

REPORT OF GEOTECHNICAL ENGINEERING EVALUATION

DOTING OAKS

Hillsborough County, Florida

PREPARED FOR:

AMH DEVELOPMENT, LLC

**3923 Coconut Palm Dr., Suite 110
Tampa, Florida 33619**

UES PROJECT NO.: 0830.2400118

December 18, 2024

PREPARED BY:



**2734 Causeway Center Drive
Tampa, Florida 33619**

December 18, 2024

Mr. Nicholas Becker
AMH Development, LLC
3923 Coconut Palm Dr., Suite 110
Tampa, Florida 33619

**RE: Report of Geotechnical Engineering Evaluation
Doting Oaks
509 N St. Cloud Ave
Valrico, Hillsborough County, Florida
UES Project No.: 0830.2400118**

Dear Mr. Becker:

UES has completed a geotechnical engineering evaluation for the referenced project. We provided our services in general accordance with our proposal number 0830.1124.00014, dated November 18, 2024. The purpose of our geotechnical engineering evaluation was to assess the capacity of subsurface soils for supporting residential structures, suitability and depth of soils for use as structural fill, and provide information for stormwater pond design and recommendations for foundation and pavement design. This report summarizes the field evaluation performed by UES and presents our findings, conclusions, and geotechnical engineering recommendations.

PROJECT INFORMATION

Existing Site

The project site is located at 509 N St. Cloud Ave in Valrico, Hillsborough County, Florida, within Sections 19 and 20, Township 29 South, and Range 21 East. The site consists of an open area covered with grass and scattered trees, along with several buildings dispersed throughout the property. We have observed various household trash, debris, old/abandoned vehicles, car parts, appliances, etc. at the property. Surrounding the site are residential buildings. The topography of the site is rolling, with an elevation change of approximately 10 feet or more. A general site location map is provided as **Figure 1**.

Proposed Construction

Based on our review of the information provided by LevelUp Consulting, LLC (LevelUp), we understand that a residential development is being considered for the referenced property, including interior roadways and stormwater ponds.

Structural loads have not been provided to us at this time. We anticipate the residential structures will be supported by shallow strip and isolated spread footings with bearing wall loads on the order of 2 to 3 kips per linear foot and isolated column loads of about 20 kips or less.

At this time, finished site grades have not been provided. We anticipate minor earthwork will be required with cut/fill depths of about 2 to 3 feet or less.

Soil Survey Review

Soil survey information from "Soil Survey of Hillsborough County, Florida", as prepared by the U.S. Department of Agriculture Natural Resource Conservation Service, soil survey on the subject property was reviewed as part of the investigation. There are three (3) soil-mapping units noted within the project limits. The soil units identified within the project area are described below:

- *Candler fine sand, 0 to 5 percent slopes (Map Unit Symbol 7)* – The NRCS defines this unit as excessively drained and located on ridges and knolls within marine terraces. The NRCS indicates this soil unit typically has a layer of fine sand to a depth of approximately 80 inches bgs. Additionally, the NRCS indicates the SHGWT for this soil is deeper than 80 inches bgs.
- *Gainesville loamy fine sand, 0 to 5 percent slopes (Map Unit Symbol 19)* – The NRCS defines this unit as well drained and located ridges within marine terraces. This soil unit typically has a surface layer of loamy fine sand to a depth of approximately 80 inches bgs. Additionally, the NRCS indicates the SHGWT for this soil is deeper than 80 inches bgs.
- *Lake fine sand, 0 to 5 percent slopes (Map Unit Symbol 25)* – The NRCS defines this unit as excessively drained and located on ridges and hills within marine terraces. This soil unit typically has a surface layer of fine sand to a depth of approximately 80 inches bgs. Additionally, the NRCS indicates the SHGWT for this soil is deeper than 80 inches bgs.

The NRCS soil classifications are based on interpretation of a combination of factors including but not limited to aerial photographs. Borders shown on the map included in **Appendix A**, between mapping units are approximate, and the transitions between soil units will be gradual. In addition to various minor inclusions within a mapped soil unit, areas of dissimilar soils can also occur. However, the soil survey provides a good basis for an initial evaluation of shallow soil conditions in the area, and can provide an indication of various historic activities such as development, mining and filling operations at the site.

SUBSURFACE EVALUATION

Field Evaluation

During our field evaluation, four (4) Standard Penetration Test (SPT) borings were advanced to a depth of approximately 20 feet bgs at generally equal intervals within the planned building lot areas; four (4) SPT borings were advanced to a depth of approximately 25 feet bgs within the planned stormwater pond areas; and six (6) auger borings were advanced to a depth of approximately 8 feet bgs at generally equal intervals along the planned interior roadways. The fieldwork was performed on November 26 and 27, 2024 using an off-road vehicle mounted CME-550 drill rig operated by J&R Precision Drilling, Inc. The procedures employed by UES for field sampling and testing were in general accordance with ASTM procedures, industry standards of care, and established geotechnical engineering practice.

A senior geotechnical engineering technician from UES, experienced in soil sampling and classifications, was onsite during the fieldwork to monitor the drilling and also perform a brief cursory site reconnaissance, noting pertinent site and topographic features as well as surface indicators of soil conditions. LevelUp selected the boring locations and provided a boring plan. UES staff personnel located the borings using a hand-held GPS unit at the project site. Because of the methods used in locating the borings, the test locations shown on **Figure 2** should be considered approximate.

The SPT borings were performed utilizing continuous sampling methods within the first 10 feet and every 5 feet thereafter until the termination depths of the borings, employing wet rotary drilling techniques to keep the boreholes from collapsing due to groundwater intrusion. The drillers collected soil samples using a 1.4-inch I.D. split barrel sampler driven by an automatic hammer system with a 140-pound hammer falling a distance of 30 inches, in general accordance with standard penetration test procedures (ASTM D1586). Upon completion, each borehole was backfilled to surface with cuttings.

The auger borings were advanced by mechanically rotating an approximately 4-inch diameter continuous flight auger into the subsurface soils. The cuttings brought to the surface were logged in

the field and representative soil samples were collected at each change in soil stratigraphy. Upon completion, each borehole was backfilled with cuttings to the surface.

Detailed descriptions of the soils encountered during the field exploration are presented on the attached soil logs and profiles in **Appendix B**.

Soil Sample Handling, Classification, and Laboratory Testing

UES field personnel classified the soils obtained from the field sampling using standard visual manual methods in accordance with ASTM D2488. The samples recovered from the SPT borings and auger borings were placed in sealed containers to retain moisture and transported to the UES soils laboratory accredited by Construction Materials Engineering Council, Inc., (CMEC) for further evaluation and testing. The soils classifications were reviewed by a professional geotechnical engineer.

