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May 22, 2019
File Number 21783

Flexible PSH Solutions, Inc.
1100 South Hope Street, Suite 103
Los Angeles, California 90015

Attention: John Molloy

Subject: Geotechnical Engineering Investigation
Proposed Apartment Development
312 through 328 North Juanita Avenue and 317 through 345 North Madison Avenue, Los Angeles, California

Dear Mr. Molloy:

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 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.

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.

REGISTERED PROFESSIONAL ENGINEER
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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.

This investigation included five exploratory excavations, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, review of available geotechnical engineering information and the preparation of this report. The exploratory excavation locations are shown on the enclosed Plot Plan. 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 office of KFA, LLP. The site is proposed to be developed with four apartment structures. The proposed structures will be seven stories in height, and will be built at-grade. The location and alignment of the proposed structure is shown on the enclosed Plot Plan. Column loads are estimated to be between 400 and 800 kips. Wall loads are estimated to be between 5 and 20 kips per lineal foot.

Any changes in the design or location of the relocated 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.

SITE CONDITIONS

The site is located at 312 through 328 North Juanita Avenue and 317 through 345 North Madison Avenue, in the City of Los Angeles, California. The site is just over two acres in area, bounded by Oakwood Avenue to the north, Madison Avenue to the east, Beverly Boulevard to the south, and Juanita Avenue to the west. The site is shown relative to nearby topographic features in the enclosed Vicinity Map.

Based on review of the topographic survey prepared by AEI Consultants, dated May 20, 2019, the site grade descends gently to the east. The topographic relief observed across the site is on the order of 10 feet, ranging from elevation 279 feet along the western property line, to elevation 269 along the eastern property line. With the exception of six relatively small buildings, the majority of the site is currently developed with asphalt-paved parking lots. Five of the existing buildings are one-story in height, while only one of the buildings is two stories in height. The existing grade elevations and site development is shown in the enclosed Survey Plan.

Vegetation at the site is non-existent. Drainage across the site appears to be by sheetflow to the city streets to the east.

Previous Site Topography

Based on review of the 1928 Edition of the Los Angeles California Topographic Map (USGS, 1927), the site used to be a part of a swale, which extended beyond the site limits. A copy of this map is attached as “Historical Topographic Map (1928)”. This swale was backfilled and graded sometime in the first half of the past century. Based on review of the 1928 topographic map, the

bottom of the swale had an elevation of approximately 255 feet. The bottom of the swale is located within the southcentral portion of the site. It is estimated that the soils placed for the backfill of this swale extend up to a depth of 18 feet below the current site grades.

LOCAL GEOLOGY

The subject site is located in the foothills near the western edge of the Elysian Park Hills, which are predominantly underlain by sandstones and siltstones of the upper Miocene Puente Formation (Lamar, 1970). The borings drilled by this firm on the western portion of the site (Borings B1 and B2) encountered bedrock at depths of 9 and 18 feet. Varying thicknesses of fill and older alluvial soils overlay the bedrock.

Bedrock in the site vicinity has undergone gentle folding, with multiple fold axes trending in a northwest-southeast direction. Bedding mapped in the vicinity of the site dips predominantly to the northwest, as indicated on the enclosed Local Geologic Map (Lamar, 1970).

RESEARCH

This firm has conducted research at the City of Los Angeles Department of Building and Safety Records Department. The following documents were found, which pertain to previous explorations conducted within the subject site, and its immediate vicinity.

Converse Foundation Engineering, November 6, 1959, Exploratory Boring, Proposed Operating Center, 316 North Juanita Avenue, Los Angeles, California, Project Number 59-639-E, prepared for the Pacific Telephone and Telegraph Company.

This document presents the findings from an exploratory boring drilled within the northcentral portion of the subject site. The boring was drilled to a depth of 33.5 feet with the aid of a bucket auger. In the boring, fill materials were observed to extend to a depth of 18.5 feet below grade.

The fill was observed to be underlain by alluvial soils; bedrock was observed at a depth of 22 feet below grade. Water seepage was observed at a depth of 18 feet. The location of this boring is shown in the enclosed Plot Plan and Survey Plan. The log for this borings may be found in the Appendix of this report.

Donald R. Warren Company, May, 1963, Foundation Investigation for proposed Office Building, 344 Juanita Street, Los Angeles, California, Project Number 63-651, prepared for Stanley Construction Company.

This foundation investigation pertains to the design and construction of the single-story warehouse structure located immediately to the north of the subject site, at 344 North Juanita Avenue. A total of five exploratory borings are presented in this investigation. The borings were drilled to depths ranging between 16 and 26 feet below grade. The materials observed in the borings consisted of fill, alluvium and bedrock. Groundwater was observed in one of the borings at a depth of 10 feet. According to the consultant, fill was only observed in two of the five borings. However, it is the opinion of this firm that this is a misrepresentation, as the site had been previously a part of a mass grading operation for the backfill of a swale, resulting in fill materials being placed throughout this property. The consultant encountered bedrock in all five borings, at depths ranging between 5 and 25 feet below grade. The location of the borings is shown in the enclosed Plot Plan and Survey Plan, and their logs may be found in the Appendix of this report.

Due to the variation of the underlying geologic materials, and in an effort to prevent excessive differential settlement, the previous consultant recommended that this structure be supported on a deep foundation system, consisting of drilled friction piles.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was explored on March 20, 2019 by excavating a total of five borings. Borings B1, B3 and B5 were drilled to depths ranging between 19 and 50 feet below grade, with the aid of a truck-mounted drilling machine using 8-inch diameter hollowstem augers. Borings B2 and B4 were excavated to a depth of 16 and 20 feet, respectively, with the aid of a 4-inch diameter hand auger. The exploration locations are shown on the Plot Plan and the geologic materials encountered are logged on Plates A-1 through A-5.

The location of exploratory excavations was determined from hardscaped features shown in the enclosed Survey Plan. Elevations of the exploratory excavations were determined from elevations presented in the topographic survey prepared by AEI Consultants, dated May 20, 2019. The location and elevation of the exploratory excavations should be considered accurate only to the degree implied by the method used.

Geologic Materials

Fill

Fill materials were encountered in all exploratory borings, to depths ranging between 7 and 21 feet below the existing grade. A boring excavated within the central portion of the site by Converse Consultants in 1959 encountered fill materials to a depth of 18.5 feet. As illustrated in the enclosed Cross Section A-A', the deepest fill is observed in the central portion of the site. As explained in the "Site Conditions" Section of this report, the site used to be a part of a larger swale, which bottom extended up to a depth of approximately 18 feet below the existing grade. This swale is illustrated in the enclosed plate titled "Historical Topographic Map (1928)". The

backfill of this swale resulted in the current deep fill observed within the site. This backfill occurred sometime in the first half of the last century, and was not placed according to modern standards. Therefore, the fill is not considered suitable for structural use.

The observed fill consists of interlayered mixtures of clay, silt and sand, which are dark brown and dark gray in color, moist to very moist, firm to stiff, or medium dense, and fine grained.

Older Alluvial Soils

The fill is in turn underlain by older alluvial soils, consisting of interlayered mixtures of sand, silt and clay. The alluvial soils are dark brown, gray and dark gray in color, moist to wet, stiff to very stiff, or medium dense to very dense and fine to medium grained.

Bedrock (Puente Formation)

Bedrock was encountered during our exploration in Borings B1 and B2, which were excavated within the western portion of the site. The bedrock was observed at depths of 7.5 and 18 feet below the existing grade. As presented in the "Research" section of this report, a previous consultant encountered bedrock within the northcentral portion of the site at an approximate depth of 22 feet below grade. Bedrock was also encountered by a previous consultant in a property located immediately to the north of the site, at 644 Juanita Avenue, to depths ranging between 5 and 25 feet below grade.

The bedrock underlying the site is comprised of upper Miocene-age Puente Formation, consisting of thin bedded siltstone and sandstone. The bedrock is yellow, gray and brown in color, moist, and moderately hard. The bedrock was observed to be well bedded. According to the enclosed Local Geologic Map (Lamar, 1970), bedding mapped in the vicinity of the site dips predominantly to the northwest, at shallow angles.

More detailed descriptions of the earth materials encountered may be obtained from individual logs of the subsurface excavations.

Groundwater

Water seepage was observed in three of the five exploratory borings, to depths ranging between 11½ and 12½ feet below the existing grade. The observed seepage most likely represents a perched condition. A perched condition is caused by differences in permeability within an earth material which allows a finite amount of water to develop above a relatively impermeable zone. It is the opinion of this firm that the encountered seepage does not represent the static groundwater level.

The historically highest groundwater level was established by review of California Geological Survey Seismic Hazard Zone Report of the Hollywood Quadrangle, (SHZR 026) Plate 1.2, which is entitled "Historically Highest Ground Water Contours". Review of this plate indicates that the historically highest groundwater level is not well defined for the site. The closest contour is almost a mile to the northwest, and corresponds to a depth of 20 feet below grade.

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 was not experienced during exploration. However, based on the experience of this firm, large diameter excavations that encounter saturated granular, cohesionless soils will most likely experience caving.

OIL FIELDS AND WELLS

Based on review of the California State Division of Oil, Gas and Geothermal Resources (DOGGR) Online Mapping System, the subject site is located just outside the Los Angeles City Oil Field. According to this map, no oil wells have been drilled at the site. The closest oil well is located approximately 2,000 feet to the southwest of the site. A copy of this map has been enclosed.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject property 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 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

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines “active” and “potentially active” faults utilizing the same aging criteria as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct

evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as a characteristic for faults that have a relatively high potential for ground rupture in the future.

CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Ground rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature and results of site reconnaissance, no known active or potentially active faults underlie the subject site. In addition, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these considerations, the potential for surface ground rupture at the subject site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table 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.

The Seismic Hazards Maps of the State of California (CDMG, 1999), does not classify the site as part of the 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 copy of this map has been included in the Appendix.

Based on the density of the older alluvium and bedrock, which underlay the site, it is the opinion of this firm that the site is not susceptible to liquefaction during the design-based seismic event.

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.

Some seismically-induced settlement of the proposed structures should be expected as a result of strong ground-shaking, however, due to the uniform nature 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. Review of the City of Los Angeles Inundation and Tsunami Hazard Areas map indicates the site does not lie within the mapped tsunami inundation boundaries.

Seiches are oscillations generated in enclosed bodies of water which can be caused by ground shaking associated with an earthquake. Review of the County of Los Angeles Flood and Inundation Hazards Map, Leighton (1990) indicates the site lies within mapped inundation boundaries due to a seiche or a breached upgradient reservoir. A determination of whether a higher site elevation would remove the site from the potential inundation zones is beyond the scope of this investigation.

Landsliding

The probability of seismically-induced landslides occurring on the site is considered to be low due to the gentle topographic relief observed across or adjacent to the site.

CONCLUSIONS AND RECOMMENDATIONS

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

As shown in the enclosed "Historical Topographic Map (1928)", the site was part of a larger swale, which was previously backfilled. Fill materials were observed in our exploration, to depths ranging between 7 and 21 feet below the existing grade. The observed fill depths roughly match the fill depths placed during the previous mass grading of the old swale. This fill is not suitable for structural use. The fill was observed to be underlain by older alluvial soils and bedrock of the Puente Formation.

Due to the fill depth and the variable stratification of the underlying geologic materials, it is the recommendation of this firm that the proposed structures be supported on a deep foundation system, consisting of drilled cast-in-place friction piles. The piles should derive their capacities from the native older alluvium and bedrock. It is also recommended that the slab-on-grade for the structures be designed as a structural slab, deriving its support from the proposed foundation system.

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 excavations on the site as indicated and should in no way be construed to reflect any variations which may occur between these excavations or which may result from changed in subsurface conditions. Any changes in the design, 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 CONSIDERATIONS

2016 CBC Seismic Parameters

Based on information derived from the subsurface investigation, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile, according to Table 1613.5.2 of the California Building Code (CBC). This information and the site coordinates were input into the USGS U.S. Seismic Design Maps tool to calculate the seismic ground motion parameters for the site. Ground motion parameters for the 2016 CBC are presented below.

2016 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	2.541g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	2.541g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.694g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.906g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.359g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.906g

EXPANSIVE SOILS

The onsite geologic materials are in the very low to moderate expansion range. The Expansion Index was found to be between 3 and 89 for representative samples. Recommended reinforcing is provided in the "Slabs-on-grade" sections of this report.

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 sources 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 318-08, 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.

METHANE ZONES

This office has reviewed the City of Los Angeles Methane Zone and Methane Buffer Zones map. Based on this review it appears that the subject site is located within a Methane Buffer Zone as designated by the City. 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.

GRADING GUIDELINES

The following guidelines are provided for any miscellaneous grading that may be required, such as for the preparation of flatwork or paving subgrades, or for the backfill of utility trenches.

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 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

All fill should be mechanically compacted in layers not more than 8 inches thick. Based on the expansive nature of the upper site soils, it is recommended that fill materials are moisture conditioned to approximately 3 percent over optimum moisture content before recompaction.

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. Fill materials having more than 15 percent finer than 0.005 millimeters may be compacted to a minimum of 90 percent of the maximum density. Comparative compaction is defined, for purposed of these guidelines, as the ratio of the in-place density to the maximum density as determined by applicable ASTM testing.

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 90 percent (or 95 percent for cohesionless soils having less than 15 percent finer than 0.005 millimeters) 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 50. 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 90 percent (or 95 percent for cohesionless soils having less than 15 percent finer than 0.005 millimeters) 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.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between 10 and 20 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.

Abandoned Seepage Pits

No abandoned seepage pits were encountered during exploration and none are known to exist on the site. However, should such a structure be encountered during grading, options to permanently abandon seepage pits include complete removal and backfill of the excavation with compacted fill, or drilling out the loose materials and backfilling to within a few feet of grade with slurry, followed by a compacted fill cap.

Where the seepage pit structure is to be left in place, the seepage pits should cleaned of all soil and debris. This may be accomplished by drilling. The pits should be filled with minimum 2-sack concrete slurry to within 5 feet of the proposed subgrade elevation. In order to provide a more uniform foundation condition, the remainder of the void should be filled with controlled fill.

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.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

FOUNDATION DESIGN

Friction Piles

Based on the deep fill and widely variable geologic stratification observed across the site, it is recommended that the proposed structures be supported on a deep foundation system, consisting of drilled cast-in-place friction piles. The piles shall derive their support from the underlying native older alluvial soils and bedrock, which during exploration were observed at depths ranging between 7 and 21.5 feet below the existing grade.

Vertical (Downward) Capacities

The vertical capacities of 24 and 30-inch diameter drilled cast-in-place friction piles are shown on the enclosed "Drilled Friction Pile Capacity Calculations". Due to the variation on the fill depth, individual calculations have been provided for scenarios where the fill extends to depths of 5, 10, 15 and 20 feet below the pile cap.

A one-third increase may be used for transient loading such as wind or seismic forces. The uplift capacity of the piles may be designed using 50% of the downward capacity provided in the

enclosed charts. Piles in groups should be spaced at least 3 diameters on center. If the piles are so spaced, no reduction in the downward or upward capacities need be considered due to group action.

The capacities presented are based on the strength of the soils. The compressive and tensile strength of the pile sections should be checked to verify the structural capacity of the piles.

Lateral Capacities

This firm has prepared the enclosed lateral analyses of the proposed piles, using the program RSPILE (version 2.013) by RocScience. The lateral analyses were performed for 24 and 30-inch diameter piles, for the free-head and a fixed-head condition, and an allowable pile deflection of ½-inch. Analyses were prepared for the scenarios where the fill extends to depths of 5, 10, 15 and 20 feet below the pile cap. Please contact this office if the allowable deflection will be different from the ½-inch addressed herein.

Assumptions regarding the anticipated pile reinforcing were made for the lateral pile analyses. This firm request that the structural engineer reviews the assumptions utilized in the analyses, and if any of them are not valid, this firm be contacted so the analyses are revised. The table below summarized the results of the lateral pile analyses. The enclosed printouts show the calculated shear, moment, and deflection for single, isolated piles.

	Fill Extends to 5 feet below bottom of Pile Cap (Lateral Capacity Based on a Maximum ½-inch Deflection)	
Pile Diameter (inches)	**Free Head Condition (kips)**	**Fixed Head Condition (kips)**
24	18.0	51.6
30	25.7	70.3

	Fill Extends to 10 feet below bottom of Pile Cap (Lateral Capacity Based on a Maximum ½-inch Deflection)	
Pile Diameter (inches)	**Free Head Condition (kips)**	**Fixed Head Condition (kips)**
24	10.5	27.2
30	15.1	39.6

	Fill Extends to 15 feet below bottom of Pile Cap (Lateral Capacity Based on a Maximum ½-inch Deflection)	
Pile Diameter (inches)	**Free Head Condition (kips)**	**Fixed Head Condition (kips)**
24	9.6	20.9
30	13.5	29.8

	Fill Extends to 20 feet below bottom of Pile Cap (Lateral Capacity Based on a Maximum ½-inch Deflection)	
Pile Diameter (inches)	**Free Head Condition (kips)**	**Fixed Head Condition (kips)**
24	9.6	20.4
30	13.4	28.4

This firm is aware that the Los Angeles Department of Building and Safety does not allow the use of uncertified fill materials for lateral support of deep foundations. However, a request for modification will be filed with the Grading Division to allow for the use of limited passive pressures in the existing fill materials. In the enclosed lateral pile analyses, a maximum allowable passive pressure equivalent to 200 pcf, or a friction angle of 5 degrees and a cohesion of 25 psf, were applied to the existing uncertified fill soils. These values are well below the friction angle and cohesion obtained from the testing of the existing uncertified fill materials, as presented in the enclosed Plate B-3.

Pile Spacing

Single isolated piles may be classified as piles at or greater than 8 widths on center. Where piles will be spaced closer than 8 diameters on center in the direction of loading, the following reduction factor may be utilized to determine the allowable lateral pile capacities.

Pile Spacing	Percentage of Passive Resistance
7B	70%
6B	55%
5B	45%
4B	38%
3B	33%

where B is the diameter of the proposed piles

Grade Beams and Pile Caps

For design of grade beams and pile caps, an allowable coefficient of friction of 0.25 may be used with the dead load forces. Passive geologic pressure for the sides of new grade beams poured against existing fill materials may be computed as an equivalent fluid having a density of 100 pounds per cubic foot. Passive geologic pressure for the sides of new grade beams poured against native or recompacted soil may be computed as an equivalent fluid having a density of 300 pounds per cubic foot.

The passive and friction components may be combined for lateral resistance without reduction. A one-third increase in the passive value may be used for short duration loading such as wind or seismic forces.

Pile Installation

Caving is not anticipated during drilling of the proposed piles. In the event that caving occurs, it will be necessary to utilize casing, or drilling polymer, to maintain open pile shafts. 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.

Groundwater seepage was encountered at depths between 11½ and 12½ feet. Piles placed below the water level will 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 6 inches with a hopper at the top. 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 of 1,000 psi 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.

Closely spaced piles should be drilled and filled alternately, with the concrete permitted to set at least overnight before drilling an adjacent hole. Pile excavations should be filled with concrete as soon after drilling and inspection as possible. For safety reasons, the shafts should not be left open overnight.

Pile Foundation Settlement

Settlement of the pile foundation system is expected to occur on initial application of loading. The maximum settlement of the proposed cast-in-place friction piles is not expected to exceed ½-inch. Differential settlement between the new piles is not expected to exceed ¼-inch.

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 earth 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

The proposed structures are expected to be built near the existing grade. Therefore the only retaining walls anticipated would be associated with the construction of elevator pits, or in cases where a building's finished floor elevation will be slightly lower than the outdoor grade.

At this time, it is unknown if the proposed retaining walls will be serviced by a subdrain system. If the installation of a subdrain system will be omitted, the walls shall be designed for an undrained condition with full hydrostatic pressure. Recommendations for drained and undrained conditions are provided herein.

Additional pressure should be added to the retaining wall design, for a surcharge condition due to vehicular traffic or adjacent structures. At this time, it is not anticipated that the retaining walls will be surcharged by existing structures. For traffic surcharge, the upper 10 feet of any 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 traffic surcharge. If the traffic is more than 10 feet from the retaining walls, the traffic surcharge may be neglected.

Cantilever Retaining Walls

Retaining walls supporting a level backslope may be designed utilizing a triangular distribution of pressure. Cantilever retaining walls may be designed utilizing the following table:

Height of Retaining Wall	Cantilever Retaining Wall **with** Wall Subdrain System Triangular Distribution of Active Earth Pressure	Cantilever Retaining Wall **without** Wall Subdrain System Triangular Distribution of Active Earth Pressure
Up to 6 feet	30 pcf	93 pcf (includes hydrostatic pressure)

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.

Restrained Retaining Walls

Restrained retaining walls may be designed to resist a triangular pressure distribution of at-rest earth pressure. Restrained retaining walls may be designed utilizing the following table:

Height of Retaining Wall	Restrained Retaining Wall **with** Wall Subdrain System Triangular Distribution of At-Rest Earth Pressure	Restrained Retaining Wall **without** Wall Subdrain System Triangular Distribution of At-Rest Earth Pressure
Up to 6 feet	85 pcf	104 pcf (includes hydrostatic pressure)

Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures.

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. Retaining walls exceeding a height of 6 feet are not currently anticipated, therefore the dynamic earth pressure may be omitted.

Surcharge from Adjacent Structures

The following surcharge equation provided in the LADBS Information Bulletin Document No. P/BC 2014-83, may be utilized to determine the surcharge loads on basement walls for existing or proposed 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 may use this equation to determine the surcharge loads based on the loading of the adjacent structures located within the surcharge influence zone.

Retaining Wall Drainage

If the retaining wall will be designed for a drained condition, the retaining walls 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 an alternative to the standard perforated subdrain pipe and gravel drainage system, the use of gravel pockets and weepholes is an acceptable drainage method. Weepholes shall be a minimum of 2 inches in diameter, placed at 8 feet on center along the base of the wall. Gravel pockets shall be a minimum of 1 cubic foot in dimension, and may consist of three-quarter inch to one inch crushed rocks, wrapped in filter fabric. Subdrainage pipes should outlet to an acceptable location.

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.

If a drainage system is not provided, the walls should be designed to resist an external hydrostatic pressure due to water in addition to the lateral earth pressure. Lateral pressures based on a hydrostatic design are provided in a previous section of this report.

Sump Pump Design

The purpose of the recommended retaining wall backdrainage system is to relieve hydrostatic pressure. Groundwater seepage was encountered during exploration at a depth of 11½ feet. Because the retaining walls are not expected to exceed a height of 6 feet, the only water which could affect the proposed retaining walls would be irrigation water and precipitation. Additionally, the proposed site grading is such that all drainage is directed to the street and the structure has been designed with adequate non-erosive drainage devices.

Based on these considerations the retaining wall backdrainage system is not expected to experience an appreciable flow of water, and in particular, no groundwater will affect it. However, for the purposes of design, a flow of 5 gallons per minute may be assumed.

Waterproofing

Moisture effecting 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 90 percent (or 95 percent for cohesionless soils having less than 15 percent finer than 0.005 millimeters) relative compaction, 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.

TEMPORARY EXCAVATIONS

The on-site fill and native soils are suitable for vertical excavations up to 5 feet where not surcharged by adjacent traffic, structures or property lines.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 slope gradient to a maximum depth of 25 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.

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.

SLABS ON GRADE

Structural Slabs

A structural slab is anticipated for the proposed structures, because the existing deep fill materials will not be completely removed and recompacted, and the structure will be supported by cast-in-place friction piles. The structural slab shall be supported by the foundation system in its entirety. The thickness and reinforcement of the slab should be designed by the structural engineer.

Outdoor Concrete Slabs

Outdoor concrete flatwork should be a minimum of 4 inches in thickness. Outdoor concrete flatwork should be cast over a subgrade consisting of controlled fill materials. In order to provide uniform support, it is recommended that the subgrade consist of 24 inches of properly recompacted soils. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent (or 95 percent for cohesionless soils having less than 15 percent finer than 0.005 millimeters) relative compaction.

Design Of Slabs That Receive Moisture-Sensitive Floor Coverings

Geotechnologies, Inc. does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore it is recommended that a qualified consultant be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure.

Where dampness would be objectionable, it is recommended that the floor slabs should be waterproofed. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection from unwanted moisture.

All concrete slabs-on-grade should be supported on vapor retarder. The design of the slab and the installation of the vapor retarder should comply with the most recent revisions of ASTM E 1643 and ASTM E 1745. The vapor retarder should comply with ASTM E 1745 Class A requirements.

Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. The barrier can be covered with a layer of trimmable, compactible, granular fill, where it is thought to be beneficial. See ACI 302.2R-32, Chapter 7 for information on the placement of vapor retarders and the use of a fill layer.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to settlement. However even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking due to minor soil movement and/or concrete shrinkage. 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.

For standard crack control maximum expansion 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) and concrete pavement, 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 24 inches of the exposed subgrade beneath the flatwork be removed and recompacted to at least 90 percent (or 95 percent for cohesionless soils having less that 15 percent finer than 0.005 millimeters) relative compaction.

Slab Reinforcing

Outdoor flatwork should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

PAVEMENTS

Prior to placing paving, the existing grade should be removed to a depth of 24 inches, moistened as required to obtain optimum moisture content, and recompacted to 90 percent (or 95 percent for cohesionless soils having less than 15 percent finer than 0.005 millimeters) relative compaction, 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. The following pavement sections are recommended:

Service	Asphalt Pavement Thickness Inches	Base Course Inches
Passenger Cars (TI=4)	4	5
Moderate Truck (TI=6)	5	7

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 conform with Section 200-2.2 or 200-2.4 of the "Standard Specifications for Public Works Construction", (Green Book), latest edition.

Concrete paving may also be utilized. Concrete paving for passenger cars and moderate truck traffic shall be a minimum of 6 inches in thickness, and shall be underlain by 4 inches of aggregate base. For standard crack control maximum expansion joint spacing of 10 feet should not be exceeded. Lesser spacing would provide greater crack control. Joints at curves and angle points are recommended. Concrete paving should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

The performance of pavement is highly dependent upon providing positive surface drainage away from the edges. Ponding 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 should be collected and transferred to an acceptable location in non-erosive drainage devices. The 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 retaining wall backfill should be sealed to prevent moisture intrusion into the backfill.

STORMWATER DISPOSAL

The proposed development will be constructed at or near the existing site grade. Groundwater seepage was encountered at depths between 11½ and 12½ feet below the site grade. The seepage consists of water perched on top of relatively impervious geologic materials, such as silt, clay or bedrock. Based on this consideration, it is the opinion of this firm that stormwater infiltration at the site is not advisable, as it would exacerbate the current perched water condition.

Where infiltration of stormwater into the subgrade soils is not advisable, most Building Officials have allowed the stormwater to be filtered through soils in planter area. 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 discharge into the planters.

It is recommended that the design team (including the structural engineer, waterproofing consultant, plumbing engineer, and landscape architect) be consulted in regards to the design and

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. Southern California sedimentary bedrock is known to contain variable layers which reflect differences in depositional environment. Such layers may include abundant gravel, cobbles and boulders. Similarly bedrock can contain concretions. Concretions are typically lenticular and follow the bedding. They are formed by mineral deposits. Concretions can be very hard. 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.

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 effect 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. Samples from the hand-auger borings are obtained utilizing a hand sampler. 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 general 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 in general accordance with 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 in general accordance with 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. The rate of deformation is approximately 0.025) inches per minute. 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 in general accordance with 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.

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 D 4829. 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.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined in general accordance with the most recent revision of ASTM D 1557. A soil at a selected moisture content is placed in five layers into a 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.

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. A hydrometer is used to determine the distribution of particle sizes by a sedimentation process. The grain size distributions are presented in the E-Plate of this report.

Atterberg Limits

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

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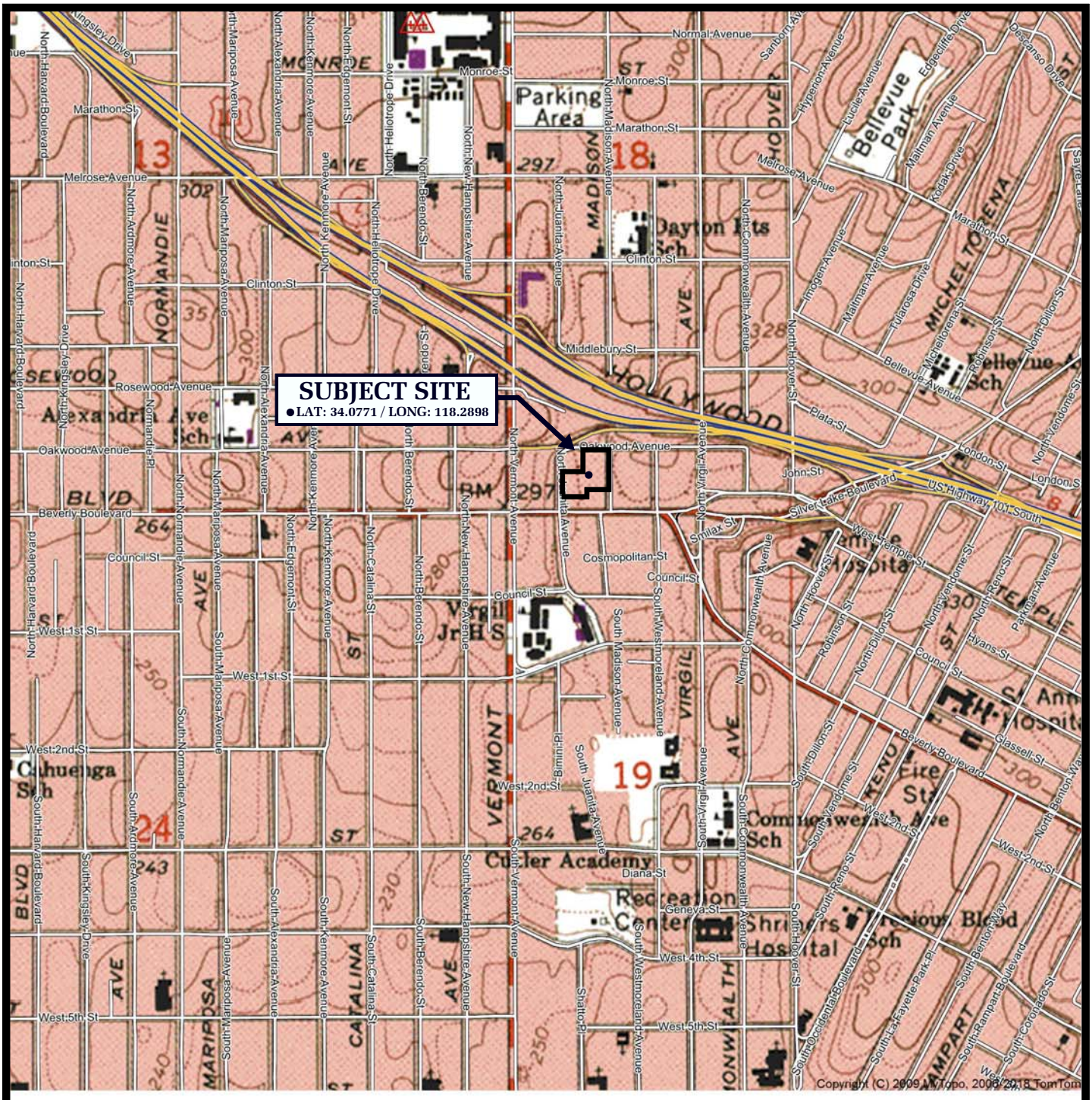

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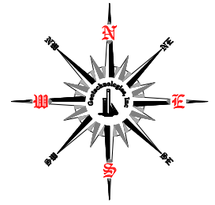
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES, HOLLYWOOD, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783



SCALE IN FEET

0 40 80

LEGEND

B5 — LOCATION & NUMBER OF BORING (This Investigation)

B1 — LOCATION & NUMBER OF BORING (Previous SIte Investigation by Converse Foundation Company - 1959)

B5 — LOCATION & NUMBER OF BORING (Previous Investigations conducted on Neighboring Site by Donald R. Warren Co. - 1962 and 1963)

21 — DEPTH OF FILL OBSERVED IN BORING (IN FEET)

A — A' — CROSS SECTION

REFERENCE: SITE PLAN BY KFA DATED 05/20/19

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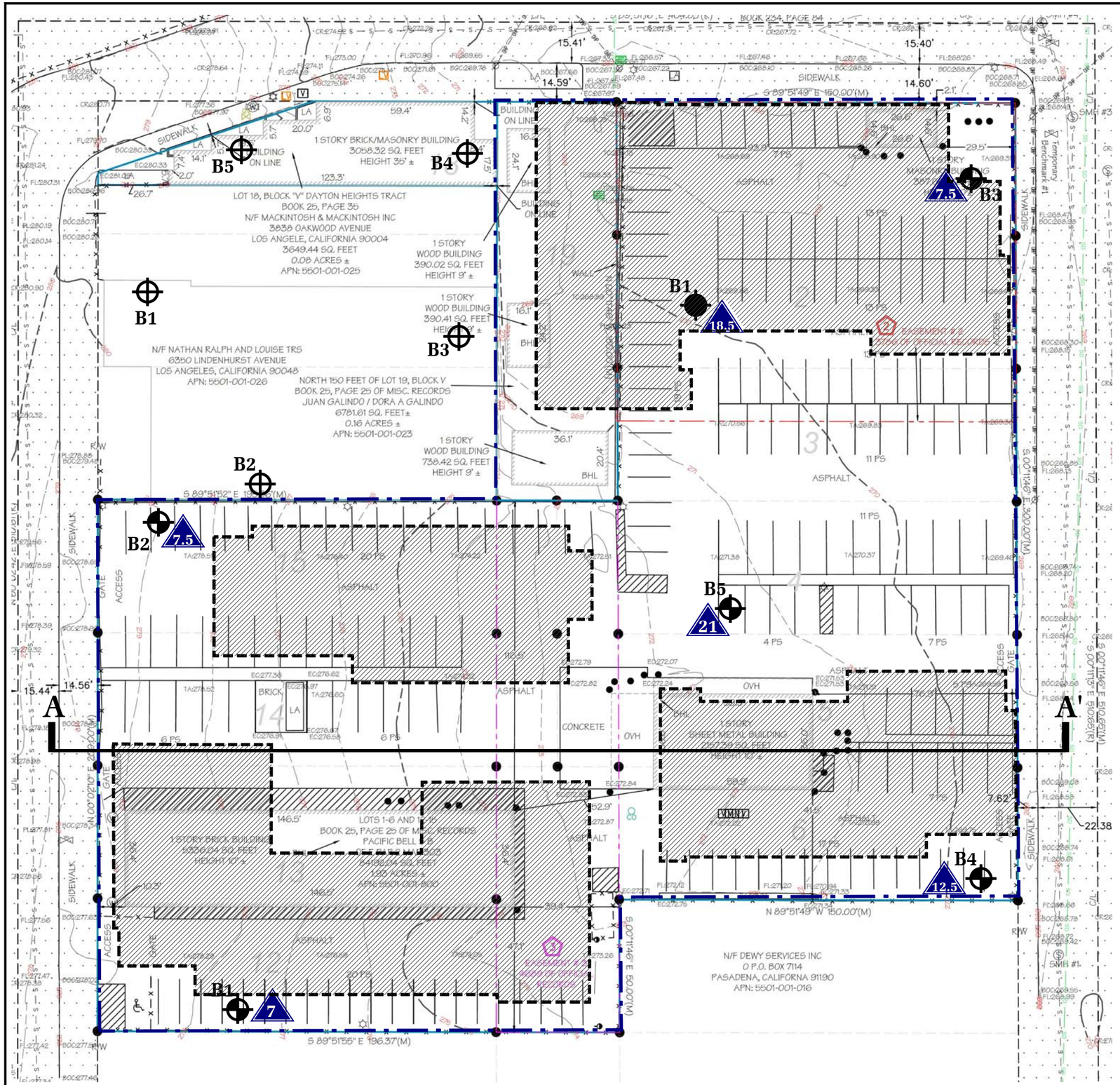
PLOT PLAN

FLEXIBLE PSH SOLUTIONS, INC.

