16
66.44	436.1	214.4	254.7	436.3	8.6	7.8	2.0	6	clean SAND to silty SAND	125	5.0	43	87	41	92	41	-	-	10	1.90	16
66.60	449.4	220.6	259.9	449.5	8.7	8.1	2.0	6	clean SAND to silty SAND	125	5.0	44	90	42	93	41	-	-	10	1.89	16
66.77	431.6	211.6	252.4	431.7	8.5	8.4	2.0	6	clean SAND to silty SAND	125	5.0	42	86	40	92	41	-	-	10	1.90	16
66.93	450.6	220.7	253.1	450.8	7.9	8.3	1.8	6	clean SAND to silty SAND	125	5.0	44	90	41	93	41	-	-	9	1.85	16
67.10	446.6	218.4	247.4	446.8	7.4	8.6	1.7	6	clean SAND to silty SAND	125	5.0	44	89	40	93	41	-	-	9	1.83	16
67.26	425.0	207.6	233.3	425.2	6.5	7.4	1.5	6	clean SAND to silty SAND	125	5.0	42	85	38	91	41	-	-	9	1.82	16
67.42	429.2	209.4	230.8	429.4	6.1	7.4	1.4	6	clean SAND to silty SAND	125	5.0	42	86	38	91	41	-	-	8	1.79	16
67.59	422.6	205.9	234.3	422.8	6.8	7.4	1.6	6	clean SAND to silty SAND	125	5.0	41	85	38	91	41	-	-	9	1.84	16
67.75	423.6	206.1	239.5	423.7	7.4	7.9	1.8	6	clean SAND to silty SAND	125	5.0	41	85	39	91	41	-	-	10	1.87	16
67.92	412.5	200.4	238.6	412.7	7.7	9.3	1.9	6	clean SAND to silty SAND	125	5.0	40	82	38	90	41	-	-	10	1.90	16
68.08	429.9	208.6	242.7	430.1	7.6	9.5	1.8	6	clean SAND to silty SAND	125	5.0	42	86	39	91	41	-	-	10	1.87	16
68.24	401.2	194.5	234.0	401.4	7.6	7.9	1.9	6	clean SAND to silty SAND	125	5.0	39	80	37	89	41	-	-	11	1.92	16
68.41	424.6	205.5	236.7	424.8	7.2	8.4	1.7	6	clean SAND to silty SAND	125	5.0	41	85	38	91	41	-	-	9	1.86	16
68.57	420.5	203.3	230.8	420.7	6.6	8.1	1.6	6	clean SAND to silty SAND	125	5.0	41	84	38	90	41	-	-	9	1.84	16
68.74	417.5	201.6	231.1	417.7	6.8	8.9	1.6	6	clean SAND to silty SAND	125	5.0	40	83	37	90	41	-	-	9	1.85	16
68.90	426.0	205.4	234.6	426.2	6.9	8.7	1.6	6	clean SAND to silty SAND	125	5.0	41	85	38	91	41	-	-	9	1.85	16
69.07	422.8	203.6	234.3	423.0	7.0	8.7	1.7	6	clean SAND to silty SAND	125	5.0	41	85	38	90	41	-	-	9	1.86	16
69.23	422.6	203.3	234.2	422.8	7.1	9.6	1.7	6	clean SAND to silty SAND	125	5.0	41	85	38	90	41	-	-	9	1.86	16
69.39	416.0	199.9	231.3	416.2	7.0	9.5	1.7	6	clean SAND to silty SAND	125	5.0	40	83	37	90	41	-	-	10	1.86	16
69.56	417.3	200.2	226.7	417.5	6.4	9.5	1.5	6	clean SAND to silty SAND	125	5.0	40	83	37	90	41	-	-	9	1.83	16
69.72	419.4	201.0	225.0	419.6	6.1	9.1	1.5	6	clean SAND to silty SAND	125	5.0	40	84	37	90	41	-	-	8	1.82	16
69.89	432.4	206.9	227.9	432.6	6.0	9.7	1.4	6	clean SAND to silty SAND	125	5.0	41	86	38	91	41	-	-	8	1.79	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

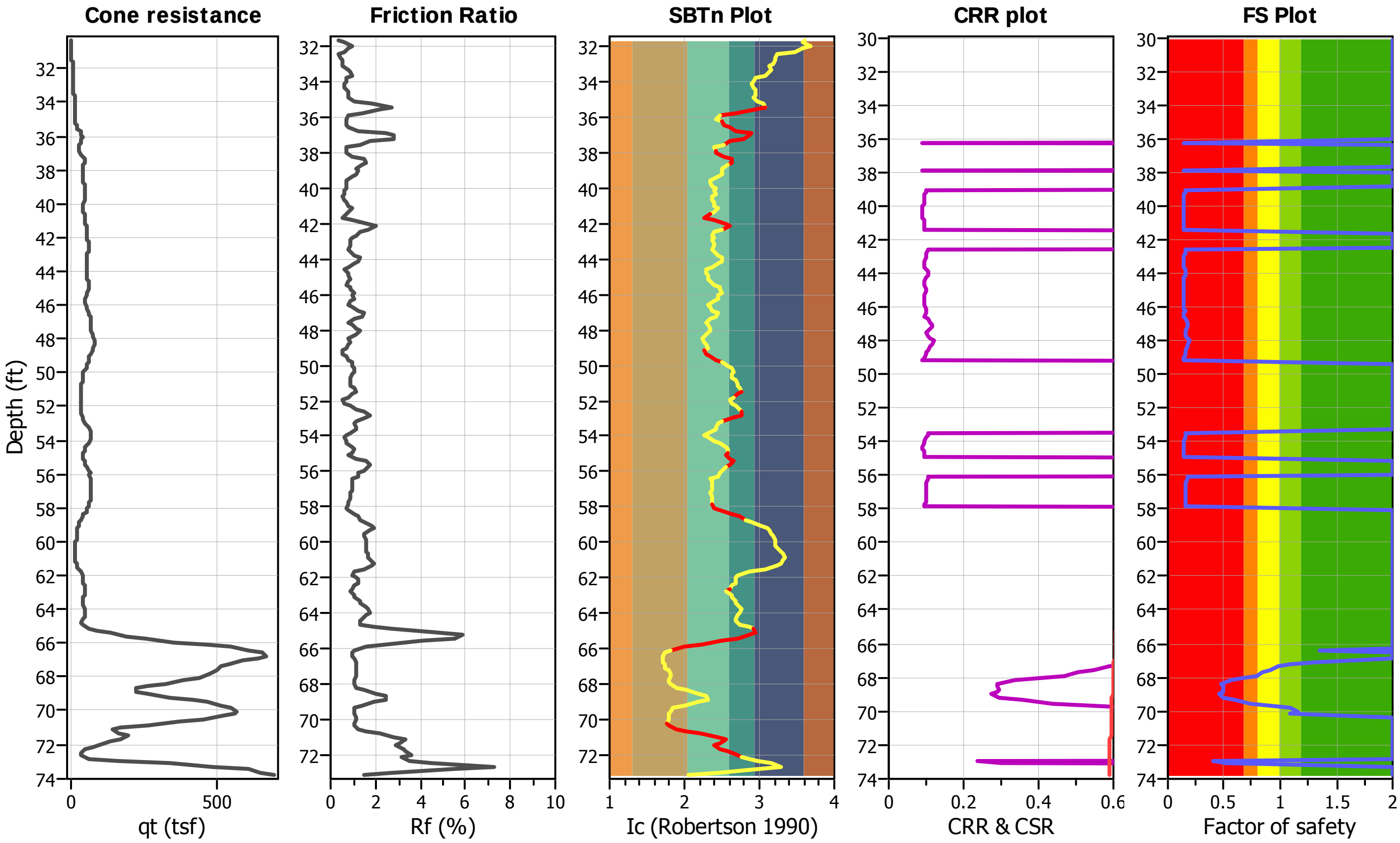
LIQUEFACTION ANALYSIS REPORT

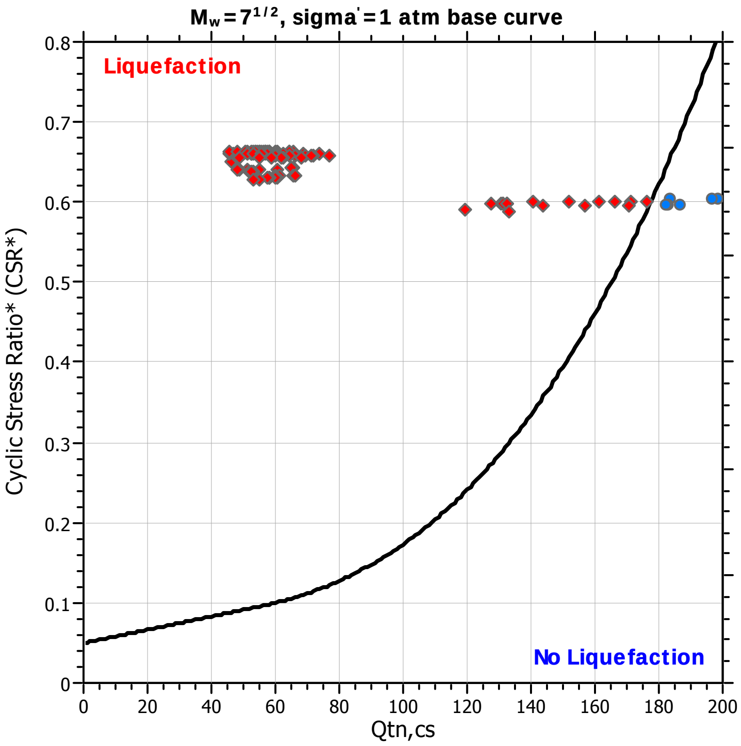
Project title : 21545 - TF Boadway LP **Location : 942 N. Broadway, Los Angeles, CA**

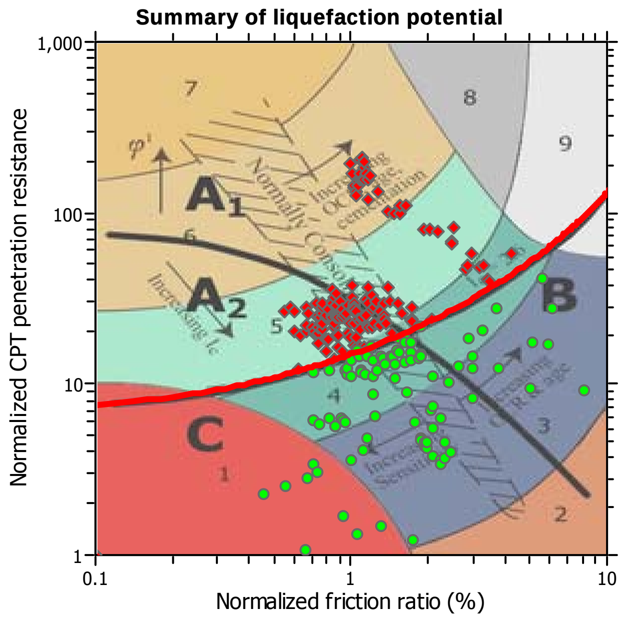
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	45.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	20.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.97	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

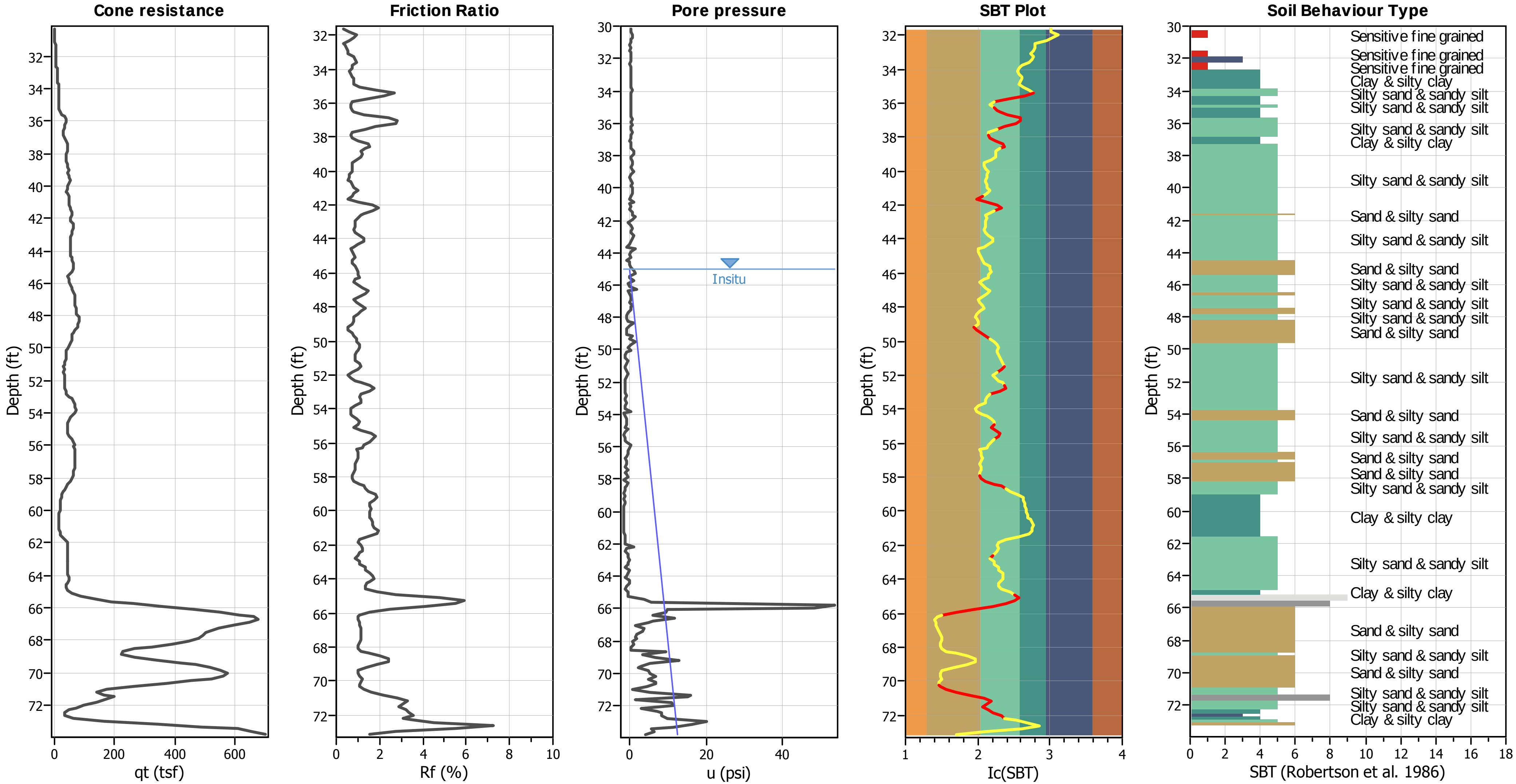






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



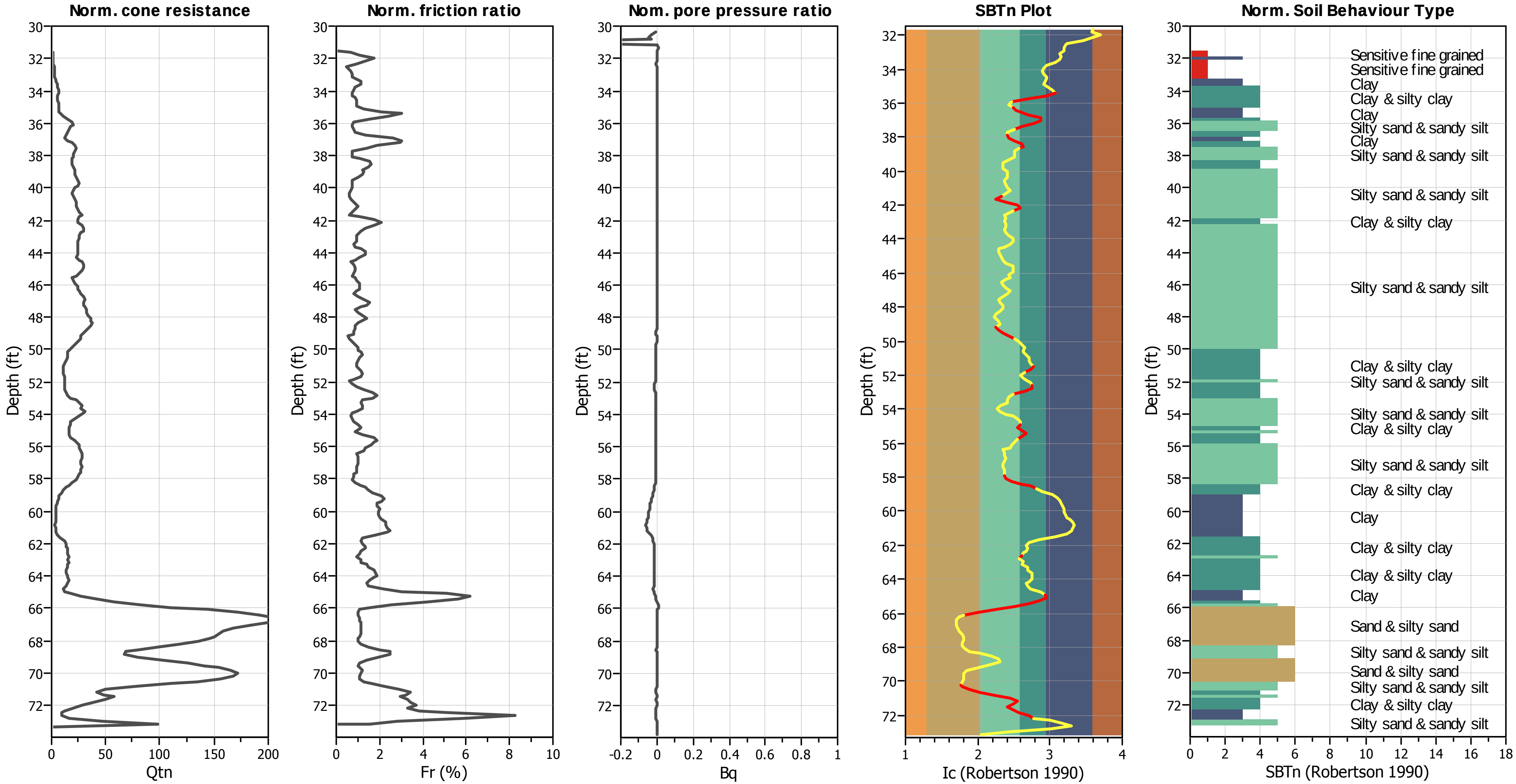
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

CPT basic interpretation plots (normalized)



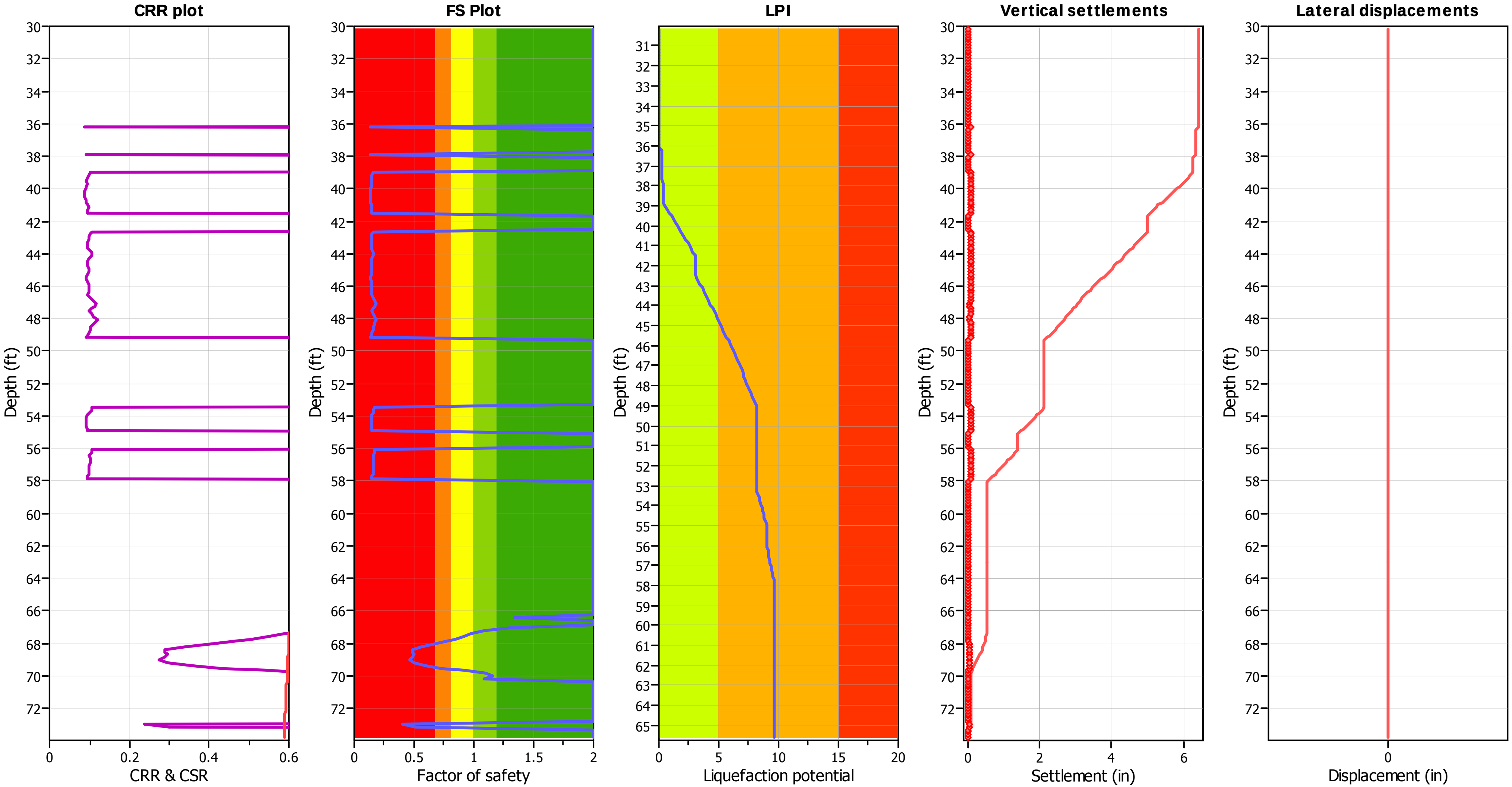
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

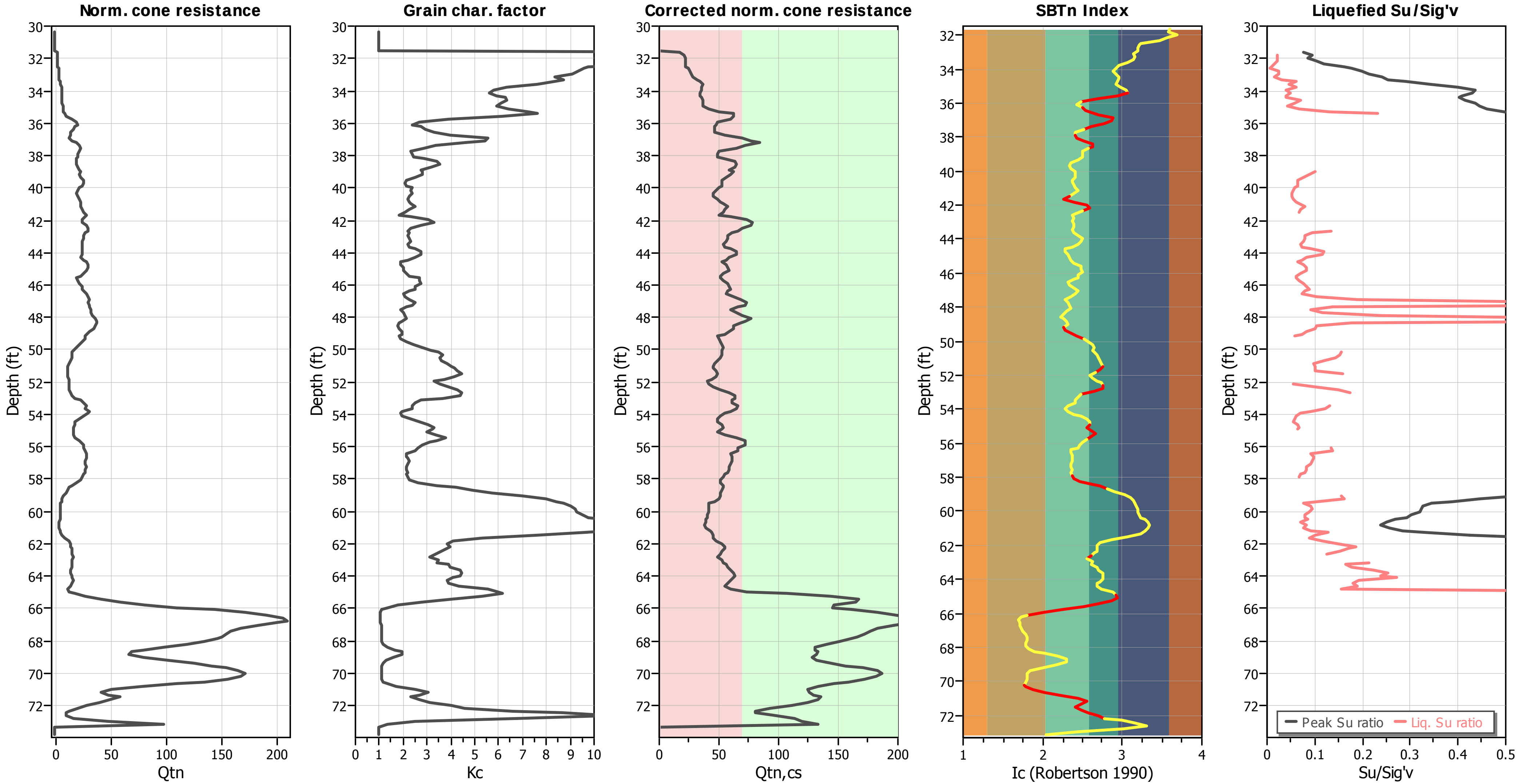
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

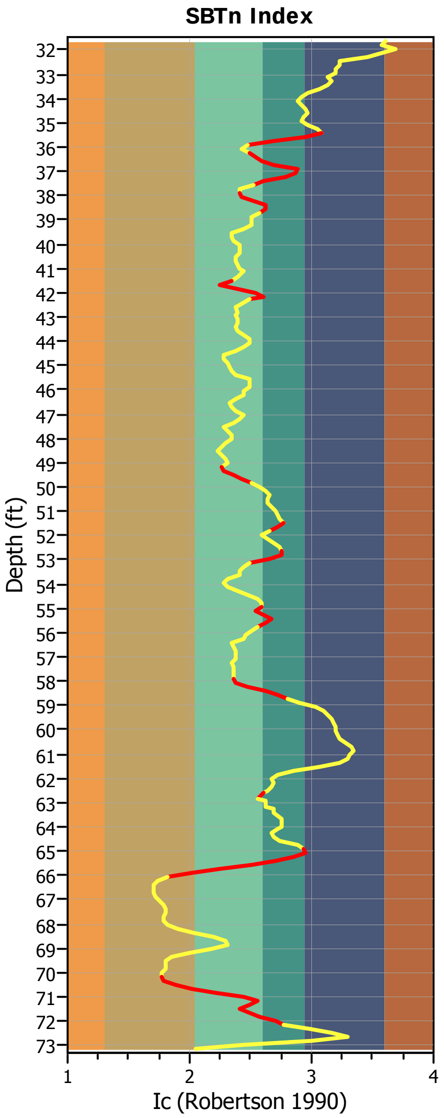
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

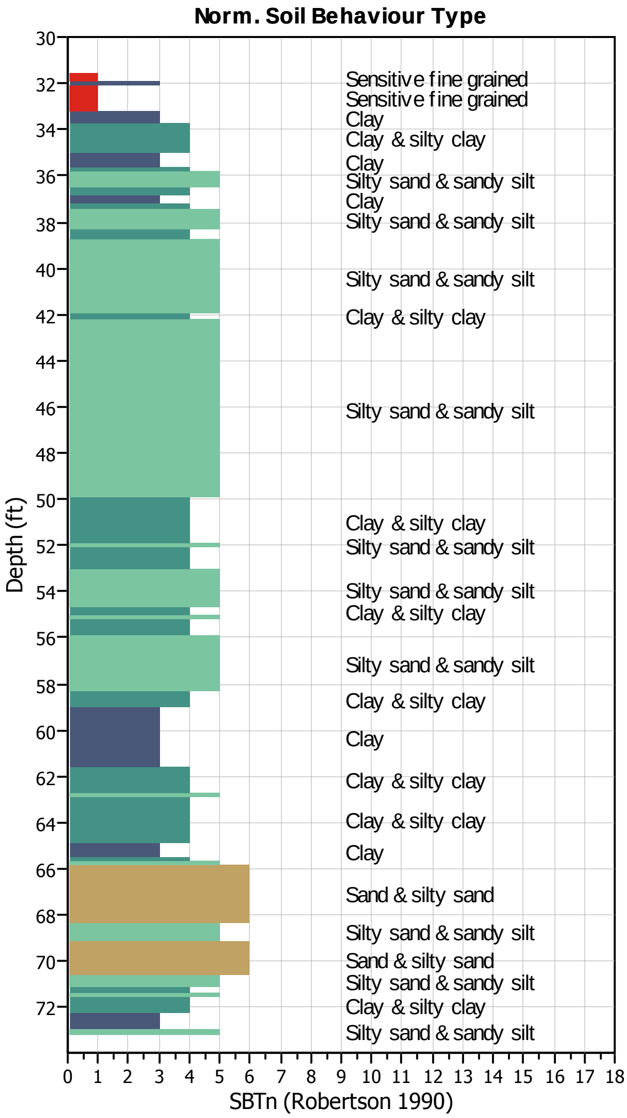
TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between 1.80 < I_c < 3.0) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.





Transition layer algorithm properties

I_c minimum check value:	1.70
I_c maximum check value:	3.00
I_c change ratio value:	0.0250
Minimum number of points in layer:	2

General statistics

Total points in CPT file:	267
Total points excluded:	76
Exclusion percentage:	28.46%
Number of layers detected:	18

:: Field input data ::

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
1	30.16	-0.01	0.00	0.08	N/A	120.90
2	30.33	-0.03	0.00	0.08	N/A	87.36
3	30.49	0.20	0.00	0.64	N/A	87.36
4	30.66	0.65	0.00	0.75	N/A	87.36
5	30.82	1.32	0.00	0.23	N/A	87.36
6	30.98	1.91	0.00	0.08	N/A	87.36
7	31.15	2.32	0.00	-0.01	N/A	87.36
8	31.31	2.73	0.00	0.07	N/A	87.36
9	31.48	3.27	0.00	-0.01	N/A	87.36
10	31.64	4.01	0.00	0.04	100.00	87.36
11	31.80	4.33	0.04	0.06	100.00	87.37
12	31.97	4.87	0.04	0.05	100.00	90.22
13	32.13	3.38	0.04	0.05	100.00	89.85
14	32.30	5.81	0.03	-0.12	95.22	88.59
15	32.46	6.14	0.02	0.11	75.96	87.36
16	32.62	6.89	0.01	0.11	74.69	88.41
17	32.79	7.18	0.05	0.19	73.30	90.94
18	32.95	7.91	0.05	0.16	72.18	92.30
19	33.12	8.13	0.03	0.09	67.93	93.07
20	33.28	9.49	0.06	0.18	70.19	96.16
21	33.44	9.22	0.12	0.16	67.91	98.25
22	33.61	11.10	0.09	0.18	63.56	100.06
23	33.77	13.94	0.12	0.19	55.86	99.44
24	33.94	14.15	0.08	0.47	52.78	99.88
25	34.10	14.28	0.10	0.27	51.56	98.82
26	34.27	13.67	0.08	0.25	53.37	98.73
27	34.43	12.66	0.08	0.18	55.63	99.76
28	34.59	13.90	0.14	0.34	55.85	100.75
29	34.76	14.91	0.12	0.17	54.40	101.06
30	34.92	14.44	0.09	0.33	53.41	101.12
31	35.09	14.94	0.14	0.12	56.39	103.82
32	35.25	16.58	0.27	0.20	61.41	108.21
33	35.41	17.73	0.48	0.20	63.60	112.46
34	35.58	22.25	0.77	0.09	54.76	113.05
35	35.74	29.21	0.29	0.41	39.85	112.96
36	35.91	43.47	0.31	0.20	29.66	109.63
37	36.07	36.03	0.23	0.60	27.29	109.33
38	36.23	36.32	0.24	0.13	30.30	108.44
39	36.40	29.92	0.25	0.28	32.24	108.18
40	36.56	29.72	0.22	0.46	35.00	107.98
41	36.73	28.83	0.24	0.38	40.28	111.25
42	36.89	30.00	0.65	0.27	50.88	115.89
43	37.05	27.58	1.22	-0.04	50.31	118.03
44	37.22	39.24	0.85	0.17	44.89	119.98
45	37.38	52.68	1.24	0.07	35.78	117.84
46	37.55	41.88	0.29	0.39	31.45	115.86
47	37.71	42.78	0.27	0.97	26.50	110.70
48	37.87	43.40	0.35	0.94	26.93	110.02

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
49	38.04	37.07	0.22	0.20	27.77	110.05
50	38.20	39.98	0.28	0.09	31.59	112.28
51	38.37	40.95	0.66	0.45	36.29	115.35
52	38.53	38.30	0.82	0.51	36.90	115.77
53	38.69	40.65	0.38	0.20	34.05	115.43
54	38.86	48.32	0.54	0.51	30.71	114.41
55	39.02	44.63	0.57	0.85	31.00	115.52
56	39.19	46.47	0.60	0.11	30.94	114.62
57	39.35	43.42	0.36	-0.22	28.01	113.65
58	39.51	50.90	0.36	0.11	24.25	112.27
59	39.68	55.83	0.35	0.50	24.02	112.45
60	39.84	45.97	0.38	0.11	24.76	112.31
61	40.01	46.59	0.35	0.57	27.12	111.07
62	40.17	38.60	0.22	0.66	26.67	109.73
63	40.33	41.29	0.23	0.71	27.00	108.85
64	40.50	41.48	0.27	0.03	25.54	109.10
65	40.66	45.88	0.23	-0.18	25.26	110.63
66	40.83	50.50	0.38	0.88	26.09	111.92
67	40.99	45.14	0.43	-0.10	26.70	112.97
68	41.15	49.46	0.38	0.19	28.47	114.32
69	41.32	51.30	0.62	-0.16	25.88	113.64
70	41.48	52.98	0.28	0.73	23.93	113.16
71	41.65	56.54	0.28	0.46	20.82	111.61
72	41.81	59.46	0.38	1.48	26.34	115.79
73	41.98	51.02	1.01	0.48	32.84	119.24
74	42.14	52.19	1.31	-0.42	35.29	120.50
75	42.30	59.34	0.89	0.07	30.48	120.52
76	42.47	73.60	0.88	0.57	26.60	119.04
77	42.63	60.52	0.71	0.33	25.39	117.93
78	42.80	57.03	0.55	0.29	26.05	116.23
79	42.96	56.20	0.49	1.12	25.37	115.03
80	43.12	55.54	0.46	0.70	26.00	114.92
81	43.29	53.22	0.54	0.30	26.18	114.58
82	43.45	53.19	0.43	-0.12	25.42	113.75
83	43.62	54.07	0.31	-0.81	25.91	114.26
84	43.78	54.48	0.63	1.24	27.99	116.00
85	43.94	55.29	0.79	0.19	30.35	117.37
86	44.11	53.28	0.67	-0.18	30.26	117.30
87	44.27	54.73	0.61	0.07	28.50	115.44
88	44.44	50.34	0.34	-0.79	25.22	114.52
89	44.60	63.55	0.45	0.00	21.77	113.24
90	44.76	65.89	0.36	-0.12	21.93	115.06
91	44.93	63.55	0.63	0.19	22.91	115.62
92	45.09	62.02	0.57	0.80	23.58	115.72
93	45.26	62.67	0.39	1.18	24.51	114.06
94	45.42	45.69	0.35	-0.07	25.76	112.54
95	45.58	45.66	0.36	-0.12	30.00	112.48
96	45.75	44.12	0.43	0.90	30.08	113.42

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
97	45.91	50.81	0.49	-0.63	30.28	114.86
98	46.08	53.73	0.61	-0.02	28.01	115.66
99	46.24	59.82	0.55	1.72	28.09	116.23
100	46.40	54.69	0.61	-0.60	25.74	115.55
101	46.57	60.99	0.43	0.01	23.44	114.89
102	46.73	68.19	0.39	0.26	24.20	117.44
103	46.90	71.35	1.15	0.27	25.65	119.31
104	47.06	69.23	0.97	-0.01	28.09	120.62
105	47.22	65.93	0.89	0.69	27.11	120.22
106	47.39	73.55	0.98	0.31	24.59	118.66
107	47.55	70.35	0.42	0.22	21.82	116.65
108	47.72	66.61	0.34	-0.56	22.99	118.05
109	47.88	78.50	1.33	-0.91	24.16	119.68
110	48.04	78.57	0.91	-0.89	24.35	121.73
111	48.21	88.18	1.07	-0.64	22.60	120.39
112	48.37	76.86	0.78	0.98	20.99	119.42
113	48.54	81.11	0.56	0.01	20.17	117.55
114	48.70	75.12	0.56	-0.82	21.00	117.38
115	48.86	68.69	0.76	-0.78	22.22	116.15
116	49.03	60.73	0.32	-0.93	22.83	114.86
117	49.19	60.54	0.33	0.56	20.86	111.68
118	49.36	58.15	0.28	-0.20	21.82	112.26
119	49.52	58.71	0.40	1.29	24.53	113.41
120	49.69	52.74	0.52	0.09	27.54	113.62
121	49.85	44.52	0.35	-0.52	31.15	113.66
122	50.01	43.79	0.45	0.02	33.91	112.89
123	50.18	38.83	0.43	-0.95	36.37	113.17
124	50.34	38.45	0.42	-1.28	37.77	112.76
125	50.51	37.94	0.40	-1.16	37.10	112.13
126	50.67	37.84	0.33	-0.52	37.31	110.99
127	50.83	32.95	0.27	-1.01	39.24	109.84
128	51.00	28.68	0.28	-1.21	40.66	109.28
129	51.16	32.74	0.28	-1.21	41.52	109.33
130	51.33	31.39	0.28	-0.95	42.48	110.68
131	51.49	31.68	0.44	-0.38	43.91	110.99
132	51.65	31.06	0.33	-1.09	41.69	110.57
133	51.82	34.47	0.21	-1.27	38.22	108.41
134	51.98	31.68	0.19	-1.28	34.98	106.36
135	52.15	31.94	0.15	-1.24	37.02	107.19
136	52.31	32.35	0.28	-1.36	39.55	109.56
137	52.47	34.26	0.42	-1.45	42.38	112.11
138	52.64	35.59	0.49	-1.36	43.54	114.95
139	52.80	42.41	0.79	-0.92	43.35	116.88
140	52.97	44.72	0.87	-1.23	38.00	117.29
141	53.13	53.78	0.51	-1.37	30.21	117.00
142	53.29	71.10	0.58	-1.12	28.03	117.37
143	53.46	58.65	0.92	-1.19	26.92	118.78
144	53.62	72.32	0.86	-1.30	27.10	118.56

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
145	53.79	68.19	0.52	0.35	22.89	117.18
146	53.95	73.19	0.48	-1.62	21.65	115.03
147	54.11	62.27	0.41	-1.31	22.84	113.48
148	54.28	48.39	0.29	-1.09	26.16	112.25
149	54.44	46.95	0.35	-0.83	29.82	111.81
150	54.61	43.88	0.39	-0.76	33.22	113.32
151	54.77	44.21	0.54	-1.38	34.85	113.82
152	54.93	44.24	0.45	-0.63	34.60	113.48
153	55.10	42.99	0.33	-1.25	32.81	111.91
154	55.26	42.13	0.29	-1.59	35.53	114.52
155	55.43	49.16	0.89	-1.43	38.73	117.72
156	55.59	51.80	1.11	-1.45	36.16	120.30
157	55.75	70.29	1.07	-0.89	33.44	120.38
158	55.92	61.92	0.85	0.04	30.81	120.49
159	56.08	66.04	1.08	-0.03	29.22	118.94
160	56.25	64.90	0.52	-0.53	28.10	119.13
161	56.41	70.03	0.88	-0.64	24.39	117.30
162	56.57	72.13	0.51	-0.80	24.85	117.76
163	56.74	66.33	0.64	-1.26	25.17	117.69
164	56.90	67.54	0.87	-1.05	25.62	117.49
165	57.07	67.69	0.47	-0.92	25.30	117.27
166	57.23	66.51	0.58	-1.51	24.37	116.68
167	57.40	68.42	0.72	-0.57	24.73	116.66
168	57.56	65.29	0.47	-1.28	25.15	116.34
169	57.72	61.41	0.52	-0.99	24.84	115.25
170	57.89	61.63	0.50	-0.70	25.15	114.54
171	58.05	58.31	0.35	-1.59	25.76	113.68
172	58.22	52.12	0.39	-0.68	29.36	113.40
173	58.38	42.79	0.50	-0.85	36.29	113.96
174	58.54	36.11	0.52	-1.26	41.85	113.73
175	58.71	35.53	0.41	-1.37	46.62	113.06
176	58.87	29.32	0.43	-1.71	52.07	112.41
177	59.04	23.83	0.46	-1.19	60.26	112.42
178	59.20	22.80	0.48	-1.52	65.72	111.41
179	59.36	19.48	0.31	-1.45	68.33	109.65
180	59.53	16.90	0.23	-1.48	70.13	107.72
181	59.69	17.25	0.27	-1.64	71.64	107.36
182	59.86	17.57	0.28	-1.65	72.89	107.71
183	60.02	16.55	0.27	-1.57	72.96	107.41
184	60.18	16.72	0.24	-1.70	74.47	106.93
185	60.35	15.62	0.24	-1.54	75.77	106.77
186	60.51	15.38	0.26	-1.62	79.29	106.31
187	60.68	13.63	0.21	-1.66	82.84	106.29
188	60.84	13.45	0.25	-1.58	84.49	105.89
189	61.00	13.94	0.23	-1.63	82.57	106.73
190	61.17	15.96	0.28	-1.63	80.46	108.17
191	61.33	17.05	0.39	-1.52	75.42	109.05
192	61.50	19.25	0.31	-1.39	63.55	109.50

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
193	61.66	28.54	0.27	-1.47	49.47	109.88
194	61.82	38.01	0.35	-1.48	41.22	111.54
195	61.99	41.58	0.46	-1.51	39.09	113.65
196	62.15	43.72	0.57	1.11	40.03	114.54
197	62.32	39.99	0.52	-1.10	39.09	114.65
198	62.48	44.97	0.47	-1.39	37.37	113.71
199	62.64	43.97	0.38	-0.55	35.56	113.46
200	62.81	44.46	0.46	-0.68	33.59	112.40
201	62.97	46.00	0.29	-0.26	36.47	114.01
202	63.14	43.14	0.66	-0.71	36.28	114.30
203	63.30	46.80	0.51	-0.49	39.99	115.41
204	63.46	40.86	0.55	-1.17	40.23	115.54
205	63.63	43.24	0.69	-0.13	43.14	116.54
206	63.79	44.42	0.78	-0.40	43.70	117.25
207	63.96	43.42	0.74	-0.82	43.09	117.82
208	64.12	48.44	0.84	-1.40	41.24	117.28
209	64.28	46.60	0.60	-0.17	39.20	116.70
210	64.45	46.32	0.56	-0.29	39.90	115.57
211	64.61	39.82	0.59	-1.09	42.66	114.88
212	64.78	35.47	0.49	-1.43	50.85	116.50
213	64.94	35.58	1.03	-0.56	53.73	120.39
214	65.10	54.17	1.93	-0.70	54.98	127.74
215	65.27	85.95	5.45	-0.55	49.56	133.35
216	65.43	127.06	8.35	3.75	40.80	136.81
217	65.60	188.65	8.25	5.42	31.25	137.28
218	65.76	244.91	6.59	53.84	20.70	137.28
219	65.93	347.80	4.59	48.39	13.19	137.00
220	66.09	465.91	5.20	9.97	8.40	136.86
221	66.25	566.03	4.91	9.56	6.89	137.28
222	66.42	616.24	6.46	5.85	6.10	137.28
223	66.58	661.06	6.76	11.76	6.21	137.28
224	66.75	708.99	8.12	5.86	6.26	137.28
225	66.91	654.96	7.40	4.97	6.59	137.28
226	67.07	578.23	6.14	1.37	7.08	137.28
227	67.24	548.36	6.22	3.81	7.76	137.28
228	67.40	503.60	6.04	3.24	8.29	137.28
229	67.57	491.34	5.59	1.55	8.20	137.28
230	67.73	513.78	5.16	1.40	7.98	137.28
231	67.89	469.63	4.70	1.73	8.01	136.90
232	68.06	449.76	4.74	0.43	8.61	136.21
233	68.22	407.44	4.20	0.94	10.27	135.76
234	68.39	313.78	4.44	0.38	13.70	135.66
235	68.55	247.96	5.40	0.17	18.73	136.08
236	68.71	229.16	6.08	9.51	22.39	136.00
237	68.88	205.09	5.06	3.31	22.74	135.84
238	69.04	233.70	5.16	6.55	18.11	135.69
239	69.21	356.94	4.85	12.96	13.02	135.77
240	69.37	422.64	4.03	5.37	9.18	135.75

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
241	69.53	476.36	4.16	2.94	8.24	136.71
242	69.70	509.44	6.13	2.29	8.06	137.28
243	69.86	561.20	6.56	4.90	8.12	137.28
244	70.03	586.42	6.81	5.00	7.65	137.28
245	70.19	572.12	6.14	6.88	7.49	137.28
246	70.35	528.85	5.34	4.65	7.96	137.28
247	70.52	470.05	5.52	6.84	10.01	137.28
248	70.68	361.27	6.24	6.61	13.59	137.28
249	70.85	283.50	6.22	4.45	19.67	136.61
250	71.01	148.91	4.63	0.78	28.10	134.30
251	71.17	81.82	3.55	5.25	33.03	133.67
252	71.34	196.24	5.89	16.02	30.07	134.68
253	71.50	215.86	5.93	15.02	26.62	136.09
254	71.67	186.69	5.67	1.45	30.00	135.26
255	71.83	109.96	4.84	10.86	33.84	133.47
256	71.99	117.11	3.32	11.48	40.82	130.55
257	72.16	65.31	2.25	2.98	44.42	126.86
258	72.32	38.67	1.33	7.08	57.52	123.04
259	72.49	33.95	1.21	8.37	69.79	122.51
260	72.65	34.79	2.30	8.32	80.86	125.83
261	72.81	36.67	4.16	9.73	58.80	129.19
262	72.98	111.38	3.64	20.16	28.45	133.78
263	73.14	349.98	5.76	16.42	14.10	136.53
264	73.31	559.87	6.15	11.40	N/A	137.28
265	73.47	554.16	-260034.67	5.69	N/A	137.28
266	73.64	711.57	-260034.67	6.46	N/A	137.28
267	73.80	694.37	-260034.67	4.11	N/A	137.28

Abbreviations

Depth: Depth from free surface, at which CPT was performed (ft)
q_c: Measured cone resistance (tsf)
f_s: Sleeve friction resistance (tsf)
u: Pore pressure (tsf)
Fines content: Percentage of fines in soil (%)
Unit weight: Bulk soil unit weight (pcf)

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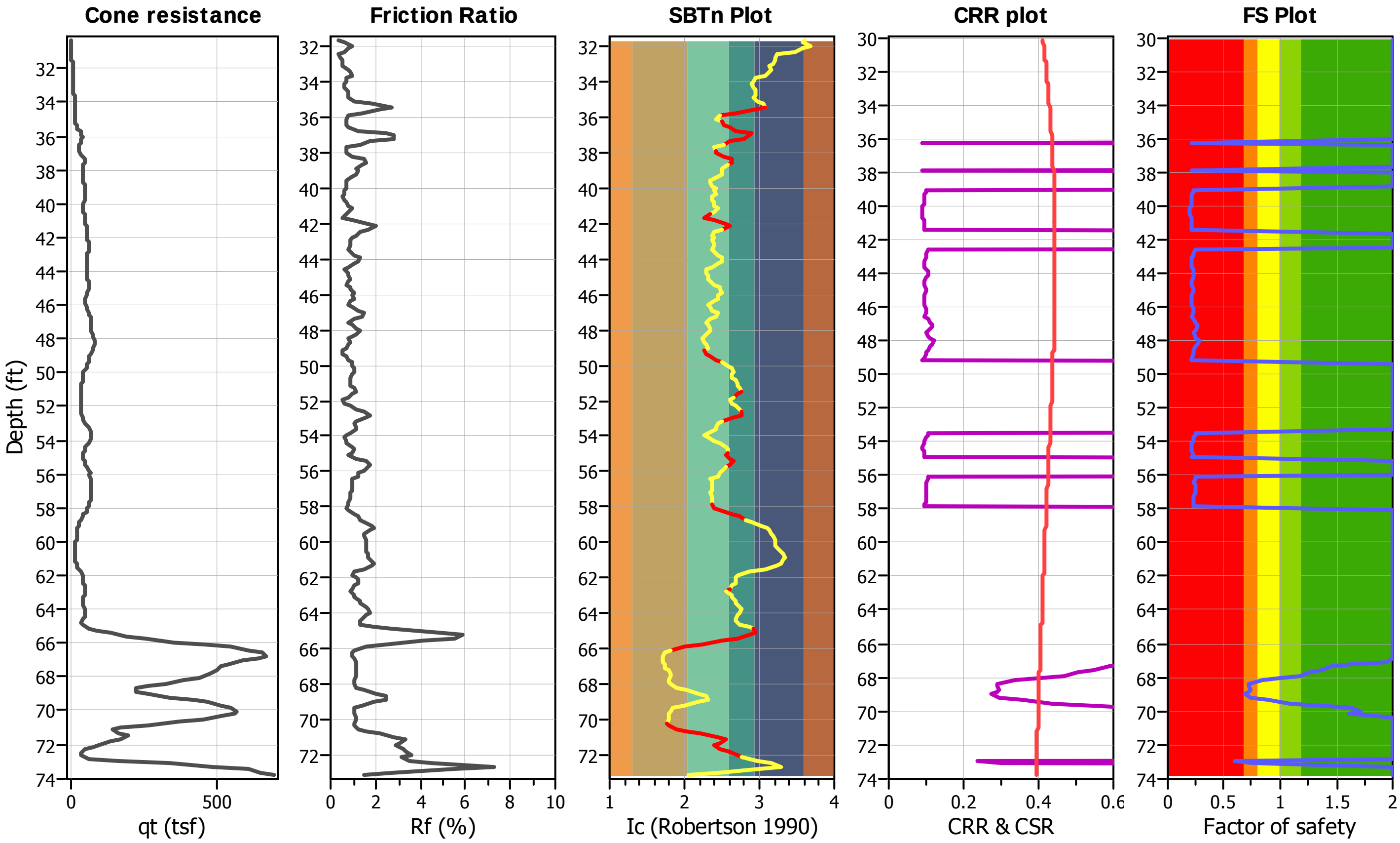
LIQUEFACTION ANALYSIS REPORT

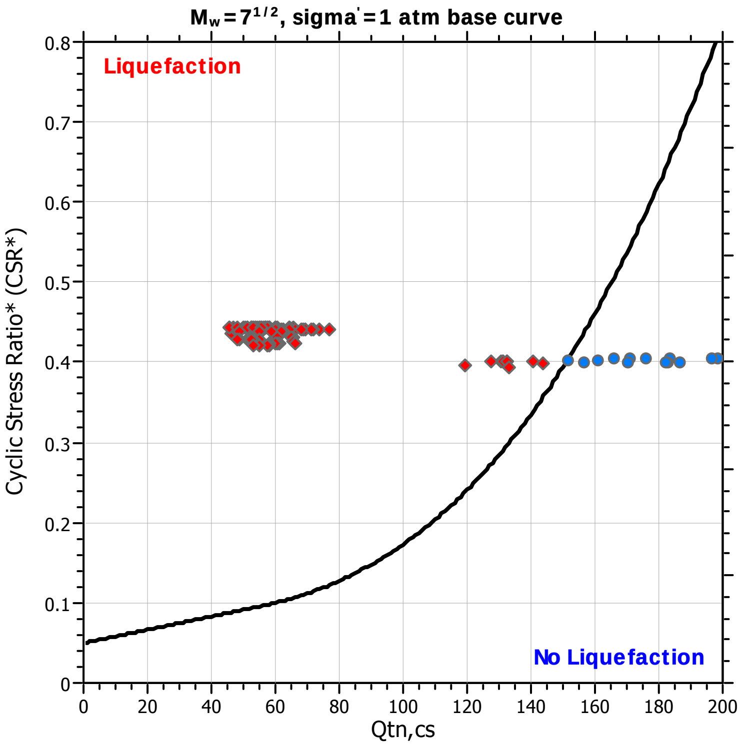
Project title : 21545 - TF Boadway LP **Location : 942 N. Broadway, Los Angeles, CA**

CPT file : CPT-01

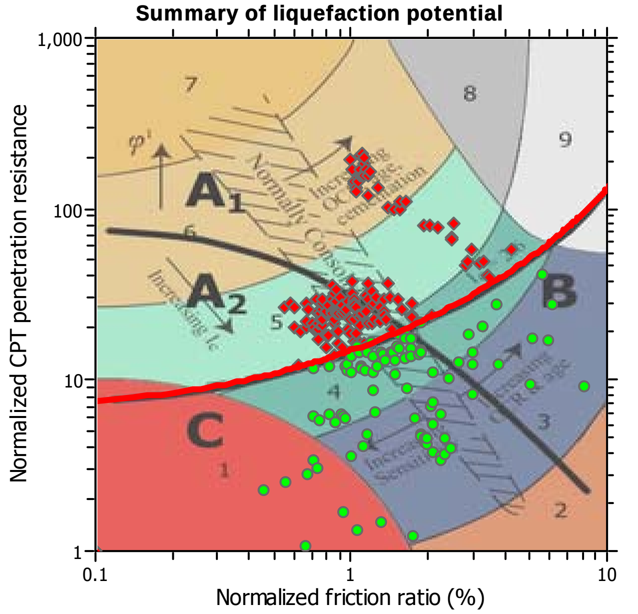
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	45.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	20.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.65	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



