Andreyev Engineering, Inc.

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▼ Groundwater ▼ Environmental ▼ Geotechnical ▼ Construction Materials Testing

July 30, 2015
Revised December 16, 2015
Project No. CPGT-15-0095

To: Traderscove Corp d/b/a HENIN Group
2300 Lee Road
Winter Park, Florida 32789

Attention: Mr. Jerome Henin, President

Subject: Report of Geotechnical Engineering Services
Riviera Bella East Subdivision
DeBary, Volusia County, Florida

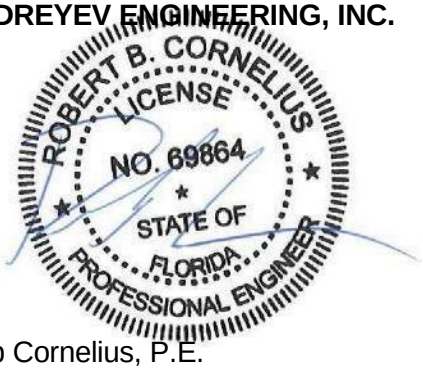
Dear Mr. Henin:

Pursuant to your request and authorization, Andreyev Engineering, Inc. (AEI) has completed a geotechnical engineering study in connection with the proposed Riviera Bella East Subdivision located in DeBary, Volusia County, Florida.

This report includes the results of exploratory borings drilled within the proposed roadways and stormwater retention pond areas, engineering evaluations, and recommendations for pavement design, stormwater management design, and proper site preparation prior to construction.

We appreciate the opportunity to provide our services on this project and trust that the information presented in this report is sufficient for design purposes. Should you have any questions concerning this report please feel free to contact the undersigned at 352-241-0508

Sincerely,
ANDREYEV ENGINEERING, INC.



Rob Cornelius, P.E.
Branch Manager
Florida Registration No.: 69864

Cc: Mr. Gary Beverly; B & S Engineering Consultants, LLC

1.0 PURPOSE AND SCOPE

This study was performed to obtain information about the general subsurface conditions within the subject site in order to form an opinion of the soil stratigraphy and develop estimates of geotechnical properties. Based on the data obtained, recommendations for each of the following were formulated:

1. Soil stratigraphy at the boring locations.

2. Provide recommendations for pavement section design.

3. Provide recommendations for stormwater management design.

4. Suitability of the on-site soils for use as fill material for grading of the planned development.

5. Provide structural fill, placement, compaction and construction quality control recommendations. Provide engineering criteria for the placement and compaction of approved fill materials.

Our work for this study involved coordination of field activities, drilling soil borings, visual classification of collected soil samples, measuring groundwater levels, performing laboratory tests, geotechnical engineering evaluations, and report preparation. Specifically, the work included the following:

1. Carried out a subsurface exploration program consisting of thirty-four (34) auger borings drilled to depths ranging from 6 to 20 feet below existing grades within the proposed roadway and stormwater retention pond areas. These borings are designated as RB-1 through RB-25 (roadway borings) and PB-1 through PB-9 (pond borings).

2. Performed a series of shallow hand auger borings within the four designated wetland areas to determine the approximate depth of surficial organic soil deposits.

3. Collected and packaged representative soil samples and returned them to our laboratory facility for evaluation and testing. We also collected four (4) relatively undisturbed tube samples of the shallow soils within the proposed pond areas. Laboratory falling head permeability tests were performed on these samples.

4. Measured the depth to groundwater at each of the roadway and pond boring locations.

5. Visually classified the collected soil samples in the laboratory according to the Unified Soil Classification System (USCS). The laboratory testing program

consisted of performing forty-six (46) Pass No. 200 sieve tests and four (4) falling head permeability tests. The permeability tests were performed on the tube samples collected at auger boring locations PB-1, PB-4, PB-5 and PB-8

6. Performed geotechnical engineering evaluations and analyses to develop recommendations as previously described.

7. Prepared this engineering report describing the results of our findings together with our geotechnical engineering evaluations and recommendations in each of the above areas.

2.0 SITE LOCATION AND PROJECT DESCRIPTION

The subject site is located on the east side of Fort Florida Road in DeBary, Volusia County, Florida (Sections 6 and 31, Township 18 South, and Range 29 East). The USGS Topographic Map depicting the site location is presented as **Figure 1**.

According to the information provided to us, it is our understanding that the site encompasses an area of 64 acres and will be developed into a single-family home residential community. The proposed development will include roadways, stormwater retention ponds, and associated underground utilities. The project will also include widening/reconstructing Fort Florida Road along an approximate 1,500 lineal feet length.

The site consists of undeveloped land. The surface conditions consist primarily of wooded land with associated underbrush. The property contains four (4) wetland areas. An earthen dam exists to the east side of the property. This dam is associated with the man-made Komomac Lake. Details of the lake/dam such as design high water, geometry, seepage barrier etc. are not known.

3.0 REVIEW OF PUBLISHED LITERATURE

3.1 U.S.G.S. Topographic Map

Referencing the data presented on the U.S.G.S. Topographic Map (**refer to Figure 1)**, the natural ground surface elevation of the site ranges from approximately 15 to 20 feet NGVD. In general, the ground surface is relatively flat with no significant topographical relief. There are several closed topographic features mapped in the central and northern portions of the site. These features are the previously indicated wetland areas.

3.2 N.R.C.S. Soil Survey Map

Details of the near surface soil groups present at the site and vicinity are summarized in the N.R.C.S. Soil Survey of Volusia County, Florida. This map is presented as **Figure 2** in the Appendix. There are two (2) soil map units identified within the subject site. General information regarding the mapped soil units for the project site is provided in the following table.

Soil Unit #	Name	High Water Table Depth (feet)	General Soil Profile
23	Farmton Fine Sand	0 to -1.0	0-50" Sand, Fine Sand 50-80" Fine Sandy Loam, Sandy Loam, Sandy Clay Loam
29	Immokalee Sand	0 to -1.0	0-85" Sand, Fine Sand

The vast majority of the site is mapped as #23 Farmton Fine Sand.

4.0 SUBSURFACE EXPLORATION PROGRAM

The subsurface exploration program included drilling twenty-five (25) auger borings within the proposed roadway areas. These borings are designated as RB-1 through RB-25. Nine (9) auger borings (PB-1 through PB-9) were drilled within the proposed stormwater retention ponds. Additionally, we drilled a series of shallow hand auger borings within the wetland areas to determine the approximate thickness of surficial organic soil deposits. The roadway and retention pond borings were drilled to depths ranging from 6 to 20 feet below grade.

