ENVIRONMENTAL CORPORATION OF AMERICA

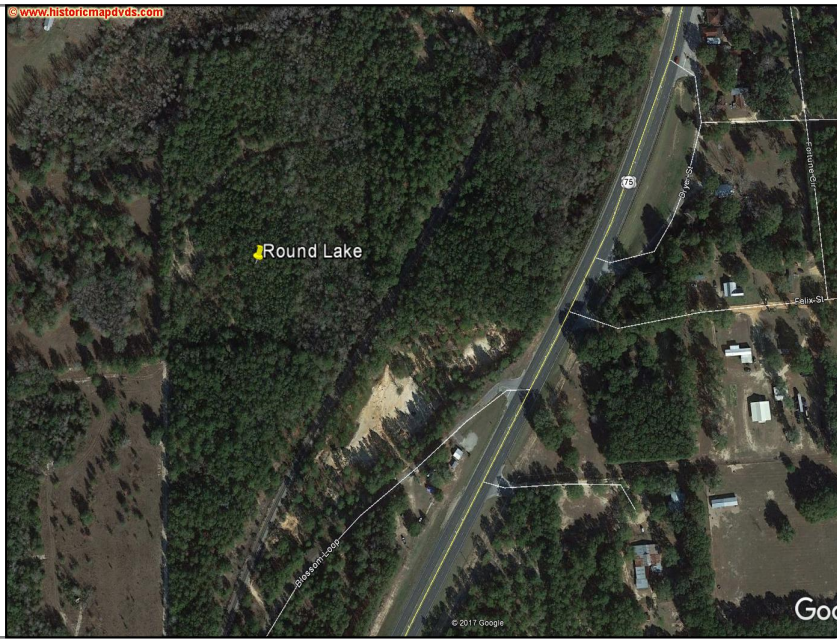
ENVIRONMENTAL | GEOTECHNICAL | WETLANDS | ECOLOGY | CULTURAL RESOURCES

Geotechnical Investigation

F8147 (Round Lake)

2441 Reedy Creed Road
Alford, Jackson County,
Florida

ECA Project No. T1252



SUBMITTED TO:

Southern Communications Services, Inc.
d/b/a Southern Linc Wireless
c/o Value Concepts, Inc.
1790 Atkinson Road NW, Suite D-100
Lawrenceville, GA 30043

PREPARED BY:

Environmental Corporation of America
1375 Union Hill Industrial Court, Suite A
Alpharetta, GA 30004

October 24, 2017

Southern Communications Services, Inc.
d/b/a Southern Linc Wireless
c/o Value Concepts, Inc.
1790 Atkinson Road NW, Suite D-100
Lawrenceville, GA 30043

Attention: Ms. Nancy Lewis

Subject: Geotechnical Investigation Report
F8147 (Round Lake)
2441 Reedy Creed Road
Alford, Jackson County, Florida
ECA Project No. T1252

Dear Ms. Lewis:

Environmental Corporation of America (ECA) is pleased to submit this report of our geotechnical investigation for the proposed project. Our services were provided as authorized by Value Concepts, Inc., via a purchase order approval dated September 26, 2017.

This report presents a review of the information provided to us, a description of the site and subsurface conditions, and our recommendations. The appendices contain a Site Location Map, a Boring Location Plan, Boring Logs, and Laboratory Testing Results.

Purpose and Scope of Work

The purpose of this investigation was to obtain specific subsurface data at the site and to provide geotechnical-related parameters for the design and construction of foundations for a new tower and associated guy anchors.

Our scope of work included the following:

- Four (4) soil test borings were drilled to depths ranging from 20 to 30 feet below the ground surface (bgs). Figure 1 shows the Site Location Map. Figure 2 shows the Boring Location Plan. Standard penetration tests (SPTs) were conducted to obtain soil samples and SPT N-values, in accordance with ASTM D-1586.

- The depth to groundwater, if any, was measured in the boring after drilling was completed.

- The soil samples were visually classified in accordance with ASTM D-2488 and a boring log was prepared. The soil conditions were evaluated by a registered professional engineer and this geotechnical report was prepared with our recommendations.

Natural moisture content measurements were conducted on selected soil samples in accordance with ASTM D-2216. Laboratory testing results are shown in Appendix C. We have recommended design parameters and settlements based on the SPT N-values, an examination of the soil samples, and our experience with similar soil conditions and structures.

Project Information

We were provided with a project site survey prepared by Point to Point Land Surveyors, Inc., and dated August 21, 2017. The proposed tower would be located at 2441 Reedy Creed Road near Alford, Jackson County, Florida. In general, the proposed tower compound is located within a hilly terrain with surface elevations ranging from 229 to 247 feet Above Mean Sea Level (AMSL) within the proposed 100-foot by 100-foot (10,000 square feet) lease area and guy anchor easements. The ground surface within the proposed lease area is heavily wooded.

