CAVIN
GEOTECHNICAL &
ENVIRONMENTAL, LLC

February 22, 2021
CGE Project No. G21006

TO: **Howe Ecological, LLC.**
732 Riverbend Blvd,
Longwood, FL 32779
Attn: Mr. Michael Howe

SUBJECT: **Preliminary Geotechnical Investigation**,
7.7 Acre Wedding Barn Property on Franklin Street,
Oviedo, Seminole County, Florida

Dear Mr. Howe:

In accordance with your request, Cavin Geotechnical & Environmental, LLC has completed a preliminary geotechnical investigation of the above referenced commercial. Our investigation consisted of drilling soil borings within the property for the purpose of assessing the suitability for development. The following report presents the results of our investigations and includes soil and groundwater conditions and recommendations regarding general site suitability, mass grading considerations and any limitations to conventional development identified.

SITE LOCATION AND DESCRIPTION

The subject property is located immediately south of E. Franklin Street in Oviedo, Seminole County. The site is further located in section 10 of Township 21 South, Range 31 East. A vicinity map showing the location of the property and adjacent features is presented on the USGS Quadrangle Map on **Figure 1**.

Based on the property information you provided the property encompasses 7.7 acres of vacant land, the majority of which is classified as wetland. The east approximately 1.5 acres of the property is outside the wetland boundaries. A former railroad line bisects the west portion of the property. In low lying wet areas of the site earthen fill was used to elevate the rail line.

Based on review of the latest design layout prepared by Stephens Barrios Engineering, we understand that the property will be used for special events and weddings, and will include a paved parking lot, outdoor seating areas and patios, and a 5,760 sq-ft enclosed building. Two retention areas are proposed for storage of stormwater runoff. The property is low lying, predominantly wetland and is suspected to contain organic soils.

The purpose of this investigation was to provide assessment of the soil and groundwater conditions on the property. This information was used to assess the general suitability of the property for the intended development and to identify any significant limitations to conventional site development and construction. .

SCOPE OF INVESTIGATION

The purpose of this preliminary geotechnical investigation was to assess the soil and groundwater conditions throughout the property. This information was used to prepare preliminary engineering recommendations regarding soil conditions, groundwater conditions, general suitability for development and any associated implications for mass grading and other design considerations.

In order to evaluate the site for the intended purpose the following investigation was conducted:

- Drilled eight (8) auger borings with relative density probing to a depth of 10 feet across the property.
- Conducted muck probes along the wetland boundary in the south portion of the development. A total of 2 transects were conducted with a probe spacing of approximately 25 feet.
- Assessed the encountered soils and identified any unsuitable soil layers such as organics, high plasticity clays, hardpan and/or debris.
- Prepared general site suitability recommendations for mass grading, stabilization and fill suitability.
- Approximated the seasonal high groundwater table and identified any groundwater related limitations.
- Prepared this preliminary geotechnical report including results of soil investigations, evaluation of encountered conditions and recommendations.

NRCS SOIL SURVEY

The “Soil Survey of Osceola County, Florida” published by the National Resource Conservation Service (NRCS) was reviewed. Based on this review the property is occupied by five predominant soil types. Specifics regarding the identified NRCS soil types are as follows:

- Basinger, Samsula and Hontoon soils, depressional (10). This is a nearly level and very poorly drained organic soil typically found in depressional areas. Under natural conditions the high water table is above the ground surface. Permeability is rapid throughout the profile.
- Pomello fine sand (27). This is a nearly level and poorly drained soil. The high water table is about 10 inches below ground surface. Permeability is rapid in the surface and subsurface layers and slow in the subsoil.

A copy of the NRCS soil survey map depicting the subject property is presented on the attached **Figure 2**.

FIELD AND LABORATORY INVESTIGATIONS

Soil Borings

The boring locations were chosen based on an initial conceptual development sketch provided by you. All borings were located in the field by a qualified technician. Representative soil samples were collected at each change of soil strata for visual classification. A total of eight (8) auger borings were drilled in throughout the proposed development area to a depth of 10 feet. The borings are designated as B-1 through B-8. The approximate locations of the borings are presented on an aerial photograph with development plan overlay on **Figure 3.**

Please note that a more detailed engineering design layout plan was provided subsequent to completion of all field investigations. The revised plan indicates the development will be expanded into areas which were not investigated as part of this scope. We strongly recommend that supplemental investigations be conducted in all identified expansion areas.