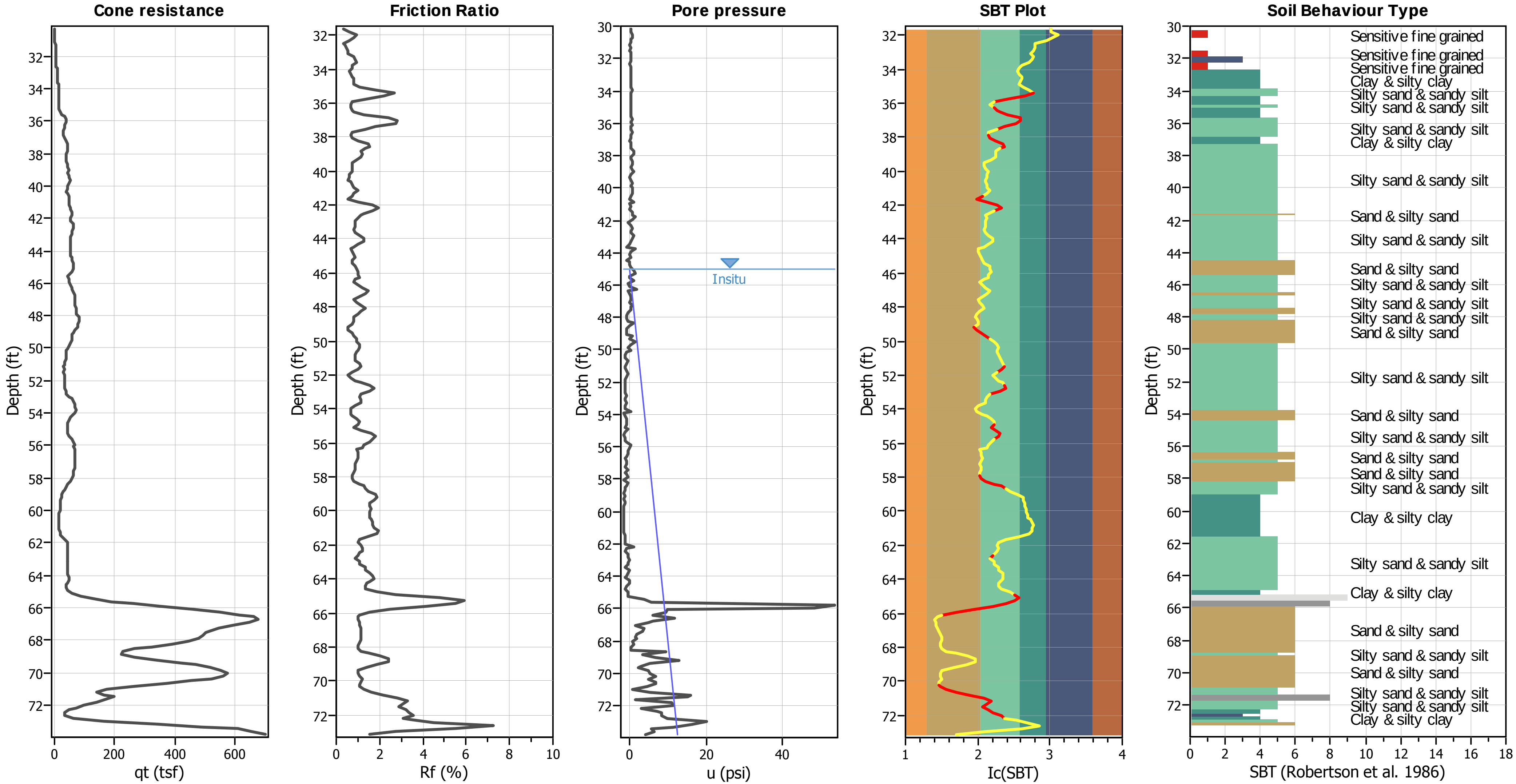


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



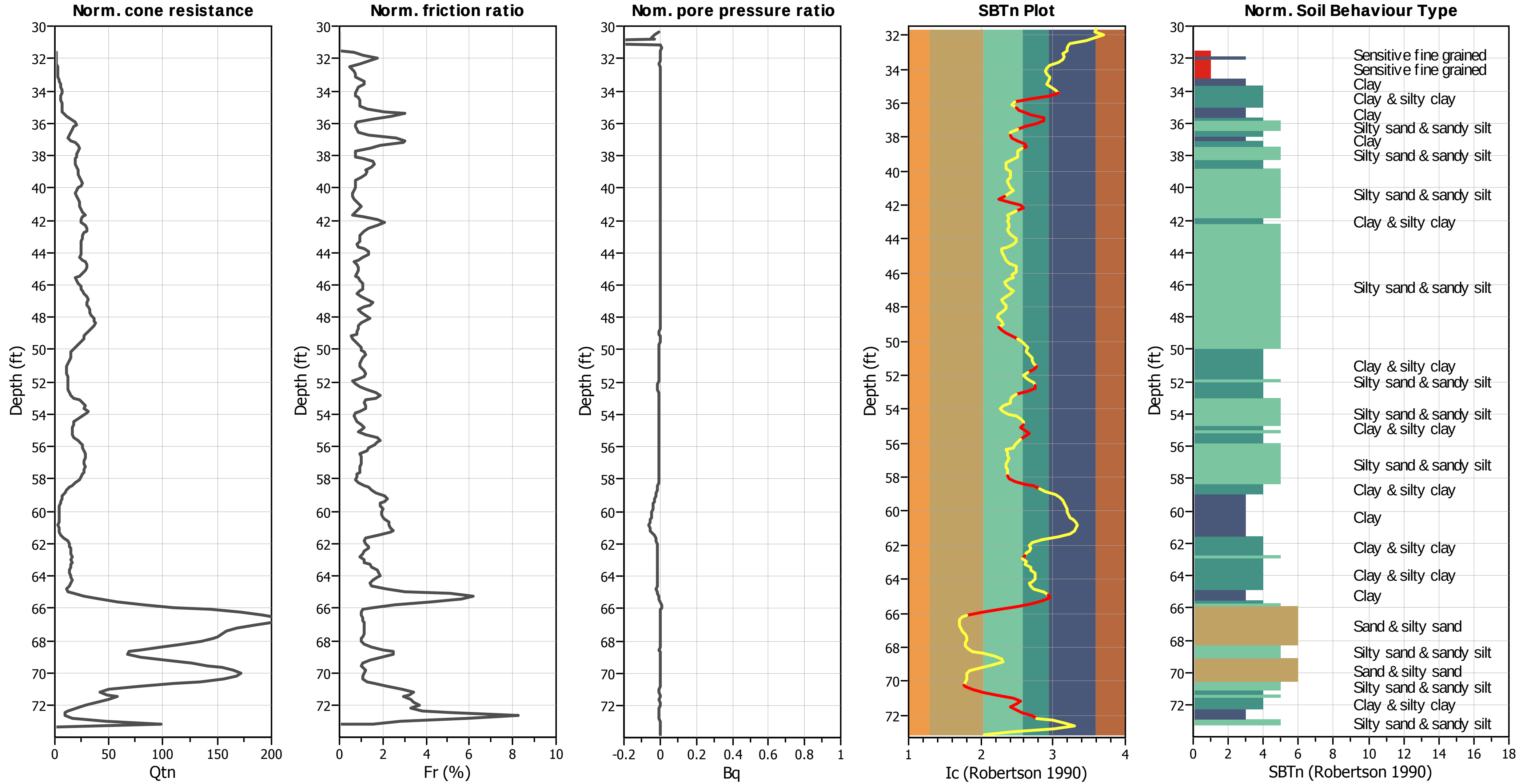
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

CPT basic interpretation plots (normalized)



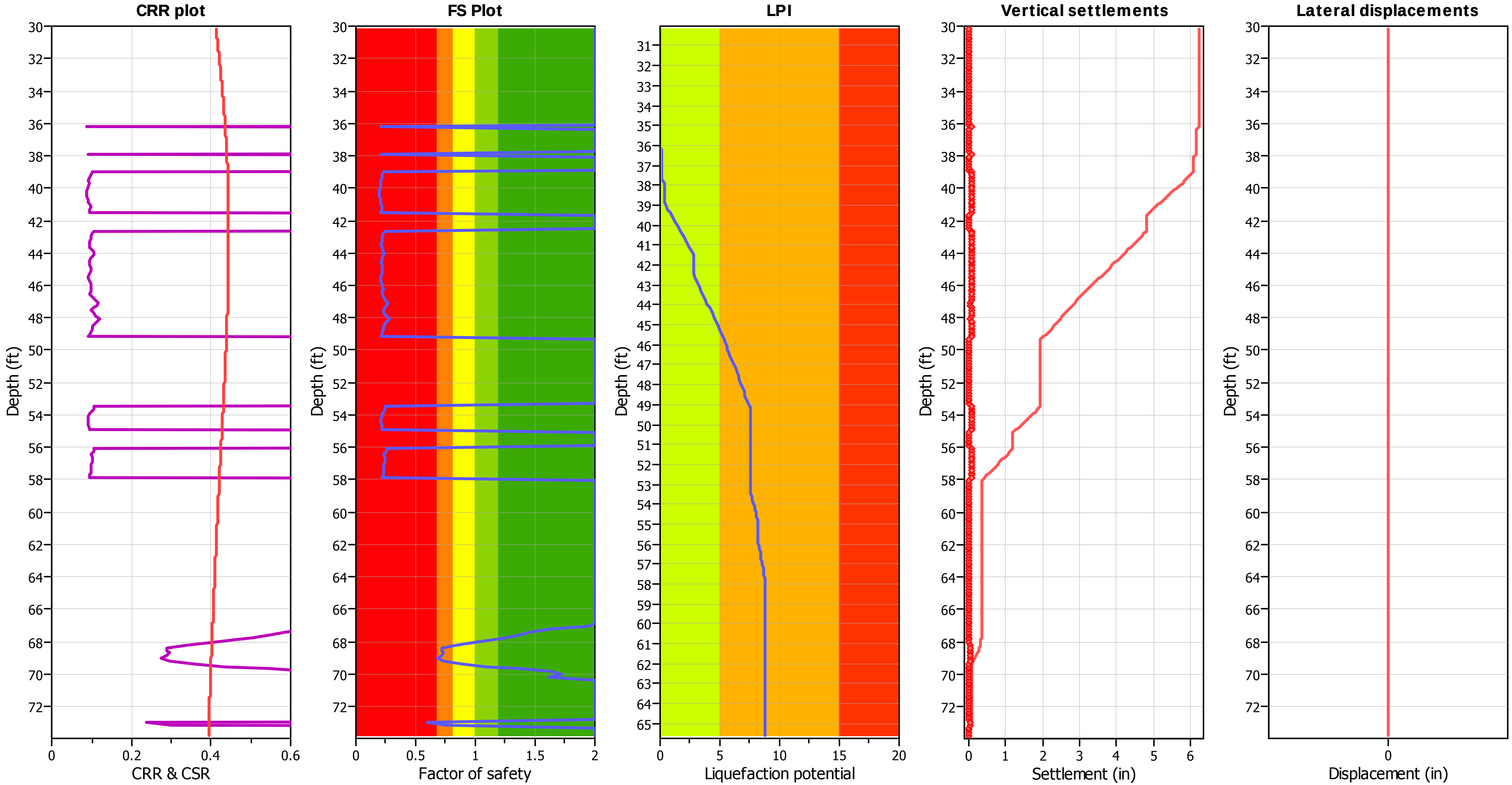
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

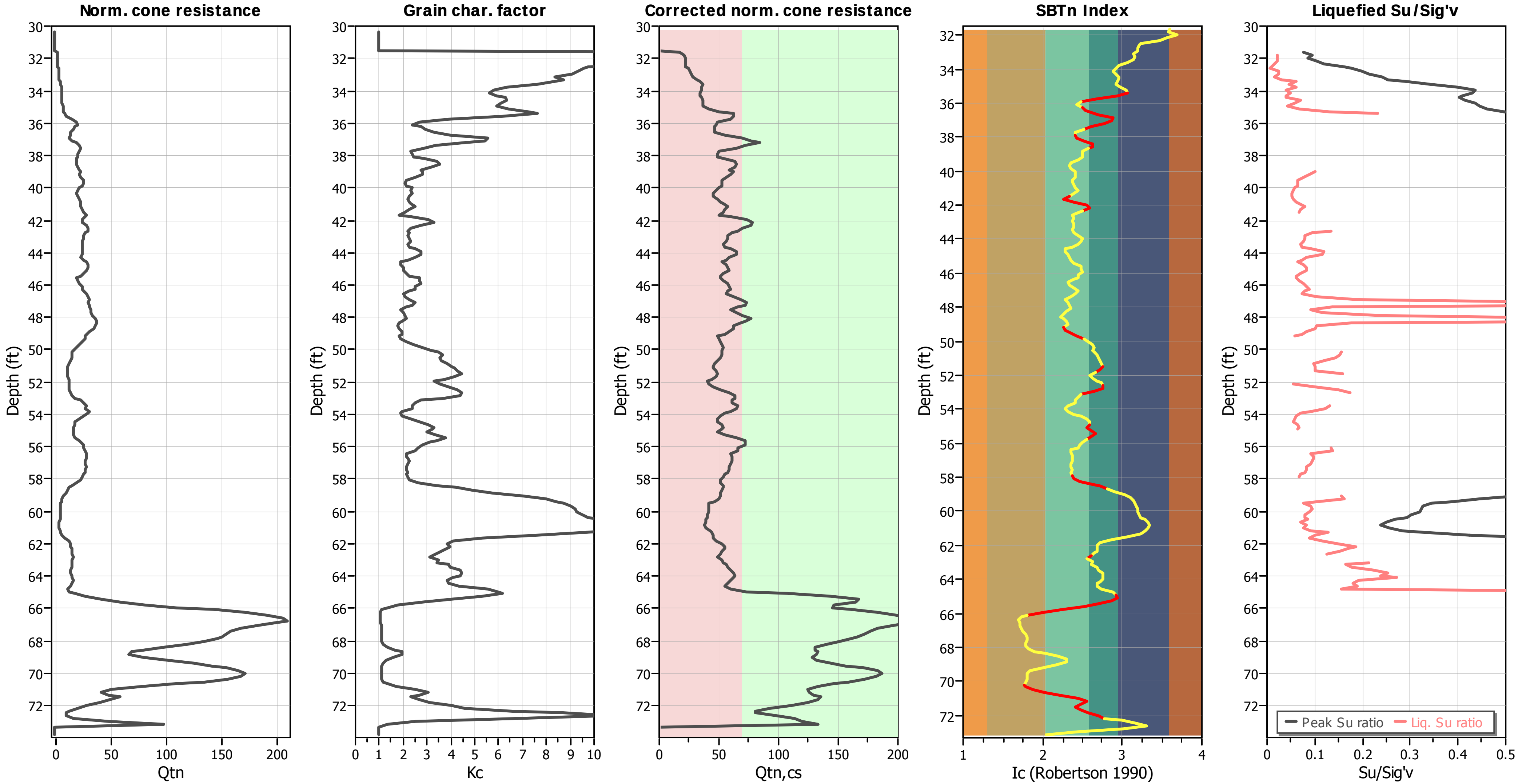
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

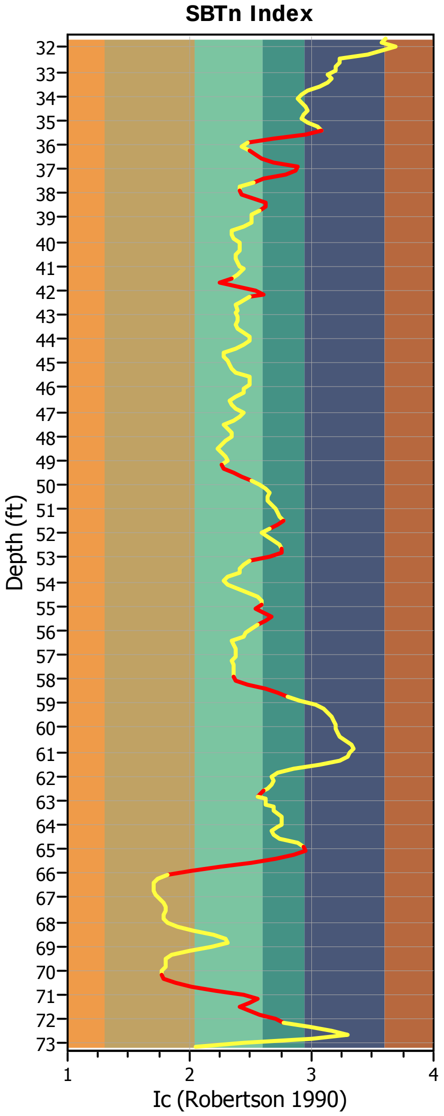
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

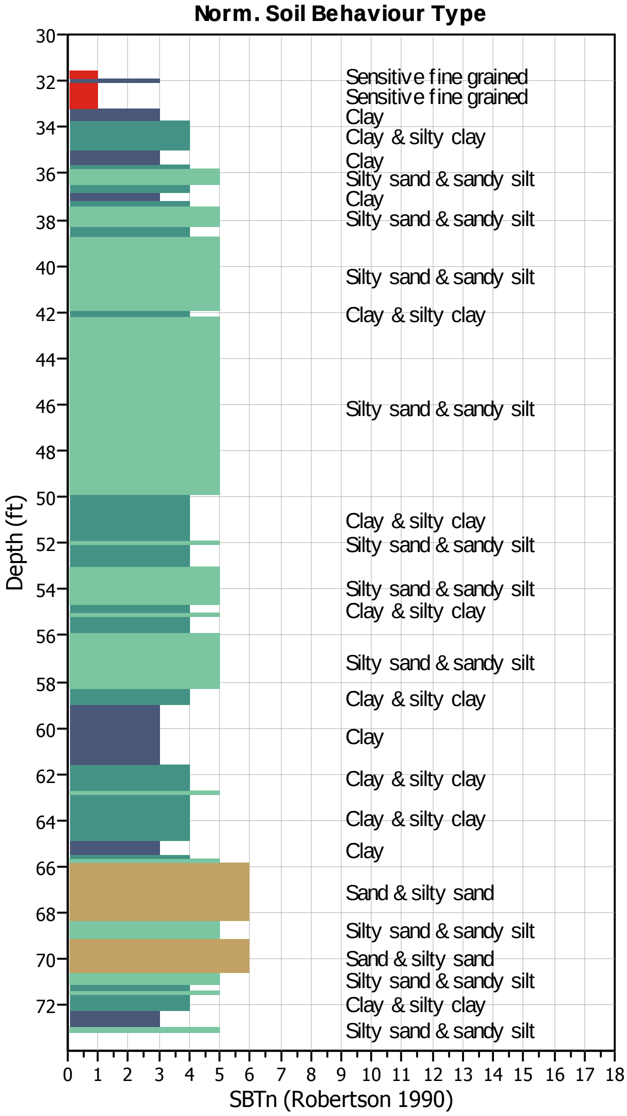
TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between 1.80 < I_c < 3.0) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.





Transition layer algorithm properties		**General statistics**	
I_c minimum check value:	1.70	Total points in CPT file:	267
I_c maximum check value:	3.00	Total points excluded:	76
I_c change ratio value:	0.0250	Exclusion percentage:	28.46%
Minimum number of points in layer:	2	Number of layers detected:	18

:: Field input data ::

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
1	30.16	-0.01	0.00	0.08	N/A	120.90
2	30.33	-0.03	0.00	0.08	N/A	87.36
3	30.49	0.20	0.00	0.64	N/A	87.36
4	30.66	0.65	0.00	0.75	N/A	87.36
5	30.82	1.32	0.00	0.23	N/A	87.36
6	30.98	1.91	0.00	0.08	N/A	87.36
7	31.15	2.32	0.00	-0.01	N/A	87.36
8	31.31	2.73	0.00	0.07	N/A	87.36
9	31.48	3.27	0.00	-0.01	N/A	87.36
10	31.64	4.01	0.00	0.04	100.00	87.36
11	31.80	4.33	0.04	0.06	100.00	87.37
12	31.97	4.87	0.04	0.05	100.00	90.22
13	32.13	3.38	0.04	0.05	100.00	89.85
14	32.30	5.81	0.03	-0.12	95.22	88.59
15	32.46	6.14	0.02	0.11	75.96	87.36
16	32.62	6.89	0.01	0.11	74.69	88.41
17	32.79	7.18	0.05	0.19	73.30	90.94
18	32.95	7.91	0.05	0.16	72.18	92.30
19	33.12	8.13	0.03	0.09	67.93	93.07
20	33.28	9.49	0.06	0.18	70.19	96.16
21	33.44	9.22	0.12	0.16	67.91	98.25
22	33.61	11.10	0.09	0.18	63.56	100.06
23	33.77	13.94	0.12	0.19	55.86	99.44
24	33.94	14.15	0.08	0.47	52.78	99.88
25	34.10	14.28	0.10	0.27	51.56	98.82
26	34.27	13.67	0.08	0.25	53.37	98.73
27	34.43	12.66	0.08	0.18	55.63	99.76
28	34.59	13.90	0.14	0.34	55.85	100.75
29	34.76	14.91	0.12	0.17	54.40	101.06
30	34.92	14.44	0.09	0.33	53.41	101.12
31	35.09	14.94	0.14	0.12	56.39	103.82
32	35.25	16.58	0.27	0.20	61.41	108.21
33	35.41	17.73	0.48	0.20	63.60	112.46
34	35.58	22.25	0.77	0.09	54.76	113.05
35	35.74	29.21	0.29	0.41	39.85	112.96
36	35.91	43.47	0.31	0.20	29.66	109.63
37	36.07	36.03	0.23	0.60	27.29	109.33
38	36.23	36.32	0.24	0.13	30.30	108.44
39	36.40	29.92	0.25	0.28	32.24	108.18
40	36.56	29.72	0.22	0.46	35.00	107.98
41	36.73	28.83	0.24	0.38	40.28	111.25
42	36.89	30.00	0.65	0.27	50.88	115.89
43	37.05	27.58	1.22	-0.04	50.31	118.03
44	37.22	39.24	0.85	0.17	44.89	119.98
45	37.38	52.68	1.24	0.07	35.78	117.84
46	37.55	41.88	0.29	0.39	31.45	115.86
47	37.71	42.78	0.27	0.97	26.50	110.70
48	37.87	43.40	0.35	0.94	26.93	110.02

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
49	38.04	37.07	0.22	0.20	27.77	110.05
50	38.20	39.98	0.28	0.09	31.59	112.28
51	38.37	40.95	0.66	0.45	36.29	115.35
52	38.53	38.30	0.82	0.51	36.90	115.77
53	38.69	40.65	0.38	0.20	34.05	115.43
54	38.86	48.32	0.54	0.51	30.71	114.41
55	39.02	44.63	0.57	0.85	31.00	115.52
56	39.19	46.47	0.60	0.11	30.94	114.62
57	39.35	43.42	0.36	-0.22	28.01	113.65
58	39.51	50.90	0.36	0.11	24.25	112.27
59	39.68	55.83	0.35	0.50	24.02	112.45
60	39.84	45.97	0.38	0.11	24.76	112.31
61	40.01	46.59	0.35	0.57	27.12	111.07
62	40.17	38.60	0.22	0.66	26.67	109.73
63	40.33	41.29	0.23	0.71	27.00	108.85
64	40.50	41.48	0.27	0.03	25.54	109.10
65	40.66	45.88	0.23	-0.18	25.26	110.63
66	40.83	50.50	0.38	0.88	26.09	111.92
67	40.99	45.14	0.43	-0.10	26.70	112.97
68	41.15	49.46	0.38	0.19	28.47	114.32
69	41.32	51.30	0.62	-0.16	25.88	113.64
70	41.48	52.98	0.28	0.73	23.93	113.16
71	41.65	56.54	0.28	0.46	20.82	111.61
72	41.81	59.46	0.38	1.48	26.34	115.79
73	41.98	51.02	1.01	0.48	32.84	119.24
74	42.14	52.19	1.31	-0.42	35.29	120.50
75	42.30	59.34	0.89	0.07	30.48	120.52
76	42.47	73.60	0.88	0.57	26.60	119.04
77	42.63	60.52	0.71	0.33	25.39	117.93
78	42.80	57.03	0.55	0.29	26.05	116.23
79	42.96	56.20	0.49	1.12	25.37	115.03
80	43.12	55.54	0.46	0.70	26.00	114.92
81	43.29	53.22	0.54	0.30	26.18	114.58
82	43.45	53.19	0.43	-0.12	25.42	113.75
83	43.62	54.07	0.31	-0.81	25.91	114.26
84	43.78	54.48	0.63	1.24	27.99	116.00
85	43.94	55.29	0.79	0.19	30.35	117.37
86	44.11	53.28	0.67	-0.18	30.26	117.30
87	44.27	54.73	0.61	0.07	28.50	115.44
88	44.44	50.34	0.34	-0.79	25.22	114.52
89	44.60	63.55	0.45	0.00	21.77	113.24
90	44.76	65.89	0.36	-0.12	21.93	115.06
91	44.93	63.55	0.63	0.19	22.91	115.62
92	45.09	62.02	0.57	0.80	23.58	115.72
93	45.26	62.67	0.39	1.18	24.51	114.06
94	45.42	45.69	0.35	-0.07	25.76	112.54
95	45.58	45.66	0.36	-0.12	30.00	112.48
96	45.75	44.12	0.43	0.90	30.08	113.42

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
97	45.91	50.81	0.49	-0.63	30.28	114.86
98	46.08	53.73	0.61	-0.02	28.01	115.66
99	46.24	59.82	0.55	1.72	28.09	116.23
100	46.40	54.69	0.61	-0.60	25.74	115.55
101	46.57	60.99	0.43	0.01	23.44	114.89
102	46.73	68.19	0.39	0.26	24.20	117.44
103	46.90	71.35	1.15	0.27	25.65	119.31
104	47.06	69.23	0.97	-0.01	28.09	120.62
105	47.22	65.93	0.89	0.69	27.11	120.22
106	47.39	73.55	0.98	0.31	24.59	118.66
107	47.55	70.35	0.42	0.22	21.82	116.65
108	47.72	66.61	0.34	-0.56	22.99	118.05
109	47.88	78.50	1.33	-0.91	24.16	119.68
110	48.04	78.57	0.91	-0.89	24.35	121.73
111	48.21	88.18	1.07	-0.64	22.60	120.39
112	48.37	76.86	0.78	0.98	20.99	119.42
113	48.54	81.11	0.56	0.01	20.17	117.55
114	48.70	75.12	0.56	-0.82	21.00	117.38
115	48.86	68.69	0.76	-0.78	22.22	116.15
116	49.03	60.73	0.32	-0.93	22.83	114.86
117	49.19	60.54	0.33	0.56	20.86	111.68
118	49.36	58.15	0.28	-0.20	21.82	112.26
119	49.52	58.71	0.40	1.29	24.53	113.41
120	49.69	52.74	0.52	0.09	27.54	113.62
121	49.85	44.52	0.35	-0.52	31.15	113.66
122	50.01	43.79	0.45	0.02	33.91	112.89
123	50.18	38.83	0.43	-0.95	36.37	113.17
124	50.34	38.45	0.42	-1.28	37.77	112.76
125	50.51	37.94	0.40	-1.16	37.10	112.13
126	50.67	37.84	0.33	-0.52	37.31	110.99
127	50.83	32.95	0.27	-1.01	39.24	109.84
128	51.00	28.68	0.28	-1.21	40.66	109.28
129	51.16	32.74	0.28	-1.21	41.52	109.33
130	51.33	31.39	0.28	-0.95	42.48	110.68
131	51.49	31.68	0.44	-0.38	43.91	110.99
132	51.65	31.06	0.33	-1.09	41.69	110.57
133	51.82	34.47	0.21	-1.27	38.22	108.41
134	51.98	31.68	0.19	-1.28	34.98	106.36
135	52.15	31.94	0.15	-1.24	37.02	107.19
136	52.31	32.35	0.28	-1.36	39.55	109.56
137	52.47	34.26	0.42	-1.45	42.38	112.11
138	52.64	35.59	0.49	-1.36	43.54	114.95
139	52.80	42.41	0.79	-0.92	43.35	116.88
140	52.97	44.72	0.87	-1.23	38.00	117.29
141	53.13	53.78	0.51	-1.37	30.21	117.00
142	53.29	71.10	0.58	-1.12	28.03	117.37
143	53.46	58.65	0.92	-1.19	26.92	118.78
144	53.62	72.32	0.86	-1.30	27.10	118.56

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
145	53.79	68.19	0.52	0.35	22.89	117.18
146	53.95	73.19	0.48	-1.62	21.65	115.03
147	54.11	62.27	0.41	-1.31	22.84	113.48
148	54.28	48.39	0.29	-1.09	26.16	112.25
149	54.44	46.95	0.35	-0.83	29.82	111.81
150	54.61	43.88	0.39	-0.76	33.22	113.32
151	54.77	44.21	0.54	-1.38	34.85	113.82
152	54.93	44.24	0.45	-0.63	34.60	113.48
153	55.10	42.99	0.33	-1.25	32.81	111.91
154	55.26	42.13	0.29	-1.59	35.53	114.52
155	55.43	49.16	0.89	-1.43	38.73	117.72
156	55.59	51.80	1.11	-1.45	36.16	120.30
157	55.75	70.29	1.07	-0.89	33.44	120.38
158	55.92	61.92	0.85	0.04	30.81	120.49
159	56.08	66.04	1.08	-0.03	29.22	118.94
160	56.25	64.90	0.52	-0.53	28.10	119.13
161	56.41	70.03	0.88	-0.64	24.39	117.30
162	56.57	72.13	0.51	-0.80	24.85	117.76
163	56.74	66.33	0.64	-1.26	25.17	117.69
164	56.90	67.54	0.87	-1.05	25.62	117.49
165	57.07	67.69	0.47	-0.92	25.30	117.27
166	57.23	66.51	0.58	-1.51	24.37	116.68
167	57.40	68.42	0.72	-0.57	24.73	116.66
168	57.56	65.29	0.47	-1.28	25.15	116.34
169	57.72	61.41	0.52	-0.99	24.84	115.25
170	57.89	61.63	0.50	-0.70	25.15	114.54
171	58.05	58.31	0.35	-1.59	25.76	113.68
172	58.22	52.12	0.39	-0.68	29.36	113.40
173	58.38	42.79	0.50	-0.85	36.29	113.96
174	58.54	36.11	0.52	-1.26	41.85	113.73
175	58.71	35.53	0.41	-1.37	46.62	113.06
176	58.87	29.32	0.43	-1.71	52.07	112.41
177	59.04	23.83	0.46	-1.19	60.26	112.42
178	59.20	22.80	0.48	-1.52	65.72	111.41
179	59.36	19.48	0.31	-1.45	68.33	109.65
180	59.53	16.90	0.23	-1.48	70.13	107.72
181	59.69	17.25	0.27	-1.64	71.64	107.36
182	59.86	17.57	0.28	-1.65	72.89	107.71
183	60.02	16.55	0.27	-1.57	72.96	107.41
184	60.18	16.72	0.24	-1.70	74.47	106.93
185	60.35	15.62	0.24	-1.54	75.77	106.77
186	60.51	15.38	0.26	-1.62	79.29	106.31
187	60.68	13.63	0.21	-1.66	82.84	106.29
188	60.84	13.45	0.25	-1.58	84.49	105.89
189	61.00	13.94	0.23	-1.63	82.57	106.73
190	61.17	15.96	0.28	-1.63	80.46	108.17
191	61.33	17.05	0.39	-1.52	75.42	109.05
192	61.50	19.25	0.31	-1.39	63.55	109.50

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
193	61.66	28.54	0.27	-1.47	49.47	109.88
194	61.82	38.01	0.35	-1.48	41.22	111.54
195	61.99	41.58	0.46	-1.51	39.09	113.65
196	62.15	43.72	0.57	1.11	40.03	114.54
197	62.32	39.99	0.52	-1.10	39.09	114.65
198	62.48	44.97	0.47	-1.39	37.37	113.71
199	62.64	43.97	0.38	-0.55	35.56	113.46
200	62.81	44.46	0.46	-0.68	33.59	112.40
201	62.97	46.00	0.29	-0.26	36.47	114.01
202	63.14	43.14	0.66	-0.71	36.28	114.30
203	63.30	46.80	0.51	-0.49	39.99	115.41
204	63.46	40.86	0.55	-1.17	40.23	115.54
205	63.63	43.24	0.69	-0.13	43.14	116.54
206	63.79	44.42	0.78	-0.40	43.70	117.25
207	63.96	43.42	0.74	-0.82	43.09	117.82
208	64.12	48.44	0.84	-1.40	41.24	117.28
209	64.28	46.60	0.60	-0.17	39.20	116.70
210	64.45	46.32	0.56	-0.29	39.90	115.57
211	64.61	39.82	0.59	-1.09	42.66	114.88
212	64.78	35.47	0.49	-1.43	50.85	116.50
213	64.94	35.58	1.03	-0.56	53.73	120.39
214	65.10	54.17	1.93	-0.70	54.98	127.74
215	65.27	85.95	5.45	-0.55	49.56	133.35
216	65.43	127.06	8.35	3.75	40.80	136.81
217	65.60	188.65	8.25	5.42	31.25	137.28
218	65.76	244.91	6.59	53.84	20.70	137.28
219	65.93	347.80	4.59	48.39	13.19	137.00
220	66.09	465.91	5.20	9.97	8.40	136.86
221	66.25	566.03	4.91	9.56	6.89	137.28
222	66.42	616.24	6.46	5.85	6.10	137.28
223	66.58	661.06	6.76	11.76	6.21	137.28
224	66.75	708.99	8.12	5.86	6.26	137.28
225	66.91	654.96	7.40	4.97	6.59	137.28
226	67.07	578.23	6.14	1.37	7.08	137.28
227	67.24	548.36	6.22	3.81	7.76	137.28
228	67.40	503.60	6.04	3.24	8.29	137.28
229	67.57	491.34	5.59	1.55	8.20	137.28
230	67.73	513.78	5.16	1.40	7.98	137.28
231	67.89	469.63	4.70	1.73	8.01	136.90
232	68.06	449.76	4.74	0.43	8.61	136.21
233	68.22	407.44	4.20	0.94	10.27	135.76
234	68.39	313.78	4.44	0.38	13.70	135.66
235	68.55	247.96	5.40	0.17	18.73	136.08
236	68.71	229.16	6.08	9.51	22.39	136.00
237	68.88	205.09	5.06	3.31	22.74	135.84
238	69.04	233.70	5.16	6.55	18.11	135.69
239	69.21	356.94	4.85	12.96	13.02	135.77
240	69.37	422.64	4.03	5.37	9.18	135.75

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
241	69.53	476.36	4.16	2.94	8.24	136.71
242	69.70	509.44	6.13	2.29	8.06	137.28
243	69.86	561.20	6.56	4.90	8.12	137.28
244	70.03	586.42	6.81	5.00	7.65	137.28
245	70.19	572.12	6.14	6.88	7.49	137.28
246	70.35	528.85	5.34	4.65	7.96	137.28
247	70.52	470.05	5.52	6.84	10.01	137.28
248	70.68	361.27	6.24	6.61	13.59	137.28
249	70.85	283.50	6.22	4.45	19.67	136.61
250	71.01	148.91	4.63	0.78	28.10	134.30
251	71.17	81.82	3.55	5.25	33.03	133.67
252	71.34	196.24	5.89	16.02	30.07	134.68
253	71.50	215.86	5.93	15.02	26.62	136.09
254	71.67	186.69	5.67	1.45	30.00	135.26
255	71.83	109.96	4.84	10.86	33.84	133.47
256	71.99	117.11	3.32	11.48	40.82	130.55
257	72.16	65.31	2.25	2.98	44.42	126.86
258	72.32	38.67	1.33	7.08	57.52	123.04
259	72.49	33.95	1.21	8.37	69.79	122.51
260	72.65	34.79	2.30	8.32	80.86	125.83
261	72.81	36.67	4.16	9.73	58.80	129.19
262	72.98	111.38	3.64	20.16	28.45	133.78
263	73.14	349.98	5.76	16.42	14.10	136.53
264	73.31	559.87	6.15	11.40	N/A	137.28
265	73.47	554.16	-260034.67	5.69	N/A	137.28
266	73.64	711.57	-260034.67	6.46	N/A	137.28
267	73.80	694.37	-260034.67	4.11	N/A	137.28

Abbreviations

Depth:	Depth from free surface, at which CPT was performed (ft)
q_c:	Measured cone resistance (tsf)
f_s:	Sleeve friction resistance (tsf)
u:	Pore pressure (tsf)
Fines content:	Percentage of fines in soil (%)
Unit weight:	Bulk soil unit weight (pcf)

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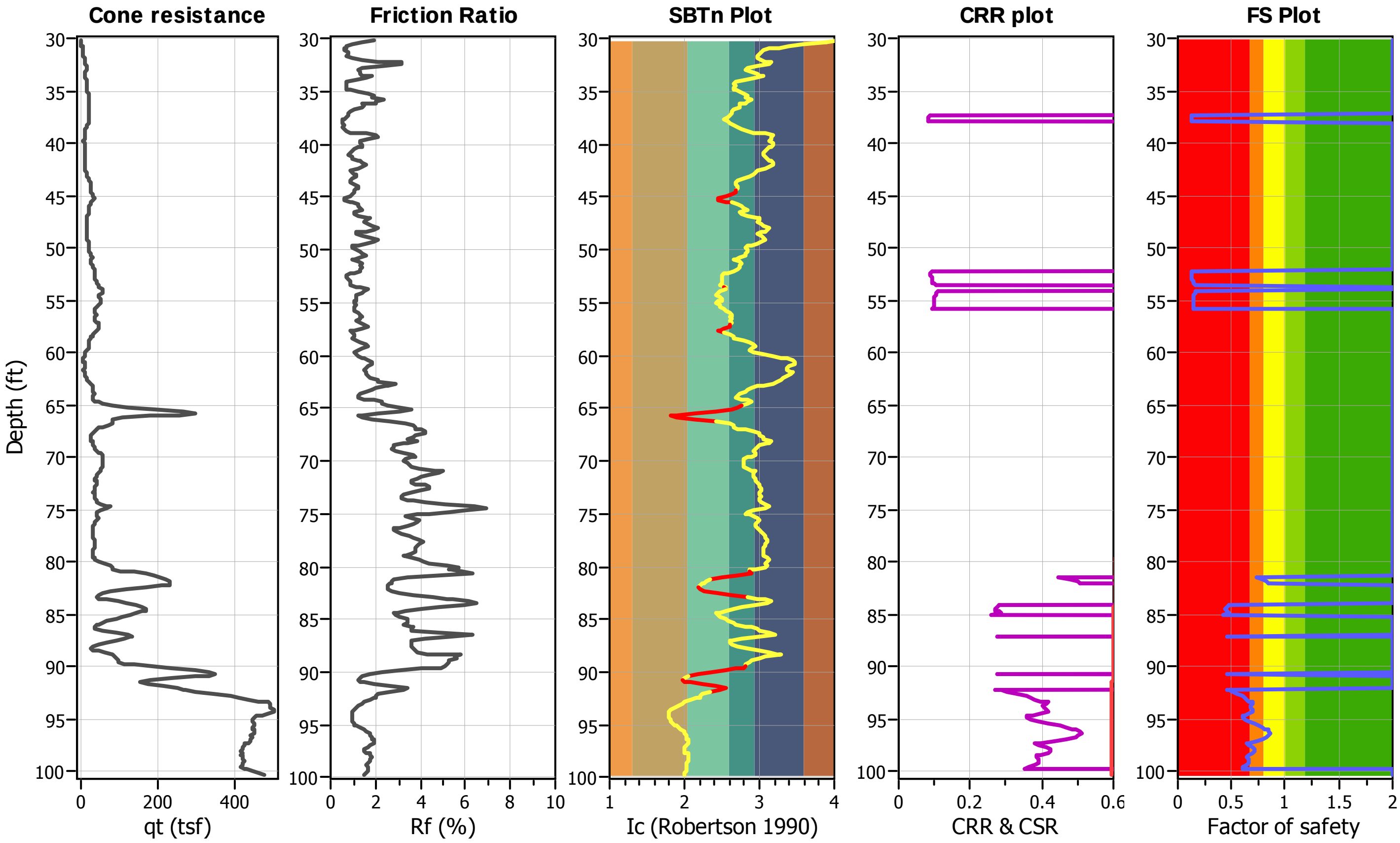
LIQUEFACTION ANALYSIS REPORT

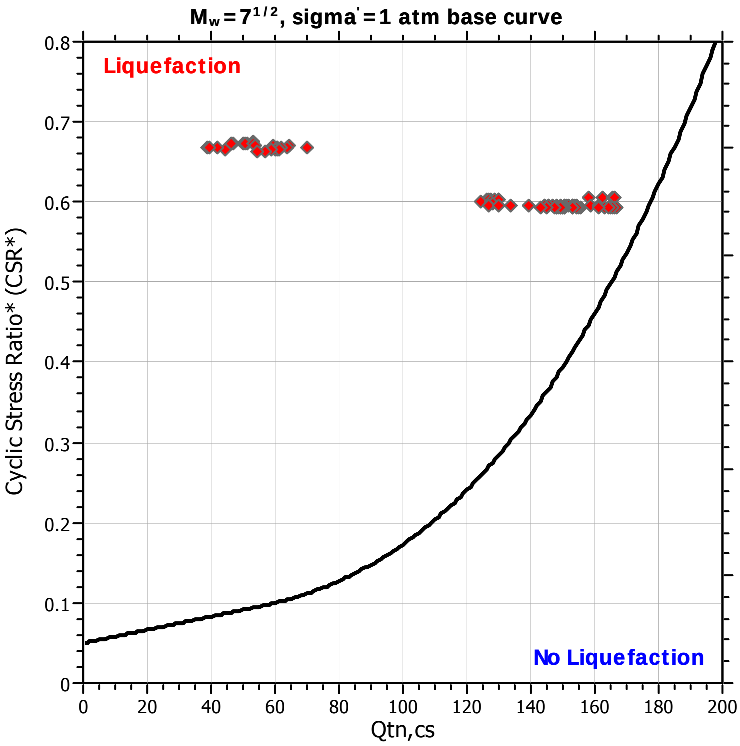
Project title : 21545 - TF Boadway LP **Location : 942 N. Broadway, Los Angeles, CA**

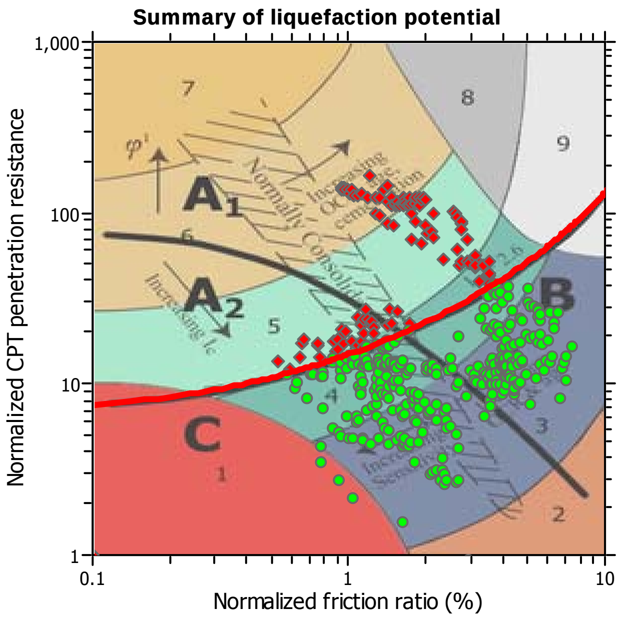
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	45.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	20.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.97	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

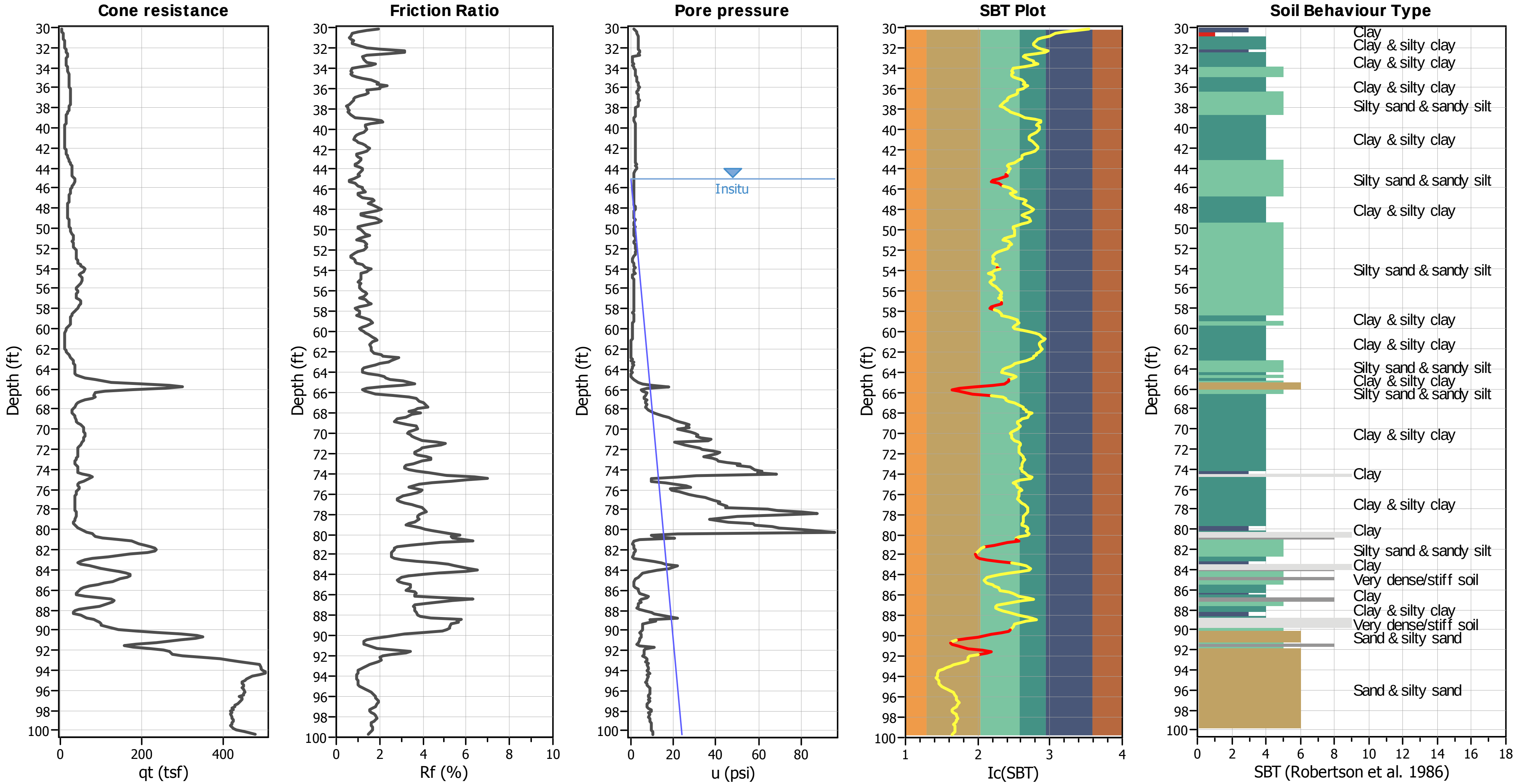






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



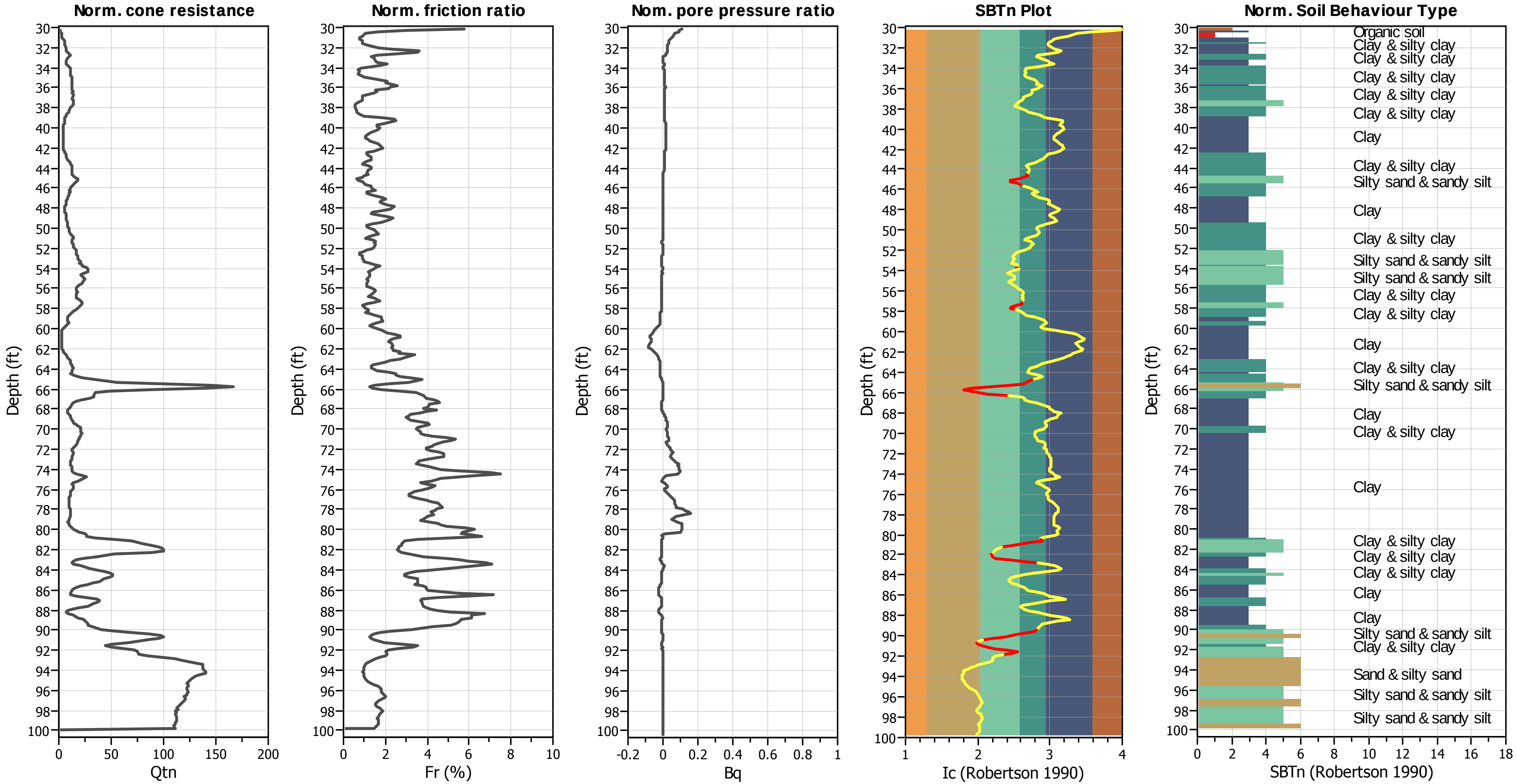
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

CPT basic interpretation plots (normalized)



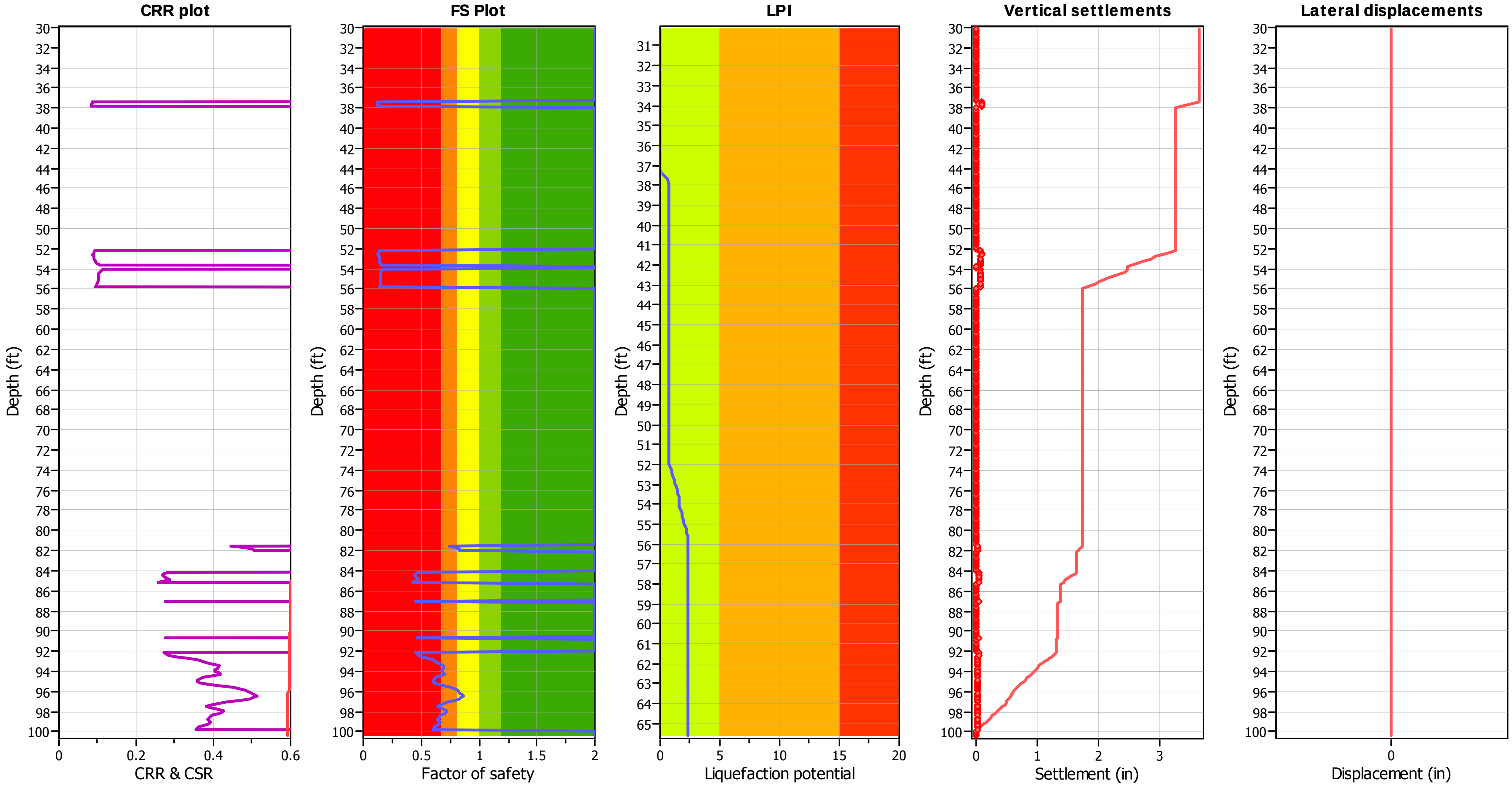
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

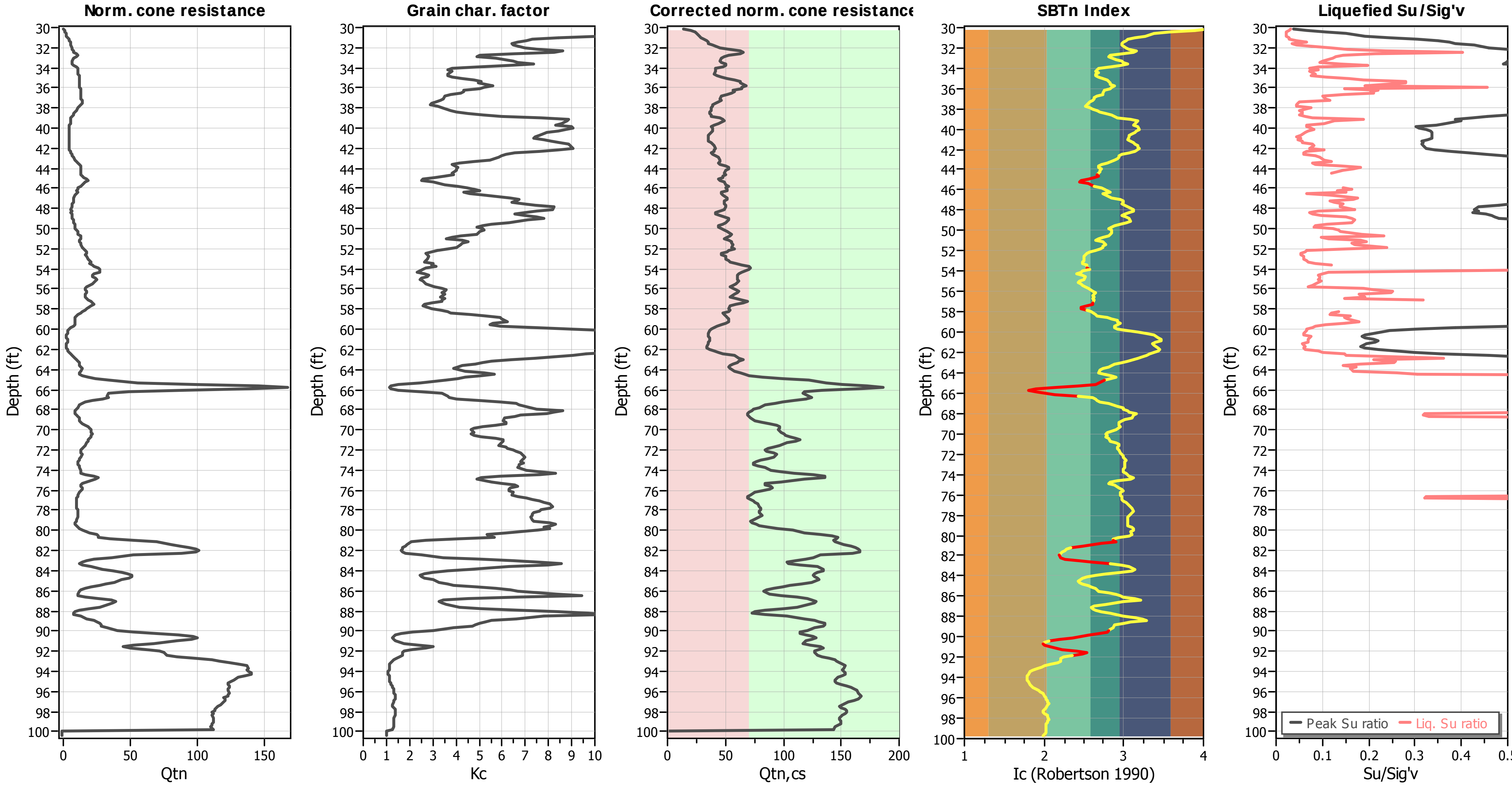
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

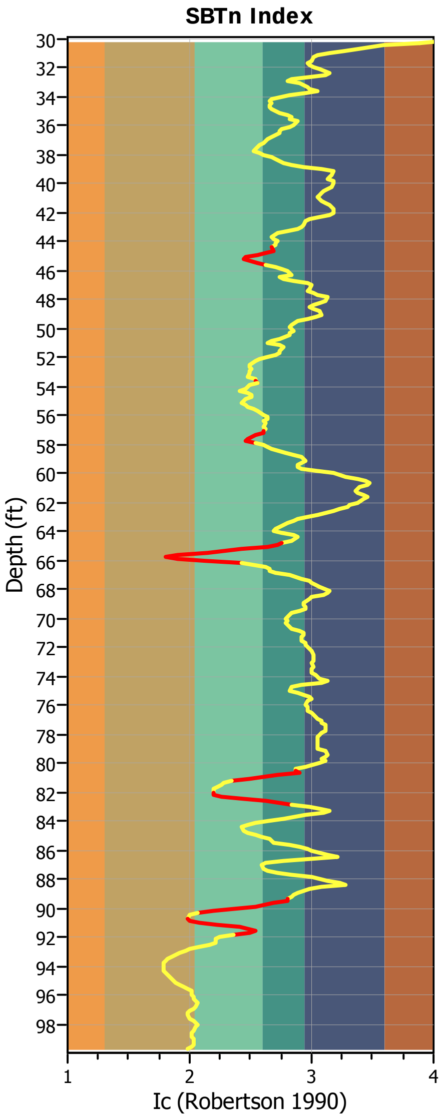
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.97	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

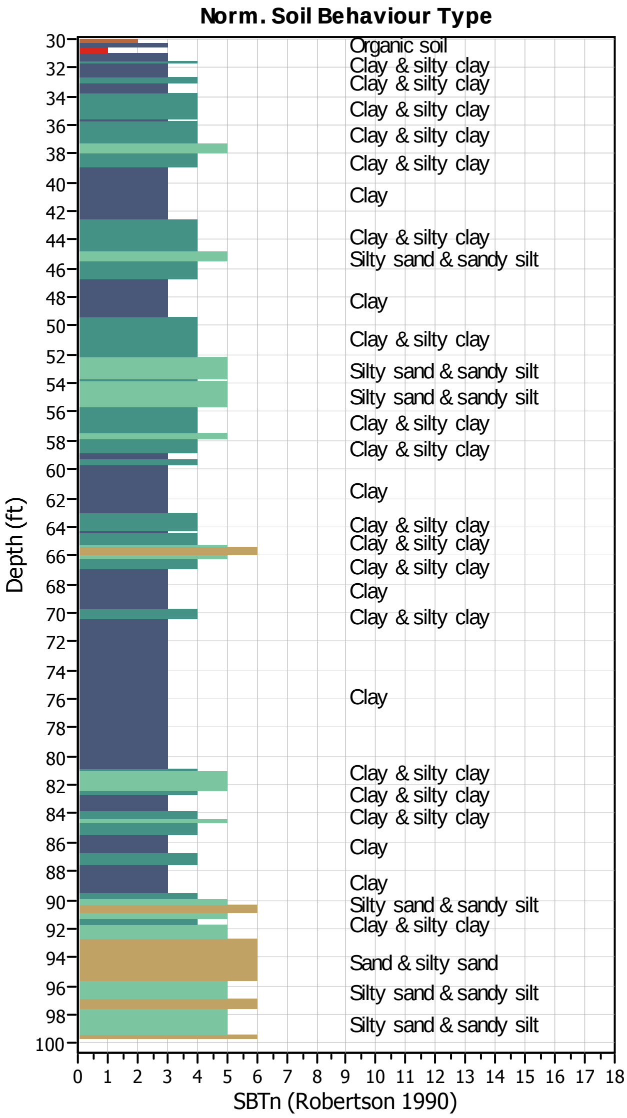
TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between 1.80 < I_c < 3.0) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.





