

May 18, 2018
BOARD OF COUNTY COMMISSIONERS
ORANGE COUNTY, FLORIDA
ADDENDUM NO. 5 / IFB NO. Y18-758-TA
SOUTH SERVICE AREA/EAST SERVICE AREA (SSA/ESA) 36-INCH POTABLE
WATER MAIN, 24-INCH RECLAIMED WATER MAIN AND J. LAWSON BLVD
POTABLE WATER RE-PUMP FACILITY

NEW BID OPENING DATE: May 24, 2018

This addendum is hereby incorporated into the bid documents of the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to and shall take precedence over the original documents. Additions are indicated by **underlining**, deletions are indicated by ~~strikethrough~~.

A. Bid Opening Date has changed from ~~May 22, 2018~~ to May 24, 2018.

B. CLARIFICATIONS:

1. Q: Can you confirm the permit fees for (1) The City of Orlando's ROW Permit is 4% of the construction costs and (2) Orange County ROW permit fee is 1.8% of the construction costs?

A: Technical Specification Section 01025 1.03 – D explains Contractor's responsibilities for permitting and permit fees for the City of Orlando ROW Permit. Question #13 in Addendum #3 addresses the Orange County ROW permit.

2. Q: Referencing the response to Question #27 in Addendum #4, the contractor is to reconstruct Lake Nona Blvd. per the restoration detail shown on sheet MOT-138. This detail indicates asphalt should be 1.5" thick, however the asphalt cores performed along Lake Nona Blvd. indicates the existing thickness is 2". Please confirm which thickness – 1.5" or 2" should pricing be based on in this area.

A: For all City of Orlando Roadways (Lake Nona Gateway Rd and Lake Nona Blvd) the Contractor is to restore the roadway per detail on sheet D-104. For all Orange County Roadways (J. Lawson Blvd and Moss Park Rd) the Contractor is to restore the roadways per detail A702 on sheet D-100.

3. Q: Referencing Question #28 in Addendum #4, the answer provided states resurfacing includes both the milled area as well as the area of Pay Item #12. In reviewing the quantity for Bid Item #11 – Milling & Resurfacing, it doesn't appear the area of Pay Item #12 was included for J. Lawson Blvd or Moss Park Road. Only the areas outside Pay Item #12 area accounted for on the G500 drawings depicting the quantities. This is contradictive to the response to question 28, thus we are looking for clarification. If the answer to question #28 is correct then the quantity for Bid Item #11 should be adjusted accordingly.

A: Disregard the answer to question #28 in Addendum #4 as denoted by strikethrough below:

~~Yes, Pay Item #11 is to include milling outside of the limits of Pay Item #12 to the limits shown on the plans. Resurfacing includes both the milled area as well as the area of Pay Item #12~~

The Contractor is to bid Pay Item #11 as the area to be resurfaced outside of Pay Item #12. Resurfacing does not include the area for Pay Item #12. Refer to revised bid schedule attached and labelled this addendum. Quantities for Bid Item #11 and #12 have been revised.

4. Q: **Bid Item #9 – Clearing and Grubbing has a bid quantity of 1 acre. Sheet G-500 shows there to be more than 1 acre of clearing identified, thus this bid item will significantly overrun. The bid quantity should be adjusted to reflect the actual quantity of clearing.**

A: Refer to revised bid schedule attached and labelled this addendum. Quantities for Bid Item # 9 have been revised.

IMPORTANT: Failure to submit your bid with the “Revised Bid Item Schedule” per this Addendum shall be cause for your bid to be rejected as non-responsive.

C. PROJECT SPECIFICATIONS

1. Add the attached Report of Subsurface Exploration and Geotechnical Engineering Evaluation prepared by Nodarse & Associates to Appendix A.
2. In Technical Specification Section 01025 1.05 Bid Item #12 section, remove SP 12.5 from paragraph b.

D. ACKNOWLEDGEMENT OF ADDENDA

1. The Bidder shall acknowledge receipt of this addendum by completing the applicable section in the solicitation or by completion of the acknowledgement information on the addendum. Either form of acknowledgement must be completed and returned not later than the date and time for receipt of proposal.
2. All other terms, conditions and specifications remain the same.

Receipt acknowledged by:

Authorized Signature

Date Signed

Title

Name of Firm

**To the Board of County Commissioners
Orange County, Florida**

The Undersigned, hereinafter called "Bidder", having visited the site of the proposed project and familiarized himself with the local conditions, nature and extent of the work, and having examined carefully the Contract Form, General Conditions, Supplementary Conditions, Plans and Specifications and other Contract Documents, with the Bond requirements herein, proposes to furnish all labor, materials, equipment and other items, facilities and services for the proper execution and completion of: **SOUTH SERVICE AREA/EAST SERVICE AREA (SSA/ESA) 36-INCH POTABLE WATER MAIN, 24-INCH RECLAIMED WATER MAIN AND J. LAWSON BLVD POTABLE WATER RE-PUMP FACILITY** in full accordance with the drawings and specifications prepared in accordance with the Contract Documents and, if awarded the Contract, to complete the said work within the time limits specified for the following ESTIMATED TOTAL BASE BID.

It is understood that this is a unit price Contract and the resultant Contract will contain estimated quantities, unit prices, extended totals and that the Estimated Total Base Bid is the sum of all pay item totals from the schedule of prices, Page D-3 through D-5.

The Contract resulting from this solicitation is based on estimated quantities. The contractor shall only be paid for materials installed in the work in accordance with the applicable unit prices for the specific work element (line item). No payment shall be made for excess materials delivered to the jobsite and not incorporated into the work. Therefore, it shall be the contractor's responsibility to determine the quantities of materials necessary to perform the project to its completion.

ESTIMATED TOTAL BASE BID:

_____ DOLLARS
(In Words)

\$ _____

In the event the Contract is awarded to this Bidder, he/she will enter into a formal written agreement with the County in accordance with the accepted bid within ten (10) calendar days after said Contract is submitted to him/her and will furnish to the County a Contract Payment and Performance Bond with good and sufficient sureties, satisfactory to the County, in the amount of 100% of the accepted bid. The Bidder further agrees that in the event of the Bidder's default or breach of any of the agreements of this proposal, the said bid deposit shall be forfeited as liquidated damages.

**IFB Y18-758-TA REVISED BID SCHEDULE
Addendum 5**

BID ITEM	REFERENCE ID	DESCRIPTION	ESTIMATED QUANTITIES	UNIT	UNIT PRICE	EXTENDED PRICE
1	10.110.110	Mobilization, Demobilization, Bonds, and Permits (not to exceed 5% of the total of all bid items 6-67)	1	LS		
2	10.130.110	Indemnification	1	LS	\$100.00	\$100.00
3	10.120.110	Preconstruction Audio-Video Documentation	1	LS		
4	10.140.110	Project Record Documents	1	LS		
5	10.150.110	Maintenance of Traffic	1	LS		
Site Work						
6	11.110.110	Erosion and Sediment Control	1	LS		
7	11.120.110	Unsuitable Materials	100	CY		
8	11.130.110	Fill Dirt	100	CY		
9	11.140.111	Clearing & Grubbing	4	AC		
Roadway						
10	11.213.110	Roadway Base	51,315	SY		
11	11.230.110	Milling and Resurfacing	<u>12,580</u>	SY		
12	11.241.110	Open Cut and Restore Asphalt Roadway	<u>51,315</u>	SY		
13	11.250.110	Concrete Driveways and Sidewalk Removal and Replacement - 4" Thick Sidewalk	47	SY		
14	11.250.110	Concrete Driveways and Sidewalk Removal and Replacement - 6" Thick Sidewalk	6,740	SY		
15	11.251.112	Construct Public Sidewalk ADA Ramp	7	EA		
16	11.260.110	Storm Pipe Removal and Replacement (15" and 18" diameter)	53	EA		
17	11.260.110	Storm Pipe Removal and Replacement (24" and 30" diameter)	8	EA		
18	11.260.110	Storm Pipe Removal and Replacement (36" and 48" diameter)	6	EA		
19	11.280.110	Remove and Replace Curbing	20,025	LF		
20	11.290.110	Sod Replacement - Bahia	11,805	SY		

21	11.291.110	Seed and Mulch	10	AC		
22	11.292.110	Tree Removal/Replacement within in ROW - Trmyr, Tree, Crepe Mrytle	29	EA		
23	11.530.110	Remove 16" Reclaimed Water Main	6,217	LF		
Driving Range Improvements						
24	11.150.111	Remove and Replace Concrete Slab and Driving Range Building	1	LS		
25	11.150.112	Removal and Replacement of Synthetic Driving Range Mat	1	LS		
26	11.150.113	Removal and Replacement or Relocation of Ancillary Equipment at Driving Range	1	LS		
27	11.150.114	Regrading and Resodding the Driving Range and Putting Green Areas	1	LS		
Water Main & Reclaimed Water Main						
29	12.110.115	Furnish & Install DIP Water Main w/fittings & RJs (20" diameter)	46	LF		
30	12.110.116	Furnish & Install DIP Water Main w/fittings & RJs (24" diameter)	330	LF		
31	12.110.118	Furnish & Install DIP Water Main w/fittings & RJs (36" diameter)	33,564	LF		
32	12.120.115	Furnish & Install DIP Reclaimed Water Main w/fittings & RJs (20" diameter)	200	LF		
33	12.120.116	Furnish & Install DIP Reclaimed Water Main w/fittings & RJs (24" diameter)	33,213	LF		
34	12.210.111	Furnish & Install Gate Valve with Box (6" diameter)	5	EA		
36	12.210.115	Furnish & Install Gate Valve with Box (16" diameter)	4	EA		
37	12.210.117	Furnish & Install Gate Valve with Box (24" diameter)	31	EA		
38	12.210.119	Furnish & Install Gate Valve with Box (36" diameter)	24	EA		
39	12.210.120	Furnish & Install Gate Valve with Motor Actuator and Box (24" diameter)	4	EA		
40	12.210.130	Furnish & Install In-Line Gate Valve with Motor Actuator (24" diameter)	1	EA		
42	12.310.117	Furnish & Install Tapping Sleeve and Valve Assembly (20" diameter)	1	EA		
43	12.310.118	Furnish & Install Tapping Sleeve and Valve Assembly (24" diameter)	2	EA		

44	12.410.118	Cut-in Connection to Existing Water Main Ends at E/W on 36"	1	EA		
45	12.510.115	Line Stop Assembly (16" diameter)	1	EA		
46	12.520.110	Air Release Valve Assembly (2" diameter)	28	EA		
47	12.530.110	Off Set Air Release Valve Assembly (2" diameter)	22	EA		
48	12.540.110	Fire Hydrant Assembly	1	EA		
49	12.610.118	Directional Drill HDPE 36" Water Main	2,046	LF		
50	12.620.116	Directional Drill HDPE 24" Reclaimed Water Main	2,043	LF		
51	12.810.110	Jack and Bore 54" Steel Casing DIP Carrier Pipe - Potable Water Main	175	LF		
52	12.820.110	Jack and Bore 42" Steel Casing DIP Carrier Pipe - Reclaimed Water Main	175	LF		
53	12.920.110	Relocation of Existing Reclaimed Water Mains (3/4" to 2")	2	EA		
54	12.920.110	Relocation of Existing Reclaimed Water Mains (4" to 12")	2	EA		
55	12.920.110	Relocation of Existing Reclaimed Water Mains (16" and greater)	3	EA		
56	12.930.110	Relocation of Existing Force Mains (4" to 12")	2	EA		
57	12.910.110	Reconnection of 4" Reclaimed Service at station 1134+40	1	EA		
58	12.910.110	Reconnection of 16" Reclaimed Service at station 1141+55	1	EA		
59	12.910.110	Reconnection of 4" Reclaimed Service at station 1138+11	1	EA		
60	12.910.110	Reconnection of 16 " Reclaimed Service at station 1143+13	2	EA		
61	12.910.110	Reconnection of 16 " Reclaimed Service at station 1160+06	1	EA		
62	12.910.110	Reconnection of 16" Reclaimed Service at station 1167+65	1	EA		
63	12.910.110	Reconnection of 4" Reclaimed Service at station 1179+98	1	EA		
64	12.910.110	Reconnection of 16" Reclaimed Service at station 1184+90	1	EA		
65	12.910.110	Reconnection of 6" Reclaimed Service at station 1191+54	1	EA		
PIPIING SUBTOTAL						
66	14.410.110	J.Lawson Blvd Potable Water Re-pump Facility	1	LS		
67	11.510.110	Grout Fill & Abandon Existing Pipe	65	LF		

TOTAL ESTIMATED BID (ITEMS 1 THROUGH 67) \$_____

Report of Subsurface Exploration and Geotechnical Engineering Evaluation

**J. Lawson Boulevard Potable Water Re-Pump Facility
Orange County, Florida**

August 4, 2011

Project No. H1105627

Prepared for:

CPH Engineers, Inc.
Orlando, Florida

Prepared by:

Nodarse & Associates
A Terracon Company
Winter Park, Florida

Offices Nationwide
Employee-Owned
nodarse.com
terracon.com



Geotechnical ■ Environmental ■ Construction Materials ■ Facilities



August 4, 2011
Project No. H1105627 (01-10-0627-101A)

Mr. David Mahler, P.E.
CPH Engineers, Inc.
1117 East Robinson Street, Suite C
Orlando, Florida 32801

Report of Subsurface Exploration and
Geotechnical Engineering Evaluation
J. Lawson Boulevard Potable Water Re-Pump Facility
Orange County, Florida

Dear Mr. Mahler:

Nodarse & Associates, Inc. (N&A) is pleased to present this report of our geotechnical engineering exploration and evaluation for the above-referenced site. The purpose of our exploration was to explore soil and groundwater conditions at the site to obtain geotechnical engineering data to assist in development at the site. This report describes the field exploration performed, the soil and groundwater conditions encountered, and our geotechnical engineering recommendations regarding the proposed development.

The following is a summary of the subsurface conditions encountered during our exploration and our recommendations regarding site development:

- Generally, soil conditions encountered in the borings were fine sand, fine sand with silt, and silty fine sand to the maximum boring termination depth of 20 feet. An exception to this generalization occurs in the borings (AB-1 and AB-2) performed within the proposed retention area, which encountered silty to clayey fine sand from a depth of about 17 feet to the boring termination depth of 20 feet.
- The soil conditions appear suitable for support of the proposed building structure on shallow foundations.
- Site preparation (including clearing, stripping, proofrolling, etc.) will be required to prepare in-situ soils for support of shallow foundations. The clearing and stripping at the site is anticipated to include removal of existing top soil, trees, major root systems, and other deleterious materials to a distance of 5 feet beyond the perimeter of construction.



Nodarse & Associates, A Terracon Company 1675 Lee Road Winter Park, FL 32789
P [407] 740 6110 F [407] 740 6112 nodarse.com terracon.com

Geotechnical



Environmental



Construction Materials



Facilities

- Groundwater was observed in the borings at depths of about 2 to 5 feet below existing grade. The normal seasonal high groundwater table is estimated to be near a depth of 0.5 to 3 feet below existing grade.

The balance of this report summarizes the field exploration and results and our geotechnical engineering recommendations regarding the proposed development.

PROJECT DESCRIPTION

The project site is located approximately 1,400 feet directly north of the J. Lawson Boulevard and Victoria Falls Drive intersection in Orange County, Florida. The proposed project consists of the construction of a building structure (masonry block construction approximately 65' x 40' in size), a stormwater pond, and associated driveway areas.

PURPOSE AND SCOPE

The purpose of our exploration was to evaluate soil and groundwater conditions at the site to provide a basis for geotechnical engineering recommendations regarding the proposed construction. For the stated purpose, the following scope of services was performed:

- Review of available pertinent information including:
 - Aerial photography.
 - USGS quadrangle maps entitled, "Pine Castle, Florida" and "St Cloud North, Florida" containing the project site.
 - USDA/SCS soil survey for Orange County, Florida.
- A field exploration including:
 - Four (4) hand auger borings to depths of 5 feet within the proposed paved driveway areas.
 - Two (2) auger borings to depths of 20 feet within the proposed retention pond area.
 - Two (2) Standard Penetration Test (SPT) borings to depths of 20 feet within the proposed building structure area.
 - Data reduction and preparation of this report.

Borings were located in the field by referencing existing site features and measuring from these features. The locations should be considered approximate and are presented on **Figure 3** in the **Appendix**.

The hand auger boring procedure consisted of manually turning a 3-inch diameter, 6-inch long sampler into the soil until it was full. The sampler was then retrieved and the soils in the sampler were visually examined and classified. This procedure was repeated until the desired termination depth was achieved. Samples of representative strata were obtained for further visual examination and classification in our laboratory. These borings were then backfilled upon completion.

The machine auger borings were performed by hydraulically turning a 4-inch diameter continuous flight auger into the ground in 5-foot increments. Additional flights were added until the desired termination depth was achieved. The auger was then extracted without further rotation and representative soil samples were retrieved from the auger. Samples were visually classified in the field and were then packaged and returned to our soils laboratory for further classification and testing. These borings were then backfilled upon completion.

Standard Penetration Tests were performed continuously in the SPT borings to a depth of 10 feet and at 5 foot depth intervals thereafter. Each sample was removed from the sampler in the field and was examined and visually classified by an Engineering Technician. Representative portions of each sample were packaged and sealed for transportation to our laboratory for further examination and visual classification. Water levels were measured in the boreholes at the time of our field exploration to evaluate the depth to groundwater. Upon completion, the boreholes were sealed with cement grout.

Located adjacent to the soil boring profiles on **Figure 4** are "N" values. These "N" values indicate the number of blows required from a 140 pound hammer to drive the split spoon sampler a distance of 12 inches into the soil. Based on empirical correlations, the "N" values can be used to indicate the relative density of cohesionless soils and consistency of cohesive soils.

SOIL CONDITIONS

Detailed soil profiles are shown on **Figure 4** in the **Appendix**. Generally, the borings encountered fine sand (SP), fine sand with silt (SP-SM), and silty fine sand (SM) from the existing ground surface to the maximum boring termination depth of 20 feet. An exception to this generalization occurs at Borings AB-1 and AB-2 where silty to clayey fine sand (SM-SC) was encountered from a depth of about 17 feet to the boring termination depth of 20 feet.

Groundwater was observed in the borings at depths of about 2 to 5 feet during our field exploration (July 2011). Groundwater levels will fluctuate with the amount of local rainfall and with site development and, therefore, may be different at other times. The estimated normal seasonal high groundwater table is expected to be at depths of about 0.5 to 3 feet below existing grade. However, changes in drainage characteristics due to site development may cause significant deviations from these anticipated estimated seasonal high groundwater levels.

LABORATORY TESTING

Moisture content and Wash Sieve No. 200 tests were performed on various samples obtained during the subsurface exploration. Also, a soil sample was obtained at the pond boring AB-1 location for laboratory permeability testing. The results of the laboratory testing are shown adjacent to the soil boring profiles on **Figure 4** in the **Appendix** at the appropriate depth from which the samples were obtained.

RECOMMENDATIONS AND EVALUATIONS

The following recommendations and evaluations are based on the project characteristics previously described, the data obtained in our field exploration and our experience with similar subsurface conditions and construction types. If the proposed development is different from that previously described, or if subsurface conditions different from those disclosed by the borings are encountered during construction, we should be notified immediately so that we might review and modify, if necessary, the following recommendations in regard to such changes.

Generally, the results of this exploration indicate that the site soils are suitable for the proposed development. The general guidelines included in this report are not intended to supersede any more stringent requirements mandated by local City or County specifications.

Building Foundation Design: Once the existing subgrade and/or new fill soils in the proposed structure areas have been prepared in accordance with the recommendations in this report, the proposed structure can be constructed on a system of conventional shallow spread or strip footings, or on a stiffened monolithic foundation/slab system bearing at minimum depths below the finished floor elevations. Footings which bear in densified existing soils or in new structural fill may be designed based on a maximum allowable bearing pressure of 2,500 pounds per square foot. Minimum footing dimensions of 24 inches should be used for strip footings even though the maximum allowable bearing pressures may not be fully developed in all cases. Footings should bear at least 18 inches below finished exterior grades. Thickened edges of a monolithic slab should bear at least 12 inches below exterior grades. Footing subgrade soils should be approved by the

Geotechnical Engineer prior to placement of concrete and steel. As a minimum acceptance criterion, the footing subgrade soils should be compacted to a minimum density of 95% of the soil's modified Proctor maximum dry density for a depth of 12 inches.

General Site Preparation: The initial step in routine site preparation should be the complete removal of all topsoil, trees, major root systems and other deleterious materials from beneath and to 5 feet beyond the structure areas. Based on the boring results, maximum stripping thicknesses are expected to be about 6 to 12 inches at this site. However, deeper stripping thickness should be anticipated where existing trees are to be removed and where root systems exist.

After this initial stripping process, the entire site should be inspected by a Geotechnical Engineer or an experienced Geotechnical Engineering Technician working under the direction of a registered Geotechnical Engineer. At that time, the site should be proofrolled using a large vibratory roller. Extreme caution should be exercised when operating vibratory equipment near existing structures. Proofrolling of the structure area should be observed by a Geotechnical Engineer or an experienced Geotechnical Engineering Technician working under the direction of a registered Geotechnical Engineer. The purposes of the proofrolling will be to detect any areas where unsuitable soils are present as well as to densify the near-surface loose soils for support of shallow foundations. Materials which yield excessively during the proofrolling should be undercut and replaced with well-compacted structural fill. The Geotechnical Engineer, based on observations at the site, can recommend the nature and extent of any remedial work. Based on our exploration, no major remedial work is anticipated at this site.

Proofrolling of the structure area should continue for the required number of passes and until the soil at a depth of 2 feet below the tank and 12 inches below the compaction surface throughout the remaining portion of the site has attained a minimum of 95% of the soil's modified Proctor maximum dry density as determined by ASTM Specification D-1557. In-place density tests should be performed by an experienced Geotechnical Engineering Technician working under the direction of a registered Geotechnical Engineer to verify the required degree of compaction. A test frequency of one (1) test per 2,500 square feet of structural area proofrolled and/or a minimum of two (2) tests within the structure area is recommended.

A minimum separation of 2 feet between the bottom of the compacted subgrade level and the groundwater level is recommended during construction and backfilling operations. A properly designed dewatering system may be required to maintain this minimum separation, depending on the time of year.

Fill Placement: After the site has been proofrolled and accepted by the Geotechnical Engineer or an experienced Geotechnical Engineering Technician working under the direction of a registered Geotechnical Engineer, fill required to bring the site to final grade may be placed and properly compacted according to the following recommendations:

- Fill should be inorganic, non-plastic, granular soil (clean sands with less than about 10% fines passing the No. 200 sieve). The fill should be placed in level lifts not to exceed 12 inches loose thickness if a large compactor is used to compact the fill. Fill should extend a minimum of 5 feet beyond building and roadway limits to prevent possible erosion or undermining of bearing soils. Fill slopes should not exceed 2 Horizontal to 1 Vertical (2H:1V).
- The fill should be compacted to a minimum of 95% of the soil's modified Proctor maximum dry density as determined by ASTM Specification D-1557. In-place density tests should be performed on each lift by an experienced Geotechnical Engineering Technician working under the direction of a registered Geotechnical Engineer to verify that the recommended degree of compaction has been achieved.
- We suggest a minimum testing frequency of one (1) test per lift per 2,500 square feet of structure area and/or a minimum of two (2) tests within the structure area.
- Fill placed in utility line trenches and adjacent to footings beneath slabs on grade should also be properly placed and compacted to the specifications stated above. However, in these restricted working areas, compaction should be accomplished with lightweight, hand-guided compaction equipment and lift thicknesses should be limited to a maximum of 4 inches loose thickness.

Temporary Dewatering: Groundwater was observed between 2 to 5 feet below existing grade. Seasonal high groundwater levels are anticipated to be about 0.5 feet below existing grade in the areas of the proposed structure. Based on this information and foundation depths, dewatering will likely be required to facilitate construction, backfilling, and compaction in the dry. Regarding dewatering, we offer the following recommendations:

- Dewatering operations at this site should be accomplished with a properly designed dewatering system operating outside the excavation limits.
- The dewatering system should be adequate to lower groundwater levels to at least 2 feet below the lowest excavation surface and keep it there during backfilling to facilitate excavations in the dry and proper compaction of bedding and backfill soils.
- The Contractor should review the boring profiles prior to implementing the dewatering system to be aware of anticipated soils.

Pavement Grading and Section Design:

Asphaltic Concrete Pavement Areas

Finished pavement grades should be set to keep the bottom of the base at least 12 to 18 inches above the seasonal high groundwater table (SHGWT), and to provide mostly a sandy subgrade. For a limerock base, a separation of 18 inches between the bottom of base and the SHGWT is recommended. For a non-limerock base (i.e. crushed concrete, soil-cement, etc.), a separation of 12 inches between the bottom of base and the SHGWT is recommended. Maintaining a sandy subgrade below a conventional pavement section is important.

Traffic loads are anticipated to consist of mostly light to normal traffic (passenger cars and light-duty trucks), but may also occasionally consist of heavy traffic (heavy-duty trucks). Based on the above information and assumptions, the minimum recommended pavement sections are as follows:

Normal Traffic Areas:

- 1.5 inches of Type S asphaltic concrete (Structural course).
- 6 inches of limerock base.
- 12 inches stabilized subgrade (40 LBR using limerock screenings for stabilization).

Heavy Traffic Areas:

- 2 inches of Type S asphaltic concrete (Structural course).
- 8 inches of limerock base.
- 12 inches stabilized subgrade (40 LBR using limerock screenings for stabilization).

For the above-described pavement sections, the road bed material should be sandy, uniform in texture, firm and compacted to at least 95 percent of the soil's modified Proctor maximum dry density to a depth of 24 inches below its surface. The pavement subgrade to a depth of at least 18 inches below the pavement base should consist of uniform, well-draining, inorganic, non-cohesive sand with less than 6 percent fines to increase drainage characteristics. The above recommended base thicknesses consider the use of a limerock base. If a non-limerock base type is considered, the base thickness should be equivalent to the above recommendations. It should be noted that a soil-cement base is typically prone to shrinkage cracking which may reflect up through the asphalt causing surface cracking and resulting in a less aesthetically-pleasing pavement.

Concrete Pavement Areas:

For concrete pavement areas, 6-inch concrete pavement (with a 28-day compressive strength of 4,000 psi) is recommended. The subgrade beneath the concrete should be well-draining sands compacted to a minimum of 98 percent of the soil’s modified Proctor to a depth of at least 24 inches. Expansion joints should be placed at normal spacing for the recommended thickness of concrete. A maximum joint spacing of 12 feet is recommended. Joints should be oriented to provide a square pattern.

Stormwater Pond: We anticipate that the proposed stormwater retention pond will be a wet pond. Borings AB-1 and AB-2 were performed in the proposed stormwater pond location at the site. A soil sample was obtained from Boring AB-1 for laboratory permeability testing.

The results of this testing is as follows:

Boring No.	Sample Depth (ft)	Stratum No. (USCS Classification)	Measured Vertical Permeability Rate (ft/day) (k_v)	Theoretical Horizontal Permeability Rate* (ft/day) (k_h)
AB-1	1 to 2	Stratum 1 (SP, SP-SM)	5	7

* Based on a transformation ratio of about 1.5.

For pond recovery/drawdown analysis, we recommend the following:

- The normal seasonal high groundwater table is estimated at a depth of about 0.5 feet.
- The top of Strata 2 and 3 soils should be considered the base of aquifer. Strata 2 and 3 were encountered in the borings at depths ranging from 13.5 to 18.5 feet.
- A fillable porosity of 25 percent.

CLOSURE

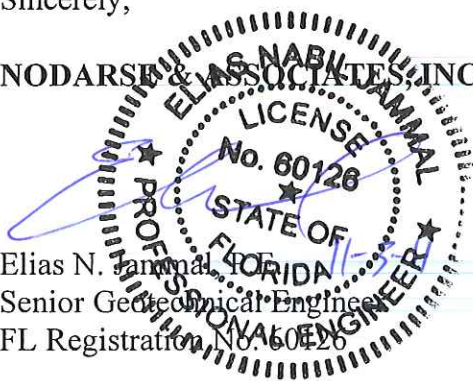
The recommendations provided above are based on widely spaced borings. This report does not reflect variations in soil conditions between or away from the boring locations. The nature and extent of the variations between the borings may not become evident until during construction. If such variations are encountered during construction, N&A should be informed and given an opportunity to re-evaluate the recommendations above after performing on-site observations during the construction period and noting the characteristics of the variations.

N&A appreciates the opportunity to be of service to you on this project and trusts this report meets your immediate needs. If you should have any questions regarding this report or if we may be of further assistance, please do not hesitate to contact the undersigned.

Sincerely,

NODARSE & ASSOCIATES, INC.

Elias N. Nodarse, P.E.
Senior Geotechnical Engineer
FL Registration No. 60126



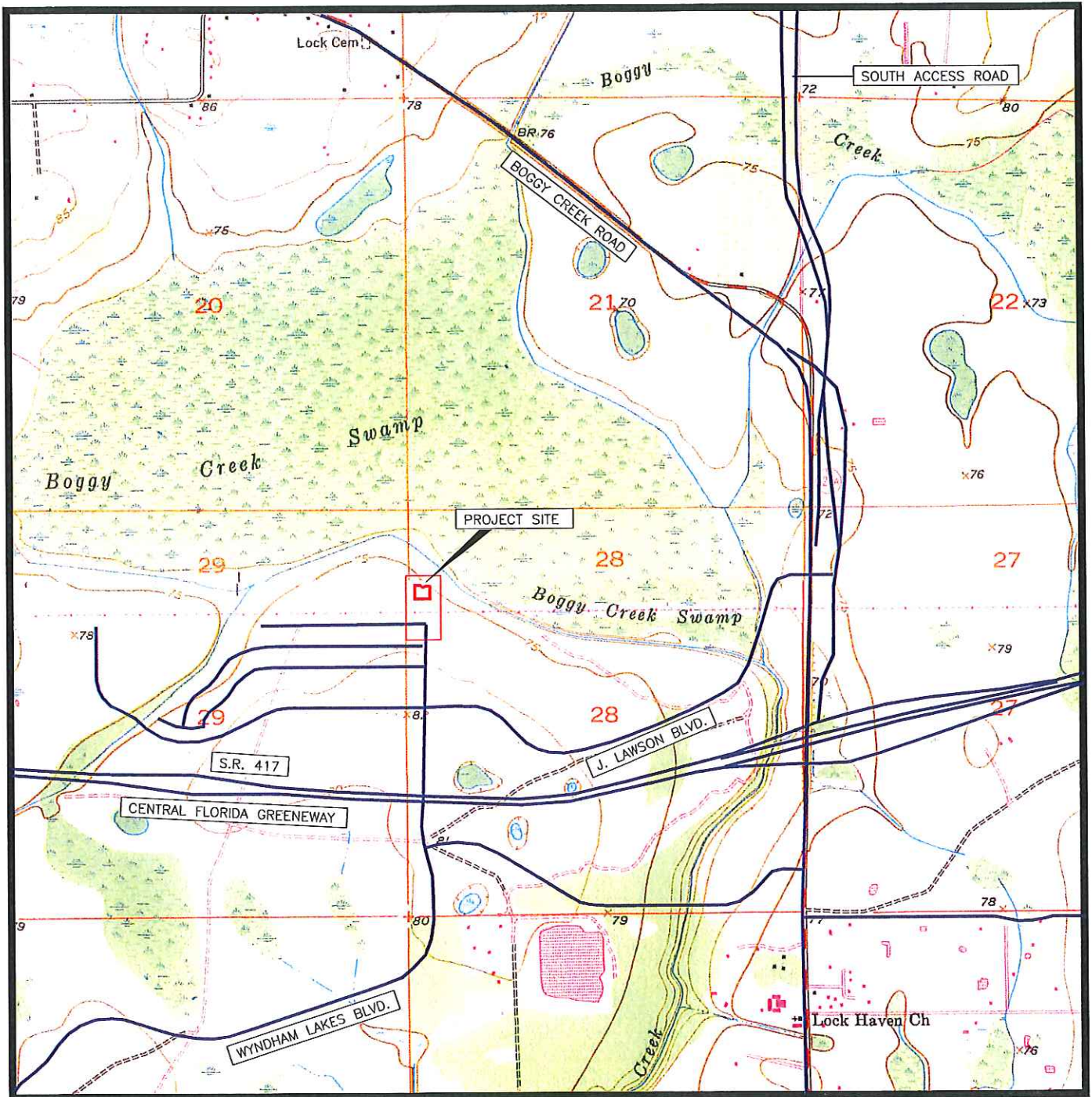
Richard D. Cree, P.E.
Regional Manager, SVP
FL Registration No. 53962



Attachments: Appendix

APPENDIX

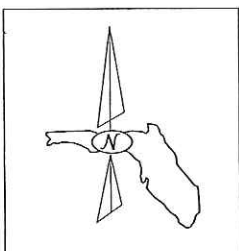
ORLANDO INTERNATIONAL AIRPORT



REFERENCE: U.S.G.S. "PINECASTLE, FLORIDA" QUADRANGLE MAP
 U.S.G.S. "ST. CLOUD NORTH, FLORIDA" QUADRANGLE MAP

ISSUED: 1953 REVISED: 1980
 ISSUED: 1953 REVISED: 1987

SECTION: 28
 TOWNSHIP: 24 SOUTH
 RANGE: 30 EAST
 SCALE: 1" = 2000'

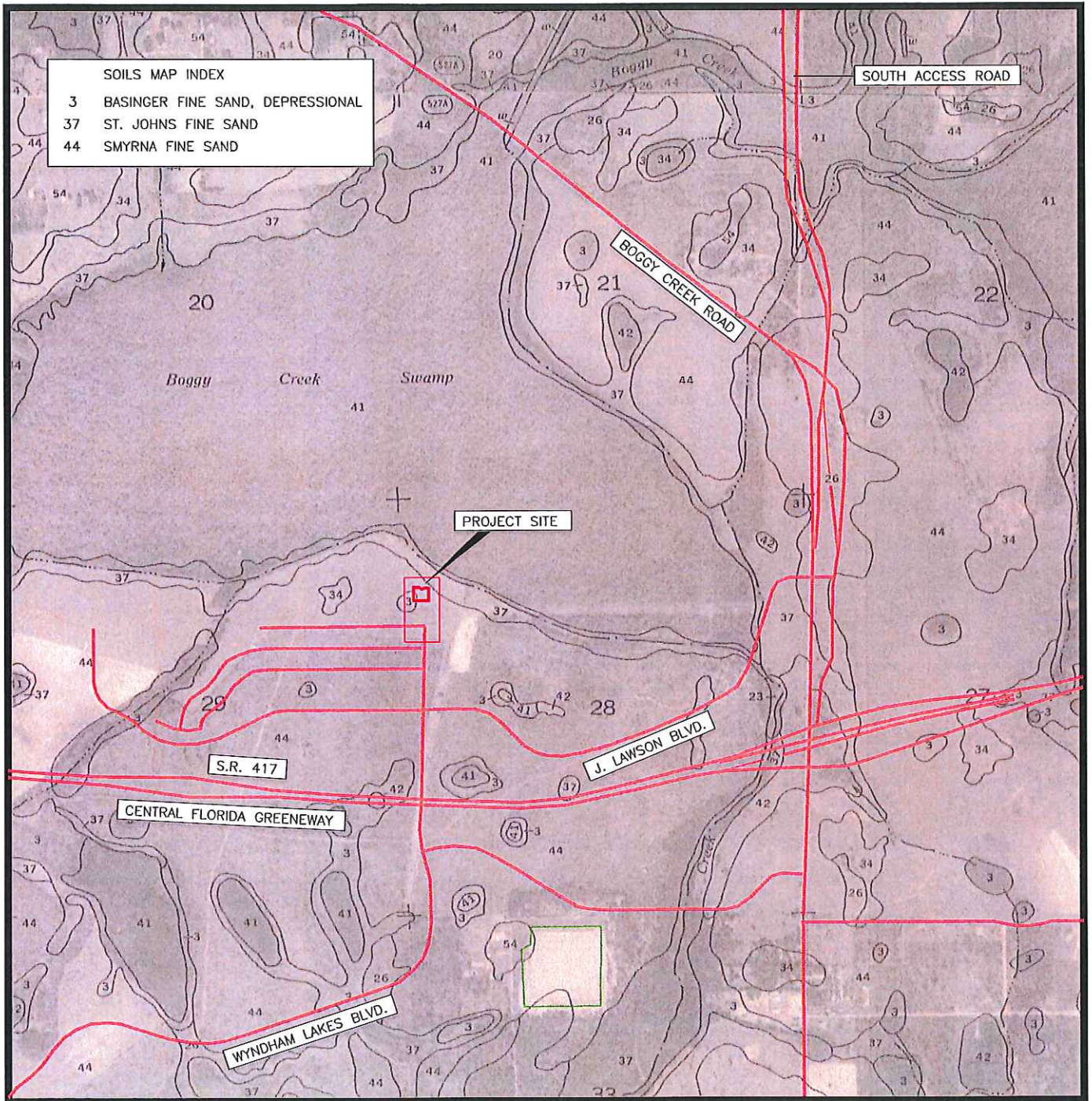


U.S.G.S. VICINITY MAP
 J. LAWSON BOULEVARD
 POTABLE WATER RE-PUMP FACILITY
 ORANGE COUNTY, FLORIDA

DRAWN: SW
 CHKD: EJ
 SCALE: NOTED
 DATE: 7-26-11



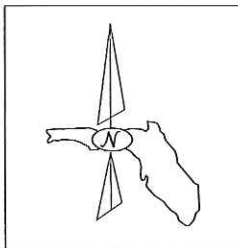
PROJ. No. 01-10-0627-101A FIGURE: 1



REFERENCE: U.S.D.A. SOIL SURVEY FOR ORANGE COUNTY, FLORIDA

ISSUED: 1989

SECTION: 28
 TOWNSHIP: 24 SOUTH
 RANGE: 30 EAST
 SCALE: 1" = 2000'



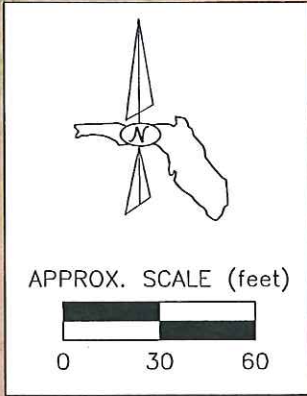
U.S.D.A. SOILS MAP
 J. LAWSON BOULEVARD
 POTABLE WATER RE-PUMP FACILITY
 ORANGE COUNTY, FLORIDA




DRAWN: SW
 CHKD: EJ
 SCALE: NOTED
 DATE: 7-26-11

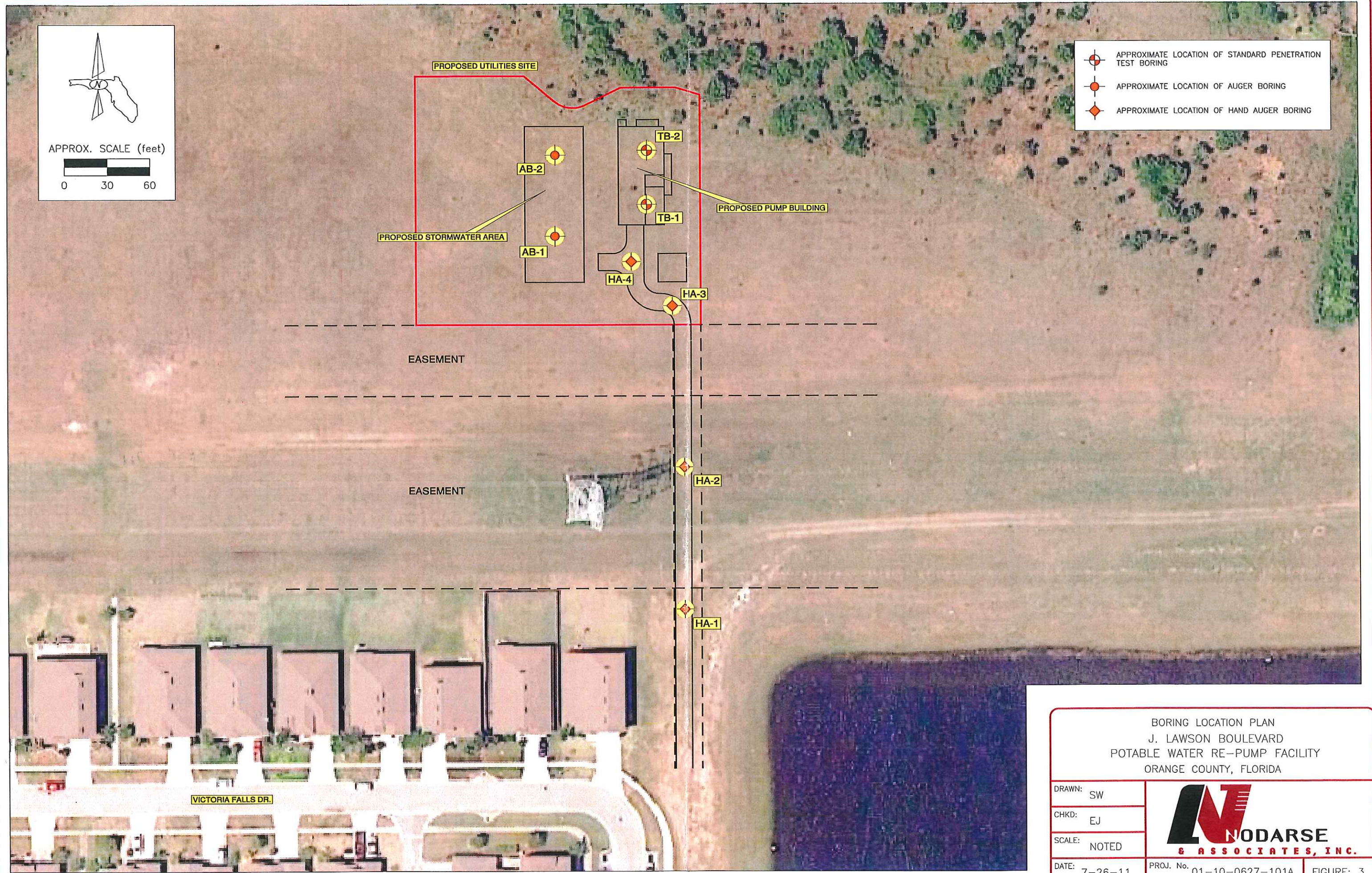


PROJ. No. 01-10-0627-101A

FIGURE: 2



-  APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING
-  APPROXIMATE LOCATION OF AUGER BORING
-  APPROXIMATE LOCATION OF HAND AUGER BORING



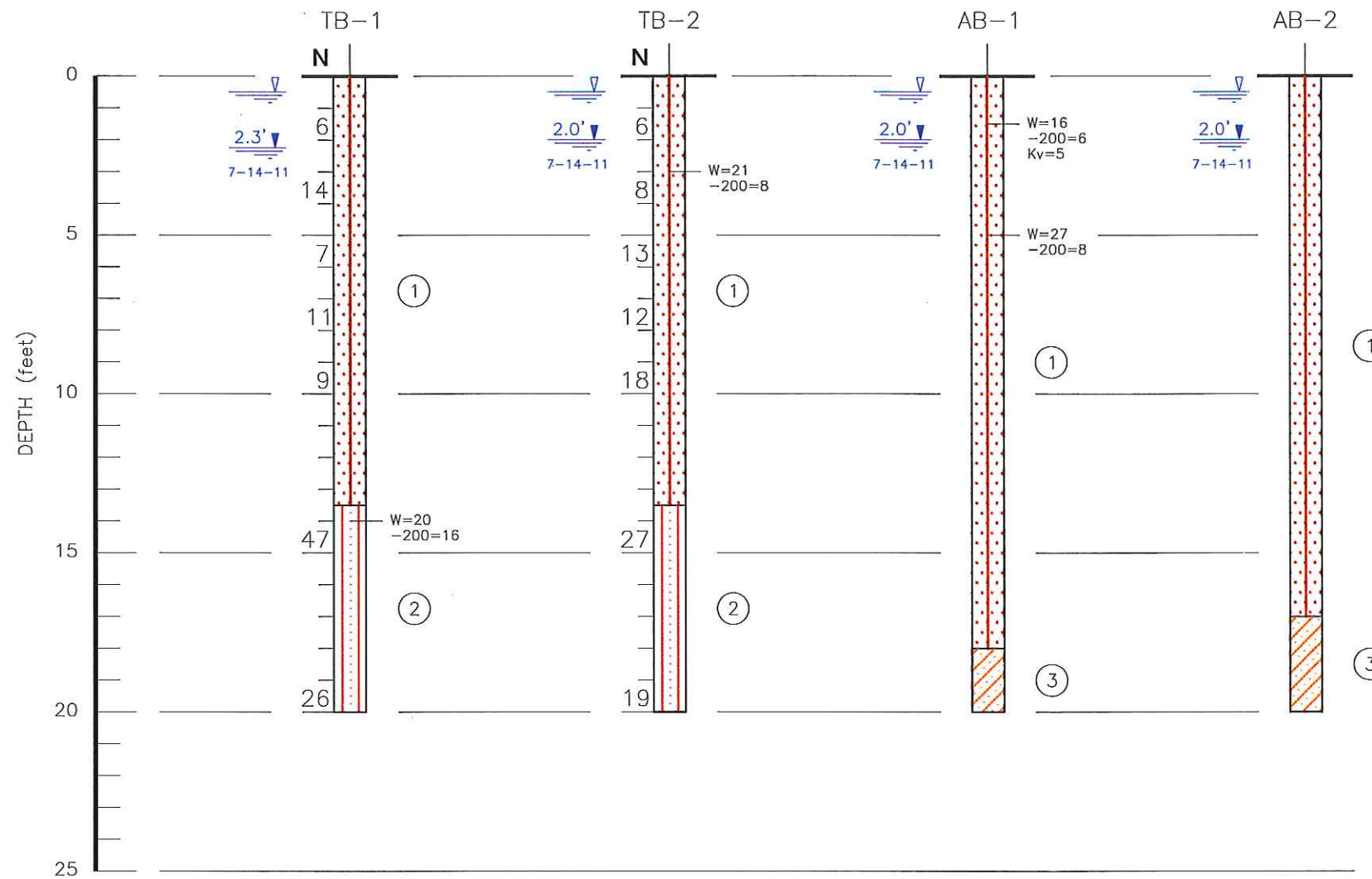
BORING LOCATION PLAN
 J. LAWSON BOULEVARD
 POTABLE WATER RE-PUMP FACILITY
 ORANGE COUNTY, FLORIDA

DRAWN: SW
 CHKD: EJ
 SCALE: NOTED
 DATE: 7-26-11

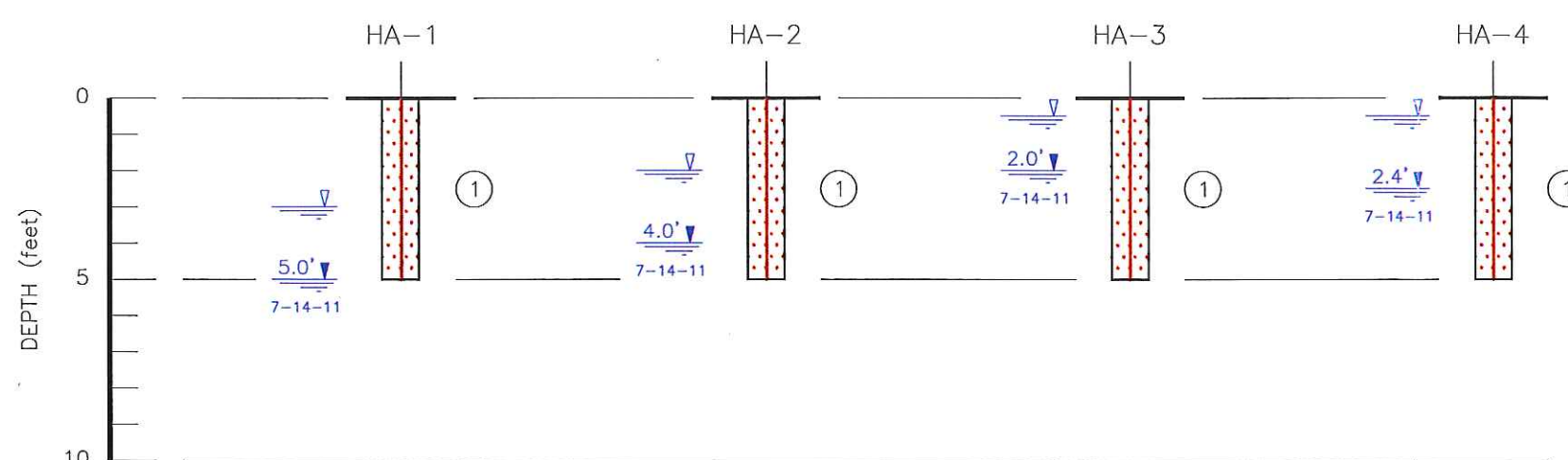


PROJ. No. 01-10-0627-101A FIGURE: 3

Jul26, 2011-4:14pm



- LEGEND
- ① GRAY TO DARK BROWN FINE SAND TO FINE SAND WITH SILT (SP)(SP-SM)
 - ② DARK BROWN SILTY FINE SAND (SM)
 - ③ BROWN SILTY TO CLAYEY FINE SAND (SM-SC)
 - (SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL
 - 2.0' 7-14-11 OBSERVED GROUNDWATER LEVEL (feet) DATE NOTED
 - ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL
 - N** STANDARD PENETRATION TEST BORING RESISTANCE REPORTED AS BLOWS PER FOOT
 - W** NATURAL MOISTURE CONTENT (%)
 - 200** FINES PASSING No. 200 SIEVE (%)
 - Kv** VERTICAL PERMEABILITY (feet/day)



SOIL BORING PROFILES
 J. LAWSON BOULEVARD
 POTABLE WATER RE-PUMP FACILITY
 ORANGE COUNTY, FLORIDA

DRAWN:	SW	
CHKD:	EJ	
SCALE:	NOTED	
DATE:	7-26-11	
PROJ. No. 01-10-0627-101A		FIGURE: 4

Jul26, 2011-4:14pm