File No.: 21783

Date: May '19



SCALE IN FEET

0 40 80

LEGEND

B5 — LOCATION & NUMBER OF BORING (This Investigation)

B1 — LOCATION & NUMBER OF BORING (Previous SIte Investigation by Converse Foundation Company - 1959)

B5 — LOCATION & NUMBER OF BORING (Previous Investigations conducted on Neighboring Site by Donald R. Warren Co. - 1962 and 1963)

21 — DEPTH OF FILL OBSERVED IN BORING (IN FEET)

PROPOSED STRUCTURES

A — A' CROSS SECTION

REFERENCE: LAND TITLE SURVEY BY AEI CONSULTANTS
DATED 04/01/19

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SURVEY PLAN

FLEXIBLE PSH SOLUTIONS, INC.

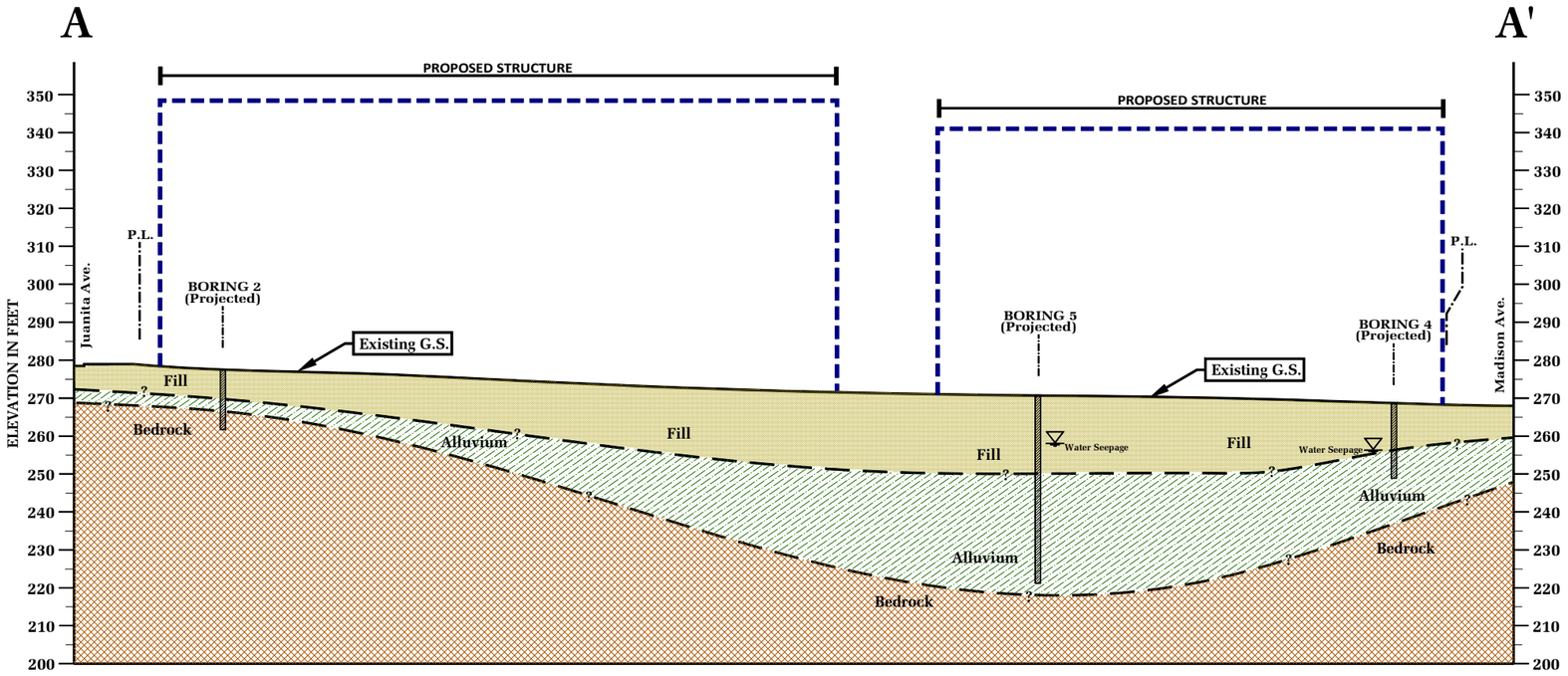
File No.: 21783

Date: May '19

E

SCALE IN FEET

0 40 80



REFERENCES: LAND TITLE SURVEY BY AEI CONSULTANTS, DATED 04/01/19
SITE PLAN BY KFA, DATED 05/20/19

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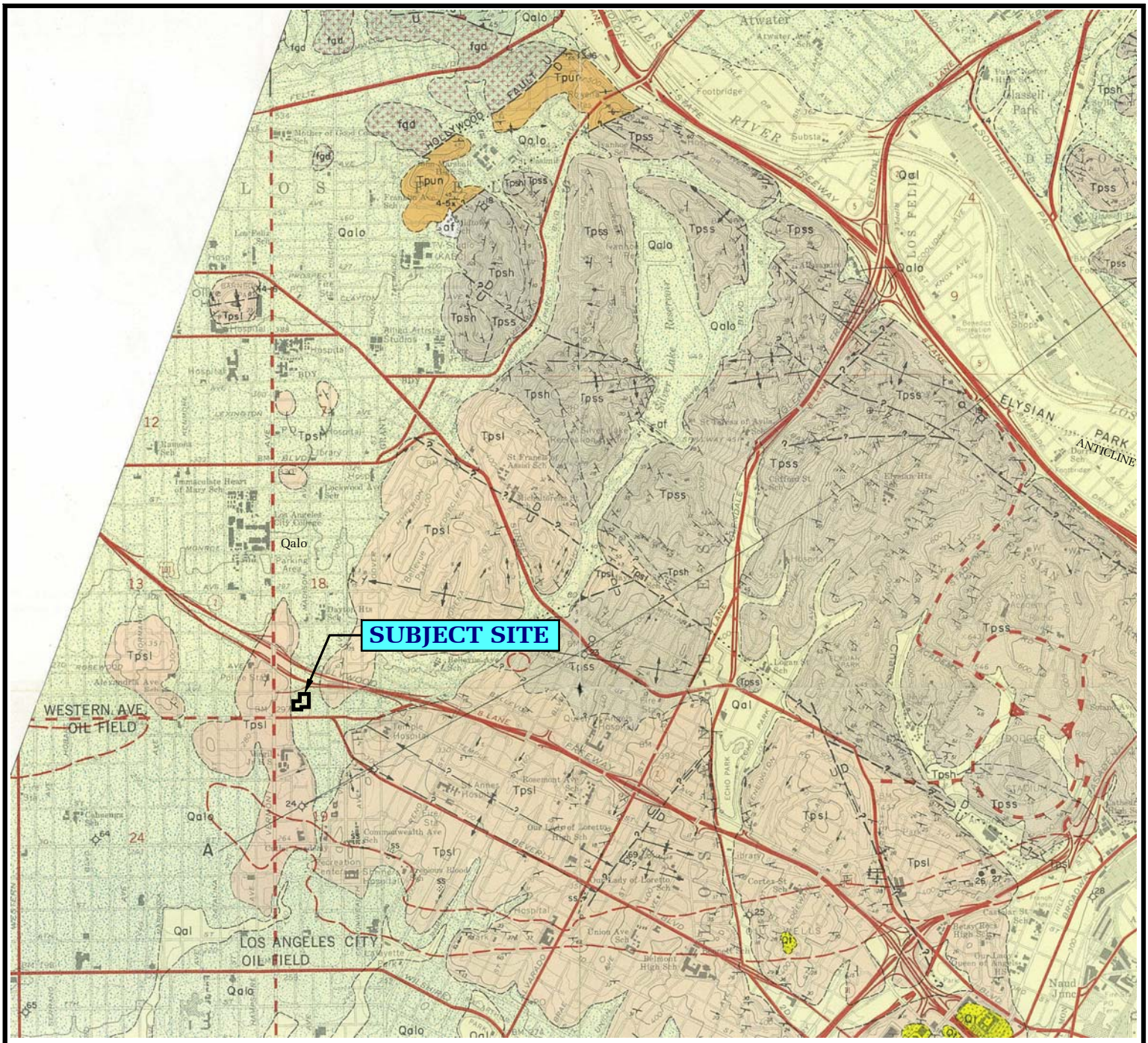
CROSS SECTION A-A'

FLEXIBLE PSH SOLUTIONS, INC.

File No.: 21783

Date: May '19



SCALE IN FEET

0 1000 2000 4000

LEGEND

Qal: Alluvium. Silt, sand and gravel
Qalo: Old Alluvium. Silt, sand and gravel
Qt: Terrace Deposits. Silt, sand and gravel
Tpsl: Puente Formation. Siltstone, well bedded, light brown and light gray
Tpsh: Puente Formation. Shale, well bedded, light gray, siliceous
Tpss: Puente Formation. Sandstone, well bedded, medium to coarse grained, light brown to gray
Tpun: Puente Formation. Undifferentiated siltstone, shale, sandstone and conglomerate
fgd: Feliz Granodiorite. Fine- to medium-grained, massive, light gray to light brown

N

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REFERENCE: D.L. LAMAR, SPECIAL REPORT 101- PLATE 1, GEOLOGIC MAP OF THE ELYSIAN PARK-REPETTO HILLS AREA, LOS ANGELES COUNTY

LOCAL GEOLOGIC MAP

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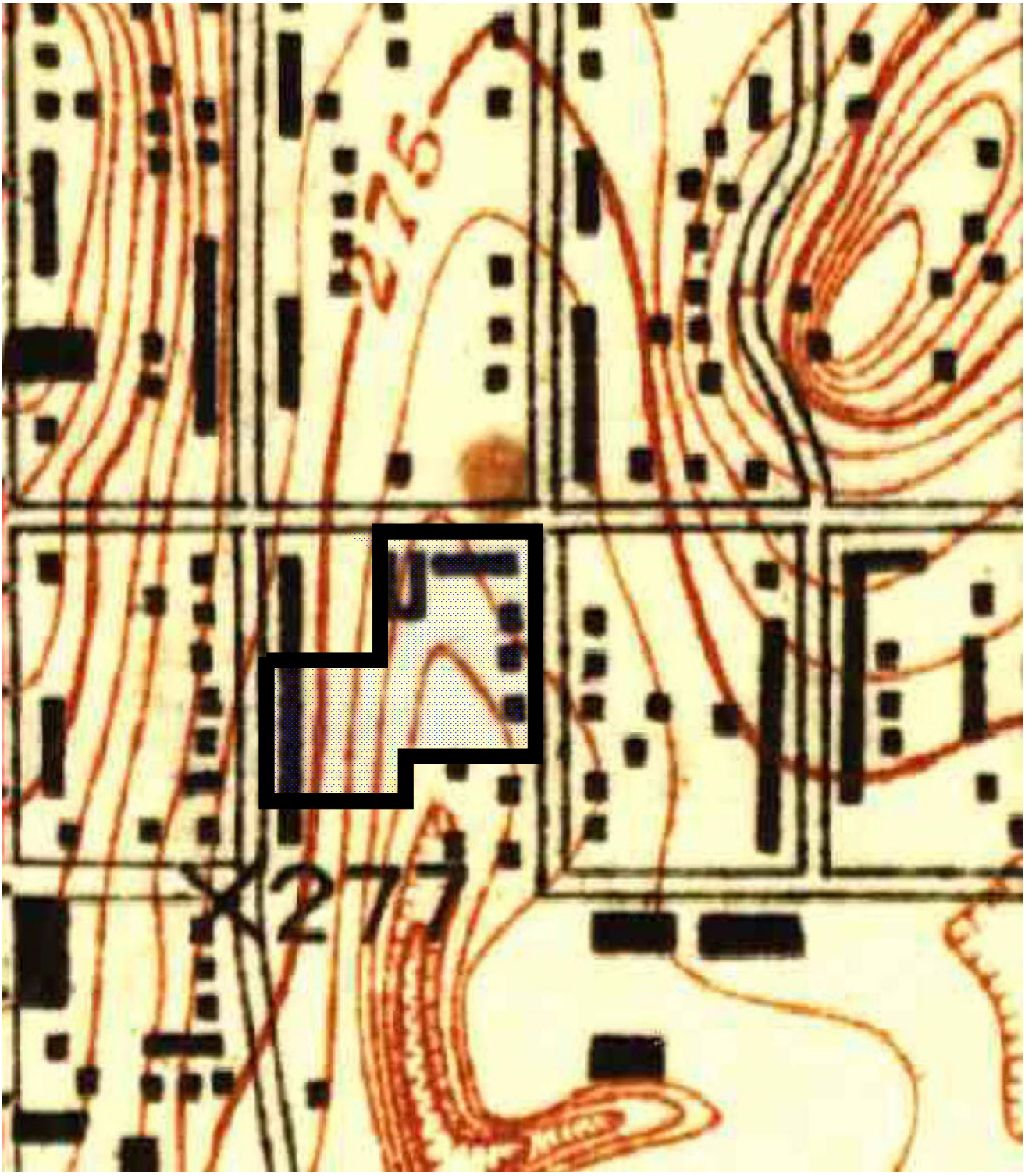
FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783



SCALE IN FEET

0 100 200 400

N

LEGEND

SUBJECT SITE

TOPOGRAPHIC CONTOUR (5-FOOT INTERVALS)

REFERENCE: LOS ANGELES CALIFORNIA TOPOGRAPHIC MAP, 1928 EDITION
DEPARTMENT OF THE INTERIOR, UNITED STATE GEOLOGIC SURVEY, JUNE, 1927

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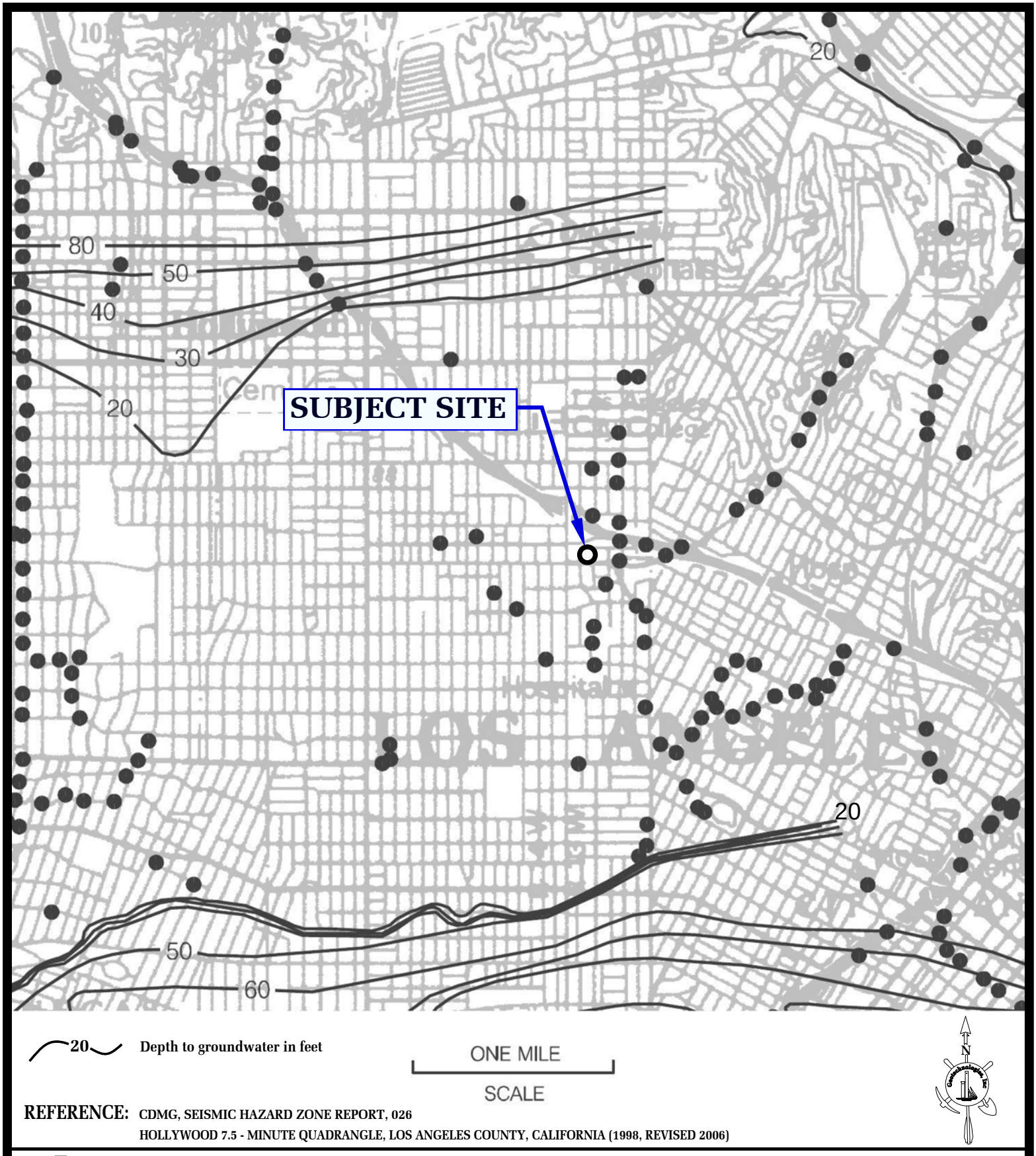
HISTORICAL TOPOGRAPHIC MAP (1928)

FLEXIBLE PSH SOLUTIONS, INC.

File No.: 21783

Date: May '19



20 Depth to groundwater in feet

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 026
HOLLYWOOD 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

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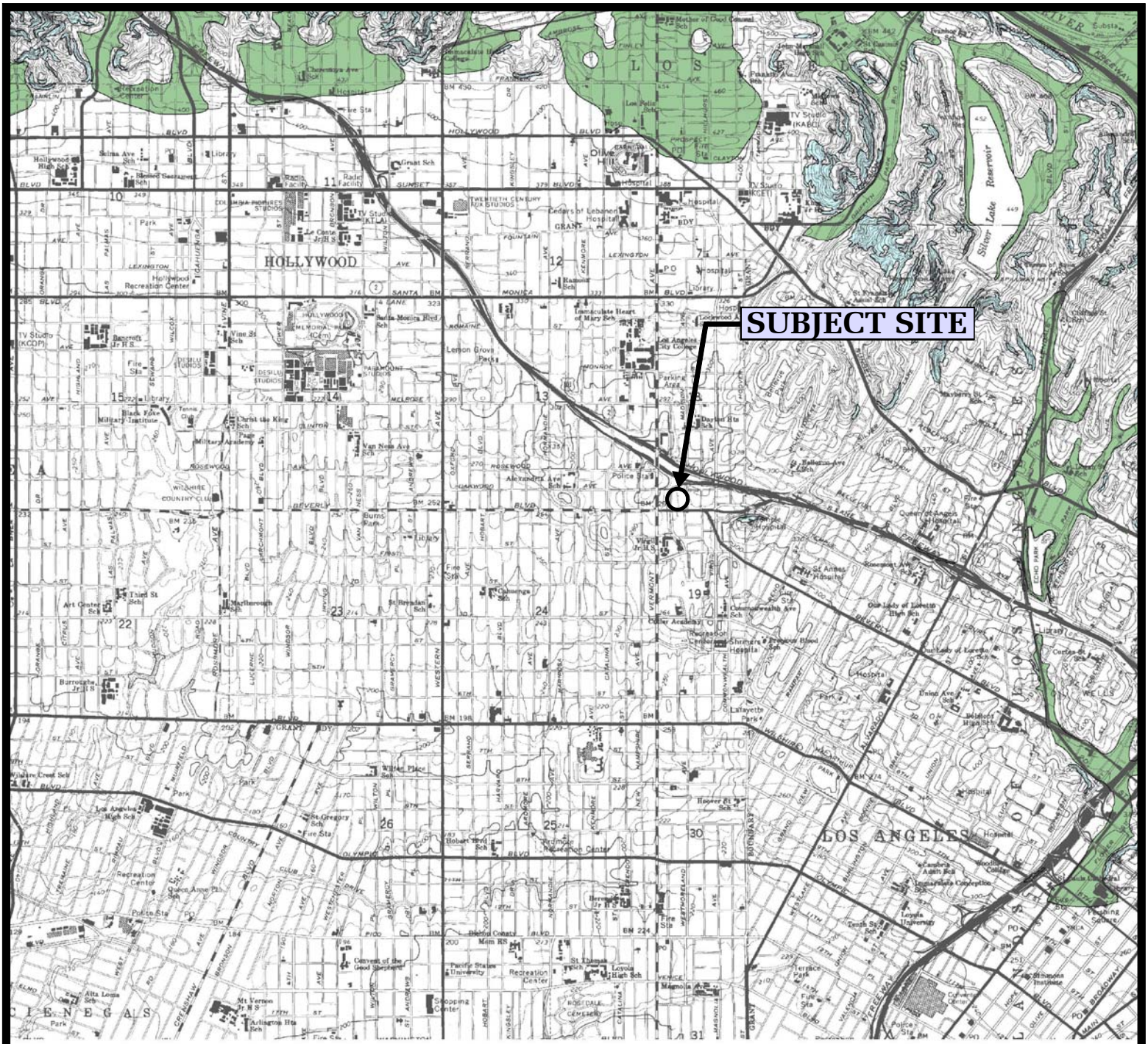
FILE NO. 21783



LIQUEFACTION AREA

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

SEISMIC HAZARD ZONE MAP

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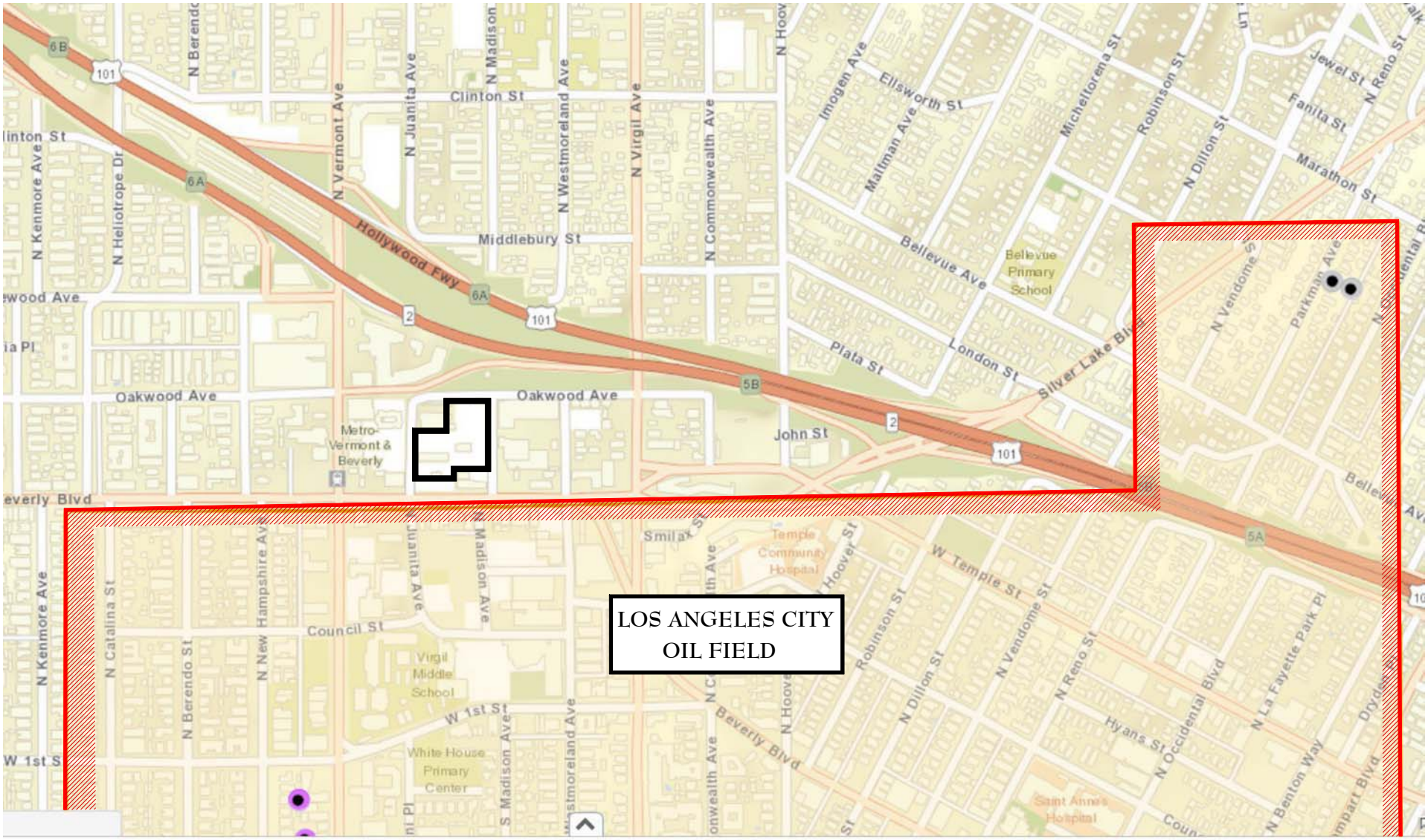
FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783



LEGEND

- Project Site
- Limits of Oil Field
- Oil Well

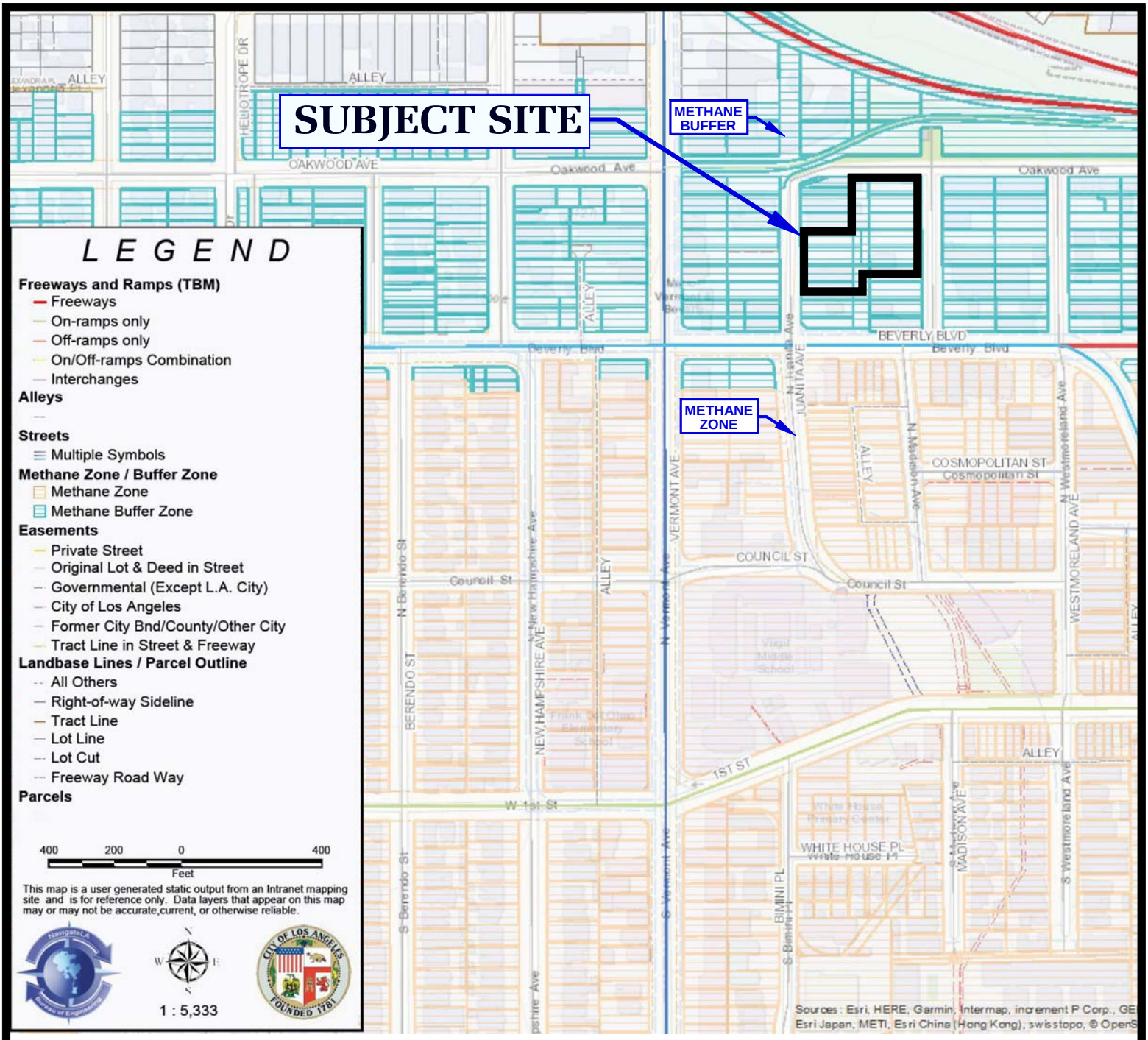
REFERENCE: STATE OF CALIFORNIA DEPARTMENT OF CONSERVATION, DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES ONLINE MAPPING SYSTEM

OIL FIELD AND OIL WELL LOCATION MAP

GEOTECHNOLOGIES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783



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

METHANE ZONE RISK MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783

BORING LOG NUMBER 1

Flexible PSH Solutions, Inc. **Date: 03/20/19** **Elevation: 277.5'***

File No. 21783 **Method: 8-inch diameter Hollow Stem Auger**

km *Reference: Survey by AEI Consultants, dated 4/1/19

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0 --		4-inch Asphalt over 6-inch Base
				-		
				1 --		
				-		FILL: Silty Sand, dark brown, moist, stiff
				2 --		
				-		
				3 --		Silty Clay, dark brown, moist, stiff
				-		
				4 --		
				-		
5	7	15.9	SPT	5 --		
				-		Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				6 --		
				-		Silty clay, dark brown, moist, stiff
				7 --		
7.5	24	20.3	100.4	-		
				8 --	CL	NATIVE ALLUVIUM: Silty Clay, dark gray, moist, stiff
				-		
				9 --		
				-		
10	16	18.9	SPT	10 --		
				-		
				11 --		
				-		
				12 --		
12.5	48	16.9	114.7	-		
				13 --	SM/SP	Silty Sand to Sand, dark gray to gray, moist, medium dense, fine to medium grained
				-		
				14 --		
				-		
15	26	18.2	SPT	15 --		
				-		
				16 --		
				-		
				17 --		
17.5	51	26.4	95.7	-		
				18 --		BEDROCK (PUENTE FORMATION): Siltstone, yellowish grayish brown, moist, moderately hard
				-		
				19 --		
				-		Total Depth 19 feet
				20 --		No Water
				-		Fill to 7½ feet
				21 --		
				-		
				22 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				-		
				23 --		
				-		Used 8-inch diameter Hollow-Stem Auger
				24 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted
				25 --		
				-		SPT=Standard Penetration Test

BORING LOG NUMBER 2

Flexible PSH Solutions, Inc. **Date: 03/20/19** **Elevation: 279.0'***

File No. 21783 **Method: 4-inch diameter Hand Auger**

km *Reference: Survey by AEI Consultants, dated 4/1/19

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
			0 --		4-inch Asphalt over 5-inch Base
			-		
			1 --		
			-		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			2 --		
2.5	26.7	83.2	-		
			3 --		Silty Clay, dark gray, moist, stiff
			-		
			4 --		
			-		
5	25.7	93.0	5 --		
			-		dark brown and gray
			6 --		
			-		
			7 --		
7.5	27.5	95.1	-		
			8 --		BEDROCK (PUENTE FORMATION): Siltstone, yellowish brown, moist, moderately hard
			-		
			9 --		
			-		
10	29.3	88.2	10 --		
			-		grayish brown
			11 --		
			-		
			12 --		
12.5	33.6	85.1	-		
			13 --		yellow to grayish brown
			-		
			14 --		
			-		
15	32.6	89.4	15 --		
			-		
			16 --		
			-		Total Depth 16 feet by refusal
			17 --		No Water
			-		Fill to 7½ feet
			18 --		
			-		
			19 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			-		
			20 --		
			-		Used 4-inch diameter Hand Auger
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

BORING LOG NUMBER 3

Flexible PSH Solutions, Inc. **Date: 03/20/19** **Elevation: 269.0'***

File No. 21783 **Method: 8-inch diameter Hollow Stem Auger**

km *Reference: Survey by AEI Consultants, dated 4/1/19

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0 --		6-inch Asphalt, No Base
				-		
				1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				2 --		
2.5	7	15.2	109.2	-		
				3 --		Silty Clay, dark gray, moist, stiff
				-		
				4 --		
				-		
5	12	34.9	83.6	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	13	19.9	107.1	-		
				8 --	CL	NATIVE ALLUVIUM: Silty Clay, dark gray, moist, stiff
				-		
				9 --		
				-		
10	18	25.1	98.8	10 --		
				-		
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	28	21.8	104.7	15 --		
				-	SM/ML	Silty Sand to Sandy Silt, dark gray to gray, moist, medium dense, fine grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-	SM	Silty Sand, dark brown, moist, dense, fine grained
20	62	18.8	105.8	20 --		
				-		Total Depth 20 feet
				21 --		Seepage Water at 11½ feet
				-		Fill to 7½ feet
				22 --		
				-		
				23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				-		
				24 --		
				-		Used 8-inch diameter Hollow-Stem Auger
				25 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted

BORING LOG NUMBER 4

Flexible PSH Solutions, Inc. **Date: 03/20/19** **Elevation: 270.0'***

File No. 21783 **Method: 4-inch diameter Hand Auger**

km *Reference: Survey by AEI Consultants, dated 4/1/19

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
			0 --		5-inch Asphalt over 3-inch Base
			-		
			1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			-		
			2 --		
2.5	13.7	116.1	-		
			3 --		
			-		
			4 --		
			-		
5	14.7	95.2	5 --		
			-		few asphalt fragments
			6 --		
			-		
7	17.2	109.0	7 --		
			-		Sandy Silt, dark brown, moist, stiff
			8 --		
			-		
			9 --		
			-		
10	29.4	91.9	10 --		
			-		Silty Clay, dark brown, moist, stiff
			11 --		
			-		
			12 --		
12.5	32.4	88.4	-		
			13 --	CL	NATIVE ALLUVIUM: Silty Clay, dark brown, moist, stiff, with caliche
			-		
			14 --		
			-		
15	29.4	96.0	15 --		
			-	ML	Sandy Silt, gray, very moist, stiff
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-	ML	Sandy Silt, gray, wet, stiff
20	29.3	99.3	20 --		
			-		Total Depth 20 feet Seepage Water at 12 feet Fill to 12½ feet
			21 --		
			-		
			22 --		
			-		
			23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			-		
			24 --		
			-		Used 4-inch diameter Hand Auger
			25 --		
			-		

BORING LOG NUMBER 5

Flexible PSH Solutions, Inc. **Date: 03/20/19** **Elevation: 271.5'***

File No. 21783 **Method: 8-inch diameter Hollow Stem Auger**

km *Reference: Survey by AEI Consultants, dated 4/1/19

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0		5-inch Asphalt over 4-inch Base
				1		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				2		
				3		
				4		
5	4	28.6	SPT	5		Sandy Silt to Silty Clay, yellow and dark brown, moist, stiff
				6		
7.5	28	13.9	84.2	7		Sandy Silt, dark brown, moist, stiff
				8		
				9		
10	4	16.7	SPT	10		Silty Sand to Clayey Silt, dark brown and dark gray, moist, medium dense, stiff, fine grained
				11		
12.5	12	19.3	105.9	12		Sandy Silt to Silty Clay, dark gray to gray, moist, stiff
				13		
				14		
15	4	24.7	SPT	15		Silty Clay, dark and gray, moist, firm
				16		
17.5	7	36.1	81.3	17		black, very moist, firm
				18		
				19		
20	35	33.3	SPT	20		
				21	SM	NATIVE ALLUVIUM: Silty Sand, dark brown, moist, medium dense to dense, fine grained
22.5	33 50/5"	7.9	117.8	22		very dense
				23		
				24		
25	74	13.0	SPT	25		
					SM/ML	Silty Sand to Sandy Silt, dark brown, moist, very dense, very stiff, fine grained

BORING LOG NUMBER 5

Flexible PSH Solutions, Inc.