The locations where the roadway and retention pond borings were drilled are shown on the attached **Figure 3**. The roadway and retention pond borings were surveyed by representatives of PEC Surveying and Mapping, LLC. The locations where the shallow hand auger borings were drilled in the wetland areas are illustrated on the attached **Figures 6 through 8**. Survey control was not provided for these locations. The locations were determined in the field using a hand held GPS unit.

The recovered soil samples were visually classified in the field with representative portions of the samples placed in jars and transported to our office for review and classification by the geotechnical engineer.

5.0 SUBSURFACE CONDITIONS

5.1 Generalized Soil Conditions

The results of our subsurface exploration program including the stratification profiles and groundwater levels are graphically presented on the attached **Figures 4 and 5.** Soil stratification is based on review of recovered soil samples and interpretation of field boring logs by a geotechnical engineer. The stratification lines represent the approximate boundaries between soil types. The actual transition may be gradual. Minor variations not considered important to our engineering evaluations may have been abbreviated or omitted for clarity.

The soils encountered consist of slightly silty fine sand, silty fine sand, slightly clayey fine sand and clayey fine sand. At several boring locations, we encountered shallow surficial deposits of muck and sand with organics/roots. Please refer to the attached **Figures 4 and 5** (soil profiles) for specific boring data.

The shallow hand auger borings performed within the four (4) wetland areas encountered surficial deposits of organic soil ranging from 0.3 to 1.5 feet thick. The results of these findings are illustrated on the attached **Figures 6 through 8**.

5.2 Groundwater Levels

At the time of our field investigation (June/July 2015), the groundwater table was encountered at depths ranging from approximately 0.5 to 4.1 feet below the existing grades. Fluctuation of the groundwater table should be anticipated throughout the year due to variations in seasonal rainfall. Based on the time of year, the encountered groundwater levels, the amount of rainfall received to date, and review of the Soil Survey data, we estimate that the normal wet season high groundwater table will range from ground surface to a depth of about 1.5 feet below existing grade at the roadway/pond boring locations. Standing water is expected to occur in the wetland areas during the rainy season.

The following table summarizes the measured groundwater levels together with our estimated normal wet season high groundwater elevations.

Boring No.	Ground Surface Elevation (feet, NGVD29)	Encountered Depth to Groundwater (feet)	Encountered Groundwater Elevation (feet, NGVD29)	Estimated Normal Wet Season High Groundwater Elevation (feet, NGVD29)
RB-1	19.7	1.9	17.8	19.2
RB-2	18.8	1.8	17.0	18.3
RB-3	17.6	2.3	15.3	17.1
RB-4	16.3	2.3	14.0	15.8
RB-5	16.3	2.8	13.5	15.3
RB-6	14.6	2.1	12.5	14.6
RB-7	16.0	3.3	12.7	15.0
RB-8	15.9	2.2	13.7	15.9
RB-9	17.0	2.9	14.1	16.0
RB-10	18.1	2.3	15.8	17.6
RB-11	19.6	2.0	17.6	19.1
RB-12	20.5	2.9	17.6	19.5
RB-13	18.7	4.1	14.6	17.7
RB-14	18.5	2.0	16.5	18.5
RB-15	20.7	3.0	17.7	19.7
RB-16	17.8	1.0	16.8	17.8
RB-17	19.8	2.5	17.3	18.8

RB-18	19.7	2.6	17.1	18.7
RB-19	20.4	2.5	17.9	19.4
RB-20	20.5	2.5	18.0	20.0
RB-21	20.7	3.1	17.6	19.7
RB-22	20.3	3.4	16.9	18.8
RB-23	20.6	3.3	17.3	19.1
RB-24	20.7	3.4	17.3	19.2
RB-25	20.4	2.0	18.4	19.9
PB-1	20.3	3.0	17.3	19.3
PB-2	20.6	3.0	17.6	19.6
PB-3	20.0	3.0	17.0	19.5
PB-4	21.0	3.3	17.7	20.0
PB-5	20.1	2.9	17.2	19.1
PB-6	19.5	2.6	16.9	19.0
PB-7	17.6	2.0	15.6	17.6
PB-8	17.1	1.4	15.7	17.1
PB-9	Not Surveyed	0.5	---	Ground Surface

5.3 Laboratory Testing

The recovered soil samples were visually classified and stratified in the laboratory by a geotechnical engineer using the Unified Soil Classification System (USCS). The soil classifications are presented on the attached **Figures 4 and 5**.

The laboratory testing program consisted of performing forty-six (46) Pass No. 200 sieve analysis and four (4) falling head permeability tests. The results of the tests are shown next to the soil profiles on **Figures 4 and 5**.

6.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

6.1 General

Based on the results of our field investigations and laboratory testing programs, the main constraints for the planned development from a geotechnical perspective are the high groundwater table conditions and poor drainage characteristics of some of the soil types that were encountered (silty/clayey sands). The organic soil deposits in the wetland areas are relatively shallow and are not expected to pose a major constraint for the site development.

Design and planning of the proposed development will need to take into account the estimated normal wet season high groundwater table conditions. The bottom of building floor slabs and pavement base material (limerock/crushed concrete base) should be set a minimum of 2 feet above the seasonal high groundwater table. For a soil cement pavement base material, the minimum separation should not be less than 1 foot.

The majority of the near surface soils encountered consist of slightly silty fine sand (Strata 1 and 9 soils). These soils were encountered within the upper 2 to 6 feet of the soil column. The percent passing the No. 200 sieve for these soil types ranged from 6.1 to 12.0 percent. These soil types that are excavated during earthwork activities will be suitable for structural fill provided that the fines content does not exceed 12 percent. Any soils excavated from below the groundwater table will require air drying prior to placement/compaction. The deeper soils consist primarily of silty and clayey fine sand. These soils are difficult to work with as they are susceptible to moisture related instability due to their high fines content. Accordingly, these type soils are not considered a good fill source. If the contractor elects to use these type soils as fill, we recommend that they not be used in the upper 2 feet of fill areas. Any highly plastic clayey soils shall not be used as fill. We recommend that on site and imported materials be tested prior to placement to verify that they are suitable for use during earthwork operations and meet the project specifications. All organic soils and root laden soils shall be removed and not used as fill. Organic soils may be suitable for surface cover in landscape areas. Highly organic soils may need to be blended with sand for this application. The suitability of the organic soils for use in landscape areas should be verified by the landscape architect.

Wet bottom retention pond design will be suitable for the planned retention ponds. Dry bottom retention ponds will require site filling and possibly the use of underdrains to artificially recover stormwater.

