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GEOTECHNICAL ENGINEERING REPORT
CLEARWATER BLUFFS – CITY HALL SITE
NWC OF PIERCE ST & S OSCEOLA AVE
CLEARWATER, FLORIDA 33756

UES PROJECT NO.:1185.2200232.0000
UES REPORT NO.: 16830

Prepared For:

Gotham Organization & The DeNunzio Group
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January 6, 2023

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January 6, 2023

Gotham Organization & The DeNunzio Group
432 Park Avenue South, 2nd Floor
New York, NY 10016

Attention: Mr. Matt Pickett

Reference: **GEOTECHNICAL ENGINEERING REPORT**
Clearwater Bluffs – City Hall Site
NWC of Pierce St & S Osceola Ave
Clearwater, Florida 33756
UES Project No.: 1185.2200232.0000
UES Report No.: 16830

Dear Mr. Pickett:

Universal Engineering Sciences, Inc. (UES) has completed the subsurface exploration for the above referenced project. The scope of our exploration was planned in conjunction with and authorized by you.

This report contains the results of our exploration, an engineering interpretation of these results with respect to the project characteristics described to us, and recommendations to aid in foundation, grade slab, and pavement design, and site preparation.

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,

UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization Number 549

SURENDRA V. SAGI
LICENSE
No. 74096
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William (Trey) Pippin, E.I.
Staff Engineer

Surendra V. Sagi, P.E
Principal Engineer

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1.0 INTRODUCTION

1.1 GENERAL

In this report, we present the results of the subsurface exploration for the proposed development. A general location plan of the project appears in Appendix A: Site Location Plan. We have divided this report into the following sections:

- SCOPE OF SERVICES - Defines what we did
- FINDINGS - Describes what we encountered
- RECOMMENDATIONS - Describes what we encourage you to do
- LIMITATIONS - Describes the restrictions inherent in this report
- APPENDICES - Presents support materials referenced in this report.

2.0 SCOPE OF SERVICES

2.1 PROJECT DESCRIPTION

The project under consideration involves the design and construction of two (2) 26-story towers over plinth with 3 levels of parking garage below. We understand the main level finished floor elevation will be 35 feet and the lowest parking level will be 5 feet. Based on Google Earth Pro existing grades at the site are generally 31 to 32 feet

An outline for the Geotechnical Investigation dated November 16, 2022 was provided by Thorton Tomasetti. The outline showed a proposed concept plan with twelve (12) boring locations. Please note some of the boring locations had to be offset due to existing site conditions. We understand the proposed superstructure will be supported by isolated columns or individual foundation elements that are spaced approximately 30 feet x 30 feet in plan. The total service live load plus dead loads on interior columns is expected to be as high as 4,500 kips. We understand Auger Cast piles and drilled shafts are being considered for the project.

The site is located at the northwest corner of Pierce St & S Osceola Ave. At the time of drilling the site was occupied by the City Hall building and paved parking lot.

The purpose of our services is to explore and evaluate the soil conditions with respect to the planned development and provide preliminary geotechnical recommendations to aid in groundwater considerations, foundation design, and site soils preparation. **Pilot borings will be required to estimate tip depths of deep foundations.**

Our recommendations are based upon the above considerations. If any of this information is incorrect or if you anticipate any changes, inform Universal Engineering Sciences so that we may review our recommendations.

2.2 PURPOSE

The purpose of the testing was:

- To better understand the in-situ stiffness and strength of the soil;

- To interpret and review the subsurface conditions with respect to the proposed construction; and

- To provide geotechnical engineering recommendations for foundation, grade slab, and and site preparation.

Recommendations concerning other soil related considerations were beyond the scope of our exploration. This report presents an evaluation of site conditions on the basis of traditional geotechnical procedures for site characterization.

2.3 FIELD EXPLORATION

The subsurface conditions were explored by drilling and sampling twelve (12) Standard Penetration Test (SPT) borings (B-1 through B-12) to depths of 45 to 110 feet below the existing ground surface (bgs). The borings were located in the field by estimating distances from known site reference points. The approximate test locations are shown on the attached Boring Location Plan in Appendix A.

The Standard Penetration Test borings were performed with a drill rig utilizing mud rotary procedures according to the procedures of ASTM D-1586, with continuous sampling performed above a depth of 10 feet, to detect slight variations in the soil profile at shallow depths, and then at five-foot intervals thereafter. The basic procedure for the Standard Penetration Test is as follows: A standard split-barrel sampler is driven into the soil by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler 1-foot, after seating 6 inches, is designated the penetration resistance, or N-value; this value is an index to soil strength and consistency.

3.0 FINDINGS

3.1 SITE CONDITIONS

The site is located at the northwest corner of Pierce St & S Osceola Ave. At the time of drilling the site was occupied by the City Hall building and paved parking lot. The ground surface at the site was relatively level.

3.2 SOIL SURVEY-PUBLISHED INFORMATION

The “Soil Survey of Pinellas County, Florida”, published by the United States Department of Agriculture (USDA) - Soil Conservation Service (SCS), was reviewed for general near-surface soil information prior to development within the general project vicinity. The USDA, SCS primary soil mapping groups within the proposed project area, and some characteristics and properties are summarized below. The location of these groups can be observed on the SCS Soil Survey Map provided in the Appendix A.

Urban Land (Soil Group No. 30): Under natural conditions, this soil group consists of areas where most of the soil surface is covered with impervious materials, such as shopping malls, large parking lots, large commercial buildings, highways, and large industrial areas.

3.3 SUBSURFACE CONDITIONS

The approximate boring location and more detailed subsurface conditions are illustrated in Appendix A: Boring Location Plan and Soil Boring Profiles. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples. Also, see Appendix A: Soils Classification Chart, for further explanation of the symbols

and placement of data on the Boring Logs. The following table summarizes the typical soil conditions encountered in the borings.

TABLE 1
General Soil Profile

Typical depth (ft)		Soil Descriptions
From	To	
0	12	Very loose to medium dense fine sand to fine sand with silt [SP/SP-SM]
12	37 to 52	Loose to medium dense clayey sand [SC]; Very soft to hard sandy clay [CL/CH]; Stiff to hard sandy clay with rock fragments [CL]
37 to 52	110*	Weathered limestone with calcareous clay

* Termination Depth of Deepest Boring
[ ] Bracketed Text Indicates: Unified Soil Classification

Variations in the depth, thickness and consistency of the aforementioned soil strata occurred at the individual test boring locations. Groundwater was not apparent in the borings at the time of drilling due to mud rotary drilling techniques and introducing drilling fluid into the boring at a depth of 10 feet bgs.

4.0 RECOMMENDATIONS

4.1 GENERAL

The recommendations herein are made based upon a review of the attached soil test data, our understanding of the proposed construction, and experience with similar projects and subsurface conditions. If the assumed structural loadings, building locations, building sizes, or grading plans change or are different from those discussed previously, we request the opportunity to review and possibly amend our recommendations with respect to those changes.

Additionally, if subsurface conditions are encountered during construction which was not encountered in the borings, report those conditions immediately to us for observation and recommendations.

In this section of the report, we present our detailed recommendations for groundwater control, building foundations, and site preparation.

4.2 GROUNDWATER CONSIDERATIONS

Groundwater was not apparent in the borings at the time of drilling due to mud rotary drilling techniques and introducing drilling fluid into the boring at a depth of 10 feet bgs. The normal seasonal high groundwater table (SHGWT) typically occurs in the August-September period at the end of the rainy season. The seasonal high groundwater level is affected by a number of factors, such as drainage characteristics of the soils; land surface elevation, relief points (i.e. drainage ditches, lakes, rivers, swampy areas) and distance to relief points.

We recommend temporary piezometers to be installed and monitored by UES to estimate the SHGWT and evaluate tidal influence on groundwater at the site.

We recommend that the contract documents provide for determining the groundwater level just prior to construction and for any dewatering measures, which might be required. We recommend that the groundwater table be maintained at least 18 inches below all earthwork and compaction surfaces.

4.3 FOUNDATION RECOMMENDATIONS

In the following sections, we have provided recommendations for support of the building with Drilled Shaft or Augercast Pile Foundation systems. Pilot borings will need to be performed to estimate tip depths for deep foundations.

4.3.1 Drilled Shafts

Computations were made by using a static analysis method to estimate allowable capacity of a 24, 30, 36, 42, 48, 54, 60 and 72-inch diameter shafts based on rock socket lengths. Additional Drilled Shaft sizes can be provided upon request by Structural Engineer of Record. Based on these analyses, recommended rock socket lengths and allowable load per drilled shaft were developed and are presented in the following table. These allowable values include a factor of safety of 2.0 for compression and 2.0 for uplift against computed ultimate value.

Table 2
Drilled Shaft Foundation Recommendations

Type	Size	*Rock Socket Lengths	Allowable Axial Load Capacity (F.S. = 2.0)	Allowable Uplift Capacity (F.S. = 2.0)	**Lateral Capacity ($1/2$ inch top deflection)
Drilled Shaft	24" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet	157 tons 236 tons 314 tons 393 tons 471 tons	126 tons 188 tons 251 tons 314 tons 377 tons	**25 tons
	30" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet	196 tons 294 tons 393 tons 491 tons 589 tons 687 tons	157 tons 236 tons 314 tons 393 tons 471 tons 550 tons	**35 tons
	36" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet 40 feet	236 tons 353 tons 471 tons 589 tons 707 tons 824 tons 942 tons	188 tons 283 tons 377 tons 471 tons 565 tons 659 tons 754 tons	**50 tons
	42" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet 40 feet 45 feet	275 tons 412 tons 550 tons 687 tons 824 tons 942 tons 1099 tons 1236 tons	220 tons 330 tons 440 tons 550 tons 659 tons 754 tons 879 tons 989 tons	**70 tons

Table 2 (continued) Drilled Shaft Foundation Recommendations					
Type	**Size**	***Rock Socket Lengths**	**Allowable Axial Load Capacity (F.S. = 2.0)**	**Allowable Uplift Capacity (F.S. = 2.0)**	****Lateral Capacity ($^1/_2$ inch top deflection)**
Drilled Shaft	48" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet 40 feet 45 feet 50 feet 55 feet	314 tons 471 tons 628 tons 785 tons 942 tons 1099 tons 1256 tons 1413 tons 1570 tons 1727 tons	251 tons 377 tons 502 tons 628 tons 754 tons 879 tons 1005 tons 1130 tons 1256 tons 1382 tons	**90 tons
	54" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet 40 feet 45 feet 50 feet 55 feet 60 feet	353 tons 530 tons 707 tons 883 tons 1060 tons 1236 tons 1413 tons 1590 tons 1766 tons 1943 tons 2120 tons	283 tons 424 tons 565 tons 707 tons 848 tons 989 tons 1130 tons 1272 tons 1413 tons 1554 tons 1696 tons	**110 tons
	60" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet 40 feet 45 feet 50 feet 55 feet 60 feet	393 tons 589 tons 785 tons 981 tons 1178 tons 1374 tons 1570 tons 1766 tons 1963 tons 2159 tons 2355 tons	314 tons 471 tons 628 tons 785 tons 942 tons 1099 tons 1256 tons 1413 tons 1570 tons 1727 tons 1884 tons	**140 tons
	72" Diameter	10 feet 15 feet 20 feet 25 feet 30 feet 35 feet 40 feet 45 feet 50 feet 55 feet 60 feet	471 tons 707 tons 942 tons 1178 tons 1413 tons 1649 tons 1884 tons 2120 tons 2355 tons 2591 tons 2826 tons	377 tons 565 tons 754 tons 942 tons 1130 tons 1319 tons 1507 tons 1696 tons 1884 tons 2072 tons 2261 tons	**200 tons

*** Pilot borings are required to estimate the production shaft tip depths/elevations due to the variability of competent rock varying from approximately 40 to 55 feet below grade.**
**** Fixed head condition. Top of pile was assumed at 25 feet below existing grade. Lateral capacities were analyzed with a 20 foot rock socket, 2% Steel and corresponding allowable axial compression loads.**

4.3.3.1 Drilled Shaft Installation

The previously recommended allowable pile resistance values are estimates based on anticipated installation techniques, the subsurface conditions at the site, and our experience in the area. Significant movement of a pile may be necessary to develop the full shear strength of the soil. Pilot borings are required to estimate the production shaft tip depths/elevations. The magnitude of this movement may not be compatible with the desired structural "fixity", and allowable deflection may become the governing criterion for capacity rather than the ultimate shear strength of the soil. This is particularly true for piles subjected to uplift. Based on our experience, the previously recommended capacities should result in deflections tolerable to the proposed building structure.

