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REPORT OF A GEOTECHNICAL EXPLORATION

Oak Trail Preserve
St. Johns County, Florida

May 16, 2016

PROJECT NO. 0930.1600101.0000
REPORT NO. 1335935

Prepared For:

Load King
1357 West Beaver Street
St. Johns County, Florida 32209

Prepared By:

UNIVERSAL ENGINEERING SCIENCES
5561 Florida Mining Boulevard South
Jacksonville, Florida 32257-3648
(904) 296-0757

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May 16, 2016

Load King
1357 West Beaver Street
St. Johns County, Florida 32209

Attention: Mr. Charles Chupp

Reference: **REPORT OF A GEOTECHNICAL EXPLORATION**
Oak Trail Preserve
St. Johns County, Florida
UES Project No. 0930.1600101.0000 and Report No. 1335935

Dear Mr. Chupp:

Universal Engineering Sciences, Inc. has completed a subsurface exploration at the site of the proposed project located in St. Johns County, Florida. This report contains the results of our exploration, an engineering evaluation with respect to the project characteristics described to us, and recommendations for groundwater considerations, foundation, and site preparation. A summary of our findings is as follows:

- Beneath a layer to topsoil, the borings generally encountered very loose to medium dense slightly clayey fine sand (SP-SC), very clayey to clayey fine sand (SC), silty fine sand (SM), and soft to stiff clay (CL-CH) in the upper 3 to 12.5 feet underlain with loose to medium dense fine sand (SP) and slightly silty fine sand (SP-SM) to the 15- to 20-foot boring termination depths.

  As exceptions, boring L-2 encountered loose clayey fine sand with wood pieces and a large amount of wood at depth ranges of 2 to 3.5 and 3.5 to 5.5 feet, respectively. Boring L-8 encountered loose slightly silty fine sand with many wood pieces (SP-SM) and loose slightly silty fine sand with some organics (SP-SM) at depth ranges of 1.5 to 4 feet and 9.5 to 11.5 feet, respectively. Borings L-11, L-12, L-13, L-16, L-17, L-21, L-22, L-26, L-29, L-31, and L-32 encountered very loose to loose fine sand (SP) and slightly silty fine sand (SP-SM) in the upper 1.5 to 2 feet. Boring L-29 encountered loose to medium dense fine sand (SP) and slightly silty fine sand (SP-SM) throughout the 15-foot boring depth.

- We measured the groundwater level at the boring locations at the time of drilling and 24 hours after the completion generally varying between 2.1 and 5.0 feet below the existing grade. Boring LA-5, however, had a groundwater level of 0.5 feet. We estimate the seasonal high groundwater level will perch within 1 foot above the clayey sands encountered at the borings.

- Boring L-2 encountered loose clayey fine sand with wood pieces and a large amount of wood at depth ranges of 2 to 3.5 and 3.5 to 5.5 feet, respectively. Boring L-8 encountered loose slightly silty fine sand with many wood pieces (SP-SM) and loose slightly silty fine sand with some organics (SP-SM) at depth ranges of 1.5 to 4 feet and 9.5 to 11.5 feet, respectively. We recommend backhoe-excavated test pits be performed at these locations to better evaluate the need for over-excavation of these soils and to delineate the vertical and horizontal extent, if warranted.

- Clayey soils were encountered relatively near the existing ground surface. It is recommended a minimum 2-foot separation be maintained between the top of the clayey materials and the bottom of the footings and between the bottom of a flexible pavement base course or bottom of a concrete pavement, and a 2-foot separation be maintained between the top of the clayey materials and the bottom of the proposed floor slab. This separation can be achieved by either filling the site or undercutting the clayey materials.

- A rigid or flexible pavement section could be used on this project. Flexible pavement combines the strength and durability of several layer components to produce an appropriate and cost-effective combination of available construction materials. Concrete pavement has the advantage of the ability to "bridge" over isolated soft areas, and it typically has a longer service life than asphalt pavement. Disadvantages of rigid pavement include an initial higher cost and more difficult patching of distressed areas than occurs with flexible pavement.

- Based on the pond boring results and classification of the soil samples, soils classified as fine sand (SP), slightly silty fine sand (SP-SM), and slightly clayey fine sand (SP-SC) as generally encountered at a depth range of 1.75 to 3 feet at LA-2 and below depths of 3.5 to 10.5 feet and extending to the 15-foot boring depths, are considered suitable for use as structural fill depending on the moisture content of the soils at the time of placement and compaction. It should be understood that all soils excavated from below the water table may be excessively wet and may require stockpiling or spreading to dry prior to placement and compaction. Soils described as slightly silty fine sand (SP-SM) will take longer to dry than clean fine sand (SP) material. Although not suitable for structural fill, due to excessive organic content, the topsoil materials may be used in landscape areas as long as positive drainage is maintained. The soils classified as clayey fine sand (SC), silty fine sand (SM), and silty clay (CL-CH) as encountered in the upper 3.5 to 10.5 feet are considered unsuitable for structural fill due to the excessive fines contents and moisture sensitivity of these soils.

- We recommend only normal, good practice site preparation techniques to prepare the existing subgrade to support the proposed structures and roadways. These techniques include clearing the construction areas, dewatering if warranted, stripping topsoils and vegetation, overexcavation of clayey material as warranted, compacting the subgrade and placing engineered fill to the desired grades.

We trust this report meets yours needs and addresses the geotechnical issues associated with the proposed construction. We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,

UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549

Stephen R. Weaver, P.E.
Geotechnical Services Manager
Florida P.E. Number 37389★
Date: 5/19/16

SRW/srw

Johnathan T. Miller
Staff Geotechnical Engineer
Florida E.I. Number 100019370

Cc: Mr. Ed Goodson
Goodson, Nevin & Associates

TABLE OF CONTENTS

1.0 INTRODUCTION

In this report, we present the results of the subsurface exploration of the site for the proposed project located in St. Johns County, Florida. We have divided this report into the following sections:

- SCOPE OF SERVICES - Defines what we did
- FINDINGS - Describes what we encountered
- RECOMMENDATIONS - Describes what we encourage you to do
- LIMITATIONS - Describes the restrictions inherent in this report
- APPENDICES - Presents support materials referenced in this report

2.0 SCOPE OF SERVICES

2.1 PROJECT DESCRIPTION

Project information was provided to us in recent correspondence with Mr. Ed Goodson with Goodson, Nevin & Associates and Mr. Brian Burke with Burke Design. We were provided with a copy of a plan titled Preliminary PUD Site Plan prepared by Burke Design, Inc. dated February 26, 2016. This plan shows the boundary limits for the property, the roadways located adjacent to the site, the layout of the proposed roadways, retention areas, and lots within the development and some of the requested boring locations.

We understand that the proposed construction will consist of a single-family residential subdivision consisting of 28 lots in St. Johns County, Florida. The development would likely include one- or two-story residential structures, a lift station, and roadways to provide access to the proposed lots. The project also includes several retention areas for stormwater management. Approximately 2,000 linear feet of off-site sanitary sewer force main is also included. Proposed grading information has not been provided. Therefore, we have assumed that less than two feet of elevating fill will be required for site development. Anticipated structural loadings are not available at the time of this proposal, therefore we have assumed that maximum loads for load bearing walls and columns will not exceed 3 klf and 75 kips, respectively.

We note that, since the applicability of geotechnical recommendations is very dependent upon project characteristics, most specifically: improvement locations, grade alterations, and actual structural loads applied, UES must review the preliminary and final site and grading plans, and structural design loads to validate all recommendations rendered herein. Without such review our recommendations should not be relied upon for final design or construction of any site improvements.

2.2 PURPOSE

The purposes of this exploration were:

- to explore the general subsurface conditions at the site for the proposed construction;
- to interpret and evaluate the subsurface conditions with respect to the proposed construction; and
- to provide geotechnical engineering recommendations for groundwater considerations, preliminary foundation design, pavement design, and site preparation.

This report presents an evaluation of site conditions on the basis of traditional geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. Universal Engineering Sciences would be pleased to perform these services, if you desire.

Our exploration was confined to the zone of soil likely to be stressed by the proposed construction. Our work did not address the potential for surface expression of deep geological conditions. This evaluation requires a more extensive range of field services than performed in this study. We will be pleased to conduct an investigation to evaluate the probable effect of the regional geology upon the proposed construction, if you desire.

2.3 FIELD EXPLORATION

A field exploration was performed from April 20-28, 2016. The approximate boring locations are shown on the attached Boring Location Plan in Appendix A. The approximate boring locations were determined in the field by our personnel using taped measurements from existing features at the site and should be considered accurate only to the degree implied by the method of measurement used. Samples of the soils encountered will be held in our laboratory for your inspection for 60 days unless we are notified otherwise.

2.3.1 SPT Borings

To preliminarily explore the subsurface conditions within the lot and lift station areas, we located and drilled thirty-three (33) Standard Penetration Test (SPT) borings to depths of 15 to 20 feet below the existing ground surface in general accordance with the methodology outlined in ASTM D 1586. A summary of this field procedure is included in Appendix A. Split-spoon soil samples recovered during performance of the boring were visually classified in the field and representative portions of the samples were transported to our laboratory for further evaluation.