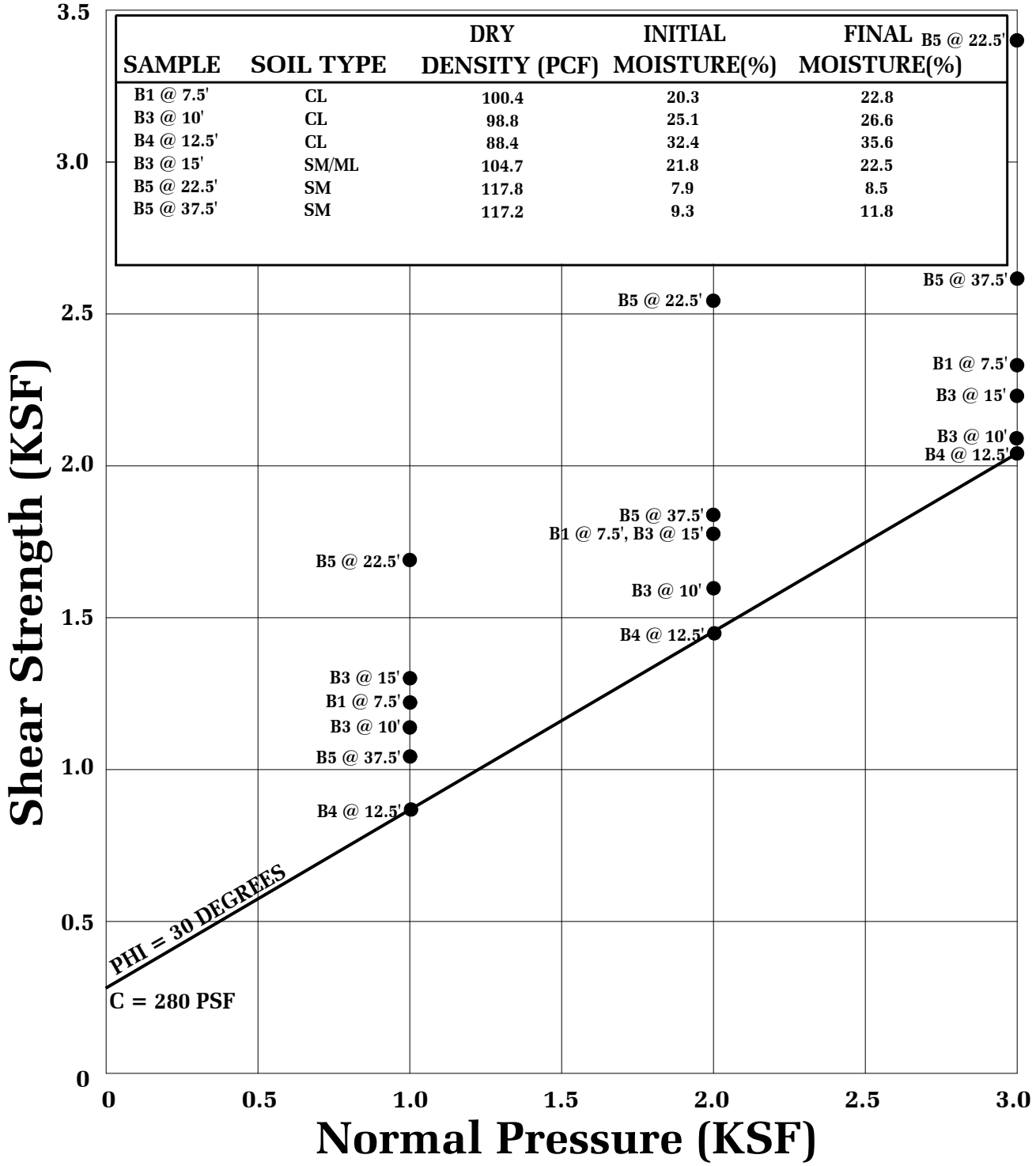
File No. 21783

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26 --		
				27 --		
27.5	37 50/2"	16.1	109.1	28 --	SM	Silty Sand, dark brown, moist, very dense, fine grained
				29 --		
30	44 50/4"	17.1	SPT	30 --		
				31 --		
				32 --		
32.5	37 50/1"	9.7	112.8	33 --		
				34 --		
35	23 50/5"	11.6	SPT	35 --		
				36 --		
				37 --		
37.5	85	9.3	117.2	38 --		
				39 --		
40	38 50/4"	19.5	SPT	40 --	SM/SP	Silty Sand to Sand, dark brown, moist, very dense, fine grained
				41 --		
				42 --		
42.5	38 50/4"	8.0	115.7	43 --		
				44 --		
45	51 50/3"	13.2	SPT	45 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				46 --		
				47 --		Used 8-inch diameter Hollow-Stem Auger
47.5	34 50/3"	10.7	117.6	48 --		140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				49 --		SPT=Standard Penetration Test
50	79	11.4	SPT	50 --		
						Total Depth 50 feet Seepage Water at 12½ feet Fill to 21 feet

NATIVE ALLUVIUM

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B1 @ 7.5'	CL	100.4	20.3	22.8
B3 @ 10'	CL	98.8	25.1	26.6
B4 @ 12.5'	CL	88.4	32.4	35.6
B3 @ 15'	SM/ML	104.7	21.8	22.5
B5 @ 22.5'	SM	117.8	7.9	8.5
B5 @ 37.5'	SM	117.2	9.3	11.8



● Direct Shear, Saturated

SHEAR TEST DIAGRAM

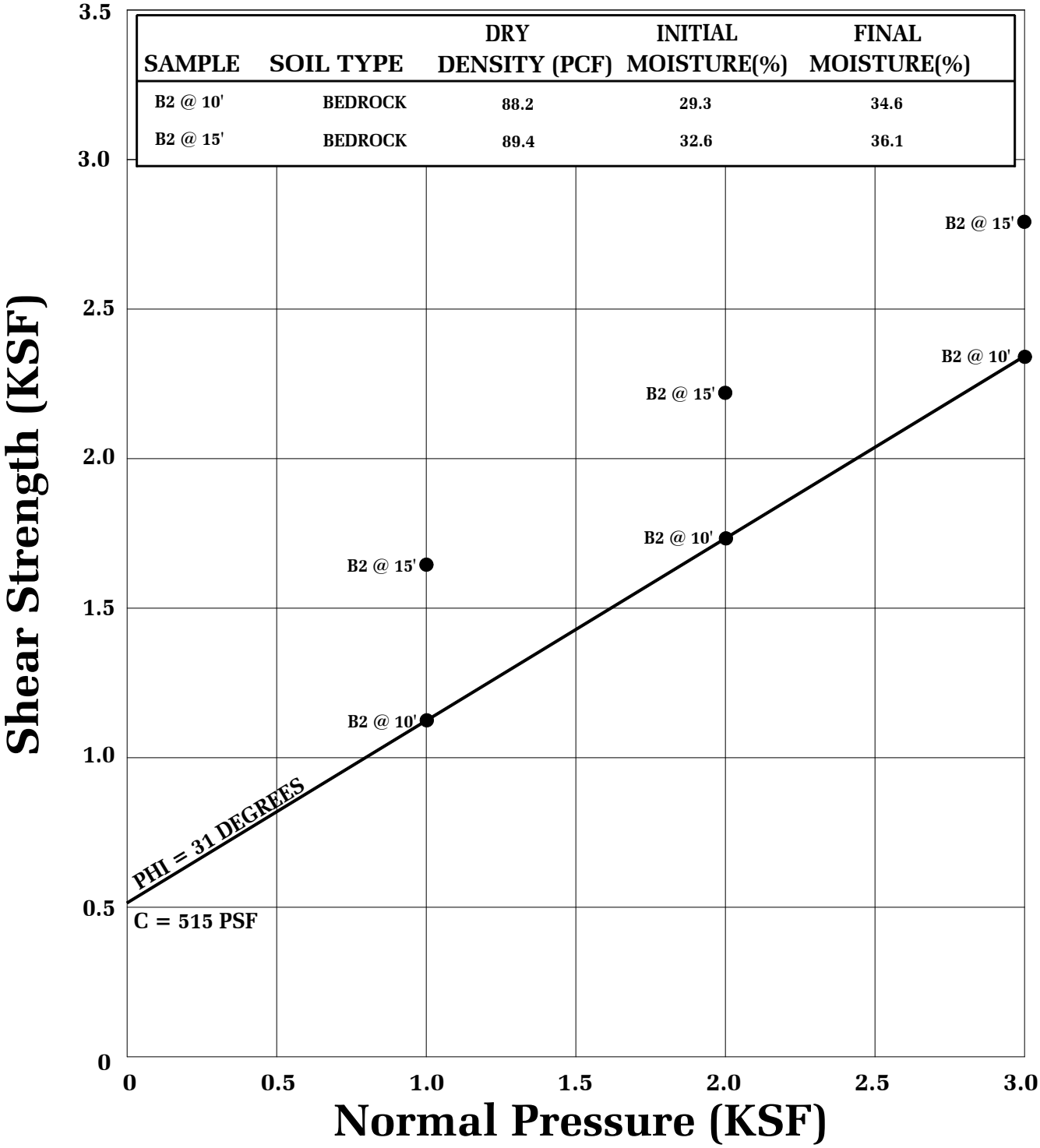
Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | **PLATE: B-1**

BEDROCK

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 10'	BEDROCK	88.2	29.3	34.6
B2 @ 15'	BEDROCK	89.4	32.6	36.1



● Direct Shear, Saturated

SHEAR TEST DIAGRAM

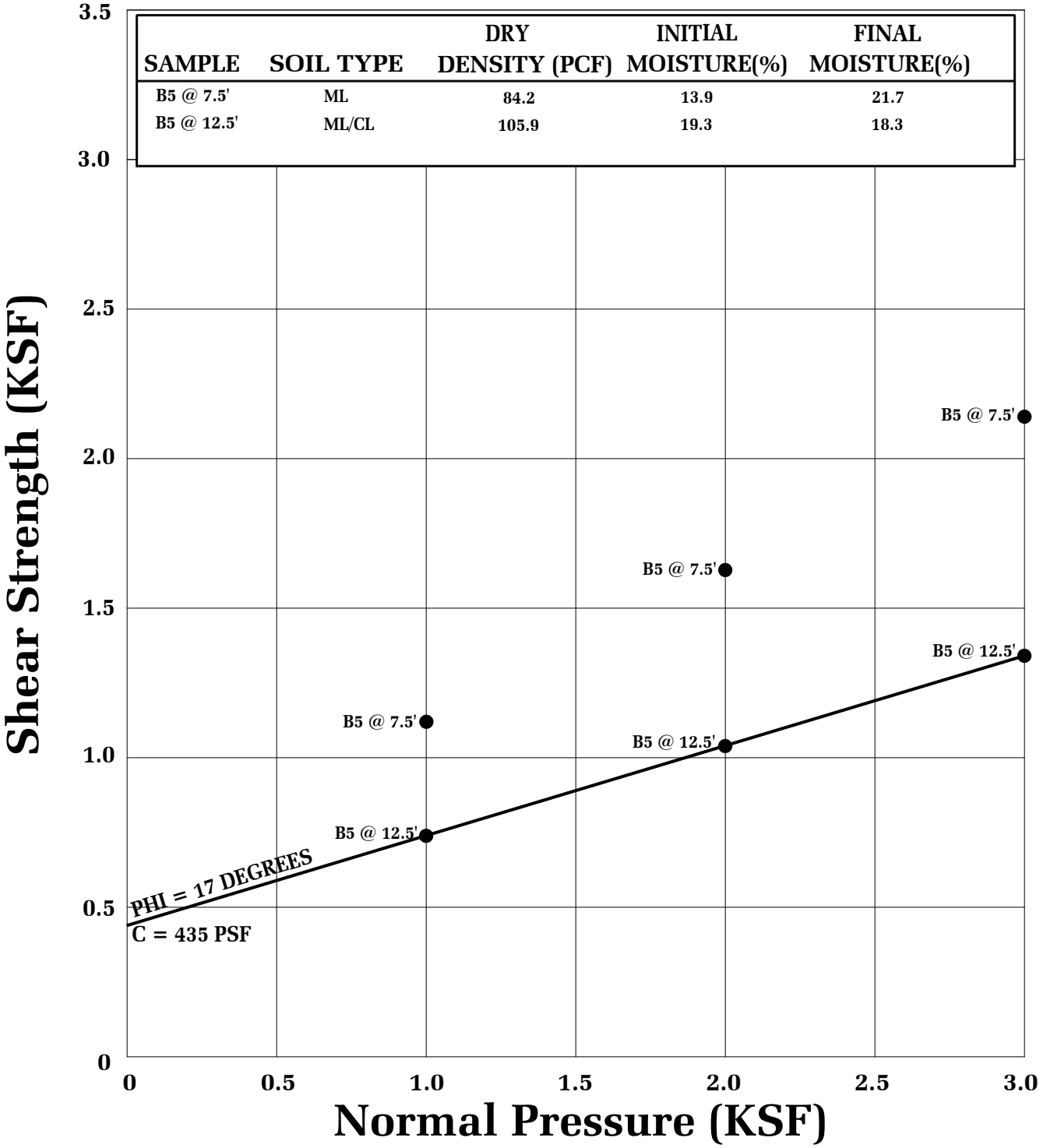
Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | **PLATE: B-2**

UNCERTIFIED FILL

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B5 @ 7.5'	ML	84.2	13.9	21.7
B5 @ 12.5'	ML/CL	105.9	19.3	18.3



● Direct Shear, Saturated

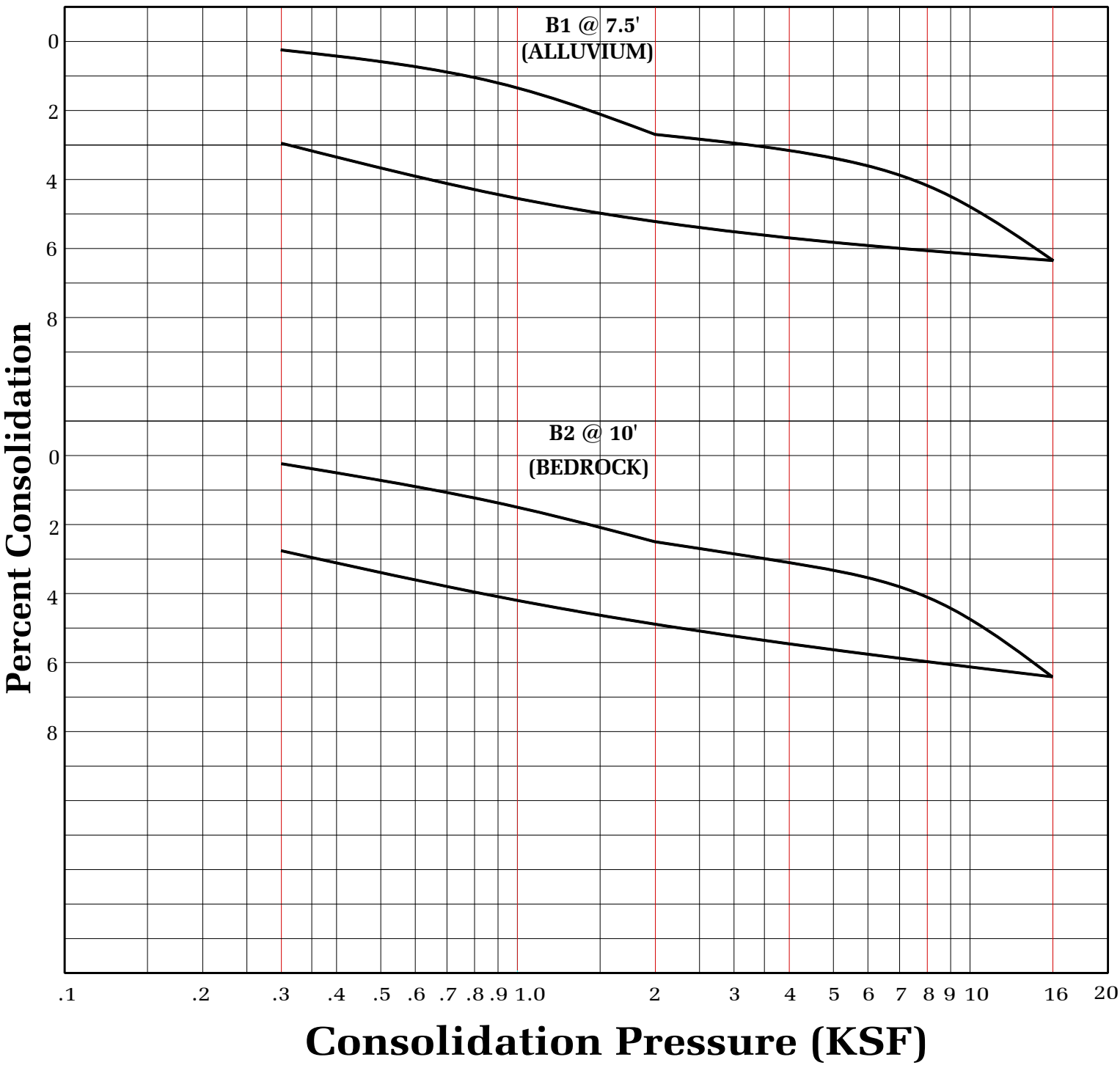
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | **PLATE: B-3**

WATER ADDED AT 2 KSF



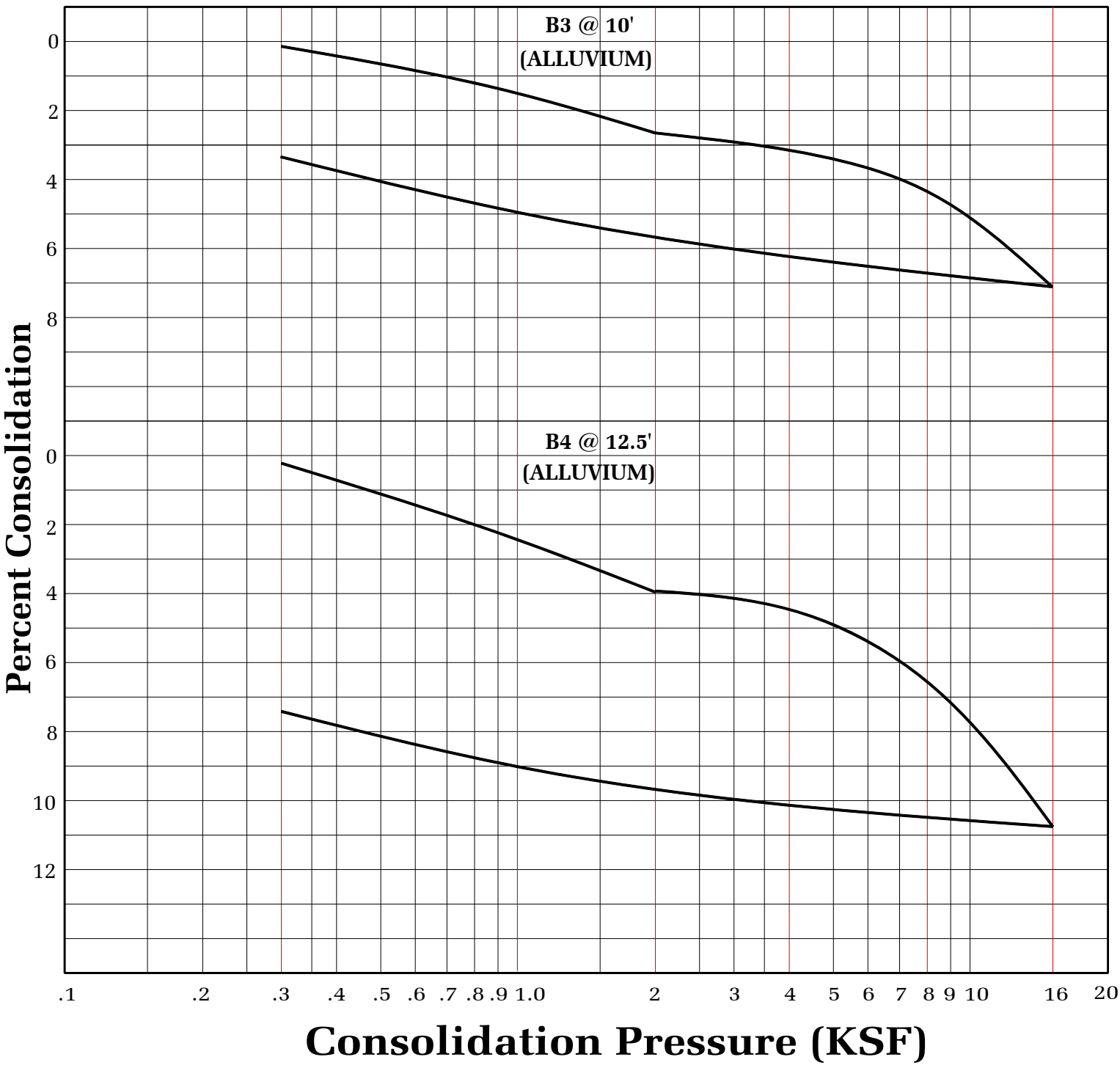
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | **PLATE: C-1**

WATER ADDED AT 2 KSF



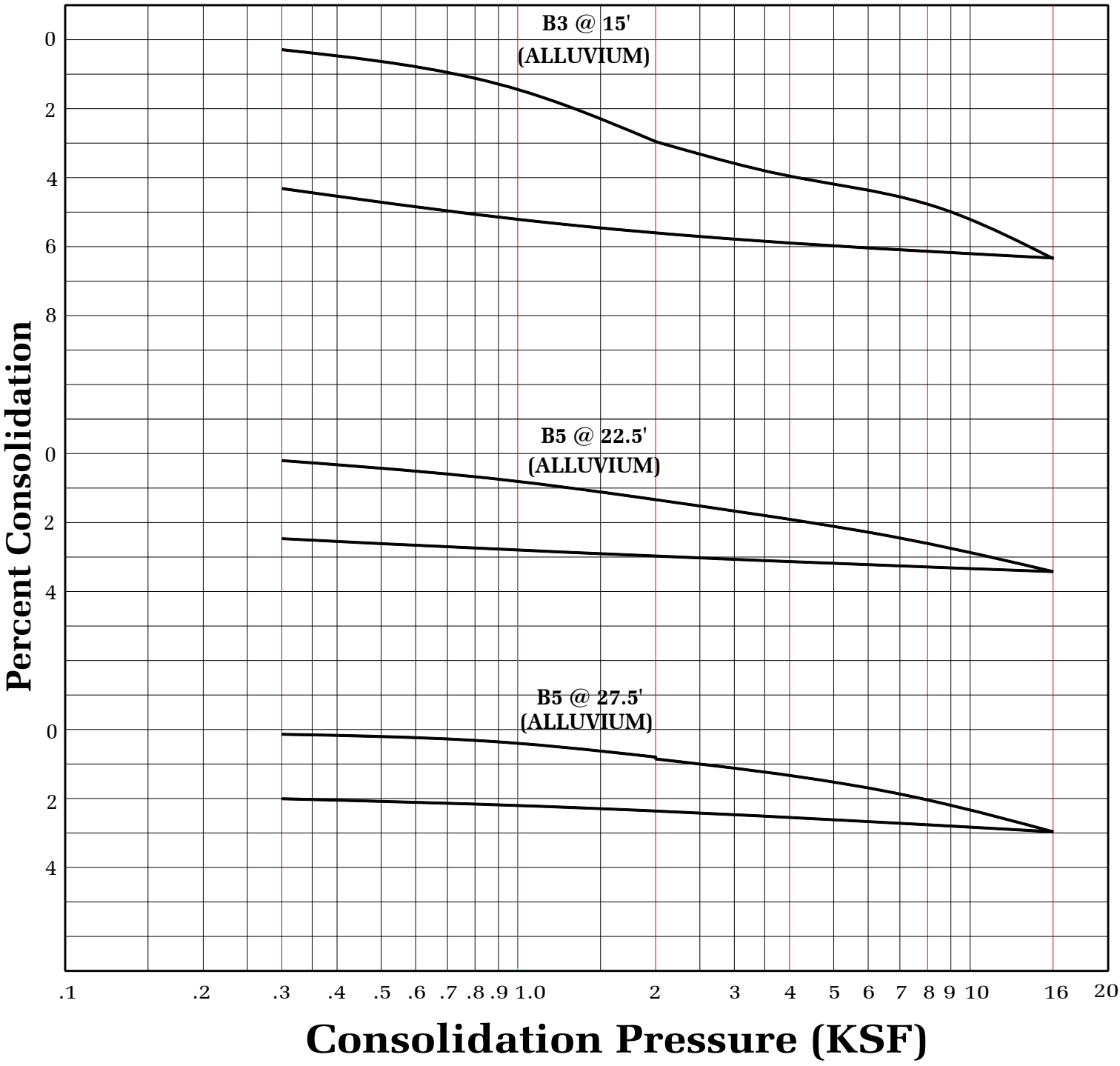
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | **PLATE: C-2**

WATER ADDED AT 2 KSF



CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | **PLATE: C-3**

ASTM D 1557

SAMPLE	B1 @ 1- 5'	B3 @ 1-5'	B5 @ 1-5'
SOIL TYPE:	SM/CL	SM/CL	SM
MAXIMUM DENSITY pcf.	121.7	123.3	134.9
OPTIMUM MOISTURE %	12.1	11.1	7.5

ASTM D 4829

SAMPLE	B1 @ 1- 5'	B3 @ 1-5'	B5 @ 1-5'
SOIL TYPE:	SM/CL	SM/CL	SM
EXPANSION INDEX UBC STANDARD 18-2	88	89	3
EXPANSION CHARACTER	MODERATE	MODERATE	VERY LOW

SULFATE CONTENT

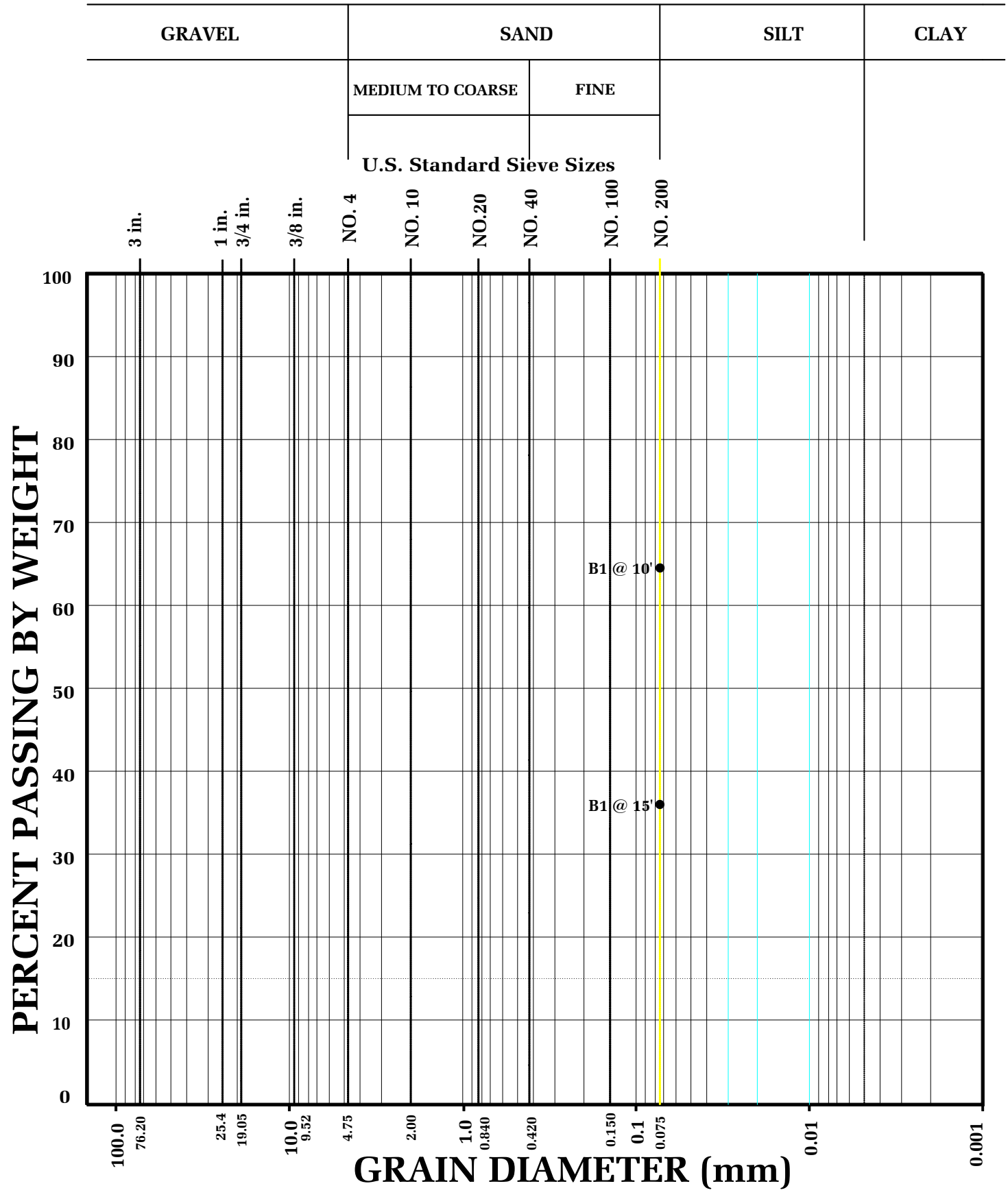
SAMPLE	B1 @ 1- 5'	B3 @ 1-5'	B5 @ 1-5'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%	< 0.10%

COMPACTION/EXPANSION DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | PLATE: D



GRAIN SIZE DISTRIBUTION

Geotechnologies, Inc.
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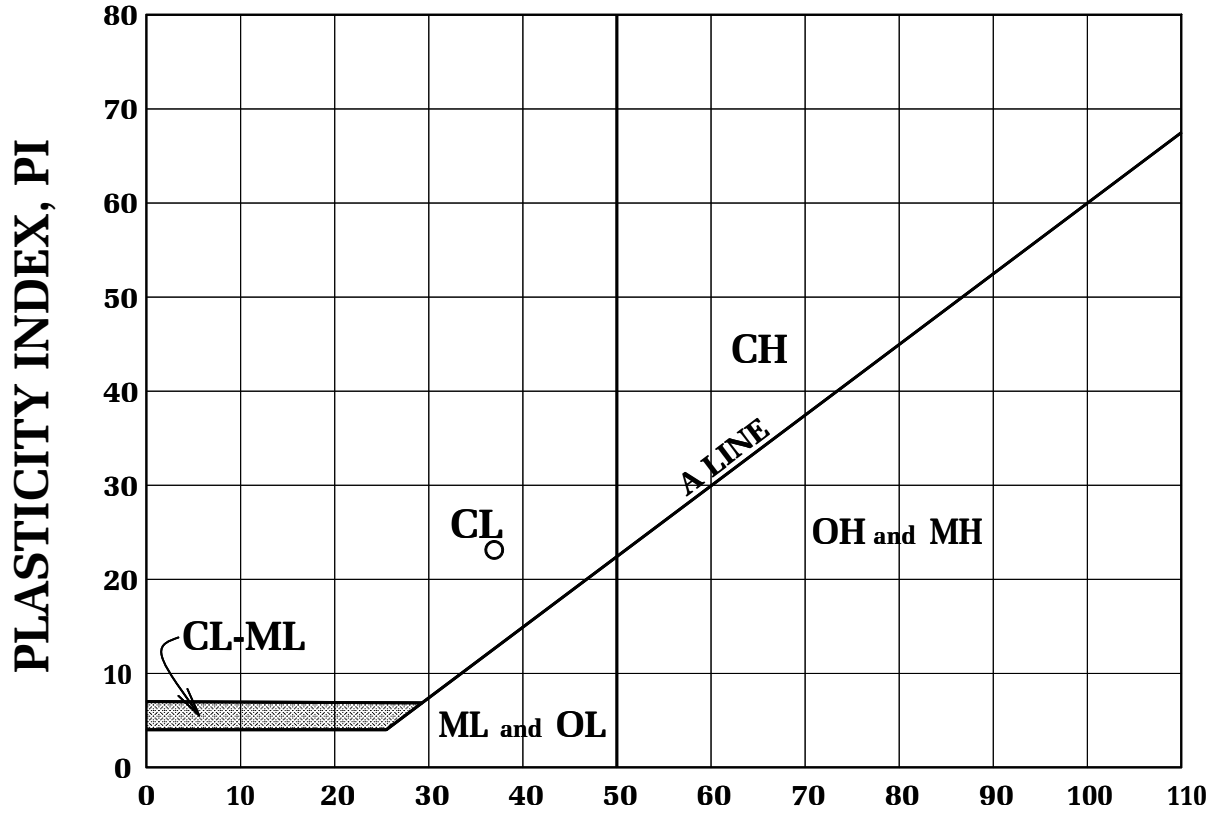
FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783

PLATE: E

ASTM D4318



BORING NUMBER	DEPTH (FEET)	TEST SYMBOL	LL	PL	PI	DESCRIPTION
B1	10	○	37	14	23	CL

ATTERBERG LIMITS DETERMINATION

Geotechnologies, Inc.
Consulting Geotechnical Engineers

FLEXIBLE PSH SOLUTIONS, INC.