Additionally, four (4) laboratory hydraulic conductivity tests, Perm-1 through Perm-4 (ASTM D2434, constant head method) were conducted on samples of Stratum 1 collected at depths ranging from about 4 feet bgs (**Figure 2**). The test samples were collected from the requested locations by LevelUp. Measured values of saturated vertical hydraulic conductivity are provided in **Table 1**. We estimated the soil porosity to be about 25 percent. We also estimate the saturated horizontal hydraulic conductivity to be 1.5 times the respective vertical component.

Table 1: Hydraulic Conductivity Test Results

Location	Sample Depth (feet below grade)	Soil Description (USCS)	Measured ¹ Saturated Vertical Hydraulic Conductivity (in/hr)
Perm-1	4	SP	6
Perm-2	4	SP	4
Perm-3	4	SP	6
Perm-4	4	SP	6

1 – Conducted in the laboratory per ASTM D2434, constant head test method.

FINDINGS

Subsurface Conditions

General Soil Profile

The subsurface stratigraphy at the project site is illustrated in the soil boring logs and profiles shown in **Appendix B**. The logs and profiles were developed using field exploratory data from the SPT borings and auger borings. The computer-generated logs and profiles should imply no increased accuracy. Based on this data, three (3) subsurface units, or strata, were identified at the site as described below.

- Stratum 1 SAND, SAND with silt, SAND with clay; loose to dense, fine-grained quartz, variable silt, clay
USCS classification = SP, SP-SM, SP-SC
- Stratum 2 CLAYEY SAND; loose to dense, fine-grained quartz, variable clay
USCS classification = SC

Stratum 3 SANDY CLAY; firm to stiff, variable sand
USCS classification = CL

Stratum 1 occurred as the surficial stratum in all auger borings and SPT borings performed at the site. This stratum typically extended from the existing ground surface to a depth of approximately 8 feet below ground surface (bgs) in the auger borings, and from the existing ground surface to depths ranging from approximately 13½ to 23½ feet bgs in the SPT borings, with a termination depth of 20 feet bgs. The soil unit consisted of sand, sand with silt, and sand with clay, with SPT 'N' values ranging from 4 to 26 blows per foot, indicating a relative density ranging from loose to dense.

Stratum 2 exclusively occurred in 5 out of 8 SPT borings and extended from 13½ feet bgs to the SPT boring termination depths of 20 and 25 feet bgs in the SPT borings. This stratum was not encountered in all auger borings. This stratum consisted of clayey sand with SPT "N" values ranging from 4 to 27 blows per foot indicating loose to dense relative density.

Stratum 3 was exclusively encountered in SPT boring PB-1 and PB-2 extending from approximately 23½ feet bgs to a SPT boring termination depth of 25 feet bgs. This stratum was not encountered in any auger borings. This soil unit consisted of clay with SPT "N" values ranging from 6 to 9 blows per foot indicating firm to stiff consistency.

The conditions presented above highlight the major subsurface stratifications encountered during our field evaluation of the site. More detailed descriptions of the materials encountered are provided on the attached SPT boring logs and auger boring profiles in **Appendix B**. A soil classification key sheet is also included as **Appendix C**. It should be understood that subsurface conditions will vary across this site and between boring locations. Changes in subsurface strata may be more gradual than indicated.

Groundwater

Groundwater was encountered in 7 out of 8 SPT borings and all auger borings at depths ranging from approximately 3.5 to 7.2 feet bgs at the time of fieldwork (**Table 2**). Groundwater was not encountered in the SPT boring PB-4 within the first approximately 10 feet. Groundwater levels will fluctuate with time due to seasonal rainfall and locally heavy precipitation events; therefore, future groundwater levels may be encountered at depths different from those indicated by our borings.

The seasonal high groundwater table is typically encountered during late summer following the rainy season. Several factors can affect the seasonal high groundwater level such as drainage characteristics of the soils; land surface elevation; and relief points such as lakes, rivers and swamps. Based on our experience, (soil indicators were not encountered) and review of the soil survey for Hillsborough County, we estimate the seasonal high groundwater levels at the boring locations may likely be at depths ranging from approximately 1.5 to 6.0 feet bgs (**Table 2**). For more accurate estimates of SHGWT, temporary standpipe piezometers should be considered.

Please also note that the SHGWT estimates presented above, do not provide any assurances that the groundwater would not rise above these levels. It is common for the groundwater table to rise above the SHGWT levels during storm events and periods of extended rainfall. Furthermore, the SHGWT levels at the property will continue to change in the future with external factors such as nearby development including construction of stormwater management facilities, extreme weather events, flooding, major karst events, etc., that occur subsequent to preparation of this report.

CONCLUSIONS

Our geotechnical engineering evaluation of this site and our recommendations with respect to the planned residential development are based on our site observations, the field exploratory data obtained from our borings, test results, and our professional judgment. It is our opinion that with proper site preparation in accordance with procedures presented in the **Recommendation** section of this report, the soils encountered should adequately support the planned residential structures on a shallow foundation system.

Based on the SPT blow counts (N values) recorded within the lot areas, the subsurface soils at the site within the upper 10 feet are generally loose (coarse-grained soils) with penetration resistances ranging from 4 to 7 blows per foot. The soils below 10 feet extending to a boring termination depth of 20 bgs are loose to dense (coarse-grained soils) with penetration resistances ranging 4 to 26 blows per foot. In-place densification of the surface and near surface soils with a heavy vibratory roller compactor will be required subsequent to site clearing and prior to beginning construction. Any additional fill required to bring the site to final design grade shall meet the criteria specified in the **Recommendations** section below.

With proper site preparation and in-place densification of the surface and near surface soils as described above, we anticipate typical one-story and two-story residential structures can be constructed at this property utilizing conventional shallow strip and/or isolated spread footings.

The SPT borings performed within the planned stormwater pond areas generally encountered fine sand (SP), sand with silt (SP-SM) and fine sand with clay (SP-SC) (Stratum 1), clayey sand (SC) (Stratum 2) and sandy clay (CL) (Stratum 3) from the ground surface to a SPT boring termination depth of approximately 25 feet bgs. If excavated, the Stratum 1 soils will provide a valuable source of structural fill for site development. Stratum 2 soils can also be utilized as structural fill, provided they meet the fill suitability criteria outlined in the **Recommendations** section below. Sandy clay (CL) (Stratum 3) soils are unsuitable for use as structural fill.

