REPORT OF SUPPLEMENTAL GEOTECHNICAL EXPLORATION & ENGINEERING EVALUATION PROPOSED VILLAGES ST. AUGUSTINE ASSISTED LIVING ST JOHNS COUNTY, FLORIDA AGES JOB NO. J16193, REPORT NO. 001

FOR

FORTRESS OF ST. AUGUSTINE, LLC
861 NORTH DEAN ROAD
AUBURN, ALABAMA 36830

JULY 30, 2014

By

AGES of JAX, Inc.

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July 30, 2014

FORTRESS OF ST. AUGUSTINE, LLC
861 North Dean Road
Auburn, Alabama 36830

Re: Report of Supplemental Geotechnical Exploration & Engineering Evaluation
Villages of St. Augustine Assisted Living
St. Johns County, Florida
AGES Job No. J16193, Report No. 001

Ladies and Gentlemen:

AGES of JAX, (AGES), Inc. has completed a supplemental geotechnical exploration and engineering evaluation of the subsurface conditions beneath the proposed building construction area of the referenced project. Our services were performed in general accordance with **AGES** Proposal No. 14JP6346, dated June 23, 2014. Our services were formally authorized by Mr. Brad Wester of Nine Barracuda, LLC, on June 24, 2014. This report includes: (1) A brief outline of the project information provided; (2) A review of site and subsurface conditions encountered; (3) Site preparation and shallow foundation design recommendations for the planned building structures; (4) Current and estimated seasonal high groundwater levels in the planned pond and roadway areas; (5) Guideline pavement design, sub-grade preparation and construction recommendations for asphalt pavements; (6) A borrow source evaluation of soils located in the pond areas to determine suitability for use as structural fill or backfill; and (7) Lift station design and construction recommendations.

We appreciate the opportunity to be of service as the geotechnical consultant during this phase of your project. Should you have any questions concerning this report or if we may be of any further service to you, please feel free to contact us.

Very truly yours,

AGES of JAX, INC.

Thomas Pauly, E.I.
Project Engineer

Timothy R. Wheeler, P.E.
Principal Engineer
Registered, Florida No. 42802

TAP/tap/J16193.wpd
Attachments

Distribution: Addressee(1); Brad Wester, Barracuda, LLC(1), Rob Matthews, Matthews Design Group(1)
Mr. Ron Warren(1)

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Key to Soil Classification
Generalized Subsurface Profile
Test Boring Records
Auger Boring Records
Summary of Laboratory Test Data Sheet
Field Exploration & Laboratory Test Procedures

REPORT ATTACHMENTS

1.0 PROJECT BACKGROUND INFORMATION

General project information has been provided by Mr. Brad Wester of Nine Barracuda, LLC, project development consultant, and Mr. Rob Matthews,P.E. of Matthews Design Group, Inc., during recent phone conversations and Email correspondence. We have also received an e-mail from Mr. Wester, which was dated June 19, 2014, which contained:(1) A Site Plan showing the proposed site layout and development along with the proposed roadway alignment and pond locations, dated March 12, 2014, prepared by Mathews Design Group, Inc.,and (2) Additional boring recommendations with specific building locations and proposed number of borings, dated June 19, 2014, provided by Wilson Structural Consultants, Inc.

Based upon the information provided, we understand that a new Senior Assisted Living Facility development, called Villages of St. Augustine, is going to be constructed and located off of State Road 16 in St. Johns County, Florida. The proposed development will consist of a one hundred thirty(130) bed assisted living facility with a total building footprint of 61,142 square feet and will include:

* One(1) 3-story, possibly concrete/block with structural steel framing, Assisted Living Facility wing building area;

* One(1) 1-story, possibly concrete/block with structural steel framing, Commons building area which connects to the Assisted Living Facility wing building area;

* One(1) 1-story, possibly concrete/block with structural steel framing, Memory Care building area which connects to the Commons building area;

* Asphalt paved parking and entrance roadway areas; and

* Three(3) wet detention storm-water management facilities.

* One(1) lift station location.

Detailed structural loading information was provided by Lawson Group Architects, Inc. and therefore we understand that maximum individual column loads may be on the order of 100 to 125 kips and maximum wall loads may be on the order of 10 to 12 klf. We have estimated that live slab on grade loads will be on the order of 150 pounds per square foot. The proposed building finish floor and existing site topography data has not been provided. However, we have assumed that less tha one to two feet of elevating fill will be added in the building areas and in the planned parking areas. . .

AGES of JAX, Inc. has previously completed a geotechnical engineering report within the referenced project development which was "Report of A Geotechnical Exploration" (Job No. J13259, Report No. 001) dated January 23, 2007.

2.0 GEOTECHNICAL EXPLORATION

2.1 Purpose of Exploration

The objective of this geotechnical exploration was to obtain site and subsurface data for use in: (1) Evaluation of the site with respect to the proposed development, (2) Storm-water management pond design and permitting, (3) Development of lift station design and construction recommendations, (4) Evaluation of the suitability of soils located in the pond areas for use as structural fill or backfill, (5) Development of guideline pavement design and construction recommendations, and (6) Development of foundation design and construction recommendations for the proposed structures. Therefore, the geotechnical exploration for this project included the collection of site and subsurface data and the performance of a geotechnical engineering analysis and evaluation.

2.2 Subsurface Testing

The field testing program was conducted during the period of July 10, 2014 to July 21, 2014. The scope of testing included four (4) 45-foot deep penetration test borings (B1to B4) within the proposed 3-story building structure footprint, eight (8) 25-foot deep penetration test borings (B5 to B12) within both proposed one-story structure footprints, one (1) 30-foot deep penetration boring (LS1) within the proposed lift station area, six (6) 6-foot deep auger borings in the planned entrance roadway and asphalt paved parking areas, and four (4) 15-foot deep auger borings (LA1 to LA4) in the planned wet storm-water management facility locations. The boring locations were co-jointly selected by **AGES** along with the structural engineer and were established by our personnel using GPS based measuring equipment. The boring locations, as shown on the attached Field Exploration Plan, should be considered as approximate.

The attached Test Boring Records, Auger Boring Records and Generalized Subsurface Profile present the descriptions of the subsurface soils encountered, the groundwater levels encountered and the penetration resistance values (blow counts) recorded when drilling and sampling the borings. The stratification lines and depth designations on the boring records represent the approximate boundary between the various soils encountered, as determined in the field by our drillers, and the transition from one strata to the next should be considered approximate. A brief discussion of the drilling, sampling, and field testing techniques used during the geotechnical exploration is provided in the attached Field Exploration Procedures section.

2.3 Laboratory Testing

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

Nine (9) moisture content tests, nine (9) fines content tests and four (4) 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 attached Summary of Laboratory Test Data Sheet. A brief description of the laboratory procedures used is also attached.

3.0 GEOTECHNICAL FINDINGS

3.1 Site Conditions

As shown on the attached Site Location Map and Field Exploration Plan, the subject site is located on an undeveloped parcel off of Florida State Road 16 in St. Augustine, Florida. The site is bounded on the north, west and east by residential structures and on the south by Florida State Road 16. The subject site was relatively level in topography and cleared. Surface soils consisted of light brown to brown fine sands and slightly silty fine sands. Some standing water was observed on the site at the time of our field exploration.

3.2 Subsurface Conditions

The subsurface conditions outlined below highlight the major subsurface stratifications encountered during our geotechnical exploration of the site. When reviewing the boring records and the subsurface conditions outlined below, it should be understood that the subsurface conditions will vary across the proposed construction area and between the boring locations.

3.2.1 Soil Conditions - Borings B1 to B4 typically encountered up to 12 inches of topsoil underlain by very loose to very dense brown to dark brown, reddish brown, grey, and tan fine sands (SP) and slightly silty fine sands (SP-SM) which extended to a maximum boring termination depth of 45 feet. Penetration resistance values ranged from 1 to 78 blows/foot. However, boring B2 encountered very loose dark brown fine sands with many organics (SP-Pt) at a depth of 2.5 to 4.5 feet.

Borings B5 to B12 typically encountered up to 12 inches of topsoil underlain by very loose to very dense brown to dark brown, reddish brown, grey, and tan fine sands (SP) and slightly silty fine sands (SP-SM) which extended to a maximum boring termination depth of 25 feet. Penetration resistance values ranged from 1 to 57 blows/foot.

Boring LS1 encountered 9 inches of topsoil underlain by loose to dense brown to dark brown, reddish brown, light grey to grey fine sands (SP) and slightly silty fine sands (SP-SM) which extended to a maximum boring termination depth of 30 feet. Penetration resistance values ranged from 5 to 40 blows/foot.