Probing of Organics and Organic Soils

A series of organic probes were conducted along the north wetland boundary and where the development is anticipated to encroach into the wetland system. A total of 2 transects were conducted, ranging in length from 100 to 150 feet. Probe spacing was approximately 25 along all the transects. In addition, borings B-1 through B-4 were drilled within wetland boundaries where development is proposed. These borings were used for confirmation of the organic probing and for additional delineation of organic soils. Borings B-5 through B-8 were drilled in the more upland east portion of the property. The organic probing and boring locations are shown on **Figure 3**.

Laboratory Tests

Laboratory testing was conducting on select soils samples in order to confirm the visual stratification of the collected soil samples. The tests included three (3) moisture content tests and three (3) percent fines passing the no. 200 sieve tests. In addition, two (2) tests of the percent content of organics were conducted on samples collected near the wetland system.

INVESTIGATION RESULTS

Soil Stratigraphy

The results of our field exploration program, including the stratification results and associated field test results, are graphically presented in the form of soil profiles in **Attachment A**. Soil stratification is based on review of recovered soil samples and interpretation of the field boring logs by a geotechnical engineer. The soil classification was performed using the Unified Soil Classification System.

Based on the field exploration and visual classification, the soils encountered on the property generally consisted of fine sands and slightly silty fine sands of relatively light coloration to a depth of about 7 to 8 feet, followed by clayey sands to the maximum boring depth of 10 feet. Borings drilled close to or within the on-site wetland generally encountered a surficial layer of peat or organic sand.

Organic Probing Results

The results of the organic probing and drilling are provided on **Figure 4**. Surficial organic thickness contours were also prepared based on the thickness measurements and are presented on the figure. The probing results indicated the presence of surficial organics at the majority of the probed locations. Where encountered, the surficial organics ranged in thickness from 0.5 to 4.5 feet and generally increased in thickness towards the interior south portion of the wetland. The maximum thickness was found to be about 4.5 feet at the south probing limit. Organic depths are likely to further increase beyond our probe extents towards the south. The vertical transition boundary between organics and non-organic soils appeared to be relatively well defined based on the probes and borings.

Groundwater Table

The shallow groundwater table was measured in the open boreholes after completion of drilling. The measured groundwater table depths ranged from 1..5 feet above ground to 8.0 feet below ground surface, with borings close to wetlands having shallower measured depths and more upland borings having deeper measured depts. The seasonal high groundwater table at the borings is estimated to be approximately 1.0 feet above ground surface to 5 feet below ground surface, depending on the measured location and soil conditions. A summary of the measured and estimated seasonal high groundwater depths is provided on the following table.

Boring No.	Measured Groundwater Depth (ft)	Preliminary Seasonal High Groundwater Estimate (ft)
B-1	4.8	1
B-2	1.5 (above ground)	ponded
B-3	0.2	ponded
B-4	2.0	0
B-5	8.1	6
B-6	7.5	6
B-7	5.2	3.5
B-8	3.3	1

The boring locations were not staked and survey ground elevations were not available for review when estimating the seasonal high levels presented. Once detailed survey information becomes available these estimates should be verified for accuracy.

Classification Test Results

Laboratory testing was conducting on select soils samples and included three (3) moisture content tests and three (3) percent fines passing the no. 200 sieve tests. The organic content of the stratum 7 peat/muck layer identified in borings B-2 and B-3 was visually classified and was found to have an organic content of 100%. The organic sand layer (stratum 8) identified in boring B-4 was tested in our laboratory and was found to have an organic content 12.2 %. The test results generally confirm the descriptions of these layers.

EVALUATIONS AND RECOMMENDATIONS

General Suitability for Development

Based on the investigation results the east portion of the subject property is generally considered suitable for development purposes using conventional type grading and construction methods. The near surface soil conditions were generally found to consist of moderate to light colored fine sands and slightly silty fine sands. The underlying soils were of a similar nature and occasionally of darker coloration. These soils may have some minor limitations to development and construction due to dark coloration and tendency to retain moisture.

Clayey sands were found at depths of about 7 to 8 feet at all boring locations. The encountered depths should be sufficient to avoid potential impacts to utilities, structures, or other infrastructure elements that are susceptible to ground movement.

The peat and organic sands were found to have high percent organic content and are not acceptable for in development areas or for use as fill during mass grading. These soils should be removed and replaced with select structural fill where encountered in all proposed development areas.

No other significant limitations to conventional construction were found based on the observed soil conditions.

Retention Area Design

The soil and groundwater results indicate that the site is suitable for design of wet detention systems. The property is only marginally suitable for design of dry retention systems due to high groundwater conditions. For dry retention site filling would likely be required to provide adequate separation between the seasonal groundwater table and/or first confining layer to facilitate infiltration.