The auger borings performed within the planned interior roadway alignments encountered fine sand (SP) and sand with silt (SP-SM) (Stratum 1) from the ground surface to an auger boring termination depth of approximately 8 feet bgs. It appears that the shallow subsurface soils encountered in our borings performed within the planned roadway alignments will provide a suitable subgrade for roadway pavement after proper site preparation and in-place densification described in the **Recommendations** section below. The encountered Stratum 1 soils can be reused as backfill material for utility installation after drying back to the soils' optimum moisture content (ASTM D1557). In addition, we recommend that suitable fill with fines contents of less than 15 percent be placed a minimum of 2 feet below the bottom of the base course (if the subgrade is un-stabilized) or a minimum of 2 feet below the bottom of the subgrade (if the subgrade is stabilized).

Groundwater was encountered at depths ranging from about 3.5 to 7.2 feet bgs at the time of drilling. We recommend maintaining a minimum separation of 12 inches between the bottom of the footers and the estimated SHGWT. For the roadway areas, we recommend that a minimum separation of 2 feet be maintained between the bottom of the planned base course and the estimated SHGWT, if a limerock base course is used. The minimum separation between the bottom of the base course and the estimated SHGWT can be reduced to 12 inches if a moisture tolerant base course such as crushed concrete or soil-cement is used in conjunction with underdrains.

Use of Information

It should be noted that subsurface conditions can vary across this site and between boring locations. Conditions can also vary in areas not explored by our borings. Contractors bidding earthwork requirements are urged to conduct their own borings, or other studies to determine those conditions that may affect their specific work requirements. UES cannot be responsible for interpretations made by others based on the information contained in this report and the attachments.

RECOMMENDATIONS

Site Preparation

Site Stripping / Undercutting

Before earthwork and construction activities begin, all existing topsoil, vegetation, surface debris, large roots down to finger-size, and any other deleterious material should be removed from within the construction limits. Site stripping should extend at least ten feet beyond the construction area. Any pockets of organics, organic laden soils and/or deleterious material should be undercut to competent soil. The resulting excavations should be backfilled with structural fill placed in maximum one-foot-thick lifts. Backfill soils should be of the same composition and compacted to the same criteria as structural fill soils. This process should be observed by a representative of UES to check that organic and/or deleterious materials have been removed.

Proof-Rolling / In-Place Densification

Following site stripping and prior to any fill placement or beginning construction, proof-rolling / in-place densification of the exposed ground surface with a heavy vibratory roller compactor should be performed within the construction area. Based on experience, vibratory rollers should be operated in static mode within 100 feet of existing structures to avoid transmission of vibrations that could cause structural distress.

Compaction within the construction area should continue until the soils appear relatively firm and unyielding and the soils have achieved a relative compaction of at least 95 percent of the modified Proctor maximum dry density (ASTM D1557) to a depth of at least 2 feet below the present ground surface.

Proof-rolling and densification efforts should be closely monitored by an UES engineering technician to observe any unusual or excessive deflection of the soils beneath the compacting equipment used. If unusual or excessive deflection is observed, then the areas should be undercut to firm soil and backfilled with compacted structural fill placed in maximum one-foot-thick lifts.

Borrow Areas

Structural Fill Suitability

Definition

The preferred soil used for structural fill and backfill can be defined as clean fine sand containing less than twelve percent material by weight that is finer than a number 200 sieve (material conforming to SP to SP-SM or SP-SC in the Unified Soils Classification System).

Encountered soils containing up to 35 percent fines (materials conforming to SC, SM, or SC-SM in the Unified Soil Classification System) may also be utilized as structural fill, provided the working subgrade is above the existing groundwater level. However, Florida Building Code (Chapter 18, Section

1803.5.3) states that soils with plasticity index of 15 or greater are considered expansive and hence are unsuitable for use as structural fill. Please note that soils conforming to SC, SM are difficult to work with and will require additional time and effort for either drying or moisture conditioning during placement and compaction.

Any muck or organic laden soil if encountered on site will not be suitable for fill and should be disposed of offsite or placed in landscape areas and used for planting purposes. In addition, soils containing organic content, as determined by ASTM D2974, of more than 5 percent shall not be used as structural fill. Because of the variability of the subsurface soils encountered, additional laboratory testing should be performed on the excavated material during earthwork activities to evaluate its suitability for use as fill material.

Placement

Structural fill with less than 12 percent fines should be placed in lifts not to exceed one foot thick. Materials with fines content greater than 12 percent should be placed in maximum 6-inch loose lifts. The fill material should be compacted to at least 95 percent of its modified Proctor maximum dry density and the moisture content shall be maintained within 2 percent of the optimum moisture content (ASTM D1557). Confined areas, such as utility trenches, should be compacted with manually operated vibratory compaction equipment.

Field density testing to verify compaction should be performed for each lift of structural fill placed for each 2,000 square feet of area below structures and for each 5,000 square feet below pavements. In pavement areas, the subbase and base materials should be tested to the same frequency. Density tests should be performed for each lift of fill for every 100 lineal feet of backfill placed in utility excavations or other excavations that are within the paving areas.

Depending on the time of year construction occurs, materials excavated and imported containing clay fines may exist in a saturated condition. These soils will require processing and drying to achieve a moisture content to allow placement and proper compaction. Spreading the clayey material in thin lifts (6 inches loose thickness) and aerating by disking can facilitate and hasten the drying process. Disking will also be useful to breakdown larger clods of clayey soils. Specialty equipment typically associated with clayey soils such as a sheep's foot roller will also be required to achieve proper compaction.

The placement and compaction of moisture sensitive soils of this type will require time and effort beyond that typically associated with sandy soils. A grading contractor experienced with placing and compaction of clay soils can likely reduce costly project delays due to soil conditions.

Groundwater Control

Groundwater maybe encountered during excavation activities. Dewatering may be accomplished by either draining the water to sumps which can then be pumped away from the area or by the use of sanded, vacuum well points. Groundwater fluctuations can occur due to variations in rainfall and other site-specific factors. These variations should be considered when planning earthwork activities.

An alternative to dewatering in shallow undercut areas where groundwater is encountered is to use clean sand classified as SP material (less than 5% fines) according to the Unified Soil Classification System as a first lift through any standing water. This first lift will create a platform to place and compact additional fill material upon.

Foundation Recommendations

Based on the subsurface data obtained from our exploratory borings, the planned residential structures can be supported on a shallow foundation system provided the recommendations contained in this report are closely adhered to and proper densification of the site bearing soils occurs.

Column footings and continuous strip footings can be designed using a net allowable soil bearing pressure of 2,000 psf assuming a footing embedment of at least 12 inches below lowest exterior adjacent grades. Using this net allowable soil bearing pressure, we anticipate maximum total foundation settlements of less than 1 inch with differential settlements less than 0.5 inches.

If the actual column/wall loads result in a footing/soil contact pressure that exceeds the above allowable bearing pressure, the footings should be constructed wider or the footing embedment below lowest adjacent exterior grade increased. We recommend maintaining a minimum separation of 1 foot between the bottom of the lowest footings and the estimated SHGWT. Even though computed footing dimensions may be less, column and wall footings should have a minimum width in accordance with the applicable building code for the type of structure and construction, to avoid excessive settlements and punching shear failures.

Because of possible disturbance from excavation, the soils exposed at the bottom of the foundation excavations should be re-compacted to at least 95 percent of the soils' modified Proctor maximum dry density (ASTM D1557) prior to the placement of reinforcing steel and concrete. The compaction should be checked prior to the placement of reinforcing steel. Density tests should be performed at intervals of 50 linear feet along footing excavations to ensure compaction.

Preliminary Floor Slab Recommendations

We have assumed that no unusual floor loads will be applied to the floor slabs due to vibration, impact or high intensity contact pressures. A modulus of subgrade reaction of 200 pounds per cubic inch may be used for floor slab design purposes if the slab is placed on structural fill or in-situ soils that have been prepared and densified in accordance with the recommendations presented in this report. This modulus of subgrade reaction is based on the assumption that the soil beneath the slab will achieve a Limerock Bearing Ratio (LBR) value of at least 15. The subgrade should also be covered with an effective vapor barrier to reduce the possibility of slab dampness.

Flexible Pavement Recommendations

The following minimum pavement sections are provided for consideration for this development. However, the project civil engineer should develop the actual minimum pavement thickness based on anticipated traffic loads and other considerations in accordance with FDOT and Hillsborough County standards. A base material other than limerock should be used if an underdrain is required to control groundwater.

Section Description	Light Duty (inches)	Heavy Duty (inches)
Surface Course Type SP-9.5 or SP-12.5 Asphaltic (Section 334 FDOT) compacted to at least 90 percent of the mix design bulk density (G_{mm}) (FM 1-T166) for light duty and 92 percent for heavy duty.	1.5	2

Base Course Limerock (Section 911, FDOT) having a minimum LBR of 100 (FM 5-515) and compacted to at least 98 percent of its modified Proctor maximum dry density with a moisture content within 2 percent of the optimum moisture content (FM 1-T180). If the bottom of the base is within 2 feet of the SHGWT, then a moisture tolerant base will be required such as soil cement (should not be used for collectors or arterial roads), crushed concrete, and shell-rock.	6	8
Stabilized Subgrade A minimum LBR of 40 (FM 5-515) and compacted to at least 98 percent of the modified Proctor maximum dry density with moisture content within 2 percent of the optimum moisture content (FM 1-T180). The subgrade beneath a proposed soil cement base shall have a minimum LBR of 20.	12	12

Alternatively, the following pavement designs, which do not require underdrain with at least 1-foot clearance of the estimated SHGWT and the bottom of the base course at the low edge of pavement, may be used with documentation proving that the in-situ or in-place soil has an LBR of 20 or higher in lieu a signed and sealed flexible pavement design in accordance with the FDOT Flexible Pavement Design Manual. It should be noted that in addition to the thicker pavement structure for one-foot base clearance, significant construction problems are likely and dewatering may be required to achieve compaction:

- The structural course shall be a minimum of 1½ inches, optional base group 5 (including crushed concrete) and 12 inches of type “B” stabilization (LBR 40).
- The structural course shall be a minimum of 1¾ inches with 11 inches of soil-cement (300 psi, plant mixed) and 12 inches of compacted in-place soils (LBR 20) as the stabilization.

Methods and materials used for pavement construction should conform to applicable sections of the most recent edition of the FDOT Standard Specifications for Road and Bridge Construction. We further recommend that LBR testing be performed on the subgrade/subbase soils to establish an LBR value to determine the level of stabilization required, if any.

Subgrade soils should be compacted as specified above and free of ruts or disturbances caused by construction vehicles after compaction has been achieved.

LIMITATIONS

This report has been prepared for the exclusive use of **AMH Development, LLC** for the specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering and geology practice in the state of Florida. No other warranty is expressed or implied.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described subsurface exploration, laboratory test results, and our experience. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our borings and test pits and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

The scope of our services does not include any environmental assessments or studies for the possible presence of hazardous or toxic materials in the soil, groundwater or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring logs regarding unusual subsurface conditions and/or composition, odor, staining, origin or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem.

If changes are made concerning the development of the property or if the actual loads differ from the loads assumed and discussed herein, the recommendations presented in this report must not be considered valid unless the changes are reviewed by our firm and recommendations modified or verified in writing. We should be given the opportunity to review the foundation plan, grading plan and the applicable portions of the project specifications when the design is finalized. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

CLOSING

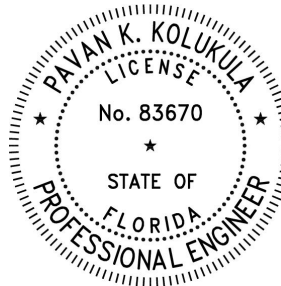
UES appreciates the opportunity to be of service to **AMH Development, LLC** by providing these geotechnical consulting services and we look forward to assisting you through project completion. If you have any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

UES



Guoan Cao, Ph.D., P.E.
Principal Engineer
Florida license No. 57219



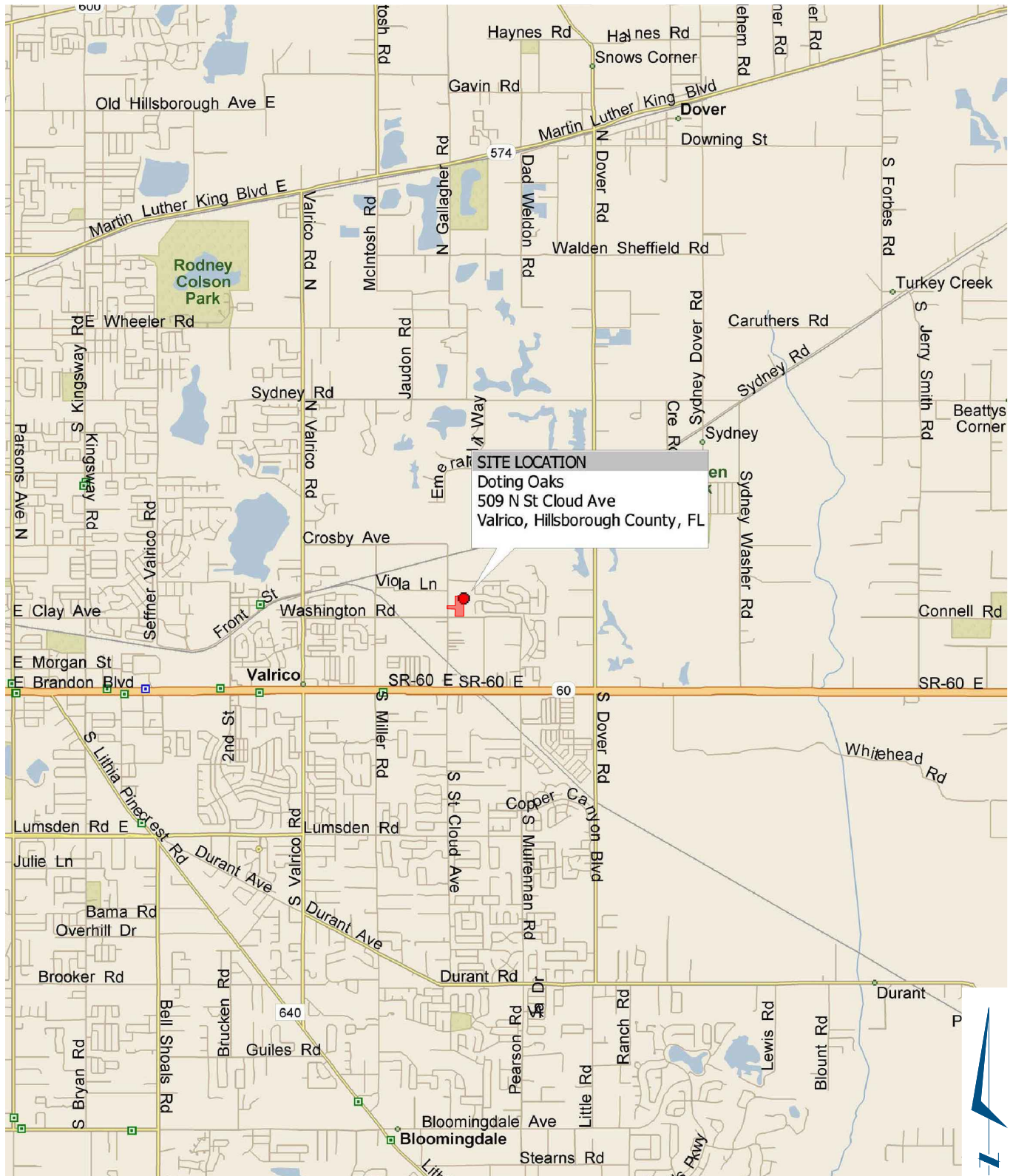
Digitally signed by Pavan K Kolukula
DN: CN=Pavan K Kolukula,
dnQualifier=A01410D0000017F323220BC00178AA5,
O=Faulkner Engineering Services Inc., C=US
Date: 2024.12.18 18:03:44-05'00'

Pavan K. Kolukula, P.E.
Senior Geotechnical Engineer
Florida License No. 83670

This item has been digitally signed and sealed by Pavan K. Kolukula, P.E. on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Attachments: Figure 1: Site Location Map
Figure 2: Test Location Plan
Table 2: Groundwater Data

Appendix A: Soil Survey Map
Appendix B: Soil Boring Logs and Auger Profiles
Appendix C: Key to Soil Classification



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DOTING OAKS 509 N ST CLOUD AVE VALRICO, HILLSBOROUGH COUNTY, FLORIDA

SITE LOCATION MAP

REVIEWED BY: PK	CLIENT: AMH DEVELOPMENT		
PROJECT No: 0830.2400118	DRILLING DATE: 11/27/2024	DRAWING DATE: 12/4/2024	DRAWN BY: SC SCALE:

FIGURE

1



Table 2 - Groundwater Data

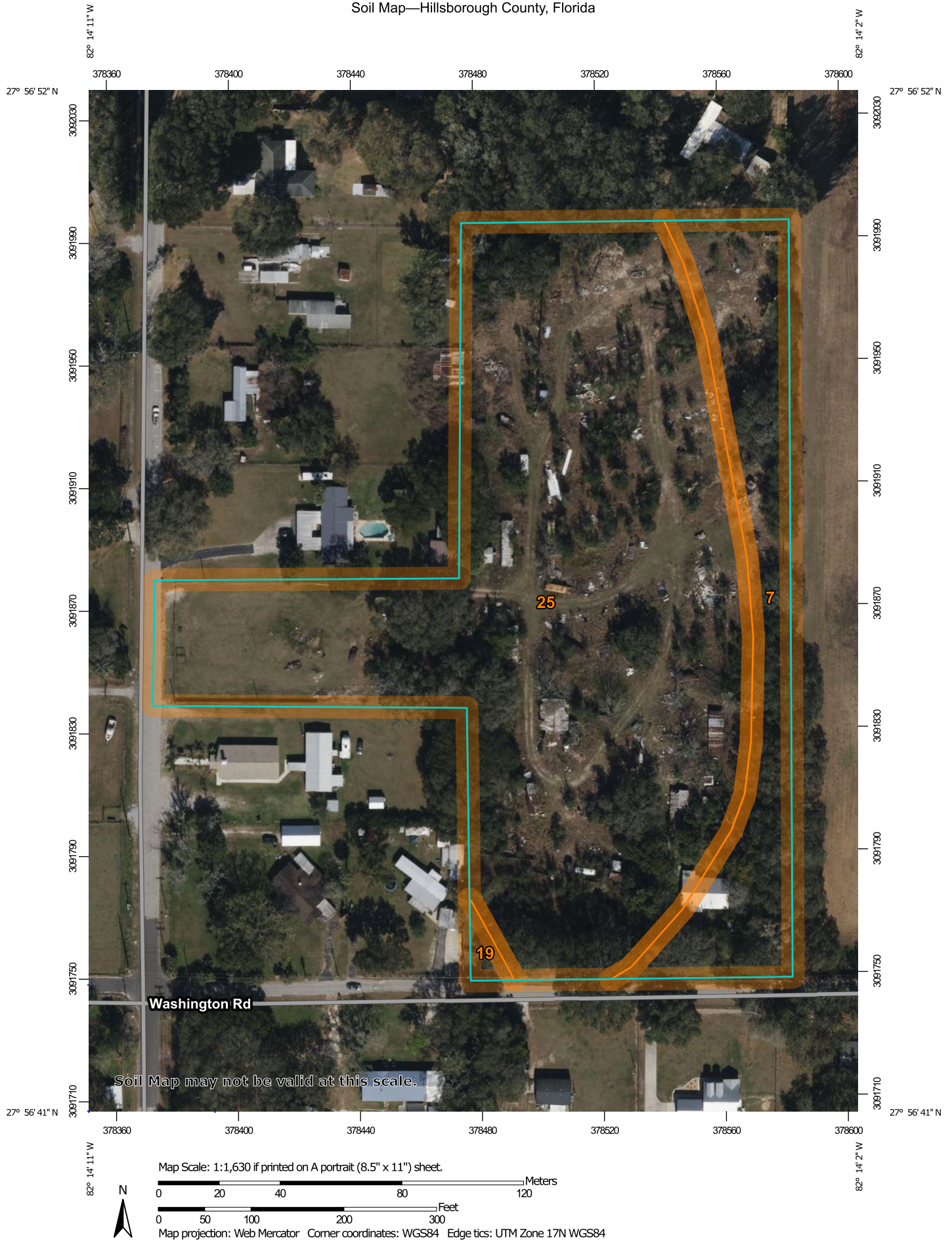
Boring	Ground Elevation (feet, NAVD 1988)¹	Existing Groundwater Table (feet, bgs)²	Estimated SHGWT³ from Field Exploration (feet, bgs)²
B-1	---	5.2	3.0
B-2	---	5.5	3.0
B-3	---	6.4	4.0
B-4	---	5.7	3.5
PB-1	---	5.7	3.5
PB-2	---	5.7	3.5
PB-3	---	7.2	5.0
PB-4	---	NE ⁴	6.0
HA-1	---	6.3	4.0
HA-2	---	5.5	3.0
HA-3	---	5.3	3.0
HA-4	---	3.5	1.5
HA-5	---	4.2	2.0
HA-6	---	6.0	4.0

¹ - North American Vertical Datum, ground elevations not available at time of drilling² - Below Ground Surface³ - Seasonal High Groundwater Table⁴ NE: Groundwater not encountered within the first 10 feet or within the depths explored

APPENDIX A

Soil Survey Map

Soil Map—Hillsborough County, Florida



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hillsborough County, Florida

Survey Area Data: Version 24, Aug 26, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7	Candler fine sand, 0 to 5 percent slopes	1.4	18.8%
19	Gainesville loamy fine sand, 0 to 5 percent slopes	0.0	0.6%
25	Lake fine sand, 0 to 5 percent slopes	6.1	80.6%
Totals for Area of Interest		7.6	100.0%

APPENDIX B

Soil Boring Logs and Auger Boring Profiles



DRILL HOLE LOG

BORING NO.: B-1

Project No.: 0830.2400118

Date: 11/27/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial :

Elevation: NA

Logged By: BB

At Completion : 5.2'

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, gray brown, fine SAND with silt		1	2 3 3	6								
			Brown		2	2 2 2	4								
5		SP	Loose, orange brown, fine SAND		3	2 3 3	6								
					4	3 3 3	6								
					5	4 3 3	6								
10		SP-SC	Medium-Dense, orange brown, fine SAND with clay		6	5 6 6	12								
15															
			Dense		7	9 12 14	26								
20				End of Boring											
25															
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: B-2

Project No.: 0830.2400118

Date: 11/27/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial :

Elevation: NA

Logged By: BB

At Completion : 5.5'

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, gray brown, fine SAND with silt		1	2 2 2	4								
		SP	Loose, brown, fine SAND		2	2 2 2	4								
5			Orange brown		3	2 2 3	5								
					4	3 3 3	6								
					5	3 3 4	7								
10		SC	Medium-Dense, light brown, clayey SAND		6	4 4 5	9								
15															
			Loose		7	3 4 4	8								
20			End of Boring												
25															
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: B-3

Project No.: 0830.2400118

Date: 11/27/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial :

Elevation: NA

Logged By: BB

At Completion : 6.4'

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, brown, fine SAND with silt		1	2 2 2	4								
		SP	Loose, brown, fine SAND		2	2 2 2	4								
			Orange brown		3	2 2 2	4								
					4	3 3 3	6								
					5	3 3 4	7								
			Light brown		6	2 2 3	5								
					7	2 2 2	4								
20			End of Boring												
25															
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: B-4

Project No.: 0830.2400118
Date: 11/26/2024

Project: Doting Oaks
Client: AMH Development
Location: Hillsborough County, Florida
Driller: J&R Precision Drilling, Inc.
Drill Rig: CME 550
Depth to Water> Initial :

Elevation: NA
Logged By: BB

At Completion : 5.7'

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, brown, fine SAND with silt		1	2 2 2	4								
			Brown		2	2 2 2	4								
		SP	Orange brown, fine SAND		3	2 2 2	4								
5			Loose, orange brown, fine SAND		4	3 3 3	6								
			Loose, orange brown, fine SAND with silt		5	3 3 3	6								
			Medium-Dense, light brown, clayey SAND		6	3 4 4	8								
		SP-SC	End of Boring		7	7 9 12	21								
10															
15															
20															
25															
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: PB-1

Project No.: 0830.2400118

Date: 11/26/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial ∇ :

Elevation: NA

Logged By: BB

At Completion ∇ : 5.7

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, brown, fine SAND with silt		1	4 3 3	6								
					2	3 3 4	7								
5		SP	Loose, orange brown, fine SAND		3	3 3 3	6								
		SP-SM	Loose, orange brown, fine SAND with silt		4	3 3 4	7								
					5	4 4 4	8								
10															
		SC	Dense, light brown, clayey SAND with limestone		6	7 12 15	27								
15															
			Medium-Dense		7	7 5 5	10								
20															
		CL	Stiff, light brown, CLAY		8	4 4 5	9								
25															
			End of Boring												
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: PB-2

Project No.: 0830.2400118

Date: 11/26/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial ∇ :

Elevation: NA

Logged By: BB

At Completion ∇ : 5.7'

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, gray brown, fine SAND with silt		1	4 4 3	7								
		SP	Orange brown, fine SAND Loose		2	3 3 3	6								
5					3	3 3 3	6								
					4	2 2 2	4								
					5	2 2 2	4								
10		SP-SC	Medium-Dense, light brown, fine SAND with clay		6	8 8 9	17								
15		SC	Loose, light brown, clayey SAND with limestone		7	3 4 4	8								
20															
		CL	Firm, light brown, CLAY with limestone		8	3 3 3	6								
25			End of Boring												
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: PB-3

Project No.: 0830.2400118

Date: 11/26/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial :

Elevation: NA

Logged By: BB

At Completion : 7.2'

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, brown, fine SAND with silt		1	2 2 2	4								
					2	2 2 2	4								
5		SP	Loose, orange brown, fine SAND		3	3 3 3	6								
					4	3 3 4	7								
					5	3 3 4	7								
10		CL	Stiff, orange brown, CLAY (-200=74.4)		6	5 5 6	11								
15															
20			Loose		7	1 2 2	4								
25			With limestone		8	2 2 2	4								
			End of Boring												
30															
35															

This information pertains only to this boring and should not be interpreted as being indicative of the site.



DRILL HOLE LOG

BORING NO.: PB-4

Project No.: 0830.2400118

Date: 11/26/2024

Project: Doting Oaks

Client: AMH Development

Location: Hillsborough County, Florida

Driller: J&R Precision Drilling, Inc.

Drill Rig: CME 550

Depth to Water> Initial :

Elevation: NA

Logged By: BB

At Completion : * NE

Depth/ Elevation (ft)	Soil Symbols	USCS	Description	Sample		Standard Penetration Test									
				Type	No.	Blows	N	Penetration Resistance							
								10	20	30	40	60	80		
0		SP-SM	Loose, gray brown, fine SAND with silt		1	3 3 2	5								
					2	2 2 2	4								
5		SP	Loose, orange brown, fine SAND		3	2 2 2	4								
					4	2 3 3	6								
					5	3 3 4	7								
10			Medium-Dense												
					6	7 10 12	22								
15		SP-SC	Medium-Dense, light brown, fine SAND with clay		7	9 11 12	23								
20															
		SC	Medium-Dense, light brown, clayey SAND		8	8 8 11	19								
25															
			End of Boring												
30															
35															

*Groundwater not encountered within the first 10 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

KEY TO SYMBOLS

Symbol	Description
--------	-------------



Poorly graded sand
with silt



Poorly graded sand



Poorly graded sand
with clay



Clayey sand



Low plasticity
clay

Misc. Symbols



Water table at
boring completion

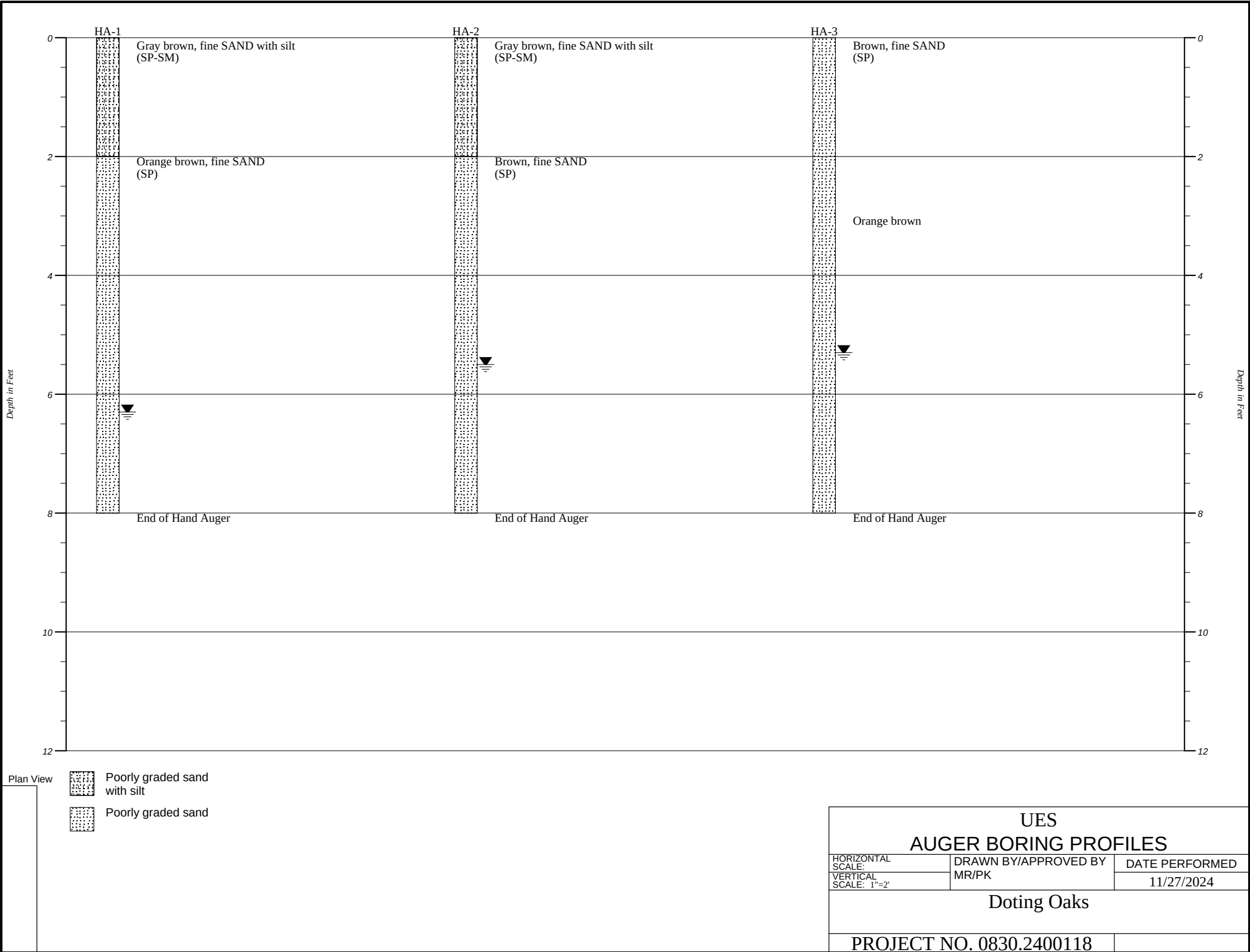
Soil Samplers

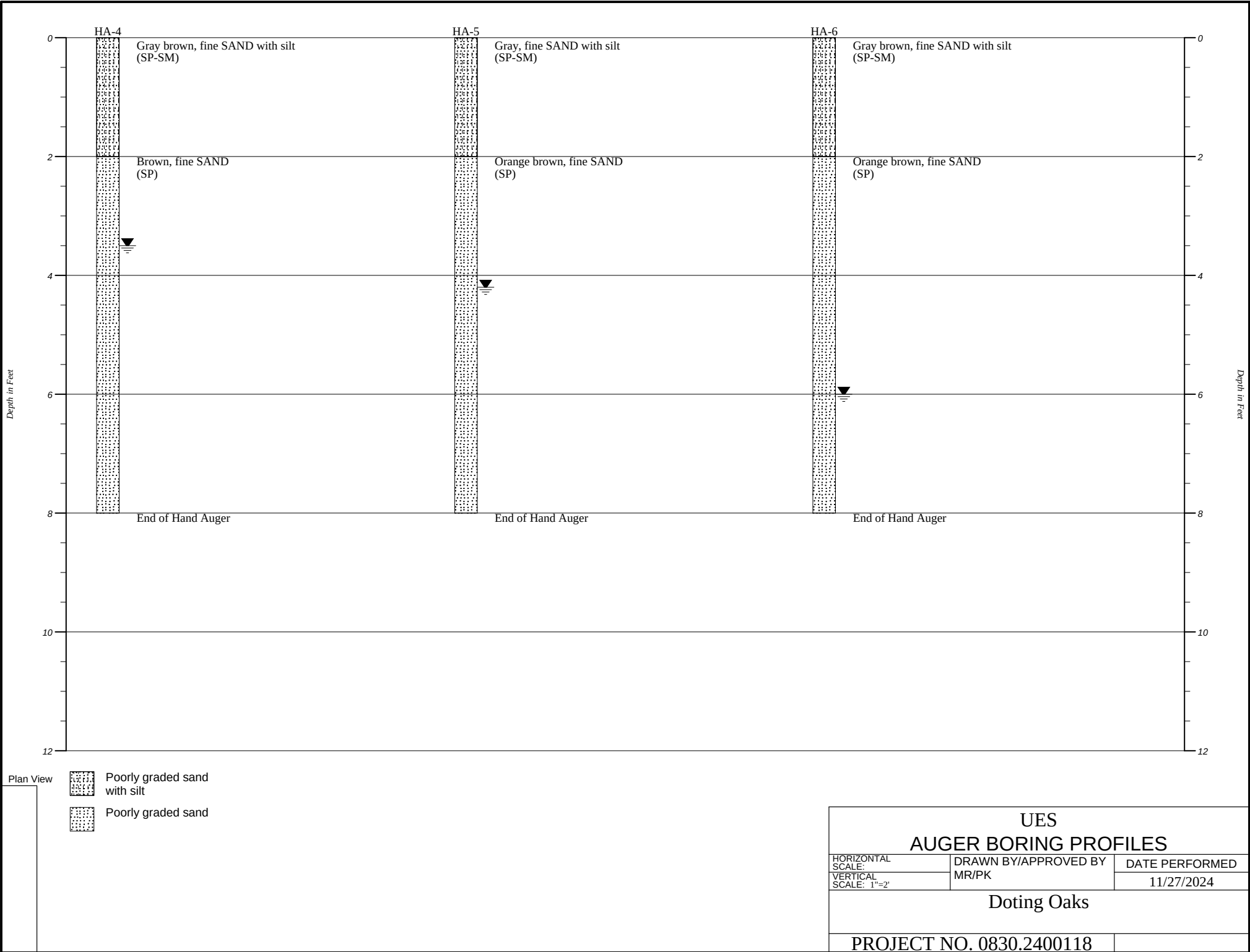


Standard penetration test

Notes:

1. Exploratory boring were performed using a 2-inch diameter split barrel sampler driven by a 140 lbs hammer (In accordance with ASTM D1586)
2. These logs are subject to the limitations, conclusions, and recommendations in this report.





APPENDIX C

Key to Soil Classification

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

Major Division		Group Symbol	Laboratory Classification Data		Soil Description
			Finer than No. 200 Sieve %	Supplementary Requirements	
Coarse-Grained (Over 50% by Weight Coarser than No. 200 Sieve)	Gravelly Soils (Over Half of Coarse Fraction Larger than No. 4 Sieve)	GW	0 - 5*	$C_u \geq 4$ and $1 \leq C_c \leq 3$	Well-Graded Gravels, Sandy Gravels
		GP	0 - 5*	$C_u < 4$ and / or $1 > C_c > 3$	Gap-Graded or Uniform Gravels, Sandy Gravels
		GM	12 or More*	$PI < 4$ or Below A-Line	Silty Gravels, Silty Sandy Gravels
		GC	12 of More*	$PI \geq 7$ and On or Above A-Line	Clayey Gravels, Clayey Sandy Gravels
	Sandy Soils (Over Half of Coarse Fraction Larger than No. 4 Sieve)	SW	0 - 5*	$C_u \geq 6$ and $1 \leq C_c \leq 3$	Well-Graded Sands, Gravelly Sands
		SP	0 - 5*	$C_u < 6$ and / or $1 > C_c > 3$	Gap-Graded or Uniform Sands, Gravelly Sands
		SM	12 or More*	$PI < 4$ or Below A-Line	Silty Sands, Silty Gravelly Sands
		SC	12 of More*	$PI \geq 7$ and On or Above A-Line	Clayey Sands, Clayey Gravelly Sands
Fine-Grained (Over 50% by Weight Finer than No. 200 Sieve)	LOW Compressibility (Liquid Limit Less Than 50)	ML	Plasticity Chart		Silts, Very Fine Sands, Silty or Clayey Fine Sands, Micaceous Silts
		CL	Plasticity Chart		Low Plasticity Clays, Sandy or Silty Clays
		OL	Plasticity Chart, Organic Odor or Color		Organic Silts and Clays of Low Plasticity
	HIGH Compressibility (Liquid Limit Greater Than 50)	MH	Plasticity Chart		Micaceous Silts, Diatomaceous Silts, Volcanic Ash
		CH	Plasticity Chart		Highly Plastic Clays and Sandy Clays
		OH	Plasticity Chart, Organic Odor or Color		Organic Silts and Clays of High Plasticity
Soils with Fibrous Organic Matter		PT	Fibrous Organic Matter, Will Char, Burn, or Glow		Peat, Sandy Peats, and Clayey Peat

*For Soils having 5 to 12 percent passing the No. 200 Sieve, use a dual symbol such as GW-GC.