Lake auger borings LA1 to LA4 typically encountered up to 7 inches of topsoil underlain by light brown to dark brown, reddish brown and grey fine sands (SP/A-3) and slightly silty fine sands (SP-SM/A-3) which extended to a maximum auger boring termination depth of 15 feet.

Auger borings A1 to A6 typically encountered up to 7 inches of topsoil underlain by light brown to dark brown, reddish brown and grey fine sands (A-3) and slightly silty fine sands (A-3) which extended to a maximum auger boring termination depth of 6 feet.

3.2.2 Groundwater Conditions - The groundwater level depths encountered at the time of drilling ranged from approximately 2.5 to 6.0 feet below the ground surface. Based on our review of the soil profile and the USDA soil survey, the estimated seasonal high groundwater level is 6 to 18 inches below the ground surface. The groundwater level should be expected to fluctuate due to seasonal climatic variations, surface water runoff patterns across the site, construction activity and the subsequent development as planned, tidal fluctuations and other interrelated factors. Since groundwater variations are anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based on the assumption that variations will occur.

4.0 GEOTECHNICAL ENGINEERING EVALUATION

4.1 Basis of Evaluation & Recommendations

Our geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned construction, and our recommendations for foundation design and site preparation/earthwork construction, are based upon: (1) our site observations; (2) the field test data obtained during this geotechnical exploration of the site; and (3) our understanding of the project information and structural loading conditions as presented in this report. If the structural information or the building location are altered, please contact us so we may review our recommendations. If any site or subsurface conditions are encountered during construction which appear to deviate from data obtained during this geotechnical exploration (as documented herein), please contact us so that we may visit the site, observe the differing conditions, and evaluate the new information relative to our geotechnical evaluation and recommendations.

4.2 Foundation System Evaluation

Based upon our geotechnical findings and our understanding of the proposed construction, we consider the site and subsurface conditions adaptable for support of the proposed structures upon a properly designed and constructed shallow foundation following proper site preparation procedures. The shallow foundation system may be designed using an allowable bearing pressure of 3,000 psf. Provided that the design and construction recommendations outlined subsequently are implemented, we estimate that total structural settlement due to fill and structural loads should be on the order of one inch or less. In addition, post construction differential settlements should be within tolerable magnitudes. The settlements should occur concurrently with construction due to the generally sandy nature of the soils encountered. Site preparation necessary for proper foundation performance includes:

* Stripping any existing vegetation and topsoil from within the proposed building construction areas;

* Over excavating the very loose fine sands with many organics in the vicinity of Boring B2 to depths on the order of 2.5 to 4 feet;

* Backfilling the over-excavated areas with suitable, compacted structural fill;

* After the above clearing/stripping and grading operations, we recommend that the exposed soils be proof-rolled with a heavily loaded dump truck or other heavy rubber-tired construction vehicle. Any areas of loose or "pumping" soils should be over-excavated and backfilled with properly compacted structural fill. Densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) should be achieved in the backfilled soils.

* Compaction of the remaining exposed natural soils to densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) using a moderate weight vibratory drum roller.

* Placement and compaction of any required structural fill to densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) within the building areas.

4.3 Borrow Source Evaluation - Wet Ponds

For most subdivision projects in Northeast Florida, either significant on-site or abundant offsite sources of clean sand fill/backfill (CLASS I or Select Fill/Backfill) can be economically excavated, transported and placed to prepare the site for vertical construction. It is typically recommended that all fill and backfill soils to be placed in building pad or roadway areas consist of non-expansive, non-plastic, inorganic clean fine sands (fine sand or slightly silty fine sand) containing less than 10% fines (USCS Classification SP,SP-SM) (AASTHO Classification A-3, A-2-4), organic content less than 3 %, and a Plasticity Index less than 4. These soils are can be readily compacted with moderately size dozers and/or vibratory drum rollers, and they can be placed in easily compacted one foot lifts. These soils are also relatively moisture insensitive, are not subject to shrink/swell related volume change, and they will readily drain and re-compact after rain events.

Soils consisting of moderately expansive, moderately plastic silty to clayey fine sands are sometimes utilized as fill/backfill when Class I Fill/Backfill soils cannot be economically obtained. Class II (Marginal) Fill/Backfill soils can consist of silty sands (SM) (A-2-4, A-4) and clayey to very clayey sands (SC) (A-2-6, A-6). These Class II materials are problematic in that these soil types: (1) are difficult to compact using local equipment and practices (a sheep foot roller may be required to get proper compaction of clayey soils), (2) may need to placed in 6-inch thick lifts which will slow filling operations, (3) these soils are very moisture sensitive and initial compaction cannot be achieved if high groundwater conditions exist or when the construction occurs during the wet season when daily rains occur, (4) these soils will not drain well after rain events and they can be disturbed which will require re-compaction efforts, (5) have a moderate shrink swell potential which can cause foundation, driveway, or roadway distress if building or pavement design changes are implemented, and (6) the may not allow for proper yard drainage yard area fill is placed. It is noted that FDOT prohibits the use of the these Class II materials within three feet of the bottom of roadway base course.

Sandy clays and Clays (CH/A4) are not considered to be usable as fill or backfill in any structural area including roadways, building pads, septic tank areas or driveway areas. These materials should not be used in green areas or yard areas since they will not drain, will form dessication cracks, and will not sustain viable grasses or other vegetation. These materials may be used as pond liner material, used to construct sound barrier berms around the perimeter of the subdivision, and/or disposed of offsite.

Based upon the results of the pond area testing, it is apparent that there are abundant quantities of good quality fill/backfill are present on site. For this project we have defined acceptable fill/backfill as non-plastic, non-expansive, inorganic, granular soils (SP, SP-SM per the USCS Soil Classification System) containing less than 10 % fines passing the number 200 sieve and exhibiting a Plasticity Index < 4.

4.4 Lift Station

It is anticipated that the lift station will bear in the 20 to 25 foot depth range. Based on the results of the penetration boring (LS1), the subsoils at the proposed bearing level could consist of acceptable firm to dense fine sands. However, if unstable soils are encountered at the planned bearing

depth, they should be over-excavated to a depth of approximately 3 feet and replaced with compacted sand or gravel (# 57 stone). Alternately a one foot thick concrete construction mud mat could be placed. The geotechnical engineer should be called to inspect the bearing level soils prior to sand/gravel/mud mat placement. Due to the depth of the excavation and the depth of the groundwater level, use of temporary dewatering measures, such as vertical or horizontal sanded wellpoint system, may be needed, to facilitate construction in the dry.

We anticipate that the buried structure will exert little or no net downward pressure on the soils under normal insitu conditions. However, the structure could be subjected to excessive hydrostatic uplift pressure if the lift station were to be emptied. Below grade structures should be designed to resist lateral earth pressures and hydrostatic uplift pressures appropriate for their depth below existing grade and wet season groundwater table (assume design groundwater level is 1.5 feet below the ground surface).

4.5 Roadways

The primary geotechnical factors affecting roadway design, construction and performance are: (1) The presence of up to 8 inches of topsoil which will have to be stripped prior to earthwork construction and (2) The presence of loose near surface sands which will require compaction and stabilization. The borings performed in the roadway areas typically encountered 6 feet of fine sands(A-3) and slightly silty fine sands (A-3).

Current groundwater levels were encountered at depths ranging from 2.5 to 6.0 feet below the existing site grades, with higher levels encountered on the northern side of the site. According to the USDA soil survey and our review of the subsurface profile, seasonal high groundwater levels will typically be between 6 to 18 inches below the ground surface.

Groundwater control is of utmost importance in maintaining the integrity of flexible pavement structures. We typically recommend that the groundwater level be maintained at least 24 inches below the pavement base course. Therefore, adequate separation may be achieved provided minimal site topography reduction is planned within the roadway alignment. In areas where groundwater is anticipated to exist within 24 inches of the bottom of a flexible pavement base course, a properly designed and constructed under-drain system will be necessary to maintain the recommended separation between the pavement base course and the groundwater level. We recommend the civil grading plans be reviewed to evaluate the need for an under-drain system. If required, we can design an under-drain system for this site.

5.0 FOUNDATION DESIGN & SITE PREPARATION RECOMMENDATIONS

5.1 Foundation Design Recommendations

5.1.1 Foundation Type - We consider a conventional shallow foundation system applicable for this project if the site preparation recommendations presented in section 5.2 of this report are performed.