FILE NO. 21783 | PLATE: F

AXIAL PILE CAPACITY CALCULATIONS

(4 Pages)

Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.
File No.: 21783
Description:

UPPER 5 FT OF PILE BEAR IN FILL

Drilled Friction Pile Capacity Calculation

Input Data:

Unit Weight of Overlying Soil Layer	γ_1	90	pcf
Thickness of Overlying Soil Layer	H_1	5	feet
Unit Weight of Bearing Strata	γ_2	120	pcf
Friction Angle of Bearing Strata	ϕ_2	30	degrees
Friction Angle between Pile and Soil	δ	22.5	degrees
Cohesion of Bearing Strata	c_2	0	psf
Adhesion	c_A	0	psf
Minimum Embedment into Bearing Strata	H_2	0	feet
Unit Weight of Water	γ_w	62.4	pcf
Depth to Groundwater from Pile Cap	H_w	12	feet

Lateral Earth Pressure Coefficient: $K_{HC} = 0.70$

Applied Factor of Safety: FS = 2

Factored Skin Friction $f_s/FS = [K_{HC}*\sigma'_v*(\tan \delta)]/FS$ **or** $fs/FS = c_A/FS$

Pile Design:

Drilled <<Driven/Drilled
Circular <<Circular/Square Pile

Pile Dimension:

24 inch diameter pile
30 inch diameter pile

Critical Depth Limit (Dc):

20 B

Pile Capacity:

Depth of Pile Below Pile Cap (feet)	Depth of Embeddment into Bearing Strata (feet)	Maximum Allowable Downward Pile Capacity: Capacity of 24 inch diameter pile (kips)	Capacity of 30 inch diameter pile (kips)
5	0	0.0	0.0
6	1	0.5	0.6
7	2	1.0	1.3
8	3	1.7	2.2
9	4	2.5	3.1
10	5	3.4	4.3
11	6	4.4	5.5
12	7	5.5	6.9
13	8	6.5	8.2
14	9	7.6	9.5
15	10	8.7	10.9
16	11	9.9	12.3
17	12	11.1	13.9
18	13	12.3	15.4
19	14	13.7	17.1
20	15	15.0	18.8
21	16	16.5	20.6
22	17	17.9	22.4
23	18	19.5	24.3
24	19	21.0	26.3
25	20	22.7	28.3
26	21	24.4	30.4
27	22	26.1	32.6
28	23	27.9	34.9
29	24	29.7	37.2
30	25	31.6	39.5
31	26	33.6	42.0
32	27	35.6	44.5
33	28	37.6	47.0
34	29	39.7	49.6
35	30	41.9	52.3
36	31	44.1	55.1
37	32	46.3	57.9
38	33	48.7	60.8
39	34	51.0	63.8
40	35	53.4	66.8
41	36	55.9	69.9
42	37	58.4	73.1
43	38	61.0	76.3
44	39	63.6	79.6
45	40	66.3	82.9
46	41	69.6	86.3
47	42	73.0	89.8
48	43	76.3	93.4
49	44	79.6	97.0
50	45	82.9	100.7
51	46	86.2	104.4
52	47	89.5	108.2
53	48	92.9	112.1
54	49	96.2	116.0
55	50	99.5	120.0
56	51	102.8	124.8
57	52	106.1	129.6
58	53	109.4	134.4
59	54	112.8	139.2
60	55	116.1	144.0

Note: 1. Minimum pile embeddment depth of 0 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

Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.
File No.: 21783
Description:

UPPER 10 FT OF PILE BEAR IN FILL

Drilled Friction Pile Capacity Calculation

Input Data:

Unit Weight of Overlying Soil Layer	γ_1	90	pcf
Thickness of Overlying Soil Layer	H_1	10	feet
Unit Weight of Bearing Strata	γ_2	120	pcf
Friction Angle of Bearing Strata	ϕ_2	30	degrees
Friction Angle between Pile and Soil	δ	22.5	degrees
Cohesion of Bearing Strata	c_2	0	psf
Adhesion	c_A	0	psf
Minimum Embedment into Bearing Strata	H_2	0	feet
Unit Weight of Water	γ_w	62.4	pcf
Depth to Groundwater from Pile Cap	H_w	12	feet

Lateral Earth Pressure Coefficient: $K_{HC} = 0.70$

Applied Factor of Safety: $FS = 2$

Factored Skin Friction $f_s/FS = [K_{HC}*\sigma'_v*(\tan \delta)]/FS$ **or** $f_s/FS = c_A/FS$

Pile Design:

Drilled <<Driven/Drilled
Circular <<Circular/Square Pile

Pile Dimension:

24 inch diameter pile
30 inch diameter pile

Critical Depth Limit (Dc):

20 B

Pile Capacity:

Depth of Pile Below Pile Cap (feet)	Depth of Embeddment into Bearing Strata (feet)	Maximum Allowable Downward Pile Capacity: Capacity of 24 inch diameter pile (kips)	Capacity of 30 inch diameter pile (kips)
10	0	0.0	0.0
11	1	0.9	1.1
12	2	1.9	2.3
13	3	2.9	3.6
14	4	3.9	4.9
15	5	5.0	6.3
16	6	6.2	7.8
17	7	7.4	9.3
18	8	8.7	10.9
19	9	10.0	12.5
20	10	11.4	14.2
21	11	12.8	16.0
22	12	14.3	17.9
23	13	15.8	19.8
24	14	17.4	21.8
25	15	19.1	23.8
26	16	20.7	25.9
27	17	22.5	28.1
28	18	24.3	30.3
29	19	26.1	32.7
30	20	28.0	35.0
31	21	30.0	37.5
32	22	32.0	40.0
33	23	34.0	42.6
34	24	36.2	45.2
35	25	38.3	47.9
36	26	40.5	50.7
37	27	42.8	53.5
38	28	45.1	56.4
39	29	47.5	59.4
40	30	49.9	62.4
41	31	52.4	65.5
42	32	54.9	68.6
43	33	57.5	71.9
44	34	60.1	75.2
45	35	62.8	78.5
46	36	65.6	81.9
47	37	68.4	85.4
48	38	71.2	89.0
49	39	74.1	92.6
50	40	77.0	96.3
51	41	80.9	100.1
52	42	84.7	103.9
53	43	88.6	107.8
54	44	92.4	111.7
55	45	96.3	115.7
56	46	100.2	119.8
57	47	104.0	123.9
58	48	107.9	128.2
59	49	111.7	132.4
60	50	115.6	136.8

Note: 1. Minimum pile embeddment depth of 0 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

Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.
File No.: 21783
Description:

UPPER 15 FT OF PILE BEAR IN FILL

Drilled Friction Pile Capacity Calculation

Input Data:

Unit Weight of Overlying Soil Layer	γ_1	90	pcf
Thickness of Overlying Soil Layer	H_1	15	feet
Unit Weight of Bearing Strata	γ_2	120	pcf
Friction Angle of Bearing Strata	ϕ_2	30	degrees
Friction Angle between Pile and Soil	δ	22.5	degrees
Cohesion of Bearing Strata	c_2	0	psf
Adhesion	c_A	0	psf
Minimum Embedment into Bearing Strata	H_2	0	feet
Unit Weight of Water	γ_w	62.4	pcf
Depth to Groundwater from Pile Cap	H_w	12	feet

Pile Design:

Drilled <<Driven/Drilled
Circular <<Circular/Square Pile

Pile Dimension:

24 inch diameter pile
30 inch diameter pile

Critical Depth Limit (Dc):

20 B

Lateral Earth Pressure Coefficient: $K_{HC} = 0.70$

Applied Factor of Safety: FS = 2

Factored Skin Friction $f_s/FS = [K_{HC}*\sigma'_v*(\tan\delta)]/FS$ **or** $fs/FS = c_A/FS$

Pile Capacity:

Depth of Pile Below Pile Cap (feet)	Depth of Embeddment into Bearing Strata (feet)	Maximum Allowable Downward Pile Capacity: Capacity of 24 inch diameter pile (kips)	Capacity of 30 inch diameter pile (kips)
15	0	0.0	0.0
16	1	1.1	1.4
17	2	2.2	2.8
18	3	3.4	4.3
19	4	4.7	5.8
20	5	6.0	7.4
21	6	7.3	9.1
22	7	8.7	10.9
23	8	10.2	12.7
24	9	11.7	14.6
25	10	13.2	16.5
26	11	14.8	18.5
27	12	16.5	20.6
28	13	18.2	22.8
29	14	20.0	25.0
30	15	21.8	27.2
31	16	23.7	29.6
32	17	25.6	32.0
33	18	27.6	34.5
34	19	29.6	37.0
35	20	31.7	39.6
36	21	33.8	42.3
37	22	36.0	45.0
38	23	38.2	47.8
39	24	40.5	50.7
40	25	42.9	53.6
41	26	45.3	56.6
42	27	47.7	59.7
43	28	50.2	62.8
44	29	52.8	66.0
45	30	55.4	69.2
46	31	58.0	72.6
47	32	60.8	75.9
48	33	63.5	79.4
49	34	66.3	82.9
50	35	69.2	86.5
51	36	72.1	90.2
52	37	75.1	93.9
53	38	78.1	97.7
54	39	81.2	101.5
55	40	84.3	105.4
56	41	88.6	109.4
57	42	92.8	113.5
58	43	97.0	117.6
59	44	101.2	121.7
60	45	105.4	126.0

Note: 1. Minimum pile embeddment depth of 0 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

Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.
File No.: 21783
Description:

UPPER 20 FT OF PILE BEAR IN FILL

Drilled Friction Pile Capacity Calculation

Input Data:

Unit Weight of Overlying Soil Layer	γ_1	90	pcf
Thickness of Overlying Soil Layer	H_1	20	feet
Unit Weight of Bearing Strata	γ_2	120	pcf
Friction Angle of Bearing Strata	ϕ_2	30	degrees
Friction Angle between Pile and Soil	δ	22.5	degrees
Cohesion of Bearing Strata	c_2	0	psf
Adhesion	c_A	0	psf
Minimum Embedment into Bearing Strata	H_2	0	feet
Unit Weight of Water	γ_w	62.4	pcf
Depth to Groundwater from Pile Cap	H_w	12	feet

Pile Design:

Drilled <<Driven/Drilled
Circular <<Circular/Square Pile

Pile Dimension:

24 inch diameter pile
30 inch diameter pile

Critical Depth Limit (Dc):

20 B

Lateral Earth Pressure Coefficient: $K_{HC} = 0.70$

Applied Factor of Safety: FS = 2

Factored Skin Friction $f_s/FS = [K_{HC}*\sigma'_v*(\tan\delta)]/FS$ **or** $fs/FS = c_A/FS$

Pile Capacity:

Depth of Pile Below Pile Cap (feet)	Depth of Embeddment into Bearing Strata (feet)	Maximum Allowable Downward Pile Capacity: Capacity of 24 inch diameter pile (kips)	Capacity of 30 inch diameter pile (kips)
20	0	0.0	0.0
21	1	1.2	1.5
22	2	2.5	3.1
23	3	3.8	4.7
24	4	5.2	6.4
25	5	6.6	8.2
26	6	8.1	10.1
27	7	9.6	12.0
28	8	11.2	13.9
29	9	12.8	16.0
30	10	14.5	18.1
31	11	16.2	20.3
32	12	18.0	22.5
33	13	19.8	24.8
34	14	21.7	27.2
35	15	23.7	29.6
36	16	25.7	32.1
37	17	27.7	34.7
38	18	29.8	37.3
39	19	32.0	40.0
40	20	34.2	42.7
41	21	36.5	45.6
42	22	38.8	48.5
43	23	41.1	51.4
44	24	43.5	54.4
45	25	46.0	57.5
46	26	48.5	60.7
47	27	51.1	63.9
48	28	53.7	67.2
49	29	56.4	70.5
50	30	59.2	73.9
51	31	61.9	77.4
52	32	64.8	81.0
53	33	67.7	84.6
54	34	70.6	88.3
55	35	73.6	92.0
56	36	76.7	95.8
57	37	79.8	99.7
58	38	82.9	103.6
59	39	86.1	107.6
60	40	89.4	111.7

Note: 1. Minimum pile embeddment depth of 0 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

LATERAL PILE ANALYSES

(80 Pages)

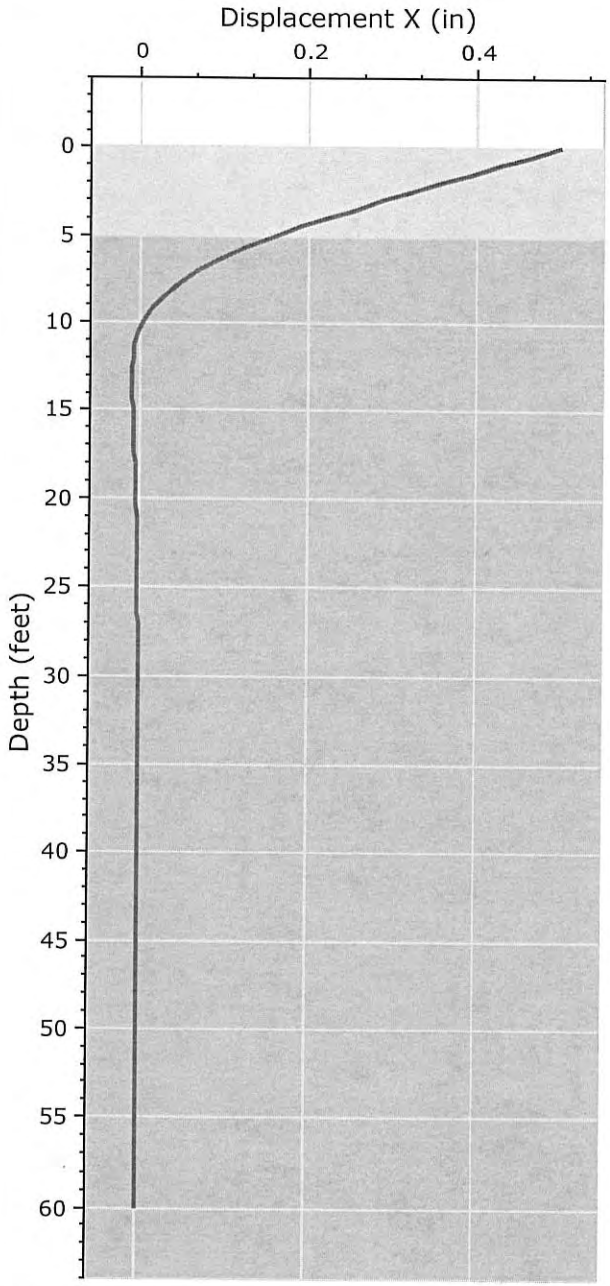
ANALYZED SCENARIOS:

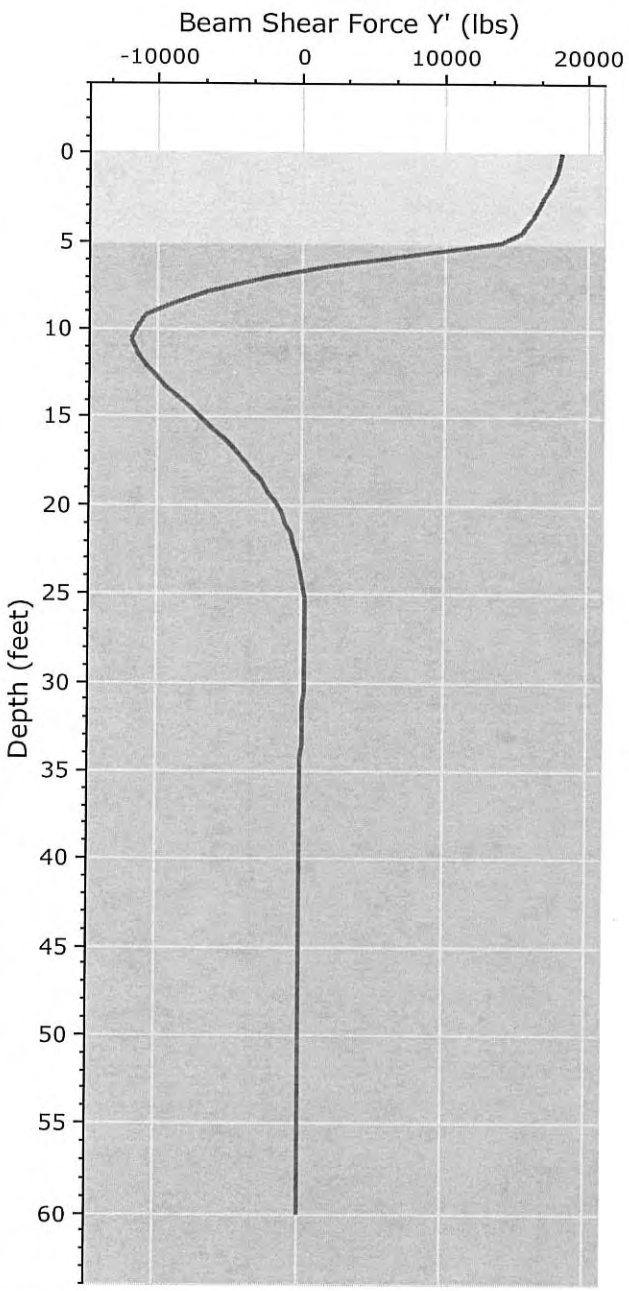
1. **Fill Extends to a depth of 5 feet below Pile Cap**
    - **24-inch Diameter Pile – Free Head Condition (Page 1-5)**
    - **24-inch Diameter Pile – Fixed Head Condition (Page 6-10)**
    - **30-inch Diameter Pile – Free Head Condition (Page 11-15)**
    - **30-inch Diameter Pile – Fixed Head Condition Page (16-20)**

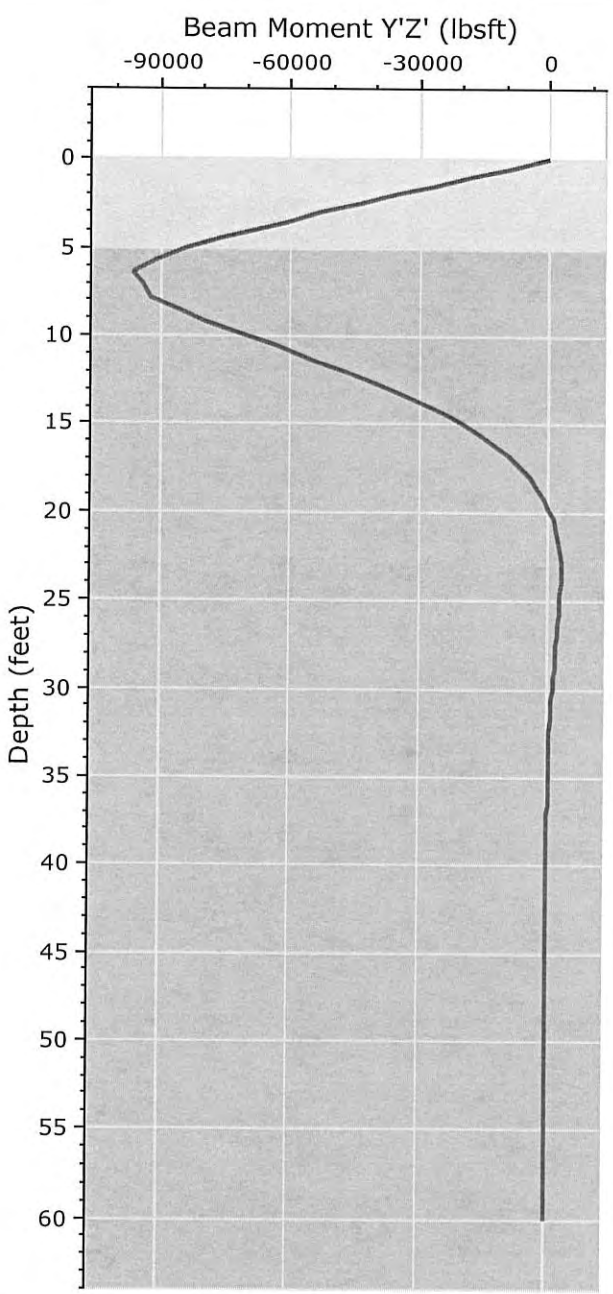
2. **Fill Extends to a depth of 10 feet below Pile Cap**
    - **24-inch Diameter Pile – Free Head Condition (Page 21-25)**
    - **24-inch Diameter Pile – Fixed Head Condition (Page 26-30)**
    - **30-inch Diameter Pile – Free Head Condition (Page 31-35)**
    - **30-inch Diameter Pile – Fixed Head Condition Page (36-40)**

3. **Fill Extends to a depth of 15 feet below Pile Cap**
    - **24-inch Diameter Pile – Free Head Condition (Page 41-45)**
    - **24-inch Diameter Pile – Fixed Head Condition (Page 46-50)**
    - **30-inch Diameter Pile – Free Head Condition (Page 51-55)**
    - **30-inch Diameter Pile – Fixed Head Condition Page (56-60)**

4. **Fill Extends to a depth of 20 feet below Pile Cap**
    - **24-inch Diameter Pile – Free Head Condition (Page 61-65)**
    - **24-inch Diameter Pile – Fixed Head Condition (Page 66-70)**
    - **30-inch Diameter Pile – Free Head Condition (Page 71-75)**
    - **30-inch Diameter Pile – Fixed Head Condition Page (76-80)**







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Free Head - 0.5 in Defflection - 5 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.24diam.free.5ft.rspile2

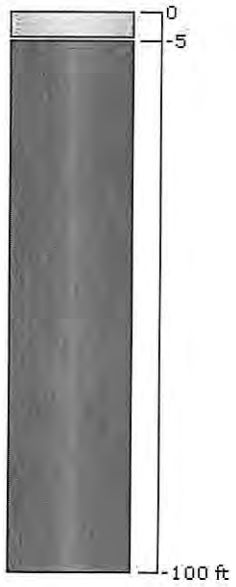
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.free.5ft
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Free Head - 0.5 in Defflection - 5 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	5	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	95	5



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

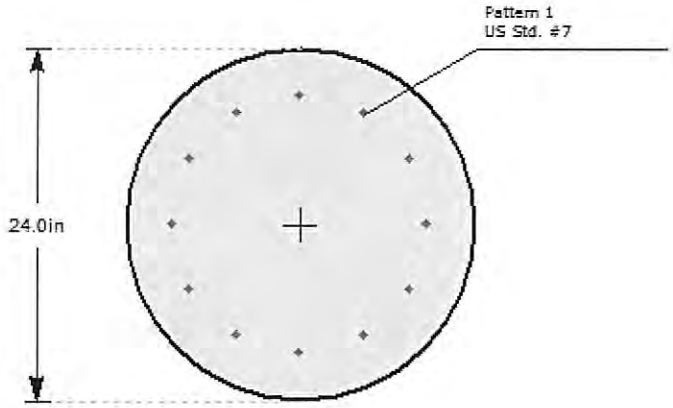
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

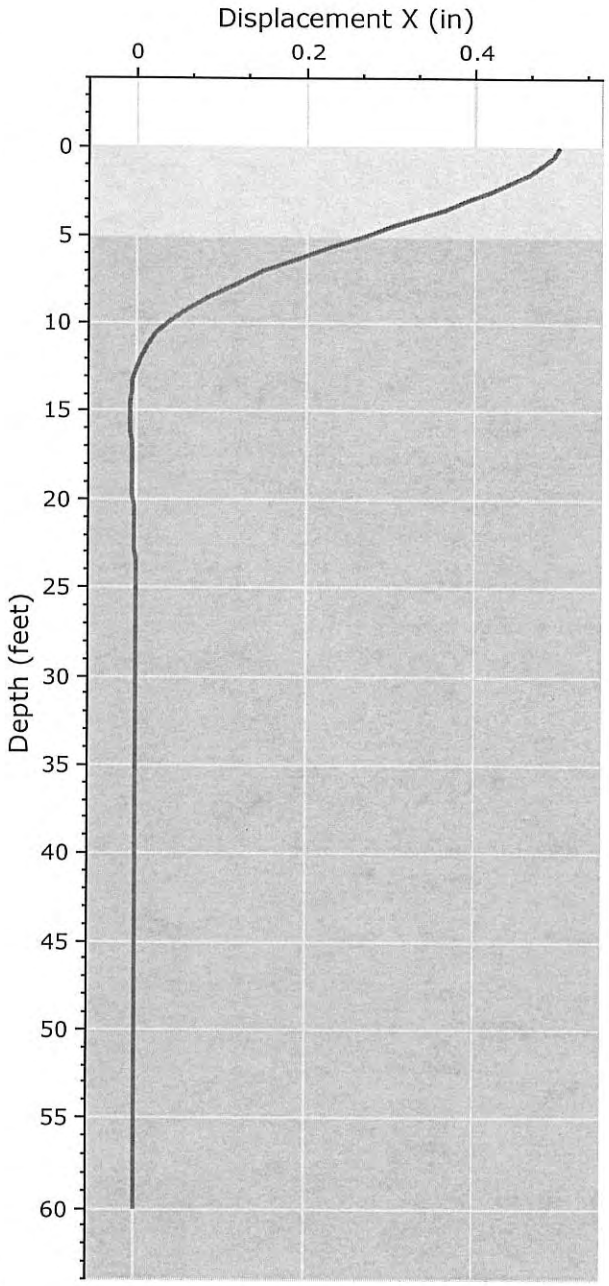
Pile Settings

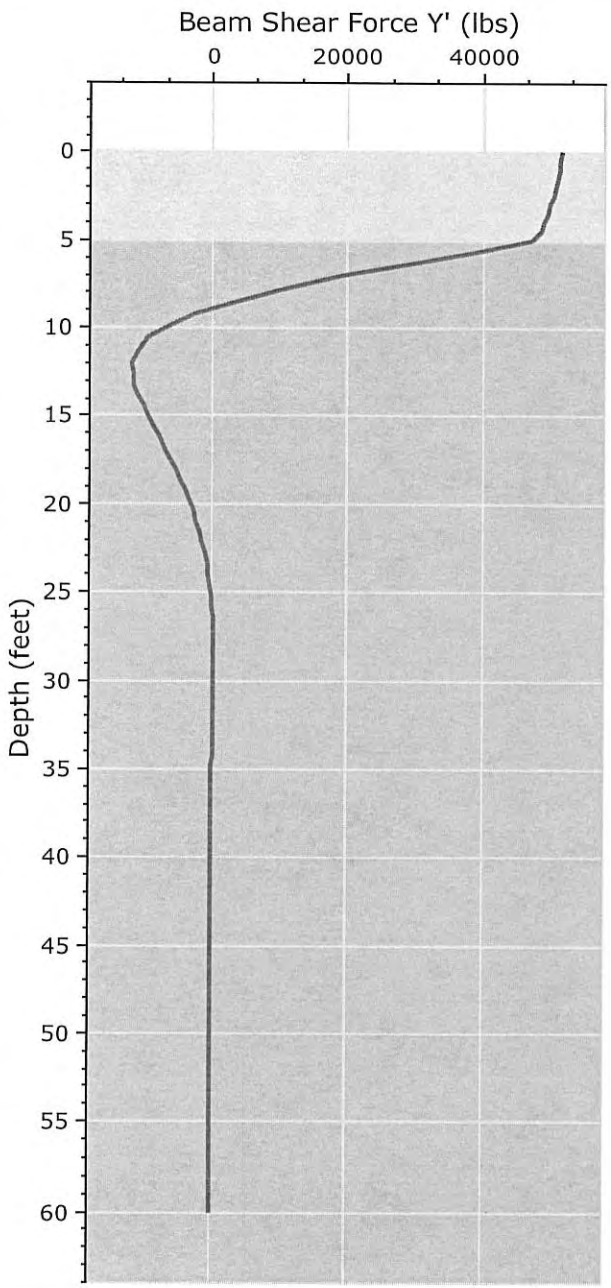
Pile 1

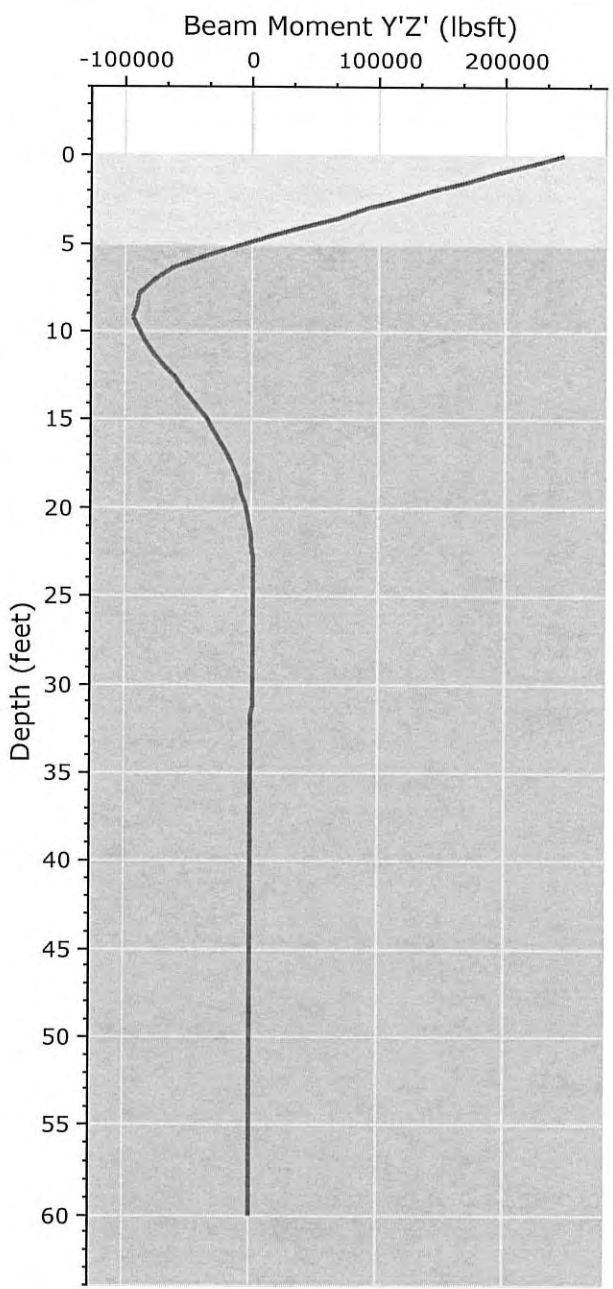
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Fixed Head - 0.5 in Defflection - 5 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.24diam.fixed.5ft.fill.rspile2

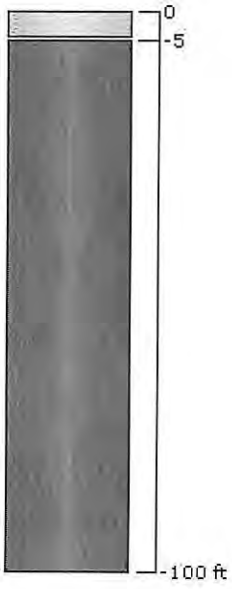
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.fixed.5ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Fixed Head - 0.5 in Defflection - 5 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	5	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	95	5