We understand that plans include constructing a 320-foot tall guyed-type tower with three guy anchors, as shown on Figure 2 in Appendix A. We assume that the equipment building/cabinet will be a pre-fabricated structure supported on a perimeter grade beam, spread footing or turndown slab. The project also includes constructing a 40-foot wide ingress/egress easement.

Field Drilling Work

The fieldwork was conducted on October 11, 2017. Information obtained from the borings was used to help us evaluate the subsurface soil conditions and to assist in formulating our recommendations. The site (tower center and lease corners) was staked at the time of our field visit.

General Site Geology and Soil Subsurface Conditions (Borings B-1, B-2, B-3, and B-4)

The geology of the site is best described by the Geological Map of State of Florida, Florida Geological Survey, and Florida Department of Environmental Protection, as being within Citronelle Formation, with the primary soil type of delta, and secondary soil types of sand. The subsurface conditions were explored with four soil test borings, drilled approximately as shown on Figure 2.

Boring B-1 (Lease Area Center): In general, extending from ground surface to the full depth drilled of 30 feet below ground surface (bgs), soils consisted of very loose well-graded silty Sand and loose to medium compact clayey Sand with medium to coarse particles and trace amounts of clay to an approximate depth of 23.5 feet, underlain by stiff sandy Clay and stiff plastic silty

Clay to the explored depth of 30 feet. The soils were classified as SM, SC, CL, and CH soil types based on the Unified Soil Classification System (USCS).

The N-values within the described depths are shown on the attached boring log and ranged from 3 to 24 blows per foot (bpf) for initial clayey sand layers and from 10 to 12 bpf for sandy/silty clay layers. Natural moisture content measurements were conducted on selected soil samples and ranged from 13.1% to 22.5%.

Unconfined compressive strength (q_u) measurements were made with a calibrated pocket penetrometer. Unconfined compressive strength measurements of 2 to 2.5 tons per square foot (tsf) were reported between 23 and 30 feet bgs.

Borings B-2 (Southwest), B-3 (Southeast) and B-4 (North) were drilled near the locations of the proposed guy anchors. It is our understanding that these three borings were drilled for the evaluation of the subsurface conditions for the design of new guy anchors.

Boring B-2 (Southwest): In general, extending from ground surface to the full depth drilled of 20 feet bgs, soils consisted of stiff to very stiff silty Clay to an approximate depth of 6 feet, underlain by medium compact silty Sand with fine to medium coarse particles to the explored depth of 20 feet. The soils were classified as CH and SM.

The N-values within the described depths are shown on the attached boring log and ranged from 9 to 19 bpf for upper silty clay layers and from 14 to 22 for the lower silty sand layers. Natural moisture content measurements were conducted on selected soil samples and ranged from 5.0% to 34.0%.

Unconfined compressive strength measurements of 4 to 4.5 tsf were reported between ground surface and 6 feet bgs.

Boring B-3 (Southeast): In general, extending from ground surface to the full depth drilled of 20 feet bgs, soils consisted of very loose to loose silty Sand with medium to coarse particles and medium compact clayey Sand to an approximate depth of 6 feet, underlain by medium compact clayey Sand/sandy Clay and stiff to very stiff sandy Clay to the explored depth of 20 feet.

The soils were classified as SM, SC, SC-CL, and CL. The N-values within the described depths are shown on the attached boring log and ranged from 2 to 13 bpf for the upper silty/clayey sand layers and from 14 to 21 bpf for the lower sandy clay layers. Natural moisture content measurements were conducted on selected soil samples and ranged from 12.4% to 18.7%.

Unconfined compressive strength measurements of 2.0 to 2.5 tsf were reported between 8 and 20 feet bgs.

Boring B-4 (North): In general, extending from ground surface to the full depth drilled of 20 feet bgs, consisted of very loose to loose well-graded silty Sand and loose clayey Sand to an approximate depth of 6 feet, underlain by stiff sandy Clay and stiff to very stiff silty Clay to the explored depth of 20 feet. The soils were classified as SM, SC, CL, and CH.

The N-values within the described depths are shown on the attached boring log and ranged from 3 to 8 bpf for upper silty/clayey sand layers and from 11 to 18 bpf for the lower sandy/silty clay layers. Natural moisture content measurements were conducted on selected soil samples and ranged from 6.4% to 25.5%.

Unconfined compressive strength measurements of 2.5 to 4.5 tsf were reported between 6 and 20 feet bgs.

Groundwater Level Conditions

The table below presents the groundwater levels encountered at the site per boring.

Boring No.	Groundwater Level per Boring (At time of drilling, ATD) (feet)
Boring B-1	20
Boring B-2	Not Encountered
Boring B-3	3.5
Boring B-4	5 (Perched groundwater level)

It should be noted that groundwater level observations made within mostly cohesive soils during drilling could be misleading. It should be anticipated that the groundwater level will fluctuate due to seasonal climatic changes during the year. To determine actual groundwater level measurements, groundwater levels should be measured using observation wells installed for prolonged periods.

Foundation Recommendations

Tower Foundations

The subsurface conditions are suitable for support of the tower using a conventional shallow foundation. For the case of a conventional shallow foundation, the soils are capable of a net allowable soil bearing pressure (q_{ALL}) of 2,500 psf at a minimum depth of foundation (D_f) of 6 feet below existing grade elevation. Total and differential settlement should be less than 1-inch and ½-inch, respectively. The proposed shallow foundation should bear within the existing medium compact clayey sand (SC).

A safety factor (SF) of 3 and a wet soil unit weight (γ_{wet}) of 115 pcf should be considered for soil bearing calculations.

Tower Guy Anchors

We assume that the guy anchors will consist of a deadman or concrete blocks and that compacted backfill will be placed around the anchors to a density equivalent to 95% of the modified proctor maximum dry density (γ_{dmax}).

Based on our review of the soils encountered at the site we recommend that the anchor blocks be designed using drained and undrained strength parameters ($\phi>0$, $S_u>0$), based on the type of soil. The following table presents our review of the subsurface conditions encountered in each of these borings at the proposed guy-anchor locations. We offer the following average soil design parameters for the design of the new guy anchors:

Boring No. (Guy Anchor No.)	Depth Below Ground (feet)	Soil Unit Weight (γ_{wet}) (pcf)	Friction Angle (ϕ) (deg)	K_p	Soil Cohesion (S_u) (psf)
B-2 (Southwest)	0-2	115	0	1.00	750
	2-6	120	0	1.00	1,500
	6-20	115	30	3.00	0
B-3 (Southeast)	0-2	85	24	2.37	0
	2-6	105	26	2.56	0
	6-8.5	110	28	2.77	0
	8.5-20	115	0	1.00	1,500
B-4 (North)	0-2	85	24	2.37	0
	2-6	105	28	2.77	0
	6-20	115	0	1.00	1,500
*Below the groundwater level designer should consider the buoyant unit weight (γ_b) = $\gamma_{wet} - \gamma_{water}$.					

Guy anchor concrete blocks should be founded at a minimum depth of foundation (D_f) between 4 and 6 feet below final grade elevations.

Building Foundations

The proposed equipment building can be supported on a perimeter grade beam, spread footing or turndown slab foundation. For the design of the building foundation the soils are capable of a maximum net allowable soil bearing pressure (q_{ALL}) of 2,000 psf. A minimum depth of foundation (D_f) of 1.5 feet below final grades should be considered. Total and differential settlements should be less than 1/2-inch and 1/4-inch, respectively.

For the design of floor concrete slabs, the designer may consider a modulus of subgrade reaction (K_s) of 72 kips/ft^3. Bearing pad should be prepared and compacted prior to placing any concrete. Prospective contractors should verify the Fill Placement section of this report.

For these foundations, ECA recommends a minimum concrete strength (f'c) of 4,000 psi with a corresponding mix design slump between 4 and 8 inches. We recommend a value of 150 pounds per cubic foot (pcf) for concrete.

Soil Site Class

Based on our site evaluation and the information provided by the International Building Code (IBC-2006/2009), to perform a dynamic analysis, the client's design engineer should consider that the soils at the site fall under a ***Stiff Soil Profile and Site Class*** S_D, with SPTs between 15 and 50 blows per foot.

The design spectral response acceleration parameters obtained from the United States Geological Survey (USGS) website and corresponding to the following site coordinates: Latitude 30.65044°N and Longitude 85.39953°W and are as follows:

International Building Code (IBC 2006/2009)	**Spectral Response Acceleration Parameters (g)**
IBC 2006	0.102g
IBC 2009	0.078g

Foundation Excavations

A groundwater level *was encountered* in three Borings B-1, B-3, and B-4. For Boring B-1 a groundwater level was encountered, but not near the expected depth of foundation. For all guy anchors excavations, the prospective contractor *would need to consider* excavation dewatering.

To avoid softening of the shallow soils exposed at the foundation bearing level, excavations should not be left open for extended periods prior to placing reinforcing steel and concrete. If rain or freezing weather is expected, excavations should not be completed. Leaving the excavations at least 1-foot above final grade should protect the bearing soils from deterioration.

If the excavation must remain open overnight or if rainfall becomes imminent while the bearing soils are exposed, we recommend that a 2 to 4-inch thick "mud-mat" of "lean" (2,000 psi) concrete be placed on the bearing soils before the placement of reinforcing steel. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete.

Fill Placement

Borrow materials for fill, **unless otherwise specified**, should consist of essentially granular material (GM, GP, GM, GC, SW, SP or SM soil symbols from the Unified Soil Classification System); A-2-6 or better, AASHTO Classification, as approved by the **Project Geotechnical Engineer**. These should be free from vegetation and should not contain rocks greater than 6 inches in size. Soils excavated within the vicinity of Boring B-1 can use as backfill material.

Any placed backfill required to attain finished grade should be placed in an engineered fashion with layers not exceeding 8 to 10-inch thick lifts and compacted to not less than 95% of the Modified Proctor Maximum dry density, as determined by method ASTM D-1557. The soil moisture content should be close to the optimum moisture content. All required fill should meet the specified compaction criteria.

Field density tests should be conducted at routine intervals as the fill is being placed to verify that adequate compaction is achieved. Prior to placing any new fill, any soft or loose near surface soils should be removed and the area Proof-Rolled with a heavy vehicle or a heavy compaction vibratory roller to confirm that any unsuitable soil conditions have been discovered.

ECA does not know the capability of the surficial soil to support pavements. However, we suggest that the upper soils be replaced by granular fill in areas of heavy traffic to improve the subgrade support capabilities and moisture sensitivity.

Stability of Excavations

Proposed project excavation depths for foundation construction must not exceed those specified by either local, state or federal safety regulations. At a minimum, excavation safety standards created by OSHA (Occupational and Safety Health Administration) and the OSHA 29 CFR Part 1926 regulation should be enforced.

Basis for Recommendations

The subsurface conditions encountered at the boring locations are shown on the Boring Logs in Appendix B. The Boring Logs represent our interpretation of the subsurface conditions based on the field log and visual examination of field samples by an engineer. The lines designating the interface between various strata on the Boring Logs represent the approximate interface locations. In addition, the transition between strata may be gradual. The water level shown on the Boring Log, if any, represents the condition only at the time of our exploration.

The recommendations contained herein are based in part on project information provided to us and only apply to the specific project and site discussed in this report. If the project information section in this report contains incorrect information or if additional information is available, please let us know so that we may review the validity of our recommendations.

Regardless of the thoroughness of a geotechnical investigation, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations to solve the problems created. ECA is best qualified to provide this service based on our familiarity with the project, the subsurface conditions, and the intent of

the recommendations and design. We wish to remind you that we will store the soil samples for 30 days. The samples will then be discarded unless you request otherwise.

We will be happy to discuss our recommendations with you and look forward to providing the additional studies or services necessary to complete this project. We appreciate the opportunity to be of service.

Please call us with any questions at (770) 667-2040.

Sincerely,
Environmental Corporation of America

HECTOR A. ACOSTA LICENSE No. 78902 10-24-17 STATE OF FLORIDA PROFESSIONAL ENGINEER

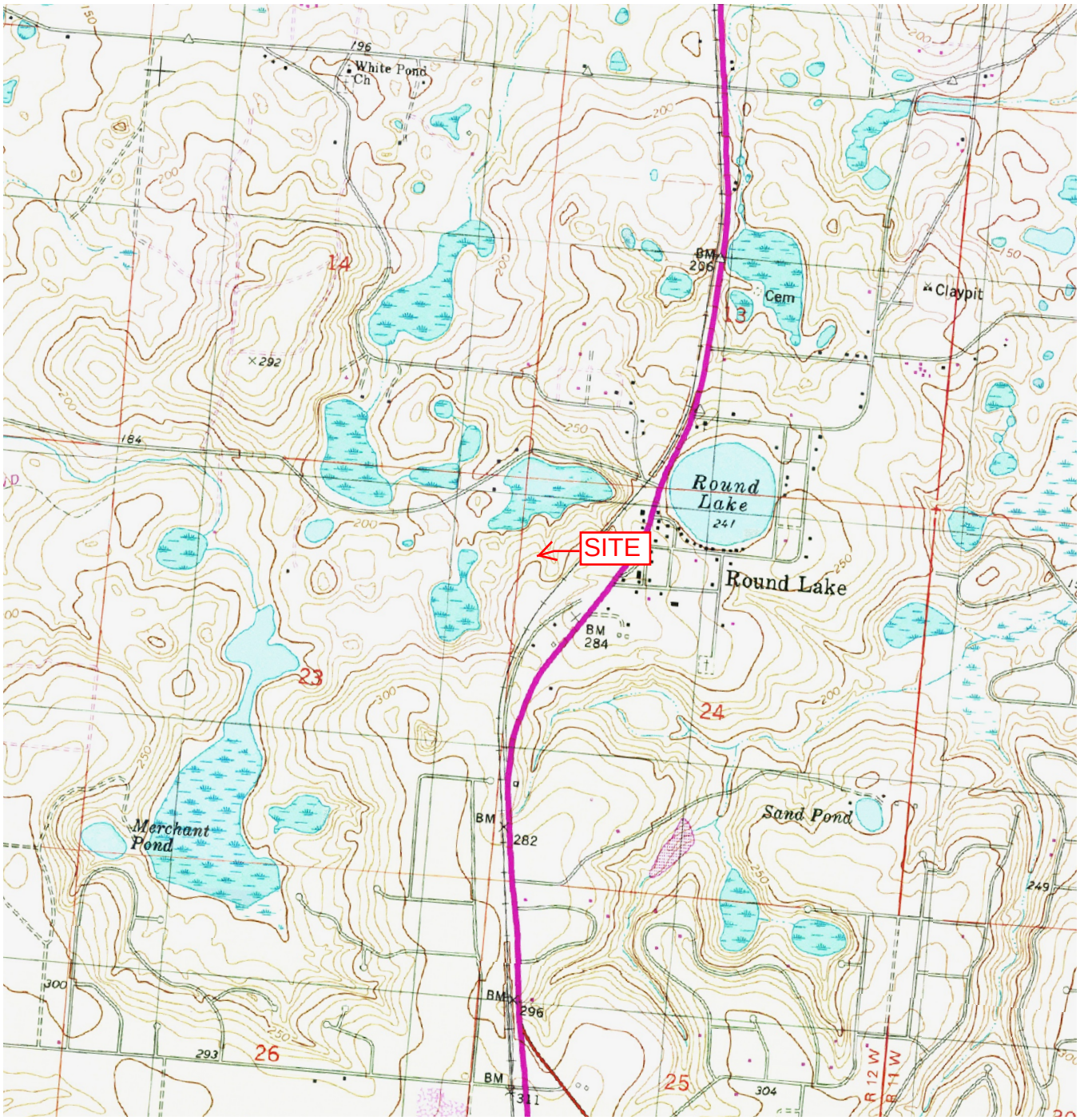
Héctor A. Acosta, M.S.C.E., P.E.
Principal Geotechnical Engineer
State of Florida Reg. No. 78902

Athulya Balakrishnan
Project Engineer

Appendix A Figures
Appendix B Boring Logs
Appendix C Laboratory Testing Results

APPENDIX A

Figures



Source: USGS Topographic Map, 7.5 Minute Series, Alford, FL (1994).

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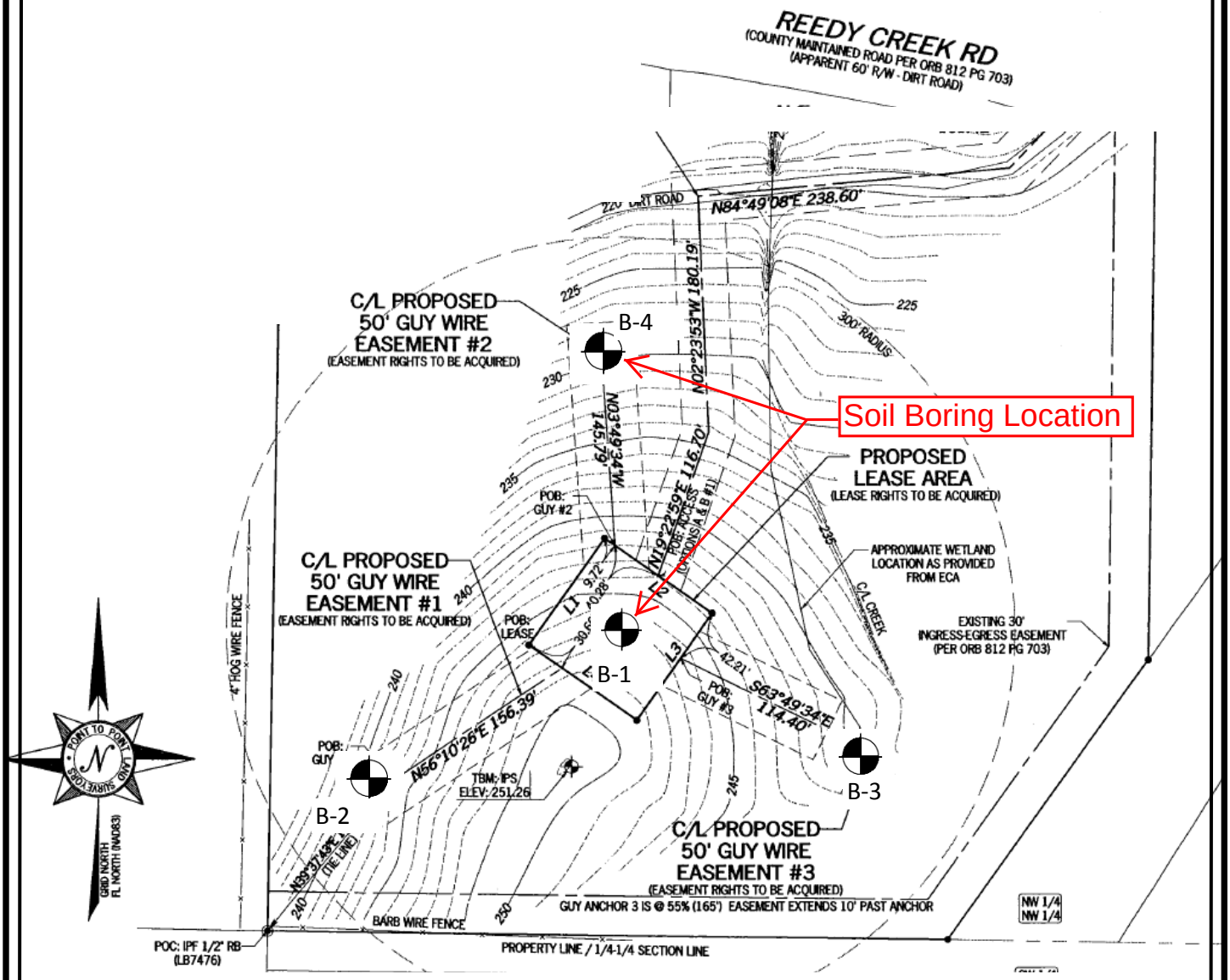
F8147 (Round Lake)

2441 Reedy Creed Road

Alford, Jackson County, Florida

Figure 1: Site Location Plan

ECA Project No. T1252



Legend: Soil Boring Location

Source: Project site survey prepared by Point to Point Land Surveyors Inc., and dated 08/21/2017.

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F8147 (Round Lake)

2441 Reedy Creed Road

Alford, Jackson County, Florida

Figure 2: Boring Location Plan

ECA Project No. T1252

APPENDIX B

Boring Logs

Project: F8147 (Round Lake) **Project Location:** Alford, FL **Project Number:** T1252	**Environmental Corp. of America** 1375 Union Hill Industrial Ct. Suite-A Alpharetta, GA 30004 (770)-667-2040	Log of Borings B-1 **Sheet 1 of 1**

Date(s) Drilled **10/11/2017**	Logged By **A. Balakrishnan**	Checked By **H. Acosta**
Drilling Method **HSA**	Drill Bit Size/Type **2.25 inches**	Total Depth of Borehole **30 feet bgs**
Drill Rig Type **D-50**	Drilling Contractor **UES**	Approximate Surface Elevation **247 feet A.M.S.L.**
Groundwater Level and Date Measured **20 feet ATD**	Sampling Method(s) **SPT**	Hammer Data **140 Lbs hammer, rope and cathead**
Borehole Backfill **Cuttings**	Location **Alford, Jackson County, Florida**	

Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	SPT N-Value	MATERIAL DESCRIPTION	MATERIAL TYPE	USCS SYMBOL	Rec. (%) / RQD(%)	Water Content(%)	qu (tsf)	LL(%)	PI(%)
0	1		1-1-2-3	3	Brown, very loose well graded silty Sand, damp	SM			-	-		
	2		3-4-5-7	9	Brown/yellowish brown, loose clayey Sand, damp	SC			13.1	-		
5	3		7-9-10-11	19	Same as above, medium compact, brown, damp	SC			-	-		
	4		8-9-9-9	18	Reddish brown, medium compact clayey Sand, damp	SC			13.6	-		
	5		7-8-8-8	16	Same as above, medium compact, medium to coarse particles, damp	SC			-	-		
10												
	6		7-8-8	16	Yellowish brown, medium compact clayey Sand with clay lumps, damp	SC			9.3	-		
15												
	7		10-11-13	24	Same as above, medium compact, trace clay, wet ▽	SC			-	-		
20												
	8		5-5-7	12	Yellowish brown/grey, stiff sandy Clay, damp	CL			22.5	2.0		
25												
	9		5-5-5	10	Grey, stiff plastic silty Clay, damp	CH			-	2.5		
30					End of Boring at 30 feet.							

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Project: F8147 (Round Lake) **Project Location:** Alford, FL **Project Number:** T1252	**Environmental Corp. of America** 1375 Union Hill Industrial Ct. Suite-A Alpharetta, GA 30004 (770)-667-2040	Log of Borings B-2 **Sheet 1 of 1**

Date(s) Drilled **10/11/2017**	Logged By **A. Balakrishnan**	Checked By **H. Acosta**
Drilling Method **HSA**	Drill Bit Size/Type **2.25 inches**	Total Depth of Borehole **20 feet bgs**
Drill Rig Type **D-50**	Drilling Contractor **UES**	Approximate Surface Elevation **243 feet A.M.S.L.**
Groundwater Level and Date Measured **Not Encountered**	Sampling Method(s) **SPT**	Hammer Data **140 Lbs hammer, rope and cathead**
Borehole Backfill **Cuttings**	Location **Alford, Jackson County, Florida**	

Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	SPT N-Value	MATERIAL DESCRIPTION	MATERIAL TYPE	USCS SYMBOL	Rec. (%) / RQD(%)	Water Content(%)	qu (tsf)	LL(%)	PI(%)
0												
	1		3-4-5-6	9	Red, stiff silty Clay, trace sand, damp	CH			-	4.0		
	2		4-6-7-9	13	Same as above, stiff, red/yellowish brown, damp	CH			34.0	4.5		
5	3		7-9-10-12	19	Light red/yellowish brown/grey (variegated), very stiff silty Clay, trace sand, damp	CH			-	4.5		
	4		8-10-12-10	22	Reddish brown, medium compact silty Sand, trace clay, damp	SM			15.1	-		
	5		8-7-7-7	14	Light brown, medium compact silty Sand, fine to medium coarse, dry	SM			-	-		
10												
	6		7-7-8	15	Light red/orange, medium compact silty Sand, fine to medium coarse particles, dry	SM			5.0	-		
15												
	7		8-10-11	21	Same as above, medium compact, dry	SM			-	-		
20					End of Boring at 20 feet.							
25												
30												

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Project: F8147 (Round Lake) **Project Location:** Alford, FL **Project Number:** T1252	**Environmental Corp. of America** 1375 Union Hill Industrial Ct. Suite-A Alpharetta, GA 30004 (770)-667-2040	Log of Borings B-3 **Sheet 1 of 1**

Date(s) Drilled **10/11/2017**	Logged By **A. Balakrishnan**	Checked By **H. Acosta**
Drilling Method **HSA**	Drill Bit Size/Type **2.25 inches**	Total Depth of Borehole **20 feet bgs**
Drill Rig Type **D-50**	Drilling Contractor **UES**	Approximate Surface Elevation **229 feet A.M.S.L.**
Groundwater Level and Date Measured **3.5 feet ATD**	Sampling Method(s) **SPT**	Hammer Data **140 Lbs hammer, rope and cathead**
Borehole Backfill **Cuttings**	Location **Alford, Jackson County, Florida**	

Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	SPT N-Value	MATERIAL DESCRIPTION	MATERIAL TYPE	USCS SYMBOL	Rec. (%) / RQD(%)	Water Content(%)	qu (tsf)	LL(%)	PI(%)
0												
	1		1-1-1-2	2	Dark brown, well graded very loose silty Sand, wet	SM			-	-		
	2		3-4-5-7	9	Same as above, loose, medium to coarse particles, damp ▽	SM			12.4	-		
5	3		7-7-6-2	13	Yellowish brown/grey, medium compact clayey Sand with coarse particles, wet	SC			-	-		
	4		8-10-11-12	21	Yellowish brown/grey, medium compact clayey Sand/sandy Clay, moist	SC-CL			14.7	-		
	5		7-8-10-12	18	Yellowish brown/grey, very stiff sandy Clay, damp	CL			-	2.5		
10												
	6		6-7-8	15	Pale yellow, stiff sandy Clay, damp	CL			18.7	2.0		
15												
	7		5-7-7	14	Grey, stiff sandy Clay, damp	CL			-	3.0		
20					End of Boring at 20 feet.							
25												
30												

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Project: F8147 (Round Lake) **Project Location:** Alford, FL **Project Number:** T1252	**Environmental Corp. of America** 1375 Union Hill Industrial Ct. Suite-A Alpharetta, GA 30004 (770)-667-2040	Log of Borings B-4 **Sheet 1 of 1**

Date(s) Drilled **10/11/2017**	Logged By **A. Balakrishnan**	Checked By **H. Acosta**
Drilling Method **HSA**	Drill Bit Size/Type **2.25 inches**	Total Depth of Borehole **20 feet bgs**
Drill Rig Type **D-50**	Drilling Contractor **UES**	Approximate Surface Elevation **240 feet A.M.S.L.**
Groundwater Level and Date Measured **5 feet ATD**	Sampling Method(s) **SPT**	Hammer Data **140 Lbs hammer, rope and cathead**
Borehole Backfill **Cuttings**	Location **Alford, Jackson County, Florida**	

Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	SPT N-Value	MATERIAL DESCRIPTION	MATERIAL TYPE	USCS SYMBOL	Rec. (%) / RQD(%)	Water Content(%)	qu (tsf)	LL(%)	PI(%)
0												
	1		1-1-2-2	3	Dark brown, well graded very loose silty Sand, dry	SM			-	-		
	2		2-3-3-3	6	Same as above, loose, brown, damp	SM			6.4	-		
5	3		3-4-4-5	8	Yellowish brown/grey, loose clayey Sand, medium to coarse particles, wet ▽	SC			-	-		
	4		4-6-7-9	13	Yellowish brown/reddish brown, stiff sandy Clay, damp	CL			13.1	2.5		
	5		7-8-10-8	18	Reddish brown/grey, very stiff silty Clay, damp	CH			-	3.0		
10												
	6		6-7-7	14	Same as above, stiff, grey, damp	CH			25.5	4.5		
15												
	7		5-5-6	11	Same as above, stiff, grey/reddish brown, damp	CH			-	4.0		
20					End of Boring at 20 feet.							
25												
30												

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Project: F8147 (Round Lake) **Project Location:** Alford, FL **Project Number:** T1252	**Environmental Corp. of America** 1375 Union Hill Industrial Ct. Suite-A Alpharetta, GA 30004 (770)-667-2040	Key to Log of Boring **Sheet 1 of 1**

1 Depth (feet)	2 Sample Number	3 Sample Type	4 Sampling Resistance, blows/ft	5 SPT N-Value	6 MATERIAL DESCRIPTION	7 MATERIAL TYPE	8 USCS SYMBOL	9 Rec. (%) / RQD(%)	10 Water Content(%)	11 qu (tsf)	12 LL(%)	13 PI(%)

COLUMN DESCRIPTIONS

1 Depth (feet): Depth in feet below the ground surface.
2 Sample Number: Sample identification number.
3 Sample Type: Type of soil sample collected at the depth interval shown.
4 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
5 SPT N-Value:
6 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
7 MATERIAL TYPE: Unconfined compressive strength, in kips per square foot.
8 USCS SYMBOL: Graphic depiction of the subsurface material encountered.
9 Rec. (%) / RQD(%):
10 Water Content(%):
11 qu (tsf): The reading from a photo-ionization detector, in parts per million.
12 LL(%): Liquid Limit, expressed as a water content.
13 PI(%): Plasticity Index, expressed as a water content.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS


Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)


Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)


Clayey SAND (SC)


Clayey SAND to Sandy CLAY (SC-CL)


Silty SAND (SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS


Auger sampler


Bulk Sample


3-inch-OD California w/ brass rings


CME Sampler


Grab Sample


2.5-inch-OD Modified California w/ brass liners


NQ Rock Core Sampler


Pitcher Sample


2-inch-OD unlined split spoon (SPT)


Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS


Water level (at time of drilling, ATD)


Water level (after waiting)


Minor change in material properties within a stratum

Inferred/gradational contact between strata

Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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APPENDIX C

Laboratory Testing Results

APPENDIX C
Laboratory Testing Results
Environmental Corporation of America (ECA)

Site Name: F8147 (Round Lake)

ECA Project No. T1252

Boring No.	Sample No.	Sample Depth (feet)	Moisture Content (%) ASTM D-2216	Soil Classification ASTM D-2488
B-1	2	2-4	13.1	SC
B-1	4	6-8	13.6	SC
B-1	6	13.5-15	9.3	SC
B-1	8	23.5-25	22.5	CL
B-2	2	2-4	34.0	CH
B-2	4	6-8	15.1	SM
B-2	6	13.5-15	5.0	SM
B-3	2	2-4	12.4	SM
B-3	4	6-8	14.7	SC-CL
B-3	6	13.5-15	18.7	CL
B-4	2	2-4	6.4	SM
B-4	4	6-8	13.1	CL
B-4	6	13.5-15	25.5	CH