FUGRO CONSULTANTS, INC.

REPORT OF GEOTECHNICAL EXPLORATION

ECUA CWRF Possible Future Compost Slab/Building
Cantonment, Escambia County, Florida

ECUA Purchase Order No. 140308
Fugro Project No. 04.83141029

Prepared for:

Mr. Ned McMath, PE
Emerald Coast Utilities Authority
2980 Old Chemstrand Road
Cantonment, FL 32533

Prepared by:

Fugro Consultants, Inc.
1300 West Main Street
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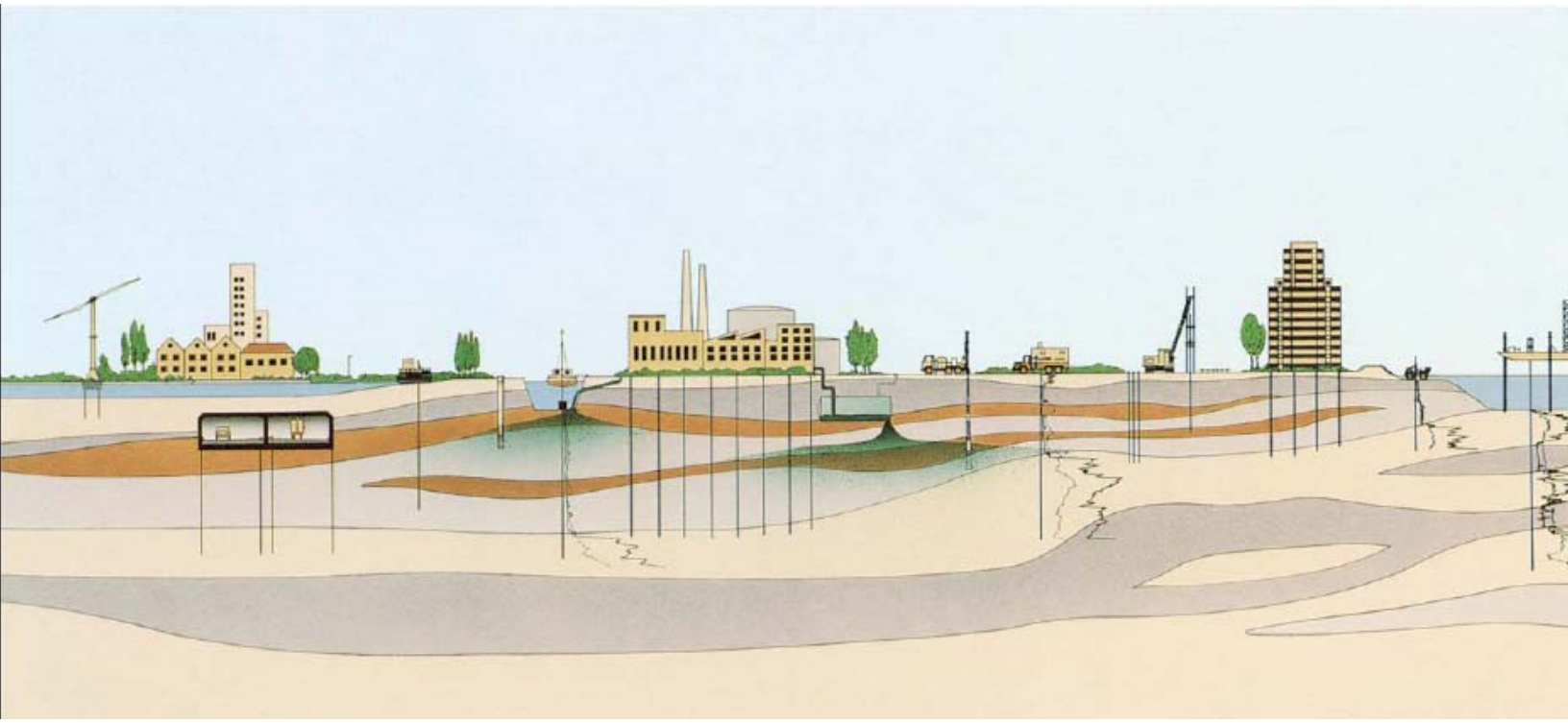
March 27, 2014



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March 27, 2014

Mr. Ned McMath, PE
Emerald Coast Utilities Authority
2980 Old Chemstrand Road
Cantonment, FL 32533

Subject: ECUA CWRF Possible Future Compost Slab/Building
Cantonment, Escambia County, Florida
ECUA Purchase Order No. 140308
Fugro Project No. 04.83141029

Dear Mr. McMath:

Thank you for choosing Fugro Consultants, Inc. (Fugro) as your Geotechnical consultant. In accordance with ECUA Purchase Order No. 140308, we have completed the Geotechnical exploration for the subject project. The results of the study are discussed in this report, three copies of which are enclosed (two bound copies, one unbound copy).

Should you have any questions regarding the enclosed report or the project in general, please do not hesitate to contact us at (850) 433-9441. Fugro would be pleased to provide Geotechnical engineering and construction materials testing services throughout the design and construction phases of the project, and we look forward to working with you on this and future projects.

Sincerely,
FUGRO CONSULTANTS, INC.

MITCHELL L. SMITH LICENSE No. 43416 STATE OF FLORIDA PROFESSIONAL ENGINEER 3/27/14

MITCHELL L. SMITH, PE
Sr. Geotechnical Engineer / Operations Manager
Florida License No. 43416

cc: Mr. Scott Jernigan, PE – Baskerville-Donovan, Inc.

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1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed on this project was issued by the ECUA via acceptance of our Geotechnical Engineering Services Proposal No. 0483131022 dated December 12, 2013 which was incorporated into ECUA Purchase Order No. 140308. The purchase order was dated January 13, 2014.

1.2 Project Description

Based on the information provided by Mr. Ned McMath, PE, ECUA Deputy Assistant Director, and Mr. Scott Jernigan, PE, Project Manager with Baskerville-Donovan, Inc., we understand that the ECUA is planning to construct a windrow compost facility on the south side of the Central Water Reclamation Facility to recycle chipped yard debris and sludge from the treatment plant. The proposed facility, which would combine yard debris and sludge to create compost, may include a possible future compost slab/building to mix the yard debris and sludge prior to transporting the mixture to the windrow composting area.

The compost slab/building would be located on the north side of the eastern 1/3 of the 24.5 acre Windrow Compost Facility site. The slab/building would be accessible to tractor trailer traffic and front end loaders. If a building is constructed, it would most likely be a slab-on-grade metal frame structure and could measure about 50'x100' (size to be determined). The building would be expected to be relatively lightly loaded. For the purposes of this report, we have assumed that column loads would be on the order of 50 kips and that the finished floor elevation would be within 2 feet of existing grade.

If any of the project information noted above is incorrect or has changed, please inform Fugro so that we may amend the recommendations presented in this report, if necessary.

1.3 Purpose and Scope of Services

The purpose of this exploration was to evaluate the subsurface conditions present in the proposed compost slab/building area and to render site preparation and foundation recommendations for the proposed facility. Our exploration consisted of two 20 foot deep Standard Penetration Test borings; laboratory soil testing consisting of natural water content tests, wash #200 sieve tests, and

Atterberg limits tests; and a site visit, visual classification of the soil samples, and analysis by our engineering staff.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous/toxic materials in the air, surface water(s), soil, or groundwater on or in the vicinity of the subject site. Any statements in this report or on the Logs of Boring regarding odors, stains, or unusual/suspicious conditions are strictly for the information of the client.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The 24.5 acre windrow compost facility site is located on the south side of the ECUA Central Water Reclamation Facility in Cantonment, Escambia County, Florida. The possible future compost slab/building would likely be constructed on the north side of the eastern 1/3 of the facility.

At the time of our exploration, the possible slab/building site was undeveloped and wooded with mature pine trees and very thick underbrush. Based on the topographic information provided, the area generally sloped downward from the northwest to the southeast with a grade change of about 2 feet.

2.2 Subsurface Conditions

Figure 1 shows the Boring Location Plan and Figure 2 shows the Logs of Boring of the two 20 foot deep Standard Penetration Test borings (B-1 and B-2) drilled in the possible slab/building area.

The borings were field located by surveyors retained by the ECUA using the attached Boring Location Plan. The ECUA also arranged for equipment to provide access to the boring locations as the site was heavily wooded at the time of drilling.

The slab/building borings generally encountered about 4 inches to 5 inches of topsoil underlain by very loose silty sand to approximately 4 feet. From roughly 4 feet to 16 feet, the borings encountered medium dense to dense silty clayey sand and very stiff sandy clay with some iron rock underlain by medium dense clayey sand in boring B-1 and by medium dense slightly silty sand in boring B-2 to the bottom of the 20 foot deep borings.

The above subsurface description is of a generalized nature, provided to highlight the major soil strata encountered. The Logs of Boring should be reviewed for specific subsurface conditions at each boring location. The stratification shown on the Logs of Boring represents the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and may occur between boring locations and should therefore be expected. The stratification represents the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

2.3 Groundwater Conditions

Groundwater was not encountered in the 20 foot deep slab/building borings at the time of drilling. However, the soil profile encountered in the borings will support shallow perched groundwater due to the low permeability near surface silty and clayey sands, especially when the site vegetation is removed. While perched groundwater was not encountered at the time of drilling (most likely due to water uptake by the trees and underbrush), the near surface soils were at or above optimum moisture at the time of drilling. We recommend that the Contractor determine the actual groundwater levels at the time of construction to determine potential impacts groundwater can/will have on construction procedures.

2.4 Laboratory Soil Testing

Laboratory soil testing consisted of water content tests, grainsize tests, and Atterberg limits tests. The results of these tests can be found on the Logs of Boring opposite the samples tested.

3.0 EVALUATION AND RECOMMENDATIONS

3.1 General Comments

The subsurface conditions encountered in the possible future compost slab/building borings (B-1 and B-2) are suitable for supporting a concrete slab or for founding a possible future structure on shallow spread footings. The surficial silty sands are very loose and will need to be compacted to provide adequate support/bearing and maintain tolerable settlements. Site preparation and foundation recommendations for the compost slab/building are presented below.

3.2 Site Preparation Recommendations

The proposed slab/building area should be cleared, grubbed, and stripped of topsoil (approximately 4 inches to 5 inches based on the borings) and other deleterious material. Excavations created during removal of significant root systems should be backfilled with soils compacted to a minimum soil density of 93% of the Modified Proctor test (ASTM D1557).

The surficial silty sands are very moisture sensitive and will prove impractical to compact if above optimum moisture. Given the presence of relatively impermeable clayey sands and sandy clay encountered approximately 4 feet to 5 feet below existing grade, perched groundwater and elevated moisture conditions can be expected during normal and elevated rainfall periods. To reduce the opportunity for potential compaction problems, we recommend that site work be scheduled for a historically dry period if practical. The site should be graded during site work operations to facilitate stormwater runoff and prevent ponding of stormwater which will soften the native soils, making them unworkable. Excavations should not be left open for an extended period of time as ponded water will soften the subsoils and likely require undercutting to firm underlying soils and backfilling with compacted fill. Additionally, hydrostatic forces created by laterally flowing groundwater could de-stabilize the sides of excavations and cause sloughing.

If the native soils are overly wet at the time of construction, they will most likely need to be undercut to firmer underlying soils and backfilled with dry readily compactable fill as the fines content of these soils do not lend themselves to drying in a timely manner. Depending on conditions at the time of construction, it may be possible to undercut and bridge over underlying soft soils in lieu of undercutting to the deeper firm soils. Bridging would only be permissible in lightly loaded slab areas. Typically, undercutting 3± feet and backfilling with clean coarse sand will

bridge most soils. This decision will have to be made in the field based on the conditions present at the time of construction.

The initial lift of backfill in relatively wet excavations should be a clean coarse sand containing less than 5% fines as this type of soil is more readily compactable than most under increased moisture conditions. These soils also have the added benefit of acting as a capillary break. Excavations should be pumped as dry as possible prior to backfilling to allow placement of backfill soils under relatively dry conditions.

Prior to placing fill soils, where applicable, the top of the ground surface should be compacted to a minimum soil density of 93% of the Modified Proctor test (ASTM D1557). Structural fill soils in the slab/building area should be placed in maximum 8 inch (loose thickness) lifts and compacted to a minimum soil density of 95% of the modified Proctor test (ASTM D1557). Thicker lifts (maximum 12 inches) may be approved if test strips indicate the specified compaction can be achieved.

3.3 Foundation and Floor Slab Recommendations

The soil immediately beneath and to a minimum depth of 12 inches below building footings should be compacted to a minimum soil density of 98% of the Modified Proctor test (ASTM D1557).

Footings having a minimum width of 1.5 feet and a minimum embedment of 1.5 feet below finished exterior grades can be designed for an allowable soil bearing pressure of 2,500 lbs/ft^2.

Settlements on sandy soils usually occur immediately upon or soon after loading, and we would expect most of the estimated 1 inch of total settlement to occur during construction. Differential settlements should be on the order of ½ of total settlements.

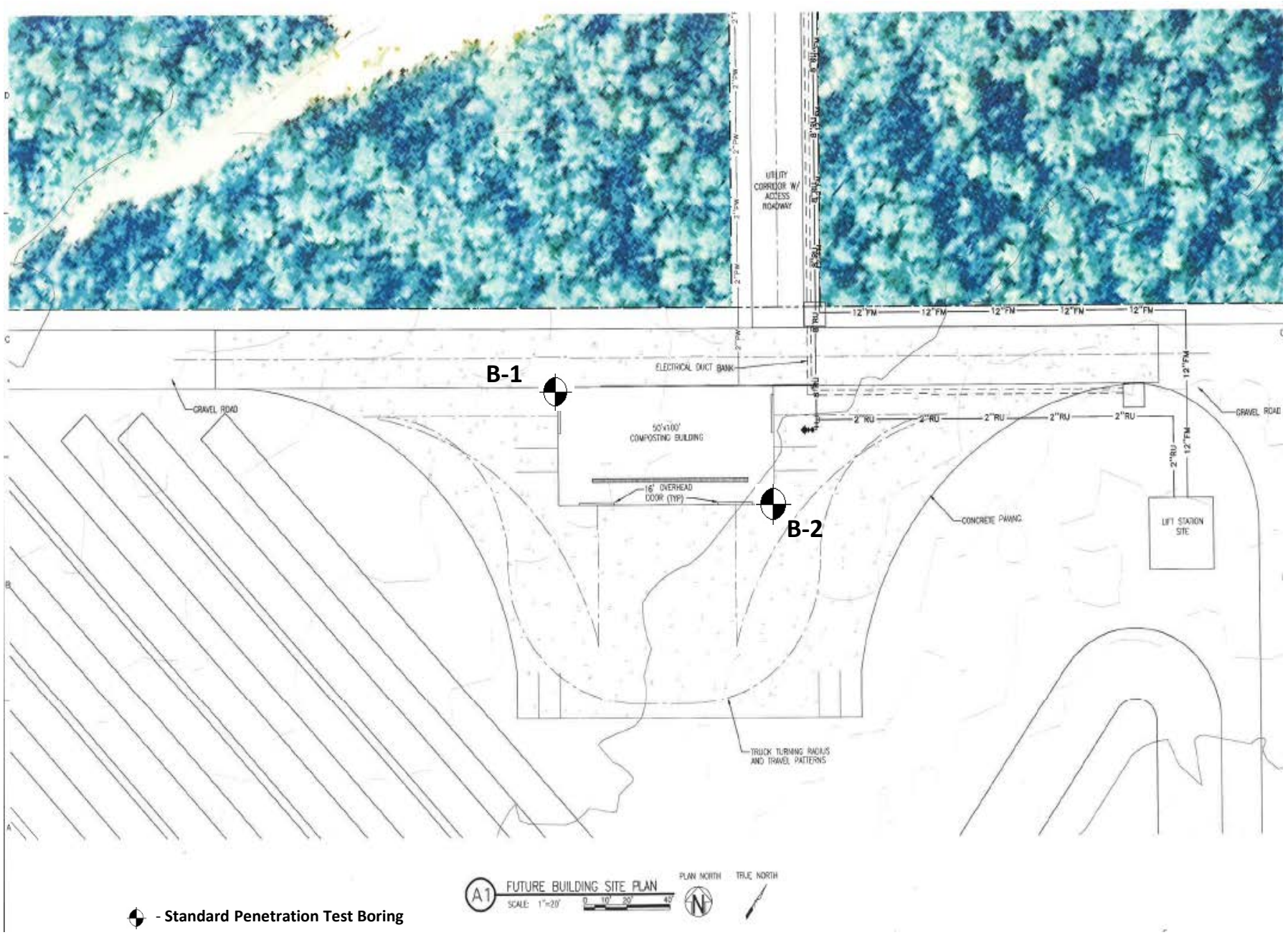
A modulus of subgrade reaction of 80 lbs/in^3 can be used for floor slab design provided the slab is placed on soils similar to the near surface in-situ soils prepared in accordance with the recommendations presented in this report. To reduce the possibility of slab cracking due to minor differential settlement, we recommend that the floor slab be structurally isolated from foundations, or that transitions from foundation-supported building elements to soil supported floors be reinforced. The subgrade should be covered by an effective vapor barrier to reduce the loss of water from the plastic concrete into the subgrade soils and to reduce the possibility of slab dampness due to moisture.

4.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by Fugro and design details furnished by Mr. Ned McMath, PE and Mr. Scott Jernigan, PE for the subject project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Fugro should be notified immediately to determine if changes in the foundation, or other, recommendations are required. If Fugro is not retained to perform these functions, we cannot be responsible for the impact of such conditions on the performance of the project.

The Geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional Geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the Geotechnical engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of the ECUA for the specific application to the subject project.



FUGRO	**BORING LOCATION PLAN**	**ECUA CWRF Possible Future Compost Slab/Building** **Escambia County, Florida**	**Project No.** **04.83141029**	**Date** **03/27/2014**	**Figure** **1**

LOCATION: See Figure 1

COORDINATES: 30.6029839; 87.2623022

SURFACE EL.: 64.0' Approx. based on Topo Map

DEPTH, FT	STRATUM DESCRIPTION	STRATUM DEPTH, FT	BLOWS PER FOOT	UNIT DRY WT, PCF	PASSING NO. 200 SIEVE, %	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)
	TOPSOIL (4 inches) (SM)	0.3							
	Brown/tan very loose silty SAND (SM)		N=1						
	Tan very loose silty SAND (SM)	2.0	N=2		30	11			
			N=6						
5	Tan/red medium stiff to very stiff silty sandy CLAY w/iron rock (CL)	5.0	N=17		71	22	36	22	14
			N=19						
10	Yellow tan medium dense silty SAND (SM)	11.0							
	Yellow/red/orange/tan medium dense silty and clayey SAND w/ small seams of clay (SM+SC)	14.0	N=23						
15	Orange/red medium dense clayey SAND (SC)	16.0							
			N=13						
20		20.0							

CLASSIFICATION

SHEAR STRENGTH

□ Penetrometer ▼ Unconfined
◇ Torvane ● Triaxial
△ Field Vane ▲ Miniature Vane

KIPS PER SQ FT

0.5 1.0 1.5 2.0 2.5

NOTES:

1. Terms and symbols defined on Figures 3 a and b.

COMPLETION DATE: February 6, 2014
TOTAL DEPTH: 20'
CAVED DEPTH: Not Applicable
DRY AUGER: Not Applicable
WET ROTARY: Not Applicable
BACKFILL: Cement-Bentonite Grout
LOGGER:

Fugro Consultants, Inc.

ECUA Possible Future Compost Slab/Building

LOG OF BORING NO. B-1

Cantonment, Escambia County, Florida

Project No. 04.83141029

FIGURE 2

FCBR_LOG (FINAL) ECUA POSSIBLE FUTURE.GPJ FUGRO DATA TEMPLATE 042610.GDT 3/25/14

LOCATION: See Figure 1

COORDINATES: 30.6030554; 87.2620302

SURFACE EL.: 61.0' Approx. based on Topo Map

DEPTH, FT	STRATUM DESCRIPTION	STRATUM DEPTH, FT	BLOWS PER FOOT	UNIT DRY WT, PCF	PASSING NO. 200 SIEVE, %	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)
	Brown very loose silty SAND (TOPSOIL, 5 Inches) (SM)	0.4	N=3						
	Tan very loose silty SAND (SM)	1.5							
	Tan very loose silty SAND w/trace iron rock (SM)		N=4		32	13			
	Red/tan loose to medium dense silty clayey SAND w/ iron rock and CLAY (SC/SM+CL)	4.0	N=9		37	19			
5			N=23		35	16	37	20	17
	Orange dense silty SAND (SM)	8.0	N=32						
	Yellow dense silty SAND (SM)	9.5							
10	Orange medium dense to dense clayey silty SAND (SM/SC)	10.0							
	Yellow/brown medium dense clayey SAND (SC)	13.5	N=25						
15	Yellow tan medium dense slightly silty SAND (SP/SM)	16.0							
			N=19						
20		20.0							

CLASSIFICATION

SHEAR STRENGTH

□ Penetrometer ▼ Unconfined
◇ Torvane ● Triaxial
△ Field Vane ▲ Miniature Vane

KIPS PER SQ FT

0.5 1.0 1.5 2.0 2.5

NOTES:

1. Terms and symbols defined on Figures 3 a and b.

COMPLETION DATE: February 6, 2014
TOTAL DEPTH: 20'
CAVED DEPTH: Not Applicable
DRY AUGER: Not Applicable
WET ROTARY: Not Applicable
BACKFILL: Cement-Bentonite Grout
LOGGER:

Fugro Consultants, Inc.

ECUA Possible Future Compost Slab/Building

LOG OF BORING NO. B-2

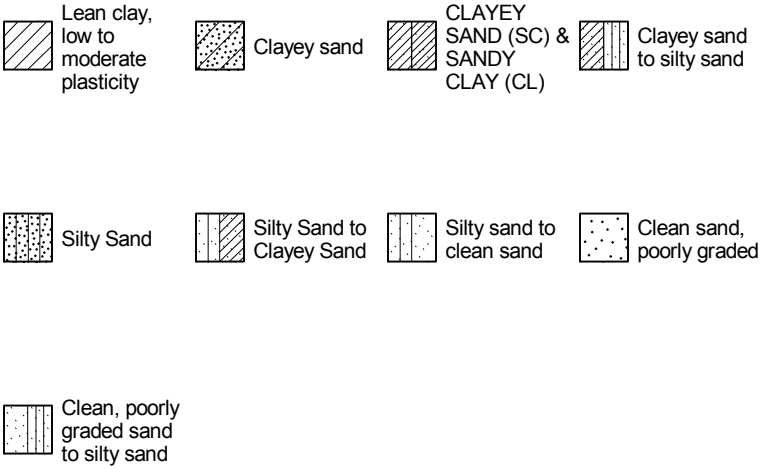
Cantonment, Escambia County, Florida

Project No. 04.83141029

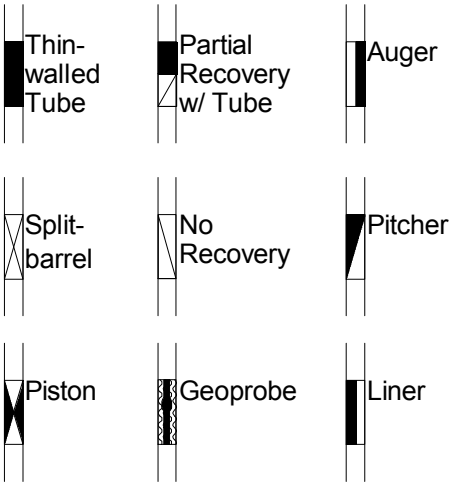
FIGURE 2

FCBR_LOG (FINAL) ECUA POSSIBLE FUTURE.GPJ FUGRO DATA TEMPLATE 042610.GDT 3/25/14

SOIL TYPES



SAMPLER TYPES

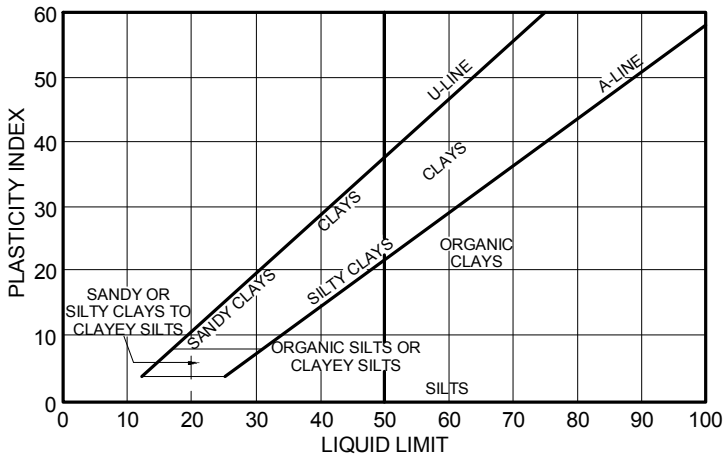


SOIL GRAIN SIZE

U.S. Standard Sieve

6"	3"	3/4"	4	10	40	200		
Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		
152	75.0	19.0	4.75	2.00	0.425	0.075	0.005	(mm)

PLASTICITY CHART



SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8 inch thick extending through the sample.
Seam	Inclusion 1/8 inch to 3 inches thick extending through the sample.
Layer	Inclusion greater than 3 inches thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil type.
Interlayered	Soil sample composed of alternating layers of different soil type.
Intermixed	Soil sample composed of pockets of different soil type and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.
Carbonate	Having more than 50% carbonate content.

STANDARD PENETRATION TEST (SPT)

A 2-in.-OD, 1-3/8-ID split spoon sampler is driven 1.5 ft into undisturbed soil with a 140-pound hammer free falling 30 in. After the sampler is seated 6 in. into undisturbed soil, the number of blows required to drive the sampler the last 12 in. is the Standard Penetration Resistance or "N" value, which is recorded as blows per foot as described below.

SPLIT-BARREL SAMPLER DRIVING RECORD

Blows Per Foot	Description
25	25 blows drove sampler 12 inches, after initial 6 inches of seating.
50/7"	50 blows drove sampler 7 inches, after initial 6 inches of seating.
Ref/3"	50 blows drove sampler 3 inches during initial 6-inch seating interval.

NOTE: To avoid damage to sampling tools, driving is limited to 50 blows during or after seating interval.

DENSITY OF GRANULAR SOILS

Descriptive Term	*Relative Density, %	**Blows Per Foot (SPT)
Very Loose	< 15	0 to 4
Loose	15 to 35	5 to 10
Medium Dense	35 to 65	11 to 30
Dense	65 to 85	31 to 50
Very Dense	> 85	> 50

*Estimated from sampler driving record.

**Requires correction for depth, groundwater level, and grain size.

STRENGTH OF COHESIVE SOILS

Term	Undrained Shear Strength, ksf	Blows Per Foot (SPT) (approximate)
Very Soft	< 0.25	0 to 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	8 to 16
Very Stiff	2.00 to 4.00	16 to 32
Hard	> 4.00	> 32

SHEAR STRENGTH TEST METHOD

U = Unconfined Q = Unconsolidated - Undrained Triaxial

P = Pocket Penetrometer T = Torvane V = Miniature Vane F = Field Vane

HAND PENETROMETER CORRECTION

Our experience has shown that the hand penetrometer generally overestimates the in-situ undrained shear strength of over consolidated Pleistocene Gulf Coast clays. These strengths are partially controlled by the presence of macroscopic soil defects such as slickensides, which generally do not influence smaller scale tests like the hand penetrometer. Based on our experience, we have adjusted these field estimates of the undrained shear strength of natural, overconsolidated Pleistocene Gulf Coast soils by multiplying the measured penetrometer reading by a factor of 0.6. These adjusted strength estimates are recorded in the "Shear Strength" column on the boring logs. Except as described in the text, we have not adjusted estimates of the undrained shear strength for projects located outside of the Pleistocene Gulf Coast formations.

Information on each boring log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as from laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines on the logs may be transitional and approximate in nature. Water level measurements refer only to those observed at the time and places indicated, and can vary with time, geologic condition, or construction activity.