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

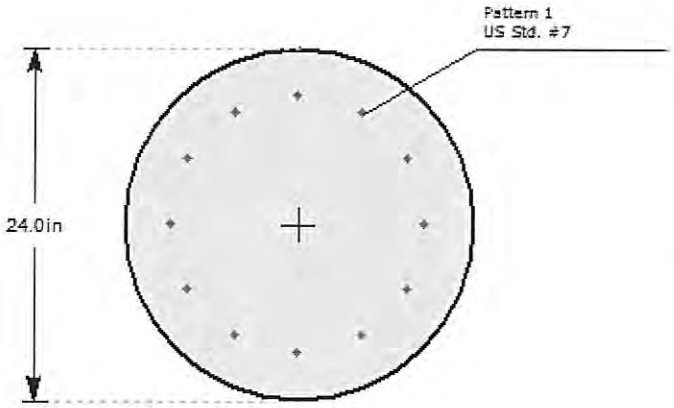
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

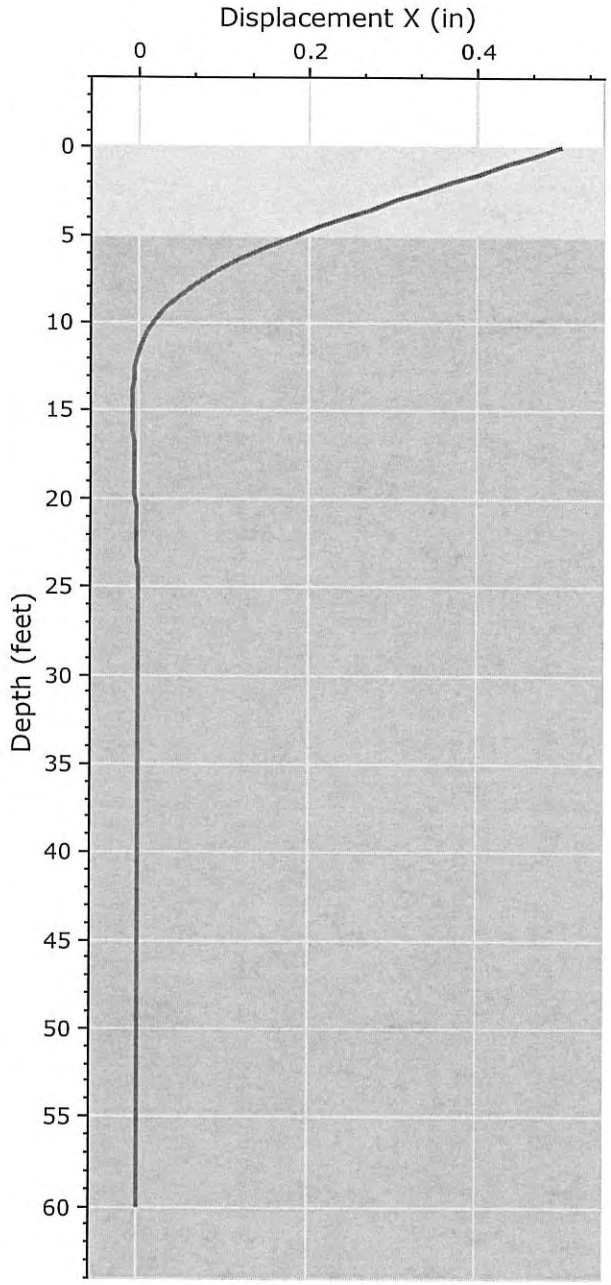
Pile Settings

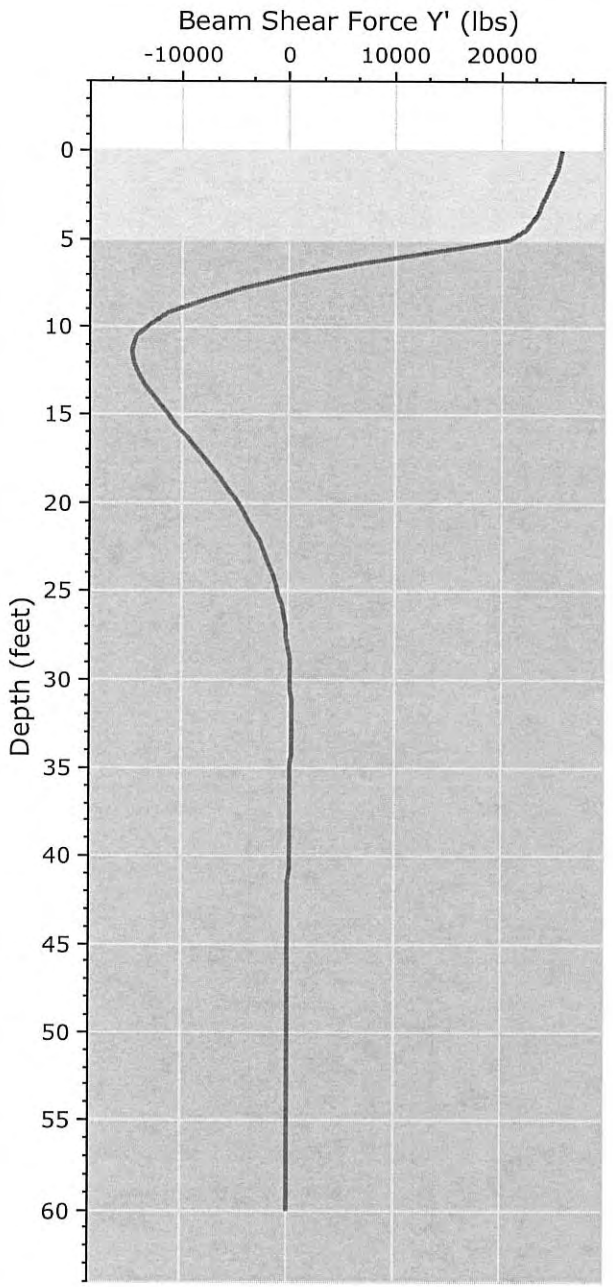
Pile 1

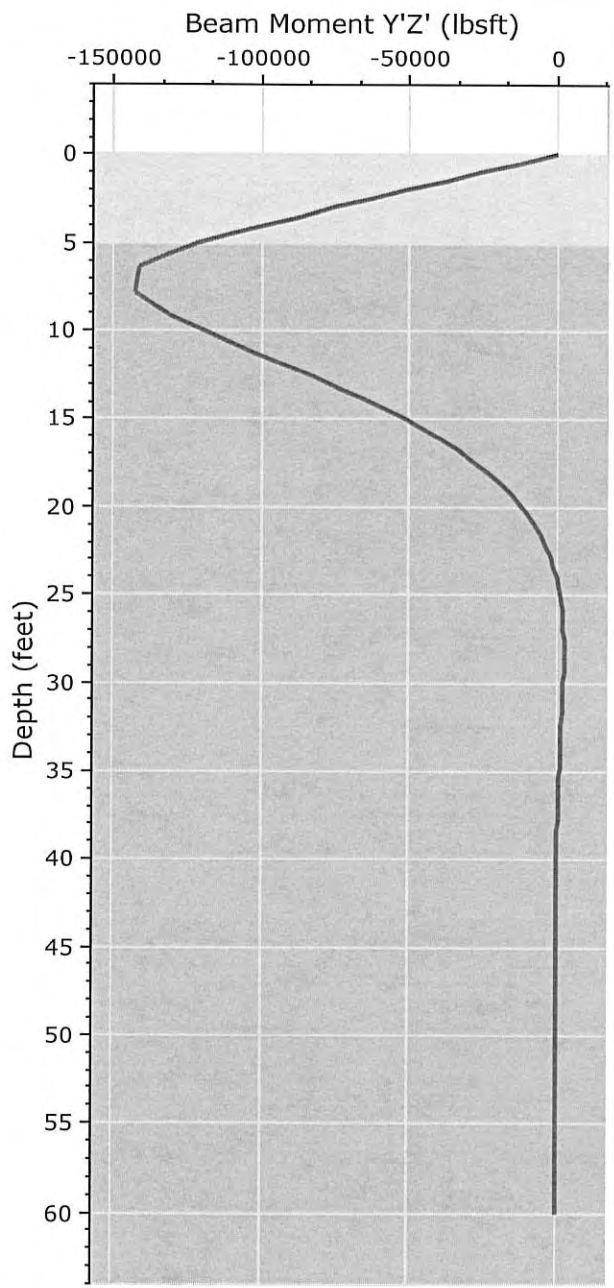
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0







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RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	30-inch diam pile - Free Head - 0.5 in Defflection - 5 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.30diam.free.5ft.fill.rspile2

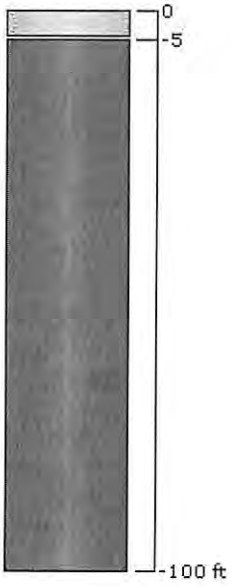
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.free.5ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Free Head - 0.5 in Defflection - 5 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	5	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	95	5



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

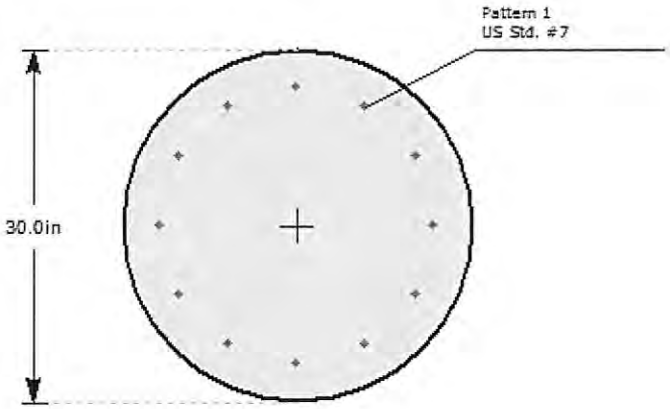
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

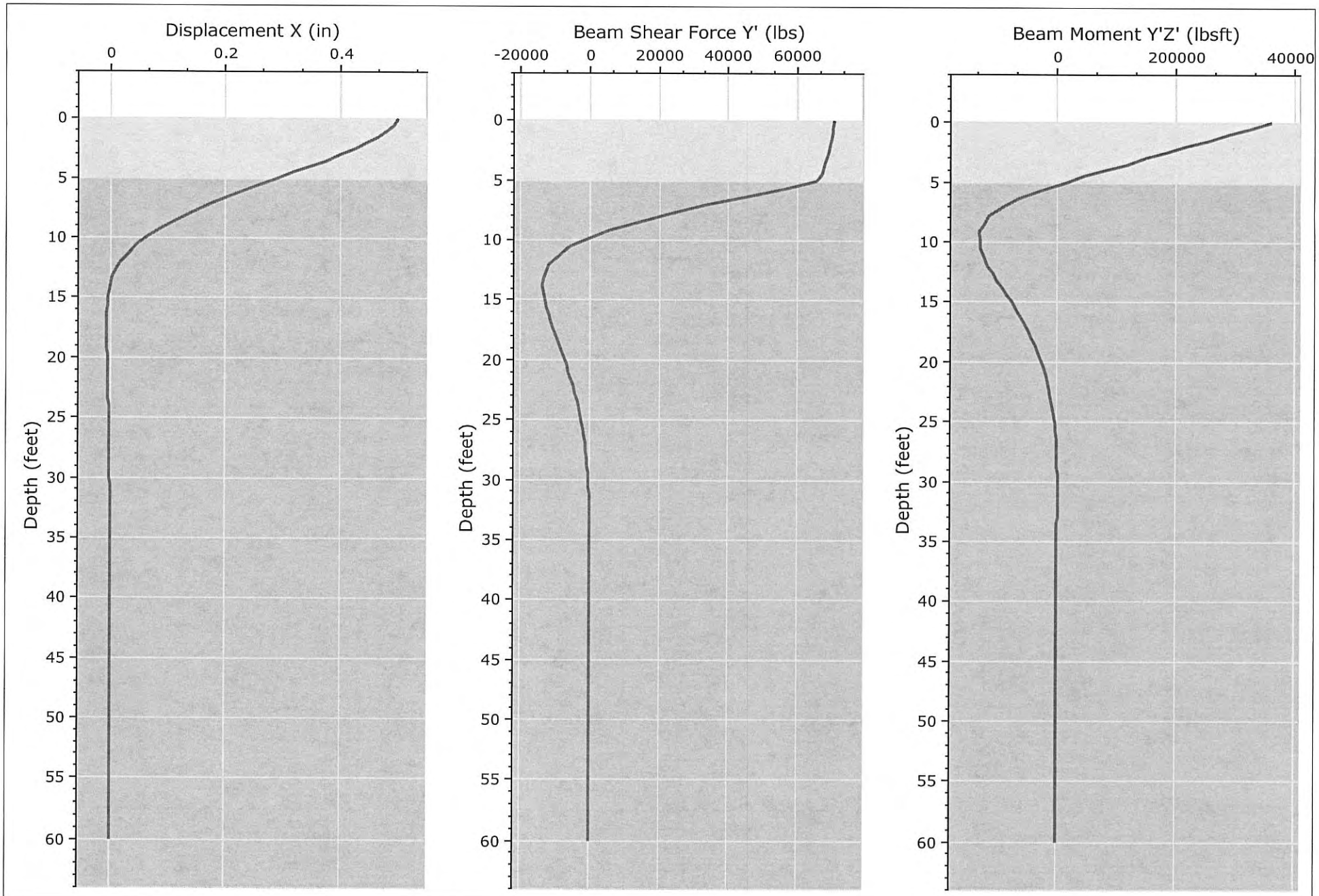
Pile Settings

Pile 1

General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0



rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis Description	30-inch diam pile - Fixed Head - 0.5 in Defflection - 5 ft of Fill
Drawn By: gvarela	Company: Geotechnologies, Inc.
Date	File Name: 21783.30diam.fixed.5ft fill.rspile2

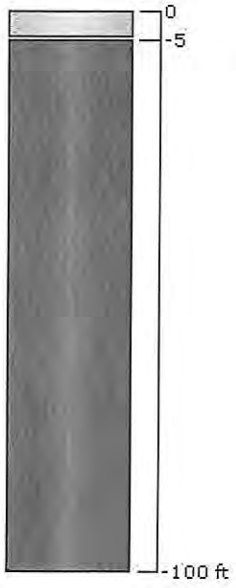
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.fixed.5ft fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Fixed Head - 0.5 in Defflection - 5 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	5	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	95	5



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

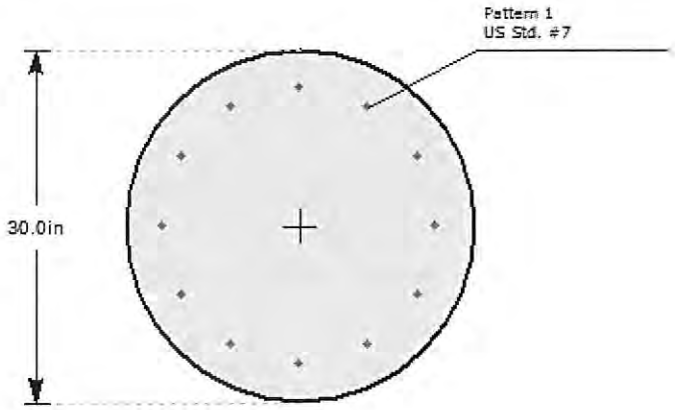
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

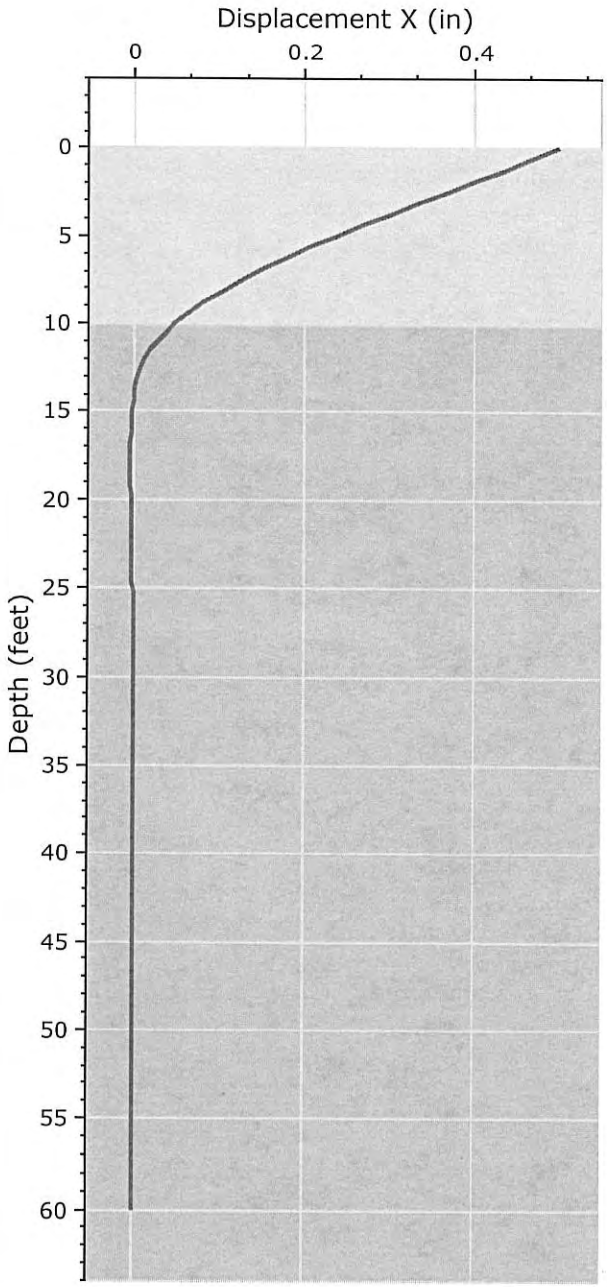
Pile Settings

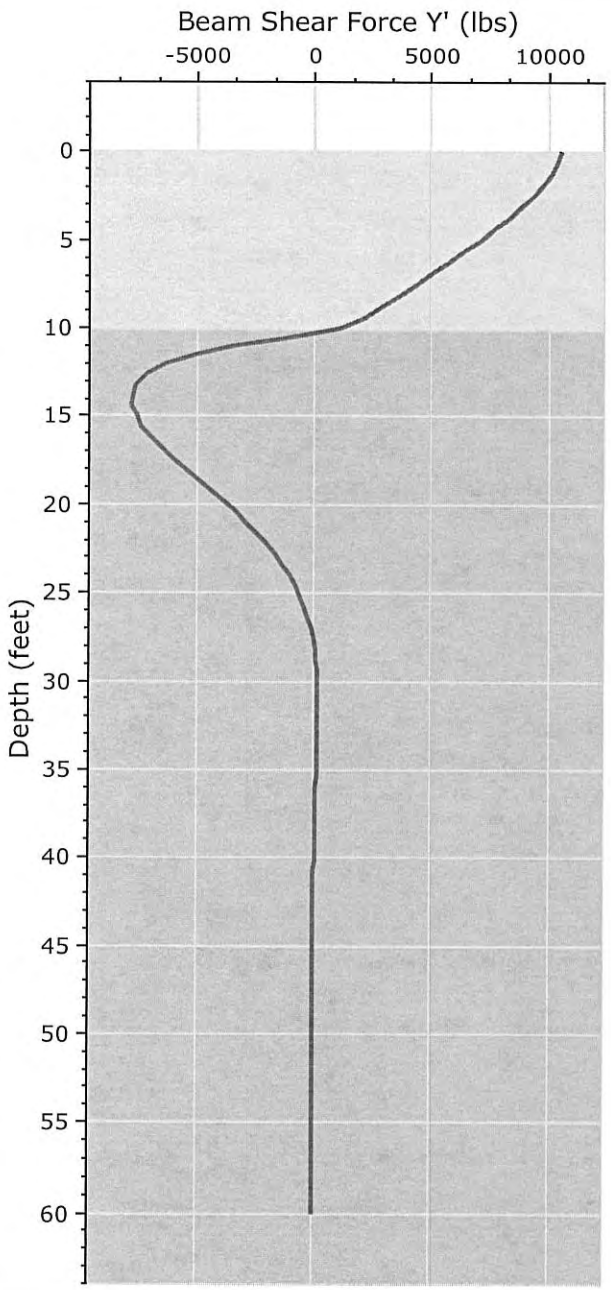
Pile 1

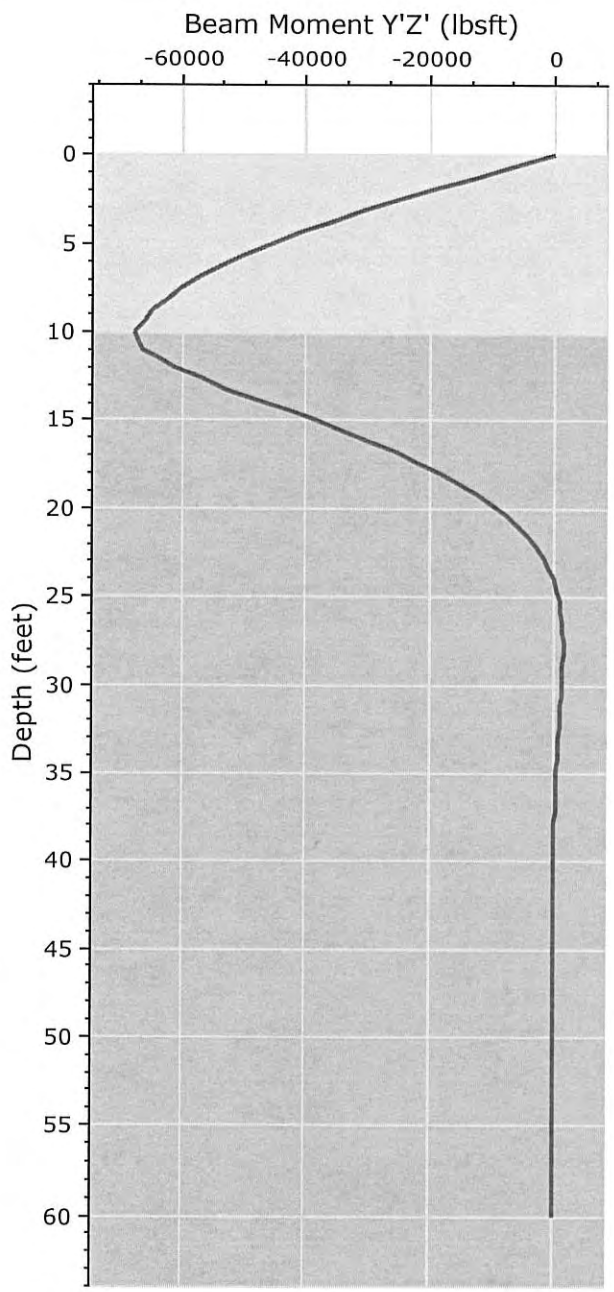
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0







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RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Free Head - 0.5 in Defflection - 10 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.24diam.free.10ft.fill.rspile2

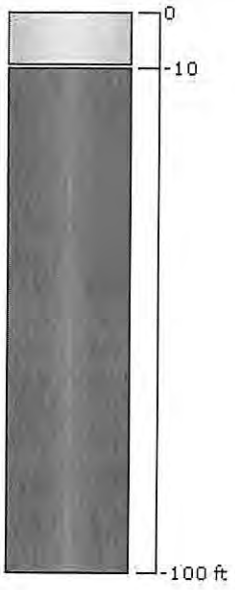
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.free.10ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Free Head - 0.5 in Defflection - 10 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	10	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	90	10



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

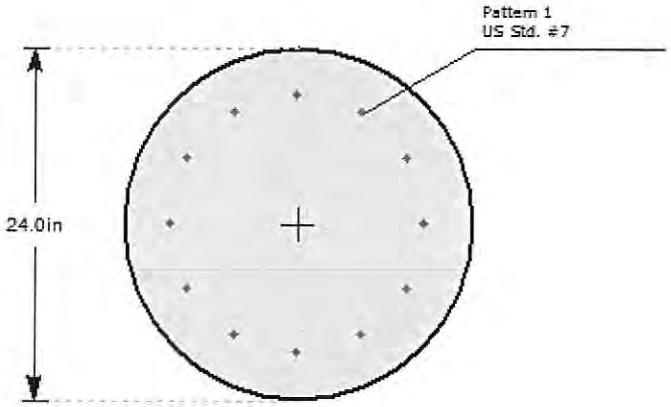
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

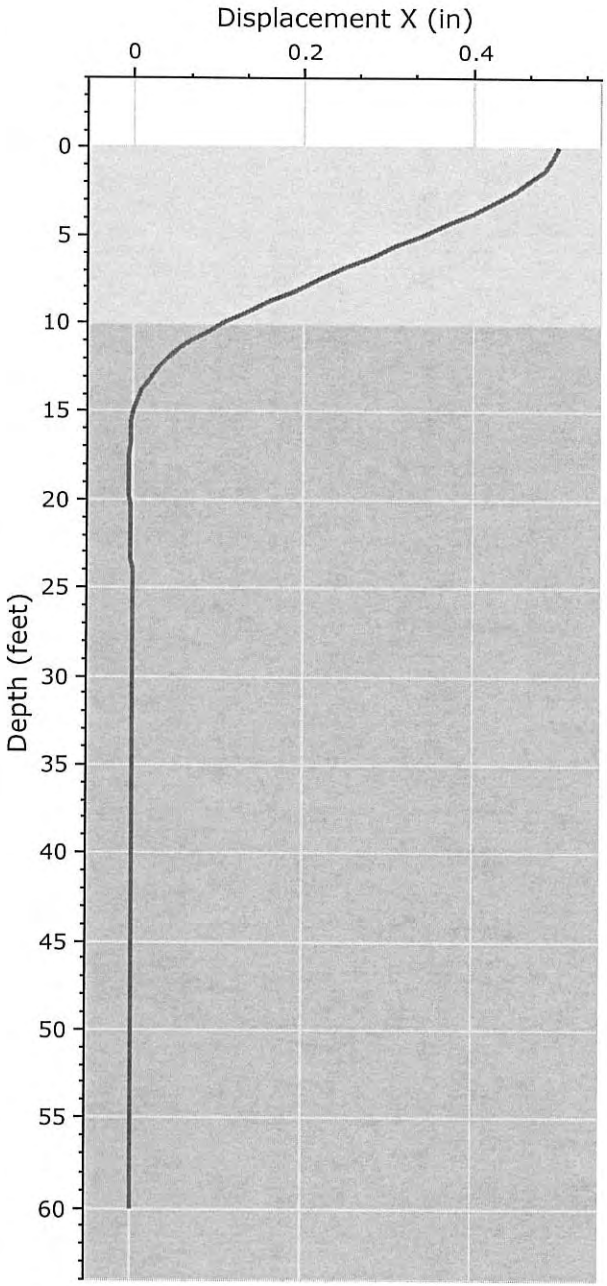
Pile Settings

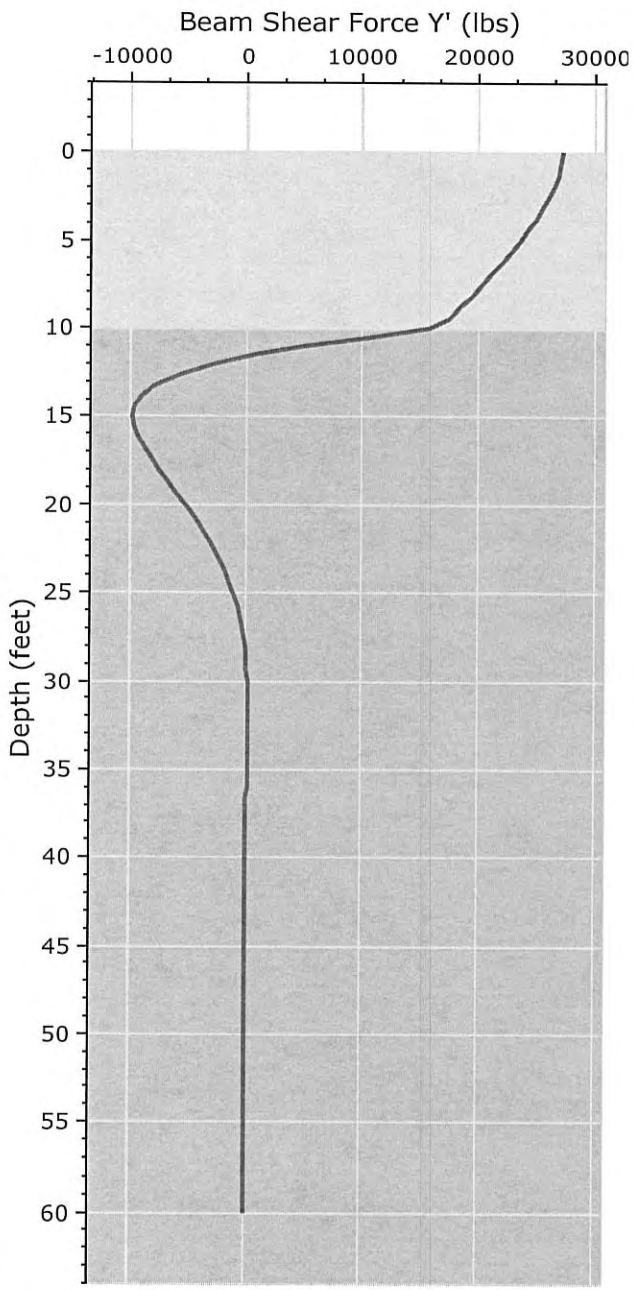
Pile 1

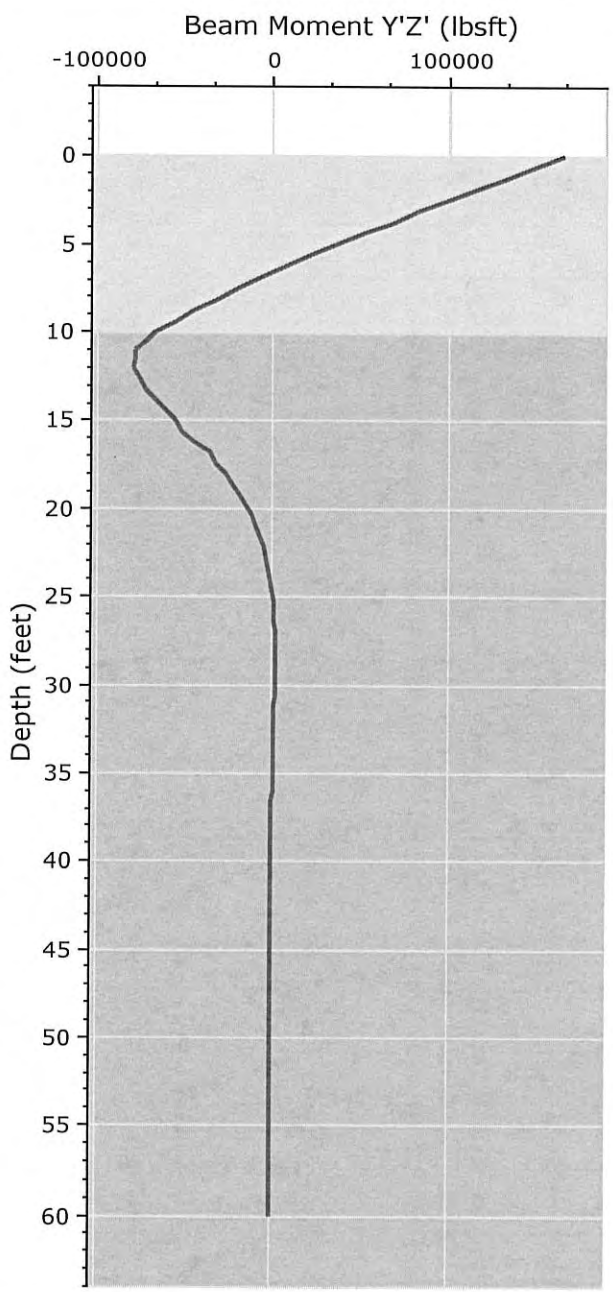
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0







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RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Fixed Head - 0.5 in Defflection - 10 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.24diam.fix.10ft.fill.rspile2

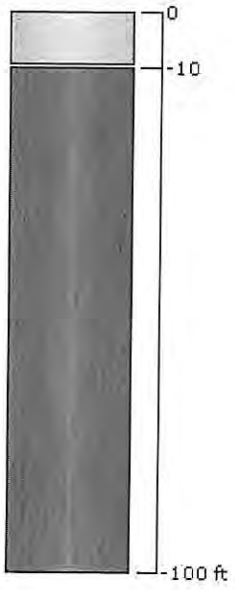
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.fix.10ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Fixed Head - 0.5 in Defflection - 10 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	10	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	90	10



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

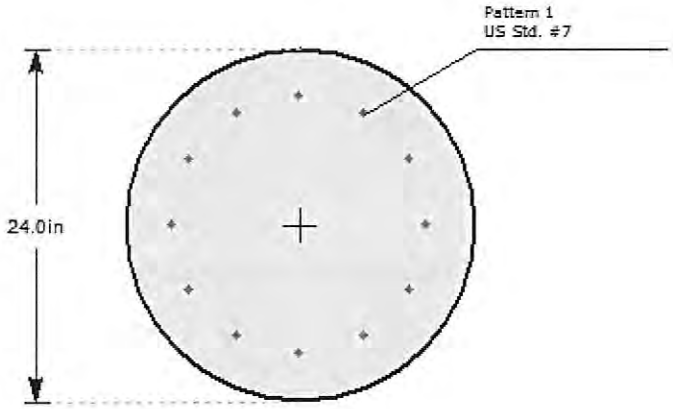
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