Transition layer algorithm properties

I_c minimum check value:	1.70
I_c maximum check value:	3.00
I_c change ratio value:	0.0250
Minimum number of points in layer:	2

General statistics

Total points in CPT file:	429
Total points excluded:	54
Exclusion percentage:	12.59%
Number of layers detected:	12

:: Field input data ::

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
1	30.16	1.75	0.04	1.06	100.00	88.44
2	30.33	2.53	0.04	1.59	100.00	88.39
3	30.49	3.38	0.03	2.53	100.00	88.37
4	30.66	4.18	0.03	2.66	88.19	88.12
5	30.82	4.95	0.03	2.97	78.17	89.31
6	30.98	5.75	0.04	3.10	68.46	90.47
7	31.15	7.32	0.04	3.29	61.94	92.69
8	31.31	8.64	0.06	2.94	60.16	95.20
9	31.48	8.40	0.09	3.21	58.20	95.72
10	31.64	8.82	0.05	3.33	56.62	95.82
11	31.80	9.67	0.06	3.32	56.86	98.49
12	31.97	10.86	0.17	3.46	60.08	102.14
13	32.13	10.98	0.22	3.29	63.56	105.88
14	32.30	12.47	0.34	3.57	69.31	109.25
15	32.46	12.37	0.58	3.53	67.11	109.99
16	32.62	13.76	0.31	3.49	57.37	109.59
17	32.79	19.66	0.21	3.58	47.81	106.57
18	32.95	16.00	0.19	0.22	46.64	105.00
19	33.12	12.19	0.18	0.41	52.27	103.80
20	33.28	12.37	0.15	0.50	56.68	102.75
21	33.44	11.17	0.14	0.49	57.84	103.20
22	33.61	12.07	0.21	0.79	61.98	105.11
23	33.77	12.27	0.30	0.72	55.76	105.45
24	33.94	16.52	0.14	0.82	47.41	104.58
25	34.10	18.44	0.11	0.90	39.23	102.35
26	34.27	18.13	0.14	2.01	37.93	101.81
27	34.43	17.51	0.11	1.89	39.26	102.16
28	34.59	17.36	0.13	1.73	37.87	101.83
29	34.76	19.66	0.12	1.71	38.00	103.07
30	34.92	19.97	0.17	2.68	39.26	105.01
31	35.09	19.83	0.25	2.61	42.69	107.12
32	35.25	19.73	0.30	2.60	46.02	109.60
33	35.41	21.72	0.45	2.82	47.96	110.98
34	35.58	21.07	0.45	3.39	47.25	111.10
35	35.74	21.25	0.31	3.06	51.20	112.64
36	35.91	20.94	0.74	3.58	49.02	111.54
37	36.07	21.02	0.24	3.49	47.45	111.95
38	36.23	24.86	0.36	3.10	43.01	109.33
39	36.40	20.28	0.34	2.81	42.78	110.26
40	36.56	24.30	0.35	2.57	42.09	109.32
41	36.73	23.43	0.24	3.26	38.86	107.90
42	36.89	21.94	0.17	3.14	36.91	106.00
43	37.05	22.80	0.18	3.32	36.44	105.47
44	37.22	23.10	0.20	3.54	35.49	105.98
45	37.38	25.29	0.20	3.43	33.76	105.23
46	37.55	24.47	0.12	3.31	32.20	104.02
47	37.71	23.39	0.12	3.30	31.54	102.02
48	37.87	21.96	0.10	3.10	34.34	102.04

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
49	38.04	19.16	0.13	2.06	36.08	101.20
50	38.20	18.79	0.09	1.84	38.77	101.02
51	38.37	17.59	0.10	1.94	40.50	100.12
52	38.53	15.35	0.10	1.88	44.31	99.88
53	38.69	13.95	0.09	1.89	48.59	99.91
54	38.86	13.41	0.11	1.78	53.80	100.62
55	39.02	12.03	0.14	1.45	63.98	104.52
56	39.19	11.76	0.34	1.41	70.98	105.69
57	39.35	10.71	0.23	1.44	70.41	106.27
58	39.51	13.26	0.19	1.90	69.06	103.59
59	39.68	9.14	0.12	1.72	67.65	101.83
60	39.84	9.55	0.12	1.52	71.64	100.67
61	40.01	10.07	0.14	1.52	72.00	101.27
62	40.17	9.66	0.15	1.50	70.14	101.55
63	40.33	10.86	0.13	1.50	68.21	101.26
64	40.50	10.87	0.12	1.64	65.51	100.33
65	40.66	10.27	0.10	1.58	63.61	99.20
66	40.83	10.87	0.08	1.62	62.52	98.72
67	40.99	11.12	0.10	1.57	62.03	98.46
68	41.15	10.40	0.09	1.52	64.65	99.17
69	41.32	10.13	0.11	1.47	66.64	99.35
70	41.48	10.27	0.11	1.67	68.69	100.67
71	41.65	10.73	0.15	1.66	70.74	101.60
72	41.81	10.12	0.16	1.74	71.27	102.13
73	41.98	10.66	0.14	1.67	71.91	102.95
74	42.14	11.41	0.20	1.75	68.45	102.62
75	42.30	11.76	0.13	1.71	63.53	102.52
76	42.47	13.75	0.12	1.67	57.24	101.29
77	42.63	14.60	0.12	1.80	55.03	102.23
78	42.80	15.14	0.17	1.74	53.94	103.56
79	42.96	16.94	0.19	1.77	53.09	104.99
80	43.12	18.05	0.21	2.11	50.71	106.06
81	43.29	19.89	0.24	2.13	45.84	105.96
82	43.45	22.84	0.16	2.10	41.45	105.69
83	43.62	24.00	0.17	2.33	39.38	106.51
84	43.78	25.71	0.29	2.05	40.01	108.83
85	43.94	28.65	0.37	2.44	41.26	110.27
86	44.11	26.46	0.34	2.17	40.83	110.38
87	44.27	27.16	0.30	1.88	40.55	109.38
88	44.44	26.08	0.25	0.83	39.07	108.82
89	44.60	27.77	0.27	0.85	39.74	109.26
90	44.76	27.46	0.35	1.21	36.88	108.68
91	44.93	30.26	0.17	1.20	33.51	108.93
92	45.09	36.93	0.27	1.08	28.80	107.47
93	45.26	35.68	0.19	1.18	28.24	108.02
94	45.42	34.34	0.21	1.13	32.93	109.38
95	45.58	28.24	0.43	1.31	36.70	109.68
96	45.75	27.45	0.25	1.08	41.03	110.26

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
97	45.91	27.29	0.31	1.22	43.59	109.42
98	46.08	20.95	0.35	1.02	45.77	109.55
99	46.24	24.37	0.28	0.96	47.76	109.53
100	46.40	24.28	0.32	1.15	42.73	107.81
101	46.57	24.04	0.14	0.91	44.52	107.37
102	46.73	20.41	0.25	1.06	48.93	107.77
103	46.90	19.14	0.38	1.01	55.99	109.43
104	47.06	19.61	0.36	0.85	58.34	109.31
105	47.22	17.45	0.25	0.95	57.77	108.39
106	47.39	17.80	0.27	1.41	56.56	107.98
107	47.55	20.16	0.31	1.03	59.56	108.30
108	47.72	14.94	0.30	0.84	62.42	108.43
109	47.88	15.30	0.30	1.52	67.43	108.70
110	48.04	16.34	0.37	1.57	66.74	107.86
111	48.21	14.02	0.20	1.34	63.03	106.63
112	48.37	16.30	0.16	1.33	59.77	104.22
113	48.54	15.20	0.17	1.45	57.37	104.50
114	48.70	16.79	0.21	1.43	59.99	106.57
115	48.86	17.53	0.33	1.42	62.77	108.34
116	49.03	16.03	0.36	1.21	64.58	109.58
117	49.19	17.66	0.37	1.56	60.54	110.02
118	49.36	22.61	0.36	1.12	55.90	109.32
119	49.52	19.86	0.24	1.03	50.96	107.92
120	49.69	20.23	0.19	1.35	48.36	105.99
121	49.85	21.43	0.18	1.65	47.02	106.45
122	50.01	22.77	0.27	1.26	48.32	107.66
123	50.18	21.51	0.30	1.24	48.90	108.92
124	50.34	24.00	0.31	1.10	47.48	110.20
125	50.51	28.59	0.41	1.11	47.02	111.82
126	50.67	27.48	0.52	0.97	42.04	111.50
127	50.83	32.15	0.22	1.59	39.22	110.47
128	51.00	30.76	0.25	2.11	37.59	109.62
129	51.16	28.14	0.41	2.13	42.34	111.13
130	51.33	27.66	0.44	1.01	44.36	111.86
131	51.49	29.58	0.37	1.03	42.66	111.76
132	51.65	31.19	0.38	1.67	42.11	112.45
133	51.82	31.50	0.54	1.57	40.45	112.37
134	51.98	32.95	0.34	1.50	37.68	113.11
135	52.15	41.09	0.47	2.47	34.25	111.76
136	52.31	34.90	0.30	1.93	32.21	111.06
137	52.47	35.98	0.23	1.83	30.35	109.09
138	52.64	38.50	0.24	1.94	30.55	108.98
139	52.80	33.91	0.29	1.25	31.06	110.66
140	52.97	41.74	0.41	0.36	30.58	111.20
141	53.13	42.76	0.30	0.59	30.19	112.22
142	53.29	40.48	0.42	0.64	29.73	112.61
143	53.46	45.57	0.46	0.83	32.67	114.41
144	53.62	42.10	0.63	1.03	32.32	116.32

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
145	53.79	53.25	0.81	1.08	33.66	118.18
146	53.95	52.91	0.97	1.48	30.10	118.66
147	54.11	61.04	0.69	1.08	28.74	118.46
148	54.28	58.48	0.72	0.89	26.75	116.73
149	54.44	49.66	0.48	1.72	29.76	115.85
150	54.61	40.82	0.55	0.76	31.18	115.16
151	54.77	48.45	0.60	0.67	30.69	115.35
152	54.93	52.91	0.51	0.54	28.59	115.57
153	55.10	51.26	0.56	0.89	27.62	115.40
154	55.26	51.89	0.55	1.29	29.08	115.68
155	55.43	48.34	0.59	1.38	29.85	114.71
156	55.59	41.87	0.38	1.46	31.80	113.83
157	55.75	39.51	0.42	1.44	33.41	112.85
158	55.92	37.92	0.45	1.08	36.01	113.42
159	56.08	36.92	0.50	1.04	37.37	114.34
160	56.25	40.28	0.60	1.12	37.02	115.07
161	56.41	42.81	0.59	1.05	36.07	114.79
162	56.57	38.41	0.43	1.31	36.85	114.00
163	56.74	34.07	0.46	1.04	35.44	112.66
164	56.90	40.51	0.35	0.92	36.71	114.50
165	57.07	43.88	0.76	0.84	36.02	116.16
166	57.23	45.35	0.80	0.93	35.74	117.71
167	57.40	51.07	0.74	0.97	32.32	117.16
168	57.56	53.27	0.55	1.03	29.30	115.05
169	57.72	43.99	0.28	1.30	28.72	112.97
170	57.89	41.08	0.38	1.05	32.36	112.35
171	58.05	36.79	0.50	0.97	35.30	112.49
172	58.22	35.69	0.33	0.85	37.66	111.71
173	58.38	31.36	0.29	0.59	38.83	109.86
174	58.54	26.86	0.28	1.25	45.07	110.01
175	58.71	23.98	0.39	0.81	49.33	110.35
176	58.87	25.57	0.36	0.90	53.37	110.89
177	59.04	22.79	0.38	0.93	53.82	111.22
178	59.20	24.46	0.44	0.81	55.20	111.16
179	59.36	23.64	0.36	0.55	51.38	110.48
180	59.53	26.07	0.26	0.56	50.73	108.54
181	59.69	20.05	0.21	0.55	53.32	106.57
182	59.86	15.72	0.19	0.54	62.39	104.80
183	60.02	13.12	0.16	0.43	71.62	103.64
184	60.18	11.34	0.16	0.34	79.93	102.66
185	60.35	9.93	0.15	0.34	87.27	102.23
186	60.51	9.50	0.15	0.29	93.20	102.54
187	60.68	9.47	0.19	0.28	95.99	102.93
188	60.84	9.37	0.18	0.22	95.28	103.25
189	61.00	10.06	0.17	0.18	89.74	103.13
190	61.17	11.40	0.17	0.04	86.45	103.09
191	61.33	10.70	0.17	0.06	87.05	102.59
192	61.50	9.37	0.14	-0.23	91.87	102.27

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
193	61.66	9.32	0.16	-0.16	94.82	101.84
194	61.82	9.37	0.15	-0.26	92.14	102.27
195	61.99	10.68	0.16	-0.13	88.04	103.51
196	62.15	12.09	0.23	-0.19	82.48	105.06
197	62.32	13.66	0.25	-0.19	80.59	107.40
198	62.48	14.85	0.37	-0.11	74.95	108.93
199	62.64	18.23	0.38	-0.07	71.90	113.16
200	62.81	24.89	0.91	-0.02	62.37	114.37
201	62.97	28.89	0.53	0.09	56.44	115.81
202	63.14	32.24	0.65	-0.11	50.99	115.01
203	63.30	31.03	0.65	1.08	48.70	114.81
204	63.46	32.40	0.46	0.44	46.48	113.52
205	63.63	31.37	0.37	0.80	42.57	112.51
206	63.79	35.10	0.44	0.71	40.97	112.28
207	63.96	35.07	0.41	0.46	39.70	112.75
208	64.12	36.50	0.43	0.04	43.44	113.87
209	64.28	31.41	0.67	0.15	49.07	115.35
210	64.45	29.89	0.78	0.00	51.58	116.55
211	64.61	37.00	0.76	-0.06	48.00	118.08
212	64.78	46.14	1.06	0.02	43.19	121.02
213	64.94	60.41	1.77	0.56	41.34	124.90
214	65.10	74.95	2.81	1.18	37.39	129.05
215	65.27	112.66	4.39	2.90	27.69	131.82
216	65.43	186.45	4.21	5.01	17.07	133.50
217	65.60	289.71	3.74	10.08	10.31	133.62
218	65.76	325.70	3.37	17.30	8.23	133.50
219	65.93	277.04	3.64	7.26	10.44	132.90
220	66.09	161.72	3.41	4.86	16.61	131.44
221	66.25	95.07	2.58	5.58	27.50	129.52
222	66.42	75.18	2.68	7.26	36.15	128.54
223	66.58	79.98	3.08	6.93	38.08	129.11
224	66.75	91.38	3.29	5.79	38.34	129.39
225	66.91	77.75	3.00	5.91	40.57	128.52
226	67.07	56.88	2.31	7.12	47.09	126.67
227	67.24	43.59	1.92	6.77	53.51	124.70
228	67.40	41.81	1.72	6.73	57.65	123.34
229	67.57	37.35	1.55	7.32	58.32	121.43
230	67.73	31.33	0.87	6.80	61.26	120.08
231	67.89	29.33	1.16	7.46	62.78	118.63
232	68.06	28.51	1.00	8.19	69.51	118.33
233	68.22	20.31	0.88	9.35	67.18	117.59
234	68.39	29.90	0.86	10.94	65.36	117.25
235	68.55	29.89	0.86	12.95	58.94	117.61
236	68.71	31.96	0.89	14.89	57.10	117.96
237	68.88	34.80	0.94	17.66	54.49	118.52
238	69.04	37.59	1.00	20.14	54.12	119.73
239	69.21	38.72	1.33	22.69	54.78	121.11
240	69.37	40.90	1.55	24.97	55.09	122.69

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
241	69.53	46.22	1.82	27.04	52.35	123.88
242	69.70	53.37	1.96	26.17	48.43	124.52
243	69.86	57.10	1.83	27.11	45.95	124.64
244	70.03	55.58	1.81	21.48	44.99	124.64
245	70.19	56.86	1.92	27.80	45.77	125.11
246	70.35	58.53	2.18	30.06	45.04	125.67
247	70.52	63.32	2.19	31.30	46.12	125.76
248	70.68	53.80	2.03	30.64	47.90	126.39
249	70.85	58.05	2.76	32.90	52.21	127.07
250	71.01	55.08	2.99	37.52	54.18	127.63
251	71.17	52.77	2.67	36.52	54.00	127.08
252	71.34	54.14	2.21	20.28	53.59	125.85
253	71.50	46.58	1.90	25.41	52.99	124.73
254	71.67	46.01	1.79	28.62	54.89	123.64
255	71.83	41.61	1.55	32.16	55.34	122.63
256	71.99	39.02	1.31	33.38	56.74	121.99
257	72.16	38.61	1.48	37.98	57.61	122.31
258	72.32	41.42	1.75	41.77	58.61	123.40
259	72.49	43.12	1.98	40.34	59.24	123.93
260	72.65	40.51	1.84	33.90	60.03	123.55
261	72.81	37.41	1.53	37.96	59.60	122.45
262	72.98	37.80	1.30	40.66	59.07	121.14
263	73.14	34.55	1.14	40.97	58.71	120.03
264	73.31	32.53	1.02	44.90	59.39	119.40
265	73.47	33.40	1.06	51.46	58.36	119.69
266	73.64	37.95	1.23	49.69	58.56	120.71
267	73.80	37.17	1.46	56.39	58.13	122.02
268	73.96	41.44	1.69	58.12	60.28	123.12
269	74.13	39.27	1.92	61.88	63.50	124.62
270	74.29	38.92	2.59	59.34	67.56	126.53
271	74.46	44.22	3.47	68.72	63.81	129.19
272	74.62	68.46	4.65	30.57	53.51	131.02
273	74.78	92.94	4.34	21.66	48.24	131.17
274	74.95	69.08	3.27	9.32	46.90	128.91
275	75.11	47.80	1.68	9.50	50.76	125.37
276	75.28	45.13	1.29	16.31	53.91	122.47
277	75.44	39.55	1.52	21.25	57.06	122.35
278	75.60	39.10	1.70	26.22	58.07	123.26
279	75.77	48.13	1.85	28.30	56.09	123.74
280	75.93	48.01	1.75	18.27	55.56	123.26
281	76.10	37.57	1.38	19.00	55.86	121.97
282	76.26	39.52	1.14	22.59	56.83	120.32
283	76.42	36.44	1.00	27.48	56.35	119.28
284	76.59	33.22	0.95	30.87	57.98	118.67
285	76.75	33.10	0.95	34.53	60.35	118.61
286	76.92	31.48	1.02	36.61	61.87	119.05
287	77.08	32.36	1.14	38.98	63.74	119.74
288	77.24	32.77	1.26	41.40	64.74	120.18

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
289	77.41	31.72	1.23	40.92	66.37	120.61
290	77.57	31.48	1.37	45.01	66.82	120.95
291	77.74	33.56	1.43	44.56	66.22	121.34
292	77.90	34.34	1.41	64.51	64.08	121.39
293	78.06	35.41	1.34	69.47	63.58	121.24
294	78.23	33.36	1.34	81.14	62.07	121.32
295	78.39	37.48	1.41	88.05	61.60	121.62
296	78.56	38.05	1.48	70.40	61.96	121.68
297	78.72	33.49	1.38	49.97	61.49	121.13
298	78.88	36.44	1.12	36.76	61.65	120.14
299	79.05	33.35	1.03	41.36	62.12	119.44
300	79.21	29.48	1.10	46.01	66.27	119.46
301	79.38	29.08	1.21	57.50	67.63	120.35
302	79.54	34.77	1.44	58.35	66.58	121.22
303	79.70	34.97	1.49	66.43	64.63	122.92
304	79.87	41.32	2.10	69.82	66.28	124.68
305	80.03	41.06	2.69	80.49	63.16	127.03
306	80.20	57.55	3.38	96.13	54.78	129.19
307	80.36	87.31	3.94	22.11	49.69	131.27
308	80.52	85.46	5.09	9.24	50.28	132.47
309	80.69	72.12	5.33	11.65	51.73	133.08
310	80.85	89.06	5.14	20.62	41.56	133.34
311	81.02	146.82	4.51	4.02	30.19	133.75
312	81.18	179.38	4.69	0.80	23.93	134.38
313	81.35	190.51	5.34	0.64	21.98	135.19
314	81.51	207.15	5.62	1.11	20.98	135.83
315	81.67	222.63	5.73	1.29	19.82	136.24
316	81.84	231.90	5.92	1.33	19.10	136.51
317	82.00	235.79	6.01	1.66	18.80	136.57
318	82.17	232.96	5.79	1.50	19.04	136.58
319	82.33	227.08	6.00	1.45	20.86	136.11
320	82.49	174.82	5.40	1.05	28.39	134.76
321	82.66	106.41	4.01	0.24	36.60	132.61
322	82.82	72.62	3.54	1.16	48.05	130.19
323	82.99	54.78	3.13	6.22	57.04	128.19
324	83.15	46.60	2.30	10.43	63.28	126.64
325	83.31	41.22	2.32	14.05	68.92	126.48
326	83.48	40.09	3.24	16.20	65.80	128.42
327	83.64	67.81	4.17	21.69	55.63	131.06
328	83.81	100.62	5.08	17.69	44.47	132.79
329	83.97	125.17	4.87	12.07	37.89	133.64
330	84.13	138.01	4.81	8.43	32.58	133.88
331	84.30	165.12	4.77	5.39	29.52	134.10
332	84.46	173.32	4.80	4.22	27.80	134.23
333	84.63	168.98	4.76	3.64	28.11	134.31
334	84.79	162.74	4.95	2.88	29.53	134.35
335	84.95	152.56	5.09	1.81	32.85	133.99
336	85.12	114.42	4.62	1.45	34.73	132.88

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
337	85.28	116.17	3.38	0.87	37.78	131.16
338	85.45	90.59	2.98	0.81	39.69	129.28
339	85.61	69.84	2.56	0.92	46.99	127.41
340	85.77	50.06	2.03	1.86	52.19	125.50
341	85.94	50.74	1.66	3.05	55.98	123.84
342	86.10	44.85	1.56	3.48	58.20	123.18
343	86.27	39.59	1.70	4.20	67.87	123.87
344	86.43	32.62	2.41	5.73	73.88	125.71
345	86.59	43.52	3.21	7.85	58.38	128.59
346	86.76	100.28	3.81	7.65	44.15	131.16
347	86.92	131.32	4.53	4.65	36.59	132.87
348	87.09	135.03	4.92	4.21	35.10	133.51
349	87.25	129.82	4.66	4.24	36.02	133.29
350	87.41	117.03	4.28	3.33	37.51	132.37
351	87.58	102.11	3.66	3.32	41.49	130.41
352	87.74	64.28	2.38	2.74	48.07	127.54
353	87.91	42.58	1.68	3.71	58.58	123.63
354	88.07	31.64	1.13	6.64	68.17	121.05
355	88.23	29.01	1.21	9.26	75.53	120.43
356	88.40	28.40	1.54	11.09	79.47	123.11
357	88.56	37.15	2.73	14.15	64.56	127.10
358	88.73	81.16	3.90	21.82	57.82	129.84
359	88.89	73.84	4.24	8.99	51.08	131.67
360	89.06	88.75	4.75	11.17	49.48	132.36
361	89.22	99.92	4.83	7.90	47.66	133.11
362	89.38	96.50	5.31	5.33	46.52	133.28
363	89.55	99.38	4.92	5.41	45.73	133.17
364	89.71	104.01	4.55	5.55	39.94	133.01
365	89.88	139.24	4.35	5.06	32.85	133.20
366	90.04	177.64	4.36	4.24	24.91	133.45
367	90.20	233.04	3.83	4.13	18.78	134.02
368	90.37	306.33	4.22	4.67	14.71	134.60
369	90.53	349.13	4.46	4.26	12.98	135.27
370	90.70	349.30	4.47	4.72	12.40	135.37
371	90.86	343.95	4.25	4.16	13.04	135.09
372	91.02	300.33	4.17	3.77	15.11	134.85
373	91.19	242.40	4.54	3.33	20.02	134.49
374	91.35	160.29	4.61	2.51	27.06	134.59
375	91.52	145.51	5.52	3.83	32.66	134.92
376	91.68	163.57	6.03	10.94	29.99	135.66
377	91.84	221.68	5.61	6.49	24.57	136.04
378	92.01	263.79	5.27	6.19	20.37	136.06
379	92.17	274.65	5.21	6.01	19.22	136.11
380	92.34	260.39	5.45	6.10	19.34	136.52
381	92.50	279.63	6.09	5.46	17.80	137.06
382	92.66	355.86	5.91	6.72	15.28	137.28
383	92.83	401.32	5.98	7.35	13.01	137.28
384	92.99	415.26	5.85	7.60	11.91	137.28

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
385	93.16	420.09	5.39	6.95	10.71	137.28
386	93.32	475.15	5.30	7.95	9.40	137.27
387	93.48	495.04	4.83	7.58	8.45	137.09
388	93.65	491.76	4.77	8.14	8.15	136.86
389	93.81	485.31	4.80	7.72	8.01	136.63
390	93.98	491.45	4.40	7.64	7.84	136.57
391	94.14	503.70	4.61	8.07	7.67	136.65
392	94.30	510.35	4.88	8.64	7.85	136.83
393	94.47	490.38	4.75	7.62	8.31	136.79
394	94.63	456.78	4.68	7.82	8.62	136.53
395	94.80	462.14	4.54	7.09	9.09	136.51
396	94.96	449.17	4.85	6.99	9.47	136.71
397	95.12	441.05	5.12	6.88	10.23	137.28
398	95.29	445.81	5.79	7.18	11.01	137.28
399	95.45	449.08	6.58	7.63	11.80	137.28
400	95.62	450.89	7.26	8.26	12.64	137.28
401	95.78	446.84	7.91	8.77	13.23	137.28
402	95.94	440.88	7.83	8.46	13.57	137.28
403	96.11	452.67	8.22	8.78	13.65	137.28
404	96.27	460.21	8.56	8.98	13.99	137.28
405	96.44	436.11	8.56	7.82	14.24	137.28
406	96.60	449.36	8.75	8.06	14.62	137.28
407	96.77	431.57	8.51	8.42	14.20	137.28
408	96.93	450.65	7.89	8.29	13.74	137.28
409	97.09	446.63	7.37	8.59	13.07	137.28
410	97.26	425.02	6.50	7.40	12.63	137.28
411	97.42	429.22	6.07	7.43	12.71	137.28
412	97.59	422.64	6.78	7.37	13.13	137.28
413	97.75	423.56	7.41	7.88	14.05	137.28
414	97.91	412.47	7.73	9.32	14.30	137.28
415	98.08	429.89	7.63	9.48	14.72	137.28
416	98.24	401.23	7.64	7.95	14.33	137.28
417	98.41	424.60	7.15	8.38	14.07	137.28
418	98.57	420.53	6.61	8.14	13.50	137.28
419	98.73	417.48	6.79	8.94	13.40	137.28
420	98.90	426.02	6.92	8.70	13.57	137.28
421	99.06	422.83	7.04	8.71	13.63	137.28
422	99.23	422.58	7.07	9.58	13.80	137.28
423	99.39	416.01	6.98	9.46	13.63	137.28
424	99.55	417.28	6.40	9.50	13.29	137.28
425	99.72	419.43	6.14	9.09	12.67	137.28
426	99.88	432.38	6.03	9.68	N/A	137.28
427	100.05	435.13	-260034.71	9.98	N/A	137.28
428	100.21	473.18	-260034.71	10.18	N/A	137.28
429	100.37	481.02	-260034.71	10.19	N/A	137.28

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)

Abbreviations

Depth: Depth from free surface, at which CPT was performed (ft)
q_c: Measured cone resistance (tsf)
f_s: Sleeve friction resistance (tsf)
u: Pore pressure (tsf)
Fines content: Percentage of fines in soil (%)
Unit weight: Bulk soil unit weight (pcf)

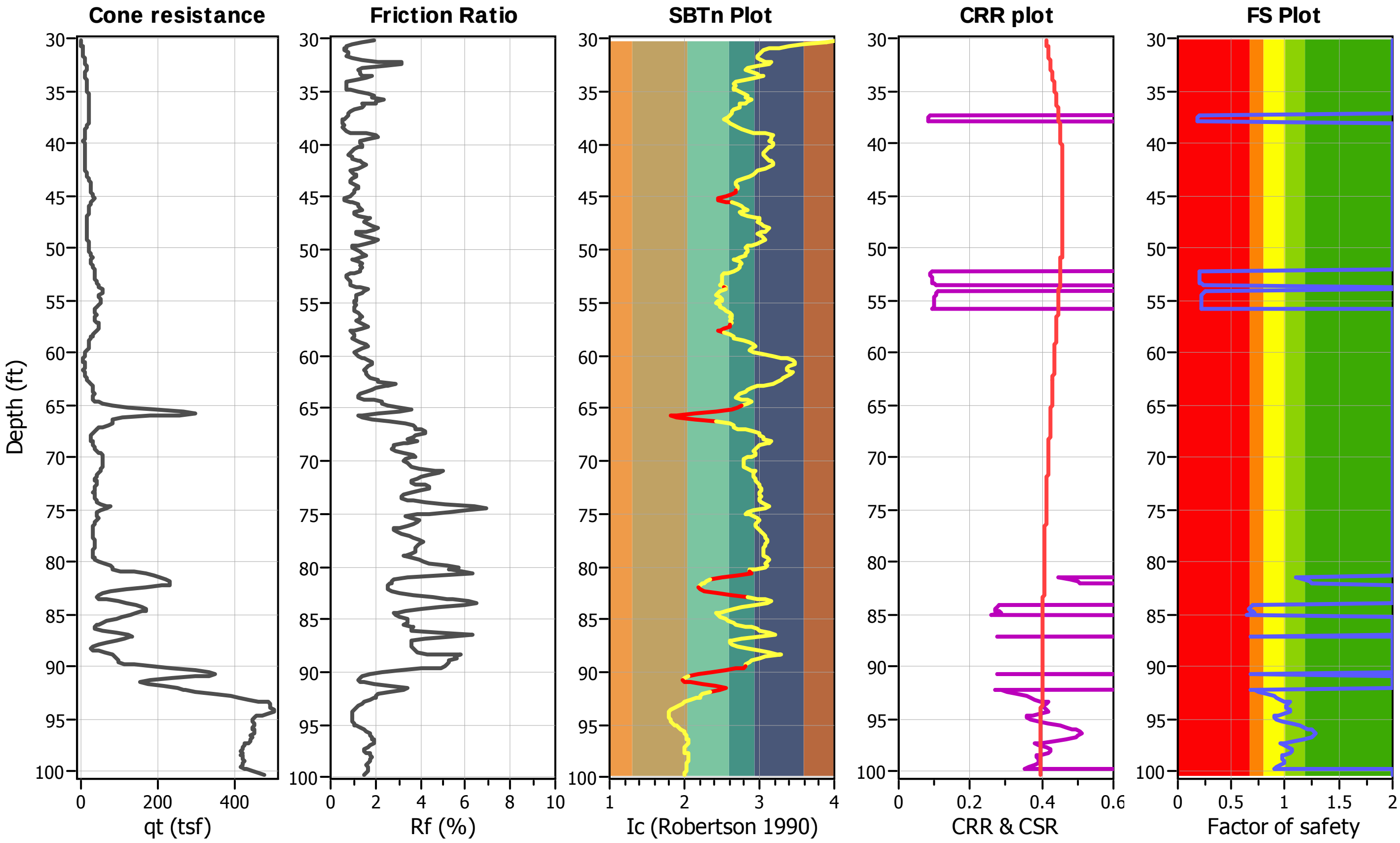
LIQUEFACTION ANALYSIS REPORT

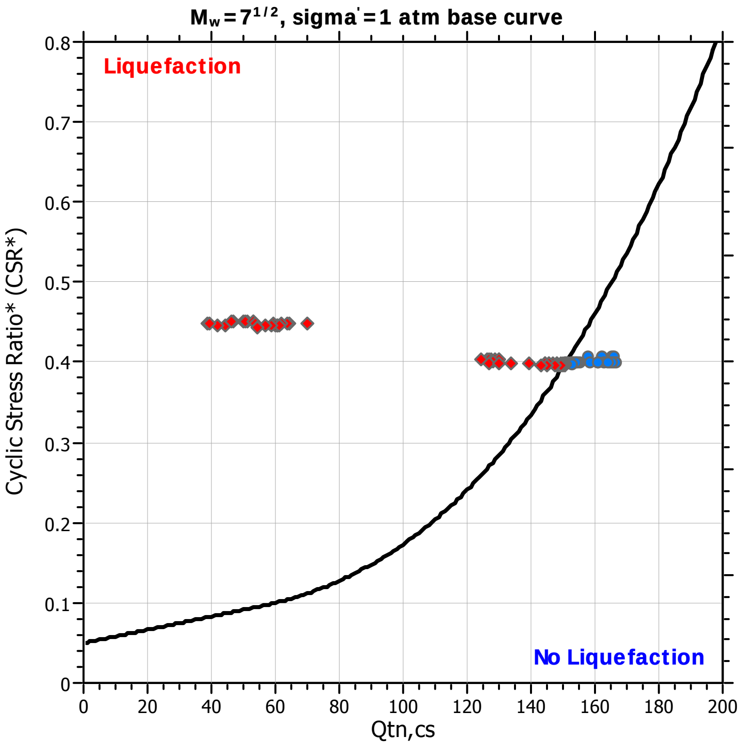
Project title : 21545 - TF Boadway LP **Location : 942 N. Broadway, Los Angeles, CA**

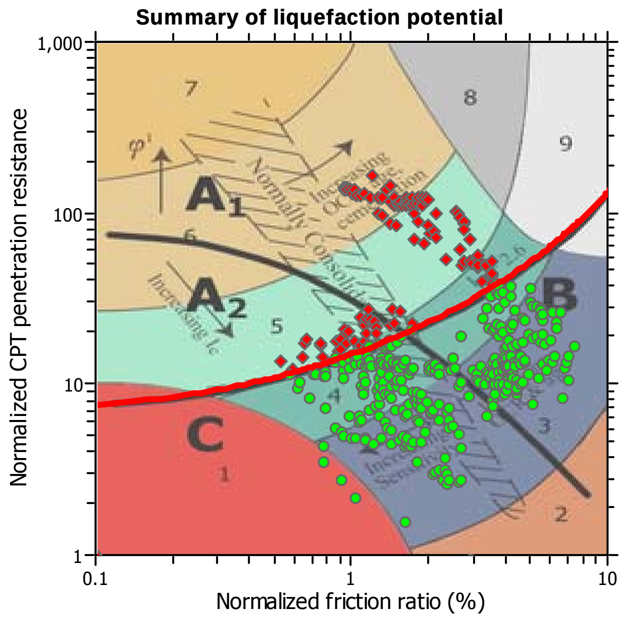
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	45.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	20.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.65	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

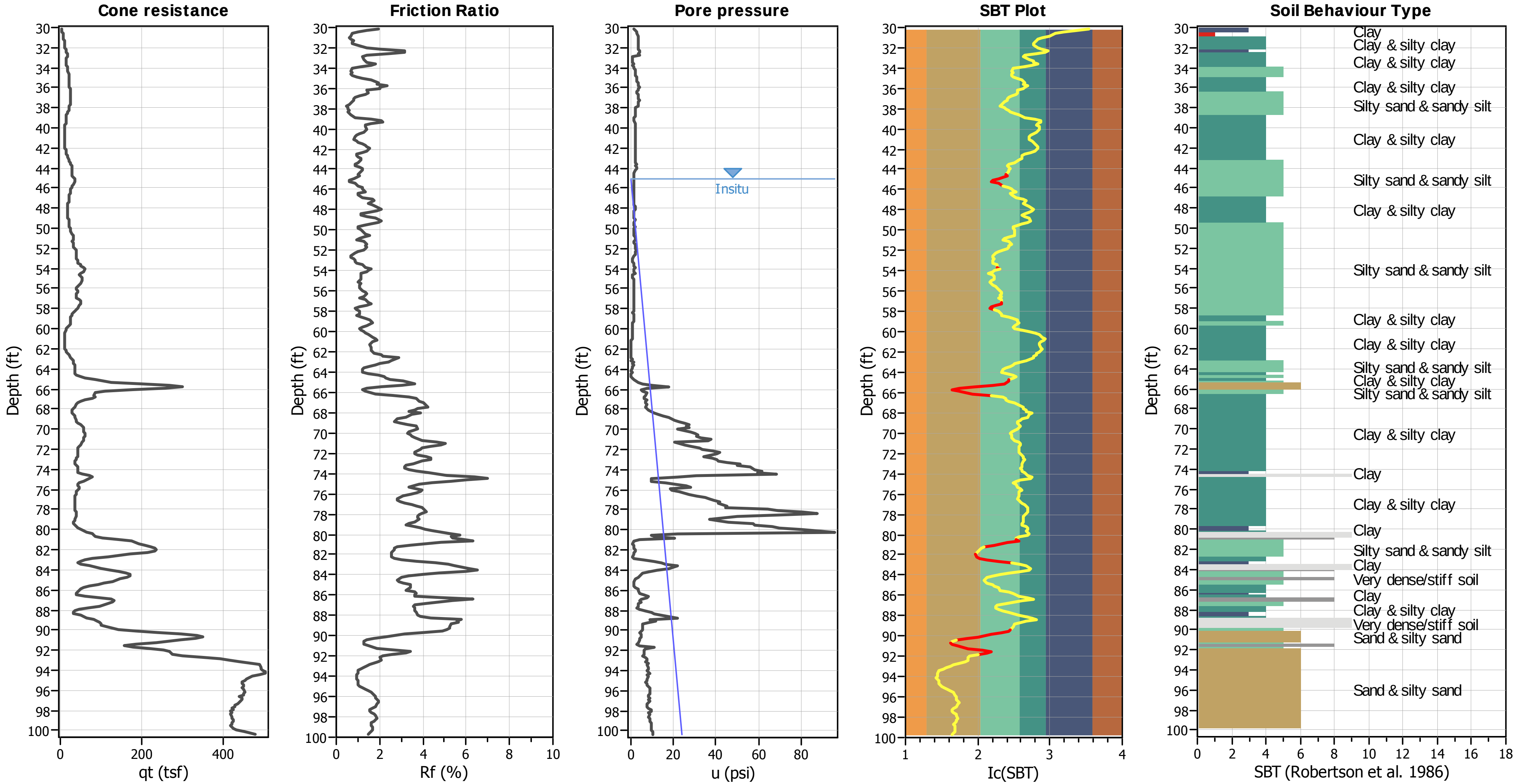






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



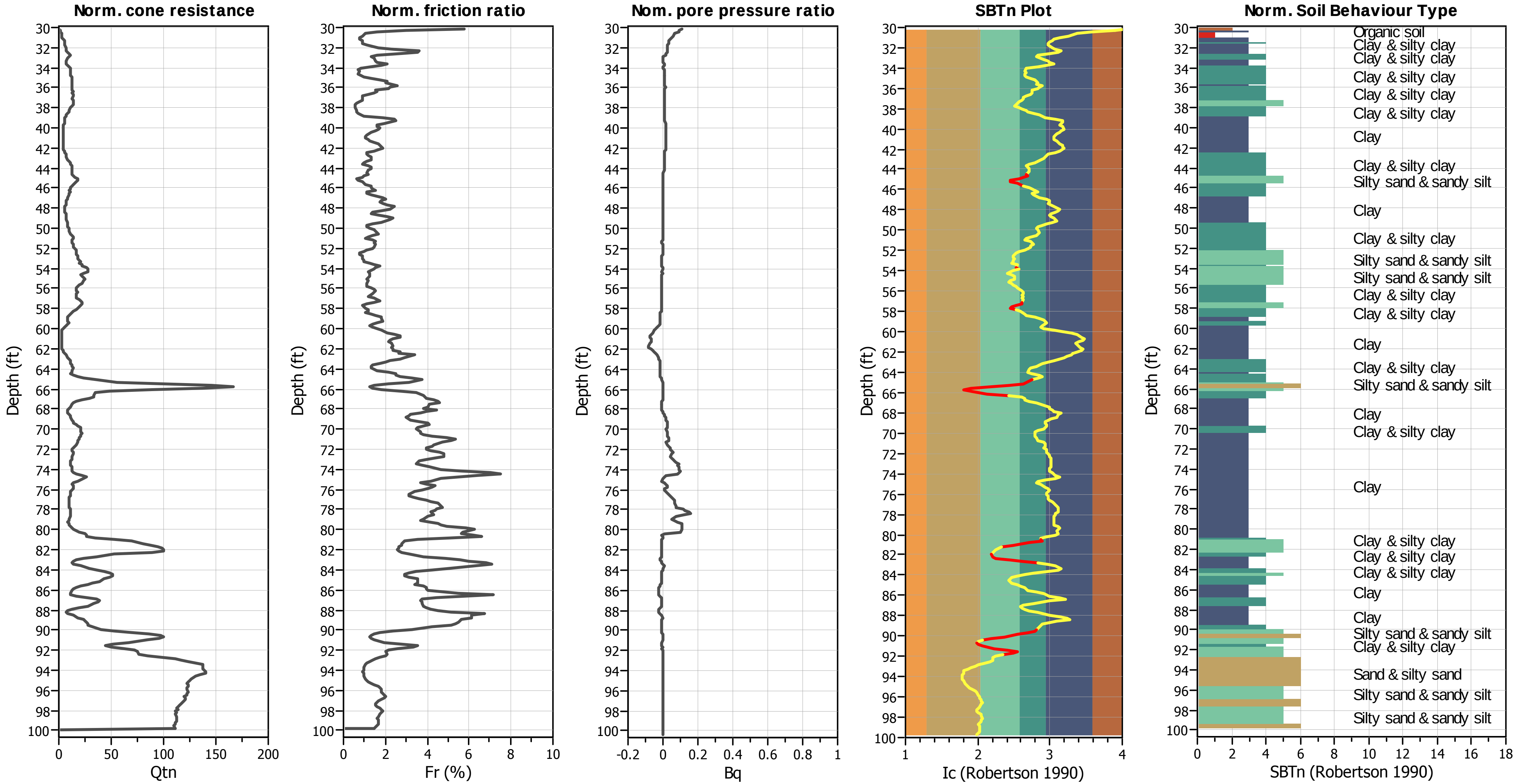
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

CPT basic interpretation plots (normalized)



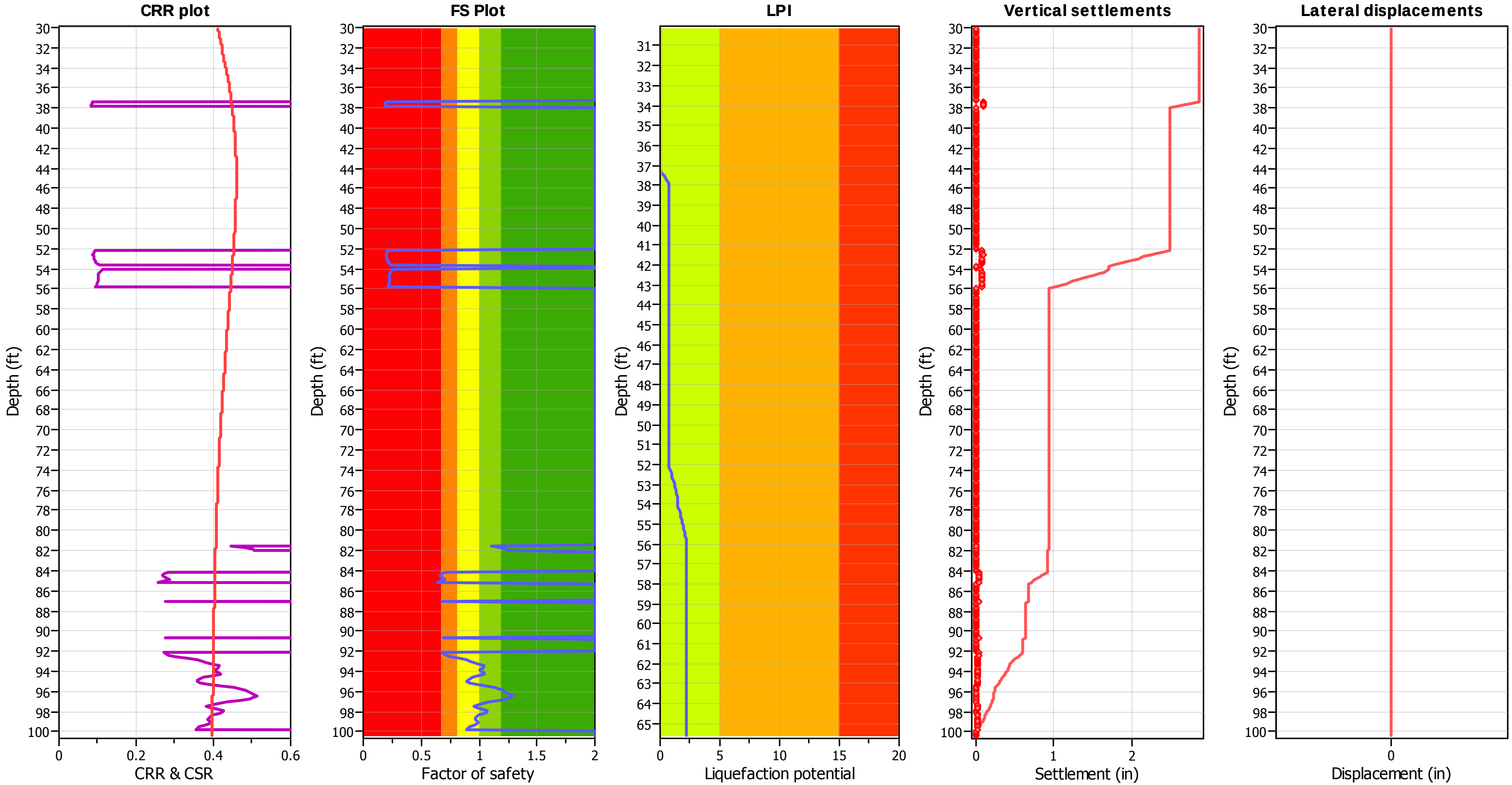
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

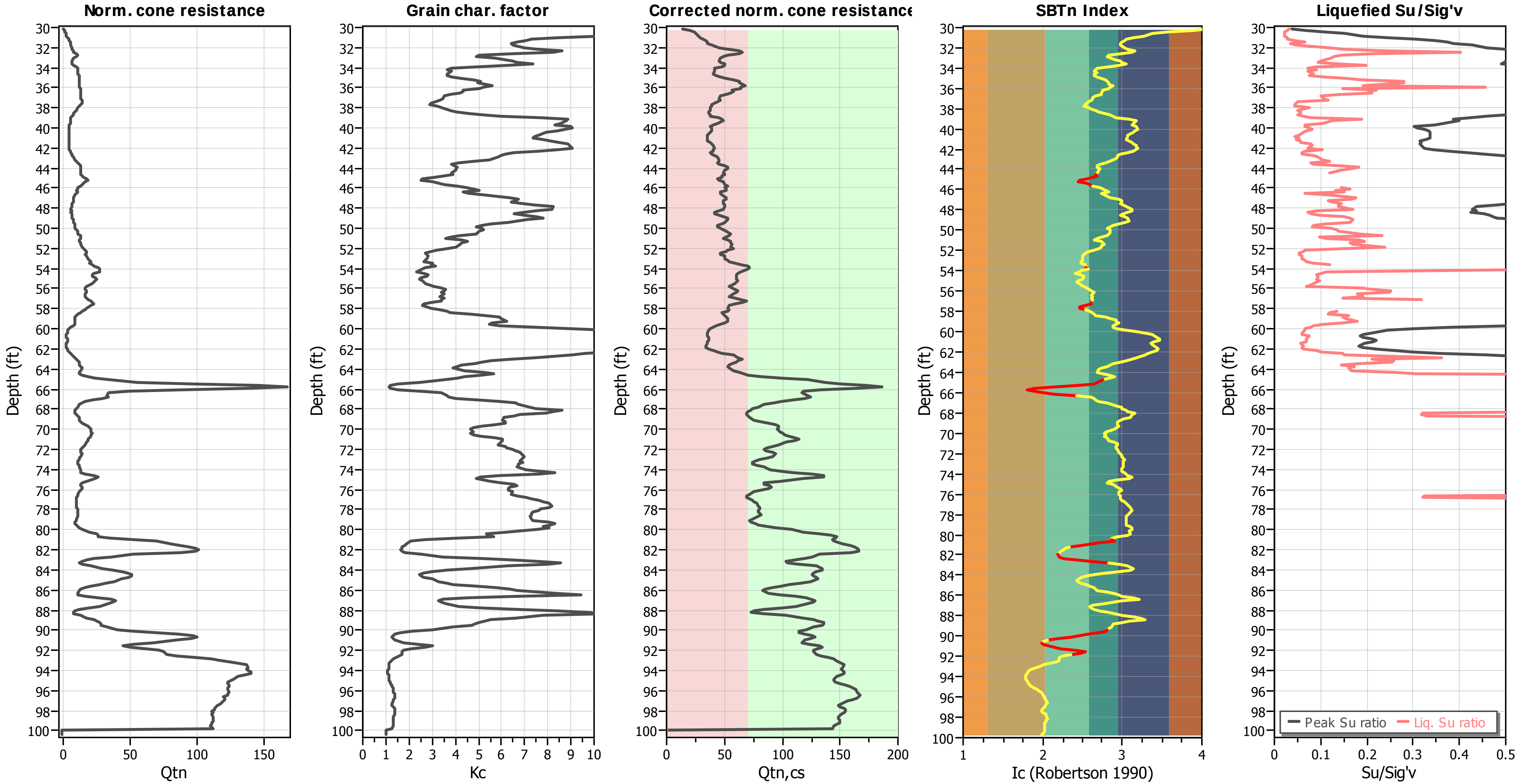
F.S. color scheme

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

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

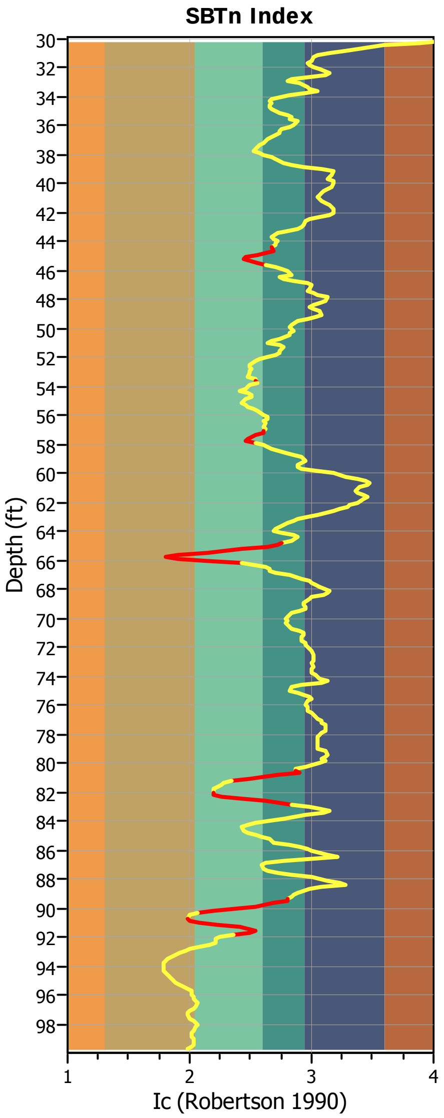
Analysis method:	NCEER (1998)	Depth to water table (erthq.):	20.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.65	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	45.00 ft	Fill height:	N/A	Limit depth:	N/A

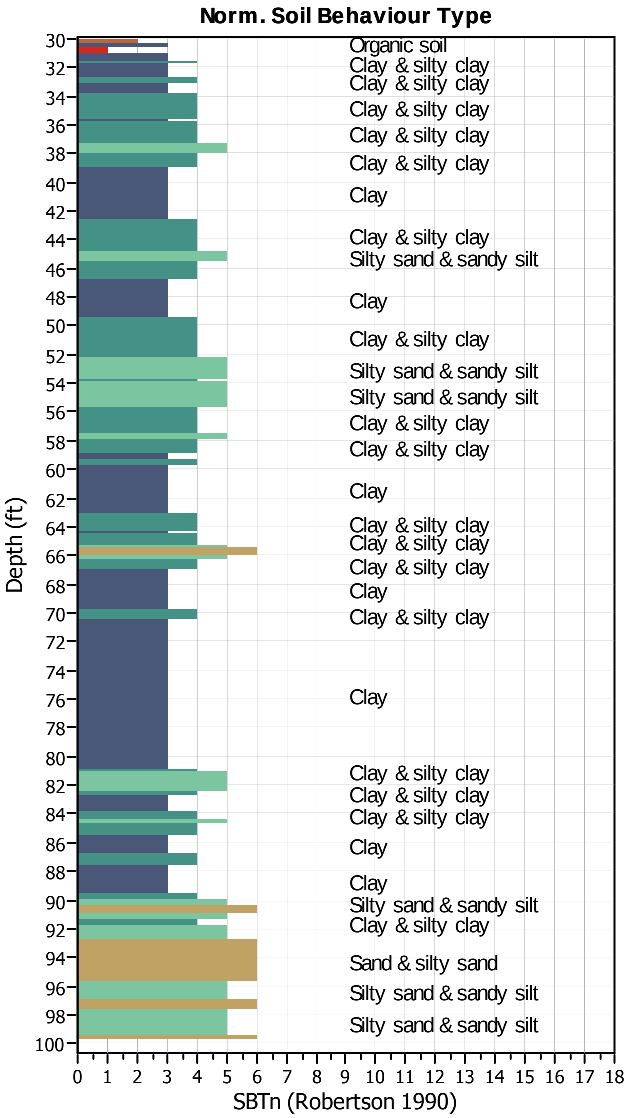
TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between 1.80 < I_c < 3.0) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.