The subsurface conditions in potential retention/detention areas generally consisted of permeable to moderately permeable fine sands and slightly silty fine sands to about 7 to 8 feet below grade. The seasonal high groundwater table varies in depth from above ground surface in the wetland to about 6 feet below ground surface in the more upland east portion of the site. These estimates should be refined by conducting additional soil borings and groundwater measurements as part of final design.

Pavement Considerations

In general, the existing shallow subsurface soils are considered suitable for support of a flexible (limerock) or semi-flexible (soil-cement) type pavement base. However due to high groundwater, there will be limitations as to the type of base material selected. Selection of base material may be dependent on the proposed degree of additional site filling proposed.

Surficial organics are present throughout the majority of the selected parking lot area. These soils must be removed entirely and replaced with clean sand fill prior to elevating the site and/or road construction.

Excavation of Unsuitable (Organic) Soils

The surficial organics encountered in the wetland must be removed and replaced with suitable fill soils in areas where development is proposed. Due to high groundwater levels and standing water dewatering will be required as part of the overexcavation/backfill process. Costs associated with the demucking operation (excavation, filling, mass grading, dewatering) are expected to be significant and should be considered in the preliminary planning phase.

Using the limited probe results we have preliminarily estimated the extent and depth of organics in the investigated area (see **Figure 4**). This figure may only be used for preliminary planning purposes and evaluation of project feasibility.

Please note that our drilling and probing did not sufficiently cover expansion areas identified on the most recent development plan, such as the south portions of the proposed parking lot and the retention ponds. These areas are generally further into the wetland and therefore can be expected to have organic depths in excess of the maximum depths encountered during our probing.

LIMITATIONS OF REPORT

The analyses and recommendations submitted in this report are based upon the anticipated location and type of construction discussed herein and the data obtained from the soil borings performed at the locations indicated, and does not reflect any variations which may occur beyond these borings. Shifting or moving the design layout will require additional evaluation.

This report is preliminary in nature and is intended for general suitability of the site for development and for preliminary planning purposes. Additional geotechnical investigations will be necessary as part of detailed design and permitting of the development. In areas of wetland encroachment and where organics soils are suspected additional probing and drilling is highly recommended to better define conditions.

CLOSURE

We appreciate the opportunity to provide our services on this project and trust that this report will be helpful for your preliminary design purposes. Should you have any questions concerning this report please do not hesitate to contact the undersigned.