Installation of the drilled shafts must also be monitored by a representative from UES. The auger teeth used to install the drilled shafts should have cutting teeth in good condition to prevent soil from being smeared on the shaft sidewalls. All production shafts should contain at least the neat-line volume of concrete calculated for the length of shaft installed.

Groundwater was not apparent in the borings at the time of drilling due to mud rotary drilling techniques and introducing drilling fluid into the boring at a depth of 10 feet bgs. However, depending on the design depth of the drilled shafts, and the rainfall variations, water will likely be encountered during the placement of the drilled shafts. Water in the bottom of the drilled shafts should be removed by pumping. Due to possible presence of groundwater, a temporary steel casing should be installed to the top of very stiff to hard clay or to the top of competent rock during drilling operations. Once the drilled shaft has been advanced to its designed depth the bottom of the shaft should be evaluated by a representative of UES to verify the proper diameter and that the bottom of the shaft is free of loose soil. The steel reinforcing cage should be installed upon the satisfactory evaluation of the drilled shaft excavation. The concrete should then be placed as soon as practicable to reduce the deterioration of the supporting soils due to sidewall caving and groundwater intrusion.

If the contractor elects to install the drilled shafts by 'wet' or 'slurry' methods a temporary casing may be needed in conjunction with the slurry. The slurry level should be at least a minimum of 5 feet or one shaft diameter, whichever is greater, above the groundwater level. The pH, specific gravity, and sand content of the drilling slurry should be periodically tested during the placement of the shafts. A significant change in any of these parameters during the drilling of the shafts may indicate excess soil migration into the slurry, which may settle on the bottom of the excavation and consequently result in a reduction of the allowable end bearing capacity of the drilled shafts.

We recommend a concrete compressive strength of 6,000 psi for drilled shafts. We recommend a thorough testing program for the concrete placed in drilled shafts. During concrete placement the concrete may be allowed to fall freely through the open area in the reinforcing steel cage as long as the concrete is not allowed to strike the rebar or the casing prior to reaching the bottom of the shaft. If the shafts are advanced utilizing the 'wet' method the concrete should be placed using a tremie pipe which should be placed about 1 shaft diameter above the bottom of the shaft. The bottom of the tremie pipe must be below the concrete during placement. A UES representative should be present to cast compressive representative test specimens of the concrete being placed in the drilled shafts. We recommend that at least two sets of specimens, four specimens per set, be cast per day and that at least one set of specimens be cast for every 50 cubic yards of concrete placed. Batching tickets should reference the mix approved in the specifications and show batching times. The concrete mix shall have a slump of 6 to 8 inches. Admixtures, such as super

plasticizer, may be needed to achieve this specified slump. The protective steel casing should be extracted as the concrete is being placed, however a head of concrete should be maintained above the bottom of the shaft casing to prevent soil and water intrusions into the shaft.

Buried obstructions such as debris or boulders can prevent shaft installation. If drilled shafts stop short of their design depths, it may be necessary to make backhoe explorations or one or more exploratory borings to evaluate the condition. Based on the findings, it may be necessary to add shafts. Likewise, it is possible that longer shafts may be required in some areas. Therefore, the contract documents should contain provisions for adding or deducting shaft length or installing additional shafts. Based on our experience in the area and our borings performed at the site we believe concrete intakes for drilled shaft construction could approach roughly 130% to 150% of the theoretical volume.

4.3.3.2 Drilled Shaft Load Testing

Because drilled shafts tend to be a non-redundant foundation (i.e. one shaft per column), the level of testing and inspection for the drilled shafts must be higher than with other deep foundation systems. The testing program should consist of a load test on at least one non-production shaft along with performing pilot borings at each shaft location. If it is economical, we can also discuss the possibility of performing load test on a production shaft. We have completed similar work successfully on our previous Tampa Bay projects.

We recommend bi-directional load cell load test method. The bi-directional load cell method consists of installing a hydraulic ram within or at the bottom of the drilled shaft. After sufficient concrete cure time the test is conducted. Strain gauges and accelerometers installed at various depths within the shaft are used to record internal stresses and movements of the shaft during the loading/unloading cycle.

The load test should be designed to fail the shaft, that is, the load should shear the limestone such that the ultimate side friction can be determined. Once determined, an appropriate factor of safety can be applied to obtain an allowable side friction.

Prior to installation, we recommend a pilot boring be drilled at each shaft location. The purpose of the borings is to determine the depth to competent limestone and to verify the soil and limestone competency at each shaft location. The competency of the soil and limestone is determined by comparing the results of the pilot borings with those of the test shaft. Once the test shaft and pilot boring program is completed, soil and rock socket lengths and shaft tip elevations are determined for each shaft. This also allows the contractor to construct reinforcing cages prior to drilling the shafts.

<u>Drilled Shaft Construction Considerations</u>

The drilled shaft construction will include the installation of temporary casing. Reinforcing steel for the shafts should be designed to extend full length to allow the steel to be properly placed in the shaft and to aid in the development of the required tension resistance.

We recommend that shafts be placed no closer than 3 diameters from center to center and that adjacent shafts not be installed within 24 hours of each other.

Tensile reinforcement should extend to the bottom of shafts subjected to uplift loading. Buoyant unit weights of the soil and concrete should be used in the calculations below the highest anticipated groundwater elevation.

Drilled shafts should have a minimum (center-to-center) spacing of three diameters. Closer spacing may require a reduction in axial load capacity. Axial capacity reduction can be determined by comparing the allowable axial capacity determined from the sum of individual piles in a group versus the capacity calculated using the perimeter and base of the pile group acting as a unit. The lesser of the two capacities should be used in design.

Drilled Shaft Inspection and Quality Control

The construction of every drilled shaft will need to be evaluated during construction by UES Geotechnical Engineer or his/her field representative. Upon completion of the drilled shaft excavations, a flat bottom bailing cleanout bucket shall be used to remove all loose material from the bottom of the drilled shaft. The cleanliness of the sgaft bottom may be verified by a weighted tape sounding. Additional inspection should include monitoring the concrete placement, inspection of reinforcing cages and placement, and confirm soil conditions.

4.3.2 Augercast piles (Alternative)

We believe the proposed structure can be supported on round augercast piles embedded into the weathered limestone layer to an average depth of 60 to 80 feet below the existing ground surface.

The borings performed at the site lost drilling circulation at various depths in most of the borings meaning cavities are present within the limestone formation, which is fairly typical in this region of Florida. Based on our experience in the area and our borings performed at the site we believe grout intakes for auger cast piles could approach roughly 200% or more of the theoretical volume. Expect difficult drilling during augercast pile installation into the weathered limestone below a depths of 35 to 55 feet bgs. The drilling equipment should be capable of penetrating weathered limestone.

Pile computations were made by using a static analysis method to estimate allowable capacity of a 16-, 18, 20, and 24-inch round auger cast piles bearing at depths of 60 to 80 feet below existing grade. Based on these analyses, a recommended embedment depth and allowable load per pile were developed and are presented in the Table 3. These allowable values include a factor of safety of 2.0 for compression and 2.0 for uplift against computed ultimate values.

TABLE 3 Pile Foundation Recommendations					
Pile Type	**Size (Dia)**	*** Average Embedment Depth Below Existing Grade**	**Allowable Axial Load Capacity (F.S. = 2.0)**	**Allowable Uplift Capacity (F.S. = 2.0)**	****Lateral Capacity ($^1/_2$ inch top deflection)**
Auger Cast	16"	60 to 80 feet*	180 tons	108 tons	**13 tons
	18"	60 to 80 feet*	230 tons	138 tons	**17 tons
	20"	60 to 80 feet*	280 tons	168 tons	**20 tons
	***24"	60 to 80 feet*	475 tons	190 tons	**25 tons

*** Depth below the existing ground surface at time of this exploration. The pile length would have to be increased as necessary to accommodate the fill height above existing grade. Pilot borings are required at each pile cap location to estimate tip depths/elevations for production due to the variability of competent rock varying from approximately 40 to 55 feet below grade.**
**** Fixed head condition. Top of pile was assumed at 25 feet below existing grade. Lateral capacities were analyzed with a 20 foot rock socket, 2% Steel and corresponding allowable axial compression loads.**
*****7,000 psi concrete compressive strength**

We recommend a grout compressive strength of at least 6,000 psi for augercast piles. The allowable capacity of pile groups can be taken as the sum of the allowable load capacities of the individual piles in the group, provided the piles are separated by a minimum center to center spacing of 3 pile diameters. The pile embedment depth and capacities indicated are based on a theoretical analysis. For 16 to 20 inch piles, a static load test will be required according to the procedures of ASTM D-1143 to verify the pile capacity. For 24 inch piles, a AFTbi-directional load test will be required similar to the load test recommended in the Drilled Shaft Section 4.3.3.2.

Auger-cast piles shall be installed using a hydraulically powered, continuous flight auger, mounted on hanging or swinging leads, suspended from a crane. After drilling is commenced, the auger shall be advanced at a steady rate, without stalling or overloading the power source.

Upon reaching the required depth, the auger shall be raised about 2 feet, while slow positive rotation is allowed. The grout pump shall then be started and pressure shall be built up until the stopper in the discharge outlet at the tip of the auger, is ejected. Pumping shall be continued until a volume equivalent to about 2 feet of pile shaft has been discharged, at which time the auger shall be re-lowered to the original depth.

Upon reaching the original depth, sufficient grout shall be pumped in, while continuing the auger rotation, to create a 3- to 5-foot head of grout above the tip of the auger. This grout head shall be maintained for the duration of the grout placement at each pile location.

After the grout head is established, extraction shall be commenced at a rate consistent with grout supply, maintaining positive rotation of the auger, to retain the drilling spoil and to ensure that the grout fills the entire cross-section. At all times, the volume of grout pumped shall be greater than the theoretical column of the hole created by withdrawal of the auger.