2.3.2 Auger Borings

To determine the subsurface conditions within the proposed roadway and pond areas, we located and drilled sixteen (16) auger borings to depths of 6 to 15 feet below the existing ground surface in general accordance with the methodology outlined in ASTM D 1452. A summary of this field procedure is included in Appendix A. Representative soil samples recovered from the auger borings were returned to our laboratory for further evaluation.

2.4 LABORATORY TESTING

Representative soil samples obtained during our field exploration were returned to our office and classified by a geotechnical engineer. The samples were visually classified in general accordance with ASTM D 2488 (Unified Soil Classification System).

Twenty-one (21) fines content tests, twenty-one (21) moisture content tests, two (2) Atterberg Limit tests, and one (1) organic content test were conducted in the laboratory on representative soil samples obtained from the borings. These tests were performed to aid in classifying the soils and to help quantify and correlate engineering properties. The results of these tests are presented on the Boring Log in Appendix A. A brief description of the laboratory procedures used is also provided in Appendix A.

3.0 FINDINGS

3.1 SOIL SURVEY

Based on the Soil Survey for St. Johns County, Florida, as prepared by the US Department of Agriculture Soil Conservation Service, the predominant predevelopment soil types at the site are identified as Manatee fine sandy loam (22), Tocoi fine sand (34), and Riviera fine sand (36), and Bluff sandy clay loam (42).

A summary of characteristics of these soil series were obtained from the Soil Survey and is included in Table 1.

TABLE 1
Summary of Soil Survey Information

Soil Type	Constituents	Hydrologic Group	Natural Drainage	Soil Permeability (Inches/Hr)	Seasonal High Water Table
Manatee (22)	0-13" Fine sandy loam 13-34" Fine sandy loam, sandy loam 34-52" Fine sandy loam, sandy loam, loamy fine sand 52-80" Fine sandy loam, sandy loam, loamy fine sand	D	Very Poorly Drained	0-13" 0.6 – 2.0 13-34" 0.6 – 2.0 34-52" 0.6 – 2.0 52-80" 0.6 – 2.0	0 – 1.0
Tocoi (34)	0-13" Fine sand 13-23" Fine sand, loamy fine sand, sand 23-45" Fine sand,sand 45-76" Loamy fine sand, loamy sand 76-80" Loamy fine sand, fine sand, loamy sand	A/D	Poorly Drained	0-13" 6.0 – 20 13-23" 2.0 – 20 23-45" 6.0 – 20 45-76" 2.0 – 6.0 76-80" 0.6 – 20	0.0 – 1.5
Riviera (36)	0-23" Fine sand 23-28" Sandy loam, sandy clay loam 28-71" Sandy loam, sandy clay loam 71-80" Sand, fine sand, loamy sand	C/D	Poorly Drained	0-23" 6.0 – 20 23-28" < 0.2 28-71" < 0.2 71-80" 0.6 – 6.0	0 – 1.0
Bluff (42)	0-3" Muck 3-9" Sandy clay loam 9-25" Sandy clay loam, sandy clay 25-53" Sandy clay loam, sandy clay, loam 53-80" Sandy clay loam, loamy fine sand, sandy loam	C/D	Very Poorly Drained	0-3" 6.0 – 20 3-9" 0.2 – 0.6 9-80" 0.06 – 0.2	0.0-1.0

3.2 SURFACE CONDITIONS

The subject property is located on the east side of Roscoe Blvd about a ½ mile north of Canal Road in St. Johns County, Florida. The site is heavily wooded with pine, oak, and palm trees with an existing pond running from east to west on the west side of the property. There is also a pond located on a property located on an adjacent property to the east of the site. Some portions of the site are wetland areas with the west and northwest area of the site containing the most upland area.

3.3 SUBSURFACE CONDITIONS

The boring locations and detailed subsurface conditions are illustrated in Appendix A: Boring Location Plan and Boring Logs. It should be noted that soil conditions will vary away from and between boring locations. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples and a limited number of

laboratory tests. Also, see Appendix A: Key to Boring Logs, for further explanation of the symbols and placement of data on the Boring Logs. Table 2: General Soil Profile, summarizes the soil conditions encountered.

TABLE 2
General Soil Profile

Typical depth (ft)		Soil Descriptions
From	To	
0	3.0 to 12.5	Very loose to medium dense slightly clayey fine sand (SP-SC), very clayey to clayey fine sand (SC), silty fine sand (SM), and soft to stiff sandy clay (CL-CH)
3.0 to 12.5	20*	Loose to medium dense fine sand (SP) and slightly silty fine sand (SP-SM)

* Termination Depth of Deepest Boring
( ) Indicates Unified Soil Classification

As exceptions, boring L-2 encountered loose clayey fine sand with wood pieces and a large amount of wood at depth ranges of 2 to 3.5 and 3.5 to 5.5 feet, respectively. Boring L-8 encountered loose slightly silty fine sand with many wood pieces (SP-SM) and loose slightly silty fine sand with some organics (SP-SM) at depth ranges of 1.5 to 4 feet and 9.5 to 11.5 feet, respectively. Borings L-11, L-12, L-13, L-16, L-17, L-21, L-22, L-26, L-29, L-31, and L-32 encountered very loose to loose fine sand (SP) and slightly silty fine sand (SP-SM) in the upper 1.5 to 2 feet. Boring L-29 encountered loose to medium dense fine sand (SP) and slightly silty fine sand (SP-SM) throughout the 15-foot boring depth.

We measured the groundwater level at the boring locations at the time of drilling and 24 hours after the completion generally varying between 2.1 and 5.0 feet below the existing grade. Boring LA-5, however, had a groundwater level of 0.5 feet.

4.0 RECOMMENDATIONS

4.1 GENERAL

In this section of the report, we present our detailed recommendations for groundwater control, preliminary building foundation, site preparation, and construction related services. The following recommendations are made based upon a review of the attached soil test data, our understanding of the proposed construction, and experience with similar projects and subsurface conditions. We recommend that we be provided the opportunity to review the project plans and specifications to confirm that our recommendations have been properly interpreted and implemented. If the anticipated construction changes significantly from those discussed previously, we request the opportunity to review and possibly amend our recommendations with respect to those changes. The discovery of any subsurface conditions during construction which deviate from those encountered in the borings should be reported to us immediately for observation, evaluation and recommendations.

4.2 GROUNDWATER CONSIDERATIONS

The groundwater table will fluctuate seasonally depending upon local rainfall. The rainy season in Northeast Florida is normally between June and September. Based upon our review of U.S.G.S. data, St. Johns County Soils Survey, and regional hydrogeology, we estimate the seasonal high groundwater level will perch within 1 foot above the clayey sands encountered at the borings.

Note, it is possible the estimated seasonal high groundwater levels will temporarily exceed these estimated levels during any given year in the future. Should impediments to surface water drainage exist on the site, or should rainfall intensity and duration, or total rainfall quantities exceed the normally anticipated rainfall quantities, groundwater levels may exceed our seasonal high estimates. We recommend positive drainage be established and maintained on the site during construction. We further recommend permanent measures be constructed to maintain positive drainage from the site throughout the life of the project. We recommend all foundation and pavement grade designs be based on the seasonal high groundwater conditions.

4.3 PRELIMINARY FOUNDATION DESIGN

Based on our preliminary evaluation of the site and subsurface conditions with respect to the anticipated construction, it appears the single-family residential structures construction can be supported on conventional shallow foundation systems subsequent to performing the necessary site preparation and earthwork construction procedures. Based on the preliminary field data obtained in this exploration, it appears maximum allowable soil bearing pressures for shallow foundations supporting the proposed structures would be on the order of 2,000 to 2,500 psf.

We anticipate that the required site preparation for this project will consist of stripping 0.5 to 1.0 foot of topsoil and soil with organics from the construction area. It may be necessary to strip deeper than one foot below the existing surface to remove the root systems of large trees. Clayey soils were encountered relatively near the existing ground surface. It is recommended a minimum 2-foot separation be maintained between the top of the clayey materials and the bottom of the footings and a 2-foot separation be maintained between the top of the clayey materials and the bottom of the proposed floor slab. This separation can be achieved by either filling the site or undercutting the clayey materials. After stripping, it will be necessary to compact the exposed surface with a moderate sized vibratory roller to densify the loose sands within the upper approximate 2 to 3 feet. After sufficient surface compaction, structural fill may be placed in lifts (12 inches maximum loose thickness) and compacted with the vibratory roller.

Care should be exercised in performing the site preparation procedures due to the presence of clayey soils near the existing ground surface. Excessive vibrations could result in pumping conditions which may result in the need for overexcavation and replacement.

In addition, fill heights greater than two feet may cause excessive consolidation of the very soft silty clay (CL-CH) layers present at borings L-20 and L-21. This may result in the need to

surcharge the lots in order to reduce the anticipated post-construction settlements to tolerable magnitudes. Once more detailed grading information is available, consolidation testing could be performed on these soils to evaluate settlement potential and the need for surcharging.

4.4 PAVEMENTS

4.4.1 General

A rigid or flexible pavement section could be used on this project. Flexible pavement combines the strength and durability of several layer components to produce an appropriate and cost-effective combination of available construction materials. Concrete pavement has the advantage of the ability to "bridge" over isolated soft areas, it requires less security lighting, and it typically has a longer service life than asphalt pavement. Disadvantages of rigid pavement include an initial higher cost and more difficult patching of distressed areas than occurs with flexible pavement.