Temporary dewatering should be anticipated during excavation activities at this site. The groundwater table should be controlled at least 2 feet below excavation and compaction surfaces.

The following sections of this report provide our recommendations for pavement design, stormwater retention pond design, and site preparation.

6.2 Pavement Design Considerations

The results of the auger borings performed within the proposed roadways revealed subsurface conditions that are suitable for support of either flexible (limerock) or semi-flexible (soil-cement) pavement structures.

For a flexible pavement section, we recommend that the limerock base thickness be a minimum of 6 inches within parking areas and at least 8 inches where there will be heavy traffic. The limerock base materials should have a minimum Limerock Bearing Ratio (LBR) of 100 and be compacted to at least 98 percent of the Modified proctor maximum dry density per ASTM D-1557. The base course should be underlain by at least 12 inches of stabilized sub-base for both light and heavy duty pavement sections having an LBR of at least 40 and compacted to a minimum of 98 percent of the Modified proctor.

In lieu of using a limerock base material for flexible pavement structure, consideration can be given to using a crushed concrete base material. The crushed concrete base material should have a minimum Limerock Bearing Ratio (LBR) of 120 and be compacted to at least 98 percent

of the Modified proctor maximum dry density per ASTM D-1557. The crushed concrete material should meet FDOT specifications. The base course should be underlain by at least 12 inches of stabilized sub-base for both light and heavy duty pavement sections having an LBR of at least 40 and compacted to a minimum of 98 percent of the Modified proctor. The thickness for light and heavy duty areas shall be the same as the limerock base thicknesses provided above.

If a soil-cement base material is used, the thickness for light and heavy duty areas shall be the same as the limerock base thicknesses provided above. For this type of pavement section, a stabilized sub-base is not recommended. The sub-grade soils to a depth of at least 12 inches below the bottom of the base should consist of well draining fine sand with less than 7 percent passing the No. 200 sieve and should be compacted to a minimum of 98 percent of the Modified proctor maximum dry density to a depth of at least 12 inches below the base course. The soil-cement base course should be compacted to a minimum of 98 percent of the Standard proctor density per AASHTO T-134. Please note that soil-cement pavements are susceptible to cracking as a result of shrinkage and are typically used only when there are high groundwater table conditions. Soil cement is the least desirable type of pavement structure from an aesthetic and performance point of view.

The asphaltic concrete wearing surface should be Type S and should have a minimum thickness of 1.5 inches in light duty areas and 2 inches in heavy duty areas. The asphaltic concrete should be rolled to achieve a minimum density of 93 percent of the laboratory density as determined by the Marshall Stability test method.

The recommended pavement thicknesses presented herein are minimum thicknesses typical of local construction practices. Actual pavement section thicknesses should be designed by the project civil engineer based on traffic loads, volumes and the selected design life. All pavement materials should conform to the requirements of FDOT, American Concrete Institute (ACI) and county requirements.

6.3 Fill Placement and Subgrade Preparation

The following are our recommendations for overall site preparation and mechanical densification work, based on the anticipated construction and our test boring results. These recommendations should be incorporated into the project general specifications prepared by the Design Engineer.

1. The proposed construction areas should be stripped and cleared of trees, surface vegetation, topsoil, root laden soils, debris, and any deleterious materials. All organic soils shall be excavated from the proposed construction areas. A representative from our firm should observe the exposed subgrade to verify an adequate depth of stripping and that all organic soils are removed in their entirety.

2. The exposed subgrade should be leveled sufficiently to permit equipment traffic, and then proof-rolled. Careful observations should be made during proof-rolling of the subgrade soils to identify any areas of soft yielding soils that may require over-excavation and replacement. The groundwater table should be controlled at least 2 feet below excavation and compaction surfaces.

3. Compaction should continue until a minimum density requirement of 95% of the maximum modified Proctor dry density established in accordance with ASTM D-1557, is achieved for a minimum depth of 1 foot below the exposed subgrade as determined by field density (compaction) tests.

4. Following satisfactory completion of the initial compaction of the exposed subgrade soils at the specified minimum depth, the areas may be brought up to finished subgrade levels. Fill should consist of fine sand with less than 12% passing the No. 200 sieve, free of rubble, organics, clay, debris and other unsuitable materials. Fill materials should be tested and approved prior to acquisition. Approved sand fill should be placed in loose lifts not exceeding 12 inches in thickness and should be compacted to a minimum of 95% of the maximum modified Proctor dry density (ASTM D-1557). Density tests to confirm compaction should be performed in each fill lift before the next lift is placed.

5. In-place density tests should be performed at a minimum frequency of one test per 5,000 square feet for a depth of 1 foot below exposed subgrade and for each 1-foot lift of placed fill.

6. Earthwork operations should take place under the full-time observation of a representative from Andreyev Engineering, Inc.

6.4 Stormwater Management System Recommendations

The following table summarizes our recommended parameters for design of the proposed stormwater retention ponds.

Dry Ponds (Borings PB-1, PB-4, PB-5, PB-8)

Boring No.	Bottom of Aquifer Elevation (feet)	Unsaturated Vertical Hydraulic Conductivity (ft./day)	Horizontal Hydraulic Conductivity (ft./day)	Normal Wet Season High Groundwater Table Elevation (feet)	Soil Storage Coefficient
PB-1	14.3	6	13	19.3	0.10
PB-4	15.0	7	16	20.0	0.10
PB-5	14.1	5	12	19.1	0.10
PB-8	9.1	7	16	17.1	0.10

Wet Ponds (Borings PB-2, PB-3, PB-6, PB-7, PB-9)

Boring No.	Normal Dry Season Low Groundwater Table Elevation (feet)	Normal Wet Season High Groundwater Table Elevation (feet)
PB-2	16.1	19.6
PB-3	15.5	19.5
PB-6	15.5	19.0
PB-7	14.1	17.6
PB-9	3.5 feet below existing grade	Ground Surface

6.5 Fill Suitability

The results of our borings indicate that the Strata 1 and 9 soils (slightly silty fine sand) are suitable for structural fill and general backfill provided that they are free of roots, organic matter, deleterious materials, and have a maximum fines (Pass No. 200 sieve) content of 12 percent. The silty and clayey soils (SM and SC materials) are not considered a good source of fill as they are inherently susceptible to moisture related compaction problems and have poor drainage characteristics. If the contractor elects to use these type soils as fill, we recommend that they not be used in the upper 2 feet of fill areas. Any highly plastic clayey soils shall not be used as fill. The clayey soils may be suitable for use as a stabilizing material for pavement subbase (flexible pavement section) or for pond berm design provided that they are properly compacted. The Strata 11 and 13 soils are not a suitable fill source due to their high organic content. However, those soils may be suitable for use in green areas.

6.6 Pipe Bedding

Trench excavation bottoms should be graded to provide a positive contact with the contour of the utility pipe to ensure uniform bedding for the full length of all pipes. Soft materials found in the trench excavation bottom should be removed and replaced with granular fill.

If required for stabilization purposes in localized areas, the bedding material should consist of crushed stone or No. 57 stone with not less than 95 percent passing the ½ inch sieve and not less than 95 percent retained on a U.S. Standard No. 4 sieve. It should be placed in 6-inch layers and compacted with hand held equipment.

6.7 Excavations

All excavations should be constructed in accordance with applicable local, state and federal regulations including those outlined by the Occupational Safety and Health Administration (OSHA). It is the contractor's sole responsibility for designing and constructing safe and stable excavations. Excavations should be sloped, benched or braced as required to maintain stability of the excavation sides and bottoms. Excavations should take into account loads resulting from equipment, fill stockpiles and existing construction. Any shoring needed to maintain a safe excavation should be designed by a professional engineer registered in the State of Florida in accordance with local, state and federal guidelines.

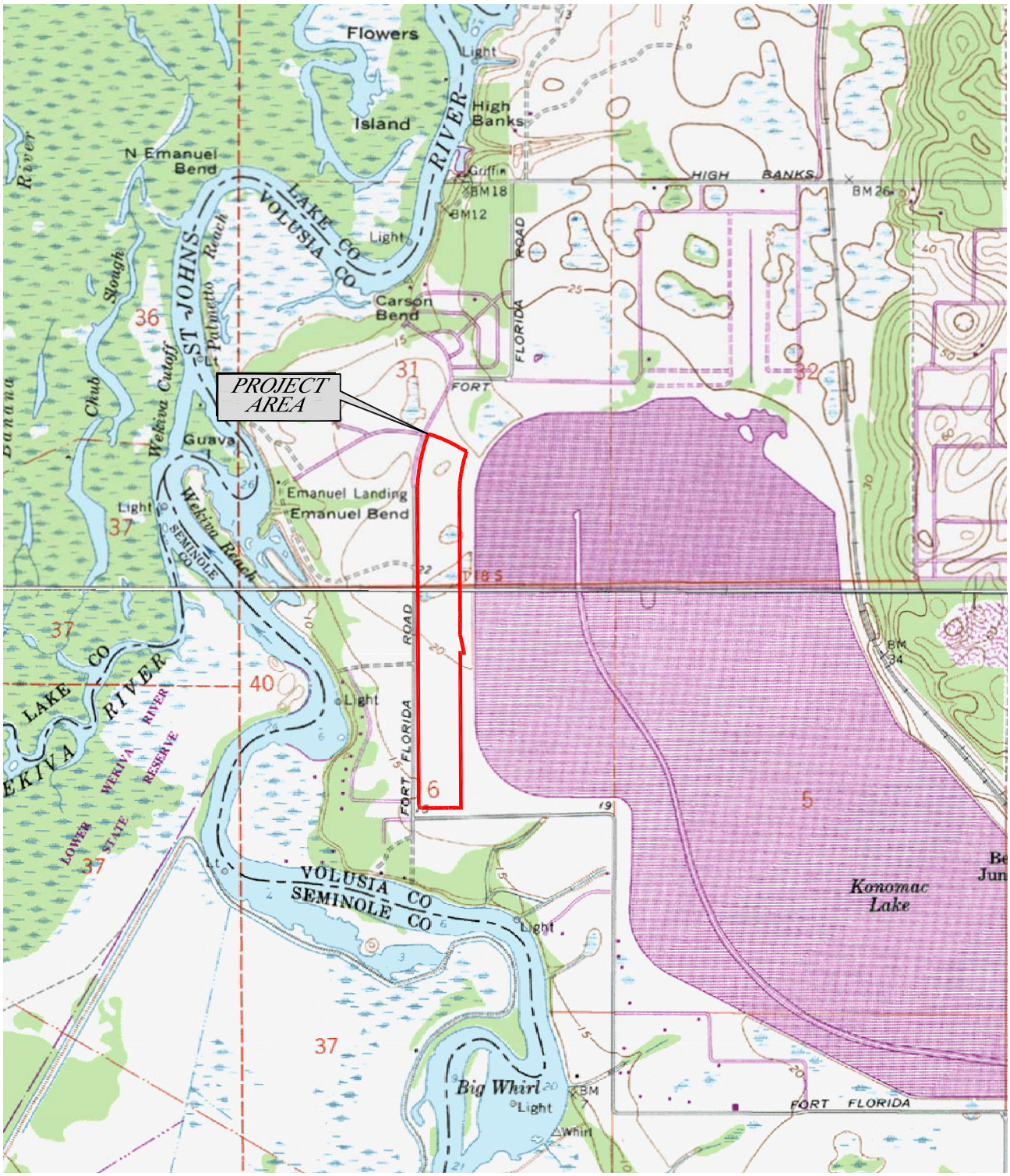
7.0 GENERAL CONDITIONS

This report has been prepared for the exclusive use of HENIN Group and its designers, based on our understanding of the project as stated in the section entitled "Site Location and Project Description". The recommendations presented in this report have been prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, expressed or implied, is made as to the professional advice presented herein.

8.0 LIMITATIONS OF REPORT

The analyses and recommendations submitted in this report are based upon the anticipated location and type of construction discussed herein and the data obtained from the soil borings performed at the locations indicated, and does not reflect any variations which may occur beyond these borings. If any variations become evident during the course of construction, or if the site development plans change, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe and evaluate the characteristics of the conditions encountered. When final design plans and specifications are available, a general review by our office is strongly recommended as a means to check that the assumptions made in preparation of this report are correct, and that earthwork recommendations are properly interpreted and implemented.

FIGURES



REFERENCE:
U.S.G.S. ORANGE CITY, FLA.
QUADRANGLE MAP
DATED 1964
PHOTOREVISED 1980
AND
U.S.G.S. ORANGE CITY, FLA.
QUADRANGLE MAP
DATED 1965
PHOTOREVISED 1988

SECTIONS 6 & 31
TOWNSHIP 18 SOUTH
RANGE 29 EAST

Andreyev Engineering, Inc.

APPROXIMATE SCALE:	DATE: 06/22/15	ENGINEER: EM
1"=2000'	PN: CPGT-15-0095	DRAWN BY: DLS

GEOTECHNICAL ENGINEERING SERVICES
RIVIERA BELLA EAST SUBDIVISION
FORT FLORIDA ROAD
DEBARY, VOLUSIA COUNTY, FL

U.S.G.S. TOPOGRAPHIC MAP

FIGURE 1

REFERENCE:
N.R.C.S. WEB SOIL SURVEY
DATA OBTAINED 6/22/2015

LEGEND:

23 FARMTON FINE SAND
29 IMMOKALEE SAND

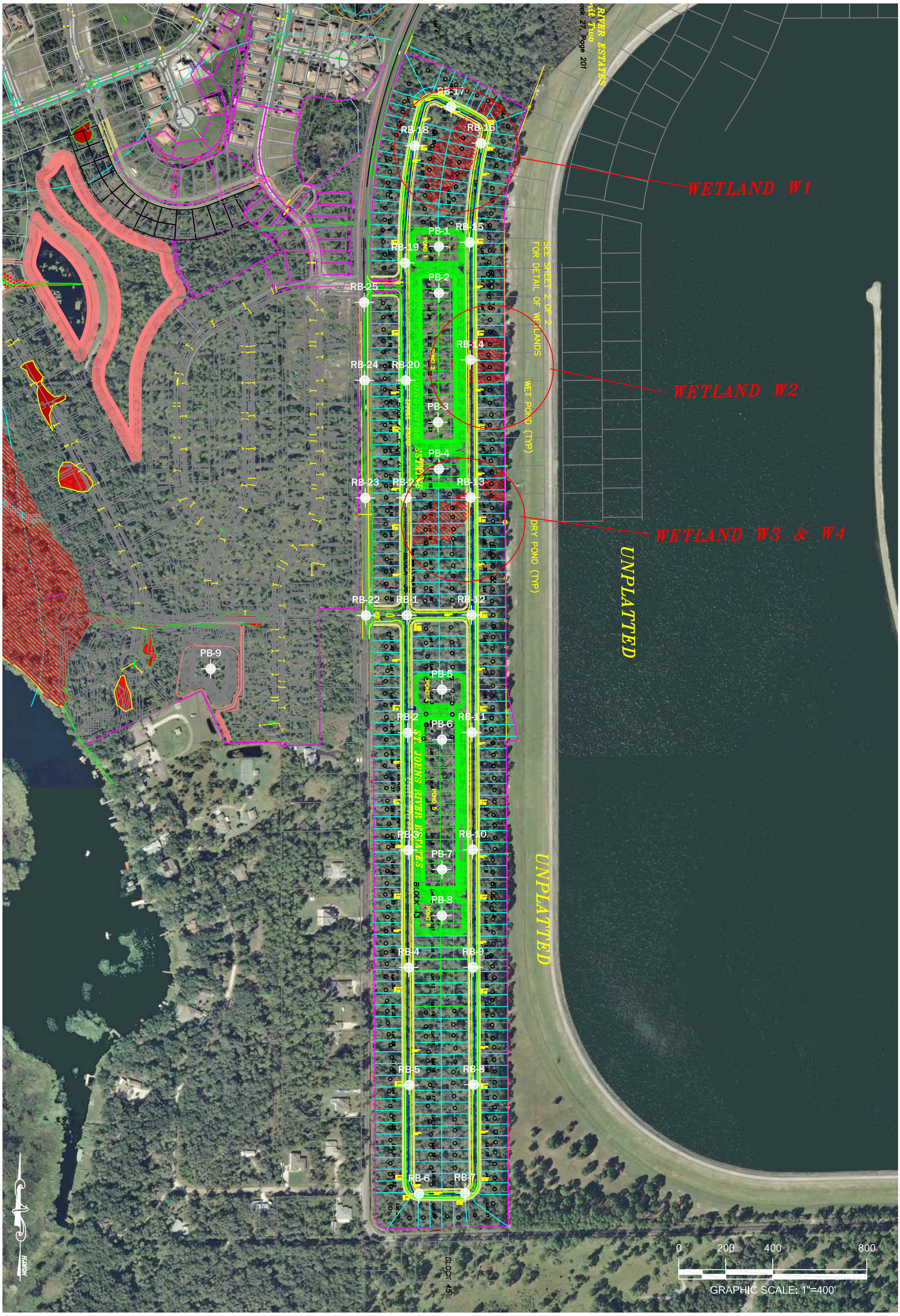
Andreyev Engineering, Inc.

APPROXIMATE SCALE:	DATE: 06/22/15	ENGINEER: EM
1"=800'	PN: CPGT-15-0095	DRAWN BY: DLS

GEOTECHNICAL ENGINEERING SERVICES
RIVIERA BELLA EAST SUBDIVISION
FORT FLORIDA ROAD
DEBARY, VOLUSIA COUNTY, FL

N.R.C.S. SOIL SURVEY MAP

FIGURE 2



LEGEND:

- APPROXIMATE POND BORING LOCATION (PB–1 THROUGH PB–9)
- APPROXIMATE ROAD BORING LOCATION (RB–1 THROUGH RB–25)

Andreyev Engineering, Inc.

GEOTECHNICAL ENGINEERING SERVICES

RIVIERA BELLA EAST SUBDIVISION

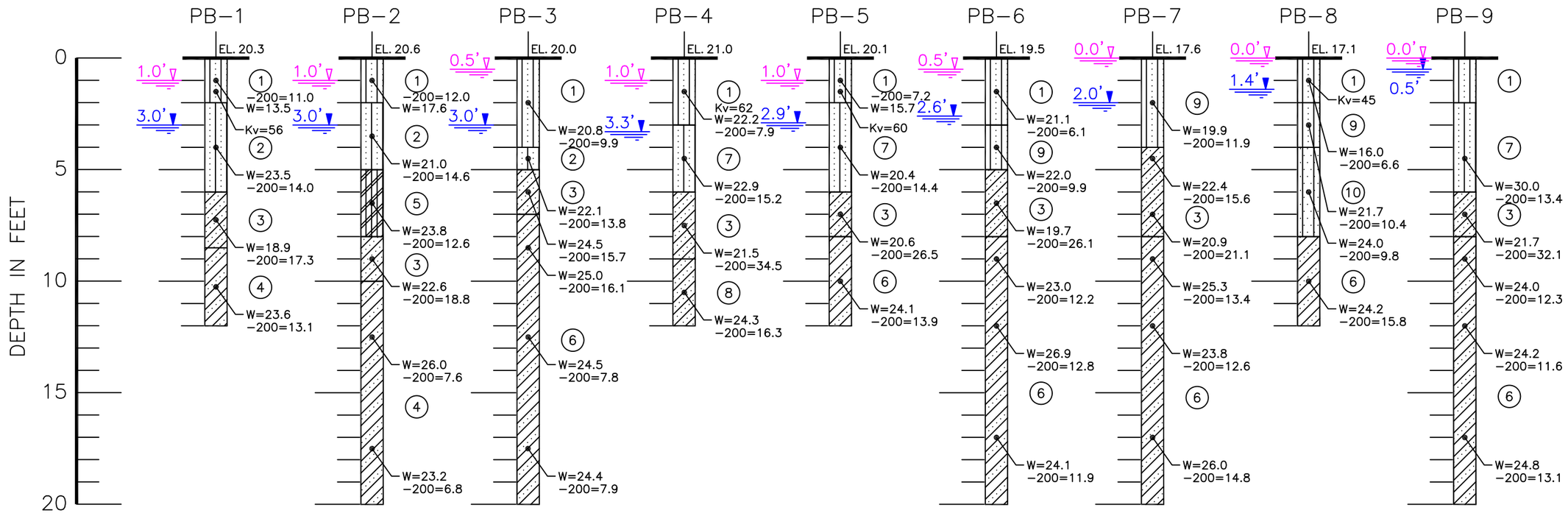
FORT FLORIDA ROAD

DEBARY, VOLUSIA COUNTY, FL

BORING LOCATION PLAN

APPROXIMATE SCALE:	DATE: 07/03/15	ENGINEER: EM
1"=400'	PN: CPGT–15–0095	DRAWN BY: DLS

FIGURE 3



LEGEND:

1. LIGHT GRAYISH BROWN TO GRAYISH BROWN SLIGHTLY SILTY FINE SAND (SP–SM)
2. DARK BROWN SILTY FINE SAND WITH CLAY (SM)
3. GRAYISH BROWN TO BROWN CLAYEY FINE SAND (SC)
4. GRAYISH BROWN SLIGHTLY CLAYEY TO CLAYEY FINE SAND (SP–SC)(SC)
5. TAN SILTY TO CLAYEY FINE SAND (SM)(SC)
6. LIGHT GRAYISH BROWN TO GRAYISH BROWN SLIGHTLY CLAYEY TO CLAYEY FINE SAND WITH SHELL (SP–SC)(SC)
7. DARK BROWN SILTY FINE SAND (SM)
8. GRAY CLAYEY FINE SAND (SC)
9. DARK BROWN SLIGHTLY SILTY FINE SAND (SP–SM)
10. BROWN SLIGHTLY SILTY TO SILTY FINE SAND (SP–SM)(SM)
11. DARK GRAYISH BROWN SLIGHTLY SILTY FINE SAND WITH ORGANICS & ROOTS (SP–SM)
12. GRAYISH BROWN SLIGHTLY SILTY FINE SAND WITH SHELL (SP–SM)
13. DARK BROWN MUCK WITH ROOTS (PT)

(SP) UNIFIED SOIL CLASSIFICATION SYSTEM GROUP SYMBOL

1.0' DEPTH TO GROUNDWATER, JUNE/JULY, 2015

1.0' ESTIMATED NORMAL WET SEASON GROUNDWATER DEPTH

W MOISTURE CONTENT, IN PERCENT

–200 PERCENT OF FINES PASSING THE U.S. No. 200 SIEVE

Kv VERTICAL COEFFICIENT OF PERMEABILITY, IN FEET PER DAY

EL GROUND ELEVATION AT BORING LOCATION (FT)

Andreyev Engineering, Inc.

GEOTECHNICAL ENGINEERING SERVICES

RIVIERA BELLA EAST SUBDIVISION

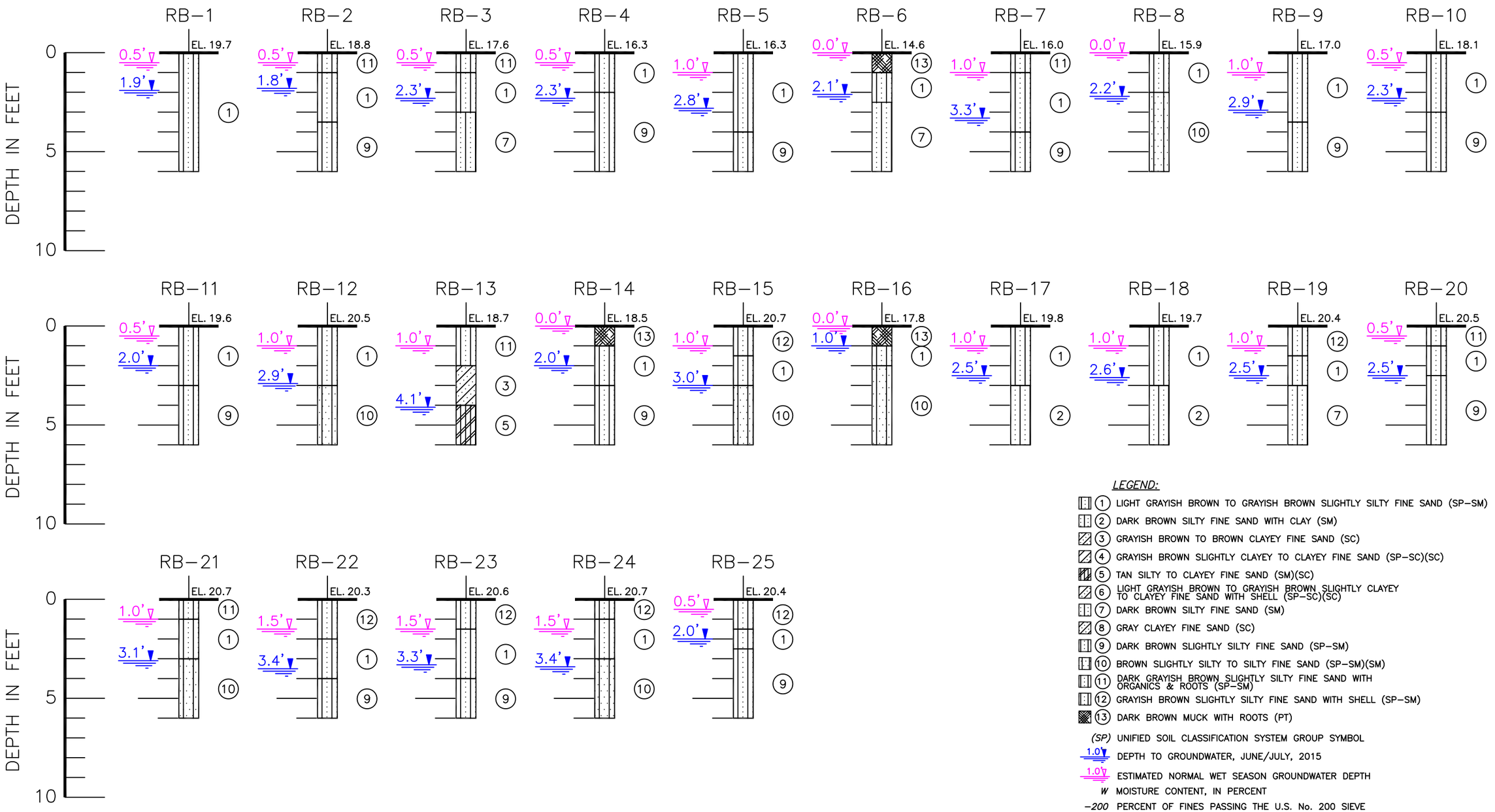
FORT FLORIDA ROAD

DEBARY, VOLUSIA COUNTY, FL

SOIL PROFILES

APPROXIMATE SCALE:	DATE: 07/30/15	ENGINEER: EM
1"=5'	PN: CPGT–15–0095	DRAWN BY: DLS

FIGURE 4



LEGEND:

1. LIGHT GRAYISH BROWN TO GRAYISH BROWN SLIGHTLY SILTY FINE SAND (SP–SM)
2. DARK BROWN SILTY FINE SAND WITH CLAY (SM)
3. GRAYISH BROWN TO BROWN CLAYEY FINE SAND (SC)
4. GRAYISH BROWN SLIGHTLY CLAYEY TO CLAYEY FINE SAND (SP–SC)(SC)
5. TAN SILTY TO CLAYEY FINE SAND (SM)(SC)
6. LIGHT GRAYISH BROWN TO GRAYISH BROWN SLIGHTLY CLAYEY TO CLAYEY FINE SAND WITH SHELL (SP–SC)(SC)
7. DARK BROWN SILTY FINE SAND (SM)
8. GRAY CLAYEY FINE SAND (SC)
9. DARK BROWN SLIGHTLY SILTY FINE SAND (SP–SM)
10. BROWN SLIGHTLY SILTY TO SILTY FINE SAND (SP–SM)(SM)
11. DARK GRAYISH BROWN SLIGHTLY SILTY FINE SAND WITH ORGANICS & ROOTS (SP–SM)
12. GRAYISH BROWN SLIGHTLY SILTY FINE SAND WITH SHELL (SP–SM)
13. DARK BROWN MUCK WITH ROOTS (PT)

(SP) UNIFIED SOIL CLASSIFICATION SYSTEM GROUP SYMBOL

1.0' DEPTH TO GROUNDWATER, JUNE/JULY, 2015

1.0' ESTIMATED NORMAL WET SEASON GROUNDWATER DEPTH

W MOISTURE CONTENT, IN PERCENT

–200 PERCENT OF FINES PASSING THE U.S. No. 200 SIEVE

EL GROUND ELEVATION AT BORING LOCATION (FT)

Andreyev Engineering, Inc.

GEOTECHNICAL ENGINEERING SERVICES

RIVIERA BELLA EAST SUBDIVISION

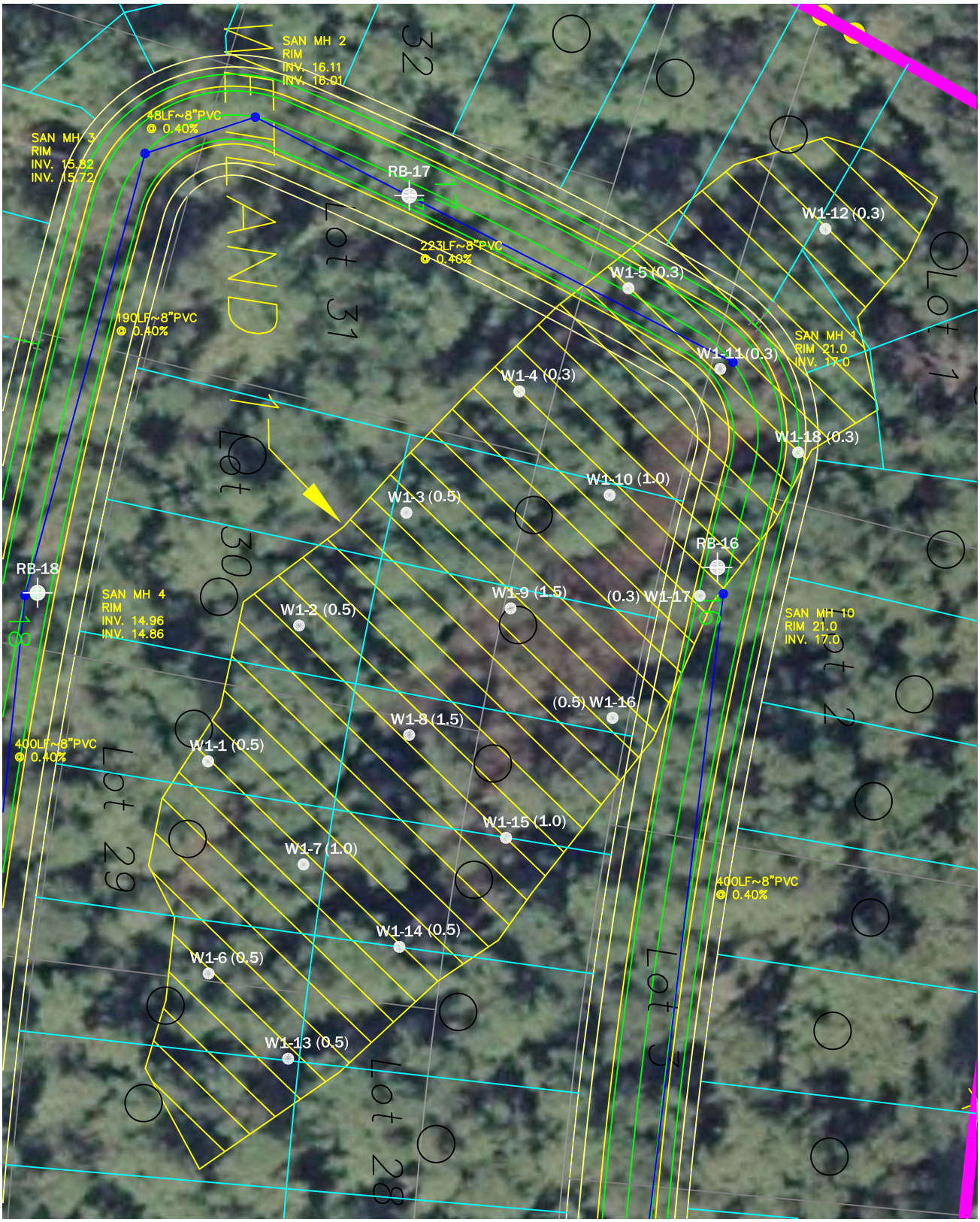
FORT FLORIDA ROAD

DEBARY, VOLUSIA COUNTY, FL

SOIL PROFILES

APPROXIMATE SCALE:	DATE: 07/30/15	ENGINEER: EM
1"=5'	PN: CPGT–15–0095	DRAWN BY: DLS

FIGURE 5



LEGEND:

- APPROXIMATE LOCATION OF MUCK PROBE
- (0.3) MUCK/ORGANIC SAND THICKNESS (IN FEET)

Andreyev Engineering, Inc.

GEOTECHNICAL ENGINEERING SERVICES

RIVIERA BELLA EAST SUBDIVISION

FORT FLORIDA ROAD

DEBARY, VOLUSIA COUNTY, FL

MUCK PROBE LOCATION PLAN
WETLAND W1

APPROXIMATE SCALE:	DATE: 07/27/15	ENGINEER: EM
1"=60'	PN: CPGT-15-0095	DRAWN BY: DLS

FIGURE 6

LEGEND:

- ● APPROXIMATE LOCATION OF MUCK PROBE
- (0.3) MUCK/ORGANIC SAND THICKNESS (IN FEET)

Andreyev Engineering, Inc.

GEOTECHNICAL ENGINEERING SERVICES

RIVIERA BELLA EAST SUBDIVISION

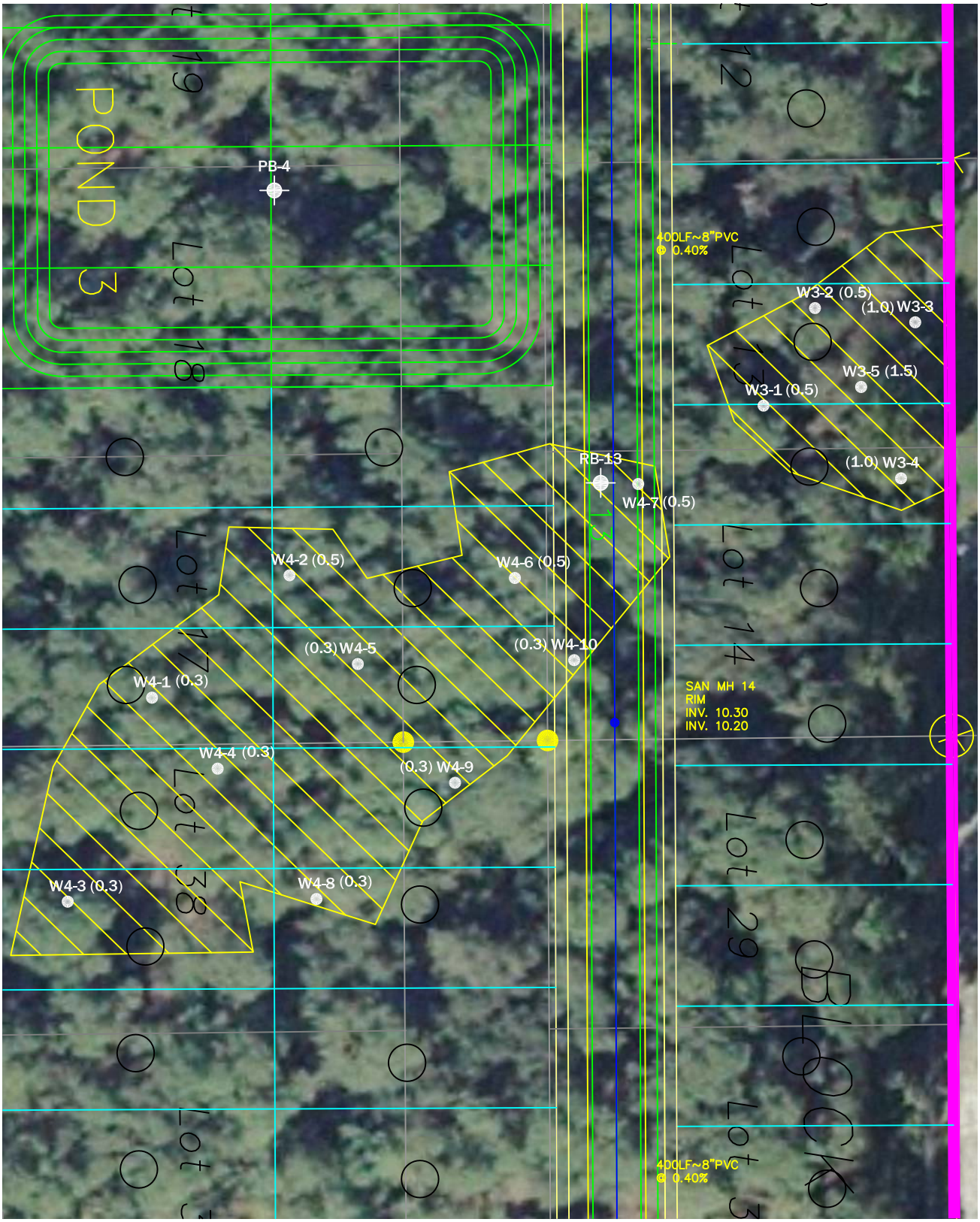
FORT FLORIDA ROAD

DEBARY, VOLUSIA COUNTY, FL

MUCK PROBE LOCATION PLAN
WETLAND W2

APPROXIMATE SCALE:	DATE: 07/27/15	ENGINEER: EM
1"=60'	PN: CPGT-15-0095	DRAWN BY: DLS

FIGURE 7



LEGEND:

- ● APPROXIMATE LOCATION OF MUCK PROBE
- (0.3) MUCK/ORGANIC SAND THICKNESS (IN FEET)

Andreyev Engineering, Inc.

APPROXIMATE SCALE:	DATE: 07/27/15	ENGINEER: EM
1"=60'	PN: CPGT-15-0095	DRAWN BY: DLS

GEOTECHNICAL ENGINEERING SERVICES

RIVIERA BELLA EAST SUBDIVISION

FORT FLORIDA ROAD

DEBARY, VOLUSIA COUNTY, FL

MUCK PROBE LOCATION PLAN
WETLAND W3 & W4

FIGURE 8