Sequencing of the construction of the auger-cast piles shall be planned such that an individual pile is not installed adjacent to a freshly grouted pile. A minimum of 24 hours shall elapse prior to the construction of a pile, located adjacent to a previously constructed pile, which lies closer than 5 feet to the previously constructed pile.

The drilling and grouting of each pile shall be performed as a continuous operation. The auger flights shall be advanced at a steady rate, without stalling. Moreover, the power source shall have sufficient rotary capacity to minimize the volume of soil brought to the surface by the augers, as they are advanced to the design pile depth. This is necessary to minimize the consequent decompression of the soils, which occurs when the augers withdraw excess soil from the sides of the augered hole.

Grout shall be available for placement immediately following advancement of the augers to the design depth. Excessive rotation of the augers after achieving the design depth shall be avoided. Placement of grout shall commence within 5 minutes after advancement of the augers to the design depth, and shall be performed continuously until the pile is fully grouted.

To help assure that pile foundation systems will perform as required, we recommend that the foundation installation be monitored and reviewed by a UES geotechnical engineer of record or his representative. The installation procedures to be monitored include, but are not limited to, grout pump pressures, record number of pump strokes, sampling of grout for compressive strength and length of pile drilled.

4.3.3 Settlement Estimates

For the pile foundation recommendations provided, we estimate the total settlements of the structure to be 1 inch or less and post construction differential settlements of ½-inch or less.

4.3.4 Floor Slabs

The floor slab will be supported on compacted sand and should either be structurally isolated from the other foundation elements or monolithic floor slab adequately reinforced to prevent distress due to differential movements. For building design, we recommend using a subgrade reaction modulus of 150 pounds per cubic inch (pci) which can be achieved by compacting the subgrade soils as recommended in the site preparation procedure. We recommend the use of a sheet vapor barrier such as visqeen beneath the building slab on grade to help control moisture migration through the slab.

4.5 SITE PREPARATION

We recommend only good practice, site preparation procedures in conjunction with the densification of the upper existing subgrade soils. These procedures include: stripping the site of all existing improvements, vegetation, roots and topsoil, or unsuitable materials and compacting and proof-rolling the exposed subgrade and filling to grade with engineered fill. A more detailed synopsis of this work is as follows:

1. If required, perform remedial dewatering prior to any earthwork operations.

2. Strip the proposed construction limits of all existing improvements, vegetation, grass, roots, topsoil, organic soils, and other unsuitable or deleterious materials within and 5 feet beyond the perimeter of the proposed building and in all paved areas. Moreover, any existing and/or former below grade elements, such as foundations and utilities should be removed from the limits of the planned building and pavement areas. Resulting excavations should be replaced with compacted fill according to the recommendations provided later in this section of our report.

3. After stripping the site as outlined above in Item #2, the upper soils should be

compacted with a heavy vibratory smooth drum roller 15 tons or more with minimum 10 passes in each direction at high frequency and amplitude under the full time observation of UES geotechnical engineer of record or his representative.

4. Compact the subgrade from the surface until you obtain a minimum density of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), to a depth of 1 foot below existing grade in the building areas.

5. Test the subgrade for compaction at a frequency of not less than one test per 2,500 square feet per foot of depth improvement in the building area.

6. Place fill and backfill material, as required. The fill should consist of "clean," fine sand with less than 5 percent soil fines. You may use fill materials with soil fines between 5 and 10 percent, but strict moisture control may be required. Place fill in uniform 12-inch compacted lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density.

7. Perform in-place density tests within the fill at a frequency of not less than one test per 2,500 square feet per lift in the building areas.

8. Compact all footing subgrade to a depth of 2 feet. Additionally, we recommend that you test one out of every four column footings, and one test per every 50 lineal feet of wall footing to verify the required compaction is obtained.

Using vibratory compaction equipment at this site may disturb adjacent and other nearby structures and roadways. We recommend that you monitor adjacent and nearby structures before and during proof-compaction. If disturbance is noted, halt vibratory compaction and inform Universal Engineering Sciences immediately. We will review the compaction procedures and evaluate if the compactive effort results in a satisfactory subgrade, complying with our original design assumptions.

4.6 DOUBLE RING INFILTROMETER TEST

UES performed one (1) Double Ring Infiltrometer (DRI) test (DRI-1) at the location shown on the attached Boring Location Plan. The DRI test was performed in general accordance with ASTM D-3385. The table below shows estimated soil design parameters. The appropriate factor of safety should be applied to stormwater drainage design.

TABLE 4: Stormwater Management Soil Design Parameters

Design Parameter	Estimated Values
Test Location	DRI-1
Test Depth (feet)*	2
Depth of Water Table (feet)*	Unknown
Estimated Depth of SHGW Level (feet)*	Unknown
Depth of Confining Layer (feet)*	12 to 17
Fillable Porosity of Surficial in-situ sands (percent)	20
Estimated Vertical Unsaturated Infiltration Rate (feet/day)	12.5
Estimated Horizontal Hydraulic Conductivity (feet/day)	19
*Depth Below Existing Grade	

4.7 SOIL PARAMTERS FOR LATERAL RESISTANCE

The table on the following page includes soil parameters for lateral resistance of soil against footings, pile caps, and grade beams.

TABLE 5
Soil Design Parameters

Location	*Typical Depth (ft)		Dry Unit Weight (pcf)	Effective Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (ksf)	Recommended Earth Pressure Coefficients		
	From	To					At Rest K_O	Active K_A	Passive K_P
All Borings	0	12	105	43	29	0	.52	.347	2.88
	12	27	120	58	0	1.5	1.00	1.00	1.00
	27	40	125	63	0	2.5	1.00	1.00	1.00
*Approximate depth below grade at the time of boring									

4.8 EARTH RETAINING STRUCTURES

Earth pressures on retaining walls are influenced by the structural design of walls, conditions of wall restraint, construction methods, and the strength of the materials being restrained. The most common conditions assumed for earth retaining wall design are the active and at-rest conditions.

Active conditions apply to relatively flexible earth retention structures, such as freestanding walls, where some movement and rotation may occur to mobilize shear strength. Walls which are rigidly restrained should be designed for the at-rest condition. However, if the walls will be backfilled before they are braced, they should also be designed to withstand active earth pressures as self-supporting cantilever walls. The wall designer must select the appropriate earth pressure based upon site and design constraints.

Development of the full active earth pressure case requires a magnitude of horizontal wall movement that often cannot be tolerated or cannot occur due to the rigidity of the wall and other design restrictions such as the impact on adjacent structures. In such cases, walls are often designed for either the at-rest condition or a condition intermediate of the active and at-rest conditions, depending on the amount of permissible wall movement.

Passive earth pressure represents the maximum possible pressure when a structure is pushed against the soil, and is used in wall foundation design to help resist active or at-rest pressures. Because significant wall movements are required to develop the passive pressure, the total calculated passive pressure is usually reduced by one-half for design purposes.

Our recommendations assume that the ground surface behind the earth retaining structures is level and that native or imported soils consisting of relatively clean sandy soils containing less than 12 percent passing the No. 200. We recommend that the soils selected for use as backfill be tested as specified prior to commencement of wall construction. Recommended soil parameters for design of earth retaining structures have been presented in Table 6 below.

TABLE 6
LATERAL EARTH PRESSURE DESIGN PARAMETERS (LEVEL BACKFILL)*

Design Parameter	Recommended Value
At-rest Earth Pressure Coefficient, Ko	0.50
Active Earth Pressure Coefficient, Ka	0.33
Passive Earth Pressure Coefficient, Kp	3.0
Moist Unit Soil Weight (pcf)	115 for SP, SP-SM
Submerged Unit Weight of Soil (pcf)	52
Coefficient of Friction (sliding)	0.4
Angle of Internal Friction, ϕ	30

Table Notes:
* For sloping backfill the table values must be adjusted.
**Hydrostatic pressure should be accounted for based on seasonal high water table estimates and oth
site drainage
considerations

Positive wall drainage must be provided for all earth retaining structures to prevent the build-up of excess hydrostatic pressures. These drainage systems can be constructed of open-graded washed stone isolated from the soil backfill with a geosynthetic filter fabric and drained by perforated pipe, or with one of several wall drainage products made specifically for this application.

Lateral earth pressures arising from surcharge loading (i.e. traffic loading, building/structure loads, etc.) should be added to the above earth pressures to determine the total lateral pressure. Additional consideration must also be given for sloped backfill at the top of the wall. In each circumstance the earth pressures for active and at-rest conditions will increase based upon the amount of surcharge and angle above horizontal of the sloped backfill. Retaining walls should also be analyzed for both internal and global stability.

4.9 FILL SUITABILITY

In general, the typical criteria for determining the acceptability of a material for use as structural fill is based on the percent "fines" in the soil matrix (e.g. material passing the No. 200 sieve). The following grouping system explains more fully the suitability of various soil types with respect to the amount of fines.

Group “A”

These soils consist of clean sands which have less than 5% soil fines (Unified Soil Classification: SP, SW). These soils are the most desirable for use as engineering fill because they drain freely when excavated from beneath the groundwater table and are not as susceptible to moisture related instability.

Group “B”

These soils consist of sand with silt which contains between 5% and 12% soil fines (Unified Soil Classification: SP-SM, SP-SC). These soils are good sources of engineered fill, but require some extra care during placement and compaction. The moisture content of these soils should not be higher than 2% above optimum during placement and compaction in order to reduce the potential for moisture related instability. These soils drain fairly well, but will require some stockpiling and aeration time when excavated from below the groundwater table.

Group “C”

These soils consist of silty and clayey sands which contain between 12% and 20% soil fines (Unified Soil Classification: SM, SC). These soils are more difficult to use because they are moisture sensitive. The moisture content of these soils should be maintained at or below optimum in order to help mitigate the potential for moisture related instability during placement and compaction. Further, these soils will require significant stockpiling and aeration periods in order to reduce the moisture content if the soils are excavated from below the groundwater table. For similar reasons, we caution the use of these soils during the wet season in areas where groundwater might be encountered.

Group “D”

These soils consist of silty and clayey sands which have greater than 20% soil fines (Unified Soil Classification: SM, SC, CL, CH, ML, MH). These soils are not recommended for use as engineered fill because they will be too difficult to dry and work.

Onsite Soils

The soils in the upper 12 feet at the site were Groups A and B soils. The soils between 12 to 17 feet bgs were Group C and D soils. Below 17 feet bgs the soils encountered were Group D. Refer to the Soil Boring Profiles in Appendix A for more details.

4.5 CONSTRUCTION RELATED SERVICES

We recommend the owner retain Universal Engineering Sciences to perform construction materials tests and observations on this project. Field tests and observations include verification of foundation and pavement subgrades by monitoring proof-rolling operations and performing quality assurance tests on the placement of compacted structural fill and pavement

courses.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address problems that might arise during construction in a timely and cost-effective manner.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of Gotham Organization & The DeNunzio Group and other designated members of their design/construction team associated with the proposed construction for the specific project discussed in this report. No other site or project facilities should be designed using the soil information contained in this report. As such, UES will not be responsible for the performance of any other site improvement designed using the data in this report.

This report should not be relied upon for final design recommendations or professional opinions by unauthorized third parties without the expressed written consent of UES. Unauthorized third parties that rely upon the information contained herein without the expressed written consent of UES assume all risk and liability for such reliance.