5.1.2 Bearing Pressure & Depth - The maximum allowable soil bearing pressure for use in shallow foundation design should not exceed 3,000 psf. The foundations should be designed based upon the maximum load which could be imposed by all loading conditions. The exterior footings should

bear at a depth of at least 12 inches below the exterior final grades and the interior footings should bear at least 12 inches below the interior floor slab. These minimum bearing depths should provide the necessary confinement for the soils at the foundation bearing levels.

5.1.3 Foundation Size - The minimum widths recommended for isolated spread-type footings and continuous wall footings are 24 and 18 inches, respectively. Even though the maximum allowable soil bearing pressure may not be achieved, these minimum width recommendations should still control the size of the foundations.

5.1.4 Bearing Material - The foundations may bear in either the compacted suitable natural granular soils or compacted structural backfill or fill. The bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) to a depth of at least one-foot below the foundation bearing levels.

5.2 Site Preparation Recommendations

5.2.1 Temporary Groundwater Control - During our geotechnical exploration, the groundwater level was encountered at depths of 2.5 to 6.0 feet below the existing site grades. Dependent upon the groundwater levels encountered at the time of construction, temporary de-watering may be required in some areas of the site. The groundwater should be controlled at all times at a depth of at least two feet below the construction level. Groundwater drawdowns on the order of one to two feet, if required, can probably be best achieved using temporary perimeter drainage ditches, four to five feet deep, which are graded: (1) to a positive gravity outfall away from the site; or (2) to sumps where the collected groundwater and surface water runoff can be removed by pumping.

5.2.2 Site Clearing/Stripping - Initial site preparation should consist of clearing any existing trees, vegetation, root systems and surficial topsoil. The clearing/stripping work should be performed within and to a distance of at least five feet beyond the perimeter of the planned building areas and three feet beyond the perimeter of the proposed pavement areas. It should be anticipated that surficial topsoil will be encountered in thicknesses of 3 inches or less. The perimeter areas may then need to be graded to help direct surface water runoff away from the construction areas.

5.2.3 Proof-Rolling - After the above clearing/stripping and grading operations, we recommend that the exposed soils be proof-rolled with a heavily loaded dump truck or other heavy rubber-tired construction vehicle. Any areas of loose or "pumping" soils should be over-excavated and backfilled with properly compacted structural fill. Densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) should be achieved in the backfilled soils.

5.2.4 Site & Fill Compaction - After completing the initial site preparation as mentioned in Sections 5.2.1 to 5.2.3, the remaining exposed sandy soils should be compacted to densities of at least 95 percent of the Modified Proctor maximum dry density to a depth of 12 inches using a vibratory drum roller which has a minimum at-drum weight on the order of five tons and a minimum drum diameter on the order of three feet, with the exception that a lightweight vibratory drum or sled compactor having a maximum static weight on the order of 1,500 to 2,500 pounds should be used within 50 feet of existing structures. This roller type or dozer will be required to improve the density of the upper approximate two feet of very loose to loose soils at this site. The structural fill required to raise the site to the planned finished grades may then be placed in loose lifts not exceeding 12 inches in thickness, and should be compacted to densities as recommended above. Loose lifts should not

exceed eight inches in areas of the site in which lightweight vibratory equipment is used. Structural fill is defined as a non-plastic, inorganic, granular soil containing less than 10 percent material passing the No. 200 mesh sieve (i.e. a relatively clean sand).

5.2.5 Disturbed Soil Conditions - Should the near-surface soils and/or structural fill material experience "pumping" and subsequent soil strength loss during site work construction, work upon these areas should be immediately terminated and: (1) the disturbed soils removed and backfilled with "dry" structural fill soils, (i.e. percent water content on the order of five to 10 percent) which are then compacted; or (2) the excess moisture content within the disturbed soils allowed to dissipate before recompacting. Furthermore, the groundwater table should be checked and controlled as necessary to help insure proper draw-down of any high groundwater conditions that may be causing the "pumping" conditions during compaction or construction activity upon these soils.

5.2.6 Foundation Areas - After placement and compaction of all structural fill in the building areas, the foundations may be excavated to their planned bearing levels using a "smoothed" bucket backhoe. All fine sandy soils existing at the bearing level should be compacted to densities equivalent to 95 percent of the Modified Proctor maximum dry density. For confined footing areas compaction of the fine sandy bearing level soils can probably be best achieved using lightweight, walk-behind sleds, rollers, or tampers having a total weight of at least 100 pounds. Loose lifts of backfilled fine sandy soil in the footing excavations, if required, should be placed in thicknesses not exceeding six inches prior to densification with the lightweight compaction equipment.

5.3 Additional Field Exploration

Boring B2 encountered fine sands with many organics at depths ranging from 2.5 to 4.5 feet. These potentially deleterious organic soils may require over-excavation from beneath the building construction areas. We recommend a series of backhoe-excavated test pits be performed in the vicinity of boring B2 to delineate the vertical and lateral extent of these soils and to allow a better determination of the content of these soils and, therefore, to better evaluate the need for over-excavation beneath the constructon areas. **AGES** can perform these additional services if requested.

6.0 PRELIMINARY PAVEMENT DESIGN & CONSTRUCTION RECOMMENDATIONS

6.1 General

Preliminary pavement design and construction recommendations applicable to this project are presented below. *The pavement thickness recommendations and construction recommendations presented in this report are based upon our past experience on similar paving projects. Detailed flexible pavement design calculations have not been performed to verify adequacy of the recommended pavement sections since detailed traffic loading information is unavailable at this time.* We request that **AGES** be retained to review the final pavement design, paving and drainage plans, and specifications to evaluate whether our guideline recommendations have been properly interpreted and implemented into the project design.

6.2 Preliminary Pavement Design Recommendations

The recommended flexible pavement structure thicknesses for the subject project are provided in the table as shown on he next page.

PAVEMENT COURSE	Automobiles & Light Duty Traffic	Heavy Duty Traffic
Asphalt Wearing Surface(In.)*	1.5	2.0
Limerock Base Course (In.)**	6.0	8.0
Prepared Sub-grade(In.)***	12.0	12.0

* Type S Asphaltic Concrete, as defined by the Current Edition of the Florida DOT Standard Specifications for Road and Bridge Construction Manual.

** Florida Limerock, exhibiting an LBR Value of 100, and meeting the specifications outlined in the Florida DOT manual (Section 200).

*** Stabilized and compacted subgrade should exhibit a Maximum LBR value of at least 40. Subgrade stabilization should be performed in accordance with Section 160 of the Standard FDOT specifications.

6.3 Preliminary Pavement Construction Recommendations

6.3.1 Pavement Sub-grade Preparation - We recommend that sub-grade materials be compacted in place according to the requirements in the "Site Preparation" section of this report. Further, beneath limerock base course, stabilize the sub-grade materials to a minimum Limerock Bearing Ratio (LBR) of 40 percent, as specified by Florida Department of Transportation (FDOT) requirements for Type B Stabilized Sub-grade. The sub-grade 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 sub-grade 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 sub-grade beneath the base course is to provide a stable and firm sub-grade so that the limerock can be uniformly placed and properly compacted. Depending upon the soil type, the sub-grade 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. **AGES** personnel should check the soils exposed on the finish grades to evaluate whether or not additional stabilization will be required beneath the base course.

6.3.2 Limerock Base Course Preparation - The limerock base course should be placed in maximum 6-inch lifts and compacted to densities equivalent to 100 percent of the Modified Proctor maximum 1dry density (ASTM D 1557). The surface of the limerock base course material should be "primed" with any of the following cutback asphalt grades: RC-70 or RC-250. Applicable Emulsified Asphalt Grades such as SS-1, CSS-1, AE-60, AE-90, etc. may also be used as specified in the FDOT Standard Specification manual Section 300. A minimum of 0.10 gallons per square yard should be applied to the base course surface. Care should be exercised to prevent over-priming of the base course surface. Prior to asphalt placement, the prime coat should be fully set and cured. The specifications governing the placement of prime coats on pavement base course surfaces and sanding is outlined in Section 300 of the Florida DOT Standard Specifications for Road and Bridge Construction (2000).

The primed base course should be sanded if: (1) more than one day (24 hours) will elapse prior to laying the asphalt wearing surface and excess prime is not absorbed, or (2) construction equipment will operate over the unprotected primed base course. If sanding is required, approximately 10 pounds of sand per square yard of surface (i.e., about 1/4 inch of sand) should be spread over the primed base course. The sand surface coating should contain less than 10 percent fines (i.e., material passing the No. 200 sieve) and be composed of non-elastic, inorganic, granular soil.