Transition layer algorithm properties

I_c minimum check value:	1.70
I_c maximum check value:	3.00
I_c change ratio value:	0.0250
Minimum number of points in layer:	2

General statistics

Total points in CPT file:	429
Total points excluded:	54
Exclusion percentage:	12.59%
Number of layers detected:	12

:: Field input data ::

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
1	30.16	1.75	0.04	1.06	100.00	88.44
2	30.33	2.53	0.04	1.59	100.00	88.39
3	30.49	3.38	0.03	2.53	100.00	88.37
4	30.66	4.18	0.03	2.66	88.19	88.12
5	30.82	4.95	0.03	2.97	78.17	89.31
6	30.98	5.75	0.04	3.10	68.46	90.47
7	31.15	7.32	0.04	3.29	61.94	92.69
8	31.31	8.64	0.06	2.94	60.16	95.20
9	31.48	8.40	0.09	3.21	58.20	95.72
10	31.64	8.82	0.05	3.33	56.62	95.82
11	31.80	9.67	0.06	3.32	56.86	98.49
12	31.97	10.86	0.17	3.46	60.08	102.14
13	32.13	10.98	0.22	3.29	63.56	105.88
14	32.30	12.47	0.34	3.57	69.31	109.25
15	32.46	12.37	0.58	3.53	67.11	109.99
16	32.62	13.76	0.31	3.49	57.37	109.59
17	32.79	19.66	0.21	3.58	47.81	106.57
18	32.95	16.00	0.19	0.22	46.64	105.00
19	33.12	12.19	0.18	0.41	52.27	103.80
20	33.28	12.37	0.15	0.50	56.68	102.75
21	33.44	11.17	0.14	0.49	57.84	103.20
22	33.61	12.07	0.21	0.79	61.98	105.11
23	33.77	12.27	0.30	0.72	55.76	105.45
24	33.94	16.52	0.14	0.82	47.41	104.58
25	34.10	18.44	0.11	0.90	39.23	102.35
26	34.27	18.13	0.14	2.01	37.93	101.81
27	34.43	17.51	0.11	1.89	39.26	102.16
28	34.59	17.36	0.13	1.73	37.87	101.83
29	34.76	19.66	0.12	1.71	38.00	103.07
30	34.92	19.97	0.17	2.68	39.26	105.01
31	35.09	19.83	0.25	2.61	42.69	107.12
32	35.25	19.73	0.30	2.60	46.02	109.60
33	35.41	21.72	0.45	2.82	47.96	110.98
34	35.58	21.07	0.45	3.39	47.25	111.10
35	35.74	21.25	0.31	3.06	51.20	112.64
36	35.91	20.94	0.74	3.58	49.02	111.54
37	36.07	21.02	0.24	3.49	47.45	111.95
38	36.23	24.86	0.36	3.10	43.01	109.33
39	36.40	20.28	0.34	2.81	42.78	110.26
40	36.56	24.30	0.35	2.57	42.09	109.32
41	36.73	23.43	0.24	3.26	38.86	107.90
42	36.89	21.94	0.17	3.14	36.91	106.00
43	37.05	22.80	0.18	3.32	36.44	105.47
44	37.22	23.10	0.20	3.54	35.49	105.98
45	37.38	25.29	0.20	3.43	33.76	105.23
46	37.55	24.47	0.12	3.31	32.20	104.02
47	37.71	23.39	0.12	3.30	31.54	102.02
48	37.87	21.96	0.10	3.10	34.34	102.04

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
49	38.04	19.16	0.13	2.06	36.08	101.20
50	38.20	18.79	0.09	1.84	38.77	101.02
51	38.37	17.59	0.10	1.94	40.50	100.12
52	38.53	15.35	0.10	1.88	44.31	99.88
53	38.69	13.95	0.09	1.89	48.59	99.91
54	38.86	13.41	0.11	1.78	53.80	100.62
55	39.02	12.03	0.14	1.45	63.98	104.52
56	39.19	11.76	0.34	1.41	70.98	105.69
57	39.35	10.71	0.23	1.44	70.41	106.27
58	39.51	13.26	0.19	1.90	69.06	103.59
59	39.68	9.14	0.12	1.72	67.65	101.83
60	39.84	9.55	0.12	1.52	71.64	100.67
61	40.01	10.07	0.14	1.52	72.00	101.27
62	40.17	9.66	0.15	1.50	70.14	101.55
63	40.33	10.86	0.13	1.50	68.21	101.26
64	40.50	10.87	0.12	1.64	65.51	100.33
65	40.66	10.27	0.10	1.58	63.61	99.20
66	40.83	10.87	0.08	1.62	62.52	98.72
67	40.99	11.12	0.10	1.57	62.03	98.46
68	41.15	10.40	0.09	1.52	64.65	99.17
69	41.32	10.13	0.11	1.47	66.64	99.35
70	41.48	10.27	0.11	1.67	68.69	100.67
71	41.65	10.73	0.15	1.66	70.74	101.60
72	41.81	10.12	0.16	1.74	71.27	102.13
73	41.98	10.66	0.14	1.67	71.91	102.95
74	42.14	11.41	0.20	1.75	68.45	102.62
75	42.30	11.76	0.13	1.71	63.53	102.52
76	42.47	13.75	0.12	1.67	57.24	101.29
77	42.63	14.60	0.12	1.80	55.03	102.23
78	42.80	15.14	0.17	1.74	53.94	103.56
79	42.96	16.94	0.19	1.77	53.09	104.99
80	43.12	18.05	0.21	2.11	50.71	106.06
81	43.29	19.89	0.24	2.13	45.84	105.96
82	43.45	22.84	0.16	2.10	41.45	105.69
83	43.62	24.00	0.17	2.33	39.38	106.51
84	43.78	25.71	0.29	2.05	40.01	108.83
85	43.94	28.65	0.37	2.44	41.26	110.27
86	44.11	26.46	0.34	2.17	40.83	110.38
87	44.27	27.16	0.30	1.88	40.55	109.38
88	44.44	26.08	0.25	0.83	39.07	108.82
89	44.60	27.77	0.27	0.85	39.74	109.26
90	44.76	27.46	0.35	1.21	36.88	108.68
91	44.93	30.26	0.17	1.20	33.51	108.93
92	45.09	36.93	0.27	1.08	28.80	107.47
93	45.26	35.68	0.19	1.18	28.24	108.02
94	45.42	34.34	0.21	1.13	32.93	109.38
95	45.58	28.24	0.43	1.31	36.70	109.68
96	45.75	27.45	0.25	1.08	41.03	110.26

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
97	45.91	27.29	0.31	1.22	43.59	109.42
98	46.08	20.95	0.35	1.02	45.77	109.55
99	46.24	24.37	0.28	0.96	47.76	109.53
100	46.40	24.28	0.32	1.15	42.73	107.81
101	46.57	24.04	0.14	0.91	44.52	107.37
102	46.73	20.41	0.25	1.06	48.93	107.77
103	46.90	19.14	0.38	1.01	55.99	109.43
104	47.06	19.61	0.36	0.85	58.34	109.31
105	47.22	17.45	0.25	0.95	57.77	108.39
106	47.39	17.80	0.27	1.41	56.56	107.98
107	47.55	20.16	0.31	1.03	59.56	108.30
108	47.72	14.94	0.30	0.84	62.42	108.43
109	47.88	15.30	0.30	1.52	67.43	108.70
110	48.04	16.34	0.37	1.57	66.74	107.86
111	48.21	14.02	0.20	1.34	63.03	106.63
112	48.37	16.30	0.16	1.33	59.77	104.22
113	48.54	15.20	0.17	1.45	57.37	104.50
114	48.70	16.79	0.21	1.43	59.99	106.57
115	48.86	17.53	0.33	1.42	62.77	108.34
116	49.03	16.03	0.36	1.21	64.58	109.58
117	49.19	17.66	0.37	1.56	60.54	110.02
118	49.36	22.61	0.36	1.12	55.90	109.32
119	49.52	19.86	0.24	1.03	50.96	107.92
120	49.69	20.23	0.19	1.35	48.36	105.99
121	49.85	21.43	0.18	1.65	47.02	106.45
122	50.01	22.77	0.27	1.26	48.32	107.66
123	50.18	21.51	0.30	1.24	48.90	108.92
124	50.34	24.00	0.31	1.10	47.48	110.20
125	50.51	28.59	0.41	1.11	47.02	111.82
126	50.67	27.48	0.52	0.97	42.04	111.50
127	50.83	32.15	0.22	1.59	39.22	110.47
128	51.00	30.76	0.25	2.11	37.59	109.62
129	51.16	28.14	0.41	2.13	42.34	111.13
130	51.33	27.66	0.44	1.01	44.36	111.86
131	51.49	29.58	0.37	1.03	42.66	111.76
132	51.65	31.19	0.38	1.67	42.11	112.45
133	51.82	31.50	0.54	1.57	40.45	112.37
134	51.98	32.95	0.34	1.50	37.68	113.11
135	52.15	41.09	0.47	2.47	34.25	111.76
136	52.31	34.90	0.30	1.93	32.21	111.06
137	52.47	35.98	0.23	1.83	30.35	109.09
138	52.64	38.50	0.24	1.94	30.55	108.98
139	52.80	33.91	0.29	1.25	31.06	110.66
140	52.97	41.74	0.41	0.36	30.58	111.20
141	53.13	42.76	0.30	0.59	30.19	112.22
142	53.29	40.48	0.42	0.64	29.73	112.61
143	53.46	45.57	0.46	0.83	32.67	114.41
144	53.62	42.10	0.63	1.03	32.32	116.32

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
145	53.79	53.25	0.81	1.08	33.66	118.18
146	53.95	52.91	0.97	1.48	30.10	118.66
147	54.11	61.04	0.69	1.08	28.74	118.46
148	54.28	58.48	0.72	0.89	26.75	116.73
149	54.44	49.66	0.48	1.72	29.76	115.85
150	54.61	40.82	0.55	0.76	31.18	115.16
151	54.77	48.45	0.60	0.67	30.69	115.35
152	54.93	52.91	0.51	0.54	28.59	115.57
153	55.10	51.26	0.56	0.89	27.62	115.40
154	55.26	51.89	0.55	1.29	29.08	115.68
155	55.43	48.34	0.59	1.38	29.85	114.71
156	55.59	41.87	0.38	1.46	31.80	113.83
157	55.75	39.51	0.42	1.44	33.41	112.85
158	55.92	37.92	0.45	1.08	36.01	113.42
159	56.08	36.92	0.50	1.04	37.37	114.34
160	56.25	40.28	0.60	1.12	37.02	115.07
161	56.41	42.81	0.59	1.05	36.07	114.79
162	56.57	38.41	0.43	1.31	36.85	114.00
163	56.74	34.07	0.46	1.04	35.44	112.66
164	56.90	40.51	0.35	0.92	36.71	114.50
165	57.07	43.88	0.76	0.84	36.02	116.16
166	57.23	45.35	0.80	0.93	35.74	117.71
167	57.40	51.07	0.74	0.97	32.32	117.16
168	57.56	53.27	0.55	1.03	29.30	115.05
169	57.72	43.99	0.28	1.30	28.72	112.97
170	57.89	41.08	0.38	1.05	32.36	112.35
171	58.05	36.79	0.50	0.97	35.30	112.49
172	58.22	35.69	0.33	0.85	37.66	111.71
173	58.38	31.36	0.29	0.59	38.83	109.86
174	58.54	26.86	0.28	1.25	45.07	110.01
175	58.71	23.98	0.39	0.81	49.33	110.35
176	58.87	25.57	0.36	0.90	53.37	110.89
177	59.04	22.79	0.38	0.93	53.82	111.22
178	59.20	24.46	0.44	0.81	55.20	111.16
179	59.36	23.64	0.36	0.55	51.38	110.48
180	59.53	26.07	0.26	0.56	50.73	108.54
181	59.69	20.05	0.21	0.55	53.32	106.57
182	59.86	15.72	0.19	0.54	62.39	104.80
183	60.02	13.12	0.16	0.43	71.62	103.64
184	60.18	11.34	0.16	0.34	79.93	102.66
185	60.35	9.93	0.15	0.34	87.27	102.23
186	60.51	9.50	0.15	0.29	93.20	102.54
187	60.68	9.47	0.19	0.28	95.99	102.93
188	60.84	9.37	0.18	0.22	95.28	103.25
189	61.00	10.06	0.17	0.18	89.74	103.13
190	61.17	11.40	0.17	0.04	86.45	103.09
191	61.33	10.70	0.17	0.06	87.05	102.59
192	61.50	9.37	0.14	-0.23	91.87	102.27

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
193	61.66	9.32	0.16	-0.16	94.82	101.84
194	61.82	9.37	0.15	-0.26	92.14	102.27
195	61.99	10.68	0.16	-0.13	88.04	103.51
196	62.15	12.09	0.23	-0.19	82.48	105.06
197	62.32	13.66	0.25	-0.19	80.59	107.40
198	62.48	14.85	0.37	-0.11	74.95	108.93
199	62.64	18.23	0.38	-0.07	71.90	113.16
200	62.81	24.89	0.91	-0.02	62.37	114.37
201	62.97	28.89	0.53	0.09	56.44	115.81
202	63.14	32.24	0.65	-0.11	50.99	115.01
203	63.30	31.03	0.65	1.08	48.70	114.81
204	63.46	32.40	0.46	0.44	46.48	113.52
205	63.63	31.37	0.37	0.80	42.57	112.51
206	63.79	35.10	0.44	0.71	40.97	112.28
207	63.96	35.07	0.41	0.46	39.70	112.75
208	64.12	36.50	0.43	0.04	43.44	113.87
209	64.28	31.41	0.67	0.15	49.07	115.35
210	64.45	29.89	0.78	0.00	51.58	116.55
211	64.61	37.00	0.76	-0.06	48.00	118.08
212	64.78	46.14	1.06	0.02	43.19	121.02
213	64.94	60.41	1.77	0.56	41.34	124.90
214	65.10	74.95	2.81	1.18	37.39	129.05
215	65.27	112.66	4.39	2.90	27.69	131.82
216	65.43	186.45	4.21	5.01	17.07	133.50
217	65.60	289.71	3.74	10.08	10.31	133.62
218	65.76	325.70	3.37	17.30	8.23	133.50
219	65.93	277.04	3.64	7.26	10.44	132.90
220	66.09	161.72	3.41	4.86	16.61	131.44
221	66.25	95.07	2.58	5.58	27.50	129.52
222	66.42	75.18	2.68	7.26	36.15	128.54
223	66.58	79.98	3.08	6.93	38.08	129.11
224	66.75	91.38	3.29	5.79	38.34	129.39
225	66.91	77.75	3.00	5.91	40.57	128.52
226	67.07	56.88	2.31	7.12	47.09	126.67
227	67.24	43.59	1.92	6.77	53.51	124.70
228	67.40	41.81	1.72	6.73	57.65	123.34
229	67.57	37.35	1.55	7.32	58.32	121.43
230	67.73	31.33	0.87	6.80	61.26	120.08
231	67.89	29.33	1.16	7.46	62.78	118.63
232	68.06	28.51	1.00	8.19	69.51	118.33
233	68.22	20.31	0.88	9.35	67.18	117.59
234	68.39	29.90	0.86	10.94	65.36	117.25
235	68.55	29.89	0.86	12.95	58.94	117.61
236	68.71	31.96	0.89	14.89	57.10	117.96
237	68.88	34.80	0.94	17.66	54.49	118.52
238	69.04	37.59	1.00	20.14	54.12	119.73
239	69.21	38.72	1.33	22.69	54.78	121.11
240	69.37	40.90	1.55	24.97	55.09	122.69

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
241	69.53	46.22	1.82	27.04	52.35	123.88
242	69.70	53.37	1.96	26.17	48.43	124.52
243	69.86	57.10	1.83	27.11	45.95	124.64
244	70.03	55.58	1.81	21.48	44.99	124.64
245	70.19	56.86	1.92	27.80	45.77	125.11
246	70.35	58.53	2.18	30.06	45.04	125.67
247	70.52	63.32	2.19	31.30	46.12	125.76
248	70.68	53.80	2.03	30.64	47.90	126.39
249	70.85	58.05	2.76	32.90	52.21	127.07
250	71.01	55.08	2.99	37.52	54.18	127.63
251	71.17	52.77	2.67	36.52	54.00	127.08
252	71.34	54.14	2.21	20.28	53.59	125.85
253	71.50	46.58	1.90	25.41	52.99	124.73
254	71.67	46.01	1.79	28.62	54.89	123.64
255	71.83	41.61	1.55	32.16	55.34	122.63
256	71.99	39.02	1.31	33.38	56.74	121.99
257	72.16	38.61	1.48	37.98	57.61	122.31
258	72.32	41.42	1.75	41.77	58.61	123.40
259	72.49	43.12	1.98	40.34	59.24	123.93
260	72.65	40.51	1.84	33.90	60.03	123.55
261	72.81	37.41	1.53	37.96	59.60	122.45
262	72.98	37.80	1.30	40.66	59.07	121.14
263	73.14	34.55	1.14	40.97	58.71	120.03
264	73.31	32.53	1.02	44.90	59.39	119.40
265	73.47	33.40	1.06	51.46	58.36	119.69
266	73.64	37.95	1.23	49.69	58.56	120.71
267	73.80	37.17	1.46	56.39	58.13	122.02
268	73.96	41.44	1.69	58.12	60.28	123.12
269	74.13	39.27	1.92	61.88	63.50	124.62
270	74.29	38.92	2.59	59.34	67.56	126.53
271	74.46	44.22	3.47	68.72	63.81	129.19
272	74.62	68.46	4.65	30.57	53.51	131.02
273	74.78	92.94	4.34	21.66	48.24	131.17
274	74.95	69.08	3.27	9.32	46.90	128.91
275	75.11	47.80	1.68	9.50	50.76	125.37
276	75.28	45.13	1.29	16.31	53.91	122.47
277	75.44	39.55	1.52	21.25	57.06	122.35
278	75.60	39.10	1.70	26.22	58.07	123.26
279	75.77	48.13	1.85	28.30	56.09	123.74
280	75.93	48.01	1.75	18.27	55.56	123.26
281	76.10	37.57	1.38	19.00	55.86	121.97
282	76.26	39.52	1.14	22.59	56.83	120.32
283	76.42	36.44	1.00	27.48	56.35	119.28
284	76.59	33.22	0.95	30.87	57.98	118.67
285	76.75	33.10	0.95	34.53	60.35	118.61
286	76.92	31.48	1.02	36.61	61.87	119.05
287	77.08	32.36	1.14	38.98	63.74	119.74
288	77.24	32.77	1.26	41.40	64.74	120.18

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
289	77.41	31.72	1.23	40.92	66.37	120.61
290	77.57	31.48	1.37	45.01	66.82	120.95
291	77.74	33.56	1.43	44.56	66.22	121.34
292	77.90	34.34	1.41	64.51	64.08	121.39
293	78.06	35.41	1.34	69.47	63.58	121.24
294	78.23	33.36	1.34	81.14	62.07	121.32
295	78.39	37.48	1.41	88.05	61.60	121.62
296	78.56	38.05	1.48	70.40	61.96	121.68
297	78.72	33.49	1.38	49.97	61.49	121.13
298	78.88	36.44	1.12	36.76	61.65	120.14
299	79.05	33.35	1.03	41.36	62.12	119.44
300	79.21	29.48	1.10	46.01	66.27	119.46
301	79.38	29.08	1.21	57.50	67.63	120.35
302	79.54	34.77	1.44	58.35	66.58	121.22
303	79.70	34.97	1.49	66.43	64.63	122.92
304	79.87	41.32	2.10	69.82	66.28	124.68
305	80.03	41.06	2.69	80.49	63.16	127.03
306	80.20	57.55	3.38	96.13	54.78	129.19
307	80.36	87.31	3.94	22.11	49.69	131.27
308	80.52	85.46	5.09	9.24	50.28	132.47
309	80.69	72.12	5.33	11.65	51.73	133.08
310	80.85	89.06	5.14	20.62	41.56	133.34
311	81.02	146.82	4.51	4.02	30.19	133.75
312	81.18	179.38	4.69	0.80	23.93	134.38
313	81.35	190.51	5.34	0.64	21.98	135.19
314	81.51	207.15	5.62	1.11	20.98	135.83
315	81.67	222.63	5.73	1.29	19.82	136.24
316	81.84	231.90	5.92	1.33	19.10	136.51
317	82.00	235.79	6.01	1.66	18.80	136.57
318	82.17	232.96	5.79	1.50	19.04	136.58
319	82.33	227.08	6.00	1.45	20.86	136.11
320	82.49	174.82	5.40	1.05	28.39	134.76
321	82.66	106.41	4.01	0.24	36.60	132.61
322	82.82	72.62	3.54	1.16	48.05	130.19
323	82.99	54.78	3.13	6.22	57.04	128.19
324	83.15	46.60	2.30	10.43	63.28	126.64
325	83.31	41.22	2.32	14.05	68.92	126.48
326	83.48	40.09	3.24	16.20	65.80	128.42
327	83.64	67.81	4.17	21.69	55.63	131.06
328	83.81	100.62	5.08	17.69	44.47	132.79
329	83.97	125.17	4.87	12.07	37.89	133.64
330	84.13	138.01	4.81	8.43	32.58	133.88
331	84.30	165.12	4.77	5.39	29.52	134.10
332	84.46	173.32	4.80	4.22	27.80	134.23
333	84.63	168.98	4.76	3.64	28.11	134.31
334	84.79	162.74	4.95	2.88	29.53	134.35
335	84.95	152.56	5.09	1.81	32.85	133.99
336	85.12	114.42	4.62	1.45	34.73	132.88

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
337	85.28	116.17	3.38	0.87	37.78	131.16
338	85.45	90.59	2.98	0.81	39.69	129.28
339	85.61	69.84	2.56	0.92	46.99	127.41
340	85.77	50.06	2.03	1.86	52.19	125.50
341	85.94	50.74	1.66	3.05	55.98	123.84
342	86.10	44.85	1.56	3.48	58.20	123.18
343	86.27	39.59	1.70	4.20	67.87	123.87
344	86.43	32.62	2.41	5.73	73.88	125.71
345	86.59	43.52	3.21	7.85	58.38	128.59
346	86.76	100.28	3.81	7.65	44.15	131.16
347	86.92	131.32	4.53	4.65	36.59	132.87
348	87.09	135.03	4.92	4.21	35.10	133.51
349	87.25	129.82	4.66	4.24	36.02	133.29
350	87.41	117.03	4.28	3.33	37.51	132.37
351	87.58	102.11	3.66	3.32	41.49	130.41
352	87.74	64.28	2.38	2.74	48.07	127.54
353	87.91	42.58	1.68	3.71	58.58	123.63
354	88.07	31.64	1.13	6.64	68.17	121.05
355	88.23	29.01	1.21	9.26	75.53	120.43
356	88.40	28.40	1.54	11.09	79.47	123.11
357	88.56	37.15	2.73	14.15	64.56	127.10
358	88.73	81.16	3.90	21.82	57.82	129.84
359	88.89	73.84	4.24	8.99	51.08	131.67
360	89.06	88.75	4.75	11.17	49.48	132.36
361	89.22	99.92	4.83	7.90	47.66	133.11
362	89.38	96.50	5.31	5.33	46.52	133.28
363	89.55	99.38	4.92	5.41	45.73	133.17
364	89.71	104.01	4.55	5.55	39.94	133.01
365	89.88	139.24	4.35	5.06	32.85	133.20
366	90.04	177.64	4.36	4.24	24.91	133.45
367	90.20	233.04	3.83	4.13	18.78	134.02
368	90.37	306.33	4.22	4.67	14.71	134.60
369	90.53	349.13	4.46	4.26	12.98	135.27
370	90.70	349.30	4.47	4.72	12.40	135.37
371	90.86	343.95	4.25	4.16	13.04	135.09
372	91.02	300.33	4.17	3.77	15.11	134.85
373	91.19	242.40	4.54	3.33	20.02	134.49
374	91.35	160.29	4.61	2.51	27.06	134.59
375	91.52	145.51	5.52	3.83	32.66	134.92
376	91.68	163.57	6.03	10.94	29.99	135.66
377	91.84	221.68	5.61	6.49	24.57	136.04
378	92.01	263.79	5.27	6.19	20.37	136.06
379	92.17	274.65	5.21	6.01	19.22	136.11
380	92.34	260.39	5.45	6.10	19.34	136.52
381	92.50	279.63	6.09	5.46	17.80	137.06
382	92.66	355.86	5.91	6.72	15.28	137.28
383	92.83	401.32	5.98	7.35	13.01	137.28
384	92.99	415.26	5.85	7.60	11.91	137.28

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)
385	93.16	420.09	5.39	6.95	10.71	137.28
386	93.32	475.15	5.30	7.95	9.40	137.27
387	93.48	495.04	4.83	7.58	8.45	137.09
388	93.65	491.76	4.77	8.14	8.15	136.86
389	93.81	485.31	4.80	7.72	8.01	136.63
390	93.98	491.45	4.40	7.64	7.84	136.57
391	94.14	503.70	4.61	8.07	7.67	136.65
392	94.30	510.35	4.88	8.64	7.85	136.83
393	94.47	490.38	4.75	7.62	8.31	136.79
394	94.63	456.78	4.68	7.82	8.62	136.53
395	94.80	462.14	4.54	7.09	9.09	136.51
396	94.96	449.17	4.85	6.99	9.47	136.71
397	95.12	441.05	5.12	6.88	10.23	137.28
398	95.29	445.81	5.79	7.18	11.01	137.28
399	95.45	449.08	6.58	7.63	11.80	137.28
400	95.62	450.89	7.26	8.26	12.64	137.28
401	95.78	446.84	7.91	8.77	13.23	137.28
402	95.94	440.88	7.83	8.46	13.57	137.28
403	96.11	452.67	8.22	8.78	13.65	137.28
404	96.27	460.21	8.56	8.98	13.99	137.28
405	96.44	436.11	8.56	7.82	14.24	137.28
406	96.60	449.36	8.75	8.06	14.62	137.28
407	96.77	431.57	8.51	8.42	14.20	137.28
408	96.93	450.65	7.89	8.29	13.74	137.28
409	97.09	446.63	7.37	8.59	13.07	137.28
410	97.26	425.02	6.50	7.40	12.63	137.28
411	97.42	429.22	6.07	7.43	12.71	137.28
412	97.59	422.64	6.78	7.37	13.13	137.28
413	97.75	423.56	7.41	7.88	14.05	137.28
414	97.91	412.47	7.73	9.32	14.30	137.28
415	98.08	429.89	7.63	9.48	14.72	137.28
416	98.24	401.23	7.64	7.95	14.33	137.28
417	98.41	424.60	7.15	8.38	14.07	137.28
418	98.57	420.53	6.61	8.14	13.50	137.28
419	98.73	417.48	6.79	8.94	13.40	137.28
420	98.90	426.02	6.92	8.70	13.57	137.28
421	99.06	422.83	7.04	8.71	13.63	137.28
422	99.23	422.58	7.07	9.58	13.80	137.28
423	99.39	416.01	6.98	9.46	13.63	137.28
424	99.55	417.28	6.40	9.50	13.29	137.28
425	99.72	419.43	6.14	9.09	12.67	137.28
426	99.88	432.38	6.03	9.68	N/A	137.28
427	100.05	435.13	-260034.71	9.98	N/A	137.28
428	100.21	473.18	-260034.71	10.18	N/A	137.28
429	100.37	481.02	-260034.71	10.19	N/A	137.28

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (tsf)	Fines content (%)	Unit weight (pcf)

Abbreviations

Depth: Depth from free surface, at which CPT was performed (ft)
q_c: Measured cone resistance (tsf)
f_s: Sleeve friction resistance (tsf)
u: Pore pressure (tsf)
Fines content: Percentage of fines in soil (%)
Unit weight: Bulk soil unit weight (pcf)

Geotechnologies, Inc.

Project: TF Broadway, LP
File No.: 21545
Description: Liquefaction Analysis (2% Exceedance in 50 Years)
Boring No: 4

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	6.9
Peak Ground Horizontal Acceleration, PGA (g):	0.97
Calculated Mag.Wtg.Factor:	1.171

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	48.0
Historically Highest Groundwater Level* (ft):	20.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y

LIQUEFACTION BOUNDARY:

Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vertical Stress σ_{vo} (psf)	Effective Vert. Stress σ_{vo}' (psf)	Fines Corrected $(N_1)_{60\text{-}cs}$	Stress Reduction Coeff, r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS (inches)
1	125.8	Unsaturated	Unsaturated	11	5	0.0	0	125.8	125.8	24.2	1.00	0.633	0.351	Non-Liq.	0.00
2	125.8	Unsaturated	Unsaturated	11	5	0.0	0	251.6	251.6	24.2	1.00	0.631	0.351	Non-Liq.	0.00
3	125.8	Unsaturated	Unsaturated	11	5	0.0	0	377.4	377.4	24.2	1.00	0.629	0.351	Non-Liq.	0.00
4	125.8	Unsaturated	Unsaturated	11	5	0.0	0	503.2	503.2	24.2	0.99	0.627	0.351	Non-Liq.	0.00
5	125.8	Unsaturated	Unsaturated	11	5	0.0	0	629.0	629.0	25.0	0.99	0.625	0.372	Non-Liq.	0.00
6	125.8	Unsaturated	Unsaturated	11	5	0.0	0	754.8	754.8	23.5	0.99	0.623	0.332	Non-Liq.	0.00
7	125.8	Unsaturated	Unsaturated	11	5	0.0	0	880.6	880.6	22.0	0.98	0.620	0.300	Non-Liq.	0.00
8	129.7	Unsaturated	Unsaturated	11	5	0.0	0	1010.3	1010.3	20.7	0.98	0.618	0.276	Non-Liq.	0.00
9	129.7	Unsaturated	Unsaturated	11	5	0.0	0	1140.0	1140.0	20.8	0.98	0.616	0.275	Non-Liq.	0.00
10	129.7	Unsaturated	Unsaturated	12	10	0.0	0	1269.7	1269.7	21.7	0.97	0.613	0.287	Non-Liq.	0.00
11	129.7	Unsaturated	Unsaturated	12	10	0.0	0	1399.4	1399.4	20.7	0.97	0.610	0.266	Non-Liq.	0.00
12	129.7	Unsaturated	Unsaturated	12	10	0.0	0	1529.1	1529.1	19.8	0.96	0.608	0.249	Non-Liq.	0.00
13	130.6	Unsaturated	Unsaturated	36	15	0.0	0	1659.7	1659.7	60.9	0.96	0.605	2.000	Non-Liq.	0.00
14	130.6	Unsaturated	Unsaturated	36	15	0.0	0	1790.3	1790.3	59.7	0.95	0.602	2.000	Non-Liq.	0.00
15	130.6	Unsaturated	Unsaturated	36	15	0.0	0	1920.9	1920.9	65.5	0.95	0.599	2.000	Non-Liq.	0.00
16	130.6	Unsaturated	Unsaturated	36	15	0.0	0	2051.5	2051.5	64.4	0.95	0.596	2.000	Non-Liq.	0.00
17	130.6	Unsaturated	Unsaturated	36	15	0.0	0	2182.1	2182.1	63.3	0.94	0.593	2.000	Non-Liq.	0.00
18	137.8	Unsaturated	Unsaturated	36	15	0.0	0	2319.9	2319.9	62.3	0.94	0.590	2.000	Non-Liq.	0.00
19	137.8	Unsaturated	Unsaturated	36	15	0.0	0	2457.7	2457.7	61.4	0.93	0.587	2.000	Non-Liq.	0.00
20	137.8	Unsaturated	Unsaturated	30	20	0.0	0	2595.5	2595.5	50.4	0.93	0.584	2.000	Non-Liq.	0.00
21	137.8	Unsaturated	Saturated	30	20	0.0	0	2733.3	2670.9	49.7	0.92	0.594	2.000	3.4	0.00
22	137.8	Unsaturated	Saturated	30	20	0.0	0	2871.1	2746.3	49.1	0.92	0.603	2.000	3.3	0.00
23	137.8	Unsaturated	Saturated	30	20	0.0	0	3008.9	2821.7	48.5	0.91	0.612	2.000	3.3	0.00
24	137.8	Unsaturated	Saturated	30	20	0.0	0	3146.7	2897.1	47.9	0.90	0.620	2.000	3.2	0.00
25	137.8	Unsaturated	Saturated	21	25	30.6	0	3284.5	2972.5	35.6	0.90	0.627	1.300	2.1	0.00
26	137.8	Unsaturated	Saturated	21	25	30.6	0	3422.3	3047.9	35.0	0.89	0.633	1.133	1.8	0.00
27	137.8	Unsaturated	Saturated	21	25	30.6	0	3560.1	3123.3	34.4	0.89	0.639	1.001	1.6	0.00
28	136.4	Unsaturated	Saturated	21	25	30.6	0	3696.5	3197.3	35.9	0.88	0.644	1.334	2.1	0.00
29	136.4	Unsaturated	Saturated	21	25	30.6	0	3832.9	3271.3	35.3	0.88	0.648	1.174	1.8	0.00
30	136.4	Unsaturated	Saturated	32	30	0.0	0	3969.3	3345.3	50.6	0.87	0.652	1.906	2.9	0.00
31	136.4	Unsaturated	Saturated	32	30	0.0	0	4105.7	3419.3	50.2	0.87	0.656	1.882	2.9	0.00
32	136.4	Unsaturated	Saturated	32	30	0.0	0	4242.1	3493.3	49.8	0.86	0.659	1.860	2.8	0.00
33	126.6	Unsaturated	Saturated	32	30	0.0	0	4368.7	3557.5	49.4	0.85	0.662	1.839	2.8	0.00
34	126.6	Unsaturated	Saturated	32	30	0.0	0	4495.3	3621.7	49.0	0.85	0.665	1.820	2.7	0.00
35	126.6	Unsaturated	Saturated	32	35	0.0	0	4621.9	3685.9	48.6	0.84	0.667	1.801	2.7	0.00
36	126.6	Unsaturated	Saturated	32	35	0.0	0	4748.5	3750.1	48.3	0.84	0.669	1.782	2.7	0.00
37	126.6	Unsaturated	Saturated	32	35	0.0	0	4875.1	3814.3	48.0	0.83	0.670	1.764	2.6	0.00
38	128.5	Unsaturated	Saturated	23	40	73.6	0	5003.6	3880.4	35.2	0.83	0.672	1.052	1.6	0.00
39	128.5	Unsaturated	Saturated	23	40	73.6	0	5132.1	3946.5	34.8	0.82	0.673	0.965	1.4	0.00
40	128.5	Unsaturated	Saturated	23	40	73.6	0	5260.6	4012.6	34.4	0.81	0.673	0.890	1.3	0.00
41	128.5	Unsaturated	Saturated	23	40	73.6	0	5389.1	4078.7	34.1	0.81	0.674	0.825	1.2	0.00
42	128.5	Unsaturated	Saturated	23	40	73.6	0	5517.6	4144.8	33.7	0.80	0.674	0.768	1.1	0.00
43	124.4	Unsaturated	Saturated	13	45	88.1	27	5642.0	4206.8	18.1	0.80	0.674	0.190	Non-Liq.	0.00
44	124.4	Unsaturated	Saturated	13	45	88.1	27	5766.4	4268.8	17.9	0.79	0.674	0.188	Non-Liq.	0.00
45	124.4	Unsaturated	Saturated	13	45	88.1	27	5890.8	4330.8	17.7	0.79	0.674	0.185	Non-Liq.	0.00
46	124.4	Unsaturated	Saturated	13	45	88.1	27	6015.2	4392.8	17.6	0.78	0.673	0.183	Non-Liq.	0.00
47	124.4	Unsaturated	Saturated	13	45	88.1	27	6139.6	4454.8	17.4	0.77	0.673	0.181	Non-Liq.	0.00
48	127.1	Unsaturated	Saturated	13	45	88.1	27	6266.7	4519.5	17.3	0.77	0.672	0.180	Non-Liq.	0.00
49	127.1	Saturated	Saturated	13	45	88.1	27	6393.8	4584.2	17.2	0.76	0.671	0.179	Non-Liq	0.00
50	127.1	Saturated	Saturated	16	50	78.9	10	6520.9	4648.9	20.8	0.76	0.670	0.215	0.3	0.27
51	127.1	Saturated	Saturated	16	50	78.9	10	6648.0	4713.6	20.7	0.75	0.668	0.213	0.3	0.27
52	127.1	Saturated	Saturated	16	50	78.9	10	6775.1	4778.3	20.6	0.75	0.667	0.212	0.3	0.27
53	127.7	Saturated	Saturated	16	50	78.9	10	6902.8	4843.6	20.5	0.74	0.665	0.210	0.3	0.27
54	127.7	Saturated	Saturated	16	50	78.9	10	7030.5	4908.9	20.4	0.73	0.664	0.209	0.3	0.27
55	115.4	Saturated	Saturated	14	55	92.2	9	7145.9	4961.9	17.9	0.73	0.662	0.183	0.3	0.30
56	115.4	Saturated	Saturated	14	55	92.2	9	7261.3	5014.9	17.8	0.72	0.661	0.182	0.3	0.30
57	115.4	Saturated	Saturated	14	55	92.2	9	7376.7	5067.9	17.7	0.72	0.660	0.182	0.3	0.30
58	115.4	Saturated	Saturated	14	55	92.2	9	7492.1	5120.9	17.7	0.71	0.658	0.181	0.3	0.31
59	115.4	Saturated	Saturated	14	55	92.2	9	7607.5	5173.9	17.6	0.71	0.657	0.180	0.3	0.31
60	115.4	Saturated	Saturated	32	60	0.0	0	7722.9	5226.9	42.7	0.70	0.655	1.516	2.3	0.00
61	115.4	Saturated	Saturated	32	60	0.0	0	7838.3	5279.9	42.5	0.70	0.653	1.511	2.3	0.00
62	115.4	Saturated	Saturated	32	60	0.0	0	7953.7	5332.9	42.4	0.69	0.652	1.506	2.3	0.00
63	132.9	Saturated	Saturated	70	65	0.0	0	8086.6	5403.4	94.9	0.69	0.649	1.499	2.3	0.00
64	132.9	Saturated	Saturated	70	65	0.0	0	8219.5	5473.9	94.6	0.68	0.647	1.492	2.3	0.00
65	132.9	Saturated	Saturated	70	65	0.0	0	8352.4	5544.4	94.4	0.68	0.644	1.485	2.3	0.00
66	132.9	Saturated	Saturated	70	65	0.0	0	8485.3	5614.9	94.1	0.67	0.642	1.479	2.3	0.00
67	132.9	Saturated	Saturated	70	65	0.0	0	8618.2	5685.4	93.9	0.67	0.639	1.472	2.3	0.00
68	134.9	Saturated	Saturated	70	65	0.0	0	8753.1	5757.9	93.7	0.66	0.636	1.465	2.3	0.00
69	134.9	Saturated	Saturated	70	65	0.0	0	8888.0	5830.4	93.4	0.66	0.634	1.459	2.3	0.00
70	134.9	Saturated	Saturated	45	70	0.0	0	9022.9	5902.9	59.9	0.65	0.631	1.452	2.3	0.00
71	134.9	Saturated	Saturated	45	70	0.0	0	9157.8	5975.4	59.8	0.65	0.628	1.446	2.3	0.00
72	134.9	Saturated	Saturated	45	70	0.0	0	9292.7	6047.9	59.6	0.65	0.626	1.439	2.3	0.00
73	136.6	Saturated	Saturated	45	70	0.0	0	9429.3	6122.1	59.5	0.64	0.623	1.433	2.3	0.00
74	136.6	Saturated	Saturated	45	70	0.0	0	9565.9	6196.3	59.3	0.64	0.620	1.426	2.3	0.00
75	136.6	Saturated	Saturated	50	75	0.0	0	9702.5	6270.5	65.8	0.63	0.618	1.420	2.3	0.00
76	136.6	Saturated	Saturated	50	75	0.0	0	9839.1	6344.7	65.6	0.63	0.615	1.413	2.3	0.00
77	136.6	Saturated	Saturated	50	75	0.0	0	9975.7	6418.9	65.4	0.63	0.613	1.407	2.3	0.00
78	130.4	Saturated	Saturated	50	75	0.0	0	10106.1	6486.9	65.3	0.62	0.610	1.401	2.3	0.00
79	130.4	Saturated	Saturated	50	75	0.0	0	10236.5	6554.9	65.2	0.62	0.608	1.396	2.3	0.00
80	130.4	Saturated	Saturated	37	80	0.0	0	10366.9	6622.9	48.1	0.61	0.606	1.390	2.3	0.00
81	130.4	Saturated	Saturated	37	80	0.0	0	10497.3	6690.9	48.0	0.61	0.603	1.384	2.3	0.00
82	130.4	Saturated	Saturated	37	80	0.0	0	10627.7	6758.9	47.9	0.61	0.601	1.379	2.3	0.00
83	133.4	Saturated	Saturated	37	80	0.0	0	10761.1	6829.9	47.8	0.60	0.599	1.373	2.3	0.00
84	133.4	Saturated	Saturated	37	80	0.0	0	10894.5	6900.9	47.7	0.60	0.597	1.367	2.3	0.00
85	133.4	Saturated	Saturated	67	85	0.0	0	11027.9	6971.9	86.2	0.60	0.595	1.362	2.3	0.00
86	133.4	Saturated	Saturated	67	85	0.0	0	11161.3	7042.9	86.0	0.59	0.593	1.356	2.3	0.00
87	133.4	Saturated	Saturated	67	85	0.0	0	11294.7	7113.9	85.8	0.59	0.591	1.351	2.3	0.00
88	147.9	Saturated	Saturated	67	85	0.0	0	11442.6	7199.4	85.6	0.59	0.588	1.344	2.3	0.00
89	147.9	Saturated	Saturated	67	85	0.0	0	11590.5	7284.9	85.4	0.58	0.586	1.337	2.3	0.00
90	147.9	Saturated	Saturated	50	90	0.0	0	11738.4	7370.4	63.6	0.58	0.584	1.331	2.3	0.00

Total Liquefaction Settlement, S = 2.87 inches

Geotechnologies, Inc.

Project: TF Broadway, LP
File No.: 21545
Description: Liquefaction Analysis (10% Exceedance in 50 Years)
Boring No: 4

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	6.9
Peak Ground Horizontal Acceleration, PGA (g):	0.65
Calculated Mag.Wtg.Factor:	1.171

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	48.0
Historically Highest Groundwater Level* (ft):	20.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y

LIQUEFACTION BOUNDARY:

Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.1

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{vc}, (psf)	Effective Vert. Stress σ_{vc}', (psf)	Fines Corrected $(N_1)_{60-cs}$	Stress Reduction Coeff. r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	125.8	Unsaturated	Unsaturated	11	5	0.0	0	125.8	125.8	24.2	1.00	0.424	0.351	Non-Liq.	0.00
2	125.8	Unsaturated	Unsaturated	11	5	0.0	0	251.6	251.6	24.2	1.00	0.423	0.351	Non-Liq.	0.00
3	125.8	Unsaturated	Unsaturated	11	5	0.0	0	377.4	377.4	24.2	1.00	0.422	0.351	Non-Liq.	0.00
4	125.8	Unsaturated	Unsaturated	11	5	0.0	0	503.2	503.2	24.2	0.99	0.420	0.351	Non-Liq.	0.00
5	125.8	Unsaturated	Unsaturated	11	5	0.0	0	629.0	629.0	25.0	0.99	0.419	0.372	Non-Liq.	0.00
6	125.8	Unsaturated	Unsaturated	11	5	0.0	0	754.8	754.8	23.5	0.99	0.417	0.332	Non-Liq.	0.00
7	125.8	Unsaturated	Unsaturated	11	5	0.0	0	880.6	880.6	22.0	0.98	0.416	0.300	Non-Liq.	0.00
8	129.7	Unsaturated	Unsaturated	11	5	0.0	0	1010.3	1010.3	20.7	0.98	0.414	0.276	Non-Liq.	0.00
9	129.7	Unsaturated	Unsaturated	11	5	0.0	0	1140.0	1140.0	20.8	0.98	0.412	0.275	Non-Liq.	0.00
10	129.7	Unsaturated	Unsaturated	12	10	0.0	0	1269.7	1269.7	21.7	0.97	0.411	0.287	Non-Liq.	0.00
11	129.7	Unsaturated	Unsaturated	12	10	0.0	0	1399.4	1399.4	20.7	0.97	0.409	0.266	Non-Liq.	0.00
12	129.7	Unsaturated	Unsaturated	12	10	0.0	0	1529.1	1529.1	19.8	0.96	0.407	0.249	Non-Liq.	0.00
13	130.6	Unsaturated	Unsaturated	36	15	0.0	0	1659.7	1659.7	60.9	0.96	0.405	2.000	Non-Liq.	0.00
14	130.6	Unsaturated	Unsaturated	36	15	0.0	0	1790.3	1790.3	59.7	0.95	0.403	2.000	Non-Liq.	0.00
15	130.6	Unsaturated	Unsaturated	36	15	0.0	0	1920.9	1920.9	65.5	0.95	0.401	2.000	Non-Liq.	0.00
16	130.6	Unsaturated	Unsaturated	36	15	0.0	0	2051.5	2051.5	64.4	0.95	0.399	2.000	Non-Liq.	0.00
17	130.6	Unsaturated	Unsaturated	36	15	0.0	0	2182.1	2182.1	63.3	0.94	0.397	2.000	Non-Liq.	0.00
18	137.8	Unsaturated	Unsaturated	36	15	0.0	0	2319.9	2319.9	62.3	0.94	0.395	2.000	Non-Liq.	0.00
19	137.8	Unsaturated	Unsaturated	36	15	0.0	0	2457.7	2457.7	61.4	0.93	0.393	2.000	Non-Liq.	0.00
20	137.8	Unsaturated	Unsaturated	30	20	0.0	0	2595.5	2595.5	50.4	0.93	0.391	2.000	Non-Liq.	0.00
21	137.8	Unsaturated	Saturated	30	20	0.0	0	2733.3	2670.9	49.7	0.92	0.398	2.000	5.0	0.00
22	137.8	Unsaturated	Saturated	30	20	0.0	0	2871.1	2746.3	49.1	0.92	0.404	2.000	4.9	0.00
23	137.8	Unsaturated	Saturated	30	20	0.0	0	3008.9	2821.7	48.5	0.91	0.410	2.000	4.9	0.00
24	137.8	Unsaturated	Saturated	30	20	0.0	0	3146.7	2897.1	47.9	0.90	0.415	2.000	4.8	0.00
25	137.8	Unsaturated	Saturated	21	25	30.6	0	3284.5	2972.5	35.6	0.90	0.420	1.300	3.1	0.00
26	137.8	Unsaturated	Saturated	21	25	30.6	0	3422.3	3047.9	35.0	0.89	0.424	1.133	2.7	0.00
27	137.8	Unsaturated	Saturated	21	25	30.6	0	3560.1	3123.3	34.4	0.89	0.428	1.001	2.3	0.00
28	136.4	Unsaturated	Saturated	21	25	30.6	0	3696.5	3197.3	35.9	0.88	0.431	1.334	3.1	0.00
29	136.4	Unsaturated	Saturated	21	25	30.6	0	3832.9	3271.3	35.3	0.88	0.434	1.174	2.7	0.00
30	136.4	Unsaturated	Saturated	32	30	0.0	0	3969.3	3345.3	50.6	0.87	0.437	1.906	4.4	0.00
31	136.4	Unsaturated	Saturated	32	30	0.0	0	4105.7	3419.3	50.2	0.87	0.439	1.882	4.3	0.00
32	136.4	Unsaturated	Saturated	32	30	0.0	0	4242.1	3493.3	49.8	0.86	0.442	1.860	4.2	0.00
33	126.6	Unsaturated	Saturated	32	30	0.0	0	4368.7	3557.5	49.4	0.85	0.444	1.839	4.1	0.00
34	126.6	Unsaturated	Saturated	32	30	0.0	0	4495.3	3621.7	49.0	0.85	0.445	1.820	4.1	0.00
35	126.6	Unsaturated	Saturated	32	35	0.0	0	4621.9	3685.9	48.6	0.84	0.447	1.801	4.0	0.00
36	126.6	Unsaturated	Saturated	32	35	0.0	0	4748.5	3750.1	48.3	0.84	0.448	1.782	4.0	0.00
37	126.6	Unsaturated	Saturated	32	35	0.0	0	4875.1	3814.3	48.0	0.83	0.449	1.764	3.9	0.00
38	128.5	Unsaturated	Saturated	23	40	73.6	0	5003.6	3880.4	35.2	0.83	0.450	1.052	2.3	0.00
39	128.5	Unsaturated	Saturated	23	40	73.6	0	5132.1	3946.5	34.8	0.82	0.451	0.965	2.1	0.00
40	128.5	Unsaturated	Saturated	23	40	73.6	0	5260.6	4012.6	34.4	0.81	0.451	0.890	2.0	0.00
41	128.5	Unsaturated	Saturated	23	40	73.6	0	5389.1	4078.7	34.1	0.81	0.451	0.825	1.8	0.00
42	128.5	Unsaturated	Saturated	23	40	73.6	0	5517.6	4144.8	33.7	0.80	0.452	0.768	1.7	0.00
43	124.4	Unsaturated	Saturated	13	45	88.1	27	5642.0	4206.8	18.1	0.80	0.452	0.190	Non-Liq.	0.00
44	124.4	Unsaturated	Saturated	13	45	88.1	27	5766.4	4268.8	17.9	0.79	0.452	0.188	Non-Liq.	0.00
45	124.4	Unsaturated	Saturated	13	45	88.1	27	5890.8	4330.8	17.7	0.79	0.451	0.185	Non-Liq.	0.00
46	124.4	Unsaturated	Saturated	13	45	88.1	27	6015.2	4392.8	17.6	0.78	0.451	0.183	Non-Liq.	0.00
47	124.4	Unsaturated	Saturated	13	45	88.1	27	6139.6	4454.8	17.4	0.77	0.451	0.181	Non-Liq.	0.00
48	127.1	Unsaturated	Saturated	13	45	88.1	27	6266.7	4519.5	17.3	0.77	0.450	0.180	Non-Liq.	0.00
49	127.1	Saturated	Saturated	13	45	88.1	27	6393.8	4584.2	17.2	0.76	0.450	0.179	Non-Liq.	0.00
50	127.1	Saturated	Saturated	16	50	78.9	10	6520.9	4648.9	20.8	0.76	0.449	0.215	0.5	0.27
51	127.1	Saturated	Saturated	16	50	78.9	10	6648.0	4713.6	20.7	0.75	0.448	0.213	0.5	0.27
52	127.1	Saturated	Saturated	16	50	78.9	10	6775.1	4778.3	20.6	0.75	0.447	0.212	0.5	0.27
53	127.7	Saturated	Saturated	16	50	78.9	10	6902.8	4843.6	20.5	0.74	0.446	0.210	0.5	0.27
54	127.7	Saturated	Saturated	16	50	78.9	10	7030.5	4908.9	20.4	0.73	0.445	0.209	0.5	0.27
55	115.4	Saturated	Saturated	14	55	92.2	9	7145.9	4961.9	17.9	0.73	0.444	0.183	0.4	0.30
56	115.4	Saturated	Saturated	14	55	92.2	9	7261.3	5014.9	17.8	0.72	0.443	0.182	0.4	0.30
57	115.4	Saturated	Saturated	14	55	92.2	9	7376.7	5067.9	17.7	0.72	0.442	0.182	0.4	0.30
58	115.4	Saturated	Saturated	14	55	92.2	9	7492.1	5120.9	17.7	0.71	0.441	0.181	0.4	0.31
59	115.4	Saturated	Saturated	14	55	92.2	9	7607.5	5173.9	17.6	0.71	0.440	0.180	0.4	0.31
60	115.4	Saturated	Saturated	32	60	0.0	0	7722.9	5226.9	42.7	0.70	0.439	1.516	3.5	0.00
61	115.4	Saturated	Saturated	32	60	0.0	0	7838.3	5279.9	42.5	0.70	0.438	1.511	3.5	0.00
62	115.4	Saturated	Saturated	32	60	0.0	0	7953.7	5332.9	42.4	0.69	0.437	1.506	3.4	0.00
63	132.9	Saturated	Saturated	70	65	0.0	0	8086.6	5403.4	94.9	0.69	0.435	1.499	3.4	0.00
64	132.9	Saturated	Saturated	70	65	0.0	0	8219.5	5473.9	94.6	0.68	0.433	1.492	3.4	0.00
65	132.9	Saturated	Saturated	70	65	0.0	0	8352.4	5544.4	94.4	0.68	0.432	1.485	3.4	0.00
66	132.9	Saturated	Saturated	70	65	0.0	0	8485.3	5614.9	94.1	0.67	0.430	1.479	3.4	0.00
67	132.9	Saturated	Saturated	70	65	0.0	0	8618.2	5685.4	93.9	0.67	0.428	1.472	3.4	0.00
68	134.9	Saturated	Saturated	70	65	0.0	0	8753.1	5757.9	93.7	0.66	0.426	1.465	3.4	0.00
69	134.9	Saturated	Saturated	70	65	0.0	0	8888.0	5830.4	93.4	0.66	0.425	1.459	3.4	0.00
70	134.9	Saturated	Saturated	45	70	0.0	0	9022.9	5902.9	59.9	0.65	0.423	1.452	3.4	0.00
71	134.9	Saturated	Saturated	45	70	0.0	0	9157.8	5975.4	59.8	0.65	0.421	1.446	3.4	0.00
72	134.9	Saturated	Saturated	45	70	0.0	0	9292.7	6047.9	59.6	0.65	0.419	1.439	3.4	0.00
73	136.6	Saturated	Saturated	45	70	0.0	0	9429.3	6122.1	59.5	0.64	0.417	1.433	3.4	0.00
74	136.6	Saturated	Saturated	45	70	0.0	0	9565.9	6196.3	59.3	0.64	0.416	1.426	3.4	0.00
75	136.6	Saturated	Saturated	50	75	0.0	0	9702.5	6270.5	65.8	0.63	0.414	1.420	3.4	0.00
76	136.6	Saturated	Saturated	50	75	0.0	0	9839.1	6344.7	65.6	0.63	0.412	1.413	3.4	0.00
77	136.6	Saturated	Saturated	50	75	0.0	0	9975.7	6418.9	65.4	0.63	0.410	1.407	3.4	0.00
78	130.4	Saturated	Saturated	50	75	0.0	0	10106.1	6486.9	65.3	0.62	0.409	1.401	3.4	0.00
79	130.4	Saturated	Saturated	50	75	0.0	0	10236.5	6554.9	65.2	0.62	0.407	1.396	3.4	0.00
80	130.4	Saturated	Saturated	37	80	0.0	0	10366.9	6622.9	48.1	0.61	0.406	1.390	3.4	0.00
81	130.4	Saturated	Saturated	37	80	0.0	0	10497.3	6690.9	48.0	0.61	0.404	1.384	3.4	0.00
82	130.4	Saturated	Saturated	37	80	0.0	0	10627.7	6758.9	47.9	0.61	0.403	1.379	3.4	0.00
83	133.4	Saturated	Saturated	37	80	0.0	0	10761.1	6829.9	47.8	0.60	0.401	1.373	3.4	0.00
84	133.4	Saturated	Saturated	37	80	0.0	0	10894.5	6900.9	47.7	0.60	0.400	1.367	3.4	0.00
85	133.4	Saturated	Saturated	67	85	0.0	0	11027.9	6971.9	86.2	0.60	0.399	1.362	3.4	0.00
86	133.4	Saturated	Saturated	67	85	0.0	0	11161.3	7042.9	86.0	0.59	0.397	1.356	3.4	0.00
87	133.4	Saturated	Saturated	67	85	0.0	0	11294.7	7113.9	85.8	0.59	0.396	1.351	3.4	0.00
88	147.9	Saturated	Saturated	67	85	0.0	0	11442.6	7199.4	85.6	0.59	0.394	1.344	3.4	0.00
89	147.9	Saturated	Saturated	67	85	0.0	0	11590.5	7284.9	85.4	0.58	0.393	1.337	3.4	0.00
90	147.9	Saturated	Saturated	50	90	0.0	0	11738.4	7370.4	63.6	0.58	0.391	1.331	3.4	0.00

Total Liquefaction Settlement, S = 2.87 inches

Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Liquefaction Analysis 2% Probability of Exceedance in 50 years
Boring Number 5

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	6.9
Peak Ground Horizontal Acceleration, PGA (g):	0.97
Calculated Mag.Wtg.Factor:	1.171

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	45.0
Historically Highest Groundwater Level* (ft):	20.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y

LIQUEFACTION BOUNDARY:

Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.3

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{vc}, (psf)	Effective Vert. Stress σ_{vc}', (psf)	Fines Corrected $(N_1)_{60-cs}$	Stress Reduction Coeff, r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	115.4	Unsaturated	Unsaturated	9	5	0.0	0	115.4	115.4	19.2	1.00	0.633	0.253	Non-Liq.	0.00
2	115.4	Unsaturated	Unsaturated	9	5	0.0	0	230.8	230.8	19.2	1.00	0.631	0.253	Non-Liq.	0.00
3	115.4	Unsaturated	Unsaturated	9	5	0.0	0	346.2	346.2	19.2	1.00	0.629	0.253	Non-Liq.	0.00
4	115.4	Unsaturated	Unsaturated	9	5	0.0	0	461.6	461.6	19.2	0.99	0.627	0.253	Non-Liq.	0.00
5	115.4	Unsaturated	Unsaturated	9	5	0.0	0	577.0	577.0	20.7	0.99	0.625	0.276	Non-Liq.	0.00
6	115.4	Unsaturated	Unsaturated	9	5	0.0	0	692.4	692.4	20.7	0.99	0.623	0.276	Non-Liq.	0.00
7	115.4	Unsaturated	Unsaturated	9	5	0.0	0	807.8	807.8	20.0	0.98	0.620	0.265	Non-Liq.	0.00
8	115.4	Unsaturated	Unsaturated	9	5	0.0	0	923.2	923.2	18.5	0.98	0.618	0.243	Non-Liq.	0.00
9	115.4	Unsaturated	Unsaturated	9	5	0.0	0	1038.6	1038.6	18.3	0.98	0.616	0.239	Non-Liq.	0.00
10	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1159.2	1159.2	96.7	0.97	0.613	2.000	Non-Liq.	0.00
11	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1279.8	1279.8	94.2	0.97	0.610	2.000	Non-Liq.	0.00
12	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1400.4	1400.4	92.0	0.96	0.608	2.000	Non-Liq.	0.00
13	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1521.0	1521.0	90.0	0.96	0.605	2.000	Non-Liq.	0.00
14	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1641.6	1641.6	88.2	0.95	0.602	2.000	Non-Liq.	0.00
15	126.7	Unsaturated	Unsaturated	54	15	0.0	0	1768.3	1768.3	100.4	0.95	0.599	2.000	Non-Liq.	0.00
16	126.7	Unsaturated	Unsaturated	54	15	0.0	0	1895.0	1895.0	98.6	0.95	0.596	2.000	Non-Liq.	0.00
17	126.7	Unsaturated	Unsaturated	54	15	0.0	0	2021.7	2021.7	96.9	0.94	0.593	2.000	Non-Liq.	0.00
18	126.7	Unsaturated	Unsaturated	54	15	0.0	0	2148.4	2148.4	95.4	0.94	0.590	2.000	Non-Liq.	0.00
19	126.7	Unsaturated	Unsaturated	54	15	0.0	0	2275.1	2275.1	94.0	0.93	0.587	2.000	Non-Liq.	0.00
20	105.6	Unsaturated	Unsaturated	100	20	0.0	0	2380.7	2380.7	172.0	0.93	0.584	2.000	Non-Liq.	0.00
21	105.6	Unsaturated	Saturated	100	20	0.0	0	2486.3	2423.9	171.2	0.92	0.595	2.000	3.4	0.00
22	105.6	Unsaturated	Saturated	100	20	0.0	0	2591.9	2467.1	170.4	0.92	0.606	2.000	3.3	0.00
23	105.6	Unsaturated	Saturated	100	20	0.0	0	2697.5	2510.3	169.6	0.91	0.617	2.000	3.2	0.00
24	105.6	Unsaturated	Saturated	100	20	0.0	0	2803.1	2553.5	168.8	0.90	0.626	2.000	3.2	0.00
25	105.6	Unsaturated	Saturated	31	25	0.0	0	2908.7	2596.7	52.1	0.90	0.635	2.000	3.1	0.00
26	105.6	Unsaturated	Saturated	31	25	0.0	0	3014.3	2639.9	51.9	0.89	0.644	2.000	3.1	0.00
27	105.6	Unsaturated	Saturated	31	25	0.0	0	3119.9	2683.1	51.7	0.89	0.652	2.000	3.1	0.00
28	105.6	Unsaturated	Saturated	31	25	0.0	0	3225.5	2726.3	54.2	0.88	0.659	2.000	3.0	0.00
29	105.6	Unsaturated	Saturated	31	25	0.0	0	3331.1	2769.5	53.9	0.88	0.666	2.000	3.0	0.00
30	105.6	Unsaturated	Saturated	58	30	0.0	0	3436.7	2812.7	100.5	0.87	0.672	2.000	3.0	0.00
31	105.6	Unsaturated	Saturated	58	30	0.0	0	3542.3	2855.9	100.1	0.87	0.677	2.000	3.0	0.00
32	105.6	Unsaturated	Saturated	58	30	0.0	0	3647.9	2899.1	99.7	0.86	0.683	2.000	2.9	0.00
33	105.6	Unsaturated	Saturated	58	30	0.0	0	3753.5	2942.3	99.3	0.85	0.688	2.000	2.9	0.00
34	105.6	Unsaturated	Saturated	58	30	0.0	0	3859.1	2985.5	98.9	0.85	0.692	2.000	2.9	0.00
35	125.3	Unsaturated	Saturated	65	35	0.0	0	3984.4	3048.4	110.3	0.84	0.695	2.000	2.9	0.00
36	125.3	Unsaturated	Saturated	65	35	0.0	0	4109.7	3111.3	109.7	0.84	0.698	2.000	2.9	0.00
37	125.3	Unsaturated	Saturated	65	35	0.0	0	4235.0	3174.2	109.1	0.83	0.700	2.000	2.9	0.00
38	126.3	Unsaturated	Saturated	73	40	0.0	0	4361.3	3238.1	121.9	0.83	0.702	2.000	2.9	0.00
39	126.3	Unsaturated	Saturated	73	40	0.0	0	4487.6	3302.0	121.2	0.82	0.703	2.000	2.8	0.00
40	126.3	Unsaturated	Saturated	73	40	0.0	0	4613.9	3365.9	120.6	0.81	0.704	2.000	2.8	0.00
41	126.3	Unsaturated	Saturated	45	45	0.0	0	4740.2	3429.8	74.0	0.81	0.705	2.000	2.8	0.00
42	126.3	Unsaturated	Saturated	45	45	0.0	0	4866.5	3493.7	73.6	0.80	0.705	1.994	2.8	0.00
43	126.3	Unsaturated	Saturated	45	45	0.0	0	4992.8	3557.6	73.3	0.80	0.705	1.981	2.8	0.00
44	126.3	Unsaturated	Saturated	45	45	0.0	0	5119.1	3621.5	72.9	0.79	0.705	1.969	2.8	0.00
45	126.3	Unsaturated	Saturated	45	45	0.0	0	5245.4	3685.4	72.6	0.79	0.705	1.957	2.8	0.00
46	126.3	Saturated	Saturated	45	45	0.0	0	5371.7	3749.3	72.3	0.78	0.704	1.945	2.8	0.00
47	126.3	Saturated	Saturated	45	45	0.0	0	5498.0	3813.2	72.0	0.77	0.704	1.934	2.7	0.00
48	98.3	Saturated	Saturated	45	45	0.0	0	5596.3	3849.1	71.8	0.77	0.704	1.927	2.7	0.00
49	98.3	Saturated	Saturated	45	45	0.0	0	5694.6	3885.0	71.6	0.76	0.705	1.921	2.7	0.00
50	98.3	Saturated	Saturated	35	50	0.0	0	5792.9	3920.9	55.6	0.76	0.705	1.914	2.7	0.00
51	98.3	Saturated	Saturated	35	50	0.0	0	5891.2	3956.8	55.4	0.75	0.706	1.908	2.7	0.00
52	88.6	Saturated	Saturated	35	50	0.0	0	5979.8	3983.0	55.3	0.75	0.706	1.903	2.7	0.00
53	88.6	Saturated	Saturated	35	50	0.0	0	6068.4	4009.2	55.2	0.74	0.707	1.899	2.7	0.00
54	88.6	Saturated	Saturated	35	50	0.0	0	6157.0	4035.4	55.1	0.73	0.707	1.894	2.7	0.00
55	88.6	Saturated	Saturated	40	55	0.0	0	6245.6	4061.6	62.9	0.73	0.707	1.890	2.7	0.00
56	88.6	Saturated	Saturated	40	55	0.0	0	6334.2	4087.8	62.8	0.72	0.707	1.885	2.7	0.00
57	96.1	Saturated	Saturated	40	55	0.0	0	6430.3	4121.5	62.7	0.72	0.707	1.880	2.7	0.00
58	96.1	Saturated	Saturated	40	55	0.0	0	6526.4	4155.2	62.5	0.71	0.707	1.874	2.7	0.00
59	96.1	Saturated	Saturated	40	55	0.0	0	6622.5	4188.9	62.4	0.71	0.706	1.869	2.6	0.00
60	96.1	Saturated	Saturated	58	60	0.0	0	6718.6	4222.6	90.3	0.70	0.705	1.863	2.6	0.00
61	96.1	Saturated	Saturated	58	60	0.0	0	6814.7	4256.3	90.1	0.70	0.705	1.858	2.6	0.00
62	96.1	Saturated	Saturated	58	60	0.0	0	6910.8	4290.0	89.9	0.69	0.704	1.852	2.6	0.00
63	113.5	Saturated	Saturated	43	65	0.0	0	7024.3	4341.1	66.5	0.69	0.702	1.844	2.6	0.00
64	113.5	Saturated	Saturated	43	65	0.0	0	7137.8	4392.2	66.3	0.68	0.700	1.836	2.6	0.00
65	113.5	Saturated	Saturated	43	65	0.0	0	7251.3	4443.3	66.1	0.68	0.698	1.828	2.6	0.00
66	113.5	Saturated	Saturated	43	65	0.0	0	7364.8	4494.4	65.9	0.67	0.696	1.820	2.6	0.00
67	103.9	Saturated	Saturated	43	65	0.0	0	7468.7	4535.9	65.7	0.67	0.694	1.814	2.6	0.00
68	103.9	Saturated	Saturated	43	65	0.0	0	7572.6	4577.4	65.5	0.66	0.692	1.807	2.6	0.00
69	103.9	Saturated	Saturated	43	65	0.0	0	7676.5	4618.9	65.4	0.66	0.691	1.801	2.6	0.00
70	103.9	Saturated	Saturated	100	70	0.0	0	7780.4	4660.4	151.7	0.65	0.689	1.795	2.6	0.00
71	103.9	Saturated	Saturated	100	70	0.0	0	7988.2	4805.8	150.5	0.65	0.681	1.774	2.6	0.00
72	122.7	Saturated	Saturated	100	70	0.0	0	8110.9	4866.1	150.0	0.65	0.679	1.765	2.6	0.00
73	122.7	Saturated	Saturated	100	70	0.0	0	8233.6	4926.4	149.5	0.64	0.676	1.756	2.6	0.00
74	122.7	Saturated	Saturated	100	70	0.0	0	8356.3	4986.7	149.0	0.64	0.673	1.748	2.6	0.00
75	122.7	Saturated	Saturated	85	75	0.0	0	8479.0	5047.0	126.3	0.63	0.671	1.740	2.6	0.00
76	122.7	Saturated	Saturated	85	75	0.0	0	8601.7	5107.3	125.9	0.63	0.668	1.732	2.6	0.00
77	122.7	Saturated	Saturated	85	75	0.0	0	8724.4	5167.6	125.5	0.63	0.665	1.723	2.6	0.00
78	118.5	Saturated	Saturated	85	75	0.0	0	8842.9	5223.7	125.1	0.62	0.663	1.716	2.6	0.00
79	118.5	Saturated	Saturated	85	75	0.0	0	8961.4	5279.8	124.8	0.62	0.661	1.709	2.6	0.00
80	118.5	Saturated	Saturated	75	80	0.0	0	9079.9	5335.9	109.8	0.61	0.658	1.701	2.6	0.00
81	118.5	Saturated	Saturated	75	80	0.0	0	9198.4	5392.0	109.5	0.61	0.656	1.694	2.6	0.00
82	118.5	Saturated	Saturated	75	80	0.0	0	9316.9	5448.1	109.2	0.61	0.654	1.687	2.6	0.00
83	129.5	Saturated	Saturated	82	85	0.0	0	9446.4	5515.2	119.0	0.60	0.651	1.678	2.6	0.00
84	129.5	Saturated	Saturated	82	85	0.0	0	9575.9	5582.3	118.6	0.60	0.649	1.670	2.6	0.00
85	129.5	Saturated	Saturated	82	85	0.0	0	9705.4	5649.4	118.2	0.60	0.646	1.662	2.6	0.00
86	129.5	Saturated	Saturated	82	85	0.0	0	9834.9	5716.5	117.9	0.59	0.643	1.654	2.6	0.00
87	118.7	Saturated	Saturated	82	85	0.0	0	9953.6	5772.8	117.6	0.59	0.641	1.647	2.6	0.00
88	118.7	Saturated	Saturated	82	85	0.0	0	10072.3	5829.1	117.3	0.59	0.639	1.640	2.6	0.00
89	118.7	Saturated	Saturated	82	85	0.0	0	10191.0	5885.4	117.0	0.58	0.638	1.633	2.6	0.00
90	118.7	Saturated	Saturated	100	90	0.0	0	10309.7	5941.7	142.3	0.58	0.636	1.627	2.6	0.00
91	118.7	Saturated	Saturated	100	90	0.0	0	10428.4	5998.0	142.0	0.58	0.634	1.620	2.6	0.00
92	118.7	Saturated	Saturated	100	90	0.0	0	10547.1	6054.3	141.6	0.58	0.632	1.614	2.6	0.00
93	118.2	Saturated	Saturated	100	90	0.0	0	10665.3	6110.1	141.3	0.57	0.631	1.608	2.5	0.00
94	118.2	Saturated	Saturated	100	90	0.0	0	10783.5	6165.9	140.9	0.57	0.629	1.601	2.5	0.00
95	118.2	Saturated	Saturated	100	95	0.0	0	10901.7	6221.7	140.6	0.57	0.628	1.595	2.5	0.00
96	118.2	Saturated	Saturated	100	95	0.0	0	11019.9	6277.5	140.3	0.57	0.626	1.589	2.5	0.00
97	129.6	Saturated	Saturated	100	95	0.0	0	11149.5	6344.7	139.9	0.56	0.625	1.582	2.5	0.00
98	129.6	Saturated	Saturated	100	95	0.0	0	11279.1	6411.9	139.5	0.56	0.623	1.574	2.5	0.00
99	129.6	Saturated	Saturated	100	95	0.0	0	11408.7	6479.1	139.1	0.56	0.621	1.567	2.5	0.00
100	129.6	Saturated	Saturated	100	100	0.0	0	11538.3	6546.3	138.7	0.56	0.620	1.560	2.5	0.00
101	129.6	Saturated	Saturated	100	100	0.0	0	11667.9	6613.5	138.3	0.56	0.618	1.553	2.5	0.00
102	124.7	Saturated	Saturated	100	100	0.0	0	11792.6	6675.8	138.0	0.55	0.617	1.546	2.5	0.00
103	124.7	Saturated	Saturated	100	100	0.0	0	11917.3	6738.1	137.7	0.55	0.616	1.540	2.5	0.00
104	124.7	Saturated	Saturated	100	100	0.0	0	12042.0	6800.4	137.3	0.55	0.615	1.534	2.5	0.00
105	124.7	Saturated	Saturated	100	105	0.0	0	12166.7	6862.7	137.0	0.55	0.614	1.527	2.5	0.00
106	124.7	Saturated	Saturated	100	105	0.0	0	12291.4	6925.0	136.7	0.55	0.613	1.521	2.5	0.00
107	124.7	Saturated	Saturated	100	105	0.0	0	12416.1	6987.3	136.4	0.55	0.613	1.515	2.5	0.00
108	123.8	Saturated	Saturated	100	105	0.0	0	12539.9	7048.7	136.0	0.55	0.612	1.509	2.5	0.00
109	123.8	Saturated	Saturated	100	105	0.0	0	12663.7	7110.1	135.7	0.54	0.612	1.503	2.5	0.00
110	123.8	Saturated	Saturated	100	110	0.0	0	12787.5	7171.5	135.4	0.54	0.611	1.497	2.4	0.00
111	123.8	Saturated	Saturated	100	110	0.0	0	12911.3	7232.9	135.1	0.54	0.611	1.491	2.4	0.00
112	123.8	Saturated	Saturated	100	110	0.0	0	13035.1	7294.3	134.8	0.54	0.611	1.485	2.4	0.00
113	115.7	Saturated	Saturated	100	110	0.0	0	13150.8	7347.6	134.6	0.54	0.611	1.480	2.4	0.00
114	115.7	Saturated	Saturated	100	110	0.0	0	13266.5	7400.9	134.3	0.54	0.611	1.475	2.4	0.00
115	115.7	Saturated	Saturated	62	115	0.0	0	13382.2	7454.2	83.1	0.54	0.612	1.470	2.4	0.00
116	115.7	Saturated	Saturated	62	115	0.0	0	13497.9	7507.5	83.0	0.54	0.612	1.465	2.4	0.00
117	115.7	Saturated	Saturated	62	115	0.0	0	13613.6	7560.8	82.8	0.54	0.613	1.460	2.4	0.00
118	105.0	Saturated	Saturated	62	115	0.0	0	13718.6	7603.4	82.7	0.54	0.614	1.456	2.4	0.00
119	105.0	Saturated	Saturated	62	115	0.0	0	13823.6	7646.0	82.6	0.54	0.615	1.453	2.4	0.00
120	105.0	Saturated	Saturated	100	120	0.0	0	13928.6	7688.6	133.0	0.54	0.616	1.449	2.3	0.00
121	105.0	Saturated	Saturated	100	120	0.0	0	14033.6	7731.2	132.8	0.54	0.618	1.445	2.3	0.00
122	105.0	Saturated	Saturated	100	120	0.0	0	14138.6	7773.8	132.6	0.54	0.619	1.441	2.3	0.00
123	105.0	Saturated	Saturated	100	120	0.0	0	14243.6	7816.4	132.4	0.54	0.621	1.437	2.3	0.00
124	105.0	Saturated	Saturated	100	120	0.0	0	14348.6	7859.0	132.2	0.54	0.623	1.434	2.3	0.00
125	102.5	Saturated	Saturated	100	125	0.0	0	14451.1	7899.1	132.0	0.54	0.625	1.430	2.3	0.00

Total Liquefaction Settlement, S = 0.00 inches

Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Liquefaction Analysis 10% Probability of Exceedance in 50 years
Boring Number 5

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	6.9
Peak Ground Horizontal Acceleration, PGA (g):	0.65
Calculated Mag.Wtg.Factor:	1.171

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	45.0
Historically Highest Groundwater Level* (ft):	20.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y

LIQUEFACTION BOUNDARY:

Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.3

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{ve}, (psf)	Effective Vert. Stress σ_{ve}', (psf)	Fines Corrected $(N_1)_{60-cs}$	Stress Reduction Coeff. r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	115.4	Unsaturated	Unsaturated	9	5	0.0	0	115.4	115.4	19.2	1.00	0.424	0.253	Non-Liq.	0.00
2	115.4	Unsaturated	Unsaturated	9	5	0.0	0	230.8	230.8	19.2	1.00	0.423	0.253	Non-Liq.	0.00
3	115.4	Unsaturated	Unsaturated	9	5	0.0	0	346.2	346.2	19.2	1.00	0.422	0.253	Non-Liq.	0.00
4	115.4	Unsaturated	Unsaturated	9	5	0.0	0	461.6	461.6	19.2	0.99	0.420	0.253	Non-Liq.	0.00
5	115.4	Unsaturated	Unsaturated	9	5	0.0	0	577.0	577.0	20.7	0.99	0.419	0.276	Non-Liq.	0.00
6	115.4	Unsaturated	Unsaturated	9	5	0.0	0	692.4	692.4	20.7	0.99	0.417	0.276	Non-Liq.	0.00
7	115.4	Unsaturated	Unsaturated	9	5	0.0	0	807.8	807.8	20.0	0.98	0.416	0.265	Non-Liq.	0.00
8	115.4	Unsaturated	Unsaturated	9	5	0.0	0	923.2	923.2	18.5	0.98	0.414	0.243	Non-Liq.	0.00
9	115.4	Unsaturated	Unsaturated	9	5	0.0	0	1038.6	1038.6	18.3	0.98	0.412	0.239	Non-Liq.	0.00
10	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1159.2	1159.2	96.7	0.97	0.411	2.000	Non-Liq.	0.00
11	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1279.8	1279.8	94.2	0.97	0.409	2.000	Non-Liq.	0.00
12	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1400.4	1400.4	92.0	0.96	0.407	2.000	Non-Liq.	0.00
13	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1521.0	1521.0	90.0	0.96	0.405	2.000	Non-Liq.	0.00
14	120.6	Unsaturated	Unsaturated	52	10	0.0	0	1641.6	1641.6	88.2	0.95	0.403	2.000	Non-Liq.	0.00
15	126.7	Unsaturated	Unsaturated	54	15	0.0	0	1768.3	1768.3	100.4	0.95	0.401	2.000	Non-Liq.	0.00
16	126.7	Unsaturated	Unsaturated	54	15	0.0	0	1895.0	1895.0	98.6	0.95	0.399	2.000	Non-Liq.	0.00
17	126.7	Unsaturated	Unsaturated	54	15	0.0	0	2021.7	2021.7	96.9	0.94	0.397	2.000	Non-Liq.	0.00
18	126.7	Unsaturated	Unsaturated	54	15	0.0	0	2148.4	2148.4	95.4	0.94	0.395	2.000	Non-Liq.	0.00
19	126.7	Unsaturated	Unsaturated	54	15	0.0	0	2275.1	2275.1	94.0	0.93	0.393	2.000	Non-Liq.	0.00
20	105.6	Unsaturated	Unsaturated	100	20	0.0	0	2380.7	2380.7	172.0	0.93	0.391	2.000	Non-Liq.	0.00
21	105.6	Unsaturated	Saturated	100	20	0.0	0	2486.3	2423.9	171.2	0.92	0.399	2.000	5.0	0.00
22	105.6	Unsaturated	Saturated	100	20	0.0	0	2591.9	2467.1	170.4	0.92	0.406	2.000	4.9	0.00
23	105.6	Unsaturated	Saturated	100	20	0.0	0	2697.5	2510.3	169.6	0.91	0.413	2.000	4.8	0.00
24	105.6	Unsaturated	Saturated	100	20	0.0	0	2803.1	2553.5	168.8	0.90	0.420	2.000	4.8	0.00
25	105.6	Unsaturated	Saturated	31	25	0.0	0	2908.7	2596.7	52.1	0.90	0.426	2.000	4.7	0.00
26	105.6	Unsaturated	Saturated	31	25	0.0	0	3014.3	2639.9	51.9	0.89	0.431	2.000	4.6	0.00
27	105.6	Unsaturated	Saturated	31	25	0.0	0	3119.9	2683.1	51.7	0.89	0.437	2.000	4.6	0.00
28	105.6	Unsaturated	Saturated	31	25	0.0	0	3225.5	2726.3	54.2	0.88	0.441	2.000	4.5	0.00
29	105.6	Unsaturated	Saturated	31	25	0.0	0	3331.1	2769.5	53.9	0.88	0.446	2.000	4.5	0.00
30	105.6	Unsaturated	Saturated	58	30	0.0	0	3436.7	2812.7	100.5	0.87	0.450	2.000	4.4	0.00
31	105.6	Unsaturated	Saturated	58	30	0.0	0	3542.3	2855.9	100.1	0.87	0.454	2.000	4.4	0.00
32	105.6	Unsaturated	Saturated	58	30	0.0	0	3647.9	2899.1	99.7	0.86	0.458	2.000	4.4	0.00
33	105.6	Unsaturated	Saturated	58	30	0.0	0	3753.5	2942.3	99.3	0.85	0.461	2.000	4.3	0.00
34	105.6	Unsaturated	Saturated	58	30	0.0	0	3859.1	2985.5	98.9	0.85	0.464	2.000	4.3	0.00
35	125.3	Unsaturated	Saturated	65	35	0.0	0	3984.4	3048.4	110.3	0.84	0.466	2.000	4.3	0.00
36	125.3	Unsaturated	Saturated	65	35	0.0	0	4109.7	3111.3	109.7	0.84	0.467	2.000	4.3	0.00
37	125.3	Unsaturated	Saturated	65	35	0.0	0	4235.0	3174.2	109.1	0.83	0.469	2.000	4.3	0.00
38	126.3	Unsaturated	Saturated	73	40	0.0	0	4361.3	3238.1	121.9	0.83	0.470	2.000	4.3	0.00
39	126.3	Unsaturated	Saturated	73	40	0.0	0	4487.6	3302.0	121.2	0.82	0.471	2.000	4.2	0.00
40	126.3	Unsaturated	Saturated	73	40	0.0	0	4613.9	3365.9	120.6	0.81	0.472	2.000	4.2	0.00
41	126.3	Unsaturated	Saturated	45	45	0.0	0	4740.2	3429.8	74.0	0.81	0.472	2.000	4.2	0.00
42	126.3	Unsaturated	Saturated	45	45	0.0	0	4866.5	3493.7	73.6	0.80	0.473	1.994	4.2	0.00
43	126.3	Unsaturated	Saturated	45	45	0.0	0	4992.8	3557.6	73.3	0.80	0.473	1.981	4.2	0.00
44	126.3	Unsaturated	Saturated	45	45	0.0	0	5119.1	3621.5	72.9	0.79	0.473	1.969	4.2	0.00
45	126.3	Unsaturated	Saturated	45	45	0.0	0	5245.4	3685.4	72.6	0.79	0.472	1.957	4.1	0.00
46	126.3	Saturated	Saturated	45	45	0.0	0	5371.7	3749.3	72.3	0.78	0.472	1.945	4.1	0.00
47	126.3	Saturated	Saturated	45	45	0.0	0	5498.0	3813.2	72.0	0.77	0.472	1.934	4.1	0.00
48	98.3	Saturated	Saturated	45	45	0.0	0	5596.3	3849.1	71.8	0.77	0.472	1.927	4.1	0.00
49	98.3	Saturated	Saturated	45	45	0.0	0	5694.6	3885.0	71.6	0.76	0.472	1.921	4.1	0.00
50	98.3	Saturated	Saturated	35	50	0.0	0	5792.9	3920.9	55.6	0.76	0.473	1.914	4.1	0.00
51	98.3	Saturated	Saturated	35	50	0.0	0	5891.2	3956.8	55.4	0.75	0.473	1.908	4.0	0.00
52	88.6	Saturated	Saturated	35	50	0.0	0	5979.8	3983.0	55.3	0.75	0.473	1.903	4.0	0.00
53	88.6	Saturated	Saturated	35	50	0.0	0	6068.4	4009.2	55.2	0.74	0.474	1.899	4.0	0.00
54	88.6	Saturated	Saturated	35	50	0.0	0	6157.0	4035.4	55.1	0.73	0.474	1.894	4.0	0.00
55	88.6	Saturated	Saturated	40	55	0.0	0	6245.6	4061.6	62.9	0.73	0.474	1.890	4.0	0.00
56	88.6	Saturated	Saturated	40	55	0.0	0	6334.2	4087.8	62.8	0.72	0.474	1.885	4.0	0.00
57	96.1	Saturated	Saturated	40	55	0.0	0	6430.3	4121.5	62.7	0.72	0.474	1.880	4.0	0.00
58	96.1	Saturated	Saturated	40	55	0.0	0	6526.4	4155.2	62.5	0.71	0.474	1.874	4.0	0.00
59	96.1	Saturated	Saturated	40	55	0.0	0	6622.5	4188.9	62.4	0.71	0.473	1.869	3.9	0.00
60	96.1	Saturated	Saturated	58	60	0.0	0	6718.6	4222.6	90.3	0.70	0.473	1.863	3.9	0.00
61	96.1	Saturated	Saturated	58	60	0.0	0	6814.7	4256.3	90.1	0.70	0.472	1.858	3.9	0.00
62	96.1	Saturated	Saturated	58	60	0.0	0	6910.8	4290.0	89.9	0.69	0.472	1.852	3.9	0.00
63	113.5	Saturated	Saturated	43	65	0.0	0	7024.3	4341.1	66.5	0.69	0.470	1.844	3.9	0.00
64	113.5	Saturated	Saturated	43	65	0.0	0	7137.8	4392.2	66.3	0.68	0.469	1.836	3.9	0.00
65	113.5	Saturated	Saturated	43	65	0.0	0	7251.3	4443.3	66.1	0.68	0.468	1.828	3.9	0.00
66	113.5	Saturated	Saturated	43	65	0.0	0	7364.8	4494.4	65.9	0.67	0.466	1.820	3.9	0.00
67	103.9	Saturated	Saturated	43	65	0.0	0	7468.7	4535.9	65.7	0.67	0.465	1.814	3.9	0.00
68	103.9	Saturated	Saturated	43	65	0.0	0	7572.6	4577.4	65.5	0.66	0.464	1.807	3.9	0.00
69	103.9	Saturated	Saturated	43	65	0.0	0	7676.5	4618.9	65.4	0.66	0.463	1.801	3.9	0.00
70	103.9	Saturated	Saturated	100	70	0.0	0	7780.4	4660.4	151.7	0.65	0.462	1.795	3.9	0.00
71	103.9	Saturated	Saturated	100	70	0.0	0	7988.2	4805.8	150.5	0.65	0.457	1.774	3.9	0.00
72	122.7	Saturated	Saturated	100	70	0.0	0	8110.9	4866.1	150.0	0.65	0.455	1.765	3.9	0.00
73	122.7	Saturated	Saturated	100	70	0.0	0	8233.6	4926.4	149.5	0.64	0.453	1.756	3.9	0.00
74	122.7	Saturated	Saturated	100	70	0.0	0	8356.3	4986.7	149.0	0.64	0.451	1.748	3.9	0.00
75	122.7	Saturated	Saturated	85	75	0.0	0	8479.0	5047.0	126.3	0.63	0.449	1.740	3.9	0.00
76	122.7	Saturated	Saturated	85	75	0.0	0	8601.7	5107.3	125.9	0.63	0.448	1.732	3.9	0.00
77	122.7	Saturated	Saturated	85	75	0.0	0	8724.4	5167.6	125.5	0.63	0.446	1.723	3.9	0.00
78	118.5	Saturated	Saturated	85	75	0.0	0	8842.9	5223.7	125.1	0.62	0.444	1.716	3.9	0.00
79	118.5	Saturated	Saturated	85	75	0.0	0	8961.4	5279.8	124.8	0.62	0.443	1.709	3.9	0.00
80	118.5	Saturated	Saturated	75	80	0.0	0	9079.9	5335.9	109.8	0.61	0.441	1.701	3.9	0.00
81	118.5	Saturated	Saturated	75	80	0.0	0	9198.4	5392.0	109.5	0.61	0.440	1.694	3.9	0.00
82	118.5	Saturated	Saturated	75	80	0.0	0	9316.9	5448.1	109.2	0.61	0.438	1.687	3.8	0.00
83	129.5	Saturated	Saturated	82	85	0.0	0	9446.4	5515.2	119.0	0.60	0.436	1.678	3.8	0.00
84	129.5	Saturated	Saturated	82	85	0.0	0	9575.9	5582.3	118.6	0.60	0.435	1.670	3.8	0.00
85	129.5	Saturated	Saturated	82	85	0.0	0	9705.4	5649.4	118.2	0.60	0.433	1.662	3.8	0.00
86	129.5	Saturated	Saturated	82	85	0.0	0	9834.9	5716.5	117.9	0.59	0.431	1.654	3.8	0.00
87	118.7	Saturated	Saturated	82	85	0.0	0	9953.6	5772.8	117.6	0.59	0.430	1.647	3.8	0.00
88	118.7	Saturated	Saturated	82	85	0.0	0	10072.3	5829.1	117.3	0.59	0.428	1.640	3.8	0.00
89	118.7	Saturated	Saturated	82	85	0.0	0	10191.0	5885.4	117.0	0.58	0.427	1.633	3.8	0.00
90	118.7	Saturated	Saturated	100	90	0.0	0	10309.7	5941.7	142.3	0.58	0.426	1.627	3.8	0.00
91	118.7	Saturated	Saturated	100	90	0.0	0	10428.4	5998.0	142.0	0.58	0.425	1.620	3.8	0.00
92	118.7	Saturated	Saturated	100	90	0.0	0	10547.1	6054.3	141.6	0.58	0.424	1.614	3.8	0.00
93	118.2	Saturated	Saturated	100	90	0.0	0	10665.3	6110.1	141.3	0.57	0.423	1.608	3.8	0.00
94	118.2	Saturated	Saturated	100	90	0.0	0	10783.5	6165.9	140.9	0.57	0.422	1.601	3.8	0.00
95	118.2	Saturated	Saturated	100	95	0.0	0	10901.7	6221.7	140.6	0.57	0.421	1.595	3.8	0.00
96	118.2	Saturated	Saturated	100	95	0.0	0	11019.9	6277.5	140.3	0.57	0.420	1.589	3.8	0.00
97	129.6	Saturated	Saturated	100	95	0.0	0	11149.5	6344.7	139.9	0.56	0.419	1.582	3.8	0.00
98	129.6	Saturated	Saturated	100	95	0.0	0	11279.1	6411.9	139.5	0.56	0.417	1.574	3.8	0.00
99	129.6	Saturated	Saturated	100	95	0.0	0	11408.7	6479.1	139.1	0.56	0.416	1.567	3.8	0.00
100	129.6	Saturated	Saturated	100	100	0.0	0	11538.3	6546.3	138.7	0.56	0.415	1.560	3.8	0.00
101	129.6	Saturated	Saturated	100	100	0.0	0	11667.9	6613.5	138.3	0.56	0.414	1.553	3.7	0.00
102	124.7	Saturated	Saturated	100	100	0.0	0	11792.6	6675.8	138.0	0.55	0.414	1.546	3.7	0.00
103	124.7	Saturated	Saturated	100	100	0.0	0	11917.3	6738.1	137.7	0.55	0.413	1.540	3.7	0.00
104	124.7	Saturated	Saturated	100	100	0.0	0	12042.0	6800.4	137.3	0.55	0.412	1.534	3.7	0.00
105	124.7	Saturated	Saturated	100	105	0.0	0	12166.7	6862.7	137.0	0.55	0.412	1.527	3.7	0.00
106	124.7	Saturated	Saturated	100	105	0.0	0	12291.4	6925.0	136.7	0.55	0.411	1.521	3.7	0.00
107	124.7	Saturated	Saturated	100	105	0.0	0	12416.1	6987.3	136.4	0.55	0.411	1.515	3.7	0.00
108	123.8	Saturated	Saturated	100	105	0.0	0	12539.9	7048.7	136.0	0.55	0.410	1.509	3.7	0.00
109	123.8	Saturated	Saturated	100	105	0.0	0	12663.7	7110.1	135.7	0.54	0.410	1.503	3.7	0.00
110	123.8	Saturated	Saturated	100	110	0.0	0	12787.5	7171.5	135.4	0.54	0.410	1.497	3.7	0.00
111	123.8	Saturated	Saturated	100	110	0.0	0	12911.3	7232.9	135.1	0.54	0.409	1.491	3.6	0.00
112	123.8	Saturated	Saturated	100	110	0.0	0	13035.1	7294.3	134.8	0.54	0.409	1.485	3.6	0.00
113	115.7	Saturated	Saturated	100	110	0.0	0	13150.8	7347.6	134.6	0.54	0.409	1.480	3.6	0.00
114	115.7	Saturated	Saturated	100	110	0.0	0	13266.5	7400.9	134.3	0.54	0.410	1.475	3.6	0.00
115	115.7	Saturated	Saturated	62	115	0.0	0	13382.2	7454.2	83.1	0.54	0.410	1.470	3.6	0.00
116	115.7	Saturated	Saturated	62	115	0.0	0	13497.9	7507.5	83.0	0.54	0.410	1.465	3.6	0.00
117	115.7	Saturated	Saturated	62	115	0.0	0	13613.6	7560.8	82.8	0.54	0.411	1.460	3.6	0.00
118	105.0	Saturated	Saturated	62	115	0.0	0	13718.6	7603.4	82.7	0.54	0.411	1.456	3.5	0.00
119	105.0	Saturated	Saturated	62	115	0.0	0	13823.6	7646.0	82.6	0.54	0.412	1.453	3.5	0.00
120	105.0	Saturated	Saturated	100	120	0.0	0	13928.6	7688.6	133.0	0.54	0.413	1.449	3.5	0.00
121	105.0	Saturated	Saturated	100	120	0.0	0	14033.6	7731.2	132.8	0.54	0.414	1.445	3.5	0.00
122	105.0	Saturated	Saturated	100	120	0.0	0	14138.6	7773.8	132.6	0.54	0.415	1.441	3.5	0.00
123	105.0	Saturated	Saturated	100	120	0.0	0	14243.6	7816.4	132.4	0.54	0.416	1.437	3.5	0.00
124	105.0	Saturated	Saturated	100	120	0.0	0	14348.6	7859.0	132.2	0.54	0.417	1.434	3.4	0.00
125	102.5	Saturated	Saturated	100	125	0.0	0	14451.1	7899.1	132.0	0.54	0.419	1.430	3.4	0.00

Total Liquefaction Settlement, S = 0.00 inches

Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Liquefaction Analysis 10% Probability of Exceedance in 50 years
Boring Number 6

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	6.9
Peak Ground Horizontal Acceleration, PGA (g):	0.65
Calculated Mag.Wtg.Factor:	1.171

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	45.0
Historically Highest Groundwater Level* (ft):	20.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y

LIQUEFACTION BOUNDARY:

Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.3

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{vc}, (psf)	Effective Vert. Stress σ_{vc}', (psf)	Fines Corrected $(N_1)_{60\text{-}cs}$	Stress Reduction Coeff, r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	105.3	Unsaturated	Unsaturated	15	5	0.0	0	105.3	105.3	35.1	1.00	0.424	1.443	Non-Liq.	0.00
2	105.3	Unsaturated	Unsaturated	15	5	0.0	0	210.6	210.6	35.1	1.00	0.423	1.443	Non-Liq.	0.00
3	105.3	Unsaturated	Unsaturated	15	5	0.0	0	315.9	315.9	35.1	1.00	0.422	1.443	Non-Liq.	0.00
4	81.5	Unsaturated	Unsaturated	9	5	0.0	0	397.4	397.4	19.2	0.99	0.420	0.253	Non-Liq.	0.00
5	81.5	Unsaturated	Unsaturated	9	5	0.0	0	478.9	478.9	20.7	0.99	0.419	0.276	Non-Liq.	0.00
6	104.9	Unsaturated	Unsaturated	5	5	0.0	0	583.8	583.8	10.8	0.99	0.417	0.159	Non-Liq.	0.00
7	104.9	Unsaturated	Unsaturated	5	5	0.0	0	688.7	688.7	10.8	0.98	0.416	0.159	Non-Liq.	0.00
8	117.6	Unsaturated	Unsaturated	100	5	0.0	0	806.3	806.3	192.5	0.98	0.414	2.000	Non-Liq.	0.00
9	117.6	Unsaturated	Unsaturated	100	5	0.0	0	923.9	923.9	197.4	0.98	0.412	2.000	Non-Liq.	0.00
10	117.6	Unsaturated	Unsaturated	100	10	0.0	0	1041.5	1041.5	191.3	0.97	0.411	2.000	Non-Liq.	0.00
11	117.6	Unsaturated	Unsaturated	100	10	0.0	0	1159.1	1159.1	185.9	0.97	0.409	2.000	Non-Liq.	0.00
12	111.3	Unsaturated	Unsaturated	100	10	0.0	0	1270.4	1270.4	181.5	0.96	0.407	2.000	Non-Liq.	0.00
13	111.3	Unsaturated	Unsaturated	100	10	0.0	0	1381.7	1381.7	177.5	0.96	0.405	2.000	Non-Liq.	0.00
14	111.3	Unsaturated	Unsaturated	100	10	0.0	0	1493.0	1493.0	174.0	0.95	0.403	2.000	Non-Liq.	0.00
15	111.3	Unsaturated	Unsaturated	100	15	0.0	0	1604.3	1604.3	190.8	0.95	0.401	2.000	Non-Liq.	0.00
16	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1684.5	1684.5	188.4	0.95	0.399	2.000	Non-Liq.	0.00
17	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1764.7	1764.7	186.1	0.94	0.397	2.000	Non-Liq.	0.00
18	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1844.9	1844.9	183.9	0.94	0.395	2.000	Non-Liq.	0.00
19	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1925.1	1925.1	181.9	0.93	0.393	2.000	Non-Liq.	0.00
20	95.6	Unsaturated	Unsaturated	74	20	0.0	0	2020.7	2020.7	132.9	0.93	0.391	2.000	Non-Liq.	0.00
21	95.6	Unsaturated	Saturated	74	20	0.0	0	2116.3	2053.9	132.3	0.92	0.401	2.000	5.0	0.00
22	95.6	Unsaturated	Saturated	74	20	0.0	0	2211.9	2087.1	131.7	0.92	0.410	2.000	4.9	0.00
23	95.6	Unsaturated	Saturated	74	20	0.0	0	2307.5	2120.3	131.2	0.91	0.419	2.000	4.8	0.00
24	95.6	Unsaturated	Saturated	74	20	0.0	0	2403.1	2153.5	130.7	0.90	0.427	2.000	4.7	0.00
25	95.6	Unsaturated	Saturated	25	25	0.0	0	2498.7	2186.7	44.0	0.90	0.434	2.000	4.6	0.00
26	110.0	Unsaturated	Saturated	25	25	0.0	0	2608.7	2234.3	43.7	0.89	0.441	2.000	4.5	0.00
27	110.0	Unsaturated	Saturated	55	30	0.0	0	2718.7	2281.9	95.6	0.89	0.447	2.000	4.5	0.00
28	110.0	Unsaturated	Saturated	55	30	0.0	0	2828.7	2329.5	100.1	0.88	0.453	2.000	4.4	0.00
29	110.0	Unsaturated	Saturated	55	30	0.0	0	2938.7	2377.1	99.6	0.88	0.458	2.000	4.4	0.00
30	100.8	Unsaturated	Saturated	55	30	0.0	0	3039.5	2415.5	99.2	0.87	0.464	2.000	4.3	0.00
31	100.8	Unsaturated	Saturated	18	35	80.2	23	3140.3	2453.9	36.0	0.87	0.468	1.551	Non-Liq.	0.00
32	100.8	Unsaturated	Saturated	18	35	80.2	23	3241.1	2492.3	35.8	0.86	0.473	1.474	Non-Liq.	0.00
33	100.8	Unsaturated	Saturated	18	35	80.2	23	3341.9	2530.7	35.6	0.85	0.477	1.404	Non-Liq.	0.00
34	91.4	Unsaturated	Saturated	18	35	80.2	23	3433.3	2559.7	35.5	0.85	0.481	1.355	Non-Liq.	0.00
35	91.4	Unsaturated	Saturated	18	35	80.2	23	3524.7	2588.7	35.3	0.84	0.485	1.309	Non-Liq.	0.00
36	91.4	Unsaturated	Saturated	15	35	70.7	19	3616.1	2617.7	29.2	0.84	0.489	0.494	Non-Liq.	0.00
37	91.4	Unsaturated	Saturated	15	35	70.7	19	3707.5	2646.7	29.1	0.83	0.492	0.486	Non-Liq.	0.00
38	97.1	Unsaturated	Saturated	15	35	70.7	19	3804.6	2681.4	29.0	0.83	0.495	0.476	Non-Liq.	0.00
39	97.1	Unsaturated	Saturated	28	40	70.7	17	3901.7	2716.1	54.5	0.82	0.498	2.000	4.0	0.00
40	97.1	Unsaturated	Saturated	28	40	83.0	17	3998.8	2750.8	54.3	0.81	0.500	2.000	4.0	0.00
41	97.1	Unsaturated	Saturated	28	40	83.0	17	4095.9	2785.5	54.2	0.81	0.502	2.000	4.0	0.00
42	106.3	Unsaturated	Saturated	28	40	83.0	17	4202.2	2829.4	54.0	0.80	0.504	2.000	4.0	0.00
43	106.3	Unsaturated	Saturated	28	40	83.0	17	4308.5	2873.3	53.8	0.80	0.505	2.000	4.0	0.00
44	106.3	Unsaturated	Saturated	28	40	83.0	17	4414.8	2917.2	53.6	0.79	0.506	2.000	4.0	0.00
45	106.3	Unsaturated	Saturated	40	45	66.5	5	4521.1	2961.1	74.0	0.79	0.507	2.000	3.9	0.00
46	106.3	Saturated	Saturated	40	45	66.5	5	4627.4	3005.0	73.7	0.78	0.507	2.000	3.9	0.00
47	93.5	Saturated	Saturated	40	45	66.5	5	4720.9	3036.1	73.5	0.77	0.509	2.000	3.9	0.00
48	93.5	Saturated	Saturated	40	45	66.5	5	4814.4	3067.2	73.3	0.77	0.510	2.000	3.9	0.00
49	93.5	Saturated	Saturated	40	45	66.5	5	4907.9	3098.3	73.1	0.76	0.511	2.000	3.9	0.00
50	93.5	Saturated	Saturated	20	50	89.7	26	5001.4	3129.4	36.9	0.76	0.511	1.775	Non-Liq.	0.00
51	93.5	Saturated	Saturated	20	50	89.7	26	5094.9	3160.5	36.8	0.75	0.512	1.715	Non-Liq.	0.00
52	120.0	Saturated	Saturated	20	50	89.7	26	5214.9	3218.1	36.6	0.75	0.511	1.613	Non-Liq.	0.00
53	120.0	Saturated	Saturated	47	55	0.0	0	5334.9	3275.7	78.2	0.74	0.510	2.000	3.9	0.00
54	120.0	Saturated	Saturated	47	55	0.0	0	5454.9	3333.3	77.9	0.73	0.508	2.000	3.9	0.00
55	120.0	Saturated	Saturated	47	55	0.0	0	5574.9	3390.9	77.5	0.73	0.507	2.000	3.9	0.00
56	120.0	Saturated	Saturated	47	55	0.0	0	5694.9	3448.5	77.2	0.72	0.505	2.000	4.0	0.00
57	119.1	Saturated	Saturated	47	55	0.0	0	5814.0	3505.2	76.8	0.72	0.504	1.992	4.0	0.00
58	119.1	Saturated	Saturated	47	55	0.0	0	5933.1	3561.9	76.5	0.71	0.502	1.981	3.9	0.00
59	119.1	Saturated	Saturated	47	55	0.0	0	6052.2	3618.6	76.2	0.71	0.501	1.970	3.9	0.00
60	119.1	Saturated	Saturated	53	60	0.0	0	6171.3	3675.3	85.6	0.70	0.499	1.959	3.9	0.00
61	119.1	Saturated	Saturated	53	60	0.0	0	6290.4	3732.0	85.2	0.70	0.497	1.948	3.9	0.00
62	119.1	Saturated	Saturated	53	60	0.0	0	6409.5	3788.7	84.9	0.69	0.495	1.938	3.9	0.00
63	119.1	Saturated	Saturated	53	60	0.0	0	6528.6	3845.4	84.6	0.69	0.493	1.928	3.9	0.00
64	119.1	Saturated	Saturated	53	60	0.0	0	6647.7	3902.1	84.2	0.68	0.492	1.918	3.9	0.00
65	119.1	Saturated	Saturated	49	65	0.0	0	6766.8	3958.8	77.6	0.68	0.490	1.908	3.9	0.00
66	119.1	Saturated	Saturated	49	65	0.0	0	6885.9	4015.5	77.3	0.67	0.488	1.898	3.9	0.00
67	119.1	Saturated	Saturated	49	65	0.0	0	7005.0	4072.2	77.0	0.67	0.486	1.888	3.9	0.00
68	119.1	Saturated	Saturated	49	65	0.0	0	7124.1	4128.9	76.7	0.66	0.484	1.879	3.9	0.00
69	119.1	Saturated	Saturated	49	65	0.0	0	7243.2	4185.6	76.5	0.66	0.482	1.869	3.9	0.00
70	119.1	Saturated	Saturated	63	70	0.0	0	7362.3	4242.3	98.0	0.65	0.480	1.860	3.9	0.00
71	119.1	Saturated	Saturated	63	70	0.0	0	7600.5	4418.1	96.9	0.65	0.473	1.832	3.9	0.00
72	119.1	Saturated	Saturated	63	70	0.0	0	7719.6	4474.8	96.6	0.65	0.471	1.823	3.9	0.00
73	119.1	Saturated	Saturated	63	70	0.0	0	7838.7	4531.5	96.3	0.64	0.469	1.814	3.9	0.00
74	119.1	Saturated	Saturated	63	70	0.0	0	7957.8	4588.2	96.0	0.64	0.467	1.806	3.9	0.00
75	119.1	Saturated	Saturated	61	75	0.0	0	8076.9	4644.9	92.6	0.63	0.465	1.797	3.9	0.00

Total Liquefaction Settlement, S = 0.00 inches

Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Liquefaction Analysis 2% Probability of Exceedance in 50 years
Boring Number 6

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	6.9
Peak Ground Horizontal Acceleration, PGA (g):	0.97
Calculated Mag.Wtg.Factor:	1.171

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	45.0
Historically Highest Groundwater Level* (ft):	20.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y

LIQUEFACTION BOUNDARY:

Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.3

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{vc}, (psf)	Effective Vert. Stress σ_{vc}', (psf)	Fines Corrected $(N_1)_{60-cs}$	Stress Reduction Coeff, r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	105.3	Unsaturated	Unsaturated	15	5	0.0	0	105.3	105.3	35.1	1.00	0.633	1.443	Non-Liq.	0.00
2	105.3	Unsaturated	Unsaturated	15	5	0.0	0	210.6	210.6	35.1	1.00	0.631	1.443	Non-Liq.	0.00
3	105.3	Unsaturated	Unsaturated	15	5	0.0	0	315.9	315.9	35.1	1.00	0.629	1.443	Non-Liq.	0.00
4	81.5	Unsaturated	Unsaturated	9	5	0.0	0	397.4	397.4	19.2	0.99	0.627	0.253	Non-Liq.	0.00
5	81.5	Unsaturated	Unsaturated	9	5	0.0	0	478.9	478.9	20.7	0.99	0.625	0.276	Non-Liq.	0.00
6	104.9	Unsaturated	Unsaturated	5	5	0.0	0	583.8	583.8	10.8	0.99	0.623	0.159	Non-Liq.	0.00
7	104.9	Unsaturated	Unsaturated	5	5	0.0	0	688.7	688.7	10.8	0.98	0.620	0.159	Non-Liq.	0.00
8	117.6	Unsaturated	Unsaturated	100	5	0.0	0	806.3	806.3	192.5	0.98	0.618	2.000	Non-Liq.	0.00
9	117.6	Unsaturated	Unsaturated	100	5	0.0	0	923.9	923.9	197.4	0.98	0.616	2.000	Non-Liq.	0.00
10	117.6	Unsaturated	Unsaturated	100	10	0.0	0	1041.5	1041.5	191.3	0.97	0.613	2.000	Non-Liq.	0.00
11	117.6	Unsaturated	Unsaturated	100	10	0.0	0	1159.1	1159.1	185.9	0.97	0.610	2.000	Non-Liq.	0.00
12	111.3	Unsaturated	Unsaturated	100	10	0.0	0	1270.4	1270.4	181.5	0.96	0.608	2.000	Non-Liq.	0.00
13	111.3	Unsaturated	Unsaturated	100	10	0.0	0	1381.7	1381.7	177.5	0.96	0.605	2.000	Non-Liq.	0.00
14	111.3	Unsaturated	Unsaturated	100	10	0.0	0	1493.0	1493.0	174.0	0.95	0.602	2.000	Non-Liq.	0.00
15	111.3	Unsaturated	Unsaturated	100	15	0.0	0	1604.3	1604.3	190.8	0.95	0.599	2.000	Non-Liq.	0.00
16	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1684.5	1684.5	188.4	0.95	0.596	2.000	Non-Liq.	0.00
17	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1764.7	1764.7	186.1	0.94	0.593	2.000	Non-Liq.	0.00
18	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1844.9	1844.9	183.9	0.94	0.590	2.000	Non-Liq.	0.00
19	80.2	Unsaturated	Unsaturated	100	15	0.0	0	1925.1	1925.1	181.9	0.93	0.587	2.000	Non-Liq.	0.00
20	95.6	Unsaturated	Unsaturated	74	20	0.0	0	2020.7	2020.7	132.9	0.93	0.584	2.000	Non-Liq.	0.00
21	95.6	Unsaturated	Saturated	74	20	0.0	0	2116.3	2053.9	132.3	0.92	0.598	2.000	3.3	0.00
22	95.6	Unsaturated	Saturated	74	20	0.0	0	2211.9	2087.1	131.7	0.92	0.612	2.000	3.3	0.00
23	95.6	Unsaturated	Saturated	74	20	0.0	0	2307.5	2120.3	131.2	0.91	0.625	2.000	3.2	0.00
24	95.6	Unsaturated	Saturated	74	20	0.0	0	2403.1	2153.5	130.7	0.90	0.637	2.000	3.1	0.00
25	95.6	Unsaturated	Saturated	25	25	0.0	0	2498.7	2186.7	44.0	0.90	0.648	2.000	3.1	0.00
26	110.0	Unsaturated	Saturated	25	25	0.0	0	2608.7	2234.3	43.7	0.89	0.658	2.000	3.0	0.00
27	110.0	Unsaturated	Saturated	55	30	0.0	0	2718.7	2281.9	95.6	0.89	0.668	2.000	3.0	0.00
28	110.0	Unsaturated	Saturated	55	30	0.0	0	2828.7	2329.5	100.1	0.88	0.676	2.000	3.0	0.00
29	110.0	Unsaturated	Saturated	55	30	0.0	0	2938.7	2377.1	99.6	0.88	0.684	2.000	2.9	0.00
30	100.8	Unsaturated	Saturated	55	30	0.0	0	3039.5	2415.5	99.2	0.87	0.692	2.000	2.9	0.00
31	100.8	Unsaturated	Saturated	18	35	80.2	23	3140.3	2453.9	36.0	0.87	0.699	1.551	Non-Liq.	0.00
32	100.8	Unsaturated	Saturated	18	35	80.2	23	3241.1	2492.3	35.8	0.86	0.706	1.474	Non-Liq.	0.00
33	100.8	Unsaturated	Saturated	18	35	80.2	23	3341.9	2530.7	35.6	0.85	0.712	1.404	Non-Liq.	0.00
34	91.4	Unsaturated	Saturated	18	35	80.2	23	3433.3	2559.7	35.5	0.85	0.718	1.355	Non-Liq.	0.00
35	91.4	Unsaturated	Saturated	18	35	80.2	23	3524.7	2588.7	35.3	0.84	0.724	1.309	Non-Liq.	0.00
36	91.4	Unsaturated	Saturated	15	35	70.7	19	3616.1	2617.7	29.2	0.84	0.730	0.494	Non-Liq.	0.00
37	91.4	Unsaturated	Saturated	15	35	70.7	19	3707.5	2646.7	29.1	0.83	0.735	0.486	Non-Liq.	0.00
38	97.1	Unsaturated	Saturated	15	35	70.7	19	3804.6	2681.4	29.0	0.83	0.739	0.476	Non-Liq.	0.00
39	97.1	Unsaturated	Saturated	28	40	70.7	17	3901.7	2716.1	54.5	0.82	0.743	2.000	2.7	0.00
40	97.1	Unsaturated	Saturated	28	40	83.0	17	3998.8	2750.8	54.3	0.81	0.747	2.000	2.7	0.00
41	97.1	Unsaturated	Saturated	28	40	83.0	17	4095.9	2785.5	54.2	0.81	0.750	2.000	2.7	0.00
42	106.3	Unsaturated	Saturated	28	40	83.0	17	4202.2	2829.4	54.0	0.80	0.752	2.000	2.7	0.00
43	106.3	Unsaturated	Saturated	28	40	83.0	17	4308.5	2873.3	53.8	0.80	0.754	2.000	2.7	0.00
44	106.3	Unsaturated	Saturated	28	40	83.0	17	4414.8	2917.2	53.6	0.79	0.755	2.000	2.6	0.00
45	106.3	Unsaturated	Saturated	40	45	66.5	5	4521.1	2961.1	74.0	0.79	0.756	2.000	2.6	0.00
46	106.3	Saturated	Saturated	40	45	66.5	5	4627.4	3005.0	73.7	0.78	0.757	2.000	2.6	0.00
47	93.5	Saturated	Saturated	40	45	66.5	5	4720.9	3036.1	73.5	0.77	0.759	2.000	2.6	0.00
48	93.5	Saturated	Saturated	40	45	66.5	5	4814.4	3067.2	73.3	0.77	0.761	2.000	2.6	0.00
49	93.5	Saturated	Saturated	40	45	66.5	5	4907.9	3098.3	73.1	0.76	0.762	2.000	2.6	0.00
50	93.5	Saturated	Saturated	20	50	89.7	26	5001.4	3129.4	36.9	0.76	0.763	1.775	Non-Liq.	0.00
51	93.5	Saturated	Saturated	20	50	89.7	26	5094.9	3160.5	36.8	0.75	0.764	1.715	Non-Liq.	0.00
52	120.0	Saturated	Saturated	20	50	89.7	26	5214.9	3218.1	36.6	0.75	0.762	1.613	Non-Liq.	0.00
53	120.0	Saturated	Saturated	47	55	0.0	0	5334.9	3275.7	78.2	0.74	0.760	2.000	2.6	0.00
54	120.0	Saturated	Saturated	47	55	0.0	0	5454.9	3333.3	77.9	0.73	0.758	2.000	2.6	0.00
55	120.0	Saturated	Saturated	47	55	0.0	0	5574.9	3390.9	77.5	0.73	0.756	2.000	2.6	0.00
56	120.0	Saturated	Saturated	47	55	0.0	0	5694.9	3448.5	77.2	0.72	0.754	2.000	2.7	0.00
57	119.1	Saturated	Saturated	47	55	0.0	0	5814.0	3505.2	76.8	0.72	0.752	1.992	2.6	0.00
58	119.1	Saturated	Saturated	47	55	0.0	0	5933.1	3561.9	76.5	0.71	0.749	1.981	2.6	0.00
59	119.1	Saturated	Saturated	47	55	0.0	0	6052.2	3618.6	76.2	0.71	0.747	1.970	2.6	0.00
60	119.1	Saturated	Saturated	53	60	0.0	0	6171.3	3675.3	85.6	0.70	0.744	1.959	2.6	0.00
61	119.1	Saturated	Saturated	53	60	0.0	0	6290.4	3732.0	85.2	0.70	0.742	1.948	2.6	0.00
62	119.1	Saturated	Saturated	53	60	0.0	0	6409.5	3788.7	84.9	0.69	0.739	1.938	2.6	0.00
63	119.1	Saturated	Saturated	53	60	0.0	0	6528.6	3845.4	84.6	0.69	0.736	1.928	2.6	0.00
64	119.1	Saturated	Saturated	53	60	0.0	0	6647.7	3902.1	84.2	0.68	0.734	1.918	2.6	0.00
65	119.1	Saturated	Saturated	49	65	0.0	0	6766.8	3958.8	77.6	0.68	0.731	1.908	2.6	0.00
66	119.1	Saturated	Saturated	49	65	0.0	0	6885.9	4015.5	77.3	0.67	0.728	1.898	2.6	0.00
67	119.1	Saturated	Saturated	49	65	0.0	0	7005.0	4072.2	77.0	0.67	0.725	1.888	2.6	0.00
68	119.1	Saturated	Saturated	49	65	0.0	0	7124.1	4128.9	76.7	0.66	0.722	1.879	2.6	0.00
69	119.1	Saturated	Saturated	49	65	0.0	0	7243.2	4185.6	76.5	0.66	0.719	1.869	2.6	0.00
70	119.1	Saturated	Saturated	63	70	0.0	0	7362.3	4242.3	98.0	0.65	0.716	1.860	2.6	0.00
71	119.1	Saturated	Saturated	63	70	0.0	0	7600.5	4418.1	96.9	0.65	0.705	1.832	2.6	0.00
72	119.1	Saturated	Saturated	63	70	0.0	0	7719.6	4474.8	96.6	0.65	0.703	1.823	2.6	0.00
73	119.1	Saturated	Saturated	63	70	0.0	0	7838.7	4531.5	96.3	0.64	0.700	1.814	2.6	0.00
74	119.1	Saturated	Saturated	63	70	0.0	0	7957.8	4588.2	96.0	0.64	0.697	1.806	2.6	0.00
75	119.1	Saturated	Saturated	61	75	0.0	0	8076.9	4644.9	92.6	0.63	0.694	1.797	2.6	0.00

Total Liquefaction Settlement, S = 0.00 inches

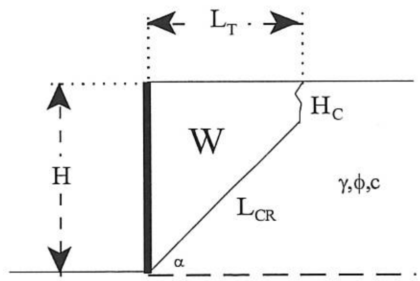
Geotechnologies, Inc.

Project: TF Broadway, LP
File No.: 21545
Description: Cantilever Retaining Walls (Up to 10 feet)

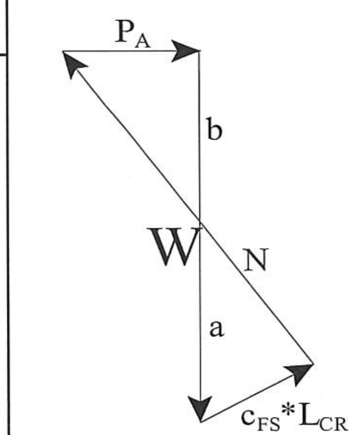
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	10.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	29.2 degrees
	(c_{FS})	56.7 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	2.1	48	5985.3	11.2	2042.9	3942.4	1113.9
46	2.0	46	5800.6	11.2	1911.8	3888.8	1172.4
47	1.9	45	5617.8	11.1	1793.9	3823.9	1226.0
48	1.8	44	5437.6	11.0	1687.6	3750.0	1275.0
49	1.8	42	5260.5	10.9	1591.5	3669.0	1319.3
50	1.7	41	5086.5	10.8	1504.1	3582.4	1359.2
51	1.7	39	4915.8	10.7	1424.6	3491.2	1394.8
52	1.7	38	4748.5	10.6	1352.0	3396.5	1426.2
53	1.6	37	4584.5	10.5	1285.4	3299.1	1453.5
54	1.6	35	4423.8	10.4	1224.3	3199.4	1476.8
55	1.6	34	4266.2	10.3	1168.1	3098.1	1496.2
56	1.6	33	4111.7	10.2	1116.1	2995.6	1511.7
57	1.6	32	3960.2	10.1	1068.1	2892.1	1523.4
58	1.6	30	3811.5	10.0	1023.5	2788.0	1531.3
59	1.5	29	3665.5	9.9	982.0	2683.5	1535.4
60	1.5	28	3522.2	9.8	943.4	2578.7	1535.9
61	1.5	27	3381.2	9.7	907.3	2473.9	1532.5
62	1.6	26	3242.7	9.6	873.6	2369.1	1525.5
63	1.6	25	3106.3	9.5	841.8	2264.4	1514.6
64	1.6	24	2972.0	9.4	812.0	2160.0	1500.0
65	1.6	23	2839.7	9.3	783.9	2055.8	1481.5
66	1.6	22	2709.2	9.2	757.3	1951.9	1459.0
67	1.7	21	2580.5	9.1	732.1	1848.4	1432.6
68	1.7	20	2453.4	9.0	708.0	1745.3	1402.1
69	1.7	19	2327.7	8.9	685.1	1642.6	1367.5
70	1.8	18	2203.5	8.8	663.1	1540.4	1328.6



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\ max}$ 1535.9 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 30.7 pcf

Design Wall for an Equivalent Fluid Pressure: **31 pcf**

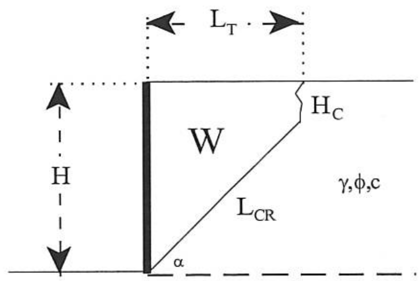
Geotechnologies, Inc.

Project: TF Broadway, LP
File No.: 21545
Description: Cantilever Retaining Walls (10 to 20 feet)

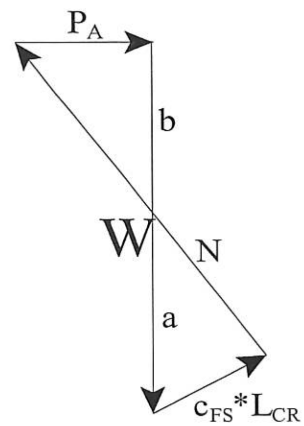
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	20.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	29.2 degrees
	(c_{FS})	56.7 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	2.1	198	24735.3	25.4	4615.2	20120.2	5684.8
46	2.0	191	23907.2	25.1	4293.6	19613.7	5913.3
47	1.9	185	23102.5	24.7	4008.7	19093.8	6122.0
48	1.8	179	22320.2	24.4	3755.0	18565.2	6311.9
49	1.8	172	21559.6	24.1	3528.1	18031.5	6483.7
50	1.7	167	20819.6	23.8	3324.0	17495.6	6638.0
51	1.7	161	20099.3	23.6	3139.9	16959.4	6775.5
52	1.7	155	19397.6	23.3	2973.0	16424.6	6896.6
53	1.6	150	18713.6	23.0	2821.3	15892.3	7001.8
54	1.6	144	18046.4	22.7	2683.0	15363.5	7091.6
55	1.6	139	17395.1	22.5	2556.4	14838.7	7166.1
56	1.6	134	16758.7	22.2	2440.2	14318.5	7225.7
57	1.6	129	16136.6	22.0	2333.4	13803.2	7270.6
58	1.6	124	15527.8	21.8	2234.9	13292.9	7301.0
59	1.5	119	14931.7	21.5	2143.8	12787.9	7317.0
60	1.5	115	14347.5	21.3	2059.4	12288.1	7318.6
61	1.5	110	13774.5	21.1	1981.1	11793.5	7305.8
62	1.6	106	13212.2	20.9	1908.2	11304.1	7278.6
63	1.6	101	12659.9	20.7	1840.2	10819.7	7237.0
64	1.6	97	12117.0	20.5	1776.7	10340.3	7180.6
65	1.6	93	11583.0	20.3	1717.2	9865.7	7109.5
66	1.6	88	11057.3	20.1	1661.5	9395.8	7023.2
67	1.7	84	10539.4	19.9	1609.1	8930.3	6921.4
68	1.7	80	10028.8	19.8	1559.7	8469.2	6803.9
69	1.7	76	9525.2	19.6	1513.0	8012.1	6670.1
70	1.8	72	9027.9	19.4	1468.9	7559.0	6519.6



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A, max}$ 7318.6 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 36.6 pcf

Design Wall for an Equivalent Fluid Pressure: 37 pcf

Geotechnologies, Inc.

Project: TF Broadway, LP

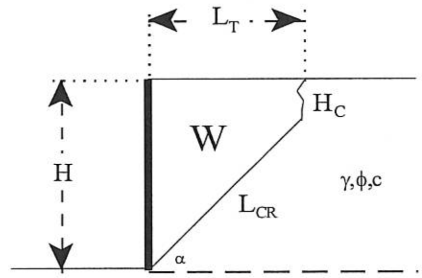
File No.: 21545

Description: Undrained Cantilever Retaining Walls (20 to 60 ft in height)

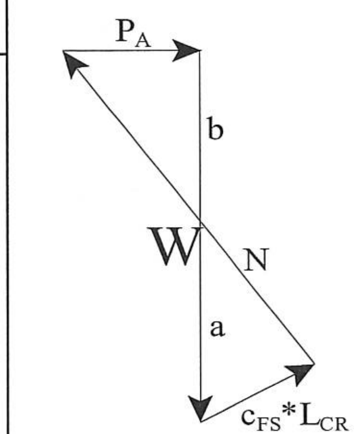
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	60.00 feet
Unit Weight of Retained Soils	(γ)	67.6 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	29.2 degrees
	(c_{FS})	56.7 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
55	2.9	1257	84997.7	69.7	7922.5	77075.1	37222.0
56	2.9	1211	81881.9	68.9	7560.0	74322.0	37505.9
57	2.9	1166	78837.6	68.1	7227.1	71610.4	37719.7
58	2.9	1122	75860.4	67.4	6920.8	68939.6	37864.4
59	2.9	1079	72946.6	66.7	6638.1	66308.4	37940.4
60	2.9	1037	70092.4	66.0	6376.8	63715.6	37948.0
61	2.9	995	67294.5	65.3	6134.6	61159.8	37887.3
62	2.9	955	64549.5	64.7	5909.8	58639.7	37757.9
63	2.9	915	61854.4	64.1	5700.7	56153.7	37559.5
64	2.9	876	59206.2	63.5	5505.7	53700.4	37291.3
65	3.0	837	56602.1	62.9	5323.7	51278.4	36952.3
66	3.0	799	54039.6	62.4	5153.5	48886.1	36541.3
67	3.1	762	51516.1	61.9	4994.0	46522.0	36056.7
68	3.1	725	49029.1	61.3	4844.3	44184.8	35496.7
69	3.2	689	46576.5	60.9	4703.6	41872.9	34859.2
70	3.3	653	44155.9	60.4	4570.9	39585.0	34141.6
71	3.4	618	41765.4	59.9	4445.6	37319.8	33341.2
72	3.5	583	39402.8	59.4	4327.0	35075.7	32454.8
73	3.6	548	37066.1	59.0	4214.5	32851.7	31478.7
74	3.8	514	34753.6	58.5	4107.3	30646.3	30409.0
75	3.9	480	32463.2	58.0	4004.8	28458.3	29241.2
76	4.1	447	30193.1	57.6	3906.4	26286.7	27970.3
77	4.4	413	27941.5	57.1	3811.3	24130.2	26590.8
78	4.7	380	25706.7	56.6	3718.7	21987.9	25096.6
79	5.0	347	23486.5	56.0	3627.6	19858.9	23481.0
80	5.4	315	21279.2	55.4	3536.8	17742.4	21736.8



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\ max}$ 37948.0 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 21.1 pcf

Hydrostatic Pressure 62.4 pcf

Design Wall for an Equivalent Fluid Pressure: 84 pcf

Geotechnologies, Inc.

Project: TF Broadway, LP
File No.: 21545

Soil Weight	γ	125 pcf
Internal Friction Angle	ϕ	40 degrees
Cohesion	c	0 psf
Height of Retaining Wall	H	20 feet

Restrained Retaining Wall Design based on At Rest Earth Pressure

$\sigma'_h = K_o \sigma'_v$

$K_o = 1 - \sin\phi$	0.357
$\sigma'_v = \gamma H$	2500.0 psf

$\sigma'_h =$	893.0 psf	
EFP =	44.7 pcf	
$P_o =$	8930.3 lbs/ft	(based on a triangular distribution of pressure)

Design wall for an EFP of 45 pcf

Geotechnologies, Inc.

Project: TF Broadway, LP

File No.: 21545

Soil Weight	γ	67.6 pcf	(Bouyant)
Internal Friction Angle	ϕ	40 degrees	
Cohesion	c	0 psf	
Height of Retaining Wall	H	60 feet	

Restrained Retaining Wall Design based on At Rest Earth Pressure

$\sigma'_h = K_o\sigma'_v$

$K_o = 1 - \sin\phi$	0.357
$\sigma'_v = \gamma H$	4056.0 psf

$\sigma'_h =$ 1448.9 psf

EFP = 24.1 pcf

$P_o =$ 43465.6 lbs/ft (based on a triangular distribution of pressure)

24.1 (Lateral Earth Pressure based on Bouyant Weight of Soil in EFP)

62.4 (Hydrostatic Pressure)

Design wall for an EFP of 87 pcf

Geotechnologies, Inc.

Project: TF Broadway, LP

File No.: 21545

Seismically Induced Lateral Soil Pressure on Retaining Wall

Input:

Height of Retaining Wall:	(H)	60.0 feet
Retained Soil Unit Weight:	(γ)	125.0 pcf
Horizontal Ground Acceleration:	(k_h)	0.32 g

Seismic Increment (ΔP_{AE}):

$\Delta P_{AE} = (0.5*\gamma*H^2)*(0.75*k_h)$

$\Delta P_{AE} =$ 54506.3 lbs/ft

Transfer load to 1/3 of the height of the wall

$T*(2/3)*H = \Delta P_{AE}*0.6*H$

T = 49055.6 lbs/ft

$EFP = 2*T/H^2$

EFP = 27.3 pcf

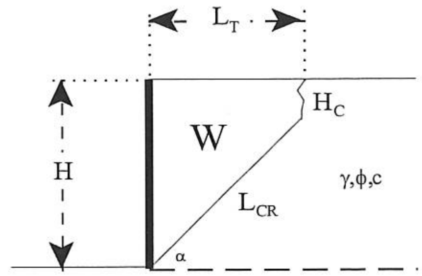
Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Temporary Shoring Walls (H <= 30 feet)

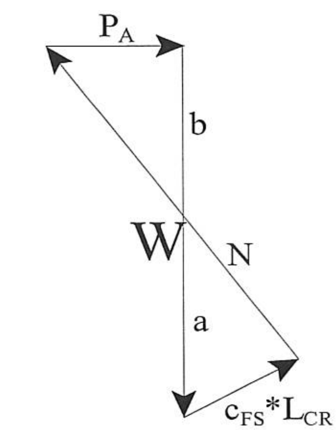
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	30.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.25
Factored Parameters:	(ϕ_{FS})	33.9 degrees
	(c_{FS})	68.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	3.3	445	55565.3	37.7	11042.4	44522.9	8757.1
46	3.1	430	53741.9	37.4	10051.6	43690.2	9388.2
47	2.9	416	51958.4	37.0	9206.0	42752.4	9970.3
48	2.8	402	50217.3	36.6	8477.1	41740.2	10505.6
49	2.6	388	48519.3	36.3	7843.6	40675.6	10996.0
50	2.5	375	46863.8	35.9	7288.7	39575.0	11443.2
51	2.4	362	45249.8	35.5	6799.5	38450.3	11848.9
52	2.4	349	43675.8	35.1	6365.4	37310.4	12214.6
53	2.3	337	42140.3	34.7	5978.3	36162.0	12541.6
54	2.2	325	40641.6	34.3	5631.3	35010.3	12830.9
55	2.2	313	39177.8	34.0	5318.8	33859.0	13083.7
56	2.1	302	37747.2	33.6	5036.3	32710.9	13300.7
57	2.1	291	36348.2	33.3	4779.9	31568.3	13482.8
58	2.1	280	34979.1	32.9	4546.5	30432.6	13630.6
59	2.1	269	33638.2	32.6	4333.1	29305.1	13744.6
60	2.1	259	32324.1	32.3	4137.6	28186.5	13825.1
61	2.0	248	31035.3	32.0	3957.9	27077.4	13872.5
62	2.0	238	29770.3	31.7	3792.3	25977.9	13886.9
63	2.0	228	28527.8	31.4	3639.3	24888.5	13868.3
64	2.1	218	27306.5	31.1	3497.6	23808.9	13816.7
65	2.1	209	26105.2	30.8	3366.1	22739.1	13731.9
66	2.1	199	24922.8	30.6	3243.7	21679.1	13613.7
67	2.1	190	23758.0	30.3	3129.6	20628.5	13461.6
68	2.1	181	22609.8	30.0	3022.9	19587.0	13275.0
69	2.2	172	21477.2	29.8	2922.9	18554.4	13053.5
70	2.2	163	20359.2	29.5	2828.9	17530.3	12796.1



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$
$b = W-a$
$P_A = b*\tan(\alpha-\phi_{FS})$
$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ — 13886.9 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP — 30.9 pcf

Design Shoring for an Equivalent Fluid Pressure: 31 pcf

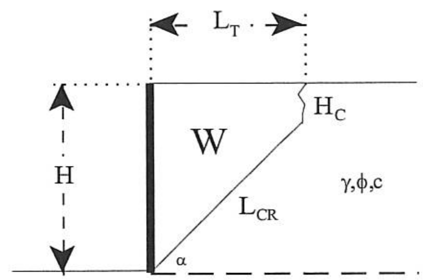
Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Temporary Shoring Walls (30 < H <= 40 feet)

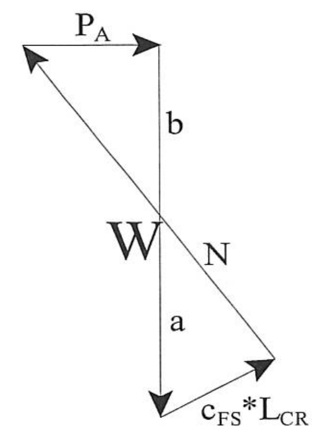
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	40.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.25
Factored Parameters:	(ϕ_{FS})	33.9 degrees
	(c_{FS})	68.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	3.3	795	99315.3	51.9	15179.7	84135.7	16548.5
46	3.1	768	95990.7	51.3	13787.6	82203.1	17663.9
47	2.9	742	92755.9	50.7	12605.0	80150.9	18692.0
48	2.8	717	89610.0	50.1	11589.8	78020.2	19636.9
49	2.6	692	86550.5	49.5	10710.2	75840.3	20502.1
50	2.5	669	83574.4	48.9	9942.1	73632.3	21290.9
51	2.4	645	80677.8	48.3	9266.4	71411.4	22006.3
52	2.4	623	77857.1	47.8	8668.3	69188.8	22650.9
53	2.3	601	75108.3	47.2	8135.8	66972.5	23227.1
54	2.2	579	72427.8	46.7	7659.3	64768.5	23736.9
55	2.2	558	69811.9	46.2	7231.0	62580.8	24182.3
56	2.1	538	67257.0	45.7	6844.3	60412.7	24564.6
57	2.1	518	64759.8	45.2	6493.9	58265.9	24885.4
58	2.1	499	62317.1	44.7	6175.1	56142.0	25145.7
59	2.1	479	59925.9	44.3	5884.3	54041.6	25346.4
60	2.1	461	57583.2	43.8	5618.0	51965.2	25488.2
61	2.0	442	55286.3	43.4	5373.6	49912.7	25571.7
62	2.0	424	53032.5	43.0	5148.7	47883.9	25597.0
63	2.0	407	50819.5	42.6	4941.1	45878.4	25564.3
64	2.1	389	48644.8	42.2	4749.1	43895.7	25473.4
65	2.1	372	46506.2	41.9	4571.2	41935.0	25324.1
66	2.1	355	44401.5	41.5	4405.8	39995.7	25115.9
67	2.1	339	42328.8	41.2	4251.9	38076.9	24847.9
68	2.1	322	40286.0	40.8	4108.2	36177.8	24519.4
69	2.2	306	38271.3	40.5	3973.9	34297.4	24129.1
70	2.2	290	36282.9	40.2	3848.0	32434.9	23675.6



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\ max}$ 25597.0 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 32.0 pcf

Design Shoring for an Equivalent Fluid Pressure: 32 pcf

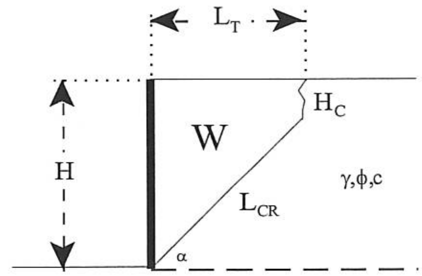
Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Temporary Shoring Walls (40 < H <= 50 feet)

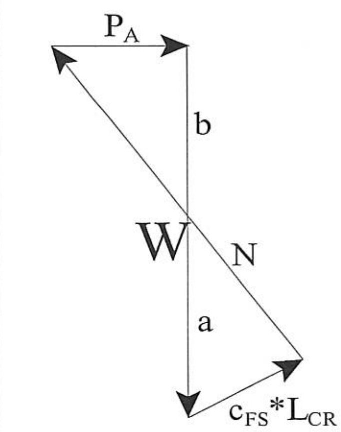
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	50.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.25
Factored Parameters:	(ϕ_{FS})	33.9 degrees
	(c_{FS})	68.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	3.3	1245	155565.3	66.0	19316.9	136248.4	26798.4
46	3.1	1202	150310.7	65.2	17523.6	132787.2	28533.4
47	2.9	1162	145209.9	64.4	16004.1	129205.8	30132.1
48	2.8	1122	140257.7	63.6	14702.4	125555.3	31601.0
49	2.6	1084	135447.9	62.8	13576.8	121871.1	32945.7
50	2.5	1046	130773.7	62.0	12595.4	118178.4	34171.5
51	2.4	1010	126228.2	61.2	11733.3	114494.9	35283.0
52	2.4	974	121804.4	60.5	10971.1	110833.3	36284.5
53	2.3	940	117495.7	59.7	10293.3	107202.4	37179.5
54	2.2	906	113295.8	59.0	9687.4	103608.4	37971.4
55	2.2	874	109198.5	58.4	9143.2	100055.3	38663.0
56	2.1	842	105198.1	57.7	8652.4	96545.7	39256.8
57	2.1	810	101289.0	57.1	8207.8	93081.2	39755.0
58	2.1	780	97466.0	56.5	7803.8	89662.2	40159.2
59	2.1	750	93724.3	55.9	7435.4	86288.9	40470.9
60	2.1	720	90059.1	55.4	7098.4	82960.7	40691.1
61	2.0	692	86466.2	54.8	6789.3	79676.8	40820.7
62	2.0	664	82941.2	54.3	6505.0	76436.2	40860.0
63	2.0	636	79480.3	53.8	6242.9	73237.4	40809.2
64	2.1	609	76079.8	53.3	6000.7	70079.1	40668.1
65	2.1	582	72736.0	52.9	5776.2	66959.8	40436.3
66	2.1	556	69445.6	52.4	5567.9	63877.7	40112.9
67	2.1	530	66205.5	52.0	5374.2	60831.3	39696.8
68	2.1	504	63012.5	51.6	5193.6	57818.9	39186.6
69	2.2	479	59863.6	51.2	5024.9	54838.7	38580.4
70	2.2	454	56756.2	50.8	4867.1	51889.1	37876.2



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$
$b = W-a$
$P_A = b*\tan(\alpha-\phi_{FS})$
$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\ max}$ 40860.0 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 32.7 pcf

Design Shoring for an Equivalent Fluid Pressure: 33 pcf

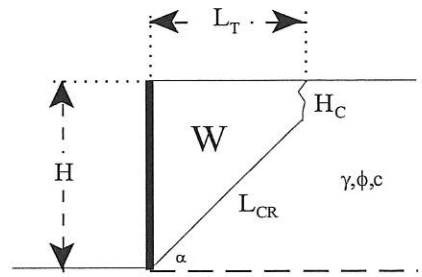
Geotechnologies, Inc.

Project: TF Broadway LP
File No.: 21545
Description: Temporary Shoring Walls (50 < H <= 70 feet)

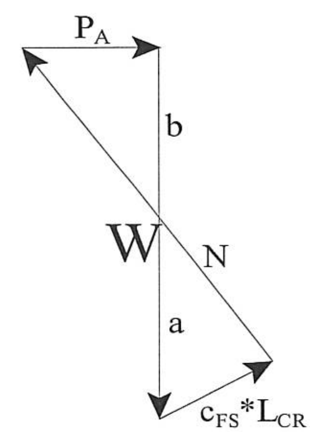
Shoring Design with Level Backfill
(Vector Analysis)

Input:

Shoring Height	(H)	70.00 feet
Unit Weight of Retained Soils	(γ)	125.0 pcf
Friction Angle of Retained Soils	(ϕ)	40.0 degrees
Cohesion of Retained Soils	(c)	85.0 psf
Factor of Safety	(FS)	1.25
Factored Parameters:	(ϕ_{FS})	33.9 degrees
	(c_{FS})	68.0 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) feet^2	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	3.3	2445	305565.3	94.3	27591.4	277973.9	54674.1
46	3.1	2361	295164.1	93.0	24995.5	270168.5	58054.0
47	2.9	2281	285087.2	91.7	22802.2	262285.0	61167.6
48	2.8	2203	275318.3	90.5	20927.8	254390.6	64027.6
49	2.6	2127	265840.9	89.3	19310.1	246530.8	66645.3
50	2.5	2053	256638.7	88.1	17902.0	238736.7	69031.2
51	2.4	1982	247695.8	86.9	16667.0	231028.7	71194.4
52	2.4	1912	238997.2	85.8	15576.7	223420.5	73143.1
53	2.3	1844	230528.8	84.8	14608.3	215920.6	74884.6
54	2.2	1778	222277.2	83.8	13743.5	208533.7	76425.3
55	2.2	1714	214229.7	82.8	12967.6	201262.1	77770.9
56	2.1	1651	206374.4	81.8	12268.4	194106.0	78926.2
57	2.1	1590	198700.1	80.9	11635.7	187064.4	79895.3
58	2.1	1530	191196.4	80.1	11061.2	180135.2	80681.6
59	2.1	1471	183853.4	79.3	10537.7	173315.7	81287.9
60	2.1	1413	176661.7	78.5	10059.3	166602.4	81716.3
61	2.0	1357	169612.5	77.7	9620.8	159991.7	81968.3
62	2.0	1302	162697.6	77.0	9217.8	153479.8	82044.7
63	2.0	1247	155909.1	76.3	8846.5	147062.6	81945.9
64	2.1	1194	149239.7	75.6	8503.7	140736.0	81671.5
65	2.1	1141	142682.1	75.0	8186.4	134495.7	81220.6
66	2.1	1090	136230.0	74.3	7892.2	128337.8	80591.5
67	2.1	1039	129876.7	73.7	7618.8	122257.9	79782.1
68	2.1	989	123616.4	73.2	7364.3	116252.1	78789.5
69	2.2	940	117443.3	72.6	7127.0	110316.3	77610.2
70	2.2	891	111351.8	72.1	6905.2	104446.5	76240.1



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$

$b = W-a$

$P_A = b*\tan(\alpha-\phi_{FS})$

$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 82044.7 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of shoring)

$EFP = 2*P_A/H^2$

EFP 33.5 pcf

Design Shoring for an Equivalent Fluid Pressure: 34 pcf

Geotechnologies, Inc.

Tiebacks Calculations

(Ref: Bowles, 1982)

Project: TF Broadway, LP

File No. 21545

Soil Parameters:

Weight of Soil	γ	125.00	*lbs/ft^3*
Friction Angle	ϕ	40.00	*degrees*
Cohesion	c	85.00	*lbs/ft^2*
Tieback Angle	α	20.00	*degrees*

Design Assumptions:

Diameter of Grout	d	0.50	*feet*
Length of Embeddment	L	20.00	*feet*
Depth to midpoint of Embeddment	h	10.00	*feet*
Earth Pressure Coefficient	K	0.50	
Factor of Safety Applied	F.S.	1.50	

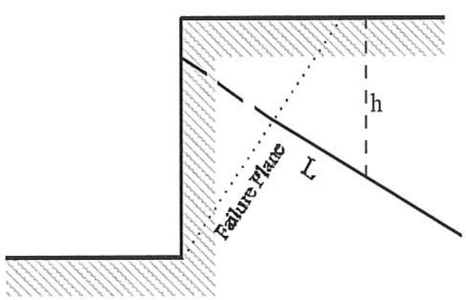
Ultimate Resistance: R_{ult} 32.83 *kips*

Eq: pi*d*γ*L*h*cos(a)*tan(ϕ)+c*pi*d*L

Allowable Resistance: $R_{allow} = R_{ult}/F.S.$ 21.89 *kips*

Allowable Skin Friction: $R_{allow}/2/pi/r/L$ 696.75 *psf*

Allowable Skin Friction Design Value **550** ***psf***



Geotechnologies, Inc.

Tiebacks Calculations

(Ref: Bowles, 1982)

Project: TF Broadway, LP

File No. 21545

Soil Parameters:

Weight of Soil	γ	125.00	*lbs/ft³*
Friction Angle	ϕ	40.00	*degrees*
Cohesion	c	85.00	*lbs/ft²*
Tieback Angle	α	40.00	*degrees*

Design Assumptions:

Diameter of Grout	d	0.50	*feet*
Length of Embeddment	L	20.00	*feet*
Depth to midpoint of Embeddment	h	10.00	*feet*
Earth Pressure Coefficient	K	0.50	
Factor of Safety Applied	F.S.	1.50	

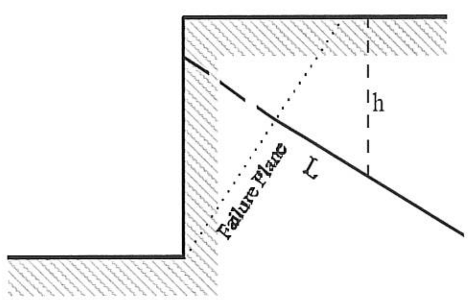
Ultimate Resistance: R_{ult} 27.11 *kips*

Eq: pi*d*γ*L*h*cos(a)*tan(ϕ)+c*pi*d*L

Allowable Resistance: $R_{allow} = R_{ult}/F.S.$ 18.07 *kips*

Allowable Skin Friction: $R_{allow}/2/pi/r/L$ 575.32 *psf*

Allowable Skin Friction Design Value **550** ***psf***



Geotechnologies, Inc.

Project: TF Broadway, LP

File No.: 21545

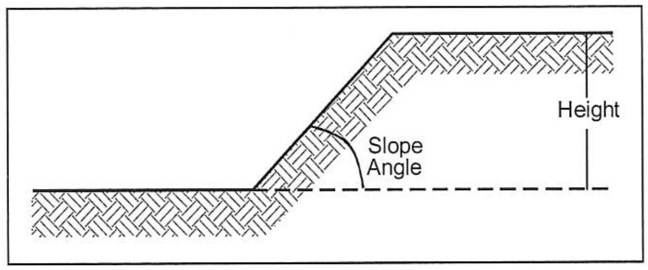
Slope Stability Calculations

Input

Soil Density	(γ)	125 pcf
Friction Angle	(ϕ)	40 degrees
Cohesion	(c)	85 psf
Factor of Safety	(FS)	1.25

Stability Number (N)

(ϕ_d)	33.9 degrees
$N_{(2:1)}$	0.000
$N_{(1.5:1)}$	0.000
$N_{(1:1)}$	0.020
$N_{(3/4:1)}$	0.037
$N_{(1:1.5)}$	0.045
$N_{(1:2)}$	0.060
$N_{(vertical)}$	0.138



Slope Angle (h:v)	Slope Angle (Degrees)	Maximum Height (Feet)
2 : 1	26.00	#DIV/0!
$1^1/_2$: 1	33.69	#DIV/0!
1 : 1	45.00	27
$^3/_4$: 1	53.13	15
1 : $1^1/_2$	56.30	12
$^1/_2$: 1	63.43	9
Vertical	90.00	4

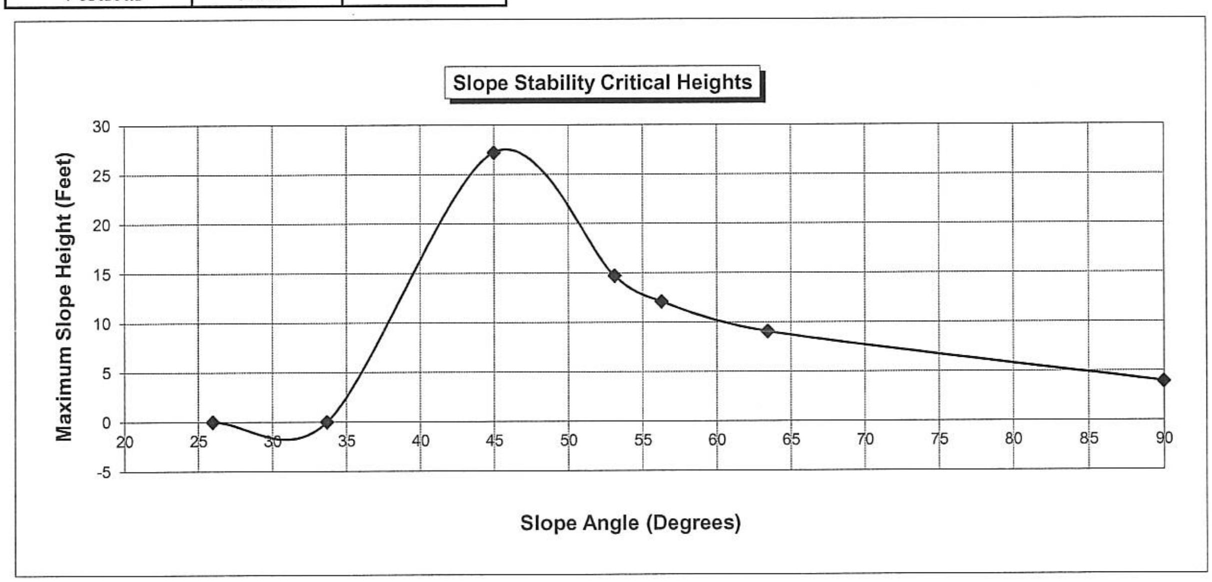
Reference: Taylor's Chart (1937)

$$(\phi_\delta) = \text{ArcTan}[(\text{Tan}\phi)/FS]$$

$$N = \frac{c}{(\gamma)(H)(FS)}$$

$$H = \frac{c}{(\gamma)(N)(FS)}$$

Assumptions: Slope is uniform, soils are homogeneous, no water seepage, no surcharge loads.



Geotechnologies, Inc.

Project: TF Broadway, LP
File No.: 21545
Description: Foundation Pile Design
3/16/2018

Driven Pile Capacity Calculation

Input Data:

Unit Weight of Overlying Soil Layer	γ_1	125 pcf
Thickness of Overlying Soil Layer	H_1	15 feet
Unit Weight of Bearing Strata	γ_2	125 pcf
Friction Angle of Bearing Strata	ϕ_2	37 degrees
Cohesion of Bearing Strata	c_2	0 psf
Minimum Embedment into Bearing Strata	H_2	10 feet
Unit Weight of Water	γ_w	62.4 pcf
Depth to Groundwater from Pile Cap	H_w	6 feet

Lateral Earth Pressure Coefficient: $K_c = 1.20$
Applied Factor of Safety: $FS = 2$
Factored Skin Friction $f_s/FS = [c_2+K_c*\sigma'_v*(\tan \phi_2)]/FS$

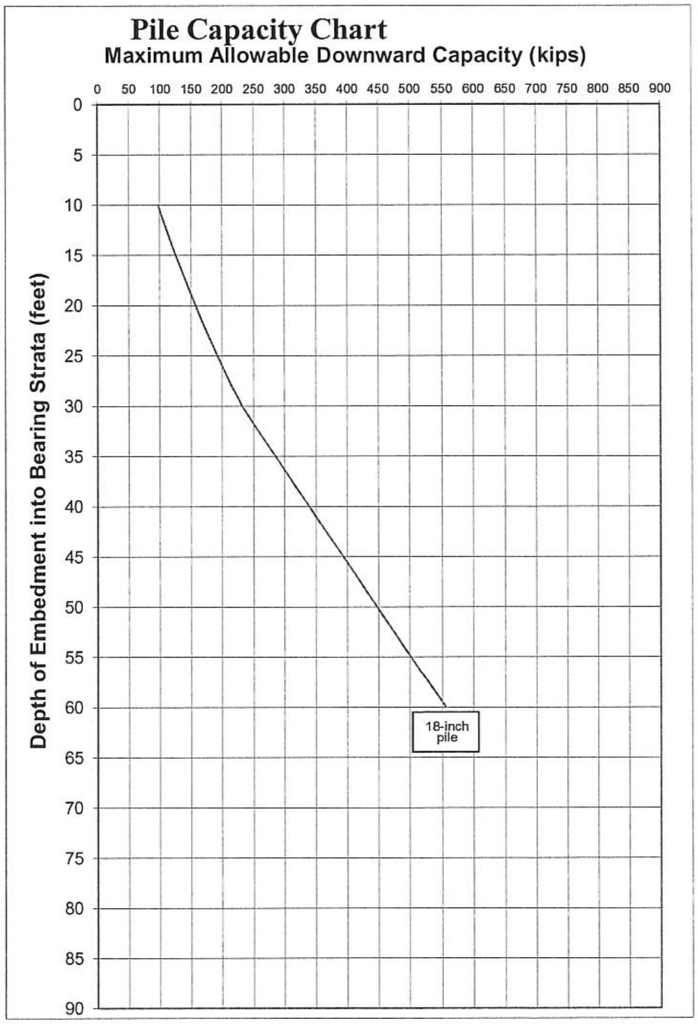
Pile Design:
Driven <<Driven/Drilled
Circular <<Circular/Square Pile

Pile Dimension:
18 inch diameter pile
18 inch diameter pile
18 inch diameter pile

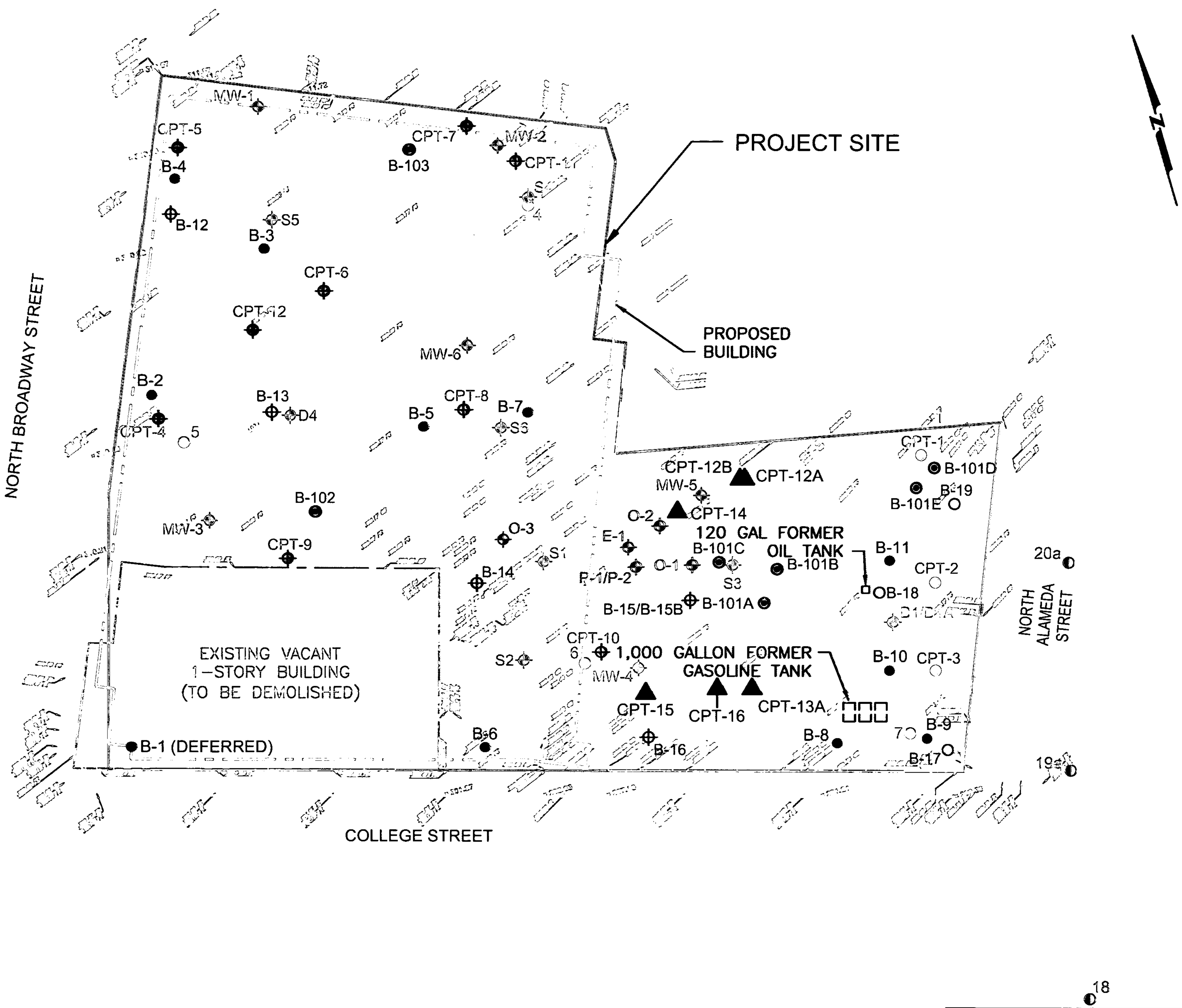
Critical Depth Limit (Dc):
20 B

Pile Capacity:

Total Depth of Pile (feet)	Depth of Embedment into Bearing Strata (feet)	Maximum Allowable Downward Pile Capacity: Capacity of 18 inch diameter pile (kips)	Capacity of 18 inch diameter pile (kips)	Capacity of 18 inch diameter pile (kips)
25	10	97.9	97.9	97.9
26	11	103.3	103.3	103.3
27	12	108.8	108.8	108.8
28	13	114.5	114.5	114.5
29	14	120.3	120.3	120.3
30	15	126.3	126.3	126.3
31	16	132.4	132.4	132.4
32	17	138.6	138.6	138.6
33	18	144.9	144.9	144.9
34	19	151.4	151.4	151.4
35	20	158.0	158.0	158.0
36	21	164.8	164.8	164.8
37	22	171.7	171.7	171.7
38	23	178.7	178.7	178.7
39	24	185.8	185.8	185.8
40	25	193.1	193.1	193.1
41	26	200.5	200.5	200.5
42	27	208.1	208.1	208.1
43	28	215.8	215.8	215.8
44	29	223.6	223.6	223.6
45	30	231.5	231.5	231.5
46	31	242.4	242.4	242.4
47	32	253.2	253.2	253.2
48	33	264.0	264.0	264.0
49	34	274.8	274.8	274.8
50	35	285.6	285.6	285.6
51	36	296.4	296.4	296.4
52	37	307.2	307.2	307.2
53	38	318.1	318.1	318.1
54	39	328.9	328.9	328.9
55	40	339.7	339.7	339.7
56	41	350.5	350.5	350.5
57	42	361.3	361.3	361.3
58	43	372.1	372.1	372.1
59	44	382.9	382.9	382.9
60	45	393.8	393.8	393.8
61	46	404.6	404.6	404.6
62	47	415.4	415.4	415.4
63	48	426.2	426.2	426.2
64	49	437.0	437.0	437.0
65	50	447.8	447.8	447.8
66	51	458.7	458.7	458.7
67	52	469.5	469.5	469.5
68	53	480.3	480.3	480.3
69	54	491.1	491.1	491.1
70	55	501.9	501.9	501.9
71	56	512.7	512.7	512.7
72	57	523.5	523.5	523.5
73	58	534.4	534.4	534.4
74	59	545.2	545.2	545.2
75	60	556.0	556.0	556.0



Note: 1. Minimum pile embedment depth of 10 feet
2. Uplift capacity may be designed using 50% of the downward capacity
3. Pile should be spaced a minimum of 3 diameters on center
4. See text of report for pile details and installation recommendations



EXPLANATION

CURRENT INVESTIGATION

B-103 ◉ BORING LOCATION AND NUMBER

PRIOR INVESTIGATIONS

CPT-16 ▲ JANUARY 2013 CONE PENETROMETER TESTS (4953-13-0061)

O-3 FEBRUARY 2005 AQUIFER TESTING INVESTIGATION OBSERVATION WELLS (4953-03-3444)

P-2 FEBRUARY 2005 AQUIFER TESTING INVESTIGATION PIEZOMETER (4953-03-3444)

E-1 FEBRUARY 2005 AQUIFER TESTING INVESTIGATION EXTRACTION WELL (4953-03-3444)

CPT-3 ○ FEBRUARY 2005 CONE PENETROMETER TESTS (4953-03-3444)

CPT-11 APRIL 2005 CONE PENETROMETER TESTS (4953-05-3446)

S3/D4 MARCH 2005 METHANE AND HYDROGEN SULFIDE INVESTIGATION (4953-03-3445)

MW-1 DECEMBER 2004 MONITORING WELL INSTALLED BY CITY OF LOS ANGELES, DEPT. OF PUBLIC WORKS, GEOTECHNICAL ENGINEERING DIVISION

B-16 MARCH 2004 BORING (4953-03-3442)

B-19 ○ MARCH 2004 GEOPROBE BORING (4953-03-3442)

B-11 ● FEBRUARY 2004 BORING (4953-03-3441)

7 ○ PRIOR INVESTIGATION (A-81132)

20a ◐ PRIOR INVESTIGATION (70111-0-0041)

"BENT" BORING LOCATION AND NUMBER

B-15B GEOPROBE REDRILLED THROUGH BORING B-15

PREVIOUS UST LOCATION (REMOVED 1956)

NOTE: MONITORING WELL NOT CONSTRUCTED AT MW-4; BORING TERMINATED

REFERENCES:

1. SITE PLAN DATED FEBRUARY 2, 2004 AND PROVIDED BY NAKADA & ASSOCIATES, INC.
2. MONITORING WELLS SURVEYED BY DULIN & BOYNTON LICENSED SURVEYORS FEBRUARY 2005.
3. A.L.T.A./ACSM LAND TITLE SURVEY DATED JANUARY 31, 2003 BY MOLLENHAUER GROUP.

0 25' 50' 100'
SCALE: 1" = 50'

AMEC
Environment & Infrastructure, Inc.
6001 Rickenbacker Road, Los Angeles, CA 90040
Phone (323) 889-5300 Fax (323) 721-6700

SCALE	1" = 50'
DRAWN	VMN
CHKD	RM/HP
BY	MBH
DATE	3/26/2013

PLOT PLAN

PROPOSED CHINATOWN BLOSSOM PLAZA PROJECT
900 NORTH BROADWAY
LOS ANGELES, CALIFORNIA

FIGURE 1

4953-13-0061

Path: P:\4953 Geotech\2013-proj\130061 Chinatown Blossom Plaza\CAD\DWG\4953-13-0061_Fig-1_Site Plan rev (13 02 07).dwg [Figure 1]
Date: March 27, 2013 - 9:20am By: walter.lopez

Table 1: Groundwater Data in Monitoring Wells

Monitoring Well	MW Lip Elev. (ft) [2]	Date Installed	Screen Interval (ft)	Date of Monitoring	Elevation to Groundwater (ft)	Depth to Groundwater (ft)
MW - 1	310.53	12/2/2004	30-60	12/2/2004 [3]	251.53	59
				12/21/2004 [3]	264.33	46.2
				1/13/2005 [3]	264.73	45.8
				1/26/2005 [3]	265.13	45.4
				2/15/2005 [4]	265.31	45.22
				2/25/2005 [4]	265.79	44.74
MW - 2	308.63	12/3/2004	30-60	12/3/2004 [3]	258.63	50
				12/21/2004 [3]	264.28	44.35
				1/13/2005 [3]	264.63	44
				1/26/2005 [3]	265.03	43.6
				2/15/2005 [4]	265.95	42.68
				2/25/2005 [4]	265.89	42.74
MW - 3	309.73	12/1/2004	30-60	12/1/2001 [3]	267.73	42
				12/21/2004 [3]	264.13	45.6
				1/13/2005 [3]	264.23	45.5
				1/26/2005 [3]	265.03	44.7
				2/15/2005 [4]	265.07	44.66
				2/25/2005 [4]	265.33	44.4
MW - 4	N/A	12/10/2004	N/A [a]	N/A [a]	N/A [a]	N/A [a]
MW - 5	297.3	12/9/2004	30-60	12/9/2004 [3]	248.3	49
				12/21/2004 [3]	264.6	32.7
				1/13/2005 [3]	267.7	29.6
				1/26/2005 [3]	267.9	29.4
				2/15/2005 [4]	267.96	29.34
				2/25/2005 [4]	269.89	27.41
MW - 6	308.54	12/7/2004	30-60	12/7/2004 [3]	259.54	49
				12/21/2004 [3]	264.24	44.3
				1/13/2005 [3]	264.54	44
				1/26/2005 [3]	265.04	43.5
				2/15/2005 [4]	265.24	43.3
				2/25/2005 [4]	265.55	42.99
E - 1	299.14	2/11/2005	20-40	2/11/2005	272.14	27
				2/15/2005	272.78	26.36
				2/25/2005	274.75	24.39

Table 1 (Continued): Groundwater Data in Monitoring Wells

Monitoring Well	MW Lip Elev. (ft) [(2)]	Date Installed	Screen Interval (ft)	Date of Monitoring	Elevation to Groundwater ft)	Depth to Groundwater (ft)
O - 1	296.88	2/9/2005	20-40	2/9/2005	271.88	25
				2/15/2005	273.06	23.82
				2/25/2005	274.67	22.21
O - 2	298.25	2/9/2005	20-40	2/9/2005	271.25	27
				2/15/2005	268.37	29.88
				2/25/2005	274.67	23.58
O - 3	305.2	2/10/2005	25-45	2/10/2005	275.2	30
				2/15/2005	265.45	39.75
				2/25/2005	265.57	39.63
				2/15/2005	269.55	29.2
				2/25/2005	272.05	26.7
P - 2	298.73	2/10/2005	50-60	2/10/2005	270.73	28
				2/15/2005	264.95	33.78
				2/25/2005	265.31	33.42

By: WL 2/19/2013, Checked: MAE 3/1/2013

(1) Monitoring wells constructed by City of Los Angeles, Department of Public Works, Geotechnical Division (Dec. 2004).

(2) Monitoring well lip elevation measured in February 2005 by Dulin & Boynton Surveyors. Elevations measured relative to permanent mark on top of well casing (north).

(3) Groundwater depth measurements collected by City of Los Angeles, Department of Public Works, Geotechnical Division.

(4) Groundwater depth measurements collected by MACTEC in February 2005 during field investigation as a part of aquifer testing and dewatering consultation services.

(4) Aquifer Test Wells installed by MACTEC in February 2005 as a part of aquifer testing and dewatering consultation services (See report dated April 2005)

[a] Monitoring well not installed due to extreme OVA values.

PRESENTATION

OF

CONE PENETRATION TEST DATA

Project:

Bond China Town
Los Angeles, CA
February 11, 2005

Prepared for:

Mr. John McKeown
MACTEC
200 Citadel Drive, 2nd Floor
Los Angeles, CA 90040-1554
Office (323) 889-5300 / Fax (323) 889-5398

Prepared by:

KEHOE TESTING & ENGINEERING
15571 Industry Lane
Huntington Beach, CA 92649-1534
Office (714) 901-7270 / Fax (714) 901-7289

TABLE OF CONTENTS

PRESENTATION

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the Bond China Town project located in Los Angeles, California. The work was performed by Kehoe Testing & Engineering (KTE) on February 11, 2005. The scope of work was performed as directed by MACTEC personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at three locations to determine the soil lithology. The groundwater measurements were taken in the open CPT hole approximately 10 minutes after completion of CPT. The following **TABLE 2.1** summarizes the CPT soundings performed:

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	59	Groundwater @ 23.0 ft
CPT-2	49	Groundwater @ 18.9 ft
CPT-3	59	Groundwater @ 16.2 ft

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

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

- Cone Resistance (qc)
- Sleeve Friction (fs)
- 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 portable computer and stored on a diskette 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. Penetration depths are referenced to ground surface. The soil classification on the CPT plots is derived from the CPT Classification Chart (Robertson, 1986) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used 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.

