

August 12, 2016

Ms. Janie Hagberg **SWFWMD** 2379 Broad Street Brooksville, FL 34604

Re: Geotechnical Investigation Report

Balm Boyette Stallion Hammock Restoration

Lithia, Florida

Amec Foster Wheeler Project No. 600308.9

Dear Ms. Hagberg,

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) is pleased to submit this Geotechnical Investigation Report for the Balm Boyette Stallion Hammock Restoration project located in Lithia, Florida. We performed our services in accordance with our proposal to you dated May 23, 2016. The scope of work included general subsurface exploration, soil testing, and development of this report.

Amec Foster Wheeler appreciates this opportunity to be of service to you. At your convenience, we are available to discuss the details of this report and any questions that you may have.

Thomas Grimm, P.E.

Senior Geotechnical Engineer

Sincerely,

John Schwartz, E.I.

Geotechnical Engineer

jls/tg

Attachment



GEOTECHNICAL INVESTIGATION REPORT BALM BOYETTE STALLION HAMMOCK RESTORATION

LITHIA, FLORIDA

Prepared for:



SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Brooksville, Florida

Prepared by

AMEC Environment & Infrastructure, Inc.

1101 Channelside Drive, Suite 200 Tampa, Florida 33602

Amec Foster Wheeler Project No. 600308.9

August 12, 2016

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1.0 INTRODUCTION

On behalf of the Southwest Florida Water Management District (SWFWMD), Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has completed a geotechnical investigation for the Balm Boyette Stallion Hammock Restoration project. The purpose of this investigation was to provide subsurface information in support of restoration of wetlands and streams within the Balm Boyette Preserve.

2.0 SITE DESCRIPTION

The project site is located within the Balm Boyette Scrub Preserve along Balm Boyette Road in Lithia, Florida. The Balm Boyette Preserve was developed on a reclaimed phosphate mine site. The preserve is a public park owned and managed by Hillsborough County. The project area consists of approximately 25 acres with recreational bike trails throughout. The location of the project area is presented in **Figure 1**.

3.0 PROJECT UNDERSTANDING

Amec Foster Wheeler understands that the purpose of this project is to rehabilitate the site ecosystem. This geotechnical investigation explored subsurface within the project area. The information developed from this investigation is anticipated to be used in support of design and construction of this project. The investigation locations and depths were identified based on the areas anticipated to supply the borrow material and confirm constructability of the stream channel by hydraulic carving.

3.1 Scope of Services

The scope of work for this geotechnical investigation included:

- Coordination of utility locations and obtaining the appropriate permits in the vicinity of the proposed borings
- Visual inspection of the project area and performing eight hand auger borings
- Collection of samples for classification and laboratory testing. Laboratory testing included 13 natural moisture content (ASTM D2216), 10 percent passing the number 200 sieve (ASTM D1140), 7 organic content (ASTM D2974), 10 Atterberg limits (ASTM D4318), and 4 grain size distribution (ASTM D6913).

Based on the findings of the field investigation, review of readily available information, and laboratory testing results, a summary of our geotechnical investigation has been developed for design and construction of this project.

4.0 AREA SOIL SURVEY AND GEOLOGY REVIEW

Soils data from the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) Soil Survey of Hillsborough County, Florida, was reviewed as part of this geotechnical evaluation. The predominant soil unit identified throughout the project area is Arents (Map Unit Symbol 4). Other soil units identified outside the project area include various fine sands, such as Myakka, Orsino, Pamello, Seffner, Winder, and Zolfo (Map Unit Symbol 29, 36, 41, 47, 60, and 61 respectively). An aerial view of the project area, along with USDA-NRCS soil units identified throughput the project area, is presented in **Figure 2**.

The soil unit Arents (Map Unit Symbols 4) and water (Map Unit Symbols 99) comprise the project area. Arents are generally a mixed soil which is associated with historic phosphate mining that occurred throughout the site. Arents are typically poorly drained and with very low runoff. The capacity of the most limiting layer to transmit water (Ksat) is high to very high (5.95 to 19.98 in/hr), and the depth to water table is about 18 to 36 inches.

Soils encountered during our field investigation were consistent with the Soil Survey and typical of waste materials, such as overburden and mine tailings. A summary of soils encountered during our field investigation and laboratory test results follows.

5.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

The subsurface exploration included eight (8) hand auger borings throughout the proposed project area. Amec Foster Wheeler staff established the boring locations in the field using handheld Global Positioning System (GPS). The locations should be considered approximate and within 10 feet of the noted location. A site boring location map, showing approximate hand auger locations, is presented in **Figure 3**. The locations as Latitude and Longitude are presented on the boring logs in **Appendix A**.

While advancing the borings, samples were visually logged in the field with respect to material type and consistency. Upon completion, each boring was checked for the presence of groundwater. The borings were then backfilled with auger cuttings to near surface.

The collected soil samples were delivered to our Tampa materials testing laboratory for additional inspection and testing. Select samples were tested to assess the soils' natural moisture content, percent passing the No. 200 sieve, organic content, Atterberg limits, and grain size distribution (gradation). Due to trace coarse materials encountered, the percent passing the No. 200 sieve also included a percent passing the No. 4 sieve in support of soil classification. A summary of the laboratory test results is presented in **Tables 1** and **2** on the next page.

Table 1 – Summary of Laboratory Index Test Results

Sam	ple	Moisture	Passing	Passing #200	Atterl	oerg Lim	its (%)	Organic
Boring	Depth (ft)	Content (%)	#4 Sieve (%)	Sieve (%)	LL	PL	PI	Content (%)
B-1	3-8	19.5	-	-	-	-	-	-
B-3	3-4	18.2	100.0	18.1	32.2	23.3	8.9	3.2
B-3	8-9	20.1	100.0	8.0	NP	NP	NP	2.7
B-5	2-3	19.9	100.0	27.1	26.1	20.0	6.1	2.7
B-5	4-5	27.6	91.7	19.0	26.5	20.9	5.6	3.4
B-6	5-10	22.9	-	-	-	-	-	-
B-7	2-2.5	15.5	98.4	13.4	NP	NP	NP	2.8
B-7	4-6	14.6	-	-	-	-	-	2.9
B-8	0-3.5	15.9	93.4	9.8	NP	NP	NP	2.5
B-8	3.5-4.5	20.7	69.9	13.2	NP	NP	NP	-
B-8	4.5-5	17.4	84.3	10.9	NP	NP	NP	-
B-8	5-6	23.1	75.0	21.1	NP	NP	NP	-
B-8	6-7	11.8	95.1	8.7	NP	NP	NP	-

Table 2 – Summary of Laboratory Gradation Test Results

Sample		Percent Passing Sieve (%)											
Boring	Depth (ft)	1.5"	1"	3/4"	3/8"	#4	#10	#20	#40	#60	#100	#200	
B-1	3-8	95	93	85	74	64	54	44	32	16	7	1	
B-6	5-10	100	100	100	99	95	92	89	74	34	12	4	
B-7	4-6	100	96	95	92	90	88	84	69	34	12	2	
B-8	3.5-4.5	100	87	81	75	70	66	62	54	34	15	3	

6.0 SUBSURFACE CONDITIONS

6.1 Soil

The borings depths ranged between 6 and 13 feet and generally encountered slightly organic, poorly graded sands with varying amounts of clay and gravel (SP-SC, SW, and SP), clayed sand (SC), and some slightly organic lean clay (CL) and slightly organic silty clay with sand (CL-ML). The sands were typically gray to brown, fine grained, loose to medium dense, moist to wet, and the lean clays were typically brown to gray, fine grained, moist to wet, and soft to firm in consistency.

The natural moisture content of soils near surface ranged from 14 to 20 percent, contained less than three percent organic matter and less than 15 percent gravel (soil particle larger than No. 4 sieve), and the percent passing the No. 200 sieve indicated about 10 to 20 percent of soils were finer than the No. 200 sieve. At greater depths the moistures remained within the 14 to 20 percent, organic content was less than 3 percent, and trace gravels were encountered.

Subsurface conditions throughout the proposed project area were typical of a previously mined site. Topsoil depths ranged from two to eight inched below ground surface (BGS). Boring B-1 was performed near an existing metal drainage pipe, where limestone and well graded sand with gravel was encountered. This soil was likely waste material and placed prior to drainage pipe placement. Boring B-2 encountered a very loose material near the water table, and the hand auger was advanced from nine to 13 feet by pushing the auger. Some lean clays were encountered in Borings B-3 and B-5 at depths ranging from 3 to 7 feet BGS.

6.2 Groundwater

Groundwater was typically greater than boring termination depth. When encountered (Borings B-2, B-3, and B-6), the depth to water table ranged from 7 to 10 feet BGS. At all other borings, groundwater was not encountered above the boring termination depths ranging from 6 to 8 feet. The groundwater conditions observed during our investigation are summarized on the boring logs in **Appendix A**.

Based on our field reconnaissance and our experience in the area, seasonal high groundwater is anticipated to range from 5 to 7 feet BGS. Seasonal high groundwater is typically observed within the months of June through September.

7.0 CONSTRUCTION MONITORING

The satisfactory long-term performance of the construction is highly dependent upon the contractor's adherence to the project specifications. We strongly recommend that a qualified geotechnical technician, responsible to Amec Foster Wheeler, designer, and Owner, monitor all aspects of site grading and stream construction. In particular, Amec Foster Wheeler should continuously monitor and test the borrow material, proof-rolling operations, and any remedial treatment of the subgrade, as well as placement and compaction of engineered fill. The geotechnical engineer or his/her representative should review subgrades prior to placement of engineered fill. We will be available to further assist you by providing these and other normally specified quality control services.

8.0 REPORT LIMITATIONS

The findings and conclusions presented in this report assume that site conditions are not substantially different than those exposed by the explorations. Amec Foster Wheeler should be advised promptly if subsurface conditions are observed during construction or appear to be present that are different from those encountered in the explorations, so those conditions can be reviewed and recommendations reevaluated where necessary.

If there is a substantial lapse of time between submission of this report and the start of work and conditions have changed due to natural causes or construction operations, Amec Foster Wheeler should review this report to determine the applicability of the findings and conclusions considering the changed conditions.

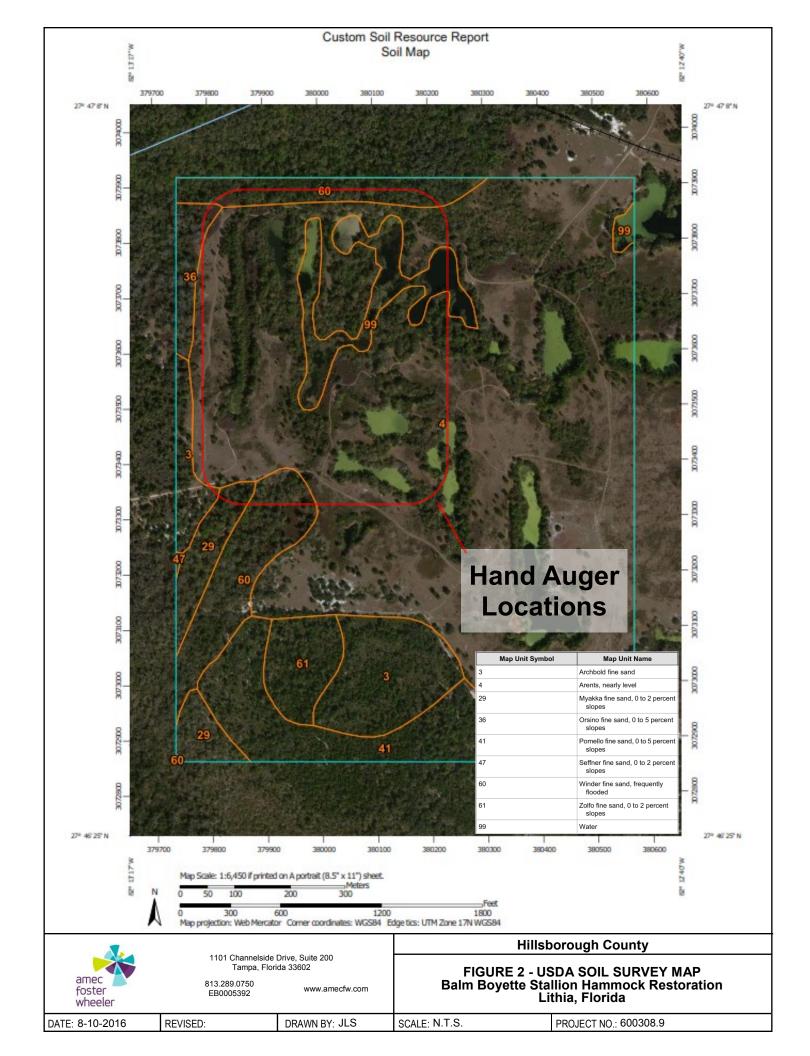
Fluctuation in the observed groundwater levels should be expected due to seasonal rainfall variations, construction activity, surface water runoff, and other site-specific factors. Since groundwater level variations are anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based on the assumption that variations will occur.

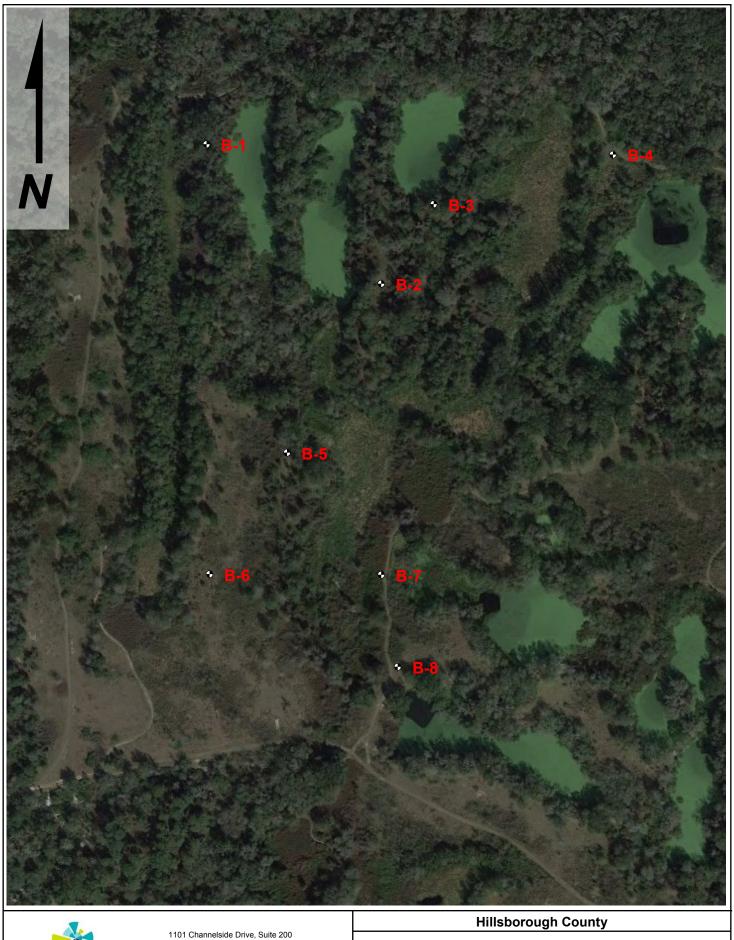
This report was prepared for use by the owner and their representatives. It should be made available to prospective contractors for information on factual data only and not as a warranty of subsurface conditions.

Contractors should make their own interpretation of the information presented and draw their own conclusions as to how the subsurface conditions may affect the work. We undertook this evaluation in accordance with normally accepted geotechnical engineering practices. Amec Foster Wheeler neither expresses nor implies any other warranty. Moreover, Amec Foster Wheeler prepared this report for the SWFWMD and accepts no responsibility for damages, if any, suffered by any third party because of decisions made or actions based on this report.

FIGURES









1101 Channelside Drive, Suite 200 Tampa, Florida 33602

813.289.0750 EB0005392

www.amecfw.com

FIGURE 3 - BORING LOCATION MAP Balm Boyette Stallion Hammock Restoration Lithia, Florida

DATE: 8-10-2016 DRAWN BY: JLS PROJECT NO.: 600308.9 REVISED: SCALE: N.T.S.

APPENDIX A

Boring Logs



CLIENT South	<u>west Florida Water</u>	^r Mana	igement	District	PROJECT NAME Balm Boyette Stallion Hammock Restoration				
PROJECT NUM	BER <u>600308.9</u>				PROJECT LOCATION Lithia, Florida				
DATE STARTED	8/3/16	c	OMPLE	TED 8/3/16	GROUND ELEVATION	HOLE SIZE _3 inches			
DRILLING CONT	TRACTOR Amec	Foste	r Wheele	er	LOCATION LAT: 27°47′0.66"N; LON: 82°13′8.59"W				
	HOD Hand Auger								
LOGGED BY _J	LS	c	HECKE	D BY TG	HOLE COMPLETION backfilled with co	uttings			
NOTES Boring	near existing (old)	metal	drain pi	ipes.					
SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTI	ON			
			11 1/ 1 O.	- \gg.aj, a.j, . o					
 		SP- SC	2.	0	prown, dry to moist, loose to medium den				
2.5			3.	0	dense LIMESTONE layer from 2-3 feet b	•			
	MC = 20%	sw	8.	no water table en	countered 8 feet below ground surface				
					Bottom of borehole at 8.0	feet.			



JENI Sout	hwest	Florida	Water I	Management District	PROJECT NAME Balm Boyette Stallion Hammock Restoration						
OJECT NUI	MBER	60030	8.9		PROJECT LOCATION Lithia, Florid	PROJECT LOCATION Lithia, Florida					
					GROUND ELEVATION						
					LOCATION LAT: 27°46'57.29"N; LO						
					 -						
	JLS			CHECKED BY _TG	HOLE COMPLETION backfilled with	cuttings					
TES											
SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG			MATERIAL DESCRIPTION						
		<u> </u>		light brown, dry, TOPSOIL	oist, loose to medium dense, poorly graded SA						
	SP- SC										
			ı	medium dense to very loose (a	advanced hand auger by self-weight), moist to	o wet					
- - - - - - 5			<u>∇</u> 13.0								
		V. /	13.0		Bottom of borehole at 13.0 feet.						



					rict						
		MBER <u>600308.9</u>				PROJECT LOCATION Lithia, Florida					
					8/3/16						
											
			(CHECKED BY	TG	HOLE COMPLETION backfilled with cuttings					
NOTE	s										
O DEPTH O (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION					
				0.3	light brown, dry, TO light brown and gra	DPSOIL ry, dry, loose, poorly graded SAND with clay					
2.5			SP- SC	3.0							
	AU	MC = 18% #200 = 18% LL = 32 PL = 23	CL	4.0		oist, loose, slightly organic lean CLAY with sand					
5.0		PI = 9 OC = 3%	SP- SC		graded SAND with	n and gray to dark gray and black, moist to wet, loose, slightly organic poorly clay					
	AU	MC = 20% #200 = 8% LL = NP PL = NP PI = NP		9.0 ▽		Bottom of borehole at 9.0 feet.					
		OC = 3%									



CLIEN	T Sout	hwest	Florida	Water Management District	PROJECT NAME Balm Boyette Stallion Hammock Re	estoration						
PROJI	ECT NUI	MBER	60030	8.9	PROJECT LOCATION Lithia, Florida							
DATE	STARTE	ED <u>8/3</u>	3/16	COMPLETED <u>8/3/16</u>	GROUND ELEVATION HOLE SIZ	ZE 3 inches						
DRILL	ING CO	NTRAC	TOR	Amec Foster Wheeler	LOCATION LAT: 27°47'0.36"N; LON: 82°12'57.92"W							
DRILL	ING ME	THOD	Hand	Auger	GROUND WATER LEVEL AT TIME OF DRILLING	GROUND WATER LEVEL AT TIME OF DRILLING						
LOGG	ED BY	JLS		CHECKED BY TG	HOLE COMPLETION backfilled with cuttings	HOLE COMPLETION backfilled with cuttings						
NOTE	s											
O DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION							
			7/7		st, loose to medium dense, poorly graded SAND with clay							
2.5		SP- SC		no water table encountered 9								
		1		9.0 No water table encountered o	Bottom of borehole at 9.0 feet.							



CLIEN	IT South	nwest Florida Wate	r Man	agement	District	PROJECT NAME Balm Boyette Stallion Hammock Restoration			
		MBER 600308.9							
DATE	STARTE	D 8/3/16		COMPLE	TED <u>8/3/16</u>	GROUND ELEVATION	HOLE SIZE 3 inches		
DRILL	ING CON	ITRACTOR Amed	Foste	er Wheele	er	LOCATION LAT: 27°46'53.41"N; LOCATION	DN: 82°13'6.61"W		
DRILL	ING MET	HOD Hand Auger	r			GROUND WATER LEVEL AT TIME	ME OF DRILLING		
LOGG	ED BY	JLS		CHECKE	D BY TG	HOLE COMPLETION backfilled with	n cuttings		
NOTE	s								
O DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIF	PTION		
				<u>11/2</u> 10.			ith alov		
 			SP- SC	2.	0	slightly organic poorly graded SAND w	·		
2.5 5.0	AU	MC = 20% #200 = 27% LL = 26 PL = 20 PI = 6 OC = 3% MC = 28% #200 = 19% LL = 27 PL = 21 PI = 6 OC = 3%	CL- ML		black to light gray	, dry to moist, loose to medium dense	slightly organic silty CLAY with sand		
-				7.	no water table end	countered 7 feet below ground surface			
			•			Bottom of borehole at	7.0 feet.		



CLIEN	T South	west Florida Wate	r Man	agement Dist	rict	PROJECT NAME Balm Boyette Stallion Hammock Restoration			
PROJE	ECT NUM	IBER 600308.9				PROJECT LOCATION Lithia, Florida			
DATE	STARTE	D 8/3/16	(COMPLETED	8/3/16	GROUND ELEVATION	HOLE SIZE 3 inches		
DRILLI	NG CON	ITRACTOR Amec	Foste	er Wheeler		LOCATION LAT: 27°46'50.27"N; LON: 82°13'9.00"W			
DRILLI	ING MET	HOD Hand Auger				$igtriangledown$ Ground water level at time of drilling $7.00~\mathrm{ft}$			
LOGGI	ED BY _	JLS	(CHECKED BY	<u> TG </u>	HOLE COMPLETION backfilled with cut	tings		
NOTES	3								
O DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTIO)N		
				<u>11 /2 11</u> 0.3	brown, dry, TOPSO				
2.5			SP- SC	5.0	with trace limeston	e fragments from 4-5 feet below ground s			
7.5	AU	MC = 23%	SP	10.0		vn/light gray, wet, poorly graded SAND Bottom of borehole at 10.0	foot		
						bollom of borenole at 10.0	ICCI.		



CLIEN	IT South	nwest Florida Wate	r Man	ageme	ent Distri	ct	PROJECT NAME Balm Boyette Stallion Hammock Restoration				
PROJI	ECT NUM	MBER 600308.9					PROJECT LOCATION Lithia, F	lorida			
DATE	STARTE	D 8/3/16	(COMP	LETED	8/3/16	GROUND ELEVATION	HOLE SIZE	3 inches		
DRILL	ING CON	ITRACTOR Amec	Foste	er Whe	eler		LOCATION LAT: 27°46'50.54"N	I; LON: 82°13'4.07"W			
DRILL	ING MET	HOD Hand Auger	•				GROUND WATER LEVEL AT	TIME OF DRILLING			
LOGG	LOGGED BY JLS CHECKED BY TG				KED BY	TG	HOLE COMPLETION backfilled	with cuttings			
NOTE	s										
OEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG			MATERIAL DESC	CRIPTION			
					1		gray, dry, TOPSOIL brown, dry, loose, slightly organic	c noorly graded SAND wi	th clay		
 			SP- SC		0.8	dank gray and dank i	orown, dry, loose, slightly organic	c poorly graded OAND WI	шы		
2.5	AU	MC = 16% #200 = 13%	SC		2.5	light tan, dry, loose,	slightly organic clayey SAND				
		#200 = 13% LL = NP PL = NP PI = NP OC = 3%	SP- SC		4.0	dark gray and dark l	orown, dry, loose, slightly organic	c poorly graded SAND wi	th clay		
5.0	AU	MC = 15% OC = 3%	SP		6.0	SANĎ	orown, dry to moist, loose to med		nic poorly graded		
		ı	-	<u> Paranti</u>	, 0.0		Bottom of borehole	e at 6.0 feet.			
i											



CLIEN	T South	nwest Florida Wate	r Mana	agement D	istrict	PROJECT NAME Balm Boyette Stallion Hammock Restoration
PROJE	ECT NUM	MBER 600308.9				PROJECT LOCATION Lithia, Florida
DATE	STARTE	D 8/3/16	(COMPLETE	ED 8/3/16	GROUND ELEVATION HOLE SIZE 3 inches
DRILLI	ING CON	ITRACTOR Amed				LOCATION LAT: 27°46'48.42"N; LON: 82°13'3.80"W
DRILLI	ING MET	HOD Hand Auger	r			GROUND WATER LEVEL AT TIME OF DRILLING
LOGGI	ED BY _	JLS	(CHECKED	BY TG	HOLE COMPLETION backfilled with cuttings
NOTES	S					
O DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
2.5	AU	MC = 16% #200 = 10% LL = NP PL = NP PI = NP OC = 3%	SP- SC	0.5	dark gray and dark	t gray/dark brown, dry, TOPSOIL k brown, dry, loose to medium dense, slightly organic poorly graded SAND with
	AU	MC = 21% #200 = 13% LL = NP PL = NP	SP	4.5		k brown, dry, medium dense, poorly graded SAND with gravel
5.0	AU	PI = NP MC = 17%	SP- SC	5.0	dark gray and dark	k brown, dry, medium dense, poorly graded SAND with clay
_	AU	#200 = 11% LL = NP PL = NP PI = NP	SC	6.0	dark gray and darl	k brown, dry to moist, medium dense, clayey SAND
1		MC = 23%	SP-		dark gray and dark	k brown, dry, medium dense, poorly graded SAND with clay
	AU	#200 = 21% LL = NP PL = NP PI = NP	SC	7.0	no water table end	countered 7 feet below ground surface Bottom of borehole at 7.0 feet.
		MC = 12% #200 = 9% LL = NP PL = NP PI = NP				

KEY TO SYMBOLS

CLIENT Nu-West Industries
PROJECT NUMBER 300907

PROJECT NAME Phase III Phosphogysum Stack - Geotechnical Investigation

PROJECT LOCATION Soda Springs, ID

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

BASALT: Basalt

CL: USCS Low Plasticity Clay

GC: USCS Clayey Gravel

GM: USCS Silty Gravel

ML: USCS Silt

SC: USCS Clayey Sand

SM: USCS Silty Sand

SP-SC: USCS Poorly-graded Sand with Clay

KEY TO SYMBOLS 2 - C-44 GINT STD US LABS.GDT - 7/17/15 14:34 - L./GEOTECH DEPT, AGRIUM-PRIVILEGED/300907 PHASE III GROUND INVEST & PRELIM DESIGN-2015/, TASK 1.3-MOBILIZATION & EXPLORATION/LAB&FIELD TEST/GINT LOGS/300907 - PHASE ?

SP-SM: USCS Poorly-graded Sand with Silt

1/ 1//

TOPSOIL: Topsoil

SAMPLER SYMBOLS



Rock Core



Split Spoon



Shelby Tube

WELL CONSTRUCTION SYMBOLS



Bentonite Seal: 1 pipe group, 1 pipe



Bentonite: Bottom of hole



Filter Pack: 1 pipe group, 1 pipe



Filter Pack: Bottom of hole



Slotted Pipe: 1 pipe group, 1 pipe

ABBREVIATIONS

MC - MOISTURE CONTENT (%)

-200 - PERCENT PASSING NO. 200 SIEVE

LL - LIQUID LIMIT (%)
PL - PLASTIC LIMIT(%)
PI - PLASTIC INDEX (%)

NP - NON PLASTIC

OC - ORGANIC CONTENT (%)

PP POCKET PENETROMETER (TSF)

COHESIVE SOIL CONSISTENCY DESCRIPTIONS

N-VALUE DESCRIPTION 0-2 - VERY SOFT

3-4 - SOFT 5-8 - FIRM 9-16 - STIFF 16-32 - VERY STIFF

>32 - HARD

NON-COHESIVE SOIL DENSITY DESCRIPTIONS

N-VALUE DESCRIPTION

0-4 - VERY LOOSE

5-10 - LOOSE

11-30 - MEDUM DENSE

31-50 - DENSE >51 - VERY DENSE