4.4.2 Asphalt (Flexible) Pavements

We have recommended a flexible pavement section with a 20-year design life for use on this project. Because traffic loadings are commonly unavailable, we have generalized our pavement design into two groups. The group descriptions and the recommended component thicknesses are presented in Table 3: Summary of Pavement Component Recommendations. The structural numbers in Table 3 are based on a structural number analysis with the stated estimated daily traffic volume for a 20-year replacement design life.

TABLE 3
Summary of Pavement Component Recommendations

Traffic Group	Maximum Traffic Loading	Component Thickness (inches)		
		Stabilized Subgrade	Base Course	Surface Course
Automobile parking lots and driveways - **standard duty**	Up to 50,000 E_{18}SAL	12	6	1.5
Truck parking lots and driveways - **heavy duty**	Up to 250,000 E_{18}SAL	12	8	2.0

4.4.2.1 Stabilized Subgrade

We recommend that subgrade materials be compacted in place according to the requirements in the "Site Preparation" section of this report. Further, beneath limerock base course, stabilize the subgrade materials to a minimum Limerock Bearing Ratio (LBR) of 40, as specified by Florida Department of Transportation (FDOT) requirements for Type B Stabilized Subgrade. The

subgrade material should be compacted to at least 98 percent of the Modified Proctor maximum dry density (ASTM D 1557, AASHTO T-180) value.

The stabilized subgrade can be a blend of existing soil and imported material such as limerock. If a blend is proposed, we recommend that the contractor perform a mix design to find the optimum mix proportions.

The primary function of stabilized subgrade beneath the base course is to provide a stable and firm subgrade so that the limerock can be properly and uniformly placed and compacted. Depending upon the soil type, the subgrade material may have sufficient stability to provide the needed support without additional stabilizing material. Generally, sands with silt or clay should have sufficient stability and may not require additional stabilizing material. Conversely, relatively "clean" sand will not provide sufficient stability to adequately construct the limerock base course. Universal Engineering Sciences should observe the soils exposed on the finish grades to evaluate whether or not additional stabilization will be required beneath the base course.

4.4.2.2 Base Course

We recommend the base course consist of locally available limerock complying with the requirements of the 2016 version of the FDOT Standard Specifications for Road and Bridge Construction (SSRBC), Section 200 and Section 911. The limerock should be mined or supplied from an FDOT approved source. Place the limerock in maximum 6 inch thick loose lifts and compact each lift to a minimum density of 98 percent of the Modified Proctor maximum dry density (ASTM D1557/AASHTO T-180).

Alternatively, we believe locally available crushed concrete base of equal thickness could be substituted for the limerock. Crushed concrete should be supplied by an FDOT approved plant with quality control procedures. Crushed concrete should meet the requirements of 2016 FDOT SSRBC Sections 200 and 911.

The base shall have an average LBR of not less than 100 and should be compacted to at least 98 percent of the Modified Proctor maximum dry density (ASTM D 1557, AASHTO T-180) value. The LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

Testing shall be performed at the following frequencies:

- Perform in-place density on the base at a frequency of 1 test per 300 linear foot of roadway or 5,000 square feet of pavement.

- Perform Limerock Bearing Ratio tests at a frequency of 1 test per visual change in material and a minimum of 1 test per 15,000 square feet of pavement.

- Engineer should perform a final visual base inspection prior to placement of prime or tack coat and paving.

4.4.2.3 Wearing Surface

For the roadways, we recommend that the surfacing consist of FDOT SuperPave (SP) asphaltic concrete. The surface course should consist of FDOT SP-9.5 fine mix for the proposed light-duty area. The heavy duty area can consist of a single 2-inch lift of SP-12.5 or 2 layers of SP-9.5 placed in 1-inch lifts. The asphalt concrete should be placed within the allowable lift thicknesses for fine Type SP mixes per the latest edition of FDOT, Standard Specifications for Road and Bridge Construction, Section 334-1.4 Thickness.

The asphaltic concrete should be compacted to an average field density of 93 percent of the laboratory maximum density determined from specific gravity (G_{mm}) methods, with an individual test tolerance of **+2 percent and -1.2% of the design G_{mm}**. Specific requirements for the SuperPave asphaltic concrete structural course are outlined in the latest edition of FDOT, Standard Specifications for Road and Bridge Construction, Section 334-5.2.4.

Please note, if the Designer (or Contract Documents) limits compaction to the static mode only or lifts are placed one-inch thick, then the average field density should be 92 percent, with an individual test tolerance of + 3 percent, and -1.2% of the design G_{mm}.

After placement and field compaction, the wearing surface should be cored to evaluate material thickness and density. Cores should be obtained at frequencies of at least one (1) core per 5,000 square feet of placed pavement, every 250 feet of lineal roadway, or a minimum of two (2) cores per day's production.

4.4.3 Concrete (Rigid) Pavements

Concrete pavement is a rigid pavement that transfers much lighter wheel loads to the subgrade soils than a flexible asphalt pavement. For a concrete pavement subgrade, we recommend using the existing surficial sands or recommend clean fine sand fill (SP), densified to at least 98 percent of Modified Proctor test maximum dry density (ASTM D 1557) without additional stabilization, with the following stipulations:

1. Subgrade soils must be densified to at least 98 percent of Modified Proctor test maximum dry density (ASTM D 1557) to a depth of at least 2 feet prior to placement of concrete.
2. The surface of the subgrade soils must be smooth, and any disturbances or wheel rutting corrected prior to placement of concrete.
3. The subgrade soils must be moistened prior to placement of concrete.
4. Concrete pavement thickness should be uniform throughout, with exception to thickened edges (curb or footing).

5. The bottom of the pavement should be separated from the estimated typical wet season groundwater level by at least 18 inches.

Our recommendations for slab thickness for standard duty and heavy duty concrete pavements are based on a) subgrade soils densified to 98 percent of the Modified Proctor maximum dry density (ASTM D 1557), b) modulus of subgrade reaction (k) equal to 200 pounds per cubic inch, c) a 20 year design life, and 3) the previously stated traffic conditions in Section 4.4.2, we recommend using the design shown in Table 4 for standard duty concrete pavements.

TABLE 4
Standard Duty (Unreinforced) Concrete Pavement

Minimum Pavement Thickness	Maximum Control Joint Spacing	Recommended Sawcut Depth
5 Inches	10 Feet x 10 Feet	1¼ Inches

Our recommended design for heavy duty concrete pavement is shown in Table 5 below.

TABLE 5
Heavy Duty (Unreinforced) Concrete Pavement

Minimum Pavement Thickness	Maximum Control Joint Spacing	Recommended Sawcut Depth
6 Inches	12 Feet x 12 Feet	1 ½ Inches

We recommend using concrete with minimum 28-day compressive strength of 4,000 psi and a minimum 28-day flexural strength (modulus of rupture) of at least 600 pounds per square inch, based on 3rd point loading of concrete beam test samples. Layout of the sawcut control joints should form square panels, and the depth of sawcut joint should be at least ¼ of the concrete slab thickness. The joints should be sawed within six hours of concrete placement or as soon as the concrete has developed sufficient strength to support workers and equipment. We recommend allowing Universal to review and comment on the final concrete pavement design, including section and joint details (type of joints, joint spacing, etc.), prior to the start of construction.

For further details on concrete pavement construction, please reference the "Guide to Jointing on Non-Reinforced Concrete Pavements" published by the Florida Concrete and Products Associates, Inc., and "Building Quality Concrete Parking Areas", published by the Portland Cement Association.

4.4.4 Effects of Groundwater

One of the most critical factors influencing pavement performance in Northeast Florida is the relationship between the pavement subgrade and the seasonal high groundwater level. Many roadways and parking areas have been damaged as a result of deterioration of the base conditions

and/or the base/surface course bond. We recommend that the seasonal high groundwater and the bottom of the flexible pavement limerock base course be separated by at least 24 inches. We recommend a separation of at least 18 inches below the bottom of a rigid concrete pavement or below a flexible pavement with a crushed concrete base. If this separation cannot be established and maintained by grading and surface drainage improvements, permanent groundwater control measures (underdrains) will be required.

4.4.5 Curbing

We recommend that curbing around the landscaped sections adjacent to the parking areas and driveways be constructed with full-depth curb sections. Using extruded curb sections which lie directly on top of the final asphalt level, or eliminating the curbing entirely, can allow migration of irrigation water from the landscape areas to the interface between the asphalt and the base. This migration often causes separation of the wearing surface from the base and subsequent rippling and pavement deterioration. Topsoil placed behind curbing in landscaped areas should be limited to 6 inches vertical thickness within five feet of flexible pavement.

4.4.6 Construction Traffic

Light duty roadways and incomplete pavement sections will not perform satisfactorily under construction traffic loadings. We recommend that construction traffic (construction equipment, concrete trucks, sod trucks, garbage trucks, dump trucks, etc.) be re-routed away from these roadways or that the pavement section be designed for these loadings.

4.5 SITE PREPARATION

We recommend normal, good practice site preparation procedures. These procedures include: removing the existing topsoil and vegetation, compacting the subgrade, and placing necessary fill or backfill to grade with engineered fill. A more detailed synopsis of this work is as follows:

1. Prior to construction, the location of any existing underground utility lines within the construction area should be established. Provisions should then be made to relocate interfering utilities to appropriate locations. It should be noted that if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion which may subsequently lead to excessive settlement of overlying structure(s).