7.0 LIFT STATION RECOMMENDATIONS

The following parameters may be used in the design of below grade structures associated with the planned lift station.

7.1 Lateral Earth Pressures

The walls of the lift station 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 assumed to be 1.5 feet below prevailing grade.

7.2 Construction and Foundation Preparation Recommendations

Based on our evaluation of the soil conditions encountered in this area, we offer the following recommendations for the proposed underground 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 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 should be designed according to OSHA sheeting and bracing requirements. We recommend a Florida registered Professional Engineer design the sheeting/bracing system.

2. A de-watering system will be required for the project. A vertical and/or horizontal sanded wellpoint system will be most appropriate for de-watering. The water table should be maintained at least 2.0 feet below the proposed bottom of slab. The de-watering system should not be decommissioned until sufficient deadweight exists on the structure 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. The upper one foot of sandy bearing level soils should be compacted to densities equivalent to 95 percent of the soils Modified Proctor Maximum Dry Density (ASTM D 1557). Clayey bearing levels soils should be over-excavated and replaced with compacted sand/gravel or a concrete working mat.

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 at the proposed walls.

5. A representative of **AGES** 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.

7.3 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 these structures are drained for maintenance or as water levels fluctuate within the lift stations, 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 used for this construction. At your request, we would be pleased to assist you in evaluating uplift protection requirements.

8.0 QUALITY CONTROL TESTING GUIDELINES

Prior to initiating compaction operations, we recommend that representative samples of the structural fill material and exposed in-place fine sandy soils be collected and tested to determine their compaction and classification characteristics. The maximum dry density, optimum moisture content gradation and plasticity characteristics should be determined. These tests are needed for compaction quality control of the structural fill and existing soils and to determine if the fill material is acceptable.

A representative number of field in-place density tests should be performed in the compacted existing soils and in each one foot lift of structural fill/backfill to confirm that the required degree of compaction has been obtained. At each test level, we recommend one density test be performed for every 5,000 square feet of building area (minimum of three locations). In-place density tests should also be performed at representative locations in the bearing level soils of the footings. We recommend that at least one density test be performed at a minimum of 25 percent of the isolated column footing bearing areas, and for every 100 linear feet of continuous footing bearing surface. In addition, in-place density tests should be performed at one location for every 10,000 square feet of pavement area (minimum of three locations).

9.0 CONSTRUCTION PLANS & SPECIFICATIONS REVIEW

We recommend that **AGES** be provided the opportunity to review the foundation plans and the specifications prepared from the recommendations presented in this report. If necessary, we will suggest any modifications that may be required to verify that our recommendations have been properly interpreted and implemented. Our report has been written in a guideline recommendation format and is not appropriate for use as (or inclusion into) the specifications without being reworded in a specification type format. It is recommended that this report not be made part of the contract documents. However, it should be made available to prospective contractors for information purposes only.

DATA ATTACHMENTS

REFERENCE:
Mapquest.com

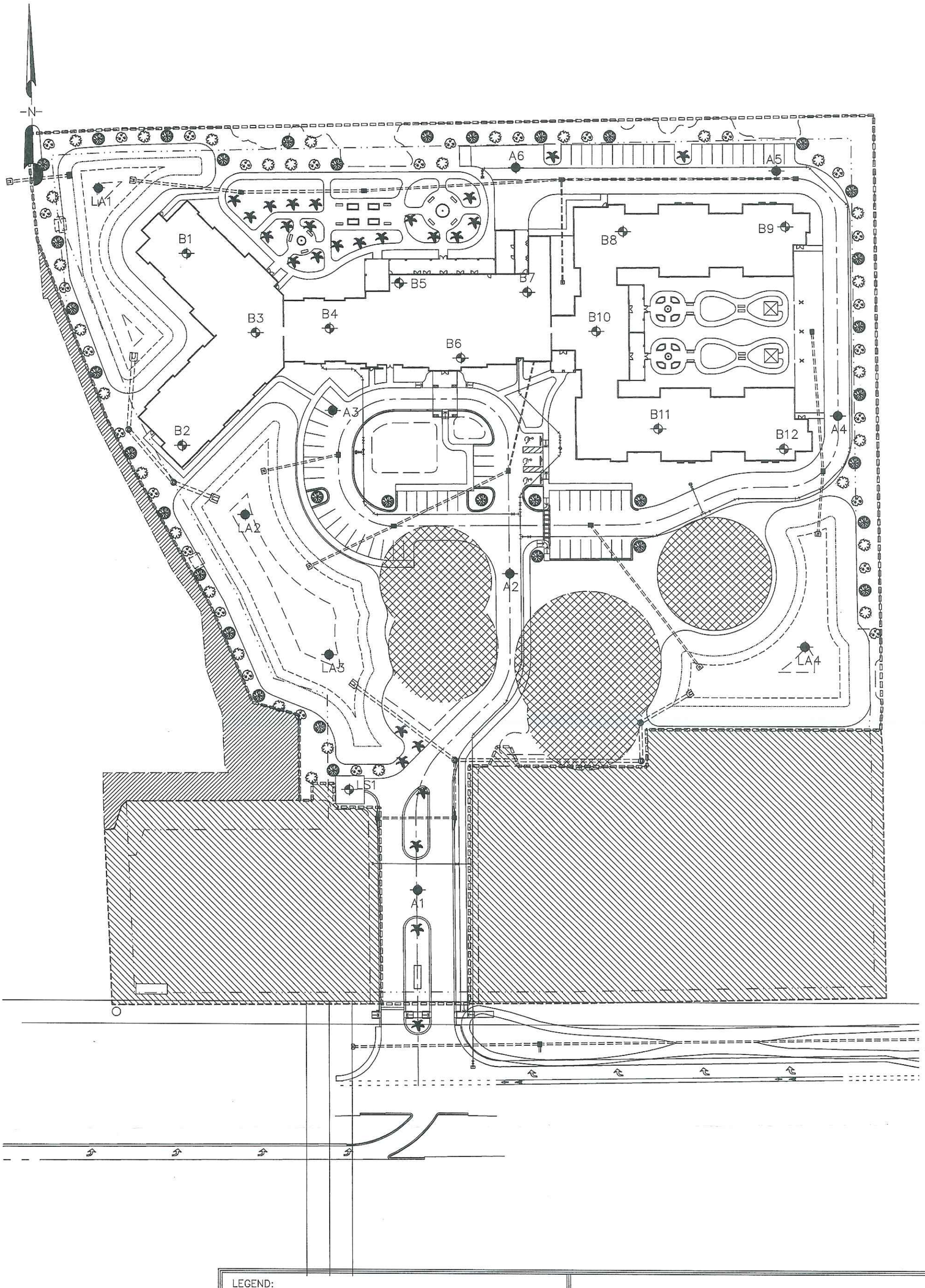
ages

Jacksonville, Florida

SITE LOCATION MAP
Villages of St. Augustine
St. Augustine, Florida

DRAWN: TSM	DATE: 07/17/14	SCALE: NTS
CHECKED: TRW	JOB NO: J16193	

CADNO



LEGEND:

- Penetration Test Boring Location (approximate)
- Auger Boring Location (approximate)

REFERENCE:

Site Plan and Topographic Data provided by Matthews Design. Plan was Undated.