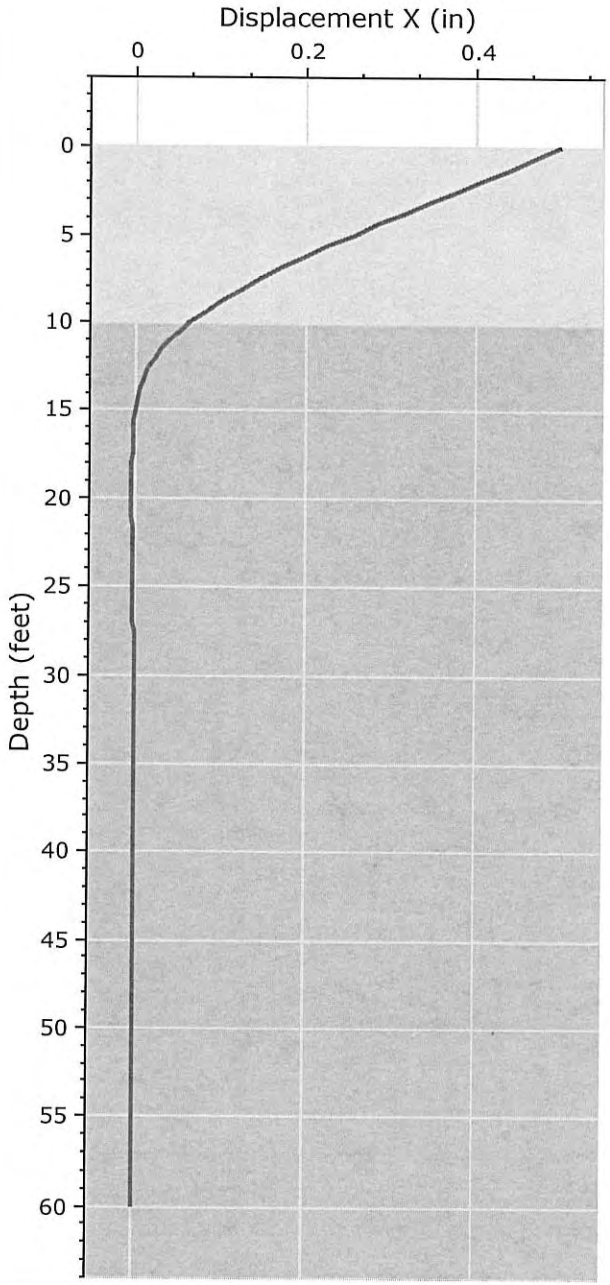
Pile Settings

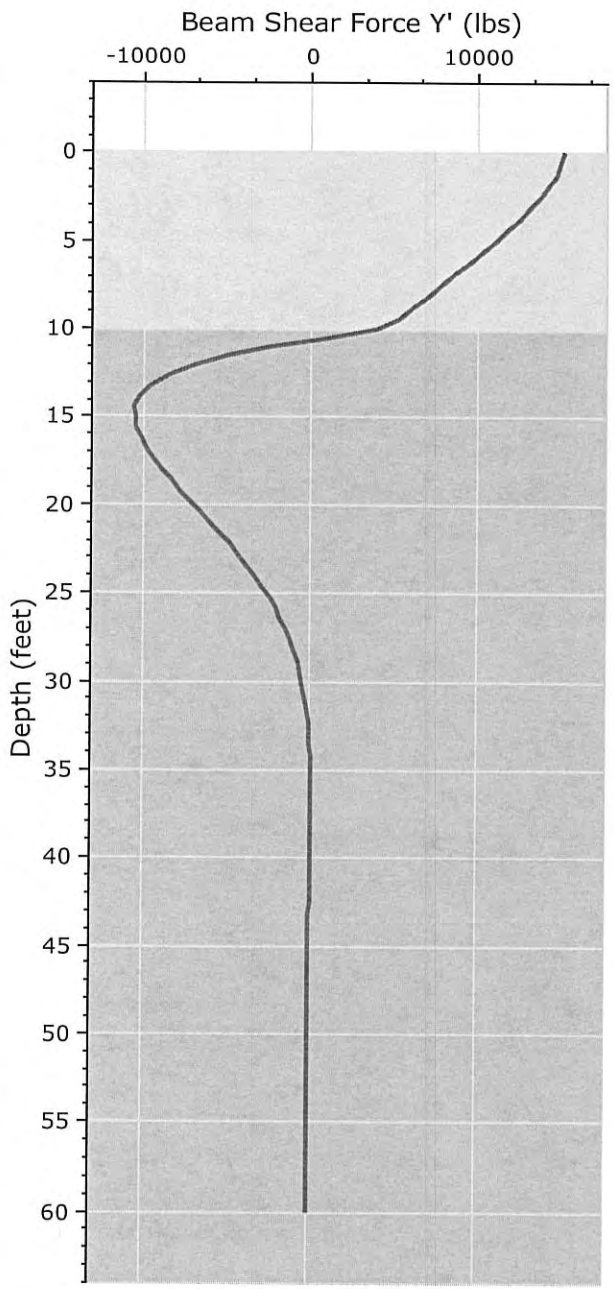
Pile 1

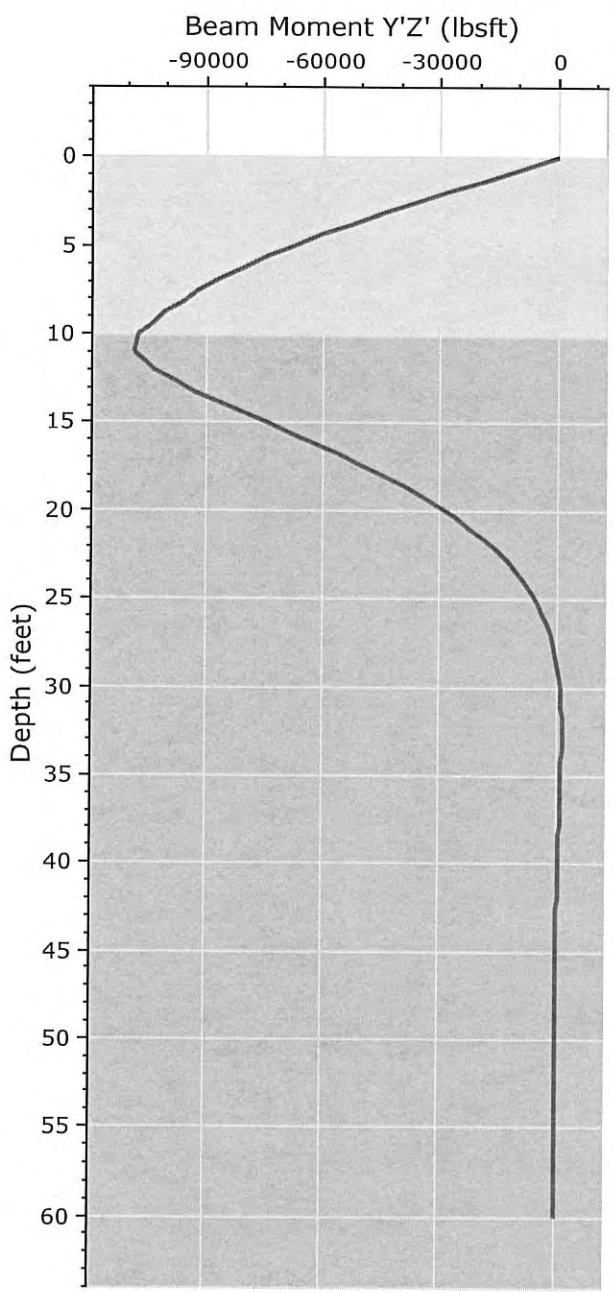
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis Description	30-inch diam pile - Free Head - 0.5 in Defflection - 10 ft of Fill
Drawn By	gvarela
Company	Geotechnologies, Inc.
Date	
File Name	21783.30diam.free.10ft.fill.rspile2

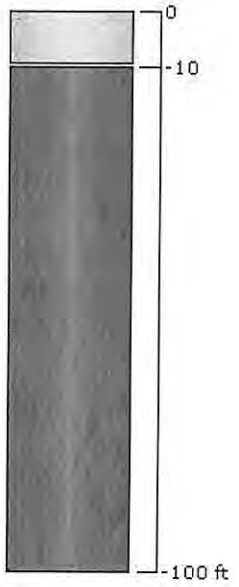
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.free.10ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Free Head - 0.5 in Defflection - 10 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	10	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	90	10



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

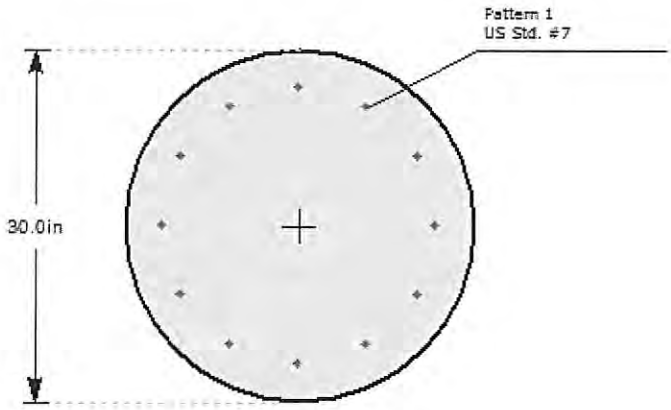
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

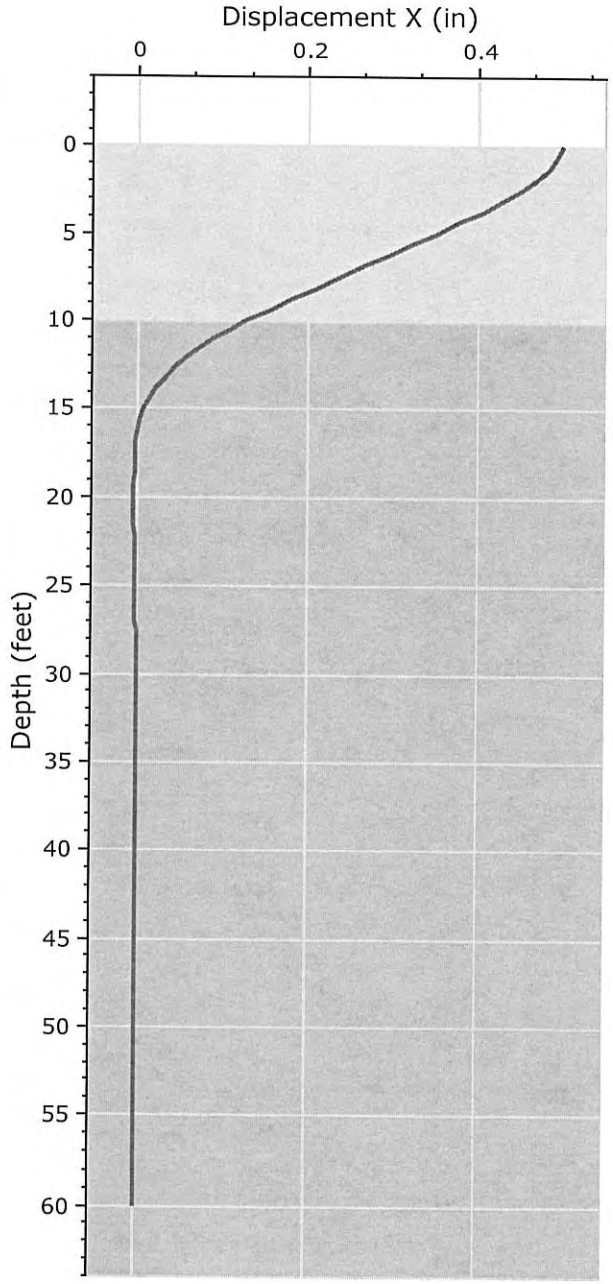
Pile Settings

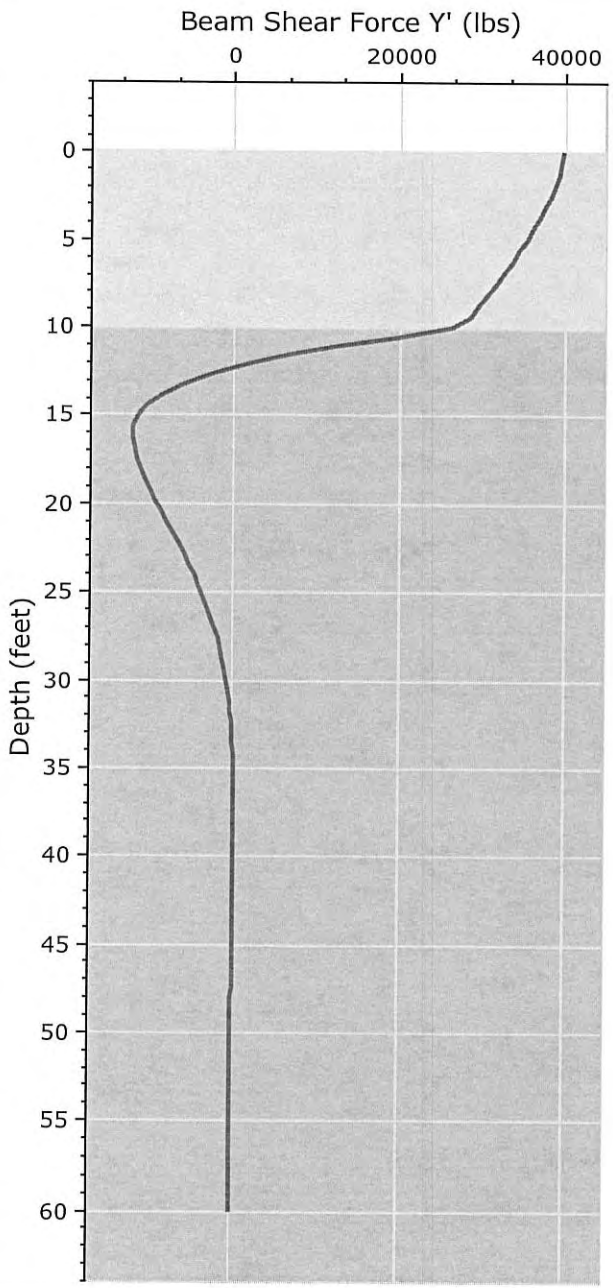
Pile 1

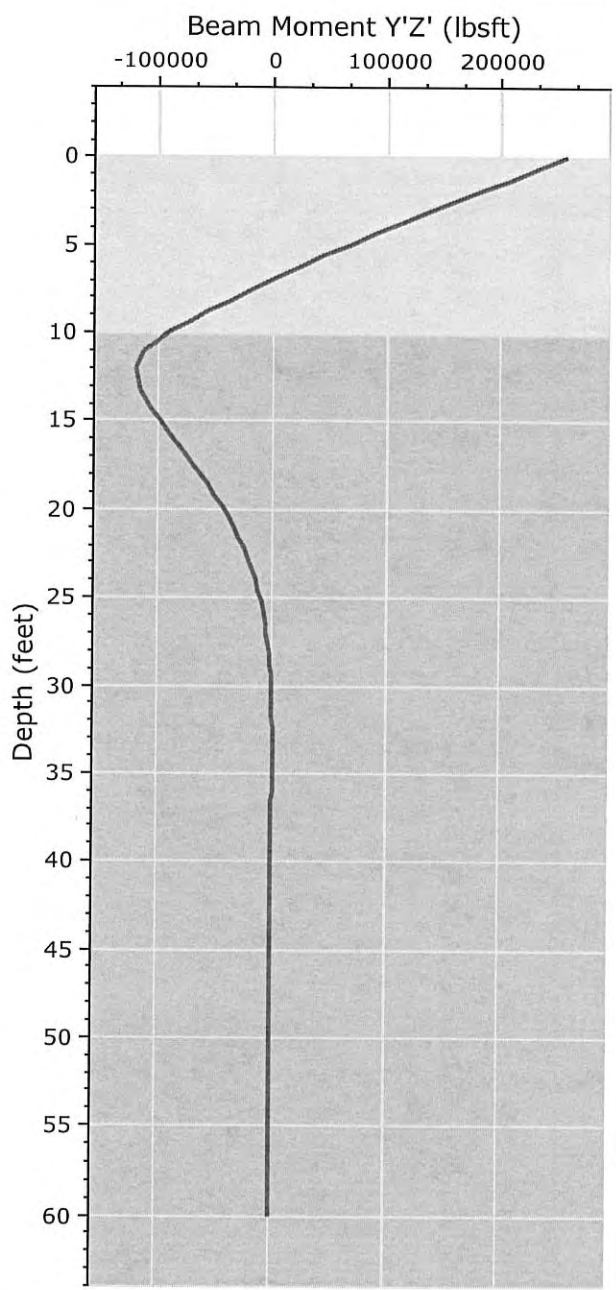
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	30-inch diam pile - Fixed Head - 0.5 in Defflection - 10 ft of Fill		
Drawn By	gvarela	Company	Geotechnologies, Inc.
Date		File Name	21783.30diam.fix.10ft.fill.rspile2

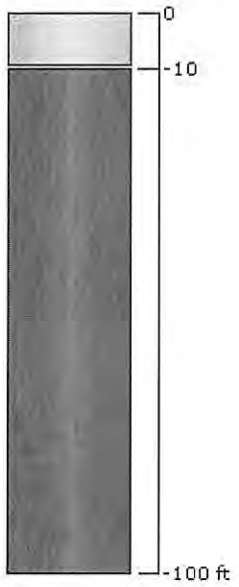
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.fix.10ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Fixed Head - 0.5 in Defflection - 10 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	10	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	90	10



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

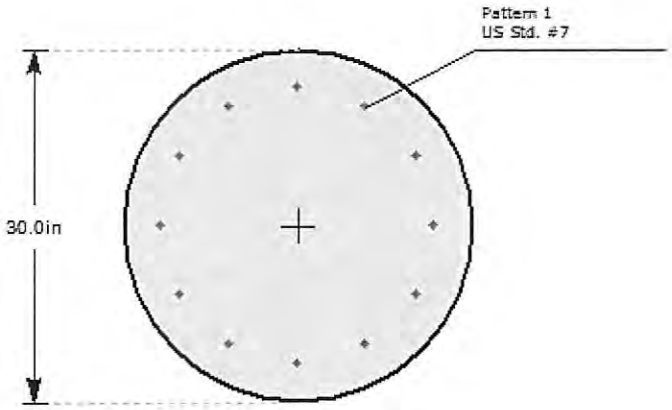
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

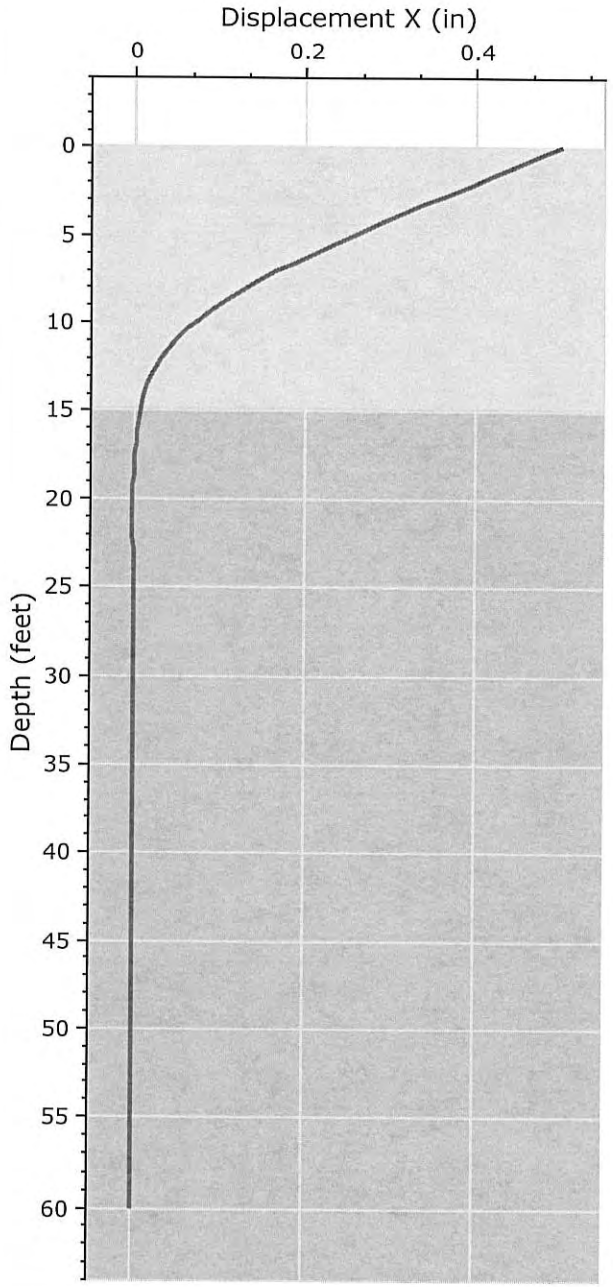
Pile Settings

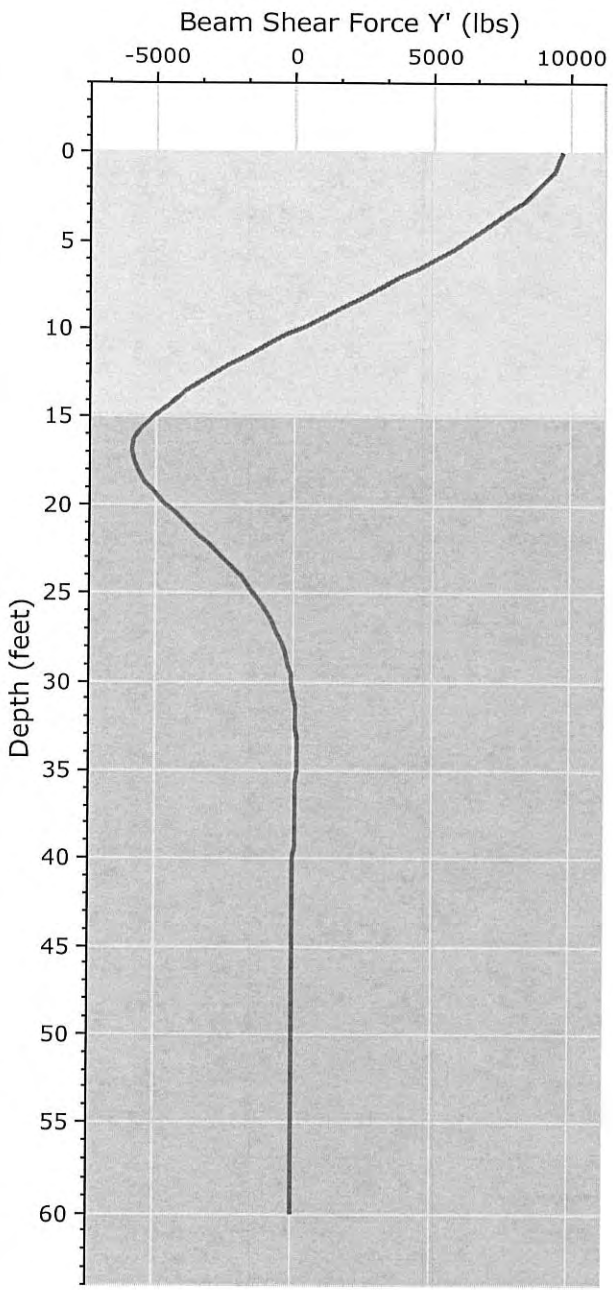
Pile 1

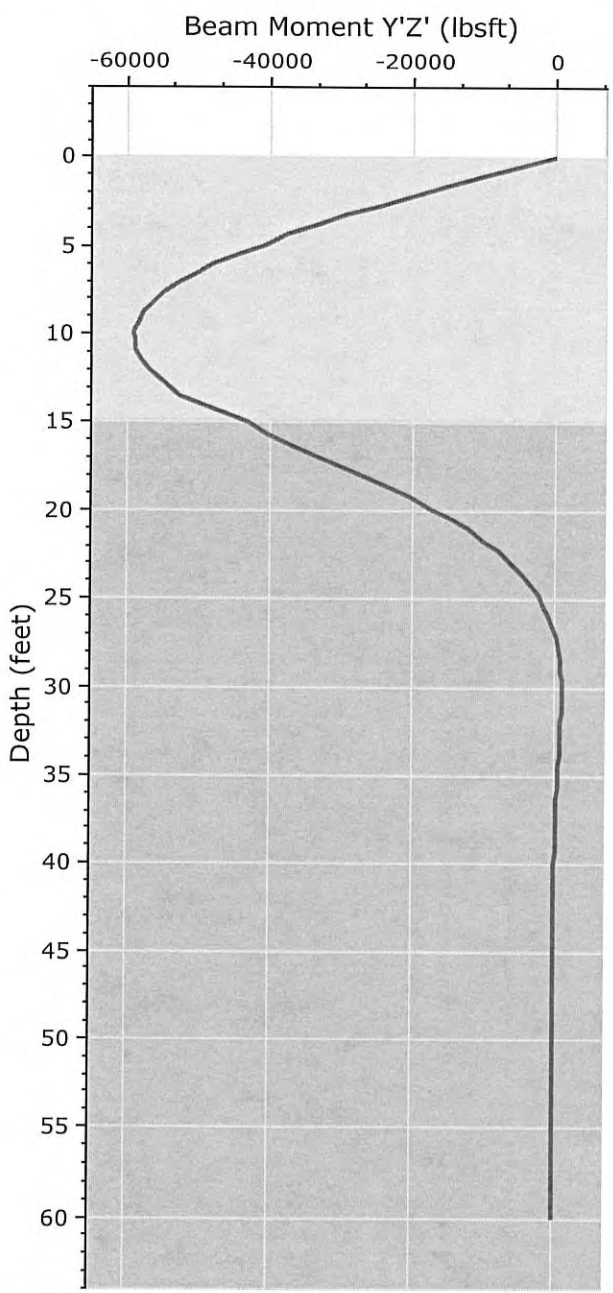
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Free Head - 0.5 in Defflection - 15 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.24diam.free.15ft.fill.rspile2

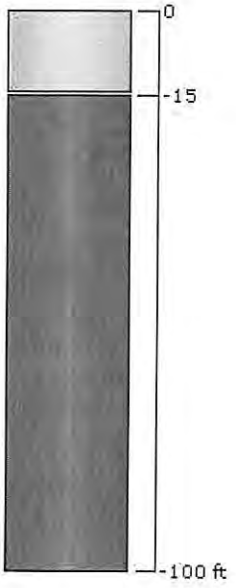
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.free.15ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Free Head - 0.5 in Defflection - 15 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	15	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	85	15



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

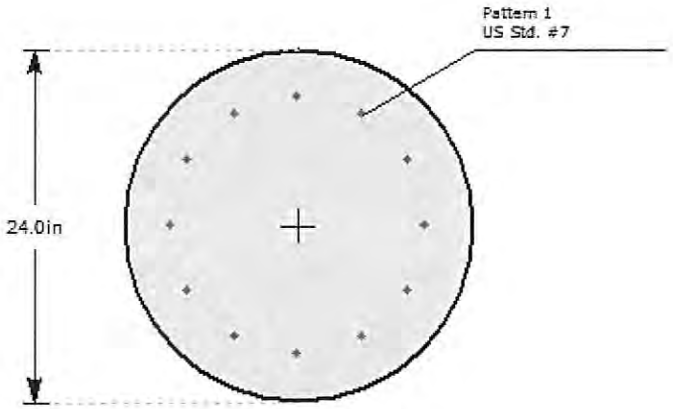
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

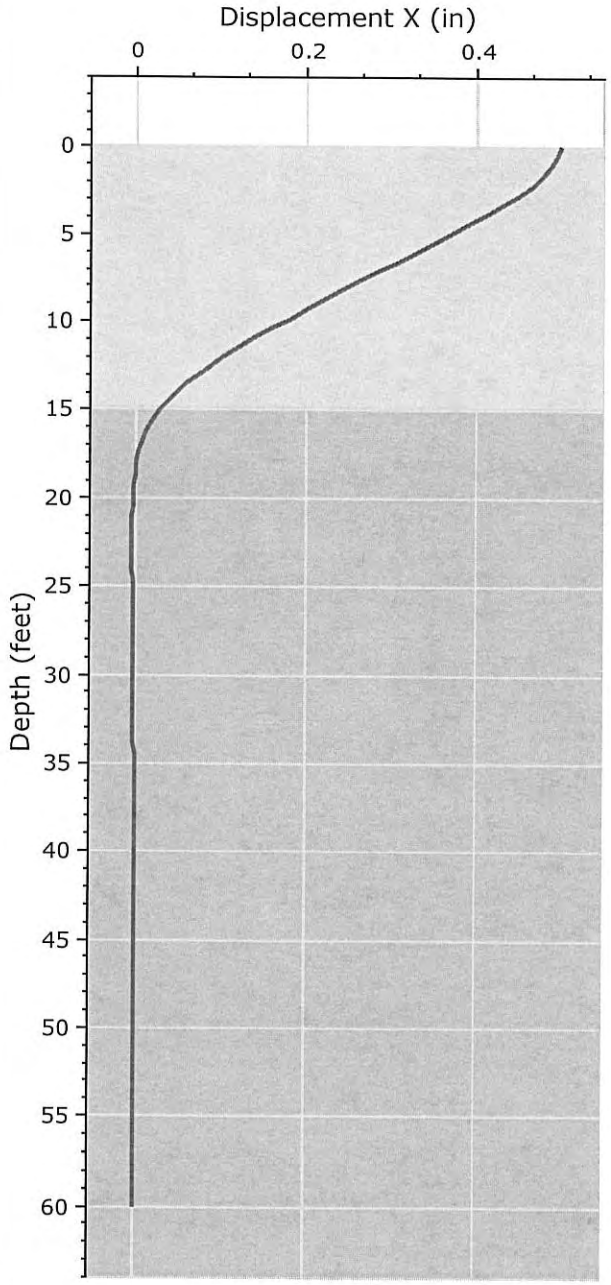
Pile Settings

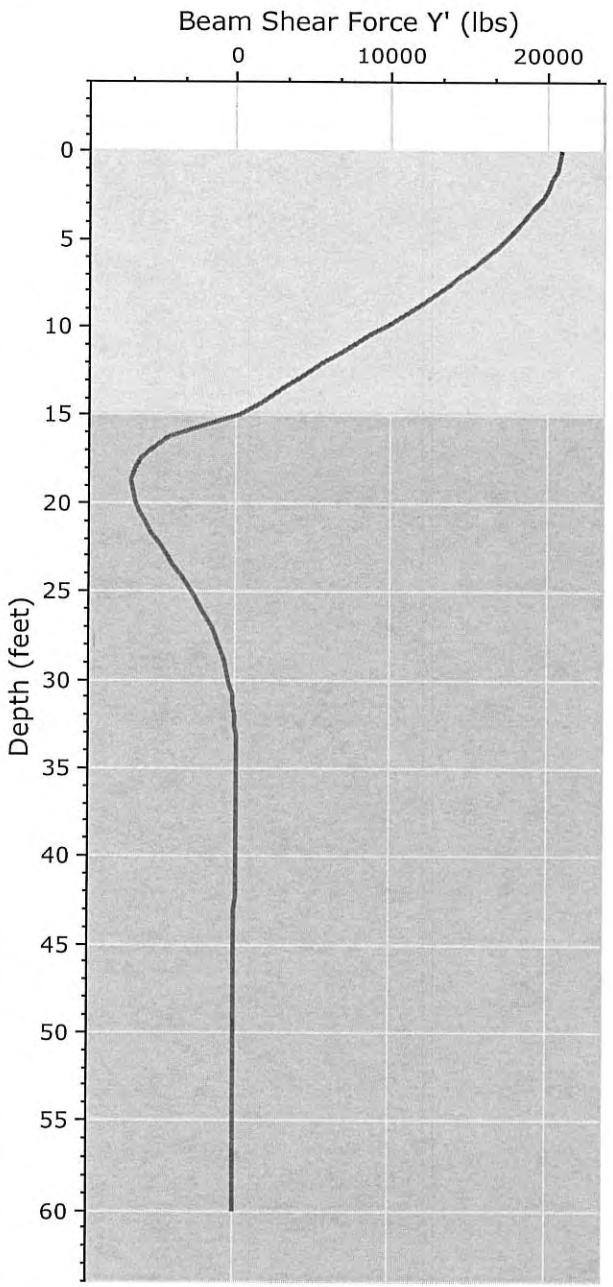
Pile 1

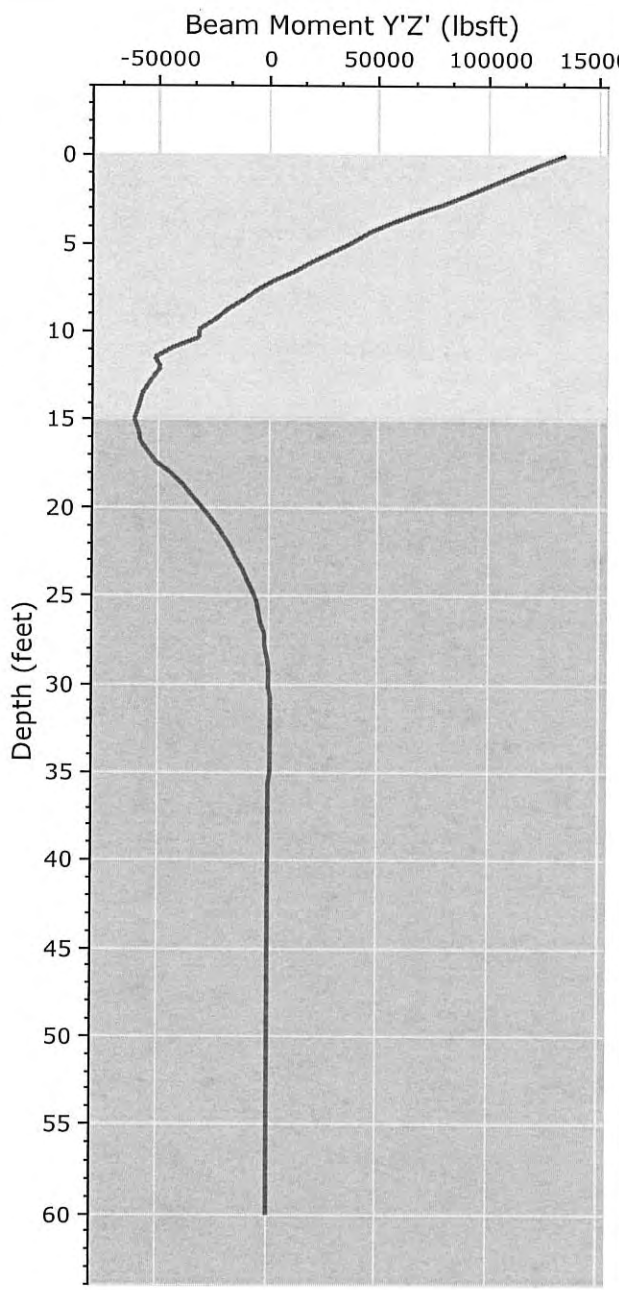
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis Description	24-inch diam pile - Fixed Head - 0.5 in Defflection - 15 ft of Fill
Drawn By: gvarela	Company: Geotechnologies, Inc.
Date	File Name: 21783.24diam.fix.15ft.fill.rspile2

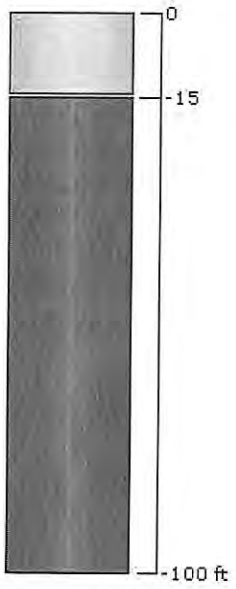
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.fix.15ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Fixed Head - 0.5 in Defflection - 15 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	15	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	85	15



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

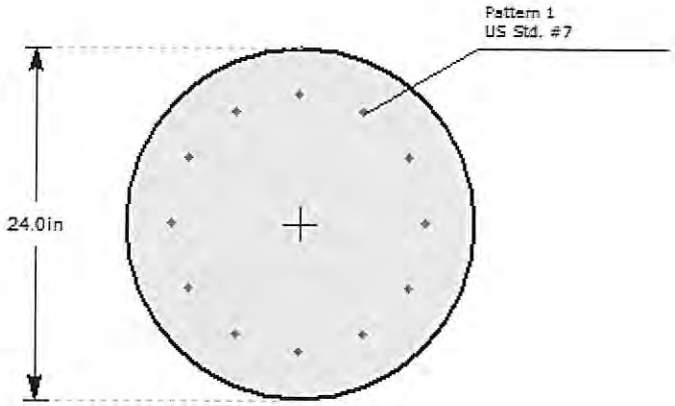
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

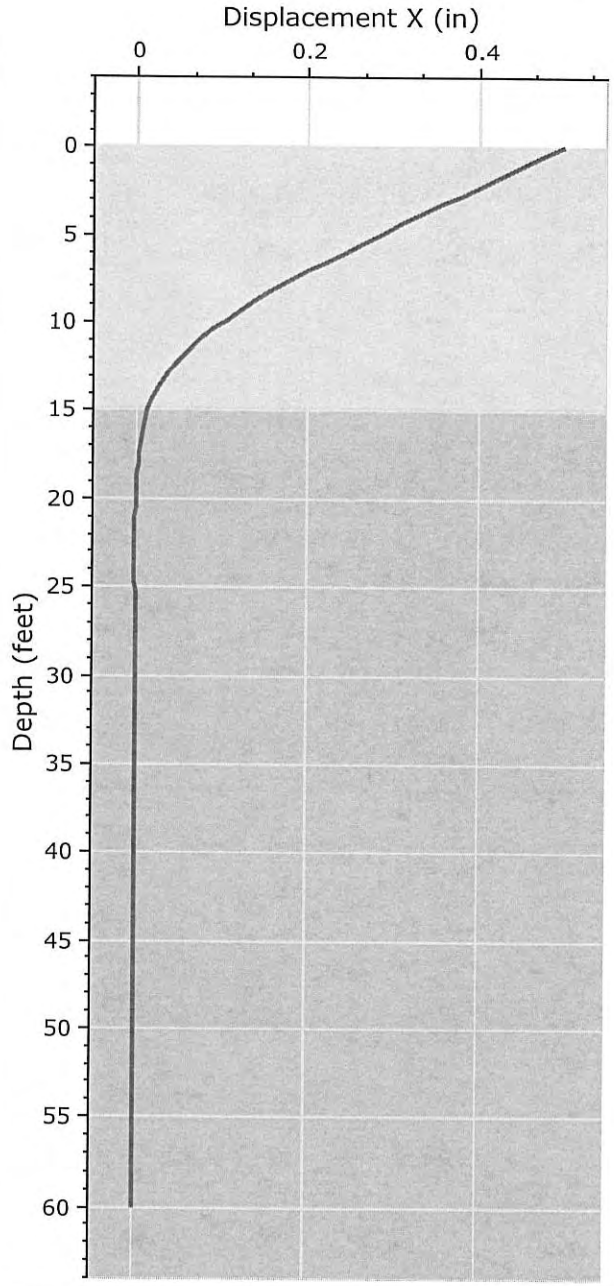
Pile Settings

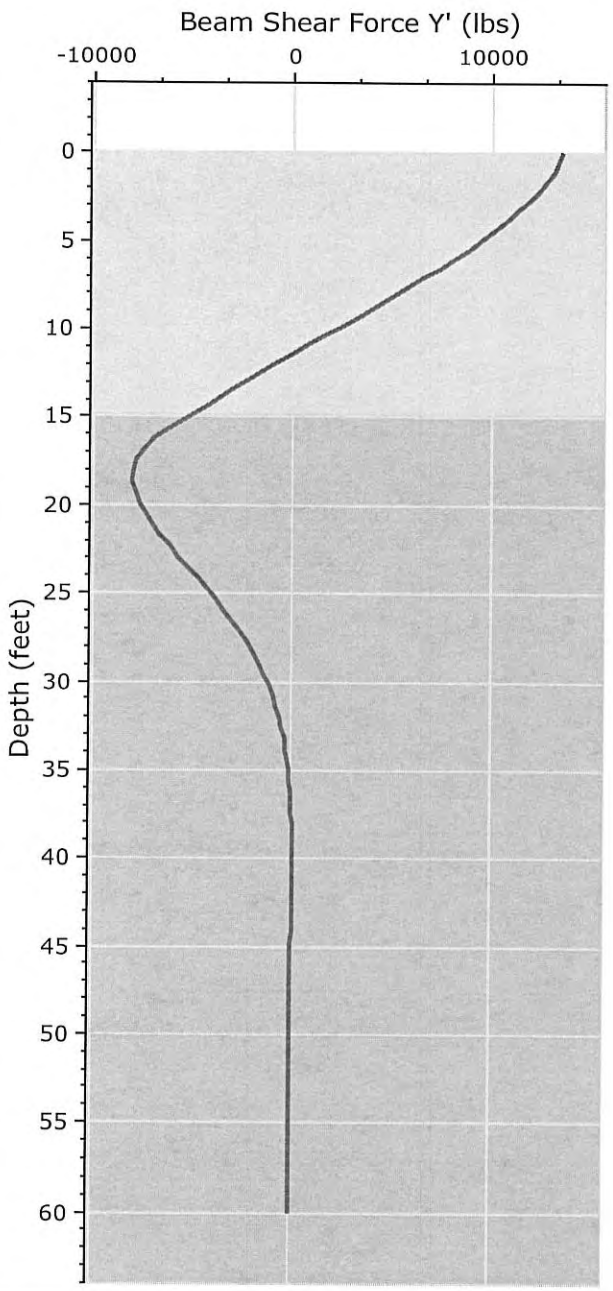
Pile 1

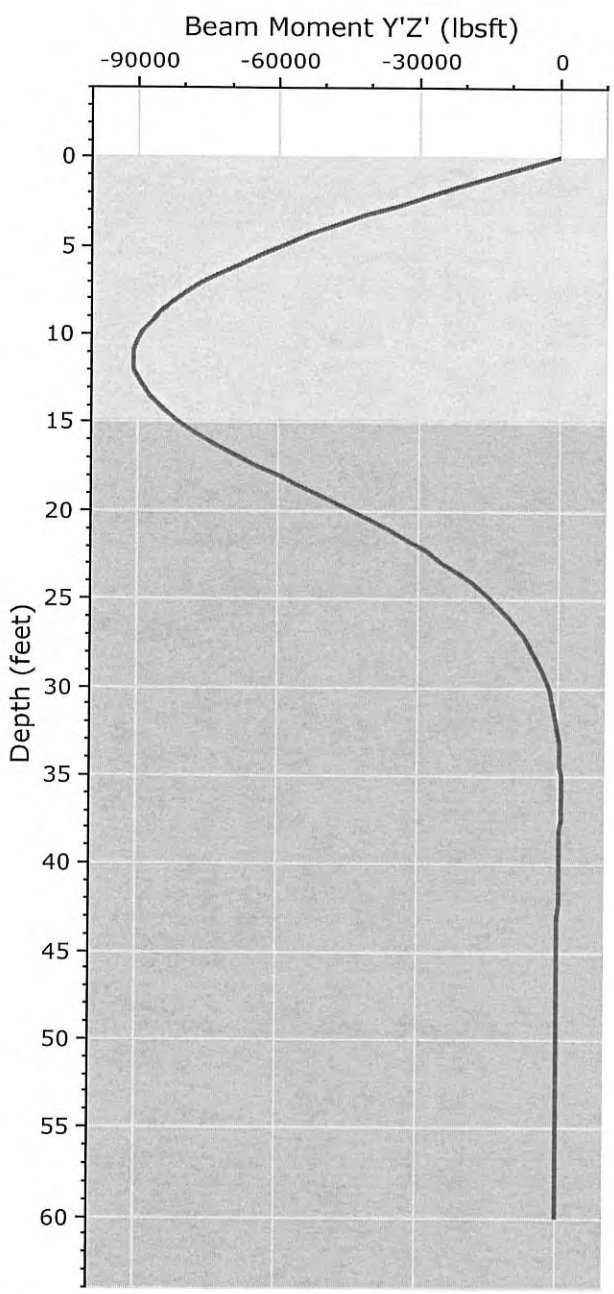
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	30-inch diam pile - Free Head - 0.5 in Defflection - 15 ft of Fill		
Drawn By	gvarela	Company	Geotechnologies, Inc.
Date		File Name	21783.30diam.free.15ft.fill.rspile2

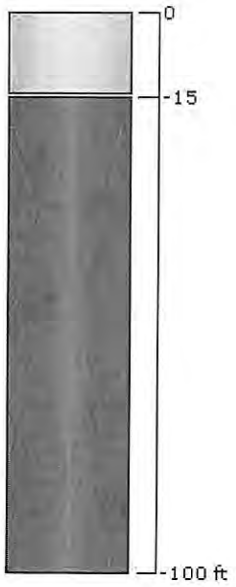
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.free.15ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Free Head - 0.5 in Defflection - 15 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	15	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	85	15



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

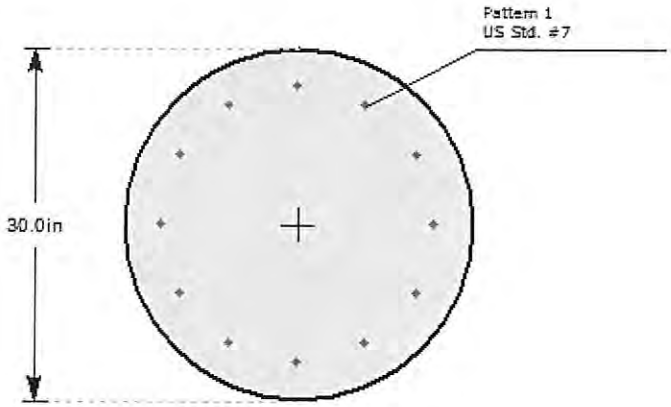
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

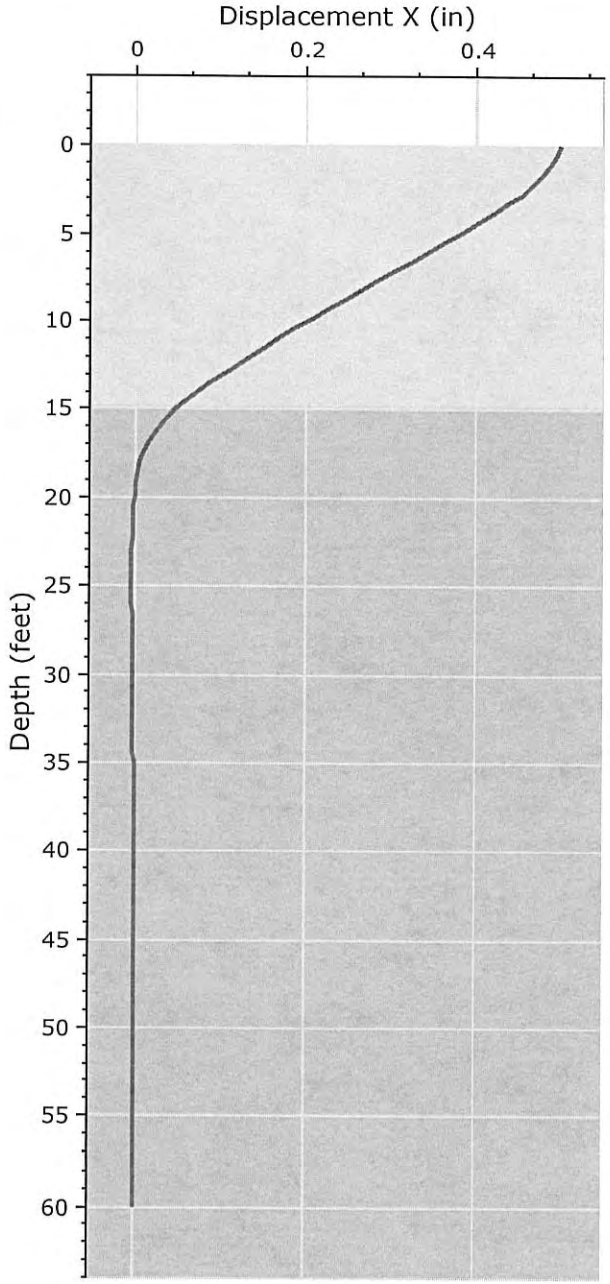
Pile Settings

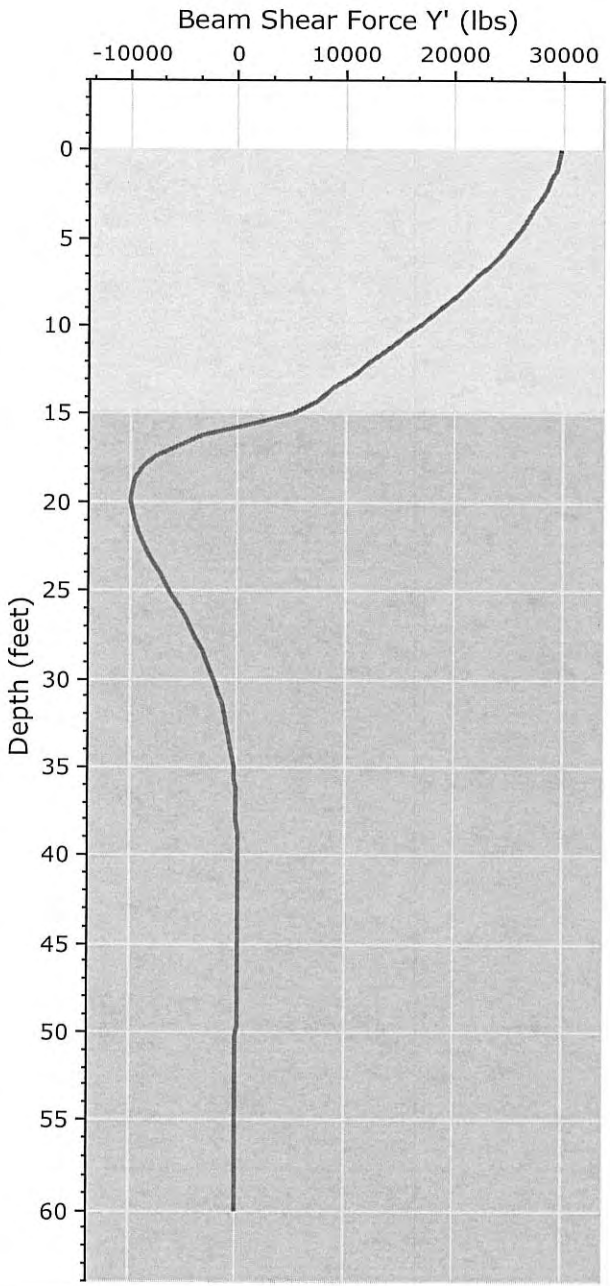
Pile 1

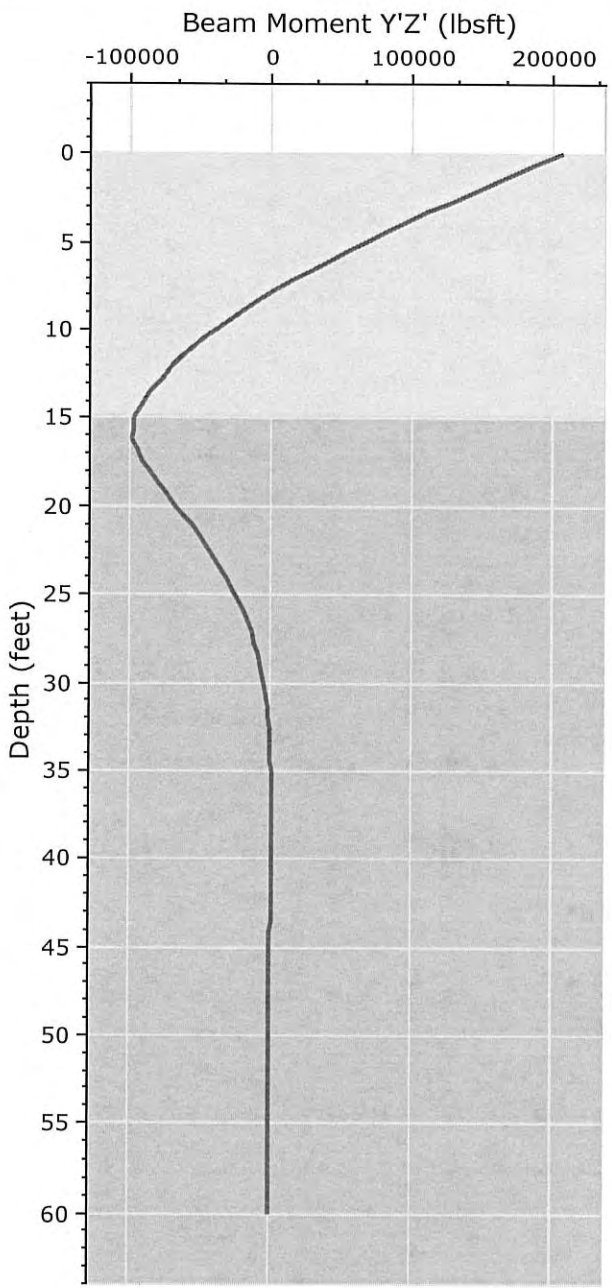
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	30-inch diam pile - Fixed Head - 0.5 in Defflection - 15 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.30diam.fix.15ft.fill.rspile2

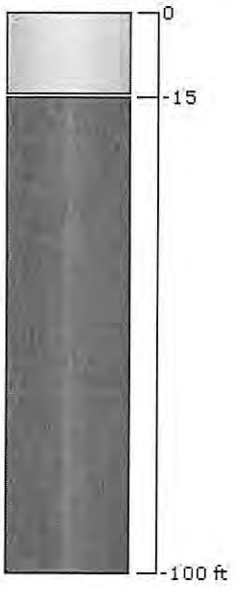
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.fix.15ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Fixed Head - 0.5 in Defflection - 15 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	15	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	85	15



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

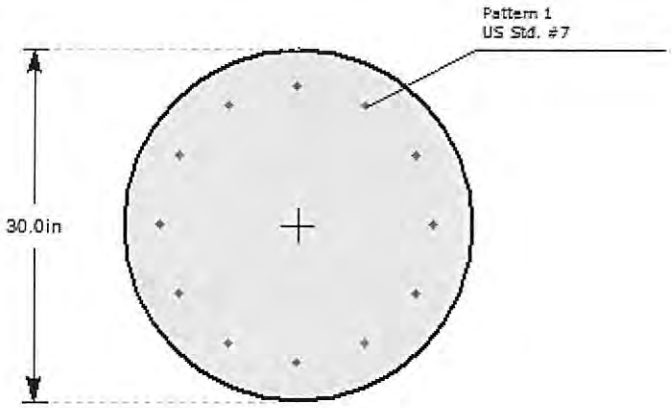
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

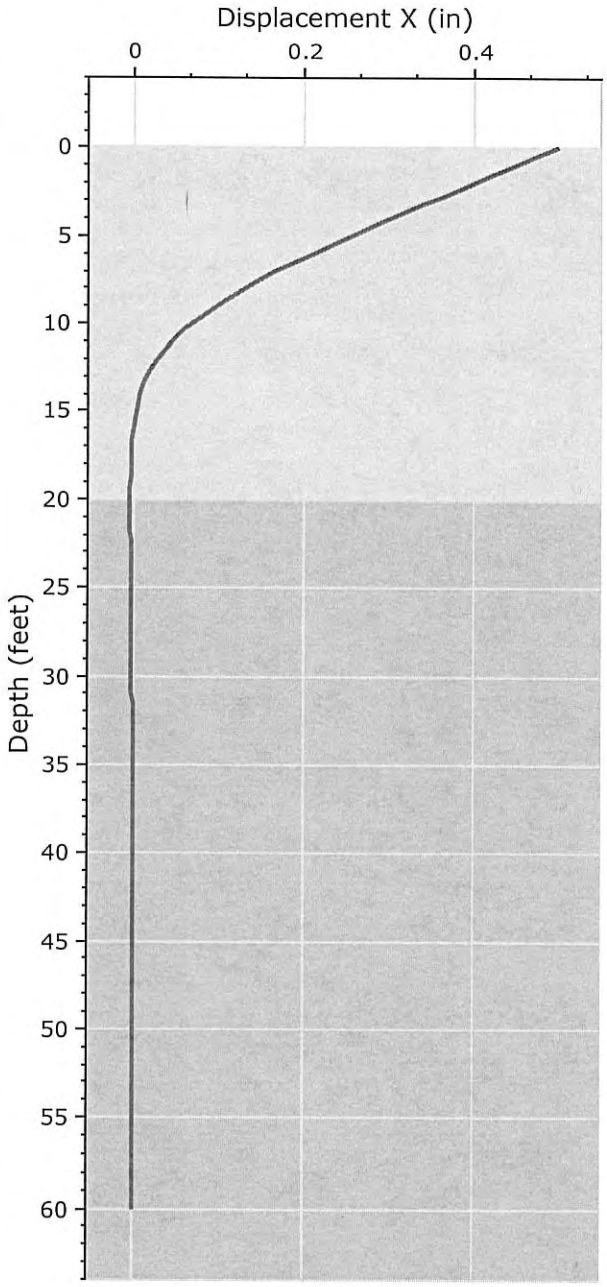
Pile Settings

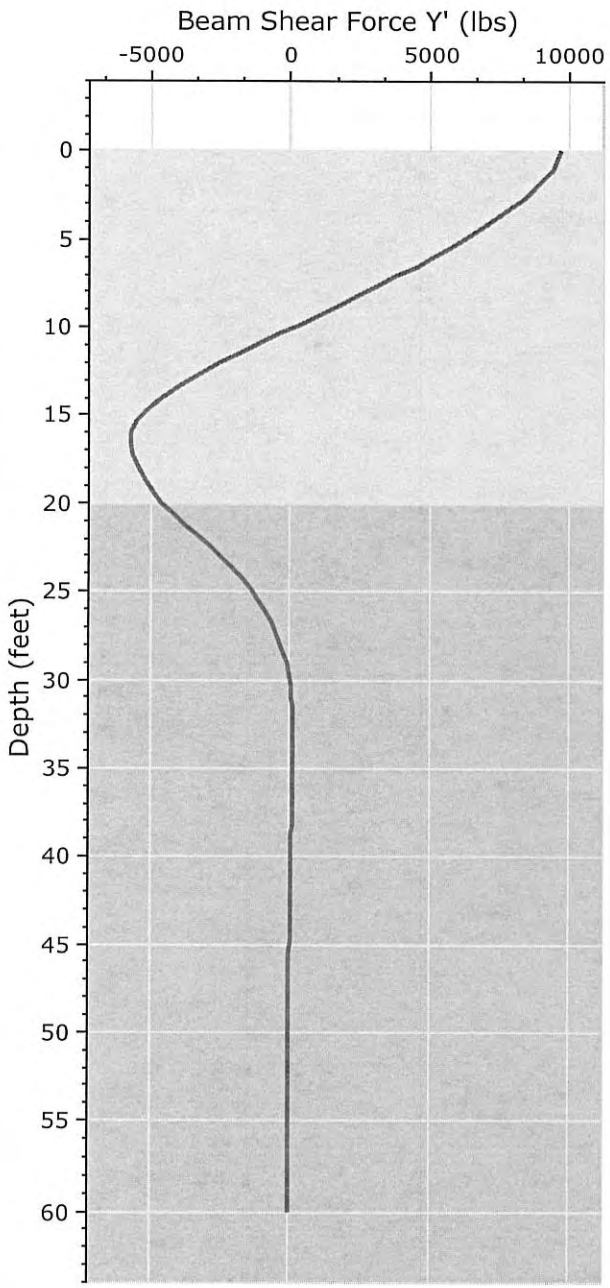
Pile 1

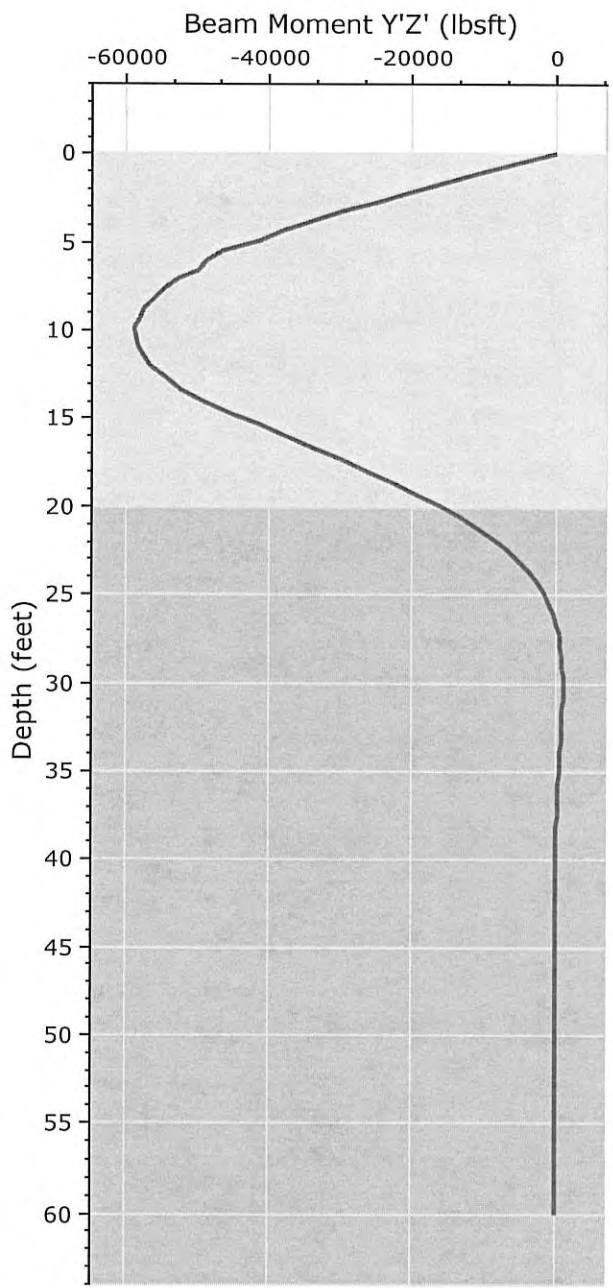
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Free Head - 0.5 in Defflection - 20 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.24diam.free.20ft.fill.rspile2

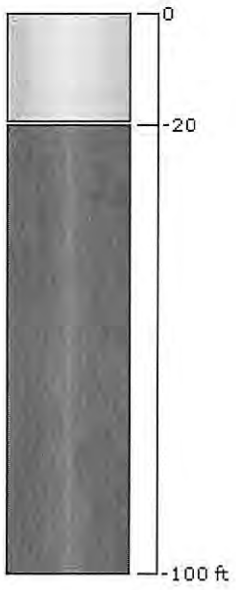
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.free.20ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Free Head - 0.5 in Defflection - 20 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	20	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	80	20



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

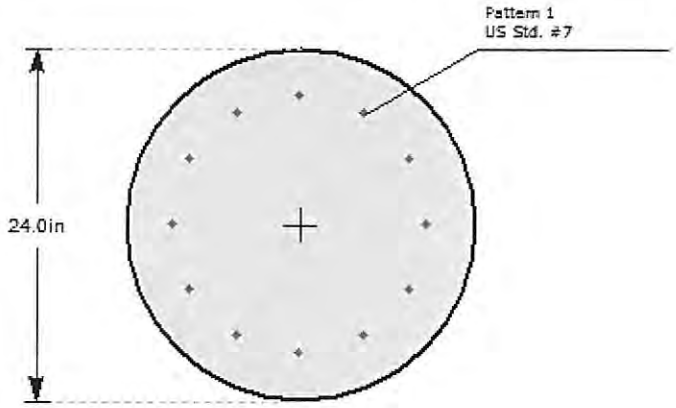
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

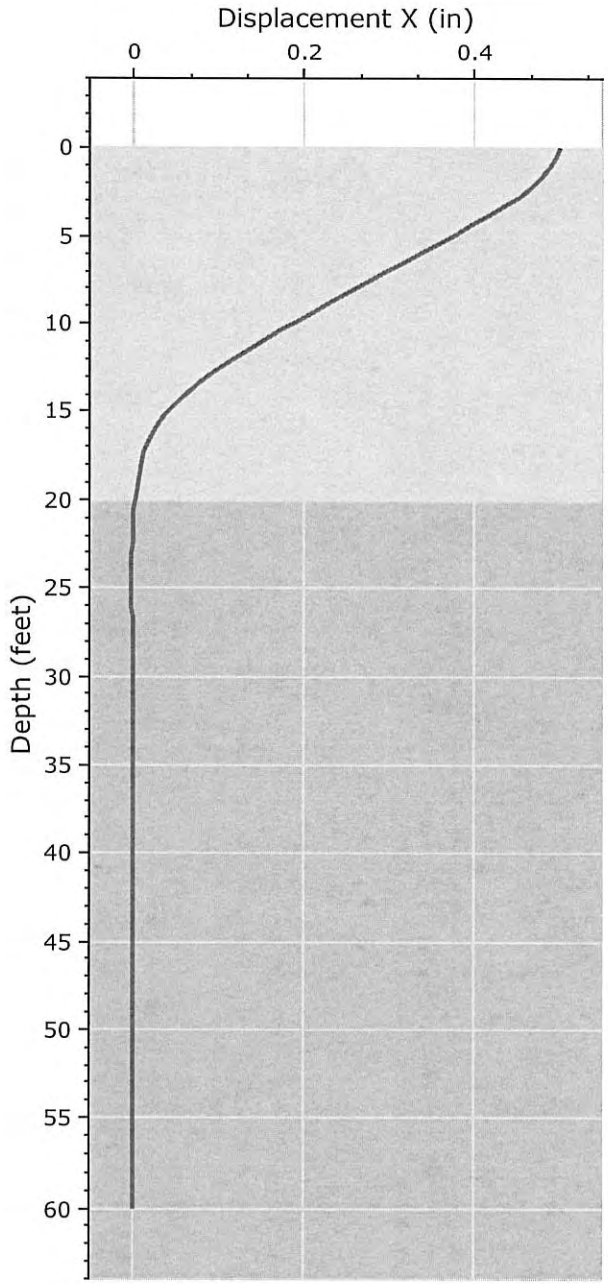
Pile Settings

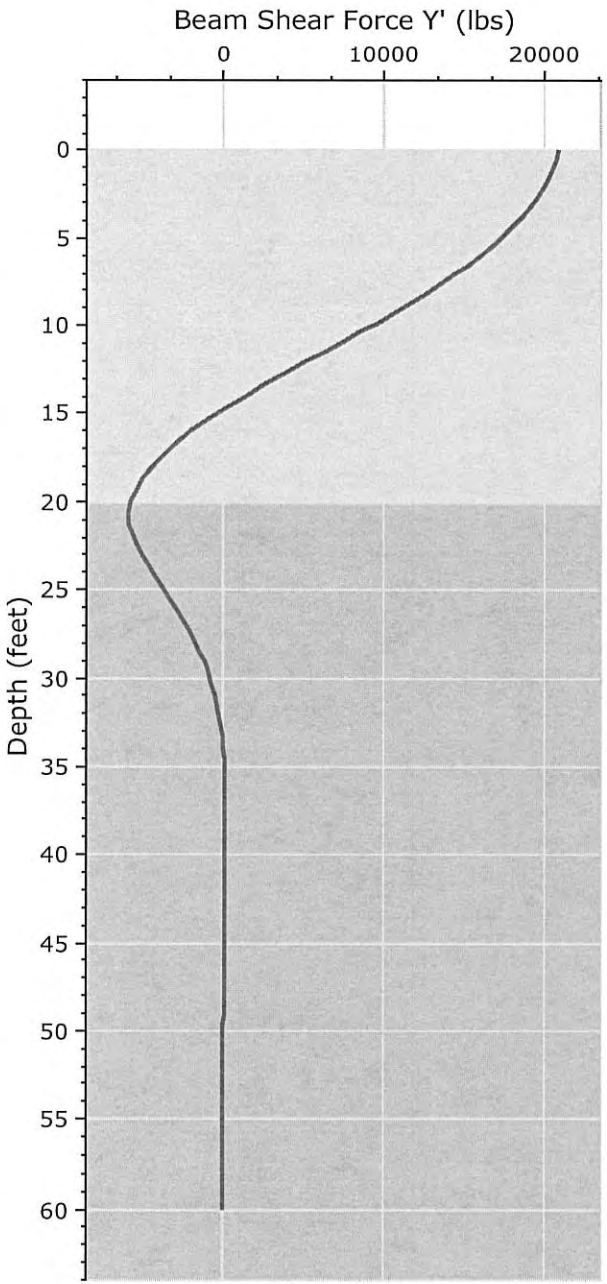
Pile 1

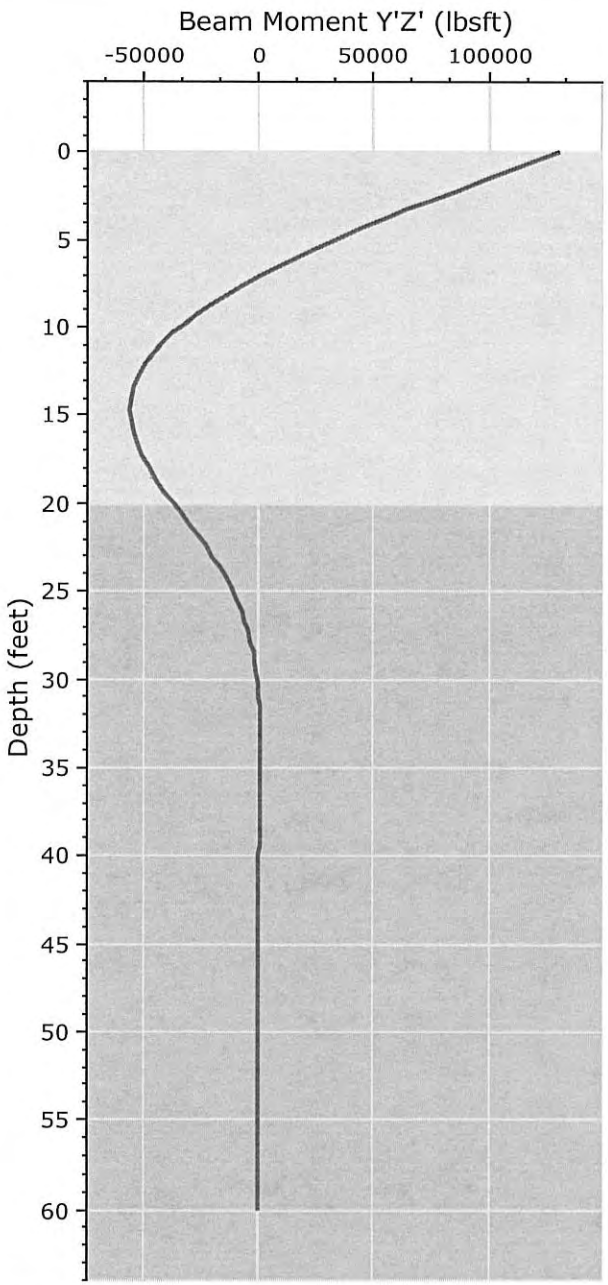
General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0







rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	24-inch diam pile - Fixed Head - 0.5 in Defflection - 20 ft of Fill		
Drawn By	gvarela	Company	Geotechnologies, Inc.
Date		File Name	21783.24diam.fix.20ft.fill.rspile2