2. The groundwater level should be maintained at least 1 foot below any excavations and 2 feet below the surface of any vibratory compaction procedures. It may be required to add moisture to the material during compaction operations due to the depths of the existing water tables.

3. Remove the existing trees and associated root systems from the construction areas; strip away the existing vegetation, topsoils and other deleterious materials from within the proposed construction limits. Root rake the exposed subgrade soils (in perpendicular

directions) to a depth of at least 12 inches to help locate and remove large roots, extensive root systems and pieces of organic debris that may occur just below the ground surface. The surface stripping and root raking should be performed within and 5 feet beyond the perimeter of the proposed building areas and within and 3 feet beyond the perimeter of the proposed paved areas. Expect typical stripping at this site to a depth of 12 inches more or less. Some isolated areas may require more than a foot of stripping or undercutting to remove the root systems of large trees.

4. Clayey soils were encountered relatively near the existing ground surface. It is recommended a minimum 2-foot separation be maintained between the top of the clayey materials and the bottom of the footings and the bottom of the proposed floor slab. This separation can be achieved by either filling the site or undercutting the clayey materials. Clayey sands which may warrant overexcavation to the recommended depths were encountered by the borings at the time of our exploration. If clayey soils are undercut, an initial lift of dry, clean sands (SP) should be placed prior to performing vibratory compaction operations.

   To avoid pumping of the underlying clayey soils, we recommend self propelled vibrating equipment remain a minimum of 2 feet above clayey soils. The sandy soils within 2 feet of the clayey soils could be compacted with a vibratory roller operating in static mode or with a track mounted dozer to avoid disturbing the clayey soils. We further recommend a minimum of 18 inches of sand overlying the clayey soils prior to operation of construction equipment. Excess disturbance of the clayey soils will degrade the strength characteristics of the soil and may result in an unsuitable soil which will require over-excavation and subsequent backfilling with clean fine sand material.

5. Compact the subgrade from the surface until you obtain a minimum density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), to a depth of 2 feet below the compacted surface. A minimum of eight (8) complete coverages (in perpendicular directions) should be made in the building construction area with the roller to improve the uniformity and increase the density of the underlying sandy soils

   Care should be exercised in performing the site preparation procedures due to the presence of clayey soils near the existing ground surface. Excessive vibrations could result in pumping conditions which may result in the need for overexcavation and replacement.

   Should the bearing level soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated and (1) the disturbed soils removed and backfilled with dry structural fill soils which are then compacted, or (2) the excess pore pressures within the disturbed soils allowed to dissipate before recompacting.

6. Place fill material, as required. The fill should consist of "clean," fine sand with less than 5 percent soil fines. You may use fill materials with soil fines between 5 and 12 percent, but

strict moisture control may be required. Typically, the soils should exhibit moisture contents within ± 2 percent of the Modified Proctor optimum moisture content during compaction. Place fill in uniform 10- to 12-inch loose lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density.

7. Perform compliance tests within the subgrade and the fill/backfill at a frequency of not less than one test per 2,500 square feet per lift in the building areas, or at a minimum of two tests per building, whichever is greater. In paved areas, perform compliance tests at a frequency of not less than one test per 10,000 square feet per lift, or at a minimum of two test locations, whichever is greater.

8. Test all footing cuts for compaction to a depth of 1 foot. We recommend you conduct density testing in every column footing, and every 100 linear feet in wall footings. Recompaction of the foundation excavation bearing level soils, if loosened by the excavation process, can probably be achieved by making several coverages with a light weight walk-behind vibratory sled or roller.

4.6 LIFT STATION STRUCTURE

We have assumed that the lift station will bear at a depth of approximately 10 to 15 feet below the existing ground surface. Use of temporary dewatering measures, such as a fully sanded vacuum wellpoint system, will be needed to facilitate construction in the dry.

The maximum allowable net soil bearing pressure for the proposed lift station for use in shallow foundation design should not exceed 2,000 psf. Preparation for the proposed subgrade should follow the recommendations outlined below. The foundations should be designed based on the maximum load which could be imposed by all loading conditions.

We anticipate the buried structure will exert little or no net downward pressure on the soils; rather, the structure may be subject to hydrostatic uplift pressures when the structure is empty. Below grade structures should be designed to resist lateral earth pressures and hydrostatic uplift pressures appropriate for their depth below existing grade and the wet season groundwater table.

The walls of the structure should be designed to resist at-rest lateral earth pressures, with equivalent fluid densities above and below the water table being as follows:

Above Water Table - Equivalent Fluid Density	55 pcf
Below Water Table - Equivalent Fluid Density	90 pcf

The water table for wall design purposes should be at the existing grade.

Foundation Preparation - Based on our evaluation of the soil conditions encountered in the lift station area, we offer the following recommendations for the proposed lift station construction.

1. The proposed construction area should be dewatered as necessary and excavated to the required foundation depth. Excavation work will be required to meet OSHA Excavation Standard Subpart P regulations, Type C Soils. Either timber shoring, a braced sheet pile structure or an excavation with temporary side slopes cut back at 1.5 horizontal to 1.0 vertical can be implemented, depending on the specific project requirements. The side slope of 1.5 horizontal to 1.0 vertical is contingent upon the dewatering system adequately controlling slope seepage. Sheet piling or shoring should be designed according to OSHA sheeting and bracing requirements. We recommend a Florida registered Professional Engineer design the sheeting/bracing system.

2. A dewatering system will be required for the project. The water table should be maintained at least 2 feet below the proposed bottom of the structures or 2 feet below the required depth of excavation. The dewatering system should not be decommissioned until sufficient deadweight exists on the structures to prevent uplift or the uplift protection system as described below, if necessary, is in place.

3. The excavation bottom should be densified using hand-operated compaction equipment. Compaction should continue until bearing level soils are compacted to a minimum density of 95 percent of the soils Modified Proctor maximum dry density (ASTM D 1557) to a depth of 12 inches.

   FDOT No. 57 stone that may be required for the foundation excavation bottom should be placed in 6 inch lifts and densified using hand-operated compaction equipment. Compaction should continue until the stone is well seated. Density testing will not be necessary if the placement and compaction of the stone is appropriately documented.

4. Backfill which will be required around buried walls should be compacted with a light hand-operated compactor to a density of 95 percent of the soils Modified Proctor maximum dry density. All backfill should be placed in level lifts not exceeding six inches loose thickness. Care should be taken not to over compact the backfill (i.e., limit compaction to a maximum of 98 percent of the maximum density) in order to limit the lateral loads on the proposed walls. Based on the boring data, the soils described as sands (SP), slightly clayey fine sand (SP-SC), and slightly silty fine sand (SP-SM) excavated from the lift station location can be used as structural backfill. The soils described as very clayey to clayey fine sand (SC), silty sands (SM) are not considered suitable for use as structural fill due to moisture sensitivity, excessive fines content, and plasticity issues.

5. Universal Engineering Sciences, Inc. should be retained to provide on-site inspection and testing of compaction/filling operations so that proper documentation of the required minimum compaction and compliance with the recommendations contained herein can be provided.

6. Structural fill/backfill should consist of an inorganic, non-plastic granular soil with less than 10 percent fines and a Unified Soil Classification of SP, SP-SM, SP-SC, SW or SW-SM (relatively clean sand).

Uplift Protection - When the water level within below-grade structures is maintained at or above the surrounding groundwater level, no net buoyancy will occur to the structure. However, when the structure is drained for maintenance or as water levels fluctuate within the lift station, a positive means of uplift protection may be necessary. Hydrostatic uplift forces can be resisted in several ways including:

1. Addition of dead weight to the structure;

2. Mobilizing the dead weight of the soil surrounding the structure through extension of footings outside the perimeter of the structure;

3. Use of a permanent gravity or mechanical dewatering system that is operated only when the structure is to be drained;

4. Use of pressure relief valves in the slab bottom in combination with one or more of the above methods; or

5. Use of uplift piles.

We anticipate that one or more of the noted methods will be needed for this construction. At your request, we would be pleased to assist you in evaluating uplift protection requirements.

4.7 FILL SUITABILITY

Based on the pond boring results and classification of the soil samples, soils classified as fine sand (SP), slightly silty fine sand (SP-SM), and slightly clayey fine sand (SP-SC) as generally encountered at a depth range of 1.75 to 3 feet at LA-2 and below depths of 3.5 to 10.5 feet and extending to the 15-foot boring depths, are considered suitable for use as structural fill depending on the moisture content of the soils at the time of placement and compaction. It should be understood that all soils excavated from below the water table may be excessively wet and may require stockpiling or spreading to dry prior to placement and compaction. Soils described as slightly silty fine sand (SP-SM) will take longer to dry than clean fine sand (SP) material. Although not suitable for structural fill, due to excessive organic content, the topsoil materials may be used in landscape areas as long as positive drainage is maintained. The soils classified as clayey fine sand (SC), silty fine sand (SM), and silty clay (CL-CH) as encountered in the upper 3.5 to 10.5 feet are considered unsuitable for structural fill due to the excessive fines contents and moisture sensitivity of these soils. Below is a table showing the depths of suitable fill at the pond auger borings.

TABLE 6 Depths of Suitable Fill	
Boring	Depths of Suitable Fill (ft)
LA-1	10.5 – 15
LA-2	1.75 – 3, 5.5 – 15
LA-3	3.5 – 15
LA-4	8 – 15
LA-5	10.5 – 15
LA-6	10.5 – 15

It should be noted the soil conditions will vary between and away from the boring locations. Using the information contained in this report to estimate quantities of available fill may produce erroneous results and is not recommended nor should the information be relied upon for such purpose. We recommend the site contractor verify the depths of suitable and unsuitable materials by performing additional auger borings and test pits within specific proposed retention areas once a site plan is developed.

4.8 TEST PITS

Boring L-2 encountered loose clayey fine sand with wood pieces and a large amount of wood at depth ranges of 2 to 3.5 and 3.5 to 5.5 feet, respectively. Boring L-8 encountered loose slightly silty fine sand with many wood pieces (SP-SM) and loose slightly silty fine sand with some organics (SP-SM) at depth ranges of 1.5 to 4 feet and 9.5 to 11.5 feet, respectively. We recommend backhoe-excavated test pits be performed at these locations to better evaluate the need for over-excavation of these soils and to delineate the vertical and horizontal extent, if warranted.

4.9 CONSTRUCTION RELATED SERVICES

We recommend the owner retain Universal Engineering Sciences to perform construction materials tests and observations on this project. Field tests and observations include verification of foundation and pavement subgrades by performing quality assurance tests on the placement of compacted structural fill and pavement courses. We can also provide concrete testing, pavement section testing, structural steel testing, and general construction observation services.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address problems that might arise during construction in a timely and cost-effective manner.

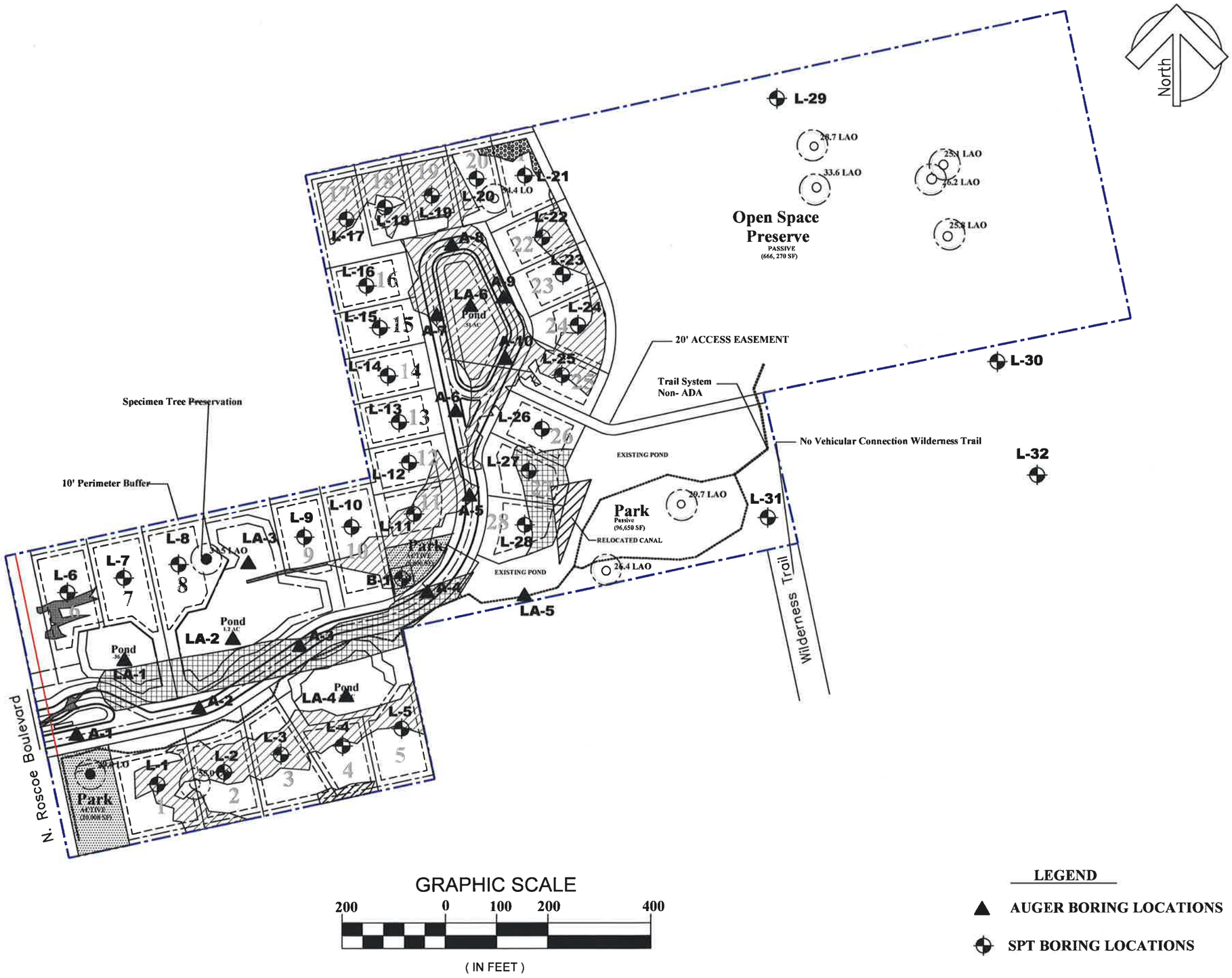
5.0 LIMITATIONS

During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. A Geotechnical Business Council (GBC) publication, "Important Information About This Geotechnical Engineering Report" appears in Appendix B, and will help explain the nature of geotechnical issues.

Further, we present documents in Appendix B: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

APPENDIX A

BORING LOCATION PLAN
BORING LOGS
KEY TO BORING LOGS
FIELD EXPLORATION PROCEDURES
LABORATORY TESTING PROCEDURES



GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

LEGEND

▲ AUGER BORING LOCATIONS

⊕ SPT BORING LOCATIONS

CLIENT: LOAD KING

DRAWN BY: TW | DATE: 5/9/16

CHECKED BY: JM | DATE: 5/9/16

SCALE: 1"=200'

PROJECT NO: 0930.1600101.0000 | REPORT NO:

GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING LOCATION PLAN

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FIGURE 1

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BORING LOG

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OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.0
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/23/16
DATE FINISHED: 4/23/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
		1-1-3	4			Loose dark gray brown Clayey fine SAND with Shell (SC)						
		4-5-6	11	▼		Stiff light brown Sandy CLAY to medium dense very Clayey fine SAND (SC/CL)	53.6	24.1	40	26		
		5-6-6	12			Medium dense to loose grayish-brown Clayey fine SAND with trace Shell (SC)						
5		4-4-5	9									
		2-1-3	4			Loose gray brown Silty fine SAND with Shell (SM)						
		4-2-5	7									
10		3-5-3	8									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		3-5-7	12									

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LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L- 2** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.5
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/23/16
DATE FINISHED: 4/23/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose gray slightly Clayey fine SAND (SP-SC)						
		1-1-2	3									
				▼		Loose brown Clayey fine SAND with Wood peices (SC)						
		3-3-3	6									
						WOOD						
		1-2-2	4									
5												
		1-5-7	12									
						Loose to medium dense grayish-brown fine SAND with Shell (SP)						
		5-4-5	9									
		4-4-7	11									
10												
		7-8-9	17									
						Medium dense grayish-brown fine SAND with Wood pieces (SP)						
15		6-4-13	17									

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LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L- 3** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.6
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/23/16
DATE FINISHED: 4/23/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		1-2-2	4			Loose gray Clayey fine SAND with trace Shell (SC)						
		5-3-3	6	▼		Loose gray Clayey fine SAND (SC)						
		4-4-4	8			Medium dense grayish-brown Clayey fine SAND (SC)						
5		4-7-7	14			Medium dense to loose gray fine SAND with trace Shell (SP)						
		3-4-9	13									
		9-5-4	9									
10		4-2-3	5			Loose gray Silty fine SAND with Shell (SM)						
						Medium dense gray fine SAND (SP)						
15		7-11-13	24									

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LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-4** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.4
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/23/16
DATE FINISHED: 4/23/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose gray Clayey fine SAND with trace Shell (SC)						
		1-1-1	2									
						Medium stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)	34.7	26.8	37	20		
		2-3-3	6	▼								
		5-3-4	7									
5						Loose gray Clayey fine SAND (SC)						
		6-5-5	10									
						Loose brown to gray slightly Silty fine SAND (SP-SM)						
		2-3-4	7									
		4-2-3	5									
						Loose gray fine SAND (SP)						
10		4-4-4	8									
						Loose brown slightly Silty fine SAND (SP-SM)						
15		3-4-6	10									

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SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/23/16
DATE FINISHED: 4/23/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose grayish-brown Clayey fine SAND (SC)						
		1/12"-2	2									
						Soft to medium stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)						
		2-2-3	5									
				▼								
		3-2-2	4									
5						Loose brown Clayey fine SAND (SC)						
		8-2-6	8									
						Medium dense brown fine SAND (SP)						
		4-7-5	12									
						Loose gray slightly Silty fine SAND (SP-SM)	8.9	29.2				
		2-4-2	6									
10												
		2-3-3	6									
						Medium dense grayish-brown fine SAND (SP)						
15		8-7-9	16									

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SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.9
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/25/16
DATE FINISHED: 4/25/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose dark brown slightly Clayey fine SAND (SP-SC)						
		1-1-1	2									
						Loose gray Clayey fine SAND (SC)						
		2-3-3	6	▼								
		4-4-4	8									
5												
		4-5-3	8			Very loose gray fine SAND (SP)	22.5	49.1				
						Loose gray Silty fine SAND (SM)						
		1/12"-2	2									
		4-5-4	9									
10						Very loose brown slightly Silty fine SAND (SP-SM)	7.3	30.4				
		3-2-1	3									
						Medium dense grayish-brown fine SAND with Shell (SP)						
15		8-7-9	16									

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SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/25/16
DATE FINISHED: 4/25/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Loose dark brown slightly Clayey fine SAND (SP-SC)						
		1-2-3	5									
						Medium stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)						
		2-3-5	8									
						Medium dense to loose brown Clayey fine SAND (SC)						
		4-6-5	11	▼			24.7	21.1				
5												
		5-6-5	11									
							13.2	29.9				
		3-5-4	9									
						Loose gray fine SAND (SP)						
		4-4-1	5									
10						Loose gray Silty fine SAND with Shell (SM)						
		2-4-4	8									
						Medium dense brown fine SAND (SP)						
15		7-9-12	21									

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REMARKS:

BORING DESIGNATION: **L-8** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/25/16
DATE FINISHED: 4/25/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
		2-3-2	5			Loose dark brown Clayey fine SAND (SC)						
		1-2-3	5			Loose to very loose dark brown slightly Silty fine SAND with many Wood pieces (SP-SM)						
		3-2-1	3	▼		Looose gray fine SAND (SP)						
5		1-2-3	5									
		3-3-4	7			Very loose gray Silty fine SAND with Shell (SM)						
		3-1-2	3			Loose brown slightly Silty fine SAND with some Organics (SP-SM)						
10		4-4-1	5				10.4	36.7				5.0
						Loose brown slightly Silty fine SAND (SP-SM)						
15		4-5-4	9									

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OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-9** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/26/16
DATE FINISHED: 4/26/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose grayish-brown Clayey fine SAND (SC)						
		1-1-2	3									
						Loose grayish-brown slightly Clayey fine SAND (SP-SC)						
		2-3-7	10	▼								
						Medium dense to loose brown fine SAND (SP)						
		7-9-9	18									
5												
		8-11-10	21									
		4-5-3	8									
		5-5-6	11									
						Medium dense gray fine SAND with Shell (SP)						
10		5-6-8	14									
						Loose grayish-brown Silty fine SAND with Shell (SM)						
15		8-8-2	10									

BORING_LOG 0930.1600101.0000-OAKTRAIL PRESERVE.GPJ UNIENGSC.GDT 5/18/16

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BORING LOG

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-10** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/26/16
DATE FINISHED: 4/26/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose gray slightly Clayey fine SAND with small Roots (SP-SC)						
		1-2-2	4									
						Loose gray Clayey fine SAND (SC)						
		2-2-4	6									
				▼		Medium stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)						
		4-3-4	7									
						Medium dense to loose brown fine SAND (SP)						
5												
		4-5-7	12									
		5-3-3	6									
						Medium dense to loose grayish-brown slightly Silty fine SAND (SP-SM)						
		4-6-9	15									
10												
		6-2-2	4									
15		7-10-12	22									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-11** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.1
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/26/16
DATE FINISHED: 4/26/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose brown fine SAND (SP)						
		1-2-3	5									
						Loose brown Clayey fine SAND (SC)						
		2-4-5	9	▼								
						Medium dense brown to light brown fine SAND (SP)						
		5-7-7	14									
5												
		5-7-6	13									
						Loose brown Silty fine SAND (SM)						
		3-2-4	6									
						Medium dense brown fine SAND (SP)						
		6-9-8	17									
						Very loose to loose grayish-brown Silty fine SAND (SM)	16.2	36.5				
10		2-1-2	3									
15		2-3-2	5									
						Medium dense grayish-brown fine SAND with Shell (SP)						
20		9-8-12	20									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-12** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.5
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/26/16
DATE FINISHED: 4/26/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose brown fine SAND (SP)						
		1-1-2	3									
						Loose to medium dense grayish-brown to brown Clayey fine SAND (SC)						
		2-2-4	6	▼								
		6-5-6	11									
5												
		5-5-6	11									
						Loose gray slightly Silty fine SAND with shell (SP-SM)						
		3-3-4	7									
						Loose gray Silty fine SAND (SM)						
		2-4-4	8									
						Medium dense grayish-brown slightly Silty fine SAND with cemented Sand layer (SP-SM)						
10		4-9-5	14									
						Medium dense brown fine SAND (SP)						
15		6-8-9	17									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-13** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/26/16
DATE FINISHED: 4/26/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose brown fine SAND (SP)						
		1-1-1	2									
						Loose brown Clayey fine SAND (SC)						
		1-3-5	8									
						Medium dense brown slightly Clayey fine SAND with Shell (SP-SC)						
		6-7-11	18	▼		Medium dense to loose brown fine SAND (SP)						
5												
		9-9-11	20									
		6-7-8	15									
		8-5-3	8			Medium dense gray fine SAND with Shell (SP)						
10												
		4-7-8	15									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		5-4-7	11									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-14** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/27/16
DATE FINISHED: 4/27/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
						Loose grayish-brown Clayey fine SAND (SC)						
		1-1-3	4									
						Stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)						
		3-4-5	9									
						Medium dense brown Clayey fine SAND (SC)						
		5-6-7	13	▼								
5												
		7-9-8	17			Medium dense grayish-brown fine SAND (SP)						
		2-5-8	13									
		7-8-6	14			Very loose gray slightly Silty fine SAND (SP-SM)						
10							11.0	31.0				
		3-1-2	3									
						Loose brown slightly Silty fine SAND (SP-SM)						
15		6-5-4	9									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-15** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Loose brown Clayey fine SAND (SC)						
		1-3-2	5									
		3-3-5	8									
		6-7-10	17	▼		Very stiff light brown Sandy CLAY to medium dense very Clayey fine SAND (SC/CL)						
5						Medium dense light brown fine SAND (SP)						
		6-12-11	23									
		4-7-9	16									
		7-3-2	5			Loose grayish-brown slightly Silty fine SAND with some Shell (SP-SM)						
10		2-4-6	10									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		3-4-7	11									

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OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-16** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.0
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose dark brown slightly Silty fine SAND (SP-SM)						
		1-1-1	2									
						Loose to medium dense brown Clayey fine SAND with trace Shell (SC)						
		2-3-4	7									
				▼								
		5-5-8	13			Medium dense brown fine SAND (SP)						
5												
		6-10-12	22									
		5-7-6	13									
						Very loose to loose gray Silty fine SAND with some Shell (SM)						
		4-1-1	2									
10												
		3-5-5	10									
						Loose brown slightly Silty fine SAND with trace Root (SP-SM)						
15		2-1-3	4									
						Medium dense brown fine SAND with Shell (SP)						
20		10-10-14	24									

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ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-17** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose brown fine SAND (SP)						
		1-1-2	3									
						Loose to medium dense brown Clayey fine SAND (SC)						
		3-3-4	7	▼								
						Medium dense brown fine SAND (SP)						
		5-7-7	14									
5												
		6-9-11	20									
		6-8-5	13			Loose gray Silty fine SAND with Shell (SM)						
		2-1-3	4									
10												
		5-4-3	7									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		5-6-10	16									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-18** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Soft to stiff light brown Sandy CLAY to very loose to loose very Clayey fine SAND (SC/CL)						
		1-1-2	3									
		2-4-5	9									
				▼		Medium dense brown fine SAND (SP)						
		5-7-9	16									
5												
		5-9-10	19									
		6-7-5	12									
						Very loose gray Silty fine SAND (SM)						
		3-1-1	2									
						Loose to medium dense gray to brown slightly Silty fine SAND (SP-SM)						
10		3-4-6	10									
15		4-6-6	12									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-19** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
		1/12"-2	2			Very loose to loose grayish-brown Clayey fine SAND (SC)						
		1-2-3	5	▼								
		2-3-4	7									
5												
		4-3-3	6			Very loose gray very Silty fine SAND with Shell (SM)						
		1-1-2	3				19.2	40.5				
		1-1-1	2			Medium dense grayish-brown slightly Silty fine SAND with Shell (SP-SM)						
10												
		3-6-7	13									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15												

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-20** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.0
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose gray Clayey fine SAND (SC)						
		1-2-1	3									
						Medium stiff to very stiff light brown Sandy CLAY to loose to medium dense very Clayey fine SAND (SC/CL)						
		2-3-3	6									
		6-7-9	16									
5				▼								
		7-5-4	9									
						Very loose light brown Silty fine SAND (SM)						
		3-2-1	3									
						Very loose grayish-brown Clayey fine SAND (SC)						
		1-1-1	2									
						Very soft gray Silty CLAY (CL-CH)						
10							91.4	131.6				
		1/18"	1/18"									
						Loose gray slightly Silty fine SAND (SP-SM)						
15		8-7-3	10									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-21** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.6
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose gray fine SAND (SP)						
		1-2-2	4									
						Loose gray to brown Clayey fine SAND (SC)						
		2-3-4	7	▼								
		3-5-5	10									
5												
		4-2-3	5			Very soft gray Silty CLAY (CL-CH)						
		1-1/12"	1			Medium dense gray fine SAND (SP)						
		4-10-13	23									
10												
		8-10-12	22									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		5-8-12	20									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-22** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.4
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose gray fine SAND (SP)						
		1-1-2	3									
						Loose orangish-gray Clayey fine SAND (SC)						
		2-3-3	6	▼								
						Loose orangish-brown slightly Clayey fine SAND (SP-SC)						
		3-5-4	9									
5						Very loose orangish-brown Clayey fine SAND (SC)						
		2-1-2	3									
						Medium dense gray fine SAND (SP)						
		3-6-6	12									
		4-8-8	16									
10		3-5-7	12									
						Medium dense reddish-brown fine SAND (SP)	2.5	27.0				
15		5-6-7	13									

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ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-23** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
		1-1-1	2			Very loose dark brown Clayey fine SAND (SC)						
		3-3-5	8			Medium stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)						
		5-6-8	14	▼		Medium dense grayish-brown Clayey fine SAND (SC)						
5		6-5-4	9			Loose brown slightly Clayey fine SAND (SP-SC)						
		2-3-4	7			Loose brown Clayey fine SAND (SC)						
		5-6-5	11			Medium dense to loose brown fine SAND (SP)						
10		4-5-5	10									
		6-5-7	12			Medium dense brown slightly Silty fine SAND (SP-SM)						
15												

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ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-24** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.2
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Loose gray Clayey fine SAND (SC)						
		2-3-3	6									
						Medium stiff to stiff light brown Sandy CLAY to loose to medium dense very Clayey fine SAND (SC/CL)						
		3-4-4	8									
		5-5-7	12									
5				▼		Medium dense brown slightly Clayey fine SAND (SP-SC)						
		6-9-6	15									
						Loose grayish-brown Clayey fine SAND (SC)						
		5-5-5	10									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
		2-3-10	13									
						Medium dense grayish-brown fine SAND (SP)						
10		7-10-11	21									
15		7-9-12	21									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-25** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.6
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		2-1-2	3			Very loose to loose grayish-brown Clayey fine SAND (SC)						
		2-3-4	7	▼								
		4-6-4	10									
5												
		3-4-5	9									
		3-2-1	3									
		1/9"-1/9"	1			Very loose to loose gray very Silty to Silty fine SAND with Shell (SM)						
10												
		2-2-6	8									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		4-5-8	13									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-26** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
		2-3-3	6			Loose brown fine SAND (SP)						
		4-3-4	7			Loose brown slightly Clayey fine SAND (SP-SC)						
		2-3-4	7	▼		Loose grayish-brown Clayey fine SAND (SC)						
5		4-4-5	9									
		4-7-7	14			Medium dense gray slightly Clayey fine SAND (SP-SC)						
		2-3-4	7			Loose to medium dense brown slightly Silty fine SAND with Shell (SP-SM)						
10		5-6-7	13									
						Loose brown slightly Silty fine SAND (SP-SM)						
15		4-5-4	9									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-27** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose to medium dense dark brown to gray Clayey fine SAND (SC)						
		2-3-4	7									
		1-2-3	5									
		4-5-4	9	▼								
5												
		3-5-8	13									
		4-3-3	6									
						Loose gray slightly Clayey fine SAND (SP-SC)						
		2-4-6	10									
						Medium dense gray fine SAND (SP)						
10												
		7-9-8	17									
15		6-4-7	11									

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OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-28** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.0
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
		3-6-8	14			Medium dense to loose brown Clayey fine SAND (SC)						
		3-3-3	6									
		3-3-3	6	▼								
5												
		3-2-3	5									
		3-3-3	6									
		2-3-3	6			Loose to very loose brown Silty fine SAND (SM)						
10												
		2-1-1	2									
						Medium dense brown slightly Silty fine SAND (SP-SM)						
15		5-6-8	14									

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OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-29** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose to medium dense gray fine SAND (SP)						
		1-2-3	5									
		2-3-4	7	▼								
		5-7-9	16									
5						Medium dense to loose grayish-brown slightly Silty fine SAND (SP-SM)	9.4	22.5				
		9-9-10	19									
		7-9-9	18									
		5-3-5	8			Loose to medium dense gray fine SAND with Shell (SP)						
10		5-5-4	9									
15		7-10-13	23									

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OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **L-30** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.6
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Loose grayish-brown Clayey fine SAND (SC)						
		2-4-3	7									
		2-2-2	4									
		2-3-4	7	▼								
5												
		4-5-4	9									
						Medium dense grayish-brown fine SAND (SP)						
		5-7-8	15									
		8-9-11	20									
10												
		8-9-10	19									
						Loose gray Silty fine SAND with Shell (SM)						
15		5-3-3	6				14.6	29.0				
						Medium dense brown fine SAND (SP)						
20		13-14-13	27									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-31** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.5
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
						Loose gray fine SAND (SP)						
		1-2-2	4									
				▼		Medium stiff light brown Sandy CLAY to loose very Clayey fine SAND (SC/CL)						
		1-2-3	5									
		4-6-8	14			Medium dense grayish-brown fine SAND (SP)						
5												
		7-9-10	19									
		7-11-11	22									
		8-9-11	20									
10												
		6-9-8	17									
						Medium dense gray fine SAND with Shell (SP)						
15		6-6-5	11									

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ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **L-32** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.1
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Very loose dark gray fine SAND (SP)						
		1-1-2	3	▼								
						Loose gray Clayey fine SAND (SC)						
		2-2-3	5									
		3-4-5	9									
5						Medium dense brown fine SAND (SP)						
		7-10-12	22									
		4-5-6	11									
						Medium dense gray slightly Silty fine SAND with trace Shell (SP-SM)						
		8-10-12	22									
10												
		5-5-6	11									
15		4-5-7	12									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **B-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/27/16
DATE FINISHED: 4/27/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0												
		3-3-1	4			Loose dark brown slightly Clayey fine SAND (SP-SC)						
		1-3-4	7	▼		Loose dark brown Clayey fine SAND (SC)						
		4-5-5	10									
5		4-4-4	8			Loose dark grayish-brown very Clayey fine SAND (SC)						
		4-4-3	7			Loose brown fine SAND (SP)						
		1/9"-1/9"	1			Very loose to loose grayish-brown slightly Silty fine SAND (SP-SM)	10.5	33.5				
10		2-2-2	4									
15		2-5-4	9			Medium dense brown fine SAND with Shell (SP)						
20		9-12-11	23									

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **LA-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.7
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0				▼		Brown to dark brown Clayey fine SAND with trace Shell (SC)	20.1	17.9				
5						Gray Clayey fine SAND (SC)						
						Gray very Silty SAND (SM)	39.0	57.9				
10						Grayish-brown slightly Silty fine SAND with Shell (SP-SM)						
15												

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **LA-2** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Brown Clayey fine SAND with Shell (SC)	25.0	19.1				
						Brown fine slightly Clayey SAND (SP-SC)						
				▼		Light brown very Clayey fine SAND (SC)	42.2	30.2				
						Brown Clayey fine SAND (SC)						
5						Light brown to gray slightly Silty fine SAND (SP-SM)						
10						Gray slightly Silty fine SAND with trace Shell (SP-SM)						
15												

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **LA-3** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.2
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Brown Clayey fine SAND (SC)						
						Light brown very Clayey fine SAND (SC)						
				▼		Grayish-brown fine SAND (SP)						
5						Light brown fine SAND with Shell (SP)						
						Gray slightly Silty fine SAND (SP-SM)						
10						Gray brown fine SAND (SP)						
						Grayish-brown slightly Silty fine SAND (SP-SM)						
15												

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

BORING DESIGNATION: **LA-4** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Brown to dark brown Clayey fine SAND (SC)						
5				▼		Gray Clayey fine SAND (SC)						
						Gray slightly Silty fine SAND (SP-SM)						
10						Gray slightly Silty fine SAND with trace Shell (SP-SM)						
						Gray slightly Silty fine SAND (SP-SM)						
15												

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ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **LA-5** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 0.5
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/28/16
DATE FINISHED: 4/28/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0				▼		TOPSOIL						
						Dark brown Clayey fine SAND (SC)						
5						Brown Silty fine SAND (SM)						
10						Reddish-brown slightly Silty fine SAND (SP-SM)						
15												

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BORING DESIGNATION: **LA-6** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.5
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						TOPSOIL						
						Dark brown very Clayey fine SAND (SC)	36.8	22.3				
				▼		Light brown Clayey fine SAND with trace Shell (SC)						
5						Gray Silty CLAY with Shell (CL-CH)						
						Gray Silty fine SAND with trace Shell (SM)						
10						Light brown fine SAND with Shell (SP)						
						Brown slightly Silty fine SAND (SP-SM)						
15												

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PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.4
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Dark gray fine SAND with trace Shell (TOPSOIL)						
						Light brown fine SAND (SP)						
						Orangish-gray Clayey fine SAND (SC)						
				▼								
						Grayish-brown slightly Clayey fine SAND (SP-SC)						
5												

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BORING DESIGNATION: **A- 2** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.2
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						TOPSOIL						
						Brown Clayey fine SAND with Shell (SC)						
						Brown Clayey fine SAND (SC)						
				▼		Light brown Sandy CLAY to very Clayey fine SAND (SC/CL)						
5												

BORING_LOG 0930.1600101.0000-OAKTRAIL PRESERVE.GPJ UNIENGSC.GDT 5/18/16

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-3

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A-3** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.1
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Brown slightly Clayey fine SAND with Shell (SP-SC)						
				▼		Brown Clayey fine SAND (SC)						
5						Light brown Sandy CLAY to very Clayey fine SAND (SC/CL)						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-4

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A- 4** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.0
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Brown slightly Clayey fine SAND (SP-SC)						
						Dark brown Clayey fine SAND (SC)						
				▼								
5												

BORING_LOG 0930.1600101.0000-OAKTRAIL PRESERVE.GPJ UNIENGSC.GDT 5/18/16

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-5

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A- 5** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Brown slightly Clayey fine SAND (SP-SC)						
						Dark brown to grayish-brown Clayey fine SAND (SC)						
5				▼								

BORING_LOG 0930.1600101.0000-OAKTRAIL PRESERVE.GPJ UNIENGSC.GDT 5/18/16

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-6

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A-6** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.2
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						TOPSOIL						
						Brown slightly Clayey fine SAND (SP-SC)						
						Light brown Sandy CLAY to very Clayey fine SAND (SC/CL)						
				▼		Light brown slightly Silty fine SAND (SP-SM)						
5												

BORING_LOG 0930.1600101.0000-OAKTRAIL PRESERVE.GPJ UNIENGSC.GDT 5/18/16

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-7

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A-7** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.0
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						TOPSOIL						
				▼		Brown Clayey fine SAND (SC)						
5						Brown fine SAND (SP)						

BORING_LOG 0930.1600101.0000-OAKTRAIL PRESERVE.GPJ UNIENGSC.GDT 5/18/16

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-8

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A-8** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.3
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						TOPSOIL						
						Brown Silty CLAY (CL-CH)						
						Brown Clayey fine SAND (SC)						
				▼		Grayish-brown Clayey fine SAND with trace Shell (SC)						
5												

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-9

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A- 9** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.8
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						TOPSOIL						
						Brown Clayey fine SAND (SC)						
						Light brown Sandy CLAY to very Clayey fine SAND (SC/CL)						
				▼		Orangish-brown Clayey fine SAND with trace Shell (SC)						
5												

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BORING LOG

PROJECT NO.:	0930.1600101.0000
REPORT NO.:	
PAGE:	A-10

PROJECT: GEOTECHNICAL EXPLORATION
OAK TRAIL PRESERVE
ST. JOHNS COUNTY, FLORIDA

CLIENT: LOAD KING

LOCATION: SEE BORING LOCATION PLAN

REMARKS:

BORING DESIGNATION: **A-10** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.5
DATE OF READING: 4/28/16
EST. W.S.W.T. (ft):

DATE STARTED: 4/20/16
DATE FINISHED: 4/20/16
DRILLED BY: BT/WILL
TYPE OF SAMPLING: ASTM D 1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						TOPSOIL						
						Brown Silty fine SAND (SM)						
				▼		Light brown Sandy CLAY to very Clayey fine SAND (SC/CL)						
						Grayish-brown Silty fine SAND (SM)						
5												

UNIVERSAL
ENGINEERING SCIENCES

KEY TO BORING LOGS

SYMBOLS

SYMBOL	DESCRIPTION
N	No. of blows of a 140-lb weight falling 30 inches required to drive standard spoon 1 foot.
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
EOB	End Of Boring
BT	Boring Terminated
-200	Fines Content or % Passing N0. 200 Sieve
MC	Moisture Content
LL	Liquid Limit
PI	Plasticity Index
K	Coefficient of Permeability
O.C.	Organic Content
▽	Estimated seasonal high groundwater level
▼	Measured groundwater level at time of drilling

RELATIVE DENSITY
(sand-silt)

Very Loose - Less Than 4 Blows/Ft.
Loose - 4 to 10 Blows/Ft.
Medium - 11 to 30 Blows/Ft.
Dense - 31 to 50 Blows/Ft.
Very Dense - More Than 50 Blows/Ft.

CONSISTENCY
(clay)

Very Soft - Less than 2 Blows/Ft.
Soft - 2 to 4 Blows/Ft.
Medium - 5 to 8 Blows/Ft.
Stiff - 9 to 15 Blows/Ft.
Very Stiff - 16 to 30 Blows/Ft.
Hard - More Than 30 Blows/Ft.

RELATIVE HARDNESS
(Limestone)

Soft - 100 Blows for more than 2"
Hard - 100 Blows for less than 2"

UNIFIED CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Well-graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Well-graded sands and gravelly sands, little or no fines
		SANDS WITH FINES	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Organic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

* Based on the material passing the 3-in. (75 mm) sieve.
** Use dual symbol (such as, SP-SM and SP-SC) for soil with more than 5% but less than 12% passing through No. 200 sieve.

MODIFIERS

These modifiers provide our estimate of the amount of minor constituents (SILT or CLAY sized particles) in the soil sample.
Trace - 5% or less
With SILT or with CLAY - 6% to 11%
SILTY or CLAYEY - 12% to 30%
Very SILTY or Very CLAYEY - 31% to 50%

These modifiers provide our estimate of the amount of organic components in the soil sample.
Trace - 1% to 2%
Few - 3% to 4%
Some - 5% to 8%
Many - Greater than 8%

These modifiers provide our estimate of the amount of other components (Shell, Gravel, Etc.) in the soil sample
Trace - 5% or less
Few - 6% to 12%
Some - 13% to 30%
Many - 31% to 50%

FIELD EXPLORATION PROCEDURES

Standard Penetration Test Boring

The penetration boring was made in general accordance with the latest revision of ASTM D 1586, "Penetration Test and Split-Barrel Sampling of Soils". The boring was advanced by rotary drilling techniques using a circulating bentonite fluid for borehole flushing and stability. At 2 ½ to 5 foot intervals, the drilling tools were removed from the borehole and a split-barrel sampler inserted to the borehole bottom and driven 18 inches into the soil using a 140 pound hammer falling on the average 30 inches per hammer blow. The number of blows for the final 12 inches of penetration is termed the "penetration resistance, blow count, or N-value". This value is an index to several in-place geotechnical properties of the material tested, such as relative density and Young's Modulus.

After driving the sampler 18 inches (or less if in hard rock-like material), the sampler was retrieved from the borehole and representative samples of the material within the split-barrel were placed in glass jars and sealed. After completing the drilling operations, the samples for each boring were transported to our laboratory where they were examined by our engineer in order to verify the driller's field classification.

Auger Boring

The auger boring was performed mechanically by the use of a continuous-flight auger attached to the drill rig and in general accordance with the latest revision of ASTM D 1452, "Soil Investigation and Sampling by Auger Borings". Representative samples of the soils brought to the ground surface by the augering process were placed in glass jars, sealed and transported to our laboratory where they were examined by our engineer to verify the driller's field classification.

The water level was maintained throughout the test period, with the required amount of water added to maintain this level in both rings recorded at time intervals of 5 minutes. After reaching a stabilized inflow volume of water, the test was continued for approximately 120 minutes.

Auger Boring - Manual

The auger boring was performed manually by the use of a post-hole auger and in general accordance with the latest revision of ASTM D 1452, "Soil Investigation and Sampling by Auger Borings". Representative samples of the soils brought to the ground surface by the augering process were placed in glass jars, sealed and transported to our laboratory where they were examined by our engineer to verify the driller's field classification.

LABORATORY TESTING PROCEDURES

Natural Moisture Content

The water content of the sample tested was determined in general accordance with the latest revision of ASTM D 2216. The water content is defined as the ratio of "pore" or "free" water in a given mass of material to the mass of solid material particles.

Percent Fines Content

The percent fines or material passing the No. 200 mesh sieve of the sample tested was determined in general accordance with the latest revision of ASTM D 1140. The percent fines are the soil particles in the silt and clay size range.

Organic Loss on Ignition (Percent Organics)

The organic loss on ignition or percent organic material in the sample tested was determined in general accordance with ASTM D 2974. The percent organics is the material, expressed as a percentage, which is burned off in a muffle furnace at 550° Celsius.

Atterberg Limits

The Atterberg Limits consist of the Liquid Limit (LL) and the Plastic Limit (PL). The LL and PL were determined in general accordance with the latest revision of ASTM D 4318. The LL is the water content of the material denoting the boundary between the liquid and plastic states. The PL is the water content denoting the boundary between the plastic and semi-solid states. The Plasticity Index (PI) is the range of water content over which a soil behaves plastically and is denoted numerically by as the difference between the LL and the PL. The water content of the sample tested was determined in general accordance with the latest revision of ASTM D 2216. The water content is defined as the ratio of "pore" or "free" water in a given mass of material to the mass of solid material particles.

APPENDIX B

IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL ENGINEERING REPORT

CONSTRAINTS AND RESTRICTIONS

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/ or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

CONSTRAINTS AND RESTRICTIONS

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is

anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of investigation. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.