NOTES:

The boring locations were established by AGES personnel using handheld GPS Locater Units. Boring locations as shown on this plan are approximate.

ages

Jacksonville, Florida

FIELD EXPLORATION PLAN

Villages of St. Augustine
St. Augustine, Florida

DRAWN: TSM	DATE: 07/17/14	SCALE:
CHECKED: TRW	JOB NO: J16193	1"=80'

CADNO

KEY TO SOIL CLASSIFICATION

CORRELATION OF N-VALUE WITH RELATIVE DENSITY & CONSISTENCY

SANDS AND GRAVEL	
NO. OF BLOWS,N*	RELATIVE DENSITY
0 - 4	VERY LOOSE
5 - 10	LOOSE
11 - 20	FIRM
21 - 30	VERY FIRM
31 - 50	DENSE
OVER 50	VERY DENSE

SILTS AND CLAYS	
NO. OF BLOWS, N*	CONSISTENCY
0 - 2	VERY SOFT
3 - 4	SOFT
5 - 8	FIRM
9 - 15	STIFF
16 - 30	VERY STIFF
31 - 50	HARD
OVER 50	VERY HARD

PARTICLE SIZE IDENTIFICATION (UNIFIED SOIL CLASSIFICATION SYSTEM)

CATEGORY	DIMENSIONS
Boulders	Diameter exceeds 12 inches
Cobbles	3 to 12 inches
Gravel	Coarse - 0.75 to 3 inches in diameter
Sand	Coarse - 2.0 mm to 4.76 mm diameter Medium - 0.42 mm to 2.0 mm diameter
Silt and Clay	Less than 0.074 mm (Invisible to the naked eye)

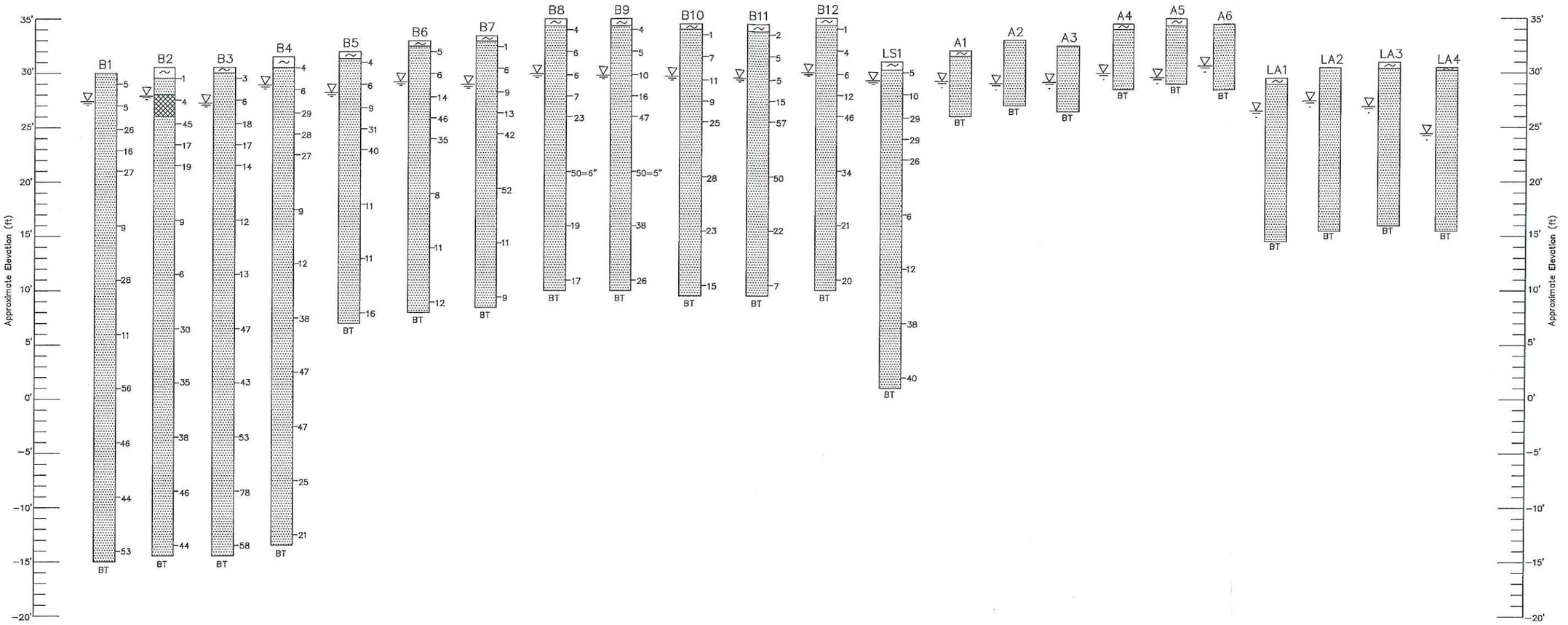
MODIFIERS

These modifiers provide our estimate of the amount of minor constituents (sand silt or clay size particles) in the soil sample.

PERCENTAGE OF MINOR CONSTITUENT	MODIFIERS
5% to 12% 12% to 30% 30% to 50%	Slightly Silty, Slightly Clayey, Slightly Sandy Silty, Clayey, Sandy Very Silty, Very Clayey, Very Sandy

These modifiers provide our estimate of the amount of other components in the soil sample.

APPROXIMATE CONTENT OF OTHER COMPONENTS (SHELL, GRAVEL, ETC.)	MODIFIERS	APPROXIMATE CONTENT OF ORGANIC COMPONENTS
0% to 5%	TRACE	1% to 2%
5% to 12%	FEW	2% to 4%
12% to 30%	SOME	4% to 8%
30% to 50%	MANY	>8%



LEGEND & SYMBOLS

- Topsoil
- Fine SAND (SP/A-3), Slightly Silty Fine SAND (SP-SM/A-3, A-2-4)
- Clayey Fine SAND, Very Clayey Fine SAND (SC/A-2-6, A-6), Silty Clayey Fine SAND (SM-SC/A-2-5))
- Silty Fine SAND, Very Silty Fine SAND (SM/A-2-4, A-4
- SILT, Sandy SILT (ML, MH, OL/A-4, A-5)
- CLAY, Sandy CLAY (CL, CH, OH/A-6,A-7)
- SANDS, SILTS, or CLAYS with Many Organics or Wood Pieces, Etc. (Pt/A-8)
- 9 Standard Penetration Resistance (blows/ft)
- Groundwater Level at Time of Drilling
- BT Boring Terminated

ages

Jacksonville, Florida

GENERALIZED SUBSURFACE PROFILE

Villages of St. Augustine

St. Augustine, Florida

DRAWN: TSM	DATE: 07/23/14	SCALE: 1"= 10'
CHECKED: TRW	JOB NO: J16193	

CADNO

TEST BORING RECORD

ages

JOB NO J16193
BORING NO B1
Sheet 1 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +30.0' Datum NA
Groundwater Depth 2.6' Time: Drilling Date: 07/11/14
Lat/Long N 29.91838 / W 81.35890

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL				BLOW COUNT
+30.0'	0							
+29.0'		LOOSE Dark Brown Slightly Silty Fine SAND (SP-SM)	1	1	2	3	3	5
		LOOSE Grey FIne SAND (SP)						
+27.5'		LOOSE Dark Brown Slightly Silty Fine SAND (SP-SM)	2	2	2	3	5	5
	5	VERY FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	3	6	11	15	19	26
+24.5'		VERY FIRM Brown Fine SAND (SP)						
+23.5'		FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	4	6	6	10	15	16
+22.0'								
		VERY FIRM Brown Fine SAND (SP)	5	7	9	18	16	27
	10							
+16.5'								
		LOOSE Dark Brown Fine SAND (SP)	6	4	4	5		9
	15							
+11.0'								
		VERY FIRM Brown Fine SAND (SP)	7	8	11	17		28
	20							
+8.0'								
		FIRM Grey Fine SAND (SP)	8	8	6	5		11
	25							
+3.0'								
		VERY DENSE to DENSE Grey Fine SAND with Some Shell Fragments (SP)	9	16	26	30		56
	30							

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

ages

JOB NO J16193
BORING NO B1
Sheet 2 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +30.0' Datum NA
Groundwater Depth 2.6' Time: Drilling Date: 07/11/14
Lat/Long N 29.94240 / W 81.30156

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
	30				
		VERY DENSE to DENSE Grey Fine SAND with Some Shell Fragments (SP)			
	35		10	19 19 27	46
-7.0'					
	40	DENSE to VERY DENSE Brown Fine SAND with Some Shell Fragments (SP)	11	15 22 22	44
-15.0'	45		12	13 23 30	53
		Boring Terminated			
	50				
	55				
	60				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b1.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B2
Sheet 1 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +30.5' Datum NA
Groundwater Depth 2.5' Time: Drilling Date: 07/11/14
Lat/Long N 29.91792/ W 81.35891

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+30.5'	0				
+29.5'		Topsoil- 12"	1	1=12" 1 1	1
+28.0'		VERY LOOSE Grey Fine SAND with Trace Organics (SP)	2	1 1 3 10	4
+26.0'		VERY LOOSE Dark Brown Fine SAND with Many Organics (SP-Pt)	3	8 16 29 8	45
+23.5'	5	DENSE Brown Fine SAND (SP)	4	8 9 8 10	17
			5	5 7 12 13	19
+16.5'	10	FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	6	3 4 5	9
+11.5'	15	LOOSE Dark Brown Slightly Silty Fine SAND (SP-SM)	7	3 4 2	6
+8.5'	20	LOOSE Grey Fine SAND (SP)	8	10 12 18	30
	25	VERY FIRM to DENSE Grey Fine SAND with Many Shell Fragments (SP)	9	11 15 20	35
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

JOB NO J16193
BORING NO B2
Sheet 2 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +30.5' Datum NA
Groundwater Depth 2.5' Time: Drilling Date: 07/11/14
Lat/Long N 29.91792/ W 81.35891

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
	30				
		VERY FIRM to DENSE Grey Fine SAND with Many Shell Fragments (SP)			
-1.5'					
		DENSE Grey Sligthly Silty Fine SAND with Some Shell Fragments (SP-SM)	10	14 18 20	38
	35				
-6.5'					
		DENSE Grey Fine SAND with Many Shell Fragments (SP)	11	11 18 28	46
	40				
-14.5'	45	Boring Terminated	12	13 19 25	44
	50				
	55				
	60				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b2.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B3
Sheet 1 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +30.5' Datum NA
Groundwater Depth 3.2' Time: Drilling Date: 07/11/14
Lat/Long N 29.91819/ W 81.35871

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+30.5'	0				
+30.0'		Topsoil- 6"			
		VERY LOOSE Grey Fine SAND with Trace Small Roots (SP)	1	1 2 1 2	3
+28.5'					
		LOOSE Grey Fine SAND with Some Small Roots (SP)	2	2 3 3 2	6
+26.5'					
	5	FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	3	6 8 10 12	18
			4	6 9 8 9	17
+23.0'					
			5	4 7 7 6	14
	10	FIRM Reddish Brown Fine SAND (SP)			
+17.5'					
	15	FIRM Brown Fine SAND (SP)	6	3 6 6	12
+11.5'					
	20	FIRM Grey Fine SAND (SP)	7	5 5 8	13
+6.5'					
	25	DENSE Grey Fine SAND with Some Shell Fragments (SP)	8	19 17 30	47
+3.5'					
		DENSE Grey Fine SAND with Many Shell Fragments (SP)			
	30		9	13 20 23	43

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

ages

JOB NO J16193
BORING NO B3
Sheet 2 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +30.5' Datum NA
Groundwater Depth 3.2' Time: Drilling Date: 07/11/14
Lat/Long N 29.91819/ W 81.35871

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
	30				
-1.5'		DENSE Grey Fine SAND with Some Shell Fragments (SP)			
	35		10	19 23 30	53
		VERY DENSE Grey Sligthly Silty Fine SAND with Some Shell Fragments (SP-SM)			
	40		11	13 28 50=6"	78
-14.5'	45		12	19 28 30	58
		Boring Terminated			
	50				
	55				
	60				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b3.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B4
Sheet 1 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +31.5' Datum NA
Groundwater Depth 2.5' Time: Drilling Date: 07/11/14
Lat/Long N 29.91820/ W 81.35851

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL				BLOW COUNT
+31.5'	0							
		Topsoil- 12"						
+30.5'			1	1	2	2	2	4
		VERY LOOSE to LOOSE Grey Fine SAND (SP)	2	2	3	3	4	6
+27.5'								
	5		3	4	13	16	22	29
		VERY FIRM Dark Brown Sligthly Silty Fine SAND (SP-SM)	4	6	13	15	20	28
+22.5'			5	6	12	15	18	27
	10	VERY FIRM Brown Sligthly Silty Fine SAND (SP-SM)						
+19.5'								
			6	5	5	4		9
	15	LOOSE Brown Fine SAND (SP)						
12.5								
	20		7	4	5	7		12
		FIRM Grey Fine SAND (SP)						
	25	DENSE Grey Fine SAND (SP)	8	12	16	22		38
+4.5'								
		DENSE Grey Fine SAND with Many Shell Fragments (SP)						
	30		9	15	22	25		47

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

ages

JOB NO J16193
BORING NO B4
Sheet 2 of 2
Boring Begun 07/11/14
Boring Completed 07/11/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +31.5' Datum NA
Groundwater Depth 2.5' Time: Drilling Date: 07/11/14
Lat/Long N 29.91820/ W 81.35851

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
	30				
-0.5'		DENSE Grey Fine SAND with Many Shell Fragments (SP)			
	35	DENSE to VERY FIRM Grey Fine SAND with Some Shell Fragments (SP)	10	15 22 25	47
	40		11	13 14 11	25
-10.5'		VERY FIRM Grey Fine SAND with Trace Shell Fragments (SP)			
-13.5'	45		12	7 9 12	21
		Boring Terminated			
	50				
	55				
	60				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b3.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B5
Sheet 1 of 1
Boring Begun 07/12/14
Boring Completed 07/12/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +32.0' Datum NA
Groundwater Depth 3.8' Time: Drilling Date: 07/12/14
Lat/Long N 29.91831/ W 81.35831

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+32.0'	0				
+31.5'		Topsoil- 8"			
		VERY LOOSE Light Brown Fine SAND (SP)	1	1 2 2 3	4
+30.0'					
		LOOSE Light Brown Fine SAND with Trace Small Roots (SP)	2	3 3 3 4	6
+28.0'					
	5	LOOSE Dark Brown Slightly Silty Fine SAND with Trace Small Roots (SP-SM)	3	3 3 6 8	9
+26.5'					
			4	7 11 20 35	31
		DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)	5	15 20 20 25	40
	10				
+19.0'					
	15		6	4 5 6	11
		FIRM Brown Fine SAND (SP)			
	20		7	6 5 6	11
+8.0'					
		LOOSE Grey Fine SAND (SP)			
+7.0'	25		8	3 3 3	6
		Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

JOB NO J16193
BORING NO B6
Sheet 1 of 1
Boring Begun 07/12/14
Boring Completed 07/12/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +33.0' Datum NA
Groundwater Depth 3.8' Time: Drilling Date: 07/12/14
Lat/Long N 29.91832/ W 81.35814

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+33.0'	0				
+32.5'		Topsoil- 6"			
		LOOSE Light Brown Fine SAND (SP)	1	1 2 3 2	5
+31.0'					
		LOOSE Dark Brown Slightly Silty Fine SAND (SP-SM)	2	3 3 3 3	6
+29.0'					
	5	FIRM Brown Fine SAND (SP)	3	4 6 8 10	14
+27.5'					
			4	8 19 27 30	46
		DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)	5	19 18 17 16	35
	10				
+20.0'					
	15		6	3 4 4	8
		LOOSE to FIRM Brown Fine SAND (SP)			
	20		7	5 6 5	11
+9.0'					
		FIRM Grey Fine SAND (SP)			
+8.0'	25		8	4 5 7	12
		Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

JOB NO J16193
BORING NO B7
Sheet 1 of 1
Boring Begun 07/12/14
Boring Completed 07/12/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +33.5' Datum NA
Groundwater Depth 4.5' Time: Drilling Date: 07/12/14
Lat/Long N 29.91829 / W 81.35796

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+33.5'	0				
+33.0'		Topsoil- 6"			
		VERY LOOSE Light Brown Fine SAND (SP)	1	1=12" 1 2	1
+31.5'			2	2 3 3 3	6
		LOOSE Brown Fine SAND (SP)	3	3 4 5 5	9
	5				
+26.5'			4	4 5 8 10	13
		FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	5	9 17 25 30	42
	10	DENSE Dark Brown Slightly Silty Fine SAND with Hardpan Chunks (SP-SM)			
+20.5'			6	13 22 30	52
	15	VERY DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)			
+14.5'			7	4 4 7	11
	20	FIRM Grey Brown Slightly Silty Fine SAND (SP-SM)			
+9.5'		LOOSE Brown Fine SAND (SP)	8	6 5 4	9
+8.5'	25	Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

JOB NO J16193
BORING NO B8
Sheet 1 of 1
Boring Begun 07/12/14
Boring Completed 07/12/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +35.0' Datum NA
Groundwater Depth 5.0' Time: Drilling Date: 07/12/14
Lat/Long N 29.91844 / W 81.35770

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+35.0'	0				
+34.5'		Topsoil- 8"			
		VERY LOOSE Light Grey Fine SAND (SP)	1	1 2 2 2	4
+31.5'					
+33.0'		LOOSE Light Brown Fine SAND with Trace Roots (SP)	2	2 3 3 3	6
+31.5'					
		LOOSE Brown Fine SAND (SP)	3	4 3 3 3	6
+30.0'	5				
		LOOSE Dark Brown Slightly Silty Fine SAND (SP-SM)	4	4 3 4 8	7
+27.5'					
			5	8 8 15 22	23
	10	VERY FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)			
+22.0'					
	15		6	32 50=6"	50=6"
		VERY DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)			
+16.0'					
	20		7	7 8 11	19
		FIRM Brown Fine SAND (SP)			
+11.0'					
+10.0'	25		8	6 8 9	17
		Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b8.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B9
Sheet 1 of 1
Boring Begun 07/14/14
Boring Completed 07/14/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +35.0' Datum NA
Groundwater Depth 5.2' Time: Drilling Date: 07/14/14
Lat/Long N 29.91846 / W 81.35725

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+35.0'	0				
+34.5'		Topsoil- 8"			
		VERY LOOSE to LOOSE Light Brown Fine SAND (SP)	1	1 2 2 3	4
			2	3 2 3 3	5
+30.5'	5		3	4 5 5 5	10
		LOOSE Brown Fine SAND (SP)			
+28.0'			4	4 6 10 15	16
		FIRM Brown Slightly Silty Fine SAND (SP-SM)			
+27.0'			5	10 12 35 42	47
	10	DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)			
+22.0'			6	43 50=5"	50=5"
	15	VERY DENSE Reddish Brown Slightly Silty Fine SAND (SP-SM)			
+16.0'			7	18 20 18	38
	20	DENSE Reddish Brown Fine SAND (SP)			
+11.0'		VERY FIRM Brown Fine SAND (SP)			
+10.0'	25	Boring Terminated	8	12 12 14	26
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b9.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B10
Sheet 1 of 1
Boring Begun 07/12/14
Boring Completed 07/12/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +34.5' Datum NA
Groundwater Depth +4.8' Time: Drilling Date: 07/12/14
Lat/Long N 29.91820/ W 81.35777

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+34.5'	0				
+34.0'		Topsoil- 6"			
		VERY LOOSE Light Brown Fine SAND (SP)	1	1=12" 1 1	1
		LOOSE Reddish Brown Fine SAND (SP)	2	2 3 4 4	7
+31.0'					
	5	FIRM Brown Fine SAND (SP)	3	5 5 6 6	11
+28.5'					
		LOOSE Dark Brown Slightly Silty Fine SAND (SP-SM)	4	3 4 5 10	9
+26.5'					
			5	6 10 15 25	25
	10	VERY FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)			
+21.5'					
			6	15 14 14	28
	15	VERY FIRM Reddish Brown Fine SAND (SP)			
+15.5'					
	20		7	6 10 13	23
		VERY FIRM Brown Fine SAND (SP)			
+10.5'					
		FIRM Grey Brown Fine SAND (SP)	8	7 7 8	15
+9.5'	25	Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

JOB NO J16193
BORING NO B11
Sheet 1 of 1
Boring Begun 07/12/14
Boring Completed 07/12/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +34.5' Datum NA
Groundwater Depth 5.0' Time: Drilling Date: 07/12/14
Lat/Long N 29.91797/ W 81.35759

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+34.5'	0				
+34.0'		Topsoil- 8"			
		VERY LOOSE Light Grey Fine SAND (SP)	1	1 1 1 3	2
		LOOSE Dark Brown Fine SAND (SP)	2	2 2 3 3	5
+31.5'					
	5	LOOSE to FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	3	3 3 2 3	5
+28.5'			4	4 5 10 7	15
+26.5'			5	17 22 35 50=5"	57
	10	VERY DENSE to DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)			
+21.5'			6	21 25 25	50
	15				
+15.5'			7	10 11 11	22
	20	VERY FIRM Brown Fine SAND (SP)			
+10.5'					
+9.5'	25	LOOSE Greenish Grey Slightly Silty Fine SAND (SP-SM)	8	3 3 4	7
		Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193b11.qpw

TEST BORING RECORD

JOB NO J16193
BORING NO B12
Sheet 1 of 1

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +35.0' Datum NA
Groundwater Depth 5.0' Time: Drilling Date: 07/14/14
Lat/Long N 29.91792/ W 81.35725

Boring Begun 07/14/14
Boring Completed 07/14/14
Driller R. Epps
Engineer TRW

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+35.0'	0				
+34.5'		Topsoil- 8"			
			1	1=12" 1 2	1
		VERY LOOSE to LOOSE Light Brown Fine SAND (SP)	2	2 2 2 3	4
	5		3	3 3 3 4	6
+29.0'					
		FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	4	4 5 7 11	12
+27.5'					
			5	14 21 25 32	46
	10	DENSE Dark Brown Slightly Silty Fine SAND (SP-SM)			
+22.0'					
	15		6	14 16 18	34
		DENSE to VERY FIRM Reddish Brown Fine SAND (SP)			
	20		7	8 11 10	21
+13.0'					
		FIRM Brown Slightly Silty Fine SAND (SP-SM)			
+10.0'	25		8	11 9 11	20
		Boring Terminated			
	30				

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

TEST BORING RECORD

JOB NO J16193
BORING NO LS1
Sheet 1 of 1
Boring Begun 07/21/14
Boring Completed 07/21/14
Driller R. Epps
Engineer TRW

Project Villages of St. Augustine
Boring Location (See Field Exploration Plan)
Ground Elevation +31.0' Datum NA
Groundwater Depth 1.7' Time: Drilling Date: 07/21/14
Lat/Long N 29.91708 / W 81.35836

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST BLOWS PER 6-IN. INTERVAL	BLOW COUNT
+31.0'	0				
+30.5'		Topsoil- 9"			
		LOOSE Light Grey Fine SAND (SP)	1	1 2 3 3	5
			2	3 4 6 7	10
+26.0'	5		3	10 14 15 14	29
24.5		VERY FIRM Dark Brown Slightly Silty Fine SAND (SP-SM)	4	11 14 15 20	29
		VERY FIRM Brown Fine SAND (SP)	5	12 14 12 15	26
+21.5'	10	VERY FIRM Reddish Brown Fine SAND (SP)			
+17.0'	15	LOOSE Brown Fine SAND (SP)	6	3 3 3	6
+12.0'	20	FIRM Grey Fine SAND (SP)	7	4 5 7	12
+7.0'	25	DENSE Light Grey Fine SAND with Some Shell Fragments (SP)	8	18 20 18	38
+1.0'	30	Boring Terminated	9	18 18 22	40

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

J16193ls1.qpw

ages

AUGER BORING RECORDS
Villages of St. Augustine
St. Augustine, Florida
AGES Job No. J16193, Report No. 001

Date Performed: 07/10/14 — Performed By: N. Wheeler

Auger ID Location Elevation	Depth (Feet)[a]	SOIL DESCRIPTION (AASHTO/ USCS CLASSIFICATION)
A1	0.0 - 0.5	Topsoil- 6" (A-8)
N 29.91685	0.5 - 4.2	Light Brown Fine SAND (A-3)
W 81.35826	4.2 - 6.0	Dark Brown Slightly Silty Fine SAND with Hardpan Chunks (A-2-4)
El. +32.0'	A.B.T.[b]	GWL[c]= 2.8 feet
A2	0.0 - 0.3	Grey Fine SAND (A-3)
N 29.91761	0.3 - 0.3	Light Grey Fine SAND (A-3)
W 81.35801	3.0 - 3.5	Brown Fine SAND (A-3)
El. +33.0'	3.5 - 5.0	Light Brown Fine SAND (A-3)
	5.0 - 6.0	Dark Brown Slightly Silty Fine SAND (A-3)
	A.B.T.[b]	GWL[c]= 4.0 feet
A3	0.0 - 1.0	Grey Brown Slightly Silty Fine SAND with Few Organics (A-2-4)
N 29.91800	1.0 - 5.0	Light Brown Fine SAND with (A-3)
W 81.35850	5.0 - 6.0	Dark Brown Slightly Silty Fine SAND (A-3)
El. +31.5'	A.B.T.[b]	GWL[c]= 3.3 feet
A4	0.0 - 0.5	Topsoil- 6" (A-8)
N 29.91800	0.5 - 3.0	Light Grey Fine SAND (A-3)
W 81.35710	3.0 - 4.0	Reddish Brown Fine SAND with Hardpan Chunks (A-3)
El. +34.5'	4.0 - 6.0	Dark Brown Slightly Silty Fine SAND (A-3)
	A.B.T.[b]	GWL[c]= 4.5 feet
A5	0.0 - 0.7	Topsoil- 8" (A-8)
N 29.91891	0.7 - 2.5	Light Grey Fine SAND (A-3)
W 81.35727	2.5 - 6.0	Light Brown Fine SAND (A-3)
El. +35.0'	A.B.T.[b]	GWL[c]= 5.4 feet
A6	0.0 - 1.0	Grey Fine SAND with Trace Organics (A-3)
N 29.91859	1.0 - 4.0	Light Grey Fine SAND (A-3)
W 81.35799	4.0 - 6.0	Brown Fine SAND (A-3)
El. +34.5'	A.B.T.[b]	GWL[c]= 3.8 feet
LA1	0.0 - 0.7	Topsoil- 7" (A-8/Pt)
N 29.91854	0.7 - 4.8	Light Brown Fine SAND(A-3/ SP)
W 81.35915	4.8 - 7.2	Dark Brown Slightly Silty Fine SAND (A-3/SP-SM) with Trace Small Roots (A-3/SP-SM)
El. +29.5'	7.2 - 9.0	Dark Brown Slightly Silty Fine SAND (A-3/SP-SM)
	9.0 - 13.0	Reddish Brown Fine SAND (A-3/SP)
	13.0 - 15.0	Light Brown Fine SAND (A-3/SP)
	A.B.T.[b]	GWL[c]= 3.0 feet Estimated Seasonal High GWL[c]= 1.5 feet (El. +28.0')

a - Depth measured below ground surface existing at boring location at time of drilling
b - Auger Boring Terminated (A.B.T.)
c - Groundwater Level (GWL) depth below existing ground surface, recorded at time of drilling, unless otherwise noted

ages

AUGER BORING RECORDS
Villages of St. Augustine
St. Augustine, Florida
AGES Job No. J16193, Report No. 001

Date Performed: 07/10/14 Performed By: N. Wheeler

Auger ID Location Elevation	Depth (Feet)[a]	SOIL DESCRIPTION (AASHTO/ USCS CLASSIFICATION)
LA2	0.0 - 1.0	Dark Brown Slightly Silty Fine SAND (A-2-4/SP-SM)
N 29.91775	1.0 - 3.0	Grey Brown Fine SAND (A-3/SP)
W 81.35874	3.0 - 6.0	Brown Fine SAND (A-3/SP)
El. +30.5'	6.0 - 15.0	Dark Brown Slightly Silty Fine SAND (A-3/SP-SM)
	A.B.T.[b]	GWL[c]= 3.0 feet
		Estimated Seasonal High GWL[c]= 1.5 feet (El. +29.0')
LA3	0.0 - 0.5	Topsoil-6" (A-8/Pt)
N 29.91741	0.5 - 3.8	Grey Fine SAND (A-3/SP)
W 81.38506	3.80 - 15.0	Dark Brown Slightly Silty Fine SAND (A-3/SP-SM)
El. +31.0'	A.B.T.[b]	GWL[c]= 4.0 feet
		Estimated Seasonal High GWL[c]= 1.5 feet (El. +29.5')
LA4	0.0 - 0.3	Topsoil- 3" (A-8/Pt)
N 29.91744	0.3 - 2.8	Light Brown Fine SAND (A-3/SP)
W 81.35719	2.8 - 5.5	Brown Fine SAND (A-3/SP)
El. +30.5'	5.5 - 6.7	Light Brown Fine SAND (A-3/SP)
	6.7 - 9.0	Dark Brown Slightly Silty Fine SAND (A-2-4/SP-SM)
	9.0 - 15.0	Reddish Brown Fine SAND (A-3/SP)
	A.B.T.[b]	GWL[c]= 6.0 feet
		Estimated Seasonal High GWL[c]= 1.5 feet (El. +29.0')

a - Depth measured below ground surface existing at boring location at time of drilling
b - Auger Boring Terminated (A.B.T.)
c - Groundwater Level (GWL) depth below existing ground surface, recorded at time of drilling, unless otherwise noted
J16193aug.wpd

ages

AUGER BORING RECORDS
Villages of St. Augustine
St. Augustine, Florida
AGES Job No. J16193, Report No. 001

Date Performed: 07/10/14 Performed By: N. Wheeler

Auger ID Location Elevation	Depth (Feet)[a]	SOIL DESCRIPTION (AASHTO/ USCS CLASSIFICATION)
LA2	0.0 - 1.0	Dark Brown Slightly Silty Fine SAND (A-2-4/SP-SM)
N 29.91775	1.0 - 3.0	Grey Brown Fine SAND (A-3/SP)
W 81.35874	3.0 - 6.0	Brown Fine SAND (A-3/SP)
El. +30.5'	6.0 - 15.0	Dark Brown Slightly Silty Fine SAND (A-3/SP-SM)
	A.B.T.[b]	GWL[c]= 3.0 feet
		Estimated Seasonal High GWL[c]= 1.5 feet (El. +29.0')
LA3	0.0 - 0.5	Topsoil-6" (A-8/Pt)
N 29.91741	0.5 - 3.8	Grey Fine SAND (A-3/SP)
W 81.38506	3.80 - 15.0	Dark Brown Slightly Silty Fine SAND (A-3/SP-SM)
El. +31.0'	A.B.T.[b]	GWL[c]= 4.0 feet
		Estimated Seasonal High GWL[c]= 1.5 feet (El. +29.5')
LA4	0.0 - 0.3	Topsoil- 3" (A-8/Pt)
N 29.91744	0.3 - 2.8	Light Brown Fine SAND (A-3/SP)
W 81.35719	2.8 - 5.5	Brown Fine SAND (A-3/SP)
El. +30.5'	5.5 - 6.7	Light Brown Fine SAND (A-3/SP)
	6.7 - 9.0	Dark Brown Slightly Silty Fine SAND (A-2-4/SP-SM)
	9.0 - 15.0	Reddish Brown Fine SAND (A-3/SP)
	A.B.T.[b]	GWL[c]= 6.0 feet
		Estimated Seasonal High GWL[c]= 1.5 feet (El. +29.0')

a - Depth measured below ground surface existing at boring location at time of drilling
b - Auger Boring Terminated (A.B.T.)
c - Groundwater Level (GWL) depth below existing ground surface, recorded at time of drilling, unless otherwise noted
J16193aug.wpd

SUMMARY OF LABORATORY TEST DATA

Villages of St. Augustine
St. Augustine, Florida
AGES Job No J16193, Report 001

Date Tested: 07/14/14

By: S. Mardini

Boring ID	Sample	Depth (ft.)	USCS/ AASHTO Symbol	Moisture Content %	Fines Content %	Atterberg Limits			Organics Content %
						Liquid Limit	Plastic Limit	Plasticity Index	
LA2	1	0.0 - 1.0	A-3/ SP-SM	24	8	—	—	—	—
A1	1	0.0 - 0.5	A-8	7	6	—	—	—	4
A3	1	0.0 - 1.0	A-3	9	5	—	—	—	3
A4	1	0.0 - 0.5	A-8	15	8	—	—	—	8
B1	6	13.5 - 15.0	SP	29	2	—	—	—	—
B2	2	2.0 - 4.0	SP-Pt	195	1	—	—	—	31
	4	6.0 - 8.0	SP-SM	30	11	—	—	—	—
B6	5	8.0 - 10.0	SP-SM	25	7	—	—	—	—
B12	5	8.0 - 10.0	SP-SM	22	9	—	—	—	—

Notes:

— Sample Not Tested

1- Moisture Content represents the insitu moisture content (Wn) and was determined in accordance with ASTM D-2216

2- Fines Content (FC) is defined as the percent of material by weight passing the # 200 Sieve (ASTM D-1140)

3- Organic Content conducted in general accordance with ASTM D2974

J16193lab.qpw

FIELD EXPLORATION PROCEDURES

Penetration Borings

The penetration borings were made in general accordance with ASTM D 1586-67, "Penetration Test and Split-Barrel Sampling of Soils". The borings were advanced to the water table by augering and, after encountering the groundwater table, further advanced by rotary drilling techniques using a circulating bentonite fluid for borehole flushing and stability. At two-foot intervals within the upper 10 feet and at five-foot intervals thereafter, the drilling tools were removed from the borehole and a split-barrel sampler inserted to the borehole bottom and driven 18 inches into the material using a 140-pound SPT hammer falling, on the average, 30 inches per hammer blow. The number of hammer 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 or rock-like material) at each test interval, the sampler was retrieved from the borehole and a representative sample of the material within the split-barrel was placed in a glass jar and sealed. After completing the drilling operations, the samples for the borings were transported to our laboratory where they were examined by our engineer in order to verify the driller's field classifications. The samples will be kept in our laboratory for a period of two months after submittal of formal written report, unless otherwise directed by the client.

LABORATORY TEST PROCEDURES

Natural Moisture Content

The water content of the sample tested was determined in general accordance with ASTM D 2216-80. 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.

Fines Content

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

Percent Organics Content

The percent organic material (i.e. organic loss on ignition) 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 400 degrees Celsius.