Output from the interpretation program CPTINT provides averaged CPT data over one-foot intervals. The CPTINT output includes Soil Classification Zones, SPT N Values and Undrained Shear Strength (Su). A summary of the equations used for the tabulated parameters is provided in the CPTINT Correlation Table in the Appendix.

The interpretation of soils encountered on this project was carried out using correlations developed by Robertson et al, 1986. It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgment 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.

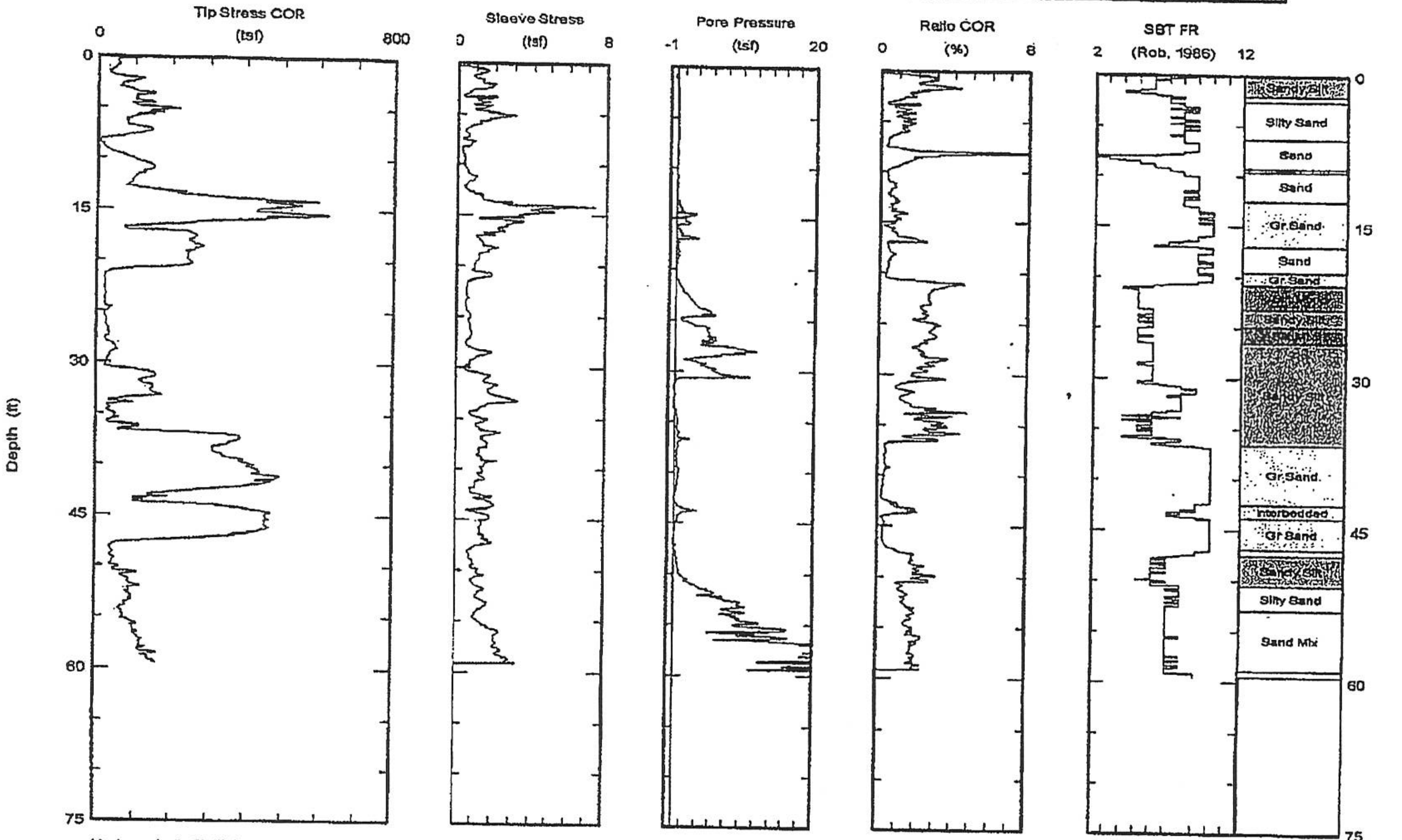
Sincerely,

KEHOE TESTING & ENGINEERING

Steven P. Kehoe, P.E.
President

02/17/05-BS

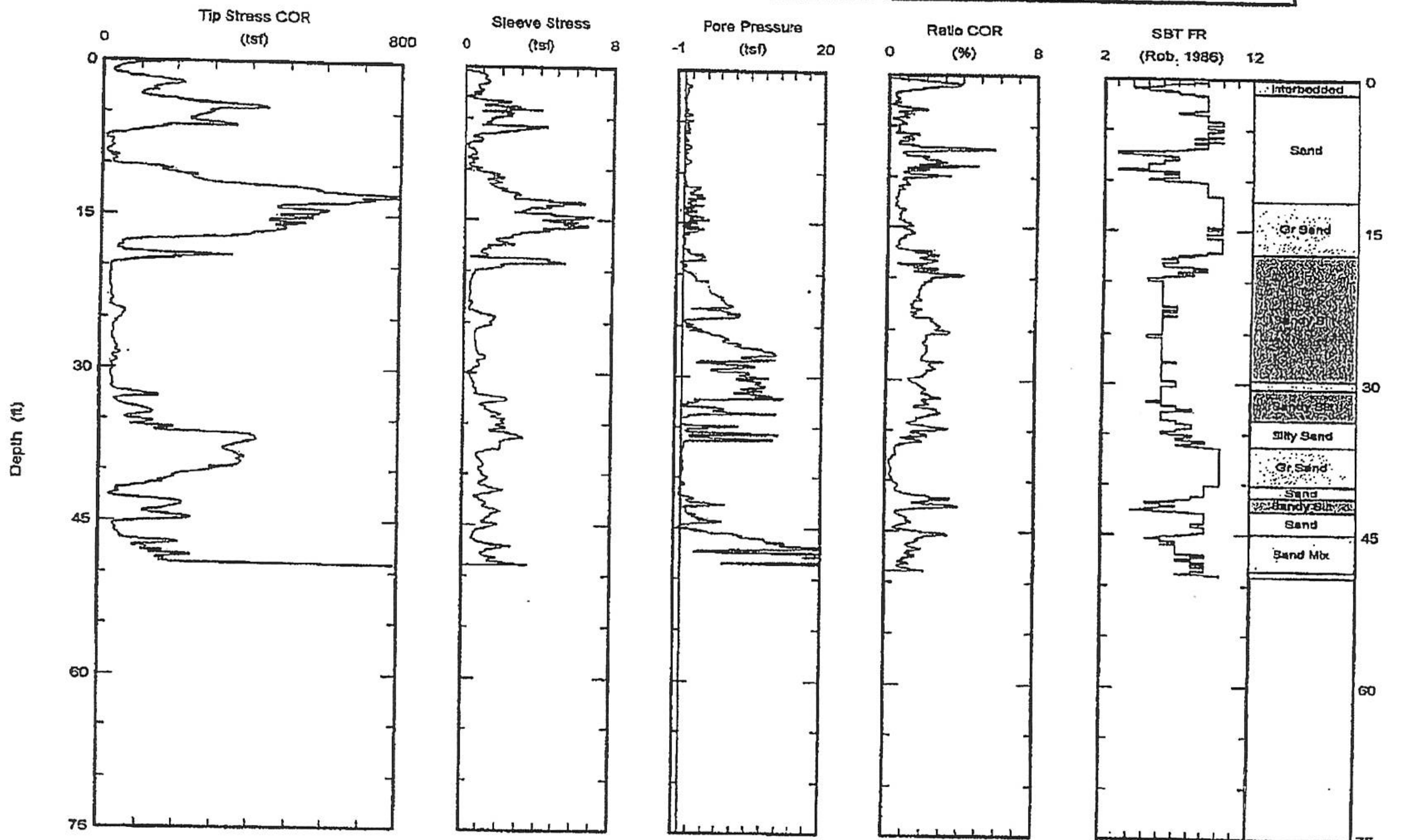
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 11/Feb/2005 Test ID: CPT-1 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 59.45 (ft)

Test ID: CPT-1
File:Z11F0501C.ecp

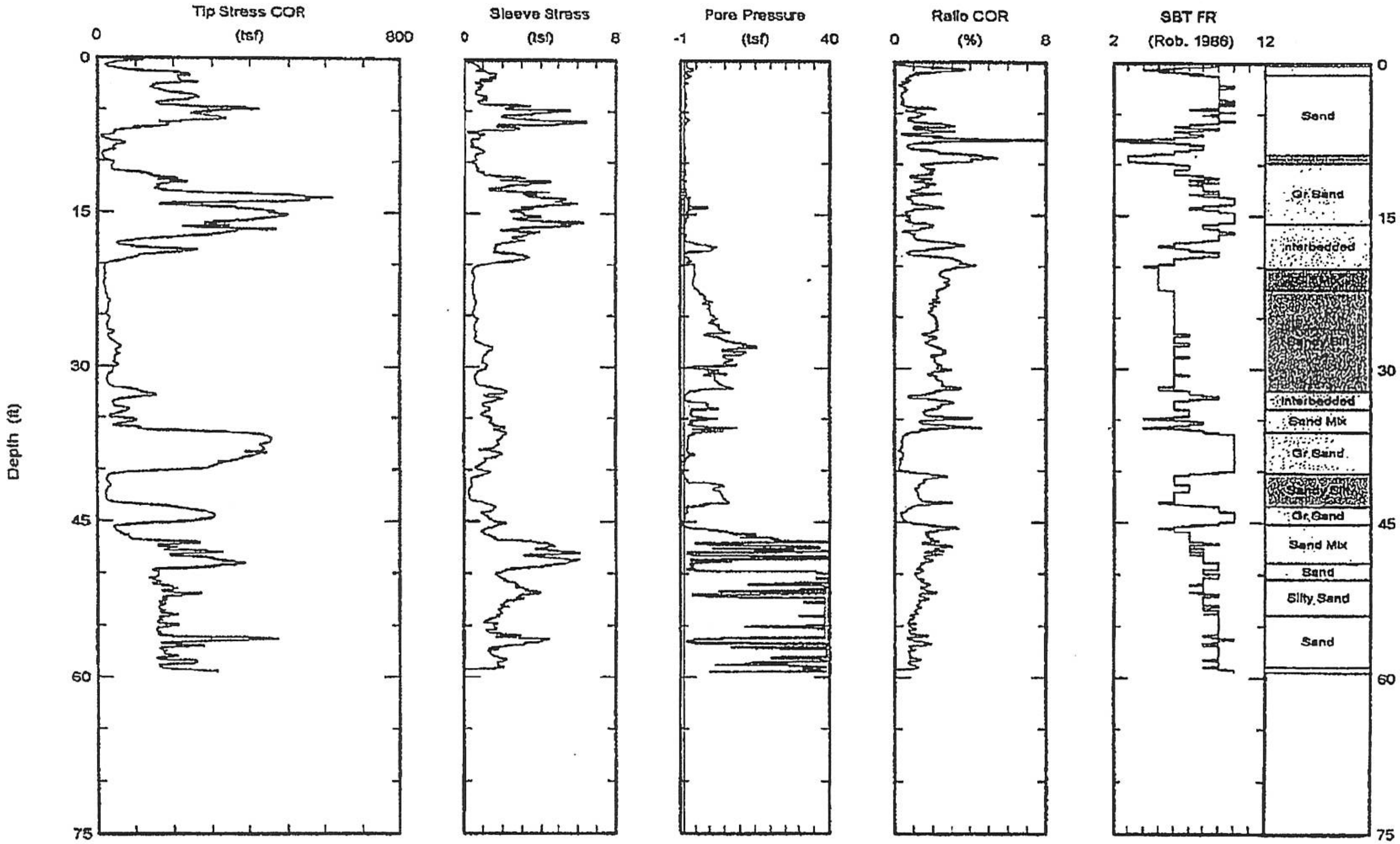
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 11/Feb/2005 Test ID: CPT-2 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 49.18 (ft)

Test ID: CPT-2
File: 211F0502C.ecp

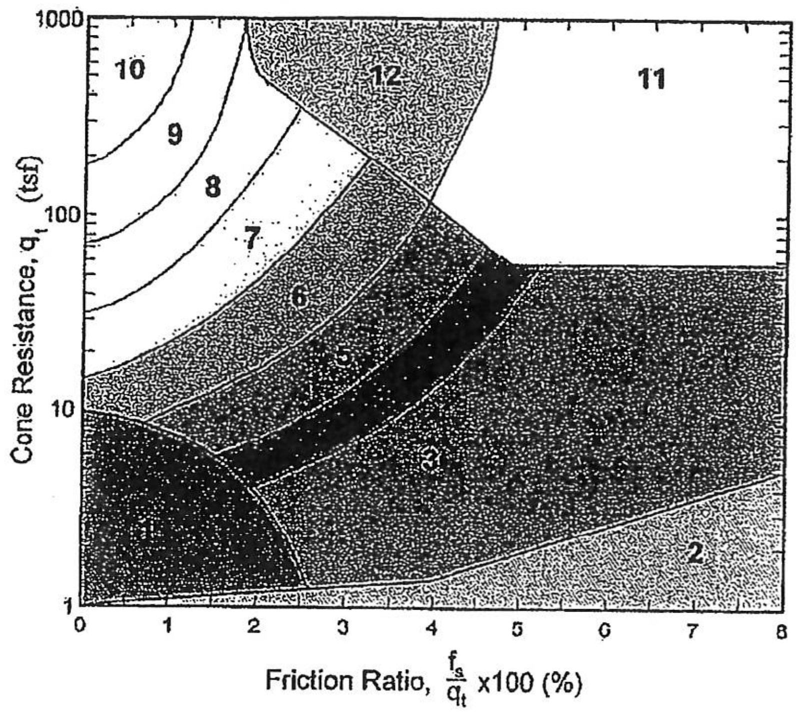
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 11/Feb/2005 Test ID: CPT-3 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 59.49 (ft)

Test ID: CPT-3
FD: Z11F0503C.ecp

CPT Soil Behavior Type Legend
(Robertson et al. 1986)



Zone	Soil Behavior Type
1	Sensitive, Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained*
12	Sand to Clayey Sand*

*Overconsolidated or cemented

"---| INPUT FILE: C:\Temp\CPT-1.CSV |---

" Depth (feet)	Qt(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	53.923	0.943	1.749	7	17	26	9E9
1.500	39.858	1.119	2.808	6	15	23	9E9
2.500	84.321	1.280	1.518	7	27	41	9E9
3.500	108.779	1.113	1.023	8	26	39	9E9
4.500	119.300	1.480	1.241	8	29	44	9E9
5.500	141.769	1.948	1.374	8	34	51	9E9
6.500	88.521	0.622	0.703	8	21	32	9E9
7.500	106.614	0.611	0.573	9	20	30	9E9
8.500	12.179	0.394	3.236	4	8	12	0.777
9.500	50.254	0.365	0.726	8	12	18	9E9
10.500	128.900	0.504	0.391	9	25	35	9E9
11.500	118.850	0.799	0.673	9	23	30	9E9
12.500	93.893	0.627	0.668	8	22	27	9E9
13.500	279.346	1.845	0.660	9	54	62	9E9
14.500	501.277	4.829	0.963	9	96	104	9E9
15.500	494.162	2.765	0.559	10	79	81	9E9
16.500	186.862	2.200	1.177	9	36	35	9E9
17.500	251.693	1.260	0.501	9	48	46	9E9
18.500	266.343	1.591	0.597	9	51	48	9E9
19.500	244.336	1.111	0.455	9	47	43	9E9
20.500	187.615	1.273	0.679	9	36	32	9E9
21.500	26.271	0.914	3.480	5	13	11	1.662
22.500	21.885	0.578	2.643	5	10	9	1.366
23.500	23.271	0.559	2.403	6	9	8	9E9
24.500	28.208	0.653	2.316	6	11	9	9E9
25.500	24.758	0.721	2.911	5	12	10	1.545
26.500	29.308	0.798	2.724	6	11	9	9E9
27.500	29.708	0.632	2.129	6	11	9	9E9
28.500	48.400	1.382	2.856	6	19	15	9E9
29.500	33.800	0.788	2.332	6	13	10	9E9
30.500	72.969	1.222	1.674	7	23	17	9E9
31.500	140.362	1.799	1.282	8	34	25	9E9
32.500	149.750	2.031	1.357	8	36	26	9E9
33.500	95.600	2.198	2.300	7	31	22	9E9
34.500	35.264	1.000	2.836	6	14	10	9E9
35.500	44.771	1.378	3.078	6	17	12	9E9
36.500	147.492	1.774	1.203	8	35	24	9E9
37.500	373.657	1.589	0.425	10	60	40	9E9
38.500	322.050	1.325	0.411	10	51	34	9E9
39.500	381.987	1.589	0.416	10	61	40	9E9
40.500	430.243	1.446	0.336	10	69	44	9E9
41.499	462.100	1.132	0.245	10	74	47	9E9
42.499	260.236	1.201	0.462	10	42	26	9E9
43.499	158.554	1.898	1.197	8	38	23	9E9
44.499	419.879	1.481	0.353	10	67	41	9E9
45.499	455.486	1.422	0.312	10	73	44	9E9
46.499	422.629	1.494	0.353	10	67	40	9E9
47.499	138.029	1.349	0.977	8	33	19	9E9
48.499	42.367	0.804	1.898	6	16	9	9E9
49.499	46.336	1.039	2.243	6	18	10	9E9
50.499	72.400	1.191	1.645	7	23	13	9E9
51.499	90.946	1.218	1.340	8	22	12	9E9
52.499	91.315	1.304	1.428	8	22	12	9E9
53.499	84.523	1.561	1.847	7	27	15	9E9
54.499	70.808	1.144	1.615	7	23	12	9E9
55.499	93.900	1.790	1.906	7	30	16	9E9
56.499	108.693	2.205	2.029	7	35	19	9E9
57.499	124.338	2.291	1.842	7	40	21	9E9
58.499	136.064	2.588	1.902	7	43	22	9E9
59.499	154.143	0.857	0.556	9	30	15	9E9

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Depth (feet)	Qt(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	58.292	0.591	1.014	7	19	29	9E9
1.500	103.571	1.072	1.035	8	25	38	9E9
2.500	167.208	0.681	0.407	9	32	48	9E9
3.500	162.353	1.548	0.953	9	31	47	9E9
4.500	356.215	2.241	0.629	10	57	86	9E9
5.500	263.500	2.021	0.767	9	50	75	9E9
6.500	169.821	1.598	0.941	9	33	50	9E9
7.500	24.036	0.462	1.923	6	9	14	9E9
8.500	21.167	0.531	2.510	5	10	15	1.376
9.500	32.069	0.522	1.626	6	12	18	9E9
10.500	155.793	1.429	0.917	9	30	41	9E9
11.500	282.714	1.717	0.607	9	54	70	9E9
12.500	591.623	2.631	0.445	10	94	113	9E9
13.500	686.407	4.829	0.704	10	110	125	9E9
14.500	535.793	4.878	0.910	10	86	92	9E9
15.500	500.379	5.310	1.061	9	96	98	9E9
16.500	452.593	2.969	0.656	10	72	70	9E9
17.500	153.750	1.792	1.166	8	37	35	9E9
18.500	115.023	1.815	1.578	8	28	26	9E9
19.500	119.207	2.662	2.233	7	38	35	9E9
20.500	27.508	0.562	2.044	6	11	10	9E9
21.500	25.892	0.434	1.676	6	10	9	9E9
22.500	29.023	0.425	1.466	6	11	9	9E9
23.500	30.508	0.507	1.661	6	12	10	9E9
24.500	59.000	1.521	2.579	6	23	19	9E9
25.500	40.857	1.054	2.579	6	16	13	9E9
26.500	34.150	0.696	2.039	6	13	10	9E9
27.500	39.469	0.778	1.970	6	15	12	9E9
28.500	43.475	1.032	2.375	6	17	13	9E9
29.500	36.642	0.694	1.894	6	14	11	9E9
30.500	30.408	0.515	1.694	6	12	9	9E9
31.500	33.325	0.731	2.193	6	13	9	9E9
32.500	91.029	1.761	1.934	7	29	21	9E9
33.500	64.840	1.355	2.090	7	21	15	9E9
34.500	112.075	2.051	1.830	7	36	25	9E9
35.500	136.725	2.071	1.515	8	33	23	9E9
36.500	363.867	2.547	0.700	10	58	39	9E9
37.500	355.958	1.625	0.457	10	57	38	9E9
38.500	367.823	0.976	0.265	10	59	39	9E9
39.500	350.077	1.079	0.308	10	56	36	9E9
40.500	216.685	1.207	0.557	9	42	27	9E9
41.499	107.408	1.613	1.502	8	26	16	9E9
42.499	64.800	1.077	1.662	7	21	13	9E9
43.499	192.950	1.649	0.855	9	37	23	9E9
44.499	178.343	1.484	0.832	9	34	21	9E9
45.499	46.892	1.009	2.152	6	18	11	9E9
46.499	71.900	0.995	1.383	7	23	14	9E9
47.499	139.125	1.581	1.136	8	33	19	9E9
48.499	179.446	1.625	0.906	9	34	20	9E9
49.499	472.967	0.000	0.000	10	9E9	9E9	9E9

CPT-3

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Depth (feet)	Qt(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	44.283	0.614	1.387	7	14	21	9E9
1.500	172.643	1.326	0.768	9	33	50	9E9
2.500	187.757	0.894	0.476	9	36	54	9E9
3.500	218.936	0.891	0.407	9	42	63	9E9
4.500	247.140	2.380	0.963	9	47	71	9E9
5.500	292.907	3.171	1.083	9	56	84	9E9
6.500	165.357	3.421	2.069	7	53	80	9E9
7.500	32.167	0.671	2.085	6	12	18	9E9
8.500	50.136	0.613	1.222	7	16	24	9E9
9.500	17.046	0.638	3.741	4	11	17	1.097
10.500	37.992	0.653	1.719	7	12	17	9E9
11.500	147.362	2.152	1.460	8	35	46	9E9
12.500	176.129	2.625	1.490	8	42	51	9E9
13.500	478.480	4.279	0.894	10	76	87	9E9
14.500	338.821	3.613	1.066	9	65	71	9E9
15.500	432.364	3.910	0.904	9	83	86	9E9
16.500	333.543	3.650	1.094	9	64	63	9E9
17.500	170.093	2.698	1.586	8	41	39	9E9
18.500	145.985	1.751	1.199	8	35	33	9E9
19.500	81.771	2.499	3.056	6	31	29	9E9
20.500	20.508	0.558	2.719	5	10	9	1.282
21.500	19.817	0.540	2.725	5	9	8	1.232
22.500	20.975	0.487	2.320	5	10	9	1.306
23.500	29.082	0.607	2.088	6	11	9	9E9
24.500	28.125	0.547	1.944	6	11	9	9E9
25.500	28.991	0.635	2.189	6	11	9	9E9
26.500	31.900	0.606	1.899	6	12	10	9E9
27.500	40.591	0.765	1.884	6	16	13	9E9
28.500	54.642	1.288	2.356	6	21	16	9E9
29.500	48.025	1.062	2.211	6	18	14	9E9
30.500	36.775	0.811	2.205	6	14	11	9E9
31.500	28.927	0.766	2.649	6	11	8	9E9
32.500	112.542	1.737	1.543	8	27	20	9E9
33.500	54.275	1.353	2.493	6	21	15	9E9
34.500	60.592	1.174	1.938	7	19	13	9E9
35.500	75.615	1.592	2.105	7	24	17	9E9
36.500	334.736	1.967	0.588	10	53	36	9E9
37.500	443.029	1.698	0.383	10	71	48	9E9
38.500	414.429	1.529	0.369	10	66	44	9E9
39.500	317.579	0.886	0.279	10	51	33	9E9
40.500	68.733	0.892	1.297	7	22	14	9E9
41.499	29.877	0.382	1.280	7	10	6	9E9
42.499	24.333	0.307	1.260	6	9	6	9E9
43.499	142.754	1.318	0.923	9	27	17	9E9
44.499	291.729	1.212	0.416	10	47	29	9E9
45.499	89.000	1.523	1.711	7	28	17	9E9
46.499	100.677	1.802	1.789	7	32	19	9E9
47.499	218.079	4.564	2.093	7	70	41	9E9
48.499	277.238	4.972	1.793	8	66	39	9E9
49.499	249.347	3.265	1.309	9	48	26	9E9
50.499	154.407	2.080	1.347	8	37	21	9E9
51.499	195.386	3.161	1.618	8	47	27	9E9
52.499	181.129	2.482	1.370	8	43	24	9E9
53.499	172.307	1.919	1.113	9	33	18	9E9
54.499	173.386	1.469	0.847	9	33	18	9E9
55.499	167.033	1.700	1.018	9	32	17	9E9
56.499	298.364	3.160	1.059	9	57	30	9E9
57.499	183.336	1.500	0.818	9	35	18	9E9
58.499	201.186	1.909	0.949	9	39	20	9E9
59.499	242.286	0.480	0.198	10	39	20	9E9

SUMMARY

OF

CONE PENETRATION TEST DATA

Project

Chinatown Blossom Plaza
904 N. Broadway
Los Angeles, CA
January 29, 2013

Prepared for

Mr. Debanik Chaudhuri
AMEC Environment & Infrastructure, Inc.
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Los Angeles, CA 90040
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Prepared by

K T E

KEHOE TESTING & ENGINEERING
5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289

Figure A-1

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Figure A-2

PRESENTATION

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the Bond China Town project located in Los Angeles, California. The work was performed by Kehoe Testing & Engineering (KTE) on April 5, 2005. The scope of work was performed as directed by MACTEC personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at nine locations to determine the soil lithology. The groundwater measurements were taken in the open CPT hole approximately 10 minutes after completion of CPT. The following **TABLE 2.1** summarizes the CPT soundings performed:

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-4	16	Refusal, hole open to 16 ft. (dry)
CPT-5	17	Refusal, hole open to 17 ft. (dry)
CPT-6	19	Refusal, hole open to 19 ft. (dry)
CPT-7	25	Refusal, hole open to 25 ft. (dry)
CPT-8	28	Refusal, hole open to 28 ft. (dry)
CPT-9	19	Refusal, hole open to 18 ft. (dry)
CPT-10	63	Refusal, groundwater at 24 ft.
CPT-11	70	Refusal, hole open to 34 ft. (dry)
CPT-12	16	Refusal, hole open to 16 ft. (dry)

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

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

- Cone Resistance (qc)
- Sleeve Friction (fs)
- 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 portable computer and stored on a diskette 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. Penetration depths are referenced to ground surface. The soil classification on the CPT plots is derived from the CPT Classification Chart (Robertson, 1986) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used 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.

Output from the interpretation program CPTINT provides averaged CPT data over one-foot intervals. The CPTINT output includes Soil Classification Zones, SPT N Values and Undrained Shear Strength (Su). A summary of the equations used for the tabulated parameters is provided in the CPTINT Correlation Table in the Appendix.

The interpretation of soils encountered on this project was carried out using correlations developed by Robertson et al, 1986. It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u In these situations, experience, judgment 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, P.E.
President

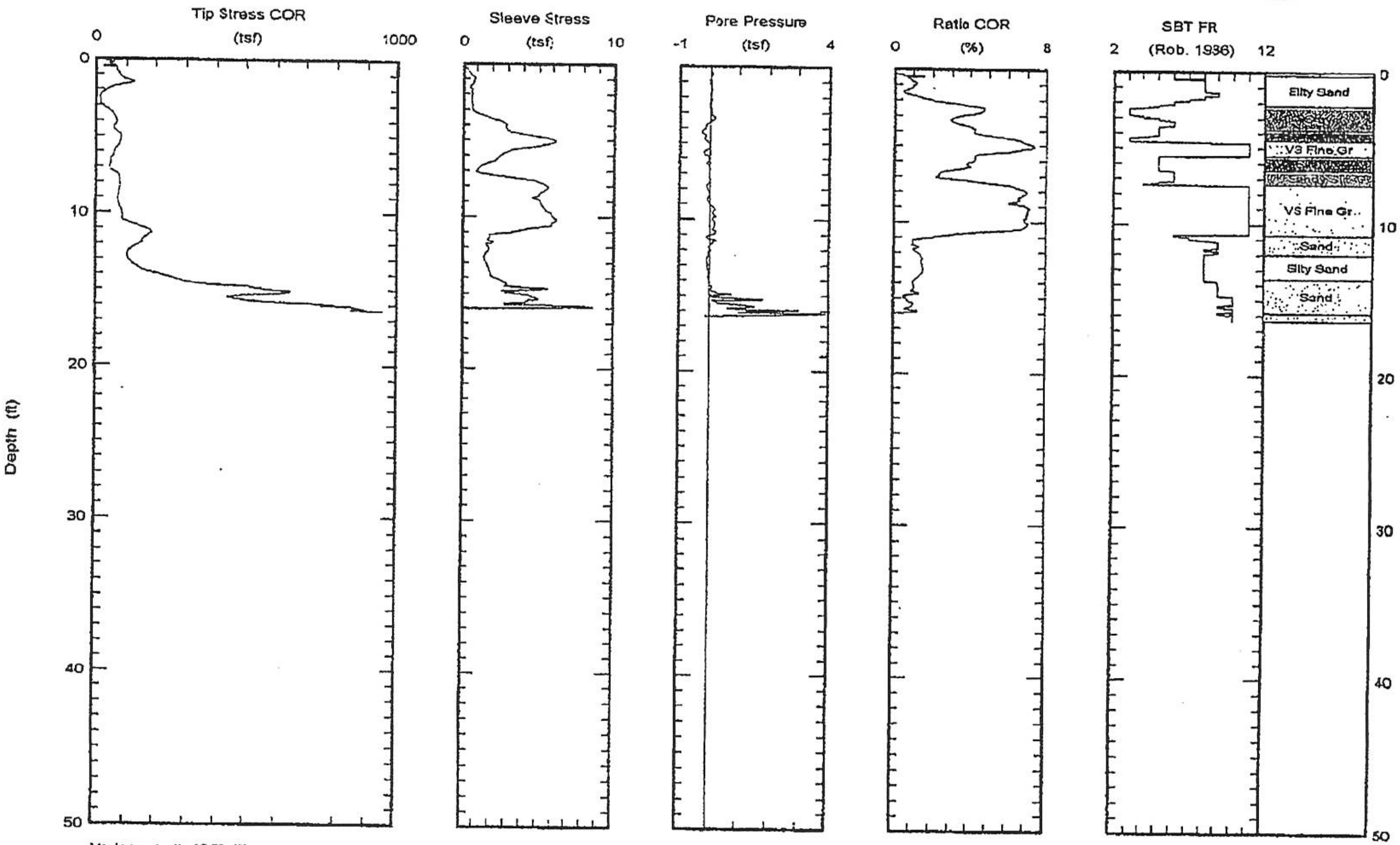
05/04/05-jh

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

CPT Data
30 ton rig

Date: 28/Apr/2005
Test ID: CPT-4
Project: LosAngeles

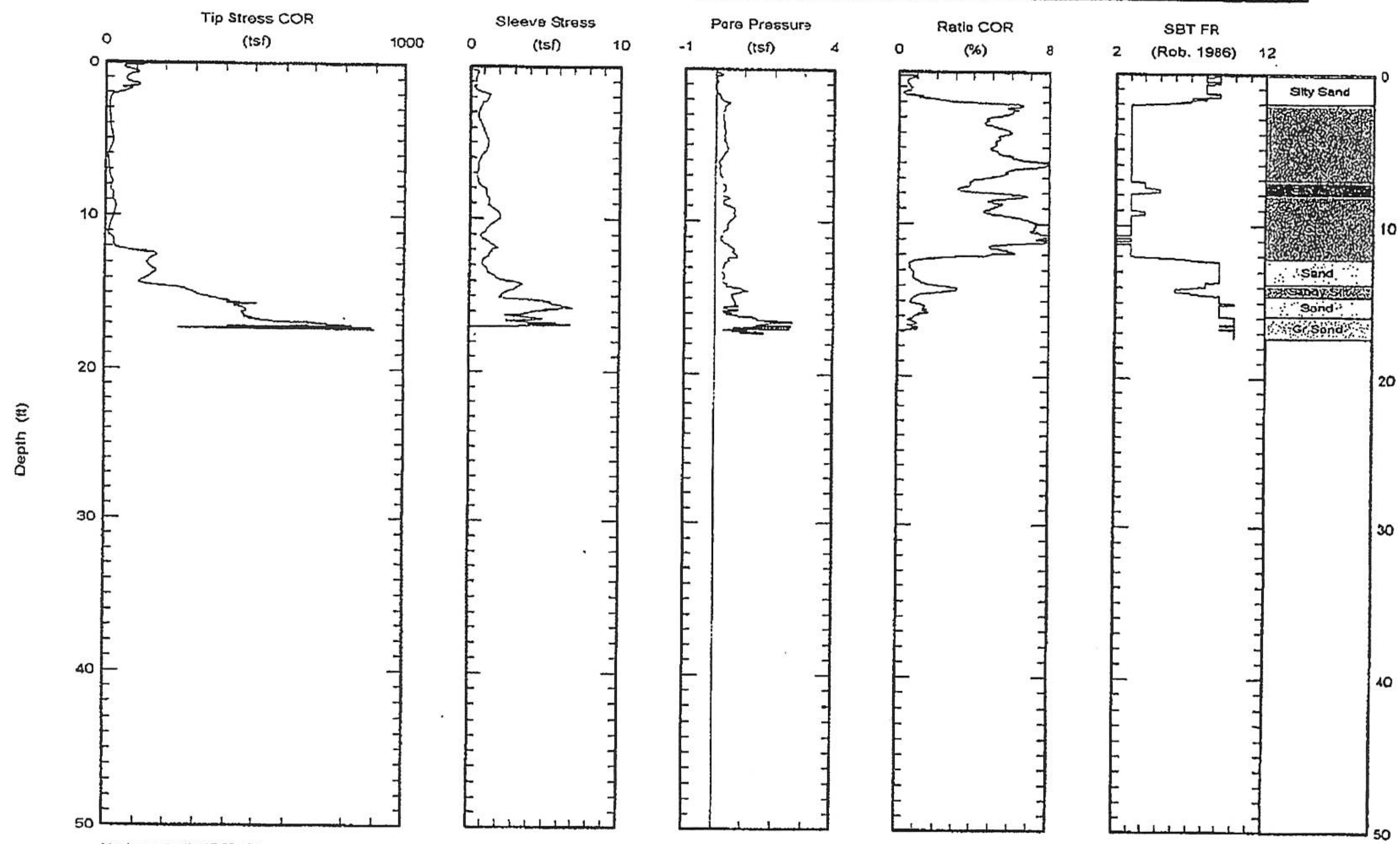
Client: MACTEC
Job Site: Bond China Town



Maximum depth: 16.39 (ft)

Test ID: CPT-4
File: 228A0801C.ECP

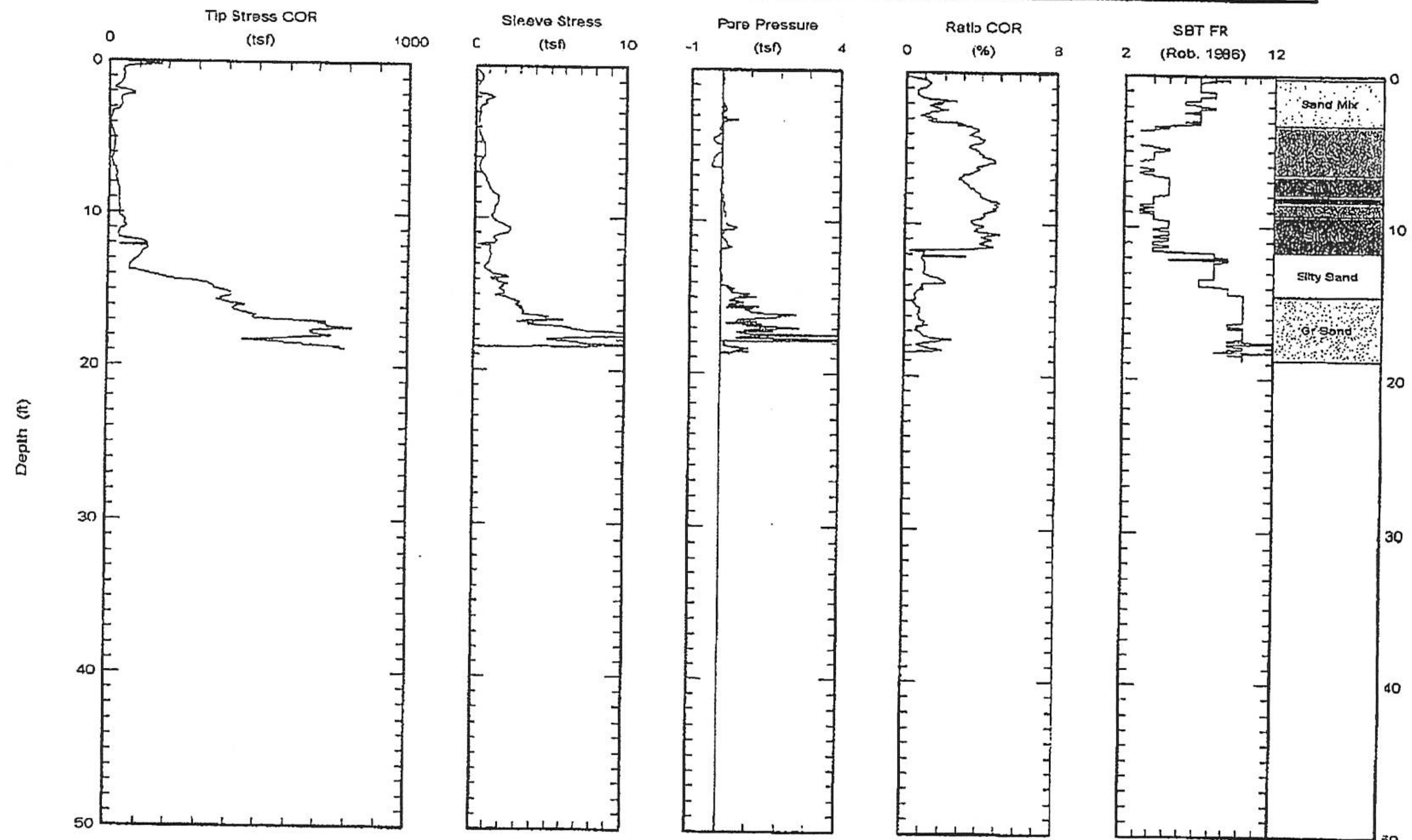
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-5 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 17.37 (ft)

Test ID: CPT-5
File: 28A0502C.ECP

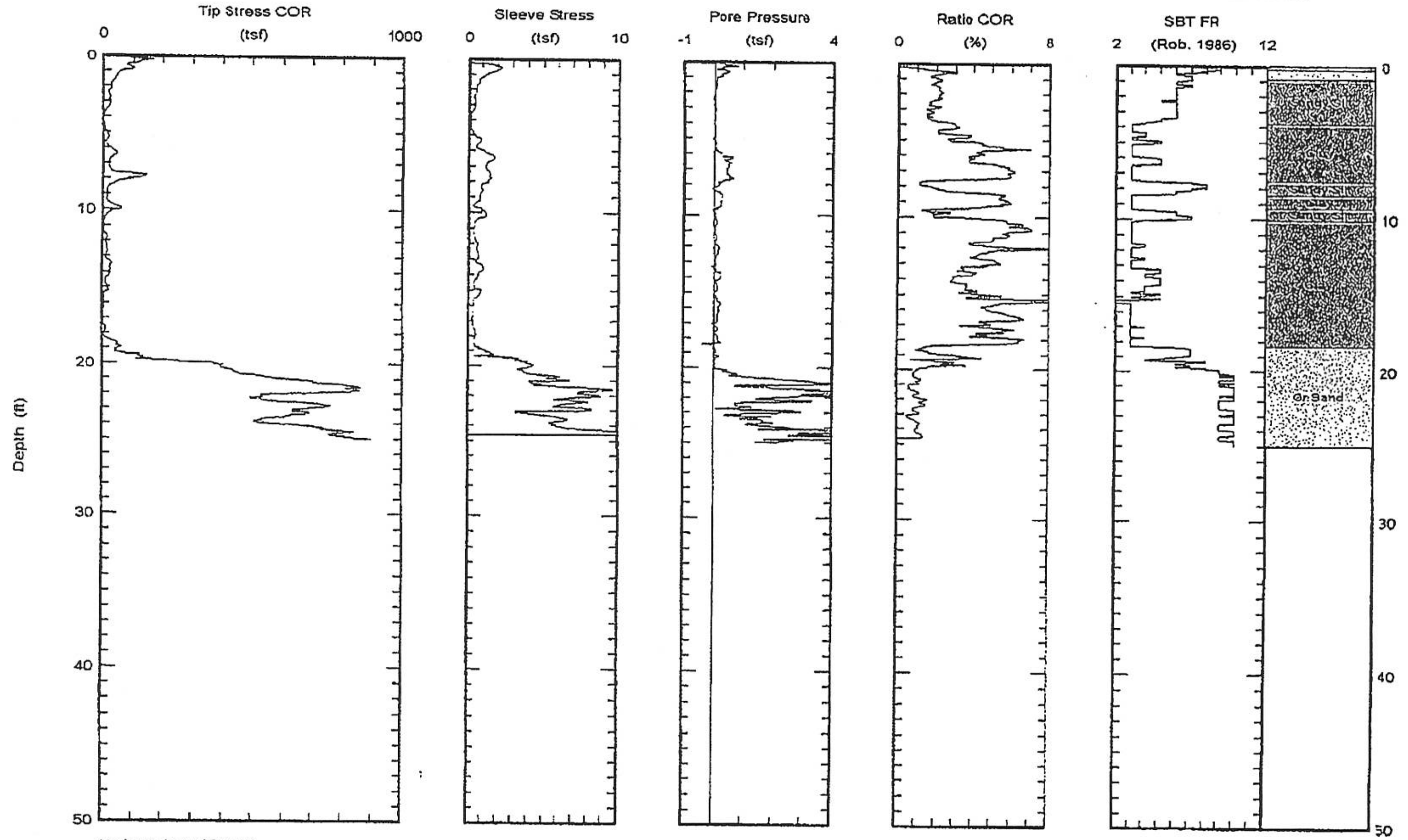
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-6 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 18.81 (ft)

Test ID: CPT-6
File: 28A0504C.ECP

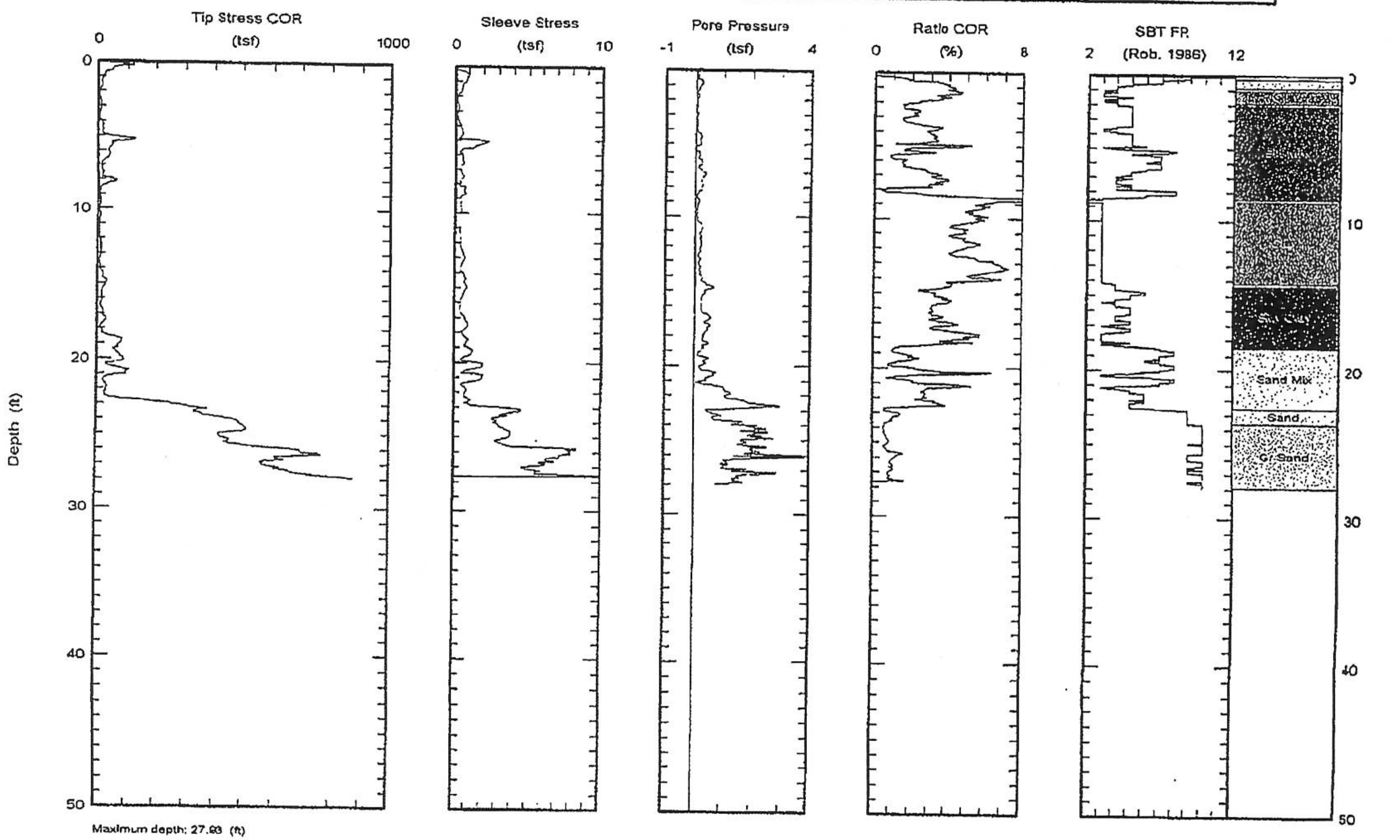
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-7 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 25.01 (ft)

Test ID: CPT-7
File: 28A0605C ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig Client: MACTEC Job Site: Bond China Town	Date: 28/Apr/2005 Test ID: CPT-8 Project: LosAngeles



Maximum depth: 27.93 (ft)

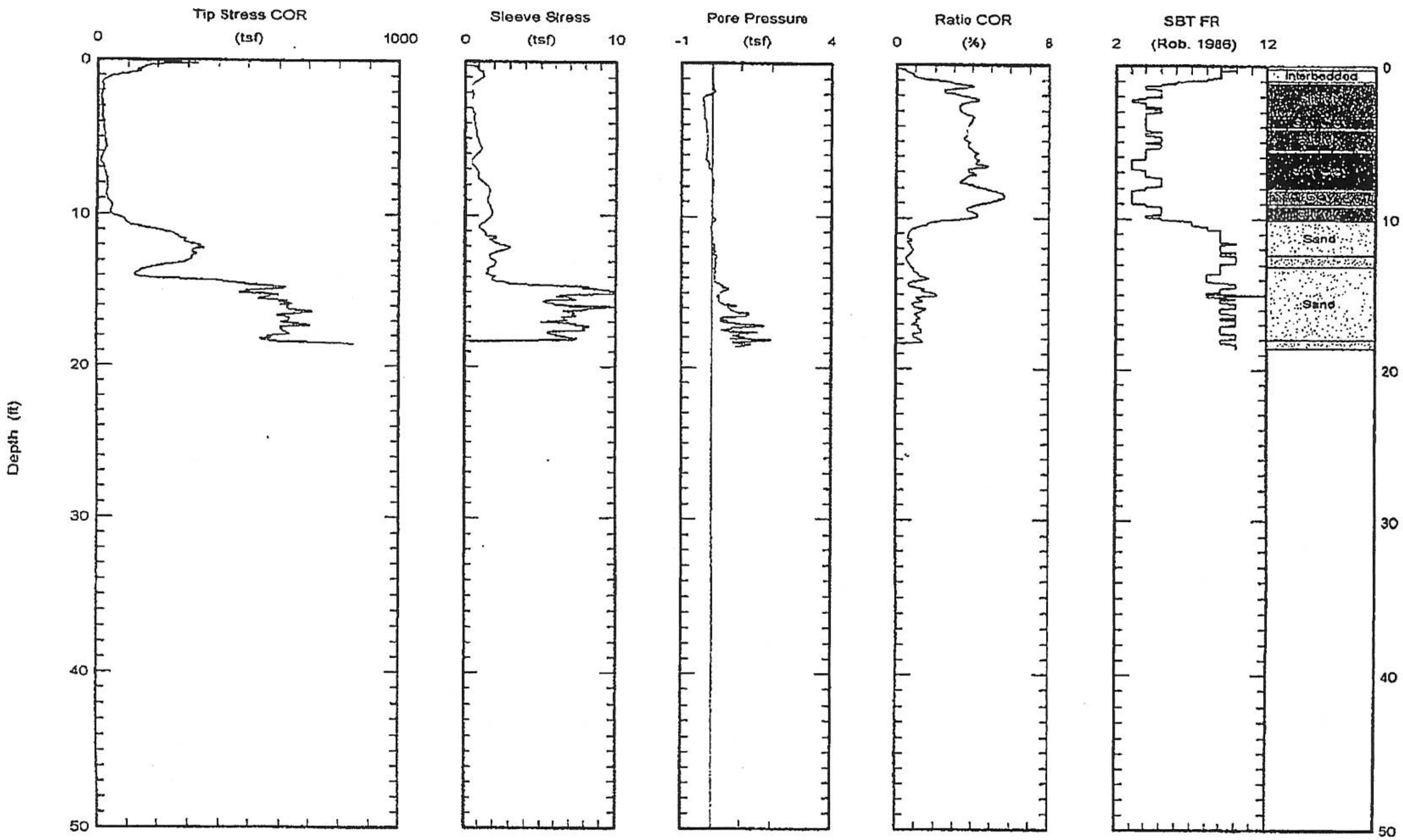
Test ID: CPT-8
File: 28A0503C ECP

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

CPT Data
30 ton rig

Date: 28/Apr/2005
Test ID: CPT-9
Project: LosAngeles

Client: MACTEC
Job Site: Bond China Town



Maximum depth: 18.58 (ft)

Test ID: CPT-9
File 228A0508C.ECP

KTE
Kehoe Testing & Engineering
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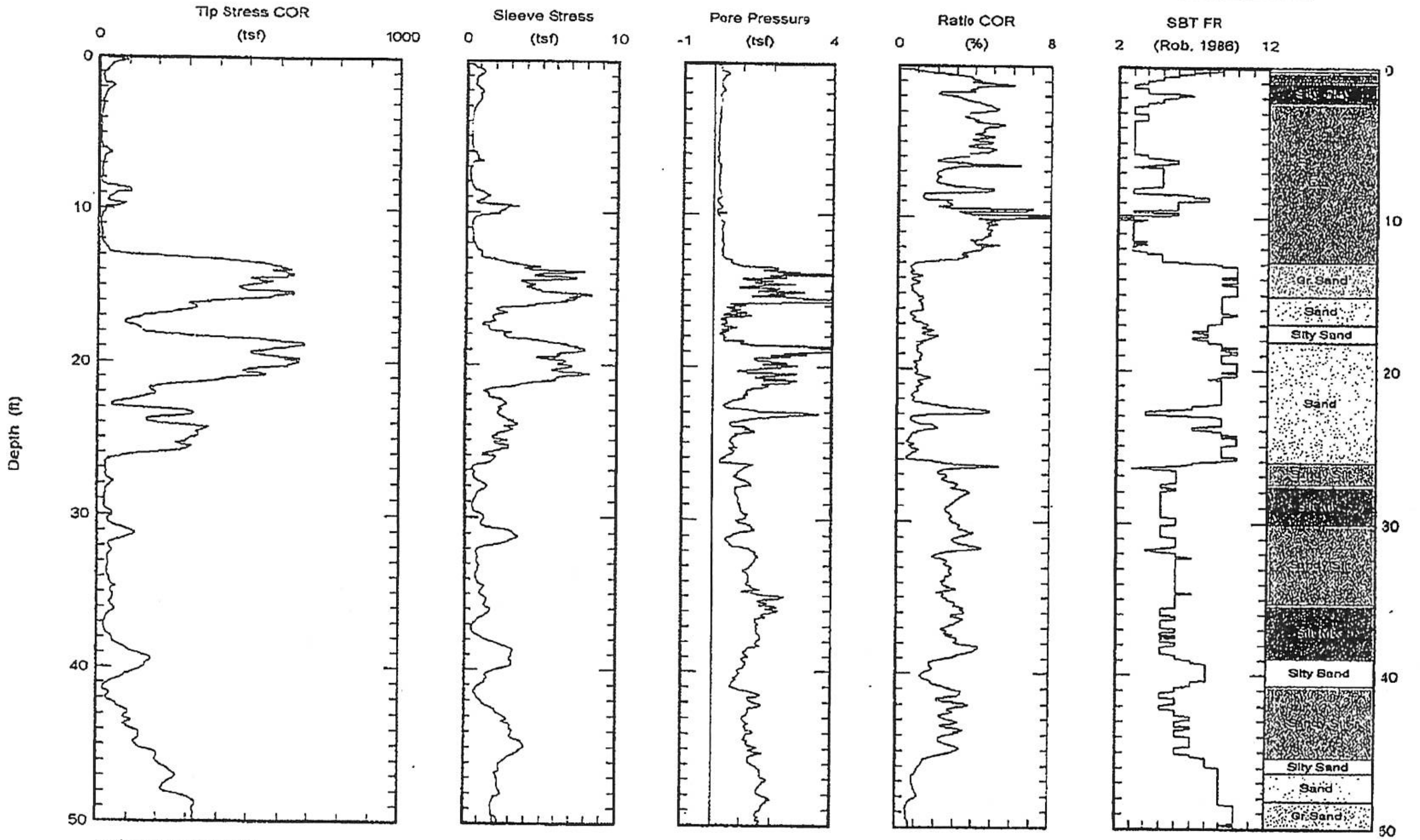
Fax: (714) 901-7289
skehoe@msn.com

CPT Data
30 ton rig

Date: 28/Apr/2005
Test ID: CPT-10
Project: LosAngeles

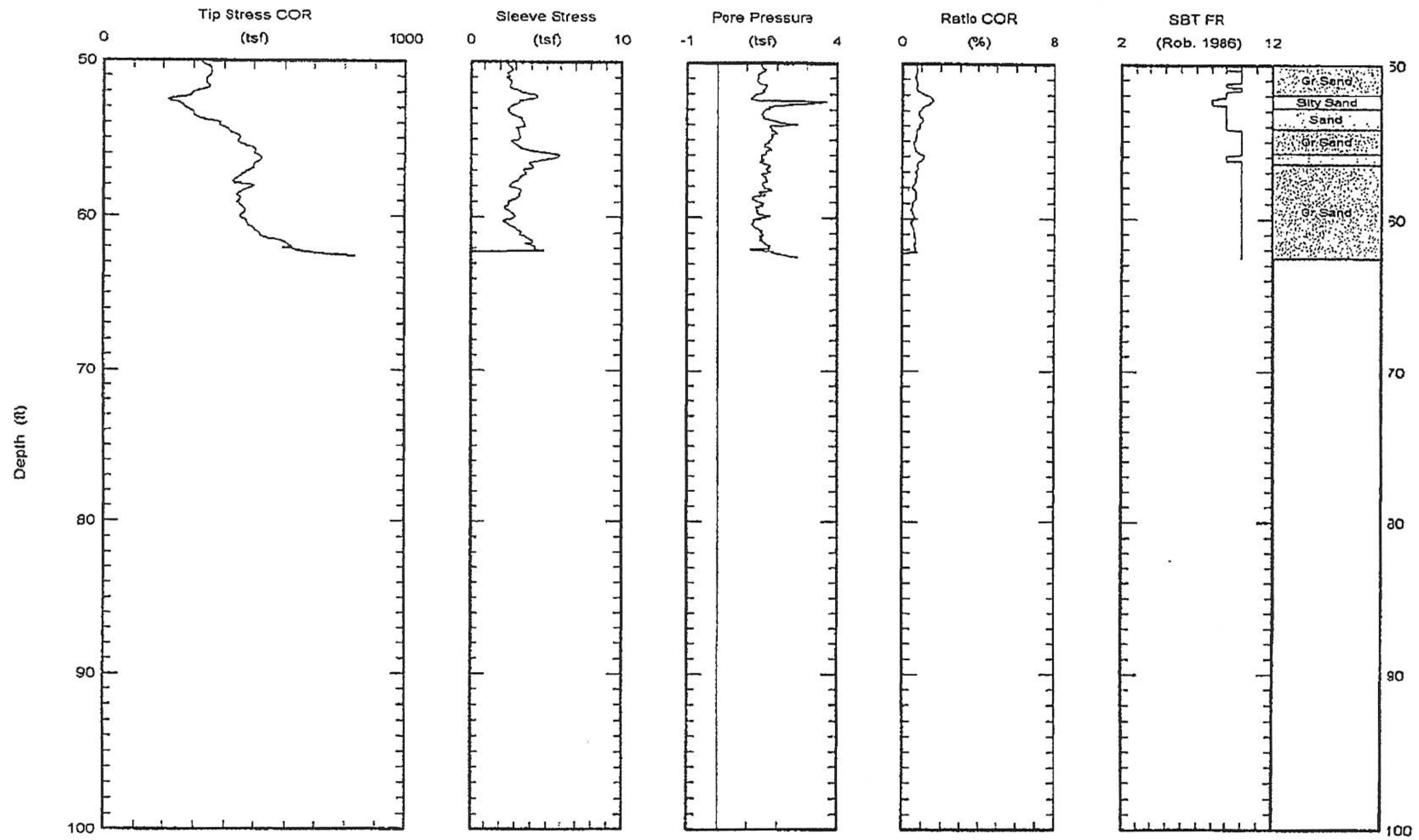
Client: MACTEC
Job Site: Bond China Town



Maximum depth: 62.64 (ft)
Page 1 of 2

Test ID: CPT-10
File: 228A0807C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-10 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



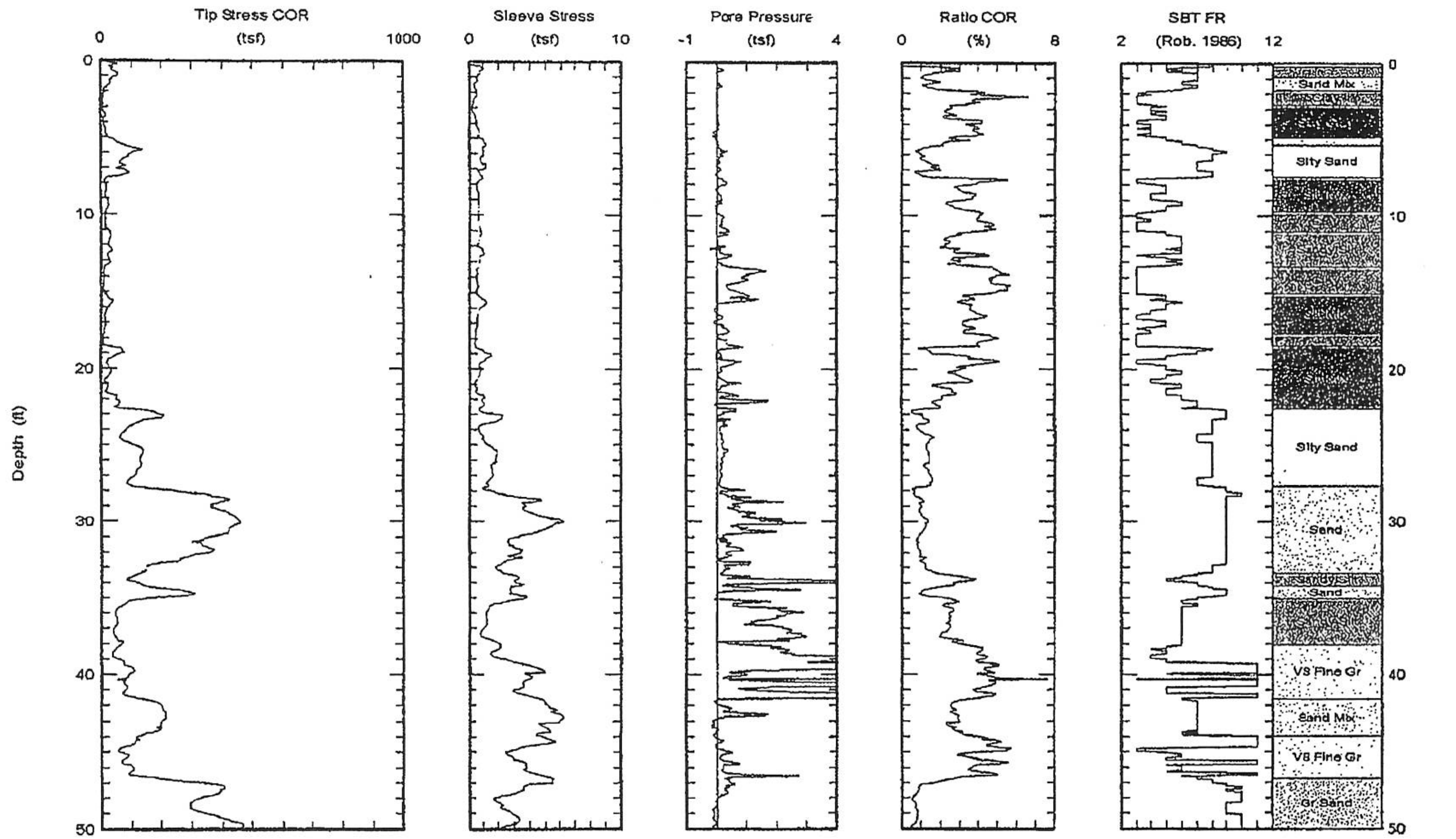
Maximum depth: 62.54 (ft)

Page 2 of 2

Test ID: CPT-10

File 228A0507C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-11 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	

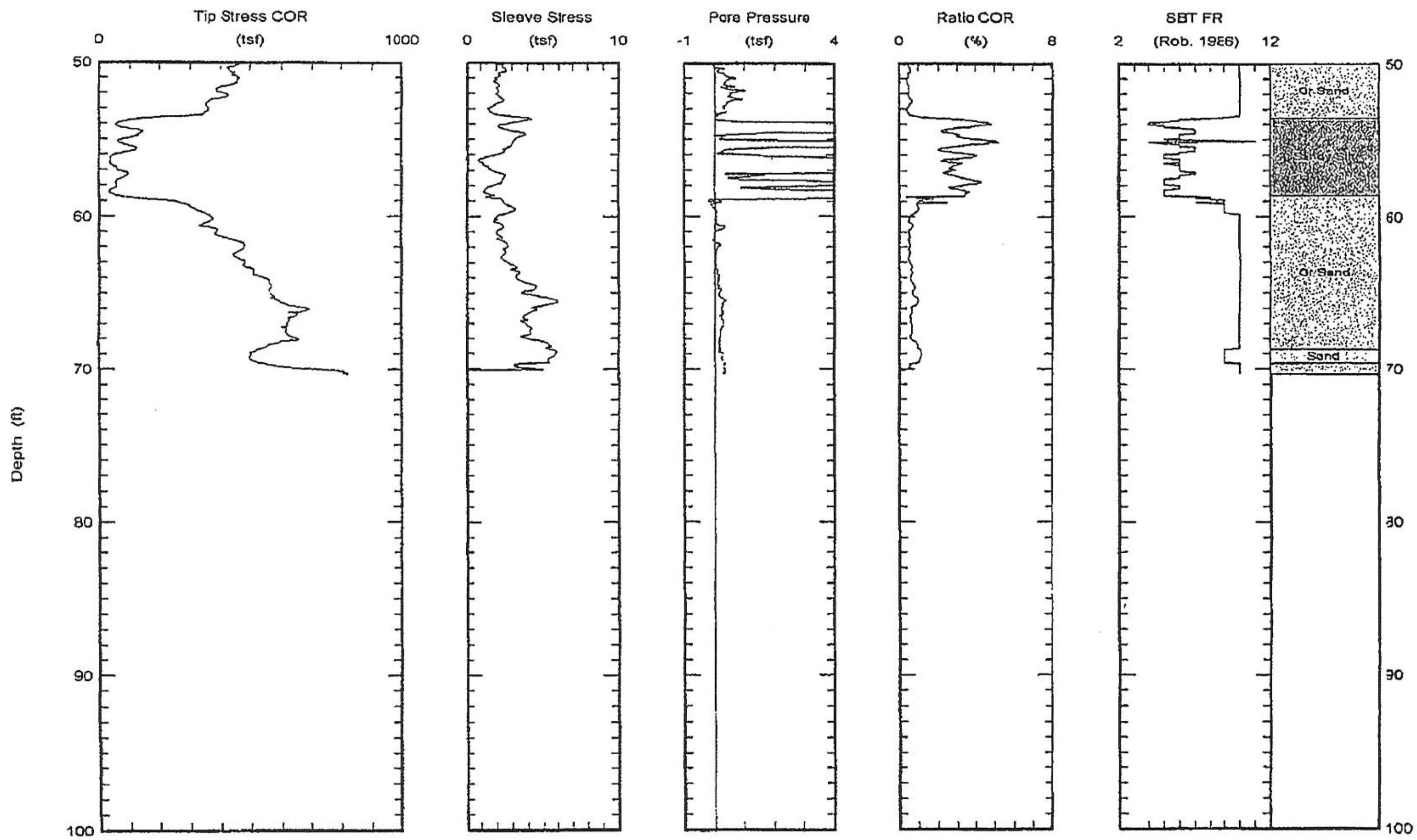


Maximum depth: 70.36 (ft)
Page 1 of 2

TestID: CPT-11
File: 228A0508C.ECP

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

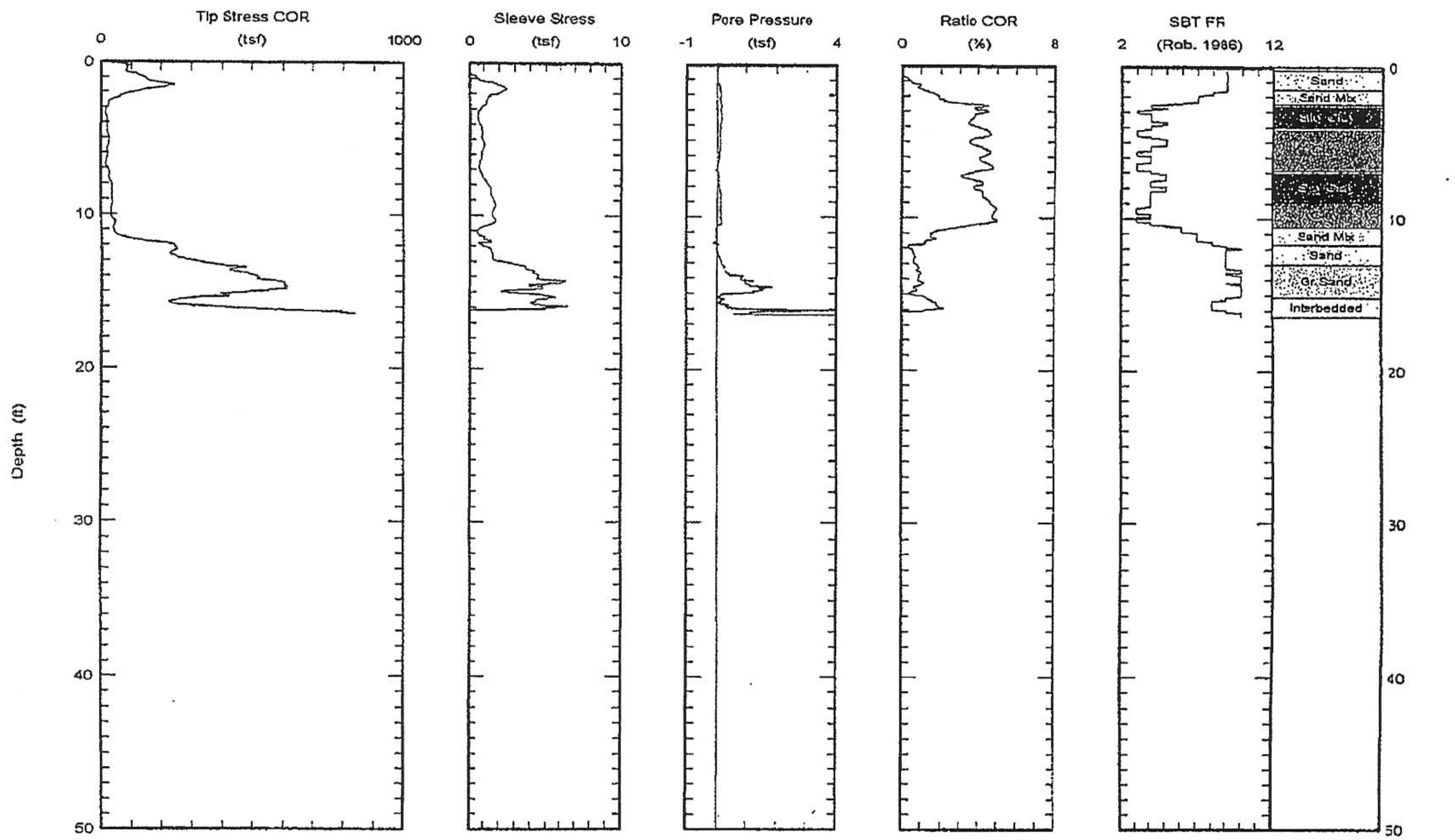
CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-11 Project: LosAngeles
Client: MACTEC Job Site: Bond China Town	



Maximum depth: 70.36 (ft)
Page 2 of 2

Test ID: CPT-11
File: 228A0500C.ECP

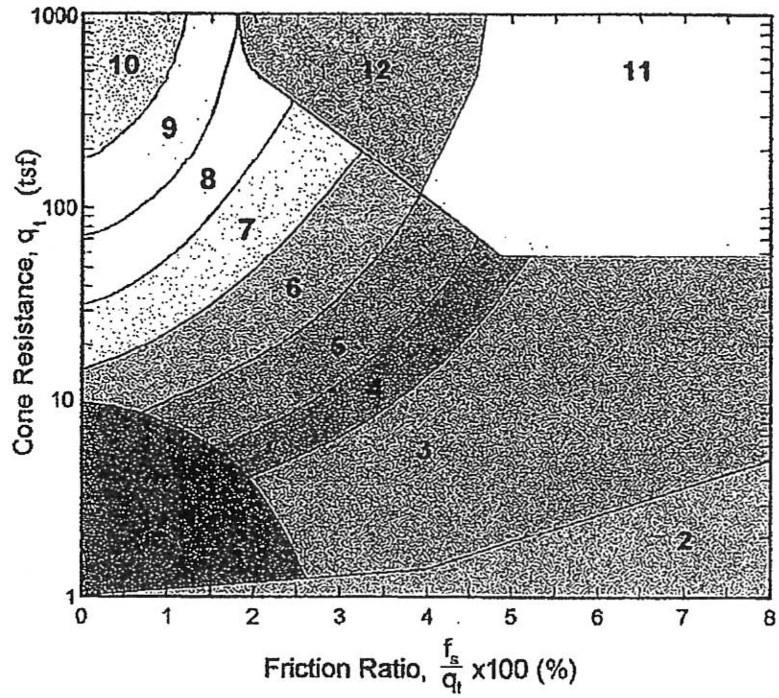
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 28/Apr/2005 Test ID: CPT-12 Project: LosAngeles
	Client: MACTEC Job Site: Bond China Town	



Maximum depth: 16.42 (ft)

Test ID: CPT-12
File: 28A0508C.ECP

CPT Soil Behavior Type Legend
(Robertson et al. 1986)



Zone		Soil Behavior Type
1		Sensitive, Fine Grained
2		Organic Material
3		Clay
4		Silty Clay to Clay
5		Clayey Silt to Silty Clay (Silt Mix)
6		Sandy Silt to Clayey Silt
7		Silty Sand to Sandy Silt (Sand Mix)
8		Sand to Silty Sand
9		Sand
10		Gravelly Sand to Sand
11		Very Stiff Fine Grained*
12		Sand to Clayey Sand*

*Overconsolidated or cemented

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	55.108	0.387	0.703	8	13	20	UNDF
1.500	83.821	0.701	0.836	8	20	30	UNDF
2.500	18.815	0.681	3.618	4	12	18	1.244
3.500	51.036	1.839	3.603	5	24	36	3.388
4.500	68.291	3.915	5.737	11	65	98	UNDF
5.500	75.873	4.243	5.592	11	73	110	UNDF
6.500	52.673	1.792	3.402	5	25	38	3.483
7.500	66.127	3.410	5.157	11	63	95	UNDF
8.500	77.443	5.124	6.617	11	74	111	UNDF
9.500	78.293	5.464	6.975	11	75	109	UNDF
10.500	106.414	5.453	5.123	11	102	137	UNDF
11.500	170.392	1.999	1.173	8	41	51	UNDF
12.500	115.557	1.651	1.429	8	28	33	UNDF
13.500	141.727	1.846	1.303	8	34	38	UNDF
14.500	373.192	3.284	0.880	9	71	75	UNDF
15.500	569.029	4.893	0.860	10	91	91	UNDF
16.500	856.783	0.000	0.000	10	UNDF	UNDF	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	77.950	0.387	0.497	8	19	29	UNDF
1.500	81.200	0.680	0.837	8	19	29	UNDF
2.500	17.986	0.986	5.463	3	17	26	1.193
3.500	14.933	0.767	5.117	3	14	21	0.985
4.500	21.525	1.152	5.336	3	21	32	1.420
5.500	19.575	1.118	5.694	3	19	29	1.287
6.500	11.100	0.696	6.258	3	11	17	0.715
7.500	19.042	0.720	3.773	4	12	18	1.241
8.500	23.355	1.291	5.515	3	22	33	1.525
9.500	31.500	1.831	5.788	3	30	45	2.069
10.500	18.725	1.388	7.395	3	18	25	1.208
11.500	24.458	1.399	5.703	3	23	30	1.588
12.500	129.869	1.205	0.927	8	31	38	UNDF
13.500	152.377	1.541	1.011	9	29	33	UNDF
14.500	200.492	2.868	1.430	8	48	52	UNDF
15.500	405.700	4.968	1.224	9	78	80	UNDF
16.500	514.143	4.046	0.786	10	82	80	UNDF
17.500	672.917	0.000	0.000	10	UNDF	UNDF	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	62.791	0.427	0.680	8	15	23	UNDF
1.500	39.636	0.392	0.990	7	13	20	UNDF
2.500	51.221	0.729	1.422	7	16	24	UNDF
3.500	15.062	0.344	2.282	5	7	11	0.990
4.500	12.336	0.451	3.669	4	8	12	0.801
5.500	17.683	0.738	4.183	3	17	26	1.154
6.500	13.620	0.473	3.481	4	9	14	0.880
7.500	25.773	0.865	3.353	5	12	18	1.688
8.500	32.682	1.481	4.530	4	21	32	2.145
9.500	34.745	1.399	4.025	4	22	33	2.279
10.500	47.908	1.990	4.150	5	23	32	3.154
11.500	55.936	1.342	2.398	6	21	27	UNDF
12.500	109.283	1.139	1.042	8	26	32	UNDF
13.500	90.208	1.244	1.379	8	22	25	UNDF
14.500	294.407	1.924	0.653	9	56	61	UNDF
15.500	403.171	2.704	0.670	10	64	66	UNDF
16.500	478.677	3.973	0.830	10	76	75	UNDF
17.500	717.873	8.343	1.162	9	138	129	UNDF
18.500	639.142	3.788	0.593	10	102	92	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	95.125	1.523	1.599	7	30	45	UNDF
1.500	39.592	0.823	2.078	6	15	23	UNDF
2.500	23.269	0.453	1.947	6	9	14	UNDF
3.500	14.362	0.238	1.654	5	7	11	0.944
4.500	5.923	0.169	2.857	3	6	9	0.377
5.500	15.275	0.702	4.589	3	15	23	0.997
6.500	33.445	1.482	4.417	4	21	32	2.210
7.500	60.145	1.425	2.365	6	23	35	UNDF
8.500	31.542	0.999	3.164	5	15	23	2.071
9.500	28.757	0.767	2.666	6	11	17	UNDF
10.500	12.933	0.748	5.786	3	12	17	0.819
11.500	10.258	0.513	4.996	3	10	13	0.638
12.500	15.592	0.742	4.760	3	15	18	0.989
13.500	24.200	0.868	3.582	5	12	14	1.559
14.500	17.973	0.611	3.396	4	11	12	1.140
15.500	11.600	0.618	5.327	3	11	11	0.710
16.500	6.509	0.361	5.514	3	6	6	0.369
17.500	9.709	0.472	4.855	3	9	8	0.576
18.500	33.245	0.648	1.950	6	13	12	UNDF
19.500	140.942	2.791	1.980	7	45	39	UNDF
20.500	453.914	4.692	1.033	9	87	74	UNDF
21.500	768.407	6.847	0.890	10	123	102	UNDF
22.500	617.254	7.075	1.146	9	118	96	UNDF
23.500	604.379	5.451	0.901	10	97	78	UNDF
24.500	741.350	5.281	0.712	10	118	93	UNDF
25.500	894.700	0.000	0.000	10	UNDF	UNDF	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	43.583	0.708	1.624	7	14	21	UNDF
1.500	13.593	0.530	3.897	3	13	20	0.901
2.500	9.215	0.186	2.017	5	4	6	0.605
3.500	9.092	0.208	2.284	4	6	9	0.592
4.500	18.400	0.571	3.098	5	9	14	1.210
5.500	62.738	1.176	1.874	7	20	30	UNDF
6.500	29.408	0.582	1.976	6	11	17	UNDF
7.500	18.933	0.531	2.793	5	9	14	1.237
8.500	25.531	0.607	2.376	6	10	15	UNDF
9.500	9.300	0.519	5.563	3	9	14	0.583
10.500	9.277	0.458	4.925	3	9	13	0.577
11.500	9.100	0.448	4.905	3	9	12	0.563
12.500	12.273	0.623	5.063	3	12	15	0.769
13.500	9.727	0.612	6.260	3	9	10	0.597
14.500	22.318	0.829	3.704	4	14	15	1.433
15.500	19.236	0.689	3.575	4	12	13	1.222
16.500	16.783	0.554	3.287	5	8	8	1.057
17.500	21.555	0.888	4.102	4	14	13	1.373
18.500	49.367	0.870	1.760	7	16	15	UNDF
19.500	70.258	1.074	1.527	7	22	19	UNDF
20.500	74.286	1.622	2.181	7	24	21	UNDF
21.500	33.842	1.097	3.226	5	16	13	2.179
22.500	96.950	1.233	1.268	8	23	19	UNDF
23.500	363.221	3.544	0.975	9	70	57	UNDF
24.500	486.429	3.496	0.718	10	78	62	UNDF
25.500	486.336	4.875	1.002	9	93	73	UNDF
26.500	646.500	6.661	1.030	9	124	95	UNDF
27.500	686.479	4.098	0.597	10	110	83	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	146.385	0.925	0.632	9	28	42	UNDF
1.500	24.438	0.723	2.959	5	12	18	1.623
2.500	15.871	0.575	3.629	4	10	15	1.046
3.500	18.169	0.692	3.817	4	12	18	1.193
4.500	22.958	0.834	3.640	4	15	23	1.509
5.500	27.415	1.082	3.949	4	17	26	1.803
6.500	16.292	0.680	4.178	3	16	24	1.058
7.500	28.558	1.070	3.747	5	14	21	1.873
8.500	32.146	1.685	5.244	3	31	47	2.107
9.500	44.258	1.788	4.039	5	21	32	2.911
10.500	106.115	1.373	1.294	8	25	35	UNDF
11.500	271.358	1.877	0.692	9	52	67	UNDF
12.500	323.907	2.255	0.696	10	52	63	UNDF
13.500	188.823	1.826	0.967	9	36	41	UNDF
14.500	420.800	5.135	1.220	9	81	88	UNDF
15.500	575.547	7.061	1.227	9	110	113	UNDF
16.500	642.221	7.178	1.117	9	123	120	UNDF
17.500	624.686	6.796	1.088	9	120	112	UNDF
18.500	637.600	3.142	0.493	10	102	91	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	42.500	0.817	1.920	6	16	24	UNDF
1.500	24.669	0.827	3.343	5	12	18	1.643
2.500	25.150	0.992	3.936	4	16	24	1.669
3.500	13.300	0.532	3.990	3	13	20	0.874
4.500	9.208	0.411	4.449	3	9	14	0.597
5.500	9.825	0.418	4.240	3	9	14	0.635
6.500	25.700	0.742	2.884	5	12	18	1.688
7.500	13.682	0.284	2.069	5	7	11	0.883
8.500	48.783	0.887	1.817	7	16	24	UNDF
9.500	48.115	1.906	3.959	5	23	35	3.171
10.500	14.833	0.807	5.410	3	14	20	0.952
11.500	12.958	0.577	4.431	3	12	16	0.822
12.500	34.933	0.996	2.846	6	13	16	UNDF
13.500	485.654	4.171	0.858	10	78	90	UNDF
14.500	577.886	4.946	0.855	10	92	100	UNDF
15.500	532.636	6.414	1.203	9	102	105	UNDF
16.500	282.614	2.650	0.937	9	54	53	UNDF
17.500	117.477	1.872	1.593	8	28	26	UNDF
18.500	452.107	5.149	1.138	9	87	78	UNDF
19.500	583.333	6.328	1.084	9	112	96	UNDF
20.500	554.992	6.612	1.191	9	106	89	UNDF
21.500	282.479	2.994	1.059	9	54	45	UNDF
22.500	113.483	2.342	2.061	7	36	29	UNDF
23.500	237.642	2.742	1.152	9	46	37	UNDF
24.500	320.127	2.501	0.781	9	61	48	UNDF
25.500	281.875	2.267	0.804	9	54	42	UNDF
26.500	56.391	1.371	2.424	6	22	17	UNDF
27.500	34.282	0.978	2.834	6	13	10	UNDF
28.500	29.730	0.999	3.341	5	14	10	1.875
29.500	31.245	0.859	2.733	6	12	9	UNDF
30.500	53.070	1.848	3.468	5	26	18	3.426
31.500	81.100	2.631	3.239	6	31	22	UNDF
32.500	39.800	0.918	2.290	6	15	10	UNDF
33.500	35.008	0.929	2.637	6	13	9	UNDF
34.500	45.386	1.149	2.516	6	17	11	UNDF
35.500	47.973	1.459	3.018	6	19	13	UNDF
36.500	38.525	1.185	3.050	5	19	12	2.438
37.500	28.800	0.810	2.783	6	11	7	UNDF
38.500	75.245	2.725	3.609	5	36	23	4.873
39.500	164.000	3.018	1.838	8	39	24	UNDF
40.500	95.608	1.550	1.619	7	31	19	UNDF
41.499	31.410	0.894	2.823	6	12	7	UNDF
42.499	71.150	1.887	2.642	6	27	16	UNDF
43.499	98.955	2.915	2.939	6	38	23	UNDF
44.499	132.182	3.505	2.648	7	42	25	UNDF
45.499	181.510	3.172	1.745	8	44	26	UNDF
46.499	228.527	2.317	1.013	9	44	25	UNDF
47.499	235.836	2.324	0.984	9	45	26	UNDF
48.499	295.373	2.057	0.696	9	57	32	UNDF
49.499	321.218	2.107	0.655	10	51	28	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
50.499	347.509	2.600	0.748	10	56	31	UNDF
51.499	341.818	2.775	0.811	9	66	36	UNDF
52.499	261.408	3.446	1.316	9	50	27	UNDF
53.499	319.027	3.082	0.965	9	61	32	UNDF
54.499	422.750	3.265	0.772	10	68	36	UNDF
55.499	478.671	3.621	0.756	10	76	39	UNDF
56.499	510.843	4.539	0.888	10	82	42	UNDF
57.499	456.985	3.271	0.715	10	73	37	UNDF
58.499	467.362	3.079	0.658	10	75	38	UNDF
59.499	460.546	2.585	0.561	10	74	37	UNDF
60.499	482.569	2.755	0.571	10	77	39	UNDF
61.499	564.638	3.812	0.675	10	90	45	UNDF
62.499	691.037	1.650	0.239	10	110	55	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	41.325	0.632	1.528	7	13	20	UNDF
1.500	27.254	0.439	1.612	6	10	15	UNDF
2.500	9.100	0.343	3.769	3	9	14	0.597
3.500	11.867	0.336	2.830	4	8	12	0.777
4.500	16.509	0.588	3.567	4	11	17	1.081
5.500	78.591	1.037	1.320	8	19	29	UNDF
6.500	75.191	0.966	1.285	8	18	27	UNDF
7.500	47.345	0.756	1.597	7	15	23	UNDF
8.500	16.627	0.553	3.319	4	11	17	1.076
9.500	20.818	0.621	2.983	5	10	15	1.349
10.500	15.209	0.667	4.379	3	15	21	0.973
11.500	28.164	0.725	2.571	6	11	14	UNDF
12.500	27.909	0.835	2.991	5	13	16	1.811
13.500	15.218	0.597	3.885	4	10	12	0.970
14.500	9.964	0.514	5.086	3	10	11	0.614
15.500	26.564	0.903	3.383	5	13	14	1.716
16.500	16.218	0.602	3.715	4	10	10	1.013
17.500	12.136	0.447	3.674	4	8	8	0.740
18.500	34.458	0.594	1.721	6	13	12	UNDF
19.500	31.100	1.081	3.466	5	15	13	1.999
20.500	23.355	0.675	2.885	5	11	9	1.477
21.500	28.591	0.630	2.199	6	11	9	UNDF
22.500	91.025	0.945	1.037	8	22	18	UNDF
23.500	140.931	1.579	1.120	8	34	27	UNDF
24.500	72.673	0.969	1.333	7	23	18	UNDF
25.500	128.483	1.755	1.366	8	31	24	UNDF
26.500	122.082	1.645	1.348	8	29	22	UNDF
27.500	114.027	1.314	1.152	8	27	20	UNDF
28.500	367.731	3.333	0.906	9	70	52	UNDF
29.500	416.000	4.413	1.060	9	80	58	UNDF
30.500	428.273	4.895	1.142	9	82	59	UNDF
31.500	341.942	2.900	0.848	9	66	47	UNDF
32.500	251.883	2.653	1.053	9	48	33	UNDF
33.500	115.927	2.622	2.257	7	37	25	UNDF
34.500	215.317	3.133	1.454	8	52	35	UNDF
35.500	72.564	1.868	2.565	6	28	19	UNDF
36.500	48.909	1.203	2.442	6	19	12	UNDF
37.500	47.667	1.168	2.430	6	18	12	UNDF
38.500	44.680	1.833	4.054	5	22	14	2.856
39.500	84.436	3.806	4.461	11	82	52	UNDF
40.500	77.355	3.727	4.790	11	75	47	UNDF
41.499	116.036	4.050	3.474	6	45	28	UNDF
42.499	209.292	5.768	2.754	7	67	41	UNDF
43.499	178.517	4.965	2.782	7	57	34	UNDF
44.499	92.911	4.457	4.796	11	89	53	UNDF
45.499	79.360	3.190	4.017	5	38	22	5.107
46.499	149.264	4.557	3.051	6	57	33	UNDF
47.499	379.308	3.346	0.882	9	73	42	UNDF
48.499	304.164	2.170	0.713	9	58	33	UNDF
49.499	425.018	2.950	0.694	10	68	38	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
50.499	444.082	2.312	0.521	10	71	39	UNDF
51.499	422.142	2.049	0.485	10	67	36	UNDF
52.499	381.233	2.128	0.558	10	61	33	UNDF
53.499	247.917	2.664	1.074	9	48	25	UNDF
54.499	98.292	3.009	3.016	6	38	20	UNDF
55.499	86.983	2.710	3.094	6	34	18	UNDF
56.499	41.850	1.275	2.927	6	17	9	UNDF
57.499	72.164	2.294	3.141	6	28	14	UNDF
58.499	69.945	1.622	2.285	6	27	14	UNDF
59.499	310.655	2.748	0.885	9	60	30	UNDF
60.499	365.275	2.174	0.595	10	58	29	UNDF
61.499	436.492	2.386	0.547	10	70	35	UNDF
62.499	465.961	2.497	0.536	10	74	37	UNDF
63.499	502.983	3.212	0.639	10	80	40	UNDF
64.499	561.517	4.070	0.725	10	90	45	UNDF
65.499	600.371	4.973	0.828	10	96	48	UNDF
66.499	641.977	3.975	0.619	10	102	51	UNDF
67.499	618.450	4.034	0.652	10	99	50	UNDF
68.499	564.650	5.261	0.932	10	90	45	UNDF
69.499	538.631	4.732	0.878	10	86	43	UNDF
70.499	791.233	0.832	0.105	10	126	63	UNDF

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Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	90.175	0.116	0.128	9	17	26	UNDF
1.500	178.146	1.845	1.035	9	34	51	UNDF
2.500	47.962	1.258	2.621	6	18	27	UNDF
3.500	18.714	0.706	3.770	4	12	18	1.234
4.500	22.021	0.914	4.146	4	14	21	1.450
5.500	24.185	1.002	4.139	4	15	23	1.591
6.500	18.631	0.812	4.356	3	18	27	1.215
7.500	27.469	1.012	3.682	5	13	20	1.800
8.500	35.608	1.513	4.247	4	23	35	2.340
9.500	35.179	1.694	4.811	3	34	51	2.307
10.500	40.762	1.365	3.346	5	20	28	2.675
11.500	103.885	0.939	0.904	8	25	32	UNDF
12.500	247.817	1.557	0.628	9	47	57	UNDF
13.500	426.908	3.765	0.882	9	82	94	UNDF
14.500	570.854	4.471	0.783	10	91	98	UNDF
15.500	334.564	4.616	1.380	9	64	66	UNDF
16.500	685.200	0.842	0.123	10	109	106	UNDF

LOG OF TEST BORING

LAB NO.: 140- 5382 **PROJECT:** Blossom Plaza, 900-944 N. Broadway, 215-219 W. College St., ...

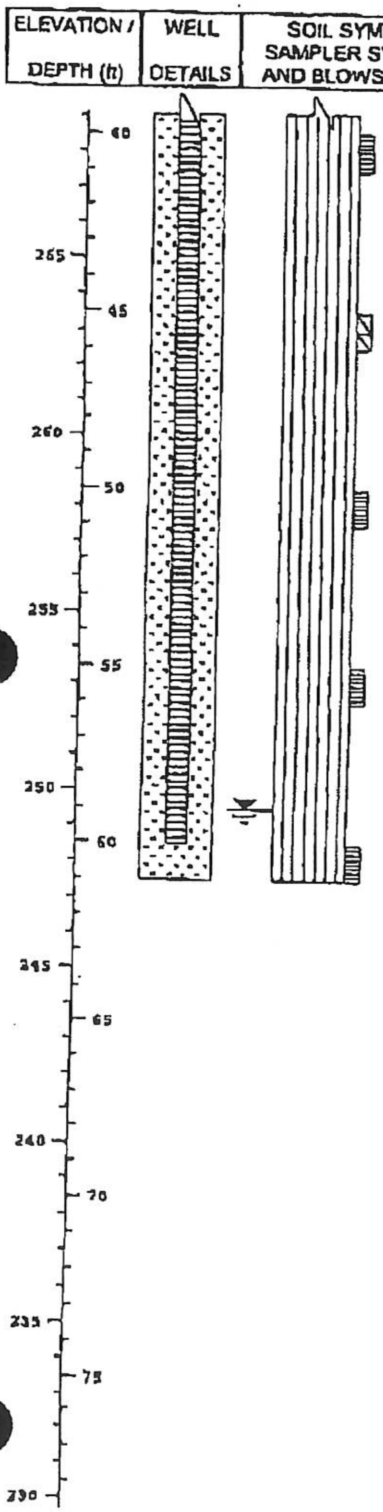
BORING NO.: MW-1 **ELEV.:** 308.5' MSL **DATE:** 12/02/2004 **(CONTAMINATION)**

BORING LOCATION: 51' E/o ECF N. Broadway and 302' N/o NCF College St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DRILLER: Cooksey **LOGGER:** Roth **ENGINEER:** Mulbern

DEPTH TO WATER: 59' **DEPTH TO WATER SEEPAGE:** None



Depth (ft)	Blows/Inches	OVA (PPM)	USCS	Field Description
40	10/6 14/6	0	ML	Greenish gray clayey silt with some very fine sand. Moist and firm. (LEL reading = 0% at 40' depth)
45	10/6 19/6	0		Split Spoon sample at 45' depth not recovered.
50	7/6 20/6	0		(LEL reading = 0% at 50' depth)
55	6/6 8/6	0		(LEL reading = 0% at 55' depth)
60	10/6 12/6	26.2		Encountered poorly graded fine sand with a rotten egg odor at 59' depth. Encountered groundwater at 59' depth. (LEL reading = 0% at 60' depth)

—

Encountered groundwater at 59' depth.

—

Test boring location coordinates:
34° 03' 53.13" N
118° 14' 12.54" W

—

Installed a 2" diameter PVC monitoring well to a depth of 60'; 30' screened pipe & 30' slotted pipe. Backfill: 60' to 28' depth with #3 sand, 28' to 25' depth with bentonite pellets, 25' to grade with soil cuttings.

LOG OF TEST BORING

LAB NO.: 140- 5382 **PROJECT:** Blossom Plaza, 900-944 N. Broadway, 215-219 W. College St., ...

BORING NO.: MW-2 **ELEV.:** 307.6' MSL **DATE:** 12/03/2004 **(CONTAMINATION)**

BORING LOCATION: 153' E/o ECF N. Broadway and 301' N/o NCF College St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DRILLER: Cooksey **LOGGER:** Roth **ENGINEER:** None Present

DEPTH TO WATER: 50' **DEPTH TO WATER SEEPAGE:** None

ELEVATION / DEPTH (ft)	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
0					2" AC pavement in poor condition
					FILL MATERIAL - Dark brown silty clay with a little sand and a few AC fragments. Moist and firm.
305		13/6 7/6	0		(LEL reading = 0% at 2½' depth)
5		4/6 6/6	0		(LEL reading = 0% at 5' depth)
300					
10		3/6 7/6	0		Encountered brick fragments at 10' depth. (LEL reading = 0% at 10' depth)
295					
15		8/6 12/6	0		(LEL reading = 0% at 15' depth)
				SP	Brown poorly graded fine-medium sand with some gravel and a little silt. Moist and dense.
290					
20		15/6 35/6	0		(LEL reading = 0% at 20' depth)
285					
25		18/6 35/6	0		(LEL reading = 0% at 25' depth)
280					
30		15/6 25/6	0		(LEL reading = 0% at 30' depth)
275					
35		39/6 35/6	0		(LEL reading = 0% at 35' depth)
270					Color changed to greenish gray at 37' depth with decreasing gravel conent.

LOG OF TEST BORING

LAB NO.: 140- 5382 **PROJECT:** Blossom Plaza, 900-944 N. Broadway, 215-219 W. College St., ...

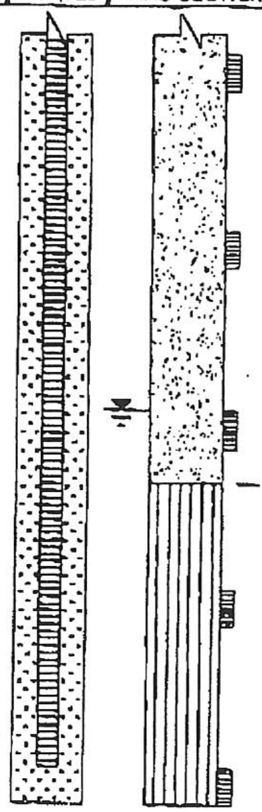
BORING NO.: MW-2 **ELEV.:** 307.6' MSL **DATE:** 12/03/2004 **(CONTAMINATION)**

BORING LOCATION: 153' E/o ECF N. Broadway and 301' N/o NCF College St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DRILLER: Cooksey **LOGGER:** Roth **ENGINEER:** None Present

DEPTH TO WATER: 50' **DEPTH TO WATER SEEPAGE:** None



ELEVATION / DEPTH (ft)	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
40		12/6 20/6	0	SP	Greenish gray poorly graded fine-medium sand with some gravel and a little silt. Moist and dense. (LEL reading = 0% at 40' depth)
265					
45		8/6 15/6	0		
260					
50		10/6 19/6	0		Encountered groundwater at 50' depth. (LEL reading = 0% at 50' depth)
255				ML	Greenish gray clayey silt with some very fine sand. Moist and firm.
55		11/6 20/6	0		(LEL reading = 0% at 55' depth)
250					
60		15/6 20/6	152		Encountered a rotten egg odor at 60' depth. (LEL reading = 0% at 60' depth)
245					
65					
240					
70					
235					
75					
230					

Encountered groundwater at 50' depth.

Test boring location coordinates:
34° 03' 52.71" N
118° 14' 11.42" W

Installed a 2" diameter PVC monitoring well to a depth of 60': 30' screened pipe & 30' slotted pipe. Backfill: 60' to 28' depth with #3 sand, 28' to 25' depth with bentonite pellets, 25' to grade with soil cuttings.

MACTEC

LOG OF BORING B-12

Chinatown Mixed-Use
Northeast Corner N. Boradway / College St.
Los Angeles, CA

Project No. 4953-03-3442

Field Location	:
Date	: 3/18/04
Logged By	: I. Cross
Total Depth of Boring	: 50'
Diameter of Boring	: 6"
Backfill Material	: Bentonite Slurry

Drilling Co.	: Gregg Drilling
Drilling Rig	: Mobile D61
Drilling Method	: Hollow Stem Auger
Sampling Method	:
Hammer Weight (lbs.)	: NA
Hammer Drop (in.)	: NA
Depth to Groundwater	: 46.9
Vapor Meter	: Gastech GT402
Surf. Seal Material	: Asphalt

Depth in Feet	Samples	Blows/ft.	Vapor Conc. (ppm)	Sample Type	Sample ID	USCS	GRAPHIC	DESCRIPTION
0								Asphalt (~3")
5	—		<0.1	Soil gas	B12-5	CL		SILTY CLAY, some fine- to medium-grained sand, dark reddish brown, damp
10	—		<0.1	Soil gas	B12-10			SILTY CLAY, dark reddish brown, damp, trace very fine-grained sand
15	—		<0.1	Soil gas	B12-15	SM		SILTY SAND, medium to coarse grained, brown, damp, some pebbles
20	—		<0.1	Soil gas	B12-20			SILTY SAND, fine to coarse grained, dark brown, ~10% pebbles
25	—		<0.1	Soil gas	B12-25			SILTY SAND, fine to medium grained, dark brown, damp, some pebble
30	—		<0.1	Soil gas	B12-30	CL		SILTY CLAY, fine- to medium-grained sand, brown, damp, some pebbles (angular) to ~6mm
35	—		<0.1	Soil gas	B12-35			SILTY CLAY, 5-10% fne- to medium-grained sand, brown, damp, ~5% pebbles (up to ~5mm)
40								

California Registered Geologist No. 7592

MACTEC

Chinatown Mixed-Use
Northeast Corner N. Boradway / College St.
Los Angeles, CA

Project No. 4953-03-3442

LOG OF BORING B-12

Field Location	:
Date	: 3/18/04
Logged By	: I. Cross
Total Depth of Boring	: 50'
Diameter of Boring	: 6"
Backfill Material	: Bentonite Slurry

Drilling Co.	: Gregg Drilling
Drilling Rig	: Mobile D61
Drilling Method	: Hollow Stem Auger
Sampling Method	:
Hammer Weight (lbs.)	: NA
Hammer Drop (in.)	: NA
Depth to Groundwater	: 46.9
Vapor Meter	: Gastech GT402
Surf. Seal Material	: Asphalt

Depth in Feet	Samples	Blows/ft.	Vapor Conc. (ppm)	Sample Type	Sample ID	USCS	GRAPHIC	DESCRIPTION
40			~~<0.1~~	~~Soil gas~~	~~B12-40~~	CL		SILTY CLAY, 10-15% fine- to medium-grained sand, olive, damp
45	—		450	Soil gas	B12-45	SM		SILTY SAND, fine to medium grained, wet water at ~46.9' bgs, wet
50								SILTY SAND, fine to medium grained, wet
55								End of Boring at 50' NOTES: Water measured at 46.9 following installation of temporary well casing. Hole backfilled with bentonite slurry from bottom up. Photoionization detector used for vapor concentration readings.
60								
65								
70								
75								
80								

California Registered Geologist No. 7592

04-28-2004 P:\ ...d Chinatown\Boring Logs\B12.bor

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

BORING 3

DATE DRILLED: 2/9/04
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8"
ELEVATION: 310.0 **

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA(ppm)***	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
305	5		0				
300	10		5				
295	15		5				
290	20		5				
285	25		0				
280	30		0				
275	35		0				
	40						

USCS	Description
SM	2" Thick Asphalt Concrete FILL - SILTY SAND - medium dense, moist, gray, fine to medium sand
CL-ML	FILL - SANDY SILTY CLAY - stiff, moist, dark brown, with som[e] brick fragments
CL-ML	SANDY SILTY CLAY - very stiff, moist, medium brown, fine san[d]
SM	SILTY SAND - medium dense, moist, light brown
SW	WELL-GRADED SAND - dense, moist, light gray, little gravel
SM	SILTY SAND - dense, moist, light brown
SW	WELL-GRADED SAND - dense, moist, medium brown
ML	SILT with Clay - very stiff, moist, brown and gray
SW	WELL-GRADED SAND - dense, moist, light brown and yellow
ML	SILT with Clay - very stiff, moist, bluish gray, petroleum odor

Field Tech: ME
Prepared By: SB
Checked By: JAA

(CONTINUED ON FOLLOWING FIGURE)

TEST 33441.GPJ LAW ...GDT 4/9/04

Bond Capital-Chinatown
Los Angeles, CA

MACTEC

LOG OF BORING
Project: 4953-03-3441 Figure: A-1.3a

BORING 3 (Continued)

DATE DRILLED: 2/9/04
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8"
ELEVATION: 310.0 **

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

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA(ppm)***	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
			200				▩	SP	POORLY GRADED SAND - medium dense, moist, light brown
									hydro carbon odor
265	45		80				▩		hydro carbon odor
									∇
260	50		20				▩		hydro carbon odor
									End of Boring at 51 '.
255	55								
250	60								
245	65								
240	70								
235	75								
	80								

NOTES:
Water measured at 49' after auger removal.
Hole backfilled with cement/bentonite grout from bottom up.

*** Photo Ionization Detector used for OVA readings.

Field Tech: ME
Prepared By: SB
Checked By: JAA

EST 3341.GPJ LAW C... GDT 4/9/04

Bond Capital-Chinatown
Los Angeles, CA

MACTEC

LOG OF BORING
Project: 4953-03-3441 Figure: A-1.3b

BORING 4

DATE DRILLED: 2/6/04
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8"
ELEVATION: 310.0 **

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

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA(ppm)***	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
							SM	2" Thick Asphalt Concrete FILL - SILTY SAND - medium dense, moist, gray, fine to medium sand
				19.5	103	30	CL-ML	FILL - SANDY SILTY CLAY - stiff, moist, dark brown, with som brick fragments
305	5	15	0				CL-ML	SANDY SILTY CLAY - very stiff, moist, medium brown, fine san
				19.0	108	29		
300	10	16	0					
				16.6	91	36	SM	SILTY SAND - medium dense, moist, light brown
295	15	35	0				SW	WELL-GRADED SAND - dense, moist, light gray, little gravel
290	20					50		8" Cobble
		33	40					occasional Cobbles 3"-6"
285	25			9.8	109	63		occasional Cobbles 3"-6"
							SM	SILTY SAND - dense, moist, light brown
		39	0				SW	WELL-GRADED SAND - dense, moist, medium brown
280	30			37.6	84	31	ML	SILT with Clay - very stiff, moist, brown and gray
							SW	WELL-GRADED SAND - dense, moist, light brown and yellow
275	35	46	0					3.2% passing No. 200 sieve
				17.1	112	40	SC	CLAYEY SAND - medium dense, moist, bluish gray, slight petroleum smell 44% passing No. 200 sieve. 17% clay
	40							

Field Tech: AR
Prepared By: SB
Checked By: JAA

(CONTINUED ON FOLLOWING FIGURE)

BORING 4 (Continued)

DATE DRILLED: 2/6/04
EQUIPMENT USED: Hollow Stem Auger
HOLE DIAMETER (in.): 8"
ELEVATION: 310.0 **

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

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA(ppm)***	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
		20	40				SP	POORLY GRADED SAND - medium dense, moist, light brown 38% passing No. 200 sieve
				9.7	121	75		40% passing No. 200 sieve
265	45							
		32	199					very moist
							SW	∇ WELL-GRADED SAND with Silt - dense, moist, bluish gray
				10.3	121	50		12% passing No. 200 sieve
260	50							
							SP	POORLY GRADED SAND - very dense, moist, bluish gray
		50/6"	50					
255	55							
						50		
		22	25				ML	SILT with Sand - very stiff, moist, grayish blue, with some Clay 84% passing No. 200 sieve, 19% clay
250	60							
						52		grayish green
245	65	33	25					
								End of Boring at 65½ '.
240	70							
235	75							
	80							

NOTES:
Water measured at 48.6' 10 minutes after auger removal.
Hole backfilled with cement/bentonite grout from bottom up.

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

*** Photo Ionization Detector used for OVA readings.

Field Tech: AR
Prepared By: SB
Checked By: JAA

TEST 3341 GPJ LAW C...GDT 4/9/04

Bond Capital-Chinatown
Los Angeles, CA

MACTEC

LOG OF BORING
Project: 4953-03-3441 Figure: A-1.4b

BORING B-103

DATE DRILLED: March 8, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 4-7/8
ELEVATION: 310**

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
310	0				2-inch thick Asphalt Concrete over 12-inch thick Base
				CL	FILL - SANDY LEAN CLAY - moist, olive brown, very fine to fine sand, some fine to coarse gravel (up to 3-inch in size), brick and wood fragments
305	5		10		Some cobbles (up to 5½-inch in size)
300	10		19	SM	SILTY SAND - medium dense, moist, olive yellow to yellow brown, fine grained, heavy iron oxide stains
				SP	POORLY GRADED SAND with GRAVEL - medium dense, moist to wet, yellowish brown, fine to coarse grained, gravel (up to 1-inch in size, subrounded to rounded)
295	15		37		Alternating gravel layers (up to 3-inch in size)
290	20		62/11"		Becomes very dense, some cobble fragments
		71			Becomes light grayish brown to olive yellow, some clay
285	25		79/10"		Becomes olive yellow to yellow brown, some clayey sand seams, fine to coarse gravel (up to 1¾-inch in size)
				ML	SANDY SILT - very stiff, moist, yellowish brown and light brownish gray, fine sand, some clay, some fine gravel (up to ¾-inch in size)
280	30	22			
			26	SM	SILTY SAND - medium dense, very moist, olive yellow and light brownish gray, very fine to fine grained, some iron stains, some mica, some siltier seams 43% Passing No. 200 Sieve
275	35	51			Becomes fine to coarse grained, some fine gravel (up to ¾-inch in size)
			82	SW	WELL GRADED SAND - very dense, wet, olive yellow, medium to coarse grained, some fine, gravel (up to ½-inch in size, subrounded and rounded)
	40				

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared By: WL
Checked By: LT

Chinatown Blossom Plaza
900 North Broadway
Los Angeles, California

amec

LOG OF BORING

Project: 4953-13-0061 Figure: A-1.3-1a

B14SOIL_CRANDALL BLOWCOUNTS ONLY L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130061 CHINATOWN BLOSSOM PLAZA\3.2 ALL FIELD NOTES\4953-13-0061.GPJ 3/27/13

B14SOIL_CRANDALL BLOWCOUNTS ONLY L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130061 CHINATOWN BLOSSOM PLAZA\3.2 ALL FIELD NOTES\4953-13-0061.GPJ 3/27/13

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING B-103 (Continued)

DATE DRILLED: March 8, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 4-7/8
ELEVATION: 310**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
		56			More medium sand
				ML	SANDY SILT - very stiff, moist to wet, light brownish to bluish gray, very fine to fine sand, some iron stains LL=NP, PI=NP
265	45		23		
		25			Less sand, some clay, light bluish gray
				SP-SM	POORLY GRADED SAND with SILT - medium dense, wet, bluish gray, fine grained, some medium to coarse
260	50		96		Becomes very dense, fine grained
		52		ML	Becomes dark gray SANDY SILT - hard, moist, greenish to bluish gray, very fine sand, some clay, some hydrogen sulfide odor
255	55		51		Some calcium carbonate veins, LL= NP, PI=NP
				SP-SM	POORLY GRADED SAND with SILT - very dense, wet, bluish gray, fine to medium grained, some fine gravel (up to ½-inch in size), hydrogen sulfide odor
250	60	61			
			80		Becomes trace fine gravel (up to ½-inch in size), hydrogen sulfide odor
245	65	78			
240	70		83		
		78			Becomes very dense 11% Passing No. 200 Sieve
235	75		56		No recovery
			90/9"		More medium to coarse sand, some fine slate gravel (up to ¾-inch in size) 7.5% Passing No. 200 Sieve
	80				

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared By: WL
Checked By: LT

B14SOIL_CRANDALL BLOWCOUNTS ONLY L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130061 CHINATOWN BLOSSOM PLAZA\3.2 ALL FIELD NOTES\4953-13-0061.GPJ 3/27/13

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING B-103 (Continued)

DATE DRILLED: March 8, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 4-7/8
ELEVATION: 310**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
		85				Some fine gravel (up to ¾-inch in size, rounded)
225	85		100/9"		SP	POORLY GRADED SAND with GRAVEL - very dense, wet, bluish gray, fine to medium grained, some coarse, fine to coarse gravel (up to 2-inch in size)
220	90		69		SP	POORLY GRADED SAND - dense, wet, bluish gray, fine to medium grained, some coarse, some fine gravel (up to ½-inch in size), some silt 5% Passing No. 200 Sieve
215	95		73			Less gravel, 8% Passing No. 200 Sieve
210	100		72/11"			A thin layer of Silty Sand, some fine gravel (up to ½-inch in size)
205	105					Possible tar zone
200	110					
195	115					SANDY SILTSTONE - hard, moist, brown with dark gray, massive, fine sand, fresh to slightly weathered, petroleum odor, some clay
			86/9"			END OF BORING AT 118 FEET
	120					

Field Tech: LH
Prepared By: WL
Checked By: LT

(CONTINUED ON FOLLOWING FIGURE)

Chinatown Blossom Plaza
900 North Broadway
Los Angeles, California

amec

LOG OF BORING
Project: 4953-13-0061 Figure: A-1.3-1c

BORING B-103 (Continued)

DATE DRILLED: March 8, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 4-7/8
ELEVATION: 310**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	BLOW COUNT* (blows/ft)	SAMPLE LOC.	
185	125				
180	130				
175	135				
170	140				
165	145				
160	150				
155	155				
	160				

NOTES:

Hand augered upper 5 feet due to utilities. Boring bailed to 48 feet after completion of drilling. Groundwater was measured at 45 feet below ground surface on 3/11/13. Borehole was backfilled with cement grout and patched with asphalt.

"N" Value Standard Penetration Test: Number of blows required to drive SPT sampler 18 inches using 140 pound automatic hammer falling 30 inches

* Number of blows required to drive Crandall Sampler 12 inches using 140 pound hammer falling 30 inches

** Approximate elevations are based on ALTA/ACSM Land Survey Title prepared by Mollenhauer Group, dated January 31, 2003.

NP: Non-plastic

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B14SOIL_CRANDALL BLOWCOUNTS ONLY L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\13006\1 CHINATOWN BLOSSOM PLAZA\3.2 ALL FIELD NOTES\4953-13-0061.GPJ 3/27/13

Field Tech: LH
Prepared By: WL
Checked By: LT

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amec

LOG OF BORING