The recommendations submitted in this report are based upon the data obtained from the soil testing performed at the locations indicated on the Boring Location Plan and from other information as referenced. This report does not reflect any variations which may occur between the test locations. The nature and extent of such variations may not become evident until the course of construction. If variations become evident, it will then be necessary for a re-evaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of the variations.

Borings and test locations for a typical geotechnical report are widely spaced and generally not sufficient for reliably detecting the presence of isolated, anomalous surface or subsurface conditions, or reliably estimating unsuitable or suitable material quantities. Accordingly, UES does not recommend relying on our subsurface information for estimation of material quantities unless our contracted services specifically include sufficient exploration for such purpose(s) and within the report we so state that the level of exploration provided should be sufficient to detect anomalous conditions or estimate such quantities. Therefore, UES will not be responsible for any extrapolation or use of our data by others beyond the purpose(s) for which it is applicable or intended.

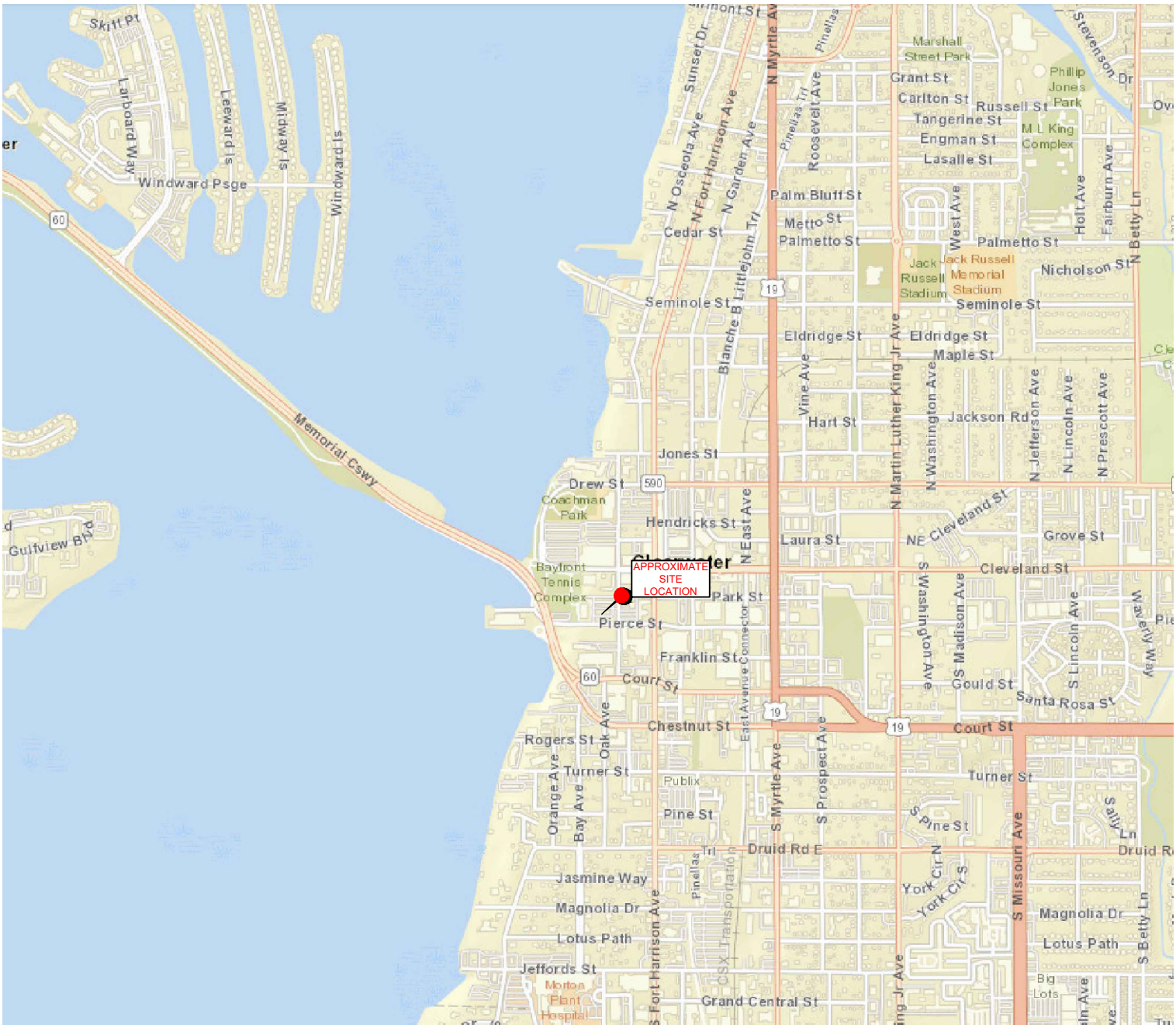
All users of this report are cautioned that there was no requirement for UES to attempt to locate any man-made buried objects or identify any other potentially hazardous conditions that may exist at the site during the course of this exploration. Therefore no attempt was made by UES to locate or identify such concerns. UES cannot be responsible for any buried man-made objects or environmental hazards which may be subsequently encountered during construction that are not discussed within the text of this report. We can provide this service if requested.

During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. A Geoprofessional Business Association (GBA), "Important Information About Your Geotechnical Engineering Report" appears in Appendix B, and will help explain the nature of

geotechnical issues.

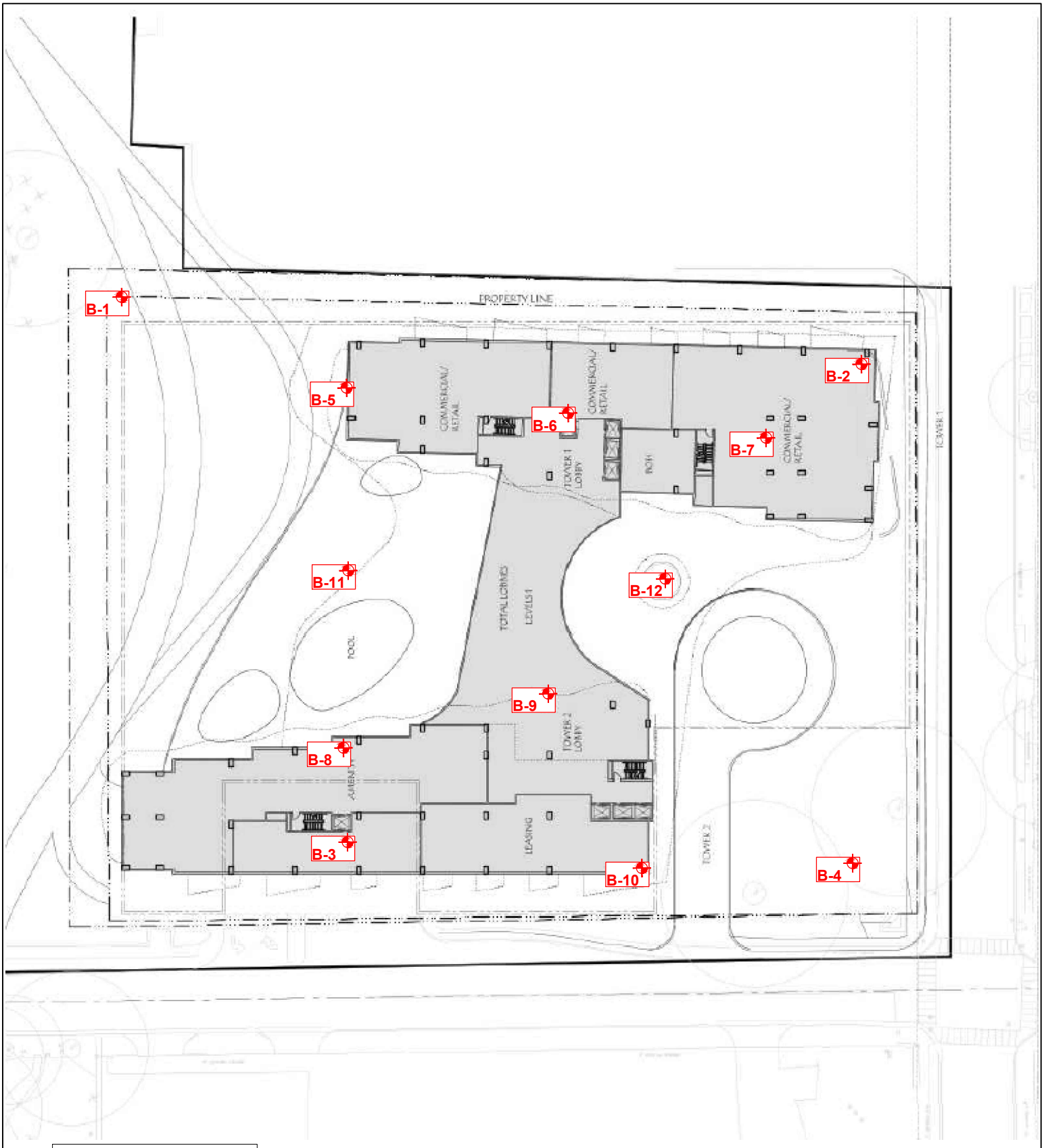
Further, we present documents in Appendix B: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

APPENDIX A



N

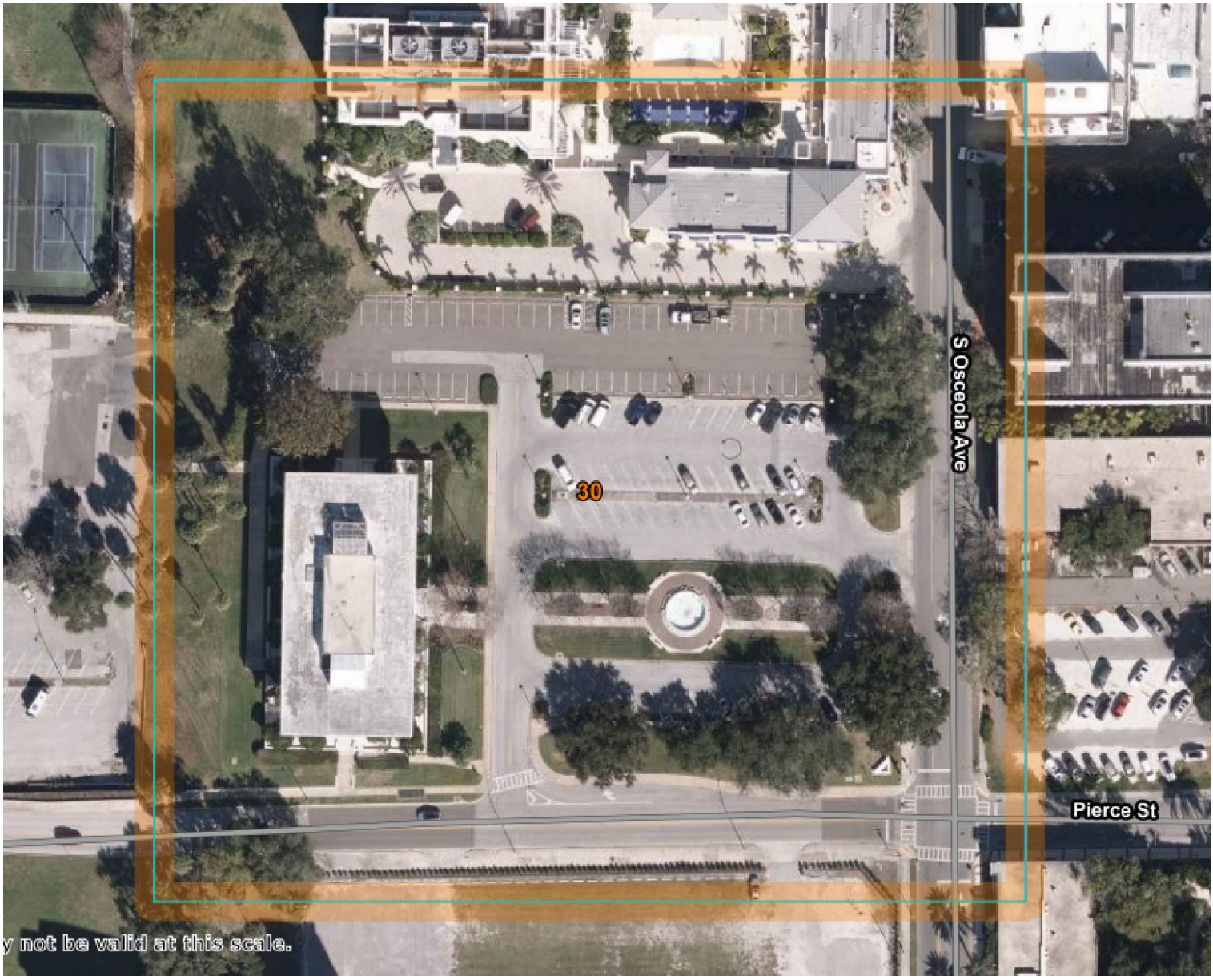
A-1	**SITE LOCATION PLAN** OBTAINED FROM USGS 2022	PROPOSED CLEARWATER BLUFFS – CITY HALL SITE NWC OF PIERCE ST & S OSCEOLA AVE CLEARWATER, FL	PROJECT NO: 1185.2200232.0000 REPORT NO: 16830 SCALE NOT TO SCALE		UNIVERSAL ENGINEERING SCIENCES LLC 1748 INDEPENDENCE BLVD. SARASOTA, FL. 941-358-7410



LEGEND	
APPROXIMATE LOCATION	
⌖	SPT BORING

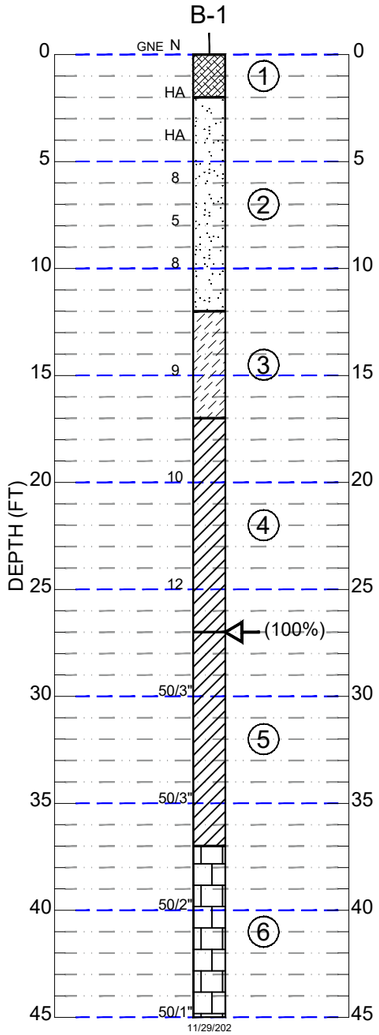
N

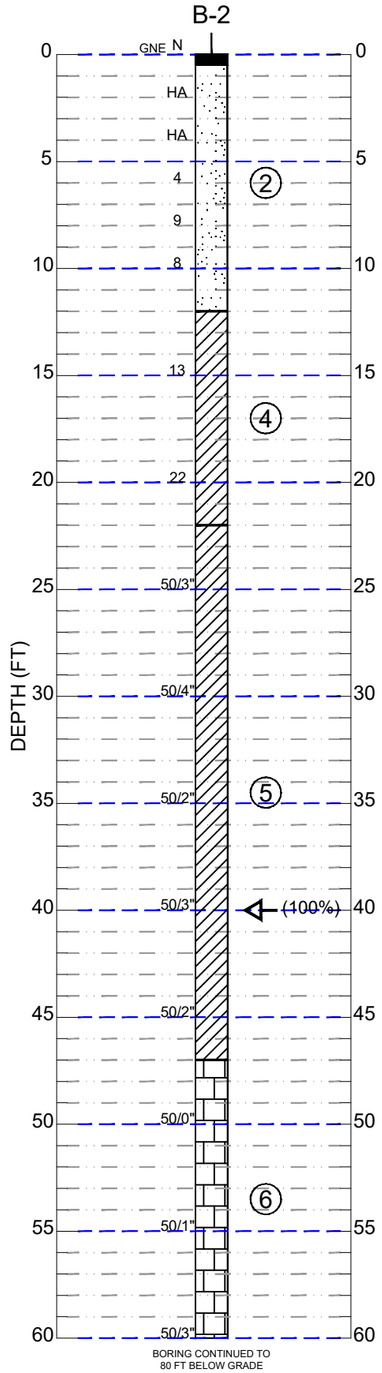
A-2	**BORING LOCATION PLAN** THIS MAP SHOWS APPROXIMATE LOCATION	PROPOSED CLEARWATER BLUFFS – CITY HALL SITE NWC OF PIERCE ST & S OSCEOLA AVE CLEARWATER, FL	PROJECT NO: 1185.2200232.0000 REPORT NO: 16830 SCALE NOT TO SCALE		UNIVERSAL ENGINEERING SCIENCES LLC 1748 INDEPENDENCE BLVD. SARASOTA, FL. 941-358-7410

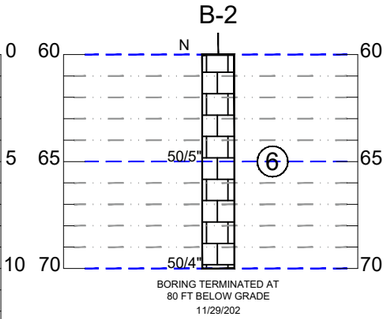


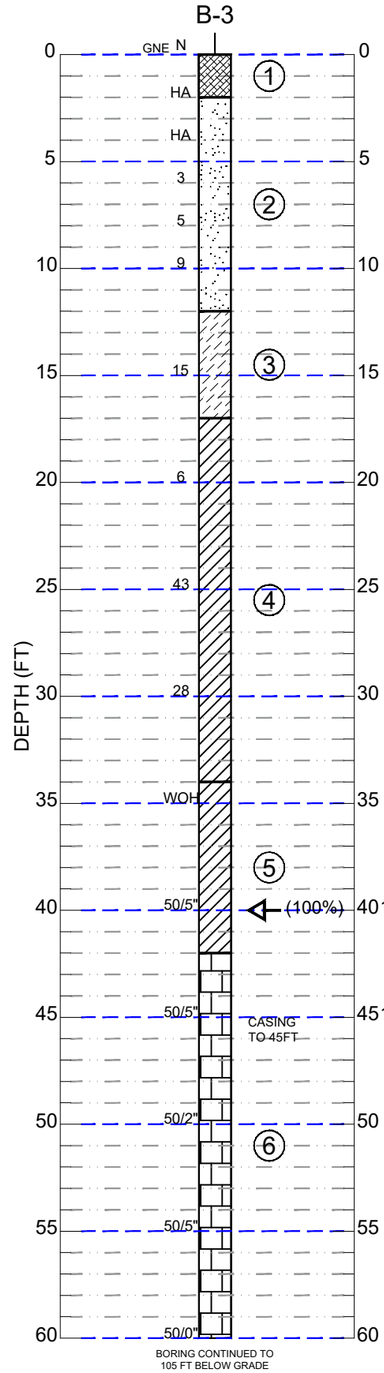
N

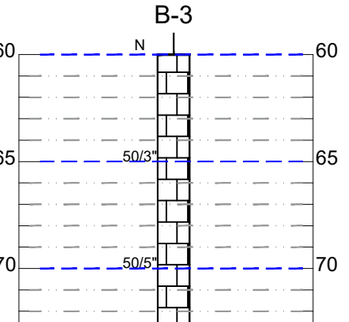
A-3	**SCS SOIL SURVEY MAP** OBTAINED FROM WEB SOIL SURVEY 2022	PROPOSED CLEARWATER BLUFFS – CITY HALL SITE NWC OF PIERCE ST & S OSCEOLA AVE CLEARWATER, FL	PROJECT NO: 1185.2200232.0000 REPORT NO: 16830 SCALE NOT TO SCALE	UNIVERSAL ENGINEERING SCIENCES LLC 1748 INDEPENDENCE BLVD. SARASOTA, FL. 941-358-7410

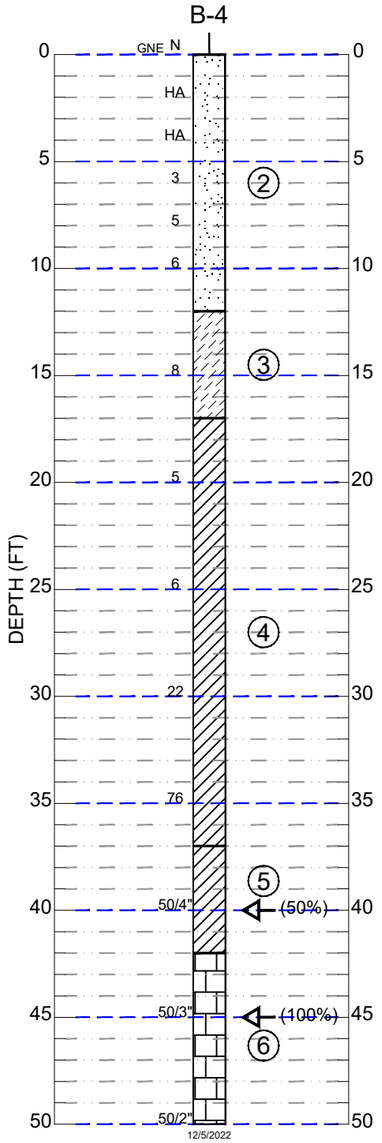












SOIL LEGEND

1. Dark brown fine sand with silt shell and rock fragments (FILL)
2. Brown to gray fine sand to fine sand with silt (SP/SP-SM)
3. Gray clayey sand (SC)
4. Olive sandy clay (CL/CH)
5. Gray sandy clay with rock fragments (CL)
6. Weathered limestone with calcareous clay

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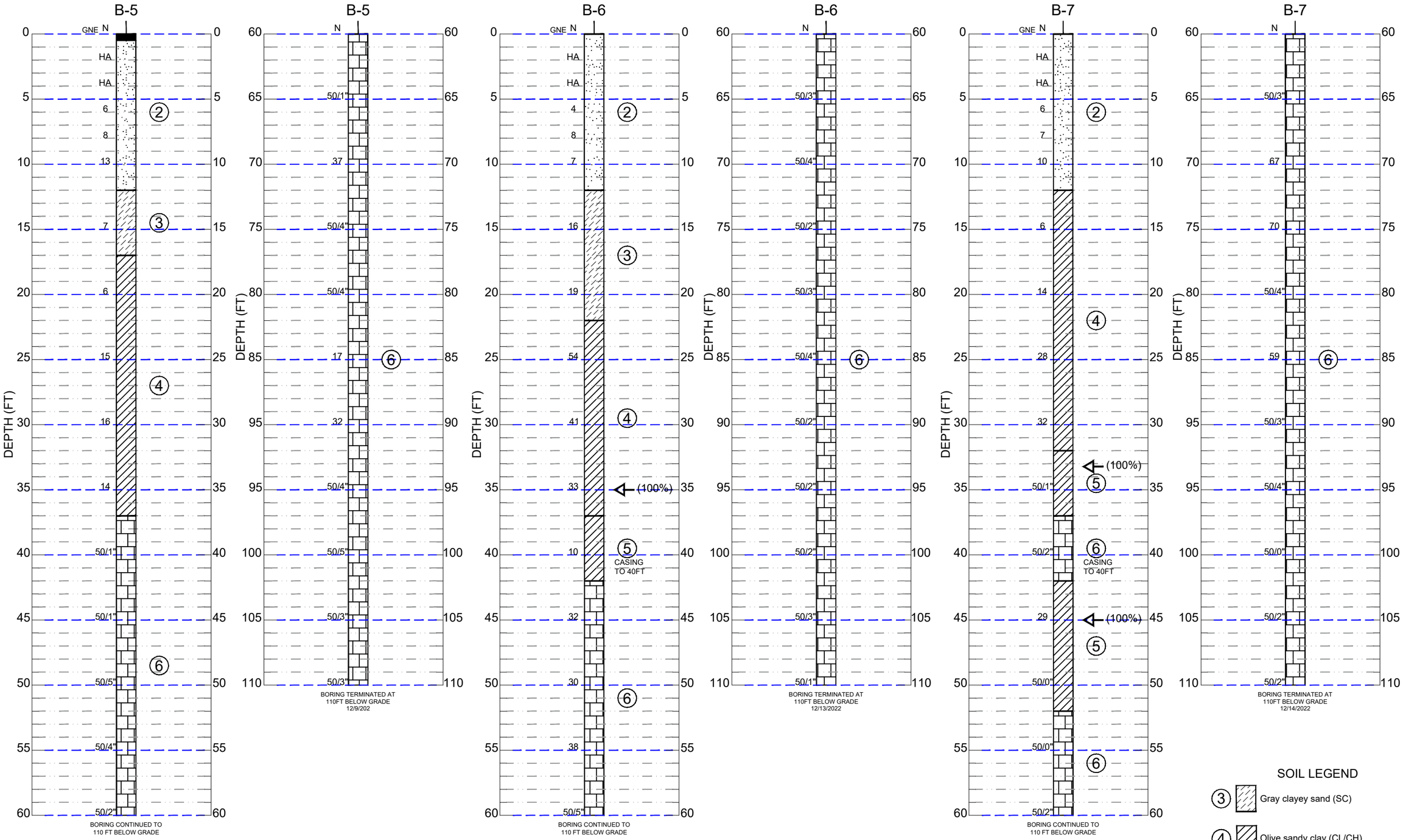
CLEARWATER, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4



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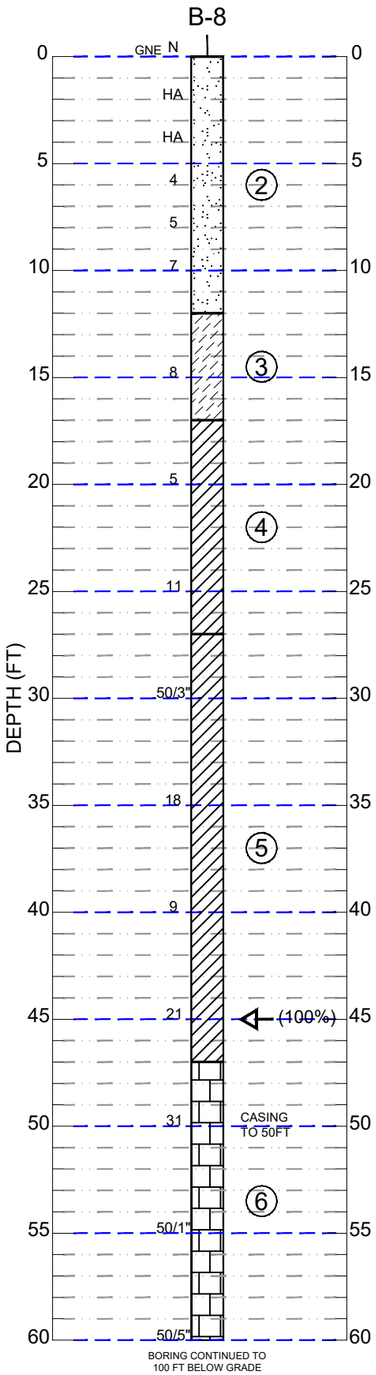
CLEARWATER, FL

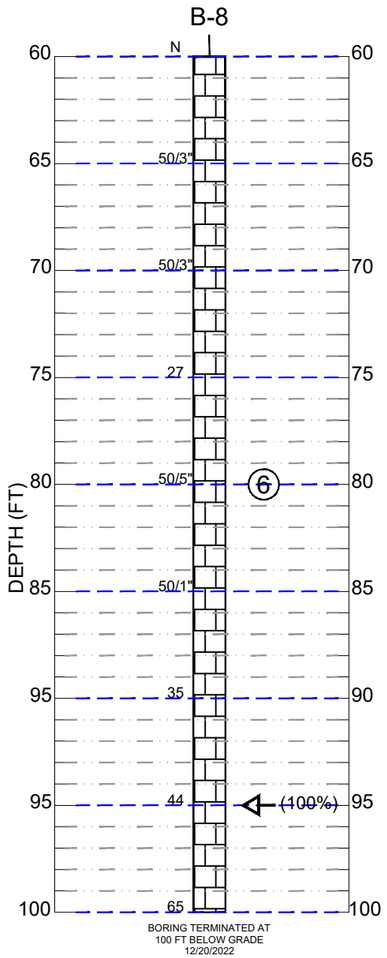
SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.1



BORING CONTINUED TO
100 FT BELOW GRADE



BORING TERMINATED AT
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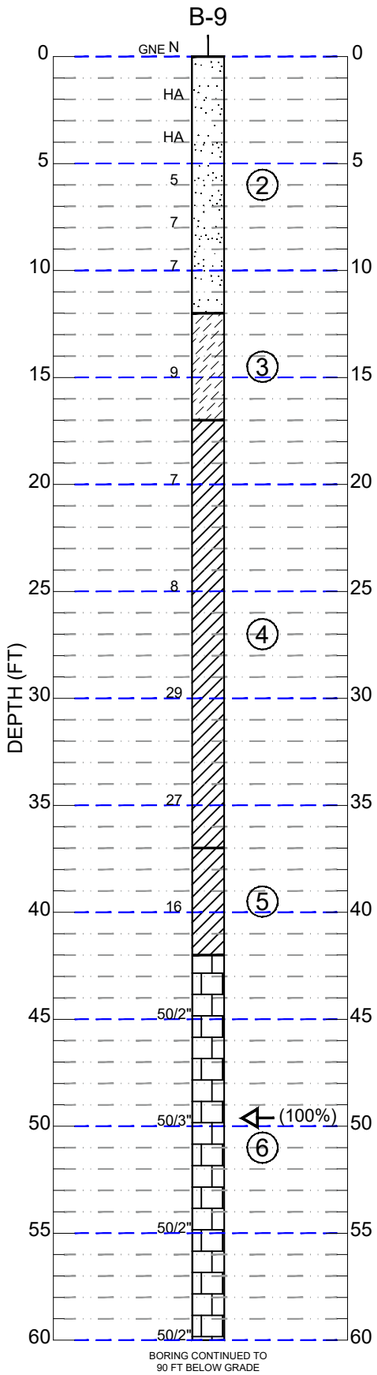
12/20/2022



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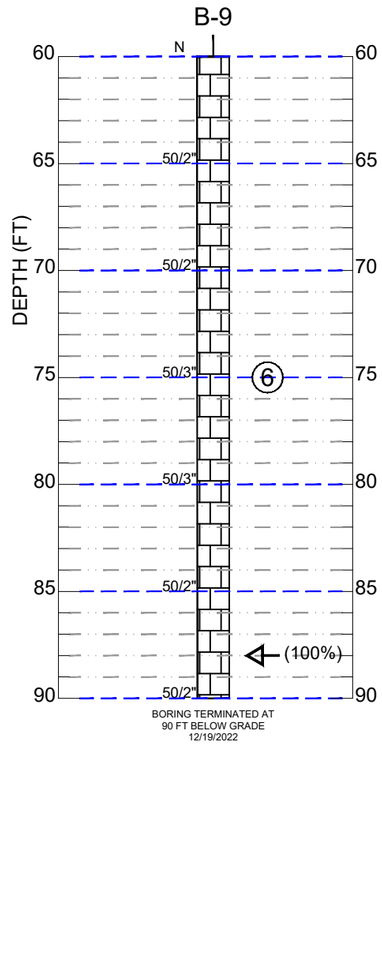

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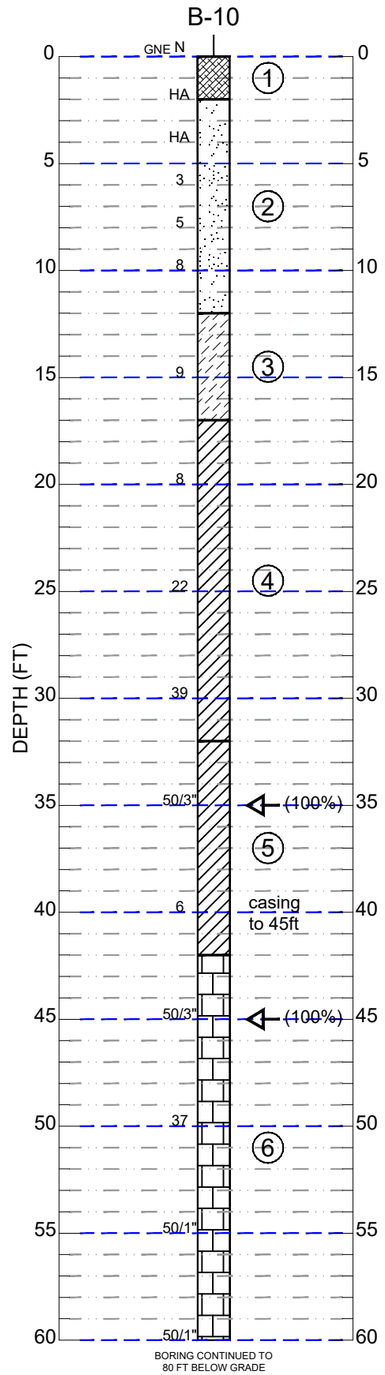
12/19/2022



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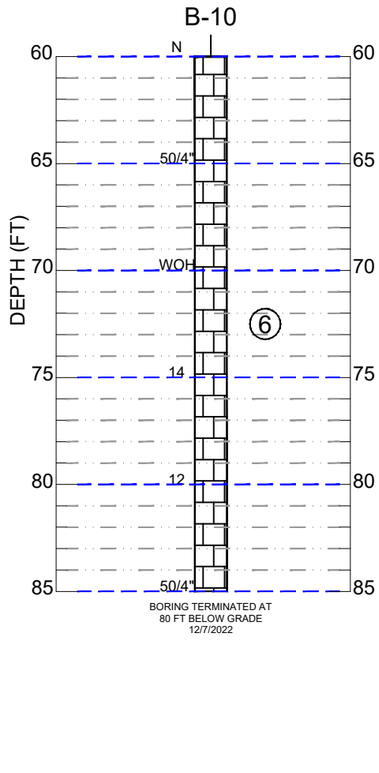

BORING TERMINATED AT
80 FT BELOW GRADE
12/7/2022

SOIL LEGEND

1. Dark brown fine sand with silt shell and rock fragments (FILL)
2. Brown to gray fine sand to fine sand with silt (SP/SP-SM)
3. Gray clayey sand (SC)
4. Olive sandy clay (CL/CH)
5. Gray sandy clay with rock fragments (CL)
6. Weathered limestone with calcareous clay

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PROPOSED CLEARWATER BLUFFS – CITY HALL SITE
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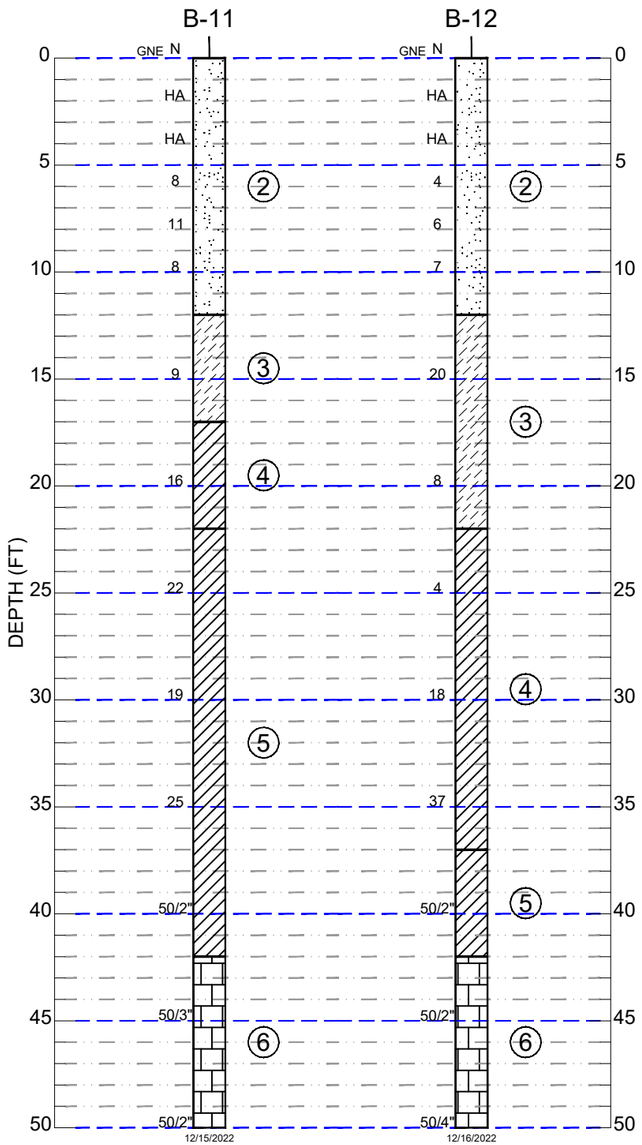
CLEARWATER, FL

SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED.

A-4.2



LEGEND

[SP]	UNIFIED SOIL CLASSIFICATION SYSTEM GROUP SYMBOL (ASTM D2487) .BASED ON VISUAL OBSERVATION AND LABORATORY TEST.
N	STANDARD PENETRATION RESISTANCE (N-VALUE) IN BLOWS PER FOOT (ASTM D1586)
HA	HAND AUGER
	GROUND WATER LEVEL MEASURED ON DATE DRILLED
	SEASONAL HIGH WATER LEVEL
GNE	GROUNDWATER LEVEL NOT ENCOUNTERD
(%)	LOSS OF CIRCULATION (%)
-200	FINES PASSING NO. 200 U.S. STANDARD SIEVE (%)
WOH	WEIGHT OF HAMMER
WOR	WEIGHT OF ROD
50/1"	50 BLOWS FOR 1 INCH
OC	ORGANIC CONTENT (%)
MC	NATURAL MOISTURE CONTENT (%)
PI	PLASTICITY INDEX (%)
LL	LIQUID LIMIT (%)
NP	NON PLASTIC
UCS	UNCONFINED COMPRESSION STRENGTH

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

COARSE-GRAINED SOILS-SANDS		FINES - CLAY AND SILT	
CONSISTENCY DESIGNATION	SPT N(BLOWS/FT)	CONSISTENCY DESIGNATION	SPT N(BLOWS/FT)
VERY LOOSE	0-4	VERY SOFT	0-1
LOOSE	5-10	SOFT	2-3
MEDIUM DENSE	11-30	MEDIUM STIFF	4-7
DENSE	31-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	16-31
		HARD	32-50
		VERY HARD	>50

SOIL LEGEND

1. Dark brown fine sand with silt shell and rock fragments (FILL)
2. Brown to gray fine sand to fine sand with silt (SP/SP-SM)
3. Gray clayey sand (SC)
4. Olive sandy clay (CL/CH)
5. Gray sandy clay with rock fragments (CL)
6. Weathered limestone with calcareous clay

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SOIL BORING PROFILES

ALL SOIL BORING TEST ARE APPROXIMATE. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED

A-4.3

UNIVERSAL ENGINEERING SCIENCES
9802 Palm River Road
Tampa, Florida 33619

(813) 740-8506

SOIL CLASSIFICATION CHART

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

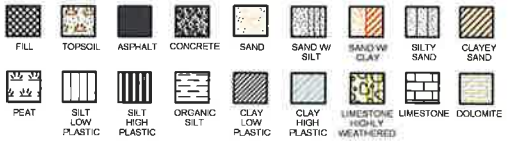
GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

2. Surface elevations are based on topographic maps and estimated locations.

3. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not guaranteed to be representative of subsurface conditions at other locations or times.

SOIL SYMBOLS



OTHER SYMBOLS

▼ Measured Water Table Level

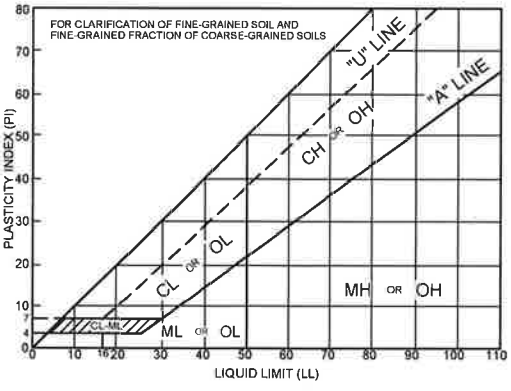
▽ Estimated Seasonal High Water Table

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 / Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-silt mixtures	Atterberg limits above "A" line or P.I. greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly-graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 / Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or P.I. greater than 7
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Silts and Clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and Clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, organic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly Organic Soils		Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:
Less than 5 percent..... GW, GP, SW, SP
More than 12 percent..... GM, GC, SM, SC
5 to 12 percent..... Borderline cases requiring dual symbols*

Particle Size	Sieve sizes	mm	Material
	< #200	< 0.074	Silt or clay
	#200 to #40	0.074 to 0.42	Sand
	#40 to #10	0.42 to 2.00	Fine
	#10 to #4	2.00 to 4.76	Medium

Particle Size	Sieve	mm	Material
	#4 to 3/4 in.	4.76 to 19.1	Gravel
	3/4 in. to 3 in.	19.1 to 76.2	Fine
	3 in. to 12 in.	76.2 to 304.8	Coarse
	12 in. to 36 in.	304.8 to 914.4	Cobble
			Boulders



Plasticity Chart

* When the percent passing a No. 200 sieve is between 5% and 12%, a dual symbol is used to denote the soil. For example; SP-SC, poorly-graded sand with clay content between 5% and 12%.

APPENDIX B

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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CONSTRAINTS AND RESTRICTIONS

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until construction begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other explorations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

Universal Engineering Sciences, LLC
GENERAL CONDITIONS

SECTION 1: RESPONSIBILITIES **1.1** *Universal Engineering Sciences, LLC*, and its subsidiaries and affiliated companies ("UES"), is responsible for providing the services described under the Scope of Services. The term "UES" as used herein includes all of UES's agents, employees, professional staff, and subcontractors. **1.2** The Client or a duly authorized representative is responsible for providing UES with a clear understanding of the project nature and scope. The Client shall supply UES with sufficient and adequate information, including, but not limited to, maps, site plans, reports, surveys, plans and specifications, and designs, to allow UES to properly complete the specified services. The Client shall also communicate changes in the nature and scope of the project as soon as possible during performance of the work so that the changes can be incorporated into the work product. **1.3** The Client acknowledges that UES's responsibilities in providing the services described under the Scope of Services section is limited to those services described therein, and the Client hereby assumes any collateral or affiliated duties necessitated by or for those services. Such duties may include, but are not limited to, reporting requirements imposed by any third party such as federal, state, or local entities, the provision of any required notices to any third party, or the securing of necessary permits or permissions from any third parties required for UES's provision of the services so described, unless otherwise agreed upon by both parties in writing.

SECTION 2: STANDARD OF CARE **2.1** Services performed by UES under this Agreement will be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of UES's profession practicing contemporaneously under similar conditions in the locality of the project. No other warranty, express or implied, is made. **2.2** Execution of this document by UES is not a representation that UES has visited the site, become generally familiar with local conditions under which the work is to be performed, or correlated personal observations with the requirements of the Scope of Services. It is the Client's responsibility to provide UES with all information necessary for UES to provide the services described under the Scope of Services, and the Client assumes all liability for information not provided to UES that may affect the quality or sufficiency of the services so described.

SECTION 3: SITE ACCESS AND SITE CONDITIONS **3.1** Client will grant or obtain free access to the site for all equipment and personnel necessary for UES to perform the work set forth in this Agreement. The Client will notify any possessors of the project site that Client has granted UES free access to the site. UES will take reasonable precautions to minimize damage to the site, but it is understood by Client that, in the normal course of work, some damage may occur, and the correction of such damage is not part of this Agreement unless so specified in the Scope of Services. **3.2** The Client is responsible for the accuracy of locations for all subterranean structures and utilities. UES will take reasonable precautions to avoid known subterranean structures, and the Client waives any claim against UES, and agrees to defend, indemnify, and hold UES harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, Client agrees to compensate UES for any time spent or expenses incurred by UES in defense of any such claim with compensation to be based upon UES's prevailing fee schedule and expense reimbursement policy.

SECTION 4: BILLING AND PAYMENT **4.1** UES will submit invoices to Client monthly or upon completion of services. Invoices will show charges for different personnel and expense classifications. **4.2** Payment is due 30 days after presentation of invoice and is past due 31 days from invoice date. Client agrees to pay a finance charge of one and one-half percent (1 ½ %) per month, or the maximum rate allowed by law, on past due accounts. **4.3** If UES incurs any expenses to collect overdue billings on invoices, the sums paid by UES for reasonable attorneys' fees, court costs, UES's time, UES's expenses, and interest will be due and owing by the Client.

SECTION 5: OWNERSHIP AND USE OF DOCUMENTS **5.1** All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, as instruments of service, shall remain the property of UES. Neither Client nor any other entity shall change or modify UES's instruments of service. **5.2** Client agrees that all reports and other work furnished to the Client or his agents, which are not paid for, will be returned upon demand and will not be used by the Client for any purpose. **5.3** UES will retain all pertinent records relating to the services performed for a period of five years following submission of the report or completion of the Scope of Services, during which period the records will be made available to the Client in a reasonable time and manner. **5.4** All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, are prepared for the sole and exclusive use of Client, and may not be given to any other entity, or used or relied upon by any other entity, without the express written consent of UES. Client is the only entity to which UES owes any duty or duties, in contract or tort, pursuant to or under this Agreement.

SECTION 6: DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS **6.1** Client represents that a reasonable effort has been made to inform UES of known or suspected hazardous materials on or near the project site. **6.2** Under this agreement, the term hazardous materials include hazardous materials, hazardous wastes, hazardous substances (40 CFR 261.31, 261.32, 261.33), petroleum products, polychlorinated biphenyls, asbestos, and any other material defined by the U.S. EPA as a hazardous material. **6.3** Hazardous materials may exist at a site where there is no reason to believe they are present. The discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work. The discovery of unanticipated hazardous materials may make it necessary for UES to take immediate measures to protect health and safety. Client agrees to compensate UES for any equipment decontamination or other costs incident to the discovery of unanticipated hazardous materials. **6.4** UES will notify Client when unanticipated hazardous materials or suspected hazardous materials are encountered. Client will make any disclosures required by law to the appropriate governing agencies. Client will hold UES harmless for all consequences of disclosures made by UES which are required by governing law. In the event the project site is not owned by Client, Client it is the Client's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials. **6.5** Notwithstanding any other provision of the Agreement, Client waives any claim against UES, and to the maximum extent permitted by law, agrees to defend, indemnify, and save UES harmless from any claim, liability, and/or defense costs for injury or loss arising from UES's discovery of unanticipated hazardous materials or suspected hazardous materials including any costs created by delay of the project and any cost associated with possible reduction of the property's value. Client will be responsible for ultimate disposal of any samples secured by UES which are found to be contaminated.

SECTION 7: RISK ALLOCATION **7.1** Client agrees that UES's liability for any damage on account of any breach of contract, error, omission, or professional negligence will be limited to a sum not to exceed $50,000 or UES's fee, whichever is greater. If Client prefers to have higher limits on contractual or professional liability, UES agrees to increase the limits up to a maximum of $1,000,000.00 upon Client's written request at the time of accepting UES's proposal provided that Client agrees to pay an additional consideration of four percent of the total fee, or $400.00, whichever is greater. If Client prefers a $2,000,000.00 limit on contractual or professional liability, UES agrees to increase the limits up to a maximum of $2,000,000.00 upon Client's written request at the time of accepting UES's proposal provided that Client agrees to pay an additional consideration of four percent of the total fee, or $800.00, whichever is greater. The additional charge for the higher liability limits is because of the greater risk assumed and is not strictly a charge for additional professional liability insurance. **7.2** Client shall not be liable to UES and UES shall not be liable to Client for any incidental, special, or consequential damages (including lost profits, loss of use, and lost savings) incurred by either party due to the fault of the other, regardless of the nature of the fault, or whether it was committed by Client or UES, their employees, agents, or subcontractors; or whether such liability arises in breach of contract or warranty, tort (including negligence), statutory, or any other cause of action. **7.3** As used in this Agreement, the terms "claim" or "claims" mean any claim in contract, tort, or statute alleging negligence, errors, omissions, strict liability, statutory liability, breach of contract, breach of warranty, negligent misrepresentation, or any other act giving rise to liability.

SECTION 8: INSURANCE **8.1** UES represents it and its agents, staff and consultants employed by UES, is and are protected by worker's compensation insurance and that UES has such coverage under public liability and property damage insurance policies which UES deems to be adequate. Certificates for all such policies of insurance shall be provided to Client upon request in writing. Within the limits and conditions of such insurance, UES agrees to indemnify and save Client harmless from and against loss, damage, or liability arising from negligent acts by UES, its agents, staff, and consultants employed by it. UES shall not be responsible for any loss, damage or liability beyond the amounts, limits, and conditions of such insurance or the limits described in Section 7, whichever is less. The Client agrees to defend, indemnify, and save UES harmless for loss, damage or liability arising from acts by Client, Client's agents, staff, and others employed by Client. **8.2** Under no circumstances will UES indemnify Client from or for Client's own actions, negligence, or breaches of contract. **8.3**

To the extent damages are covered by property insurance, Client and UES waive all rights against each other and against the contractors, consultants, agents, and employees of the other for damages, except such rights as they may have to the proceeds of such insurance.

SECTION 9: DISPUTE RESOLUTION **9.1** All claims, disputes, and other matters in controversy between UES and Client arising out of or in any way related to this Agreement will be submitted to mediation or non-binding arbitration, before and as a condition precedent to other remedies provided by law. **9.2** If a dispute arises and that dispute is not resolved by mediation or non-binding arbitration, then: (a) the claim will be brought in the state or federal courts having jurisdiction where the UES office which provided the service is located; and (b) the prevailing party will be entitled to recovery of all reasonable costs incurred, including staff time, court costs, attorneys' fees, expert witness fees, and other claim related expenses.

SECTION 10: TERMINATION **10.1** This agreement may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof, or in the case of a force majeure event such as terrorism, act of war, public health or other emergency. Such termination shall not be effective if such substantial failure or force majeure has been remedied before expiration of the period specified in the written notice. In the event of termination, UES shall be paid for services performed to the termination notice date plus reasonable termination expenses. **10.2** In the event of termination, or suspension for more than three (3) months, prior to completion of all reports contemplated by the Agreement, UES may complete such analyses and records as are necessary to complete its files and may also complete a report on the services performed to the date of notice of termination or suspension. The expense of termination or suspension shall include all direct costs of UES in completing such analyses, records, and reports.

SECTION 11: REVIEWS, INSPECTIONS, TESTING, AND OBSERVATIONS **11.1** Plan review, private provider inspections, and building inspections are performed for the purpose of observing compliance with applicable building codes. Threshold inspections are performed for the purpose of observing compliance with an approved threshold inspection plan. Construction materials testing ("CMT") is performed to document compliance of certain materials or components with applicable testing standards. UES's performance of plan reviews, private provider inspections, building inspections, threshold inspections, or CMT, or UES's presence on the site of Client's project while performing any of the foregoing activities, is not a representation or warranty by UES that Client's project is free of errors in either design or construction. **11.2** If UES is retained to provide construction monitoring or observation, UES will report to Client any observed work which, in UES's opinion, does not conform to the plans and specifications provided to UES. UES shall have no authority to reject or terminate the work of any agent or contractor of Client. No action, statements, or communications of UES, or UES's site representative, can be construed as modifying any agreement between Client and others. UES's performance of construction monitoring or observation is not a representation or warranty by UES that Client's project is free of errors in either design or construction. **11.3** Neither the activities of UES pursuant to this Agreement, nor the presence of UES or its employees, representatives, or subcontractors on the project site, shall be construed to impose upon UES any responsibility for means or methods of work performance, superintendence, sequencing of construction, or safety conditions at the project site. Client acknowledges that Client or its contractor is solely responsible for project jobsite safety. **11.4** Client is responsible for scheduling all inspections and CMT activities of UES. All testing and inspection services will be performed on a will-call basis. UES will not be responsible for tests and inspections that are not performed due to Client's failure to schedule UES's services on the project, or for any claims or damages arising from tests and inspections that are not scheduled or performed.

SECTION 12: ENVIRONMENTAL ASSESSMENTS Client acknowledges that an Environmental Site Assessment ("ESA") is conducted solely to permit UES to render a professional opinion about the likelihood or extent of regulated contaminants being present on, in, or beneath the site in question at the time services were conducted. No matter how thorough an ESA study may be, findings derived from the study are limited and UES cannot know or state for a fact that a site is unaffected by reportable quantities of regulated contaminants as a result of conducting the ESA study. Even if UES states that reportable quantities of regulated contaminants are not present, Client still bears the risk that such contaminants may be present or may migrate to the site after the ESA study is complete.

SECTION 13: SUBSURFACE EXPLORATIONS **13.1** Client acknowledges that subsurface conditions may vary from those observed at locations where borings, surveys, samples, or other explorations are made, and that site conditions may change with time. Data, interpretations, and recommendations by UES will be based solely on information available to UES at the time of service. UES is responsible for those data, interpretations, and recommendations, but will not be responsible for other parties' interpretations or use of the information developed or provided by UES. **13.2** Subsurface explorations may result in unavoidable cross-contamination of certain subsurface areas, as when a probe or boring device moves through a contaminated zone and links it to an aquifer, underground stream, or other hydrous body not previously contaminated. UES is unable to eliminate totally cross-contamination risk despite use of due care. Since subsurface explorations may be an essential element of UES's services indicated herein, Client shall, to the fullest extent permitted by law, waive any claim against UES, and indemnify, defend, and hold UES harmless from any claim or liability for injury or loss arising from cross-contamination allegedly caused by UES's subsurface explorations. In addition, Client agrees to compensate UES for any time spent or expenses incurred by UES in defense of any such claim with compensation to be based upon UES's prevailing fee schedule and expense reimbursement policy.

SECTION 14: SOLICITATION OF EMPLOYEES Client agrees not to hire UES's employees except through UES. In the event Client hires a UES employee within one year following any project through which Client had contact with said employee, Client shall pay UES an amount equal to one-half of the employee's annualized salary, as liquidated damages, without UES waiving other remedies it may have.

SECTION 15: ASSIGNS Neither Client nor UES may delegate, assign, sublet, or transfer its duties or interest in this Agreement without the written consent of the other party.

SECTION 16: GOVERNING LAW AND SURVIVAL **16.1** This Agreement shall be governed by and construed in accordance with the laws of the jurisdiction in which the UES office performing the services hereunder is located. **16.2** In any of the provisions of this Agreement are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired and will survive. Limitations of liability and indemnities will survive termination of this agreement for any cause.

SECTION 17: INTEGRATION CLAUSE **17.1** This Agreement represents and contains the entire and only agreement and understanding among the parties with respect to the subject matter of this Agreement, and supersedes any and all prior and contemporaneous oral and written agreements, understandings, representations, inducements, promises, warranties, and conditions among the parties. No agreement, understanding, representation, inducement, promise, warranty, or condition of any kind with respect to the subject matter of this Agreement shall be relied upon by the parties unless expressly incorporated herein. **17.2** This Agreement may not be amended or modified except by an agreement in writing signed by the party against whom the enforcement of any modification or amendment is sought.

SECTION 18: WAIVER OF JURY TRIAL Both Client and UES waive trial by jury in any action arising out of or related to this Agreement.

SECTION 19: INDIVIDUAL LIABILTY PURSUANT TO FLORIDA STAT. 558.0035, AN INDIVIDUAL EMPLOYEE OR AGENT OF UES MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE.