Hamilton 45

Preliminary Geotechnical Engineering Report

October 25, 2023 | Terracon Project No. HF235121

Prepared for:

Duke Energy Florida, LLC
400 N. Spring Garden Avenue
DeLand, Florida 32720

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October 25, 2023

Duke Energy Florida, LLC
400 N. Spring Garden Avenue
DeLand, Florida 32720

Attn: Chris Wimsatt
P: (937) 689-0583
E: Chris.wimsatt@duke-energy.com

Re: Preliminary Geotechnical Engineering Report
Hamilton 45
US Highway 41
Jasper, Florida
Terracon Project No. HF235121

Dear Mr. Wimsatt:

We have completed the scope of Preliminary Geotechnical Engineering services for the above referenced project in general accordance with Terracon Proposal No. PHF235121 dated September 14, 2023. This report presents the findings of the subsurface exploration and provides preliminary geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon

JAY WILLIAM CASPER
LICENSE
No 36330
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

10/25/2023

Joshua C. S. Rakestraw, EI
Staff Engineer

Jay W. Casper, PE
Senior Principal
Florida PE No. 36330

This document has been digitally signed and sealed by Jay W. Casper, PE 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.

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Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Preliminary Geotechnical Engineering services performed for the proposed facility to be located at US Highway 41 in Jasper, Florida. The purpose of these services was to provide information and geotechnical engineering recommendations relative to the following:

- Boring logs with field and laboratory data
- Stratification based on visual soil classification
- Groundwater levels observed during drilling
- Site Location and Exploration Plans
- Subsurface exploration procedures
- Description of subsurface conditions
- Estimated seasonal groundwater fluctuations
- Preliminary recommended foundation options
- Preliminary site preparation/earthwork recommendations
- Preliminary pavement considerations
- Preliminary geotechnical engineering stormwater management considerations

The geotechnical engineering scope of services for this project included the advancement of seven standard penetration test (SPT) borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and as a separate table in the **Exploration Results** section.

Project Description

Item	Description
Information Provided	An email request for proposal was provided by Chris Wimsatt on September 6, 2023. The request included a Duke Energy Site Readiness document which included a general approach to potential development.

Item	Description
Project Description	45 acres along US Highway 41, opposite of 4661 US Highway 41, south of Jasper, Florida. The proposed site is west of the Norfolk Southern Railspur. Two alternate conceptual development plans were provided: ▪ Concept 1 includes 2 industrial facilities (165,000-sf and 225,000-sf), associated parking and drive areas, and 3 stormwater management ponds. ▪ Concept 2 includes a 435,000-sf industrial facility, associated parking and drive areas, and 3 stormwater management ponds.
Building Construction	Not provided; we anticipate that the facilities will be constructed using concrete tilt-up panels and slab-on-grade construction techniques
Finished Floor Elevation	Not provided; we anticipated that finished floors may be up to about 5 feet above existing site grades.
Maximum Loads	In the absence of information provided by the design team, we will use the following loads in estimating settlement based on our experience with similar projects. ▪ Columns: 500 kips ▪ Walls: 10 kips per linear foot (klf) ▪ Slabs: 250 pounds per square foot (psf)
Pavements	We have assumed both rigid concrete and flexible asphalt pavement sections may be considered in future development plans.
Stormwater	We anticipate that 3 stormwater ponds will be constructed for the proposed development. The layout and grading of the ponds will depend on the site constraints, depth to water, and soil conditions.

Terracon should be notified if any of the above information is inconsistent with the planned construction (e.g., maximum loads and limits of grading) as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located east of US Highway 41 and south of Jasper, Florida. Parcel Area: 45 acres Latitude/Longitude (approximate) 30.50490° N, 82.93988° W See **Site Location**
Existing Improvements	Unimproved area with an apparent natural gas right-of-way bisecting the site in the east to west direction. A substation facility is located near the northwestern boundary and a railroad runs along the eastern boundary of the parcel.
Current Ground Cover	Mostly grasses.
Existing Topography	The parcel appears to consist of gentle rolling hills. Site elevations vary from about EL 120 feet to EL 135 feet, NGVD29 datum.

Geotechnical Characterization

Soil Conditions

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** and the GeoModel can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Silty Sand**	Mostly silty sand, some cementation near surface, occasional layers of cleaner sand
2	**Clayey Sand**	Sand with varying amounts of clay, can contain silt
3	**Clay**	Clay with varying amounts of sand

The subsurface was generally characterized by a veneer of loose to medium dense silty sand with occasional sand layers (Model Layer 1) to a depth of about 2 to 6 feet-bgs (below ground surface), underlain by layers of loose to medium dense clayey sands (Model Layer 2) and clays (Model Layer 3). The clay soil layers ranged in thickness from about 1 foot up to about 15 feet. The clays encountered tended to be below about 13.5 feet and stiff to hard. In most borings we encountered a layer of sand to silty sand below a confining layer of clayey sands to sandy clays. The depth of this layer tended to be 13.5 to 15 feet-bgs and ranged from about 5 to 15 feet thick.

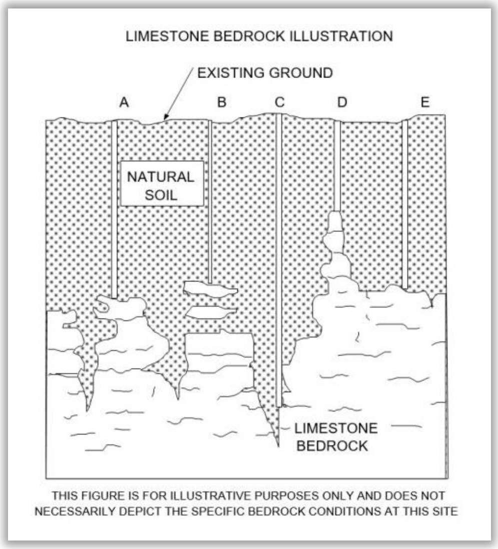
Groundwater

The groundwater levels observed during our exploration, taken while drilling, were determined based on the moisture observed in the recovered sample. Groundwater was observed in samples at an estimated depth of 13.75 feet. However, this does not mean groundwater is not present in the area of the other borings and at higher levels. Due to the low permeability of the soils encountered in the borings, a relatively long period of time may be necessary for the groundwater level to develop and stabilize in a borehole. The groundwater observations are illustrated on the **GeoModel** and annotated on the boring logs in **Exploration Results**.

The field exploration described in this report was conducted during a period of relatively dry weather. Due to the clayey soils and topography of the site, we anticipate shallow perched groundwater conditions may be present above the clayey soils (GeoModel Layers 2 and 3) during seasonal periods of higher precipitation. The term "perched" is used to describe a condition where water becomes temporarily to semi-permanently entrapped within a zone of relatively permeable soils (e.g., sands with silt and silty sands) overlying a zone of relatively impermeable/hydraulically restrictive soils (e.g., clayey sands, clay, cemented/very dense soil). Otherwise, based on NRCS mapping, groundwater levels should remain at depths of 4 to 6 feet or more at the highest elevations of the site, with potentially a few areas at the site boundaries with shallower groundwater.

Groundwater level fluctuations may occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. Long-term observations in piezometers or observation wells sealed from the influence of surface water are often required to define permanent groundwater levels. Therefore, groundwater levels during construction or at other times in the life of the structure may be different than the levels indicated on the boring logs, and the possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Florida's Karst Geology



Karst is a distinctive landscape that commonly occurs where carbonate bedrock strata (i.e. limestone) are subjected to dissolution weathering by even slightly acidic surface and ground water. Rainwater picks up carbon dioxide from the atmosphere and as it infiltrates down through the soil profile. The weathering is typified by a chemical solutioning process that progresses along joints, fractures and bedding planes in the bedrock. This process often results in a highly irregular rock profile, often referred to as "pinnacling", that contains deep weathered slots filled with soft soils. Voids are created as the bedrock dissolves and over time widened fractures, solution cavities, and caves form. This may progress to ground subsidence and/or sinkholes as soil overburden ravels into or is eroded by groundwater into the subsurface voids.

Limestone or other indicators of sinkhole activity were not encountered within a depth of 50 feet bgs in the two deeper borings on site. Prediction of future subsidence or collapse is very difficult, and even an extensive subsurface exploration cannot rule out the possibility of ground subsidence. As with any site underlain by a carbonate bedrock formation, karst activity is on-going and there is always the risk of future impact to ground-supported structures. Regardless of the preventative measures and remediation, the Owner must understand and accept the inherent risk for development in this region of Florida.

Geotechnical Overview

The site appears suitable for the anticipated construction based upon geotechnical conditions encountered in the exploration, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Based on the conditions encountered and estimated load-settlement relationships, single to multi-story structures with maximum column loads of up to 500 kips can be supported on conventional shallow foundations.

The near surface, clayey sands could become unstable with typical earthwork and construction traffic, especially after precipitation events. The effective drainage should be completed early in the construction sequence and maintained after construction to avoid potential issues. If possible, the grading should be performed during the warmer and drier times of the year. Detailed site preparation recommendations, including subgrade improvement and fill placement, can be provided in a final Geotechnical Report. A final report can provide detailed pavement section thickness design if design traffic loading information is made available.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Preliminary Earthwork

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide preliminary recommendations for use in the preparation of specifications for the work.

Site Preparation

Prior to placing fill, existing vegetation and root mat should be removed. Complete stripping of the topsoil should be performed in the proposed building and parking/driveway areas.

Normal or traditional site preparation procedures should be sufficient for the intended use at this site. The normal or traditional procedures include surface vibratory compaction and/or proof-rolling of the exposed natural sandy soils on the site prior to any fill placement. Clean sand fill to reach the projected final grades is typically placed and compacted in thin lifts, while performing density tests to verify compaction to a minimum of the soils' ASTM D1557 maximum density (usually 95 to 98 percent of ASTM D 1557 maximum dry density). It should be noted that very little clean sand was found on the site.

It may be necessary to implement site drainage measures prior to or concurrent with initial mass grading and may include excavation of perimeter ditches with supplemental lateral ditches extending into the site, as required. Ditches may need to be constructed and maintained to gravity drain throughout the site preparation process. Failure to protect the subgrade soils and control surface water runoff can significantly impact the earthwork construction schedule and result in unnecessary reworking of the subgrade.

The Contractor should be prepared to cope with shallow perched groundwater conditions at this site during periods of heavy rainfall. Pumping equipment may be utilized if the collector ditch system cannot effectively gravity drain water away from the site, especially during the rainy season.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material placed under and within 10 feet of structures and pavements or material used to construct sloped embankments supporting roadways or structures. Imported structural fill should generally consist of sandy soil with less than about 15% "fines", material passing the No. 200 sieve, (Unified Soil Classification of SP, SP-SM, or SM). The near surface sandy to silty sand soils encountered in the borings to depths between 2 and 6 feet-bgs are generally considered acceptable for use/reuse as structural fill. However, the on-site silty sand soils generally contained between 15 to 20% fines and will be difficult to dry and compact when wet. Clayey sands encountered below the surficial silty sand layers are generally not recommended for reuse as structural fill, as they are difficult to compact and can become unstable if exposed to moisture. It is recommended that further testing be performed to determine fill suitability, particularly from pond excavations, once a final site plan has been completed.

Earthwork Construction Considerations

After initial proofrolling and compaction, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

Earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proof-rolling and mitigation of areas delineated by the proof-roll to require mitigation, and quality control of compacted materials including laboratory compaction testing (Modified Proctor per ASTM D 1557) and field density testing of existing site subgrade soils and structural fill.

Preliminary Foundations

The borings did not encounter soil conditions that would preclude conventional shallow foundation support of structures up to the maximum loads stated in this report. Heavier structures could also likely utilize shallow foundation support; however, additional borings would be necessary to adequately explore soils likely to experience stress increase from larger heavier structures. Site grading requirements would need to consider the relatively shallow clayey soils at some locations and the potential for perched groundwater levels to provide acceptable site drainage and bearing conditions for building and pavement support.

Detailed bearing capacity and settlement evaluation will be required in final design-level geotechnical explorations for specific structures once development plans are finalized.

Preliminary Pavements

Typical flexible pavement sections on sites with similar subsurface conditions include natural sandy subgrade, a compacted stabilized subgrade, a compacted base course layer and an asphaltic concrete wearing surface. Typical rigid pavement sections would include a compacted free-draining subgrade and typically unreinforced Portland cement concrete wearing surface. Site grading should be planned to establish a minimum separation of 24 inches between the bottom of the base course and the seasonal high groundwater levels for flexible pavements and 18 inches between the bottom of the concrete surface and the seasonal high groundwater level for rigid pavement. A minimum of 18 inches of relatively clean sand is recommended below concrete pavements, which would likely require import of clean sand materials due to its scarcity on site.

Preliminary Stormwater Management Considerations

The relatively shallow clayey sand to fat clay soils encountered on the site could severely affect the design or performance of stormwater management facilities. Even the sandy layers are primarily silty sands and may have a relatively low permeability. Based upon the subsurface conditions and depending on site grading and stormwater facility locations, we would expect that dry ponds may need artificial drainage assistance such as underdrains to achieve adequate recovery performance.

Final Geotechnical Evaluation

The scope of this evaluation was preliminary in nature for due diligence evaluation of the subsurface conditions at the property and was not intended to develop final design level geotechnical recommendations. As plans move forward, we would be pleased to provide proposals for Final Geotechnical Engineering Explorations of specific developments or sites within the project area.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until additional design level exploration is performed, or during or after construction. Terracon should be retained as the Geotechnical Engineer to provide additional design level geotechnical exploration, as well as observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

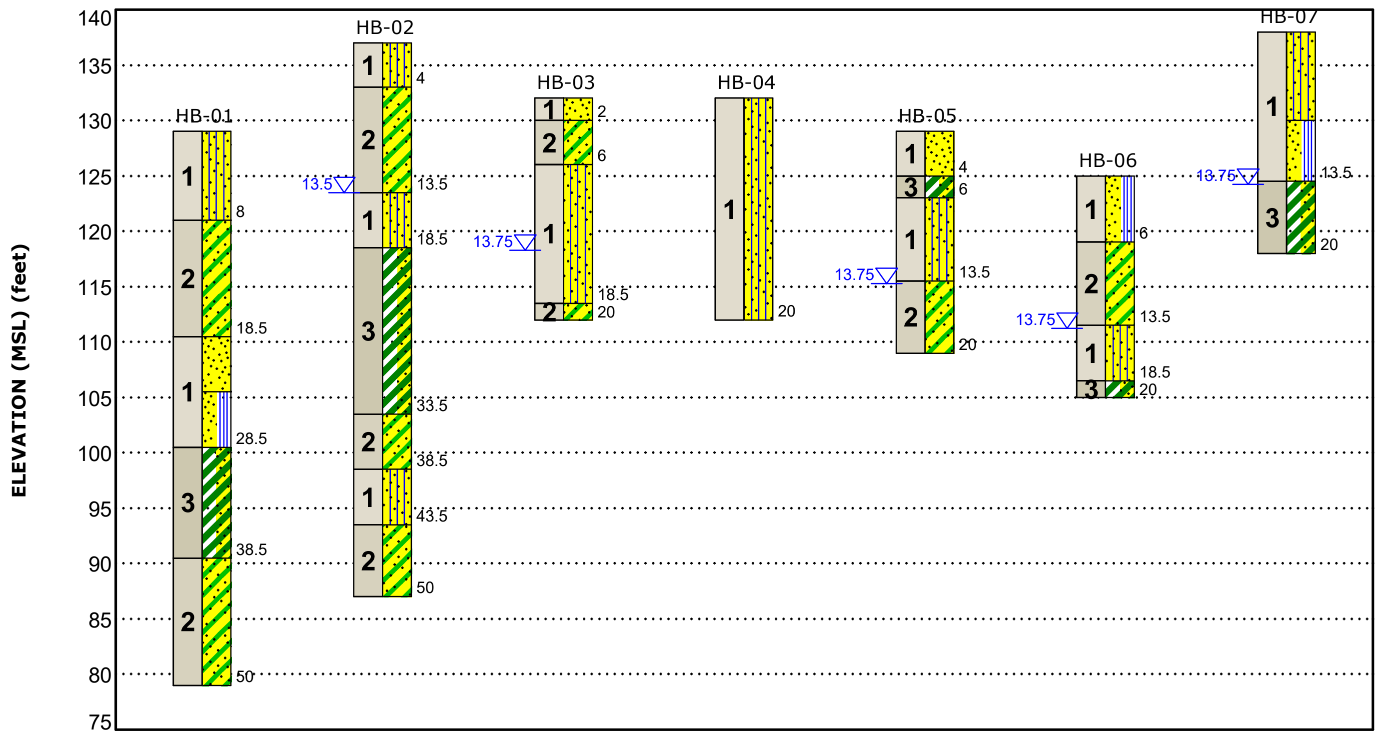
Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Figures

Contents:

3559 Timberlane School Rd
Tallahassee, FL

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	**Silty Sand**	Mostly silty sand, some cementation near surface, occasional layers of cleaner sand
2	**Clayey Sand**	Sand with varying amounts of clay, can contain silt
3	**Clay**	Clay with varying amounts of sand

Legend

First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
5	20	Potential Development Area
2	50	

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±20 feet) and referencing existing site features. Approximate ground surface elevations were obtained using Google Earth. If a more precise boring layout is desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using a mud rotary drilling technique. In the mud rotary procedure, drilling fluid was circulated in the boreholes to stabilize the borehole walls and flush soil cuttings to the surface. Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon is recorded at an interval of 6 inches. The sum of blows in the second and third interval of a normal 18-inch or 24-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value (N). The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. The groundwater levels are shown on the attached boring logs.

Log Recording: The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Fines Content
- Atterberg Limits

The laboratory testing program included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System. The estimated group symbol for the Unified Soil Classification System is shown on the boring log and a brief description of the Unified Soil Classification System is included in the supporting information section of this report. Laboratory test results have been tabulated in the Attachments and presented on the individual Boring Logs.

Site Location and Exploration Plans

Contents:

Note: All attachments are one page unless noted above.

Site Location

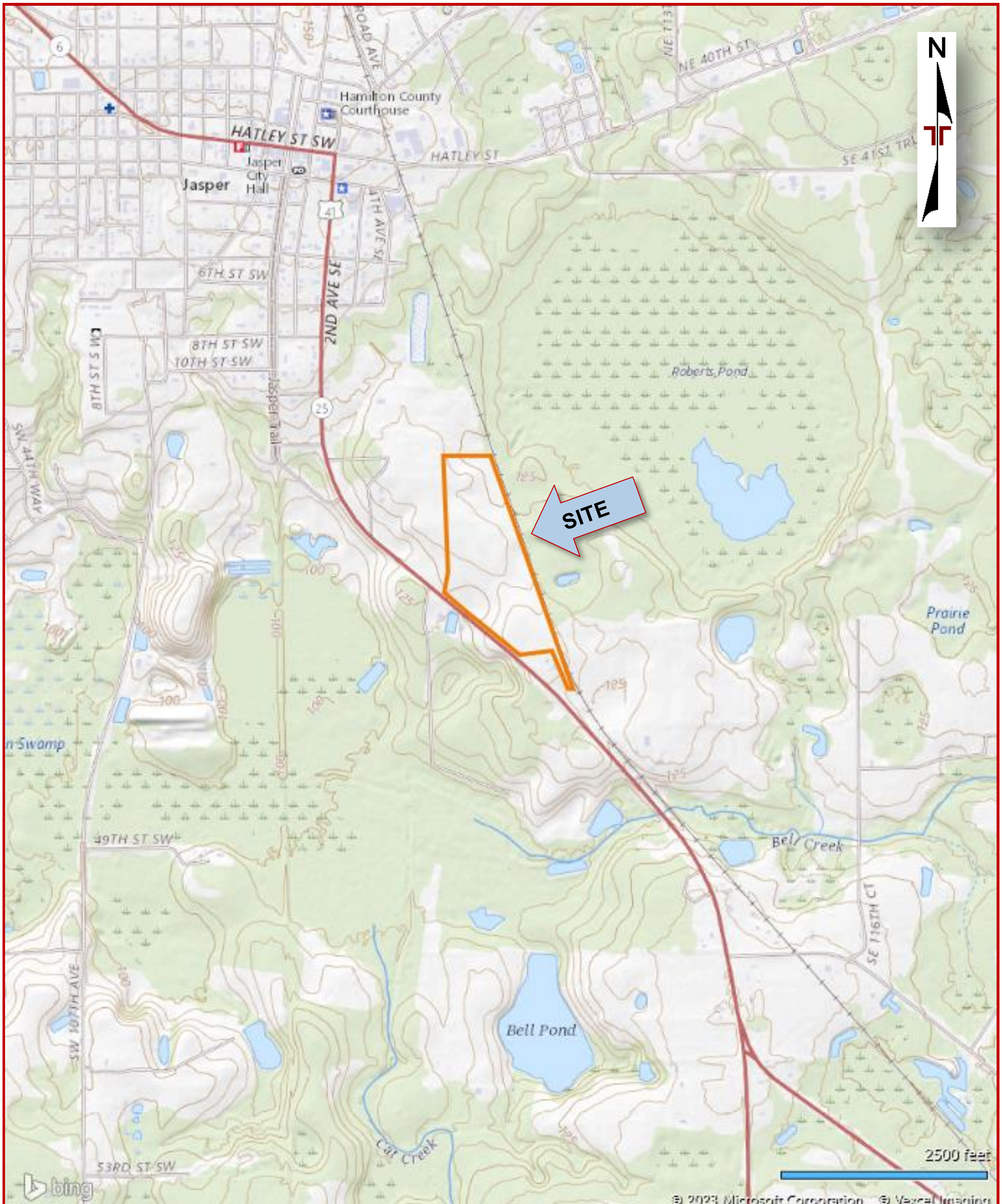


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

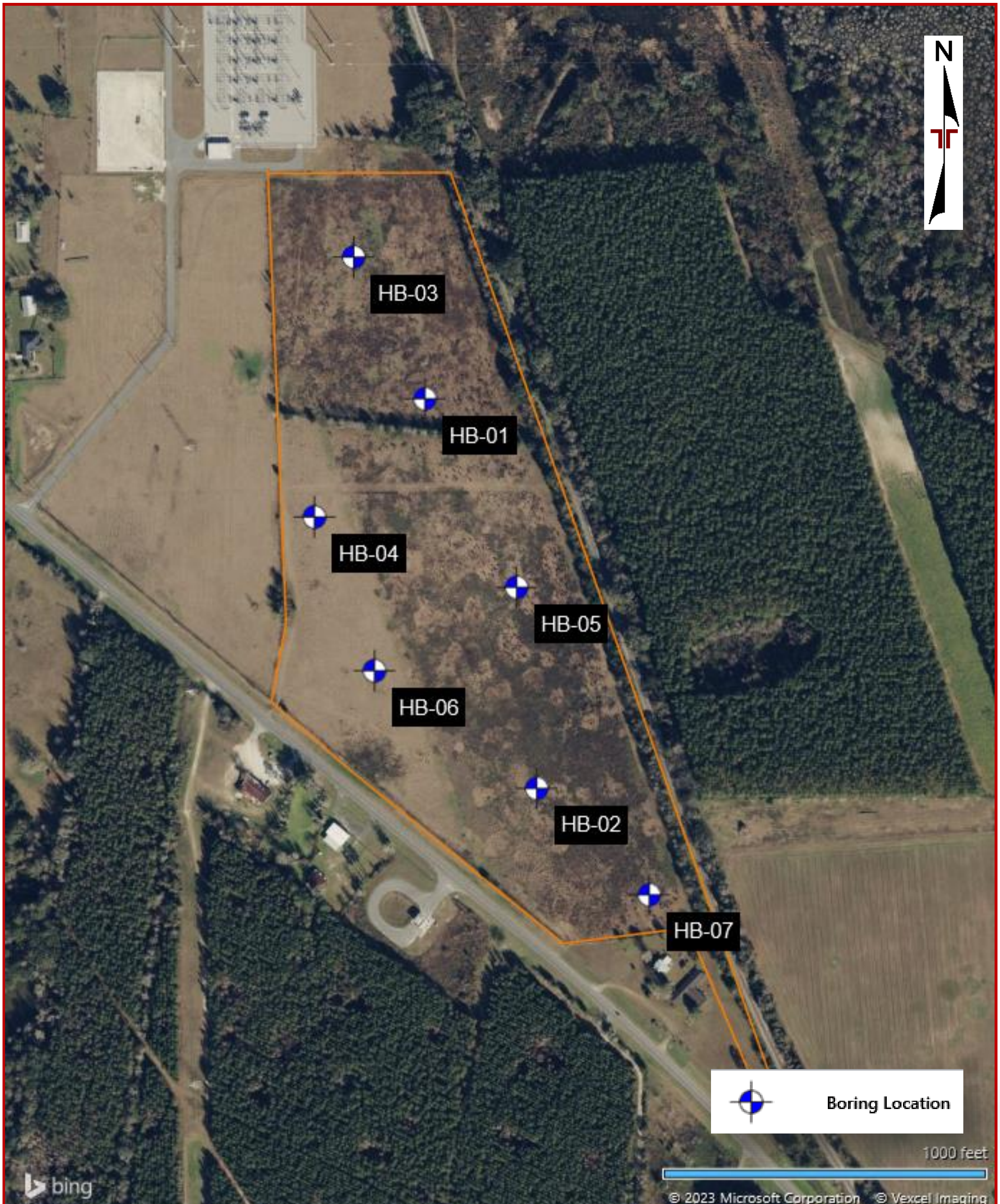


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless noted above.

Hamilton 45
US Highway 41 | Jasper, Florida
Terracon Project No. HF235121

Terracon
3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-01

Location: See Exploration Plan

Latitude: 30.5062° Longitude: -82.9401°

Elevation: 129 (Ft.) +/-

Model Layer	Depth (Ft.)	Description	Elevation (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1	8.0	**SILTY SAND (SM)**, trace roots, fine grained, brown, loose below 4 feet - reddish brown below 6 feet - light brown	121			3-3-2-2 N=5 2-2-3-4 N=5 5-4-4-3 N=8 3-3-4-4 N=7			
2	18.5	**CLAYEY SAND (SC)**, reddish grayish brown, loose to medium dense below 13.5 feet - light brownish gray	110.5			4-4-3-4 N=7 5-6-8 N=14	15.5	29-12-17	29
1	23.5	**POORLY GRADED SAND (SP)**, trace clay and rock, fine grained, light brownish gray, medium dense	105.5			6-6-6 N=12			
1	28.5	**POORLY GRADED SAND WITH SILT (SP-SM)**, few rocks, fine grained, light brownish gray, loose	100.5			3-2-5 N=7			
3	38.5	**FAT CLAY WITH SAND (CH)**, reddish grayish brown, stiff to very stiff	90.5			3-4-5 N=9 7-7-8 N=15			
2	50.0	**CLAYEY SAND (SC)**, fine grained, orangish gray, medium dense to dense below 48.5 feet - gray	79			8-9-7 N=16 4-9-19 N=28 12-16-20 N=36			

Boring Terminated at 50 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Water level not determined

Notes
Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

Drill Rig
BR-2500

Hammer Type
Automatic

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-09-2023

Boring Completed
10-09-2023

Terracon
3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-02

Location: See Exploration Plan

Latitude: 30.5029° Longitude: -82.9390°

Model Layer	Depth (Ft.)	Description	Elevation: 137 (Ft.) +/-
1	4.0	**SILTY SAND (SM)**, with cemented sand, fine grained, reddish brown, loose below 2 feet - brown	133
2	13.5	**CLAYEY SAND (SC)**, fine grained, grayish brown, medium dense	123.5
1	18.5	**SILTY SAND (SM)**, fine grained, green, medium dense	118.5
3	33.5	**FAT CLAY WITH SAND (CH)**, gray, stiff to very stiff	103.5
2	38.5	**CLAYEY SAND (SC)**, trace rock, fine grained, reddish gray, medium dense	98.5
1	43.5	**SILTY SAND (SM)**, fine grained, gray, medium dense	93.5
2	50.0	**CLAYEY SAND (SC)**, grayish brown, dense to very dense	87

Boring Terminated at 50 Feet

Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
3-4-4-3 N=8			
3-2-3-3 N=5			
4-4-5-5 N=9	16.0		33
15-9-8-8 N=17			
5-8-7-7 N=15			
6-8-13 N=21			
4-6-7 N=13			
3-3-3 N=6			
3-5-7 N=12			
12-12-10 N=22			
11-12-11 N=23	20.0		14
14-20-25 N=45			
19-18-20 N=38			

Depth (Ft.): 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Groundwater encountered while sampling at 13.5 feet

Notes

Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

Drill Rig
BR-2500

Hammer Type
Automatic

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-09-2023

Boring Completed
10-09-2023

Terracon
3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-03

Location: See Exploration Plan

Latitude: 30.5074° Longitude: -82.9408°

Model Layer	Graphic Log	Depth (Ft.)	Description	Elevation: 132 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		2.0	**POORLY GRADED SAND (SP)**, with cemented sand and trace roots, fine grained, reddish brown, medium dense	130			X	4-6-9-10 N=15			
2		6.0	**CLAYEY SAND (SC)**, fine grained, brown, medium dense	126			X	12-11-11-9 N=22	11.7		34
					5		X	6-6-6-4 N=12			
1		18.5	**SILTY SAND (SM)**, fine grained, brown, medium dense below 8 feet - orangish brown below 13.5 feet - few rocks, gray, loose	113.5			X	5-5-4-4 N=9			
					10		X	4-4-4-4 N=8			
					15	▽	X	3-2-2 N=4			
2		20.0	**CLAYEY SAND (SC)**, trace rocks, brownish gray, medium dense	112	20		X	4-6-9 N=15			

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ Groundwater encountered while sampling at 13.75 feet

Drill Rig
BR-2500

Hammer Type
Automatic

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-09-2023

Boring Completed
10-09-2023

Notes
Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-04

Location: See Exploration Plan

Latitude: 30.5052° Longitude: -82.9412°

Elevation: 132 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.) / Material Description	Elevation	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**SILTY SAND (SM)**, with cemented sand, trace roots, fine grained, reddish brown, loose					4-4-3-2 N=7	4.8		17
		below 2 feet - brown					4-4-3-2 N=7			
		below 4 feet - trace rock		5			3-2-2-3 N=4			
							3-3-3-2 N=6			
		below 8 feet - grayish brown		10			3-2-3-3 N=5			
				15			3-2-2 N=4			
		20.0 below 18.5 feet - mostly rock, light brown, medium dense	112	20			4-5-6 N=11			
		Boring Terminated at 20 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Water level not determined

Drill Rig
BR-2500

Hammer Type
Automatic

Notes
Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-09-2023

Boring Completed
10-09-2023

Terracon
3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-05

Location: See Exploration Plan

Latitude: 30.5046° Longitude: -82.9392°

Elevation: 129 (Ft.) +/-

Model Layer	Depth (Ft.)	Material Description	Elevation (Ft.)	Water Level Observations	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1	4.0	**POORLY GRADED SAND (SP)**, with cemented sand, trace roots, fine grained, brown, medium dense	125		3-5-4-6 N=9; 7-5-5-5 N=10			
3	6.0	**FAT CLAY WITH SAND (CH)**, gray, very stiff	123		8-5-7-7 N=12	18.1	53-17-36	50
1	13.5	**SILTY SAND (SM)**, fine grained, reddish grayish brown, medium dense; below 8 feet - grayish brown	115.5		8-9-10-10 N=19; 7-6-5-5 N=11			
2	20.0	**CLAYEY SAND (SC)**, few rock, fine grained, greenish gray, medium dense; below 18.5 feet - grayish brown	109	Groundwater at 13.75 ft	6-8-8 N=16; 4-6-7 N=13			

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Groundwater encountered while sampling at 13.75 feet

Drill Rig
BR-2500

Hammer Type
Automatic

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-06-2023

Boring Completed
10-06-2023

Notes
Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-06

Location: See Exploration Plan

Latitude: 30.5039° Longitude: -82.9406°

Elevation: 125 (Ft.) +/-

Model Layer	Depth (Ft.)	Description	Elevation	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**POORLY GRADED SAND WITH SILT (SP-SM)**, with cemented sand, few roots, fine grained, brown, loose to medium dense				4-4-6-4 N=10			
						4-4-3-2 N=7			
	6.0	below 4 feet, grayish brown	119			2-2-2-3 N=4			
2		**CLAYEY SAND (SC)**, trace rock, fine grained, reddish gray, medium dense				6-6-8-10 N=14			
	13.5	below 8 feet, gray	111.5			11-10-12-12 N=22	18.6	44-16-28	43
1	18.5	**SILTY SAND (SM)**, fine grained, gray, medium dense	106.5	▽ (13.75 ft)		5-4-6 N=10			
3	20.0	**FAT CLAY WITH SAND (CH)**, trace rock, fine grained, gray, stiff	105			3-2-4 N=6			
		Boring Terminated at 20 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ Groundwater encountered while sampling at 13.75 feet

Drill Rig
BR-2500

Hammer Type
Automatic

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-06-2023

Boring Completed
10-06-2023

Notes
Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

Terracon
3559 Timberlane School Rd
Tallahassee, FL

Boring Log No. HB-07

Location: See Exploration Plan

Latitude: 30.5020° Longitude: -82.9379°

Model Layer	Graphic Log	Depth (Ft.)	Description (Elevation: 138 (Ft.) +/-)	Elevation	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1			**SILTY SAND (SM)**, with cemented sand, trace roots, fine grained, brown, loose				X	3-3-3-2 N=6	6.1		17
			below 2 feet - trace rock, reddish brown				X	3-2-1-1 N=3			
			below 4 feet - trace rock, trace roots		5		X	2-2-1-2 N=3			
		8.0		130			X	3-3-3-3 N=6			
			POORLY GRADED SAND WITH SILT (SP-SM), few rocks, fine grained, brown, dense		10		X	6-11-15-9 N=26			
		13.5		124.5		▽					
3			**FAT CLAY WITH SAND (CH)**, green, stiff		15		X	4-5-5 N=10			
			below 18.5 feet - reddish greenish gray				X	3-3-4 N=7			
		20.0		118	20						

Boring Terminated at 20 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

▽ Groundwater encountered while sampling at 13.75 feet

Notes

Elevation Reference: Elevations were interpolated from Google Earth.

Advancement Method
Mud Rotary

Abandonment Method
Boring backfilled with bentonite grout upon completion

Drill Rig
BR-2500

Hammer Type
Automatic

Driller
Brandon H.

Logged by
Brandon H.

Boring Started
10-06-2023

Boring Completed
10-06-2023

Laboratory Testing Summary Table

Boring No.	Depth Range (feet)	Moisture Content (%)	Fines Content (%)	Atterberg Limits (LL-PL-PI)	USCS Classification
HB-01	8-10	15.5	29	29-12-17	SC
HB-02	4-6	16.0	33	-	SC
HB-02	38.5-40	20.0	14	-	SM
HB-03	2-4	11.7	34	-	SC
HB-04	0-2	4.8	17	-	SM
HB-05	4-6	18.1	50	53-17-36	CH
HB-06	8-10	18.6	43	44-16-28	SC
HB-07	0-2	6.1	17	-	SM

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

3559 Timberlane School Rd
Tallahassee, FL

General Notes

Sampling	Water Level	Field Tests
Standard Penetration Test	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		**Consistency of Fine-Grained Soils** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**Consistency**	**Unconfined Compressive Strength Qu (tsf)**	**Standard Penetration or N-Value (Blows/Ft.)**
Very Loose	< 3	Very Soft	less than 0.25	0 - 1
Loose	3 - 8	Soft	0.25 to 0.50	1 - 3
Medium Dense	8 - 24	Medium Stiff	0.50 to 1.00	3 - 5
Dense	24 - 40	Stiff	1.00 to 2.00	6 - 12
Very Dense	> 40	Very Stiff	2.00 to 4.00	12 - 24
		Hard	> 4.00	> 24

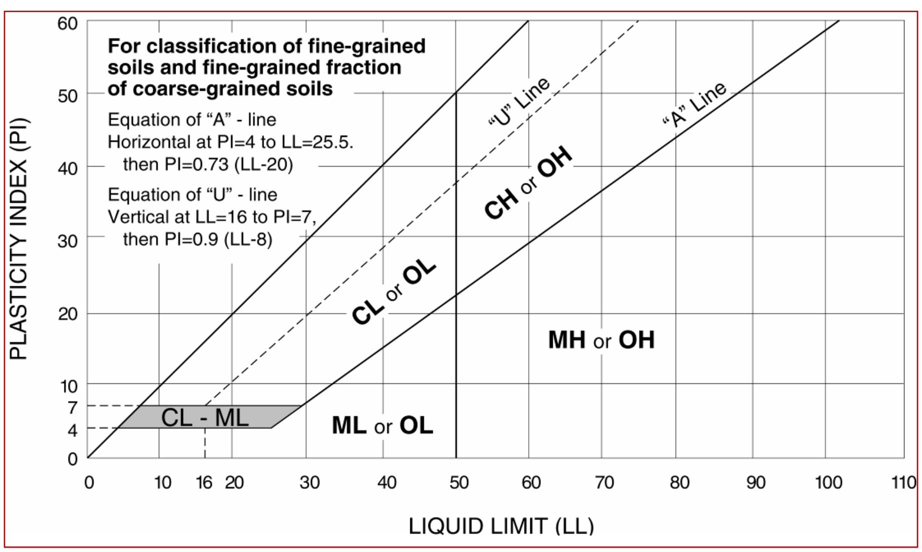
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

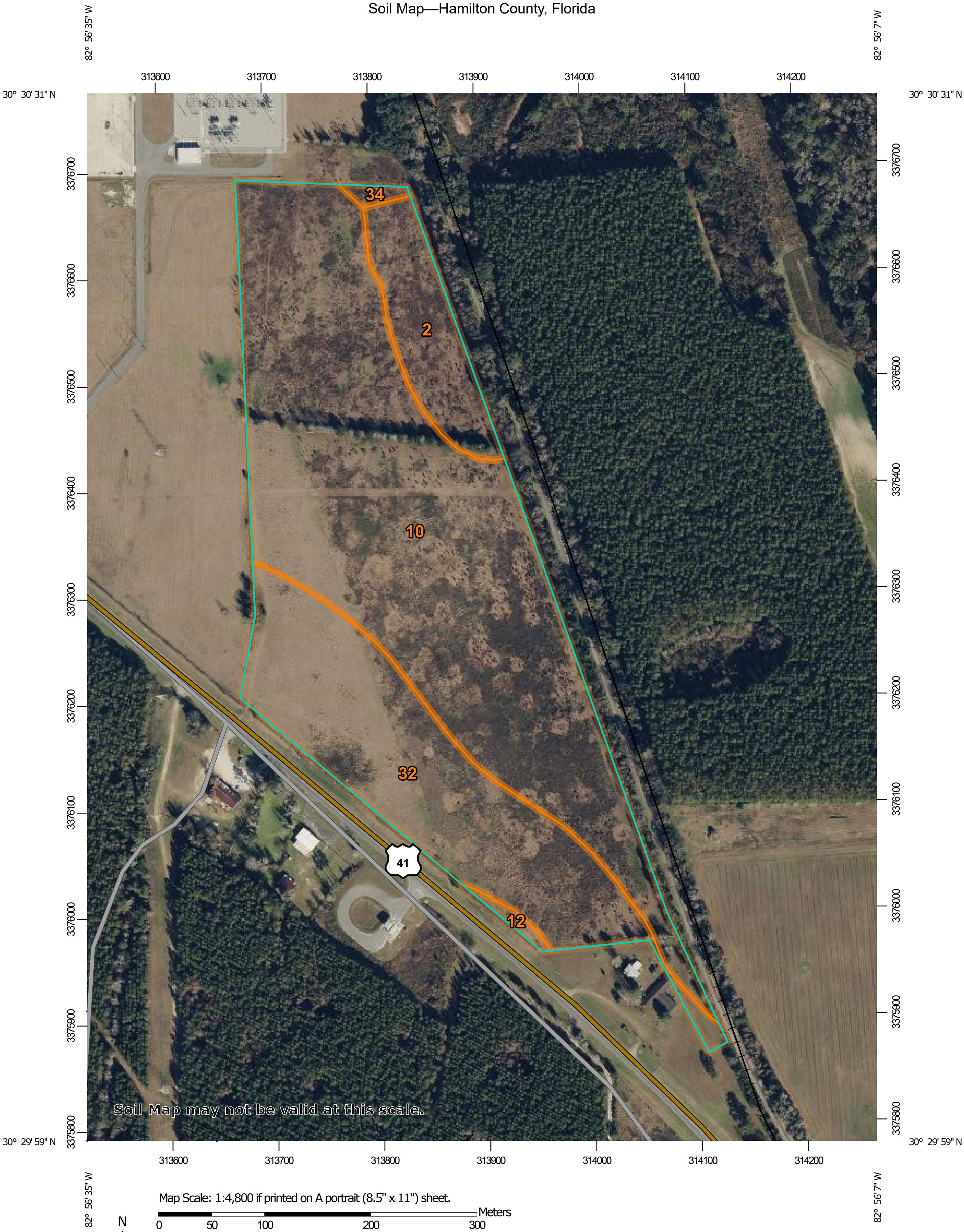
Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	**Group Name** [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Soil Map—Hamilton County, Florida



Map Scale: 1:4,800 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

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 1:24,000.

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: Hamilton County, Florida
Survey Area Data: Version 22, Aug 25, 2023

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

Date(s) aerial images were photographed: Jan 8, 2022—Mar 13, 2022

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
2	Albany fine sand, 0 to 5 percent slopes	3.5	8.2%
10	Lowndes sand, 0 to 5 percent slopes	26.9	63.0%
12	Lowndes and Norfolk soils, 8 to 12 percent slopes	0.2	0.5%
32	Norfolk loamy fine sand, 2 to 5 percent slopes	11.8	27.7%
34	Plummer sand	0.2	0.5%
Totals for Area of Interest		**42.6**	**100.0%**