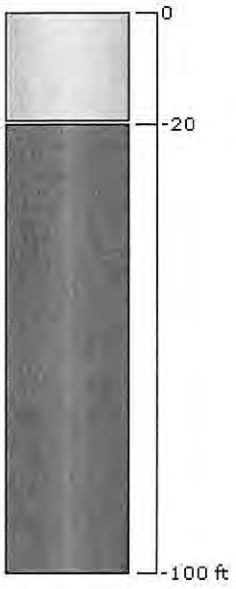
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.24diam.fix.20ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	24-inch diam pile - Fixed Head - 0.5 in Defflection - 20 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	20	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	80	20



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

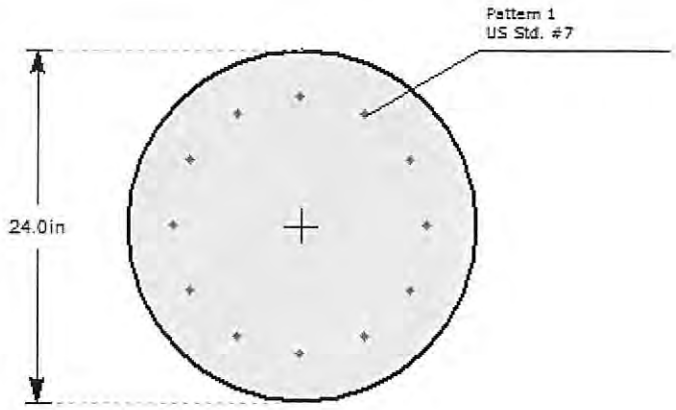
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	8.7	0	US Std. #7		8640000.00	4176000000.00
2	7.534	4.35	US Std. #7		8640000.00	4176000000.00
3	4.35	7.534	US Std. #7		8640000.00	4176000000.00
4	5.327e-016	8.7	US Std. #7		8640000.00	4176000000.00
5	-4.35	7.534	US Std. #7		8640000.00	4176000000.00
6	-7.534	4.35	US Std. #7		8640000.00	4176000000.00
7	-8.7	1.065e-015	US Std. #7		8640000.00	4176000000.00
8	-7.534	-4.35	US Std. #7		8640000.00	4176000000.00
9	-4.35	-7.534	US Std. #7		8640000.00	4176000000.00
10	-1.598e-015	-8.7	US Std. #7		8640000.00	4176000000.00
11	4.35	-7.534	US Std. #7		8640000.00	4176000000.00
12	7.534	-4.35	US Std. #7		8640000.00	4176000000.00

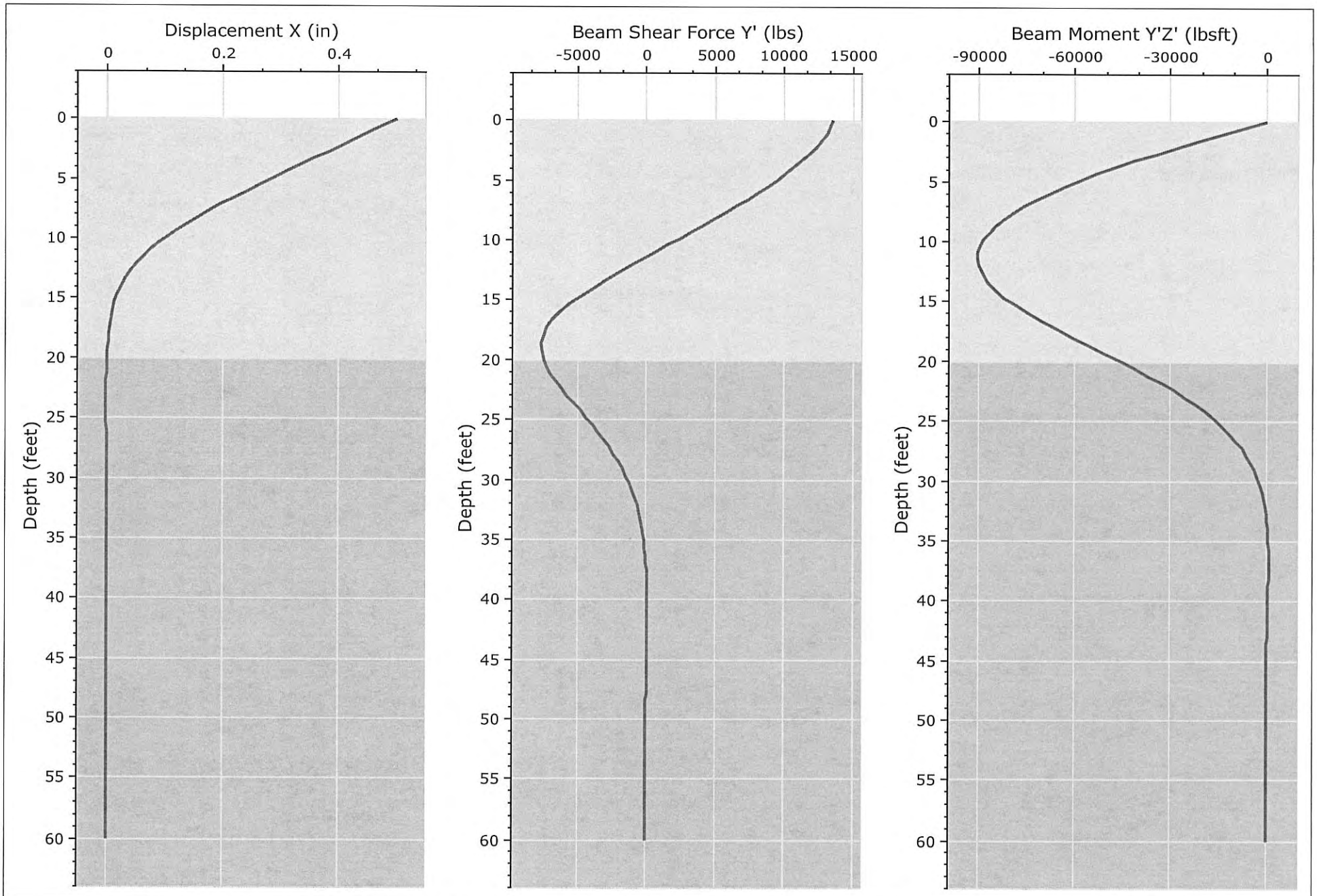
Pile Settings

Pile 1

General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0



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RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	30-inch diam pile - Free Head - 0.5 in Defflection - 20 ft of Fill		
Drawn By	gvarela	Company	Geotechnologies, Inc.
Date		File Name	21783.30diam.free.20ft.fill.rspile2

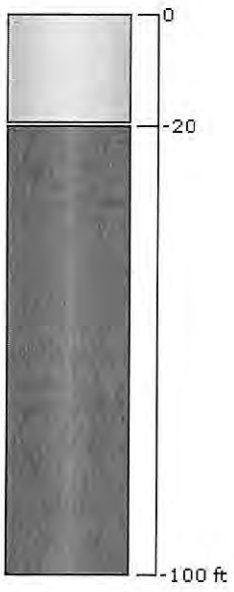
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.free.20ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Free Head - 0.5 in Defflection - 20 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	20	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	80	20



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

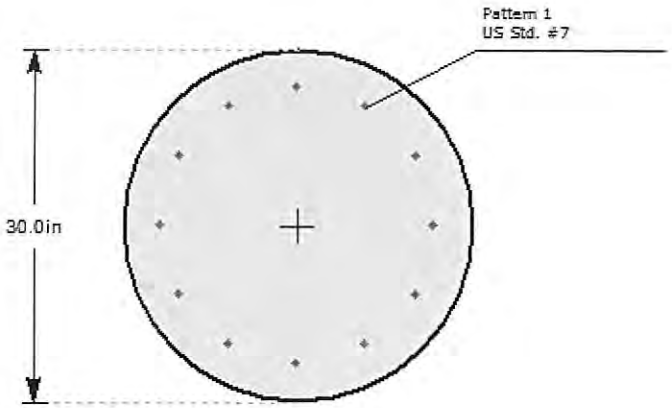
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

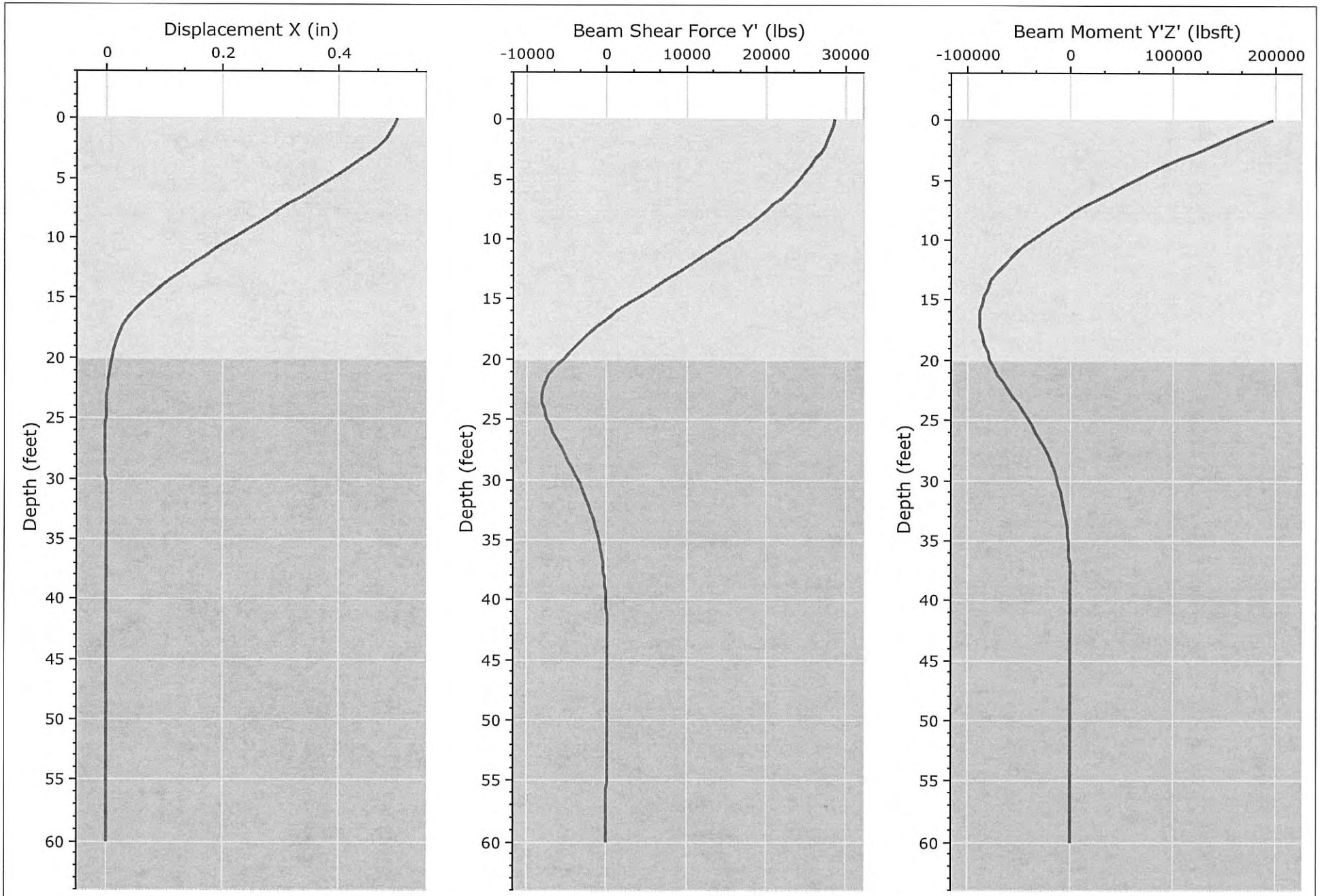
Pile Settings

Pile 1

General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Moment X, (lbsft)	0



rocscience

RSPILE 2.015

Project	File No. 21783 - Flexeble PSH Solutions, Inc.		
Analysis Description	30-inch diam pile - Fixed Head - 0.5 in Defflection - 20 ft of Fill		
Drawn By	gvarela	*Company*	Geotechnologies, Inc.
Date		*File Name*	21783.30diam.fix.20ft.fill.rspile2

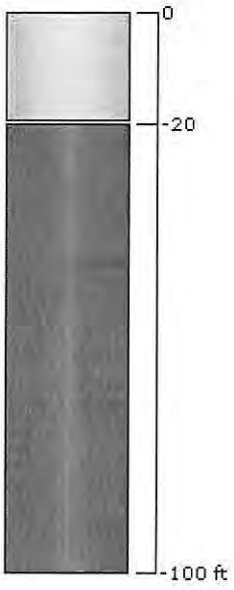
RSPile Analysis Information
File No. 21783 - Flexeble PSH Solutions, Inc.

Project Summary

Document Name	21783.30diam.fix.20ft.fill
Project Title	File No. 21783 - Flexeble PSH Solutions, Inc.
Analysis	30-inch diam pile - Fixed Head - 0.5 in Defflection - 20 ft of Fill
Author	gvarela
Company	Geotechnologies, Inc.
Last saved with RSPile version	2.015

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
Uncertified Fill Materials		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	20	0
Native Alluvial Soils or Bedrock		Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand	80	20



Soil Properties

Uncertified Fill Materials

Property	Value
Name	Uncertified Fill Materials
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	90
Sat. Unit Weight (lbs/ft3)	130
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	5
Initial Stiffness (lbs/ft3)	100000
Cohesion (psf)	25

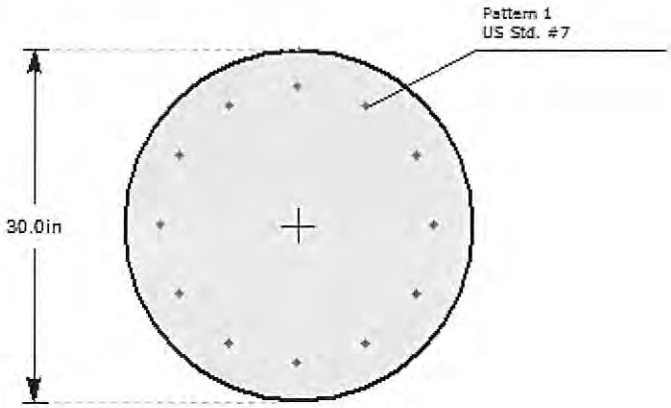
Native Alluvial Soils or Bedrock

Property	Value
Name	Native Alluvial Soils or Bedrock
Color	
Soil Type	Lateral: Silt (Cemented C - Phi Coil), Axial: API Sand
Unit Weight (lbs/ft3)	120
Sat. Unit Weight (lbs/ft3)	127.318
Friction Angle (degrees)	30
Coefficient of Lateral Earth Pressure	1
Bearing Capacity Factor	40
Maximum Unit Skin Friction (psf)	1e+006
Maximum Unit End Bearing Resistance (psf)	1e+006
Friction Angle (degrees)	30
Initial Stiffness (lbs/ft3)	150000
Cohesion (psf)	280

Pile Properties

Pile Property 1

Property	Value
Name	Pile Property 1
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	2.5
Compressive Strength (psf)	648000



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	11.7	0	US Std. #7		8640000.00	4176000000.00
2	10.13	5.85	US Std. #7		8640000.00	4176000000.00
3	5.85	10.13	US Std. #7		8640000.00	4176000000.00
4	7.164e-016	11.7	US Std. #7		8640000.00	4176000000.00
5	-5.85	10.13	US Std. #7		8640000.00	4176000000.00
6	-10.13	5.85	US Std. #7		8640000.00	4176000000.00
7	-11.7	1.433e-015	US Std. #7		8640000.00	4176000000.00
8	-10.13	-5.85	US Std. #7		8640000.00	4176000000.00
9	-5.85	-10.13	US Std. #7		8640000.00	4176000000.00
10	-2.149e-015	-11.7	US Std. #7		8640000.00	4176000000.00
11	5.85	-10.13	US Std. #7		8640000.00	4176000000.00
12	10.13	-5.85	US Std. #7		8640000.00	4176000000.00

Pile Settings

Pile 1

General	
Property	Pile Property 1
Location	-1.668, 1.302
Elevation:	0 (ft)
Length:	60 (ft)

Orientation	
Elevation (ft)	0
Length (ft)	60
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading	
Loading Type	Static
Load Factor Profile	None
Type	**Value**
Deflection X, (ft)	0.0416
Slope Y, (deg)	0

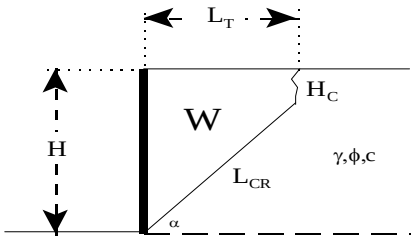
Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.
File No.: 21783
Description: Retaining Wall up to 6 feet in height

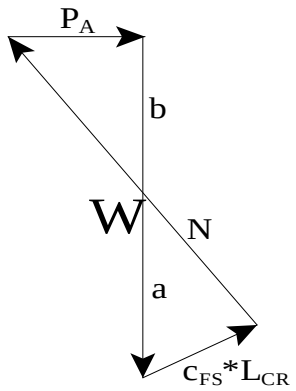
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	6.00	feet
Unit Weight of Retained Soils	(γ)	120.0	pcf
Friction Angle of Retained Soils	(ϕ)	17.0	degrees
Cohesion of Retained Soils	(c)	435.0	psf
Factor of Safety	(FS)	1.50	
Factored Parameters:	(ϕ_{FS})	11.5	degrees
	(c_{FS})	290.0	psf



Failure Angle (α)	Height of Tension Crack (H_C)	Area of Wedge (A)	Weight of Wedge (W)	Length of Failure Plane (L_{CR})	a	b	Active Pressure (P_A)
degrees	feet	$feet^2$	lbs/lineal foot	feet	lbs/lineal foot	lbs/lineal foot	lbs/lineal foot
40	6.5	-4	-430.7	-0.8	-447.3	16.6	0.0
41	6.4	-3	-321.0	-0.6	-330.7	9.7	0.0
42	6.3	-2	-230.8	-0.4	-236.1	5.3	0.0
43	6.2	-1	-157.3	-0.3	-159.9	2.6	0.0
44	6.1	-1	-98.1	-0.2	-99.1	1.1	0.0
45	6.1	0	-51.2	-0.1	-51.5	0.3	0.0
46	6.0	0	-15.0	0.0	-15.0	0.0	0.0
47	6.0	0	12.0	0.0	12.0	0.0	0.0
48	6.0	0	30.8	0.1	30.7	0.1	0.1
49	5.9	0	42.4	0.1	42.2	0.2	0.2
50	5.9	0	47.7	0.1	47.4	0.3	0.3
51	5.9	0	47.4	0.1	47.1	0.3	0.3
52	5.9	0	42.1	0.1	41.8	0.3	0.2
53	5.9	0	32.1	0.1	32.0	0.2	0.1
54	6.0	0	18.0	0.0	18.0	0.1	0.0
55	6.0	0	0.1	0.0	0.1	0.0	0.0
56	6.0	0	-21.4	-0.1	-21.4	0.1	0.0
57	6.1	0	-46.1	-0.1	-46.5	0.4	0.0
58	6.2	-1	-74.1	-0.2	-75.1	1.0	0.0
59	6.2	-1	-105.0	-0.3	-107.1	2.0	0.0
60	6.3	-1	-138.9	-0.4	-142.6	3.7	0.0
61	6.4	-1	-175.7	-0.5	-181.8	6.0	0.0
62	6.5	-2	-215.5	-0.6	-224.7	9.3	0.0
63	6.7	-2	-258.2	-0.7	-271.8	13.6	0.0
64	6.8	-3	-303.9	-0.9	-323.1	19.2	0.0
65	7.0	-3	-352.8	-1.1	-379.3	26.4	0.0



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

$P_{A,\,max}$ 0.3 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 0.0 pcf

Design Wall for an Equivalent Fluid Pressure: 30 pcf

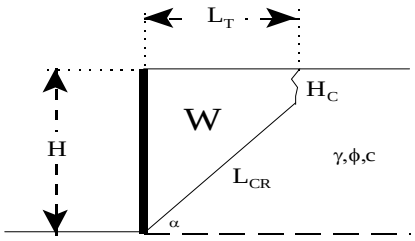
Geotechnologies, Inc.

Project: Flexible PSH Solutions
File No.: 21783
Description: Undrained Catilever Retaining Wall (Designed for Hydrostatic Pressure)

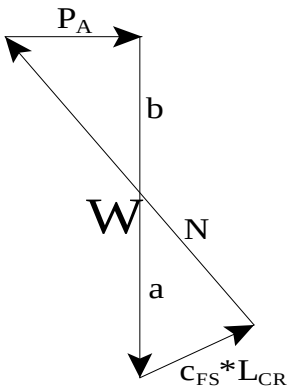
Retaining Wall Design with Level Backfill (Vector Analysis)

Input:

Retaining Wall Height	(H)	6.00	feet	
Unit Weight of Retained Soils	(γ)	57.6	pcf	**(Buoyant)**
Friction Angle of Retained Soils	(ϕ)	17.0	degrees	
Cohesion of Retained Soils	(c)	435.0	psf	
Factor of Safety	(FS)	1.50		
Factored Parameters:	(ϕ_{FS})	11.5	degrees	
	(c_{FS})	290.0	psf	



Failure Angle (α)	Height of Tension Crack (H_C)	Area of Wedge (A)	Weight of Wedge (W)	Length of Failure Plane (L_{CR})	a	b	Active Pressure (P_A)
degrees	feet	$feet^2$	lbs/lineal foot	feet	lbs/lineal foot	lbs/lineal foot	lbs/lineal foot
40	13.5	-87	-5024.5	-11.7	-6957.9	1933.3	0.0
41	13.3	-81	-4652.6	-11.1	-6409.8	1757.2	0.0
42	13.1	-75	-4327.1	-10.6	-5933.8	1606.7	0.0
43	12.9	-70	-4041.5	-10.1	-5519.3	1477.8	0.0
44	12.8	-66	-3790.5	-9.7	-5157.9	1367.3	0.0
45	12.6	-62	-3569.8	-9.4	-4842.3	1272.5	0.0
46	12.5	-59	-3375.5	-9.1	-4566.8	1191.3	0.0
47	12.5	-56	-3204.5	-8.8	-4326.3	1121.7	0.0
48	12.4	-53	-3054.2	-8.6	-4116.5	1062.4	0.0
49	12.4	-51	-2922.1	-8.4	-3934.2	1012.0	0.0
50	12.3	-49	-2806.5	-8.3	-3776.1	969.6	0.0
51	12.3	-47	-2705.6	-8.1	-3639.9	934.3	0.0
52	12.3	-45	-2618.1	-8.0	-3523.5	905.4	0.0
53	12.4	-44	-2542.8	-8.0	-3425.1	882.3	0.0
54	12.4	-43	-2478.6	-7.9	-3343.2	864.6	0.0
55	12.5	-42	-2424.7	-7.9	-3276.6	851.9	0.0
56	12.6	-41	-2380.4	-8.0	-3224.4	844.0	0.0
57	12.7	-41	-2345.1	-8.0	-3185.7	840.6	0.0
58	12.8	-40	-2318.4	-8.1	-3159.9	841.6	0.0
59	13.0	-40	-2299.7	-8.2	-3146.7	846.9	0.0
60	13.2	-40	-2288.9	-8.3	-3145.6	856.7	0.0
61	13.4	-40	-2285.8	-8.4	-3156.7	870.9	0.0
62	13.6	-40	-2290.3	-8.6	-3180.0	889.7	0.0
63	13.9	-40	-2302.4	-8.9	-3215.7	913.3	0.0
64	14.2	-40	-2322.2	-9.1	-3264.2	941.9	0.0
65	14.5	-41	-2350.0	-9.4	-3326.0	976.1	0.0



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

$P_{A,\,max}$ 0.0 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$

EFP 0.0 pcf

Design Wall for an Equivalent Fluid Pressure: 93 pcf (Includes Hydrostatic Pressure)

Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.

File No.: 21783 **DRAINED RESTRAINED RETAINING WALL**

Soil Weight	γ	120	pcf
Internal Friction Angle	ϕ	17	degrees
Cohesion	c	0	psf
Height of Retaining Wall	H	6	feet

Restrained Retaining Wall Design based on At Rest Earth Pressure

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

$K_o = 1 - \sin\phi$	0.708	
$\sigma'_v = \gamma H$	720.0	psf

σ'_h =	509.5	psf	
EFP =	84.9	pcf	
P_o =	1528.5	lbs/ft	(based on a triangular distribution of pressure)

Design wall for an EFP of 85 pcf

Geotechnologies, Inc.

Project: Flexible PSH Solutions, Inc.

File No.: 21783 **UNDRAINED RESTRAINED RETAINING WALL**

Soil Weight	γ	57.6 pcf	**(Buoyant)**
Internal Friction Angle	ϕ	17 degrees	
Cohesion	c	0 psf	
Height of Retaining Wall	H	6 feet	

Restrained Retaining Wall Design based on At Rest Earth Pressure

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

$K_o = 1 - \sin\phi$	0.708	
$\sigma'_v = \gamma H$	345.6 psf	
σ'_h =	244.6 psf	
EFP =	40.8 pcf	
P_o =	733.7 lbs/ft	(based on a triangular distribution of pressure)

Design wall for an EFP of 104 pcf **(Includes Hydrostatic Pressure)**

BORING LOG BY CONVERSE FOUNDATION ENGINEERING (1959)

(1 Page)

LOG OF EXPLORATORY BORING

Boring No.	Depth in Feet	L. A. Code Classif.	Soil Description
1	0 - 11.8	Fill	Mixed FILL - Alternate layers of SANDY SILT, SILTY SAND and CLAYEY SILT (dry to moist, medium firm to firm, light brown and dark brown) + occasional chunks of wood and asphalt.
	11.8 - 18.5	Fill	Mixed FILL - CLAYEY SILT-SAND and CLAYEY SILT (very moist to wet, medium soft, gray and gray black) with considerable wood, glass and other rubble. Eight inches soft asphalt at 12 feet. Slow water seepage at 18 feet.
	18.5 - 22.0	Compact Silt	SANDY SILT (very moist, medium firm, dark brown)
	22.0 - 33.5	Soft Bedrock	SANDSTONE (moist, firm, dark brown) with alternate SILTSTONE bedding below 32 feet.

BORING LOGS BY DONALD R. WARREN Co. (1963)

(5 Pages)

DATE November 1962 — DONALD R. WARREN CO. — JOB No. F 62-1597

BY HJ/AAR — ENGINEERS — SHEET No. 2 OF

LOS ANGELES 12, CALIFORNIA

SUBJECT Stanley Construction Co. — REFERENCE

Warehouse for Golden State Glass
Corner Oakwood Avenue & Juanita Street, Los Angeles, Calif.

LOG OF BORINGS — BORING NO. 1

○ = Undisturbed Sample

Surface Elev. 101 ft.

DEPTH	SAMPLE NO.	DRY DENSITY LBS./CU. FT.	MOISTURE CONTENT, %	SHEAR STRENGTH KIPS/SQ. FT.	UNIFIED SOIL CLASSIFICATION	
0	①	97	18.5	5.5		Black, slightly sandy fat clay (dry & hard)
						Same (slightly moist & very stiff)
5'	②	93	20.2	3.4		Light brown med. to fat clay (slightly moist & stiff)
						Weathered shale (moist & very dense)
10'	③	90	30.0	2.4		Shale, in place (moist & very dens
15'						Same, but much harder

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DATE November 1962 **DONALD R. WARREN CO.** JOB No. F 62-1597

BY HJ/AAR ENGINEERS LOS ANGELES 12, CALIFORNIA SHEET No. 3 OF

SUBJECT Stanley Construction Co. REFERENCE

Warehouse for Golden State Glass
Corner Oakwood Avenue & Juanita Street, Los Angeles, Calif.

LOG OF BORINGS

BORING NO. 2

Surface Elev. 98 ft.

DEPTH	SAMPLE NO.	DRY DENSITY LBS./CU. FT.	MOISTURE CONTENT, %	SHEAR STRENGTH KIPS/SQ FT.	UNIFIED SOIL CLASSIFICATION	
0						3" concrete slab
						Black, slightly sandy clay (moist & stiff)
5'						Same but color is light brown
10'						Light brown very fine sandy medium to fat clay (moist & stiff)
						Light brown weathered shale, (moist & very dense) A few cobbles & gravel at 12'
15'						Light brown shale, in place (moist & very dense)
20'						

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DATE November 1962 | DONALD R. WARREN CO. | JOB NO F 62-1597

BY HJ/AAR | ENGINEERS, LOS ANGELES 12, CALIFORNIA | SHEET NO 4 OF

SUBJECT Stanley Construction Co. | REFERENCE

Warehouse for Golden State Glass
Corner Oakwood Avenue & Juanita Street, Los Angeles, Calif.

LOG OF BORINGS

BORING NO. 3

○ = Undisturbed Sample

▼ = Water Table

Surface Elev. 95 ft.

DEPTH	SAMPLE NO.	DRY DENSITY LBS./CU. FT.	MOISTURE CONTENT, %	SHEAR STRENGTH KIPS/SQ. FT.	UNIFIED SOIL CLASSIFICATION	
0					FILL	Fine sandy lean clay with pieces of concrete & brick (dry & loose)
5'	①	111	14.7	-		Black, slightly sandy fat clay (moist & stiff to very stiff)
	②	104	6.7	2.0		Brown very fine sandy med. to fat clay (moist & stiff)
10'						Brown slightly clayey very fine sand (moist & very dense)
12' ▼						Light brown clean very fine sand (very moist & very dense)
	③	108	18.7	2.8		Tan slightly clayey fine sand (very moist & very dense)
15'						Slightly silty fine to medium sand (saturated)
20'						

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DATE May 14, 1963

BY HJR/PF

DONALD R. WARREN CO.
ENGINEERS
LOS ANGELES 12, CALIFORNIA

JOB No. P63-651

SHEET No. 5 OF

REFERENCE

SUBJECT Stanley Const. Co.
Office Building
344 No. Juanita St., Los Angeles, California

LOG OF BORINGS

BORING NO. 4

○ = Undisturbed Sample
▼ = Water Table

DEPTH	SAMPLE NO.	DRY DENSITY LBS./CU. FT.	MOISTURE CONTENT, %	SHEAR STRENGTH KIPS/SQ. FT	UNIFIED SOIL CLASSIFICATION	
0'						Brown, sandy medium to fat clay (moist)
	①	102	12.3	2.2		
5'	②	105	17.2	1.6		Brown fine sandy medium clay (moist and stiff)
						Brown clayey fine sand (moist and medium dense)
▼ 10'	③	102	22.9	2.3		Brown fine sandy medium clay (very moist and firm)
						Clayey medium sand with shale fragments (saturated, and medium dense)
15'	④	113	17.9	2.9		
						Dark gray clayey sand with scatter gravel (moist and very dense)
20'	⑤	95	23.8	3.0		Dark brown silty fine sand (moist, and very dense) Layers of oily shale.
25'	⑥	117	6.1	4.7		
						The water is coming in fast.

0230170176

DATE May 14, 1963

BY HJR/PF

DONALD R. WARREN CO.
ENGINEERS
LOS ANGELES 12, CALIFORNIA

JOB No F63-651

SHEET No 6 OF

SUBJECT Stanley Const. Co.
Office Building
344 No. Juanita St., Los Angeles, California

REFERENCE

LOG OF BORINGS

BORING NO. 5

DEPTH	SAMPLE NO.	DRY DENSITY LBS./CU. FT.	MOISTURE CONTENT, %	SHEAR STRENGTH KIPS/SQ. FT.	UNIFIED SOIL CLASSIFICATION	
0'						Black slightly sandy fat clay (moist and stiff)
5'						Brown slightly sandy medium to fat clay
10'						Light brown and gray weathered shale (moist and dense)
						Same but in place material (moist and fairly hard)
15'						
20'						
25'						No water.

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