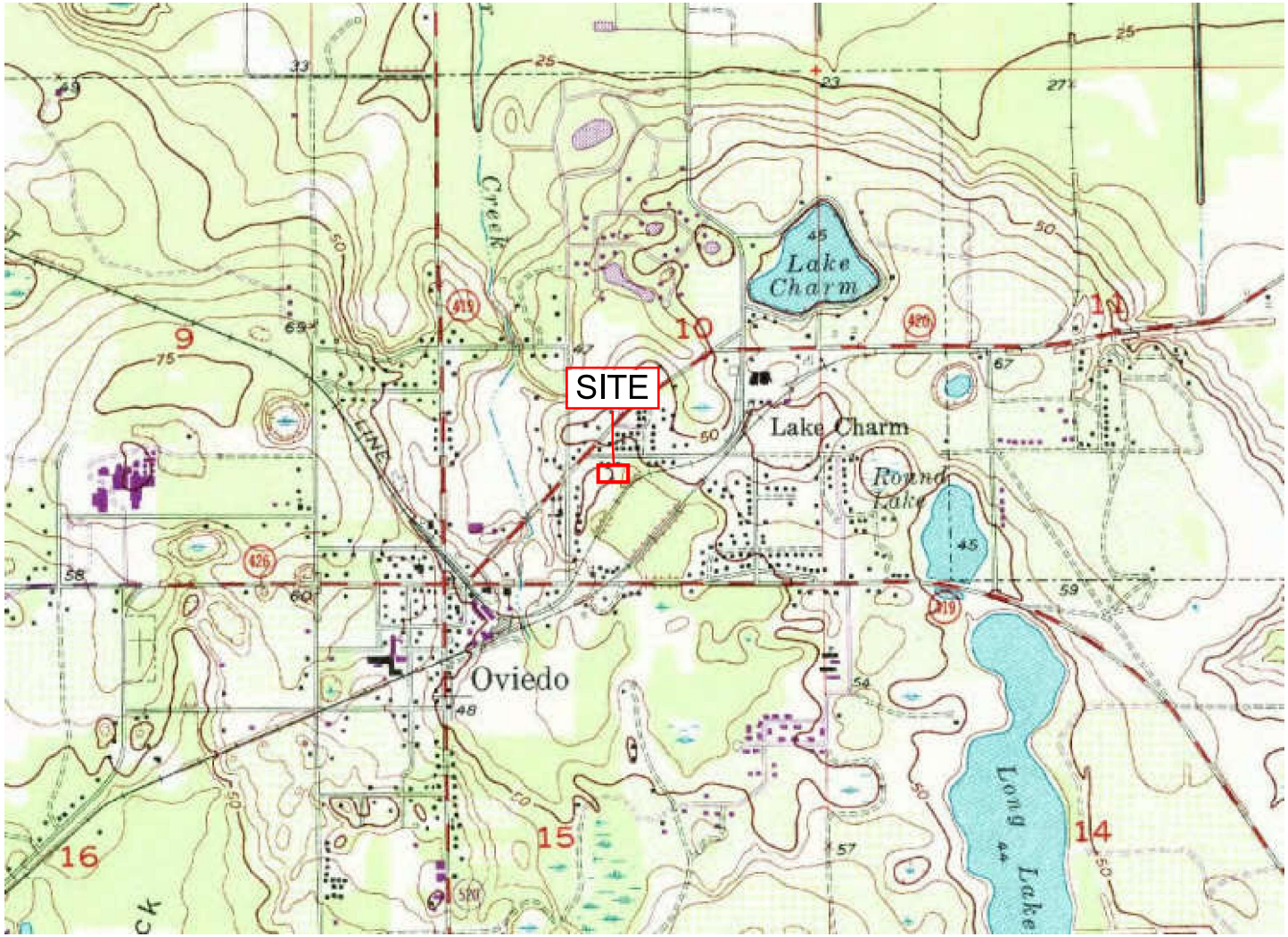
Sincerely,

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC.

T. Scott Cavin, P.E.
President
FL Registration No. 48125

Attachment A
Figures

FIGURES



REFERENCE:
U.S.G.S. 7.5 MINUTE SERIES QUADRANGLE MAP
"OVIEDO, FL" QUADRANGLE

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

PRELIMINARY GEOTECHNICAL INVEST.
PROPOSED WEDDING BARN PROPERTY
OVIEDO, SEMINLE CO. FL

U.S.G.S QUADRANGLE MAP

APPROXIMATE SCALE:	DATE:	Rev. By: TSC
1" = 2,000'	2/20/2021	Drafted By: DS

FIGURE 1

REFERENCE:
N.R.C.S. SOIL SURVEY
SEMINOLE COUNTY, FL

10 Basinger, Samsula & Hontoon Depressional
27 Pomello Fine Sand 0 to 5 Percent Slopes

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

PRELIMINARY GEOTECHNICAL INVEST.
PROPOSED WEDDING BARN PROPERTY
OVIEDO, SEMINLE CO. FL

APPROXIMATE SCALE:		
N.T.S.	2/20/2021	Drafted By: DS

N.R.C.S. SOIL SURVEY MAP

FIGURE 2

ATTACHMENT A

SOIL PROFILES

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-1

CGE Project No: G21006 Groundwater Depth: 4.8 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Gray fine sand (SP)	1	10						
1											
1.5	2		Very lt. brownish gray fine sand (SP)	2	17						
2											
2.5					20						
3											
3.5	3		Light brown slightly silty fine sand (SP-SM)	3	12						
4											
4.5					17						
5											
5.5					20						
6											
6.5	4		Light grayish brown to brown slightly silty to silty fine sand (SP-SM)(SM)	4	30						
7											
7.5					30						
8											
8.5	5		Light grayish brown to brown clayey fine sand (SC)	5	30						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
11											
11.5											
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12.5											
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Remarks:

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-2

CGE Project No: G21006 Groundwater Depth: 1.5' above grd Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Dark dark brown fibrous peat to muck (PT)	7	0						
1											
1.5					0						
2	2		Light grayish brown slightly silty to silty fine sand	4							
2.5			(SP-SM)(SM)		2						
3											
3.5	3		Light brown slightly silty fine sand (SP-SM)	3	5						
4											
4.5					7						
5											
5.5					12						
6											
6.5	4		Very light brown silty fine sand (SM)	6	15						
7											
7.5					20						
8											
8.5	5		Light grayish brown to brown clayey fine sand (SC)	5	20						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
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11.5											
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19											
19.5											
20											

Remarks:

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

Soil Boring Log

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-3

CGE Project No: G21006 Groundwater Depth: 0.2 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Dark dark brown fibrous peat to muck (PT)	7	2						
1											
1.5	2		Light grayish brown slightly silty to silty fine sand	4	7						
2			(SP-SM)(SM)								
2.5					17						
3											
3.5					16						
4											
4.5	3		Light brown slightly silty fine sand (SP-SM)	3	17						
5											
5.5					20						
6											
6.5					20						
7	4		Light grayish brown to brown clayey fine sand (SC)	5							
7.5					25						
8											
8.5					25						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
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Remarks:

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-4

CGE Project No: G21006 Groundwater Depth: 2.0 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Dark dark brown organic fine sand (SP)	8	4						
1											
1.5	2		Dark gray slightly silty fine sand (SP-SM)	9	11						
2											
2.5	3		Light grayish brown slightly silty to silty fine sand	4	20						
3			(SP-SM)(SM)								
3.5					25						
4											
4.5					25						
5											
5.5					30						
6											
6.5	4		Light brown slightly silty fine sand (SP-SM)	3	30						
7	5		Light grayish brown to brown clayey fine sand (SC)	5							
7.5					30						
8											
8.5					30						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
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Remarks:

CAVIN GEOTECHNICAL & ENVIRONMENTAL, LLC

Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-5

CGE Project No: G21006 Groundwater Depth: 8.1 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Gray fine sand (SP)	1	15						
1											
1.5	2		Very lt. brownish gray fine sand (SP)	2	20						
2											
2.5					30						
3											
3.5	3		Light brown slightly silty fine sand (SP-SM)	3	30						
4											
4.5					25						
5											
5.5	4		Light grayish brown to brown slightly silty to silty fine sand (SP-SM)(SM)	4	15						
6											
6.5					20						
7											
7.5					30						
8	5		Light grayish brown to brown clayey fine sand (SC)	5							
8.5					30						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
11											
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Remarks:

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Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-6

CGE Project No: G21006 Groundwater Depth: 7.5 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Gray fine sand (SP)	1	17						
1											
1.5					20						
2											
2.5	2		Very lt. brownish gray fine sand (SP)	2	30						
3											
3.5					30						
4											
4.5	3		Light brown slightly silty fine sand (SP-SM)	3	25						
5											
5.5					20						
6											
6.5	4		Light grayish brown to brown slightly silty to silty fine sand (SP-SM)(SM)	4	17						
7											
7.5					27						
8											
8.5	5		Light grayish brown to brown clayey fine sand (SC)	5	30						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
11											
11.5											
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Remarks:

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Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-7

CGE Project No: G21006 Groundwater Depth: 5.2 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Light gray/brown mixed sl. silty fine sand (SP-SM)	1	10						
1											
1.5					17						
2											
2.5					25						
3											
3.5					30						
4			Light brown slightly silty fine sand (SP-SM)	3							
4.5					30						
5											
5.5					25						
6			Light grayish brown to brown slightly silty to silty fine	4							
6.5			sand (SP-SM)(SM)		25						
7											
7.5					30						
8											
8.5			Light grayish brown to brown clayey fine sand (SC)	5	30						
9											
9.5					30						
10											
10.5			Termination Depth 10'								
11											
11.5											
12											
12.5											
13											
13.5											
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20											

Remarks:

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Soil Boring Log

Sheet 1 of 1

Project: Wedding Barn - Franklin St. Location: Oviedo, FL Borehole ID: B-8

CGE Project No: G21006 Groundwater Depth: 3.3 Drill Date: 2/12/2021

Ground Elevation: Method: Auger Engineer: SC Boring By: Kpepper

Depth in feet	Sample No.	Graphic Log	Type of Soil, Color and Consistency	Stratum No.	P Reading	SPT N Value	Laboratory Testing				
							w%	-200%	LL	PI	Kv
0.5	1		Light gray/brown mixed sl. silty fine sand (SP-SM)	1	30						
1											
1.5					30						
2											
2.5	2		Very lt. brownish gray fine sand (SP)	2	30						
3											
3.5					30						
4											
4.5	3		Light brown slightly silty fine sand (SP-SM)	3	30						
5											
5.5					30						
6											
6.5					30						
7											
7.5	4		Light grayish brown to brown slightly silty to silty fine sand (SP-SM)(SM)	4	30						
8											
8.5					30						
9											
9.5	5		Light grayish brown to brown clayey fine sand (SC)	5	30						
10											
10.5			Termination Depth 10'								
11											
11.5											
12											
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Remarks: