Final Report of Geotechnical Engineering
Investigation for Bridge Structures
WEKIVA PARKWAY (SR 429) – SECTION 7A
From 0.2 Miles West of Longwood-Markham Road
to 0.1 Miles East of Orange Boulevard
Seminole County, Florida
Financial Project ID 240200-2-52-01
GEC Project No. 3520G

July 13, 2017

AECOM
315 East Robinson Street, Suite 245
Orlando, Florida 32801

Attention: Mr. Steve Noppinger, P.E.
Project Manager

Subject: Final Report of Geotechnical Engineering Investigation for Bridge Structures
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Dear Mr. Noppinger:

Geotechnical and Environmental Consultants, Inc. (GEC) is pleased to present this Report of Geotechnical Engineering Investigation for Bridge Structures for the above-referenced project. The purpose of our investigation was to explore subsurface conditions at seven bridge sites and to evaluate bridge foundation alternatives and provide geotechnical engineering recommendations to aid in design and construction of the proposed structures. This report presents the results of our field and laboratory investigations and includes our bridge foundation recommendations.

The analyses and recommendations in this report are based on bridge design information provided by AECOM and IDA Consulting Engineers and data collected by GEC during the project design phase.

GEC appreciates the opportunity to be of service to AECOM and FDOT on this project. If you should have any questions concerning the contents of this report, please contact us.

Very truly yours,

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1.0 SITE AND PROJECT DESCRIPTION

The Wekiva Parkway (SR 429) Segment 7A project alignment… begins 0.2 miles west of Longwood-Markham Road (Station 954+00) and ends 0.1 miles east of Orange Boulevard (Station 1055+70)…

The Wekiva Parkway (SR 429) Segment 7A project alignment consists of an approximately 2-mile long portion of the Wekiva Parkway alignment that begins 0.2 miles west of Longwood-Markham Road (Station 954+00) and ends 0.1 miles east of Orange Boulevard (Station 1055+70) in Seminole County, Florida. The project alignment is depicted on excerpts of the U.S. Geological Survey (USGS) Sanford and Sanford SW, Florida Quadrangle Maps (**Figure 1**) in the **Appendix**.

Based on our review of the project plans, we understand the following major project elements are proposed along the project alignment:

- An approximately 2-mile long portion of the Wekiva Parkway alignment that begins 0.2 miles west of Longwood-Markham Road (Station 954+00) and ends east of Orange Boulevard (Station 1055+70). The proposed roadway typical section in this area includes a four-lane divided (expandable to six-lane divided) section. The proposed roadway profile depicts all but about 1,000 feet (Station 993+00 to 1003+00) of high fill embankment ranging in height from 10 to 38 feet above existing grade.
- Two service road alignments (north and south of SR 429) to provide access to local traffic.
- MSE walls are proposed along the SR 429 mainline alignment in all areas of high fill with wall heights ranging from approximately 10 to 38 feet above existing grade.
- Six bridge sites including:
    - Wekiva Parkway over Longwood Markham Road (twin bridges)
    - Wekiva Parkway over Yankee Lake Road (twin bridges)
    - Wekiva Parkway over Lake Markham Road (twin bridges)
    - Wekiva Parkway over Glade View Drive (twin bridges)
    - Wekiva Parkway over Eastbound Frontage Road (twin bridges)
    - Wekiva Parkway over Orange Avenue & Orange Boulevard (twin bridges)
- Two toll facilities located on Ramp E and Ramp F, which include a toll gantry structure and associated support facilities.
- Seven cantilever sign structures and four truss sign structures.
- Four mast arm signal poles at the intersection of Orange Boulevard and SR 46.
- One, approximately 282-ft long, 9-ft by 2-ft box culvert structure.
- Seven CCTV pole structures associated with the project ITS.

The majority of the land use along the project alignment consists of rural residential dwellings. The following details existing site conditions at each of the proposed bridge sites:

- **Wekiva Parkway over Longwood Markham Road**: Existing site conditions include the 2-lane, rural "T" intersection of SR 46 with Longwood Markham Road. The intersection is mostly undeveloped with single family homes located more than 200 feet south of the proposed bridge site. Two existing gas lines are present on the north side of the existing SR 46, which are to be relocated during construction.
- **Wekiva Parkway over Yankee Lake Road**: Existing site conditions include the 2-lane, rural "T" intersection of SR 46 and Yankee Lake Road. The intersection is mostly undeveloped with single family homes located approximately 190 feet south of the proposed bridge site. Two existing gas lines are present on the north side of the existing SR 46, which are to be relocated during construction.
- **Wekiva Parkway over Lake Markham Road**: The proposed bridge site is approximately 120 feet north of the existing "T" intersection of SR 46 and Lake Markham Road. The bridge site is currently undeveloped with heavy tree cover that predominantly consists of longleaf pine at the eastbound bridge site and a combination of longleaf pine and cypress trees at the westbound bridge site. In addition, the bridge site is bordered to the north by Yankee Lake.
- **Wekiva Parkway over Glade View Drive**: Existing site conditions include the 2-lane, rural "T" intersection of SR 46 and Glade View Drive. The intersection is mostly undeveloped with a plant nursery facility located northwest of the intersection that is to be acquired as part of the right-of-way acquisition for the proposed project. Two existing gas lines are present on the north side of the existing SR 46, which are to be relocated during construction.
- **Wekiva Parkway over EB Frontage Road**: Existing site conditions include two, residential lots consisting of single-story residential structures and heavy tree cover. We understand both residences are to be acquired as part of the right-of-way acquisition for the proposed project.
- **Wekiva Parkway over S. Orange Ave. & Orange Blvd.**: Existing site conditions include the existing 2-lane, rural roadways of Wayside Drive and Orange Boulevard. In addition, the majority of the proposed bridge site is currently occupied by a single-story, commercial structure with associated parking lot that are to be acquired as part of the right-of-way acquisition for the proposed project. Adjacent, existing structures to the proposed bridge site also include a single-story residential structure to the north and the Lakeside Fellowship Church to the east. Both existing structures are within 200 feet of the proposed bridge site. An existing gas line is present on the north side of the existing Wayside Drive.

High fill embankments up to 38 feet high are anticipated at the proposed bridge abutments. MSE walls will be designed to support the embankments at the bridge abutments and along the majority of the SR 429 mainline within the project limits. The approximate bridge locations are shown on the U.S. Geological Survey (USGS) Florida Quadrangle map on **Figure 1** in the **Appendix**. A summary of the proposed bridge structures is presented in the following table:

Table 1
Summary of Proposed Bridge Locations

Proposed Bridge Site	Begin Station	End Station	No. of Bridges	No. of Bents/Piers	Approx. Individual Bridge Length (ft)	Approx. Individual Bridge Width (ft)	Approx. Embankment Fill Height (ft)
SR 429 over Longwood Markham Road (Bridge Nos. 770099/100)	964+01	967+59	2	3	358	43	34
SR 429 over Yankee Lake Road (Bridge Nos. 770101/102)	978+43	982+00	2	3	357	43	33
SR 429 over Lake Markham Road (Bridge Nos. 770103/104)	1021+21	1024+79	2	3	358	43 to 47	42
SR 429 over Glade View Drive (Bridge Nos. 770105/106)	1056+05	1059+53	2	3	348	47 to 55	34
SR 429 over EB Frontage Road (Bridge Nos. 770107/110)	1082+08	1083+59	2	2	151	43 to 47	30
SR 429 over Orange Ave./Orange Blvd. (Bridge nos. 770108/109)	1104+61	1109+58	2	5	497	43 to 47	30

Please note that due to a reduction in the project limits; the previously proposed bridge at Osprey Hammock Trail is no longer within the limits of the Wekiva Parkway Section 7A project alignment. However, the results of our soil borings for the Osprey Hammock Trail Bridge are still included within this report for informational purposes.

This report describes our exploration procedures, exhibits the data obtained and presents our conclusions and recommendations regarding the geotechnical engineering aspects of the bridge and elements of this project. Geotechnical recommendations and the results of our subsurface investigation for retaining walls are included under separate cover.

2.0 REVIEW OF AVAILABLE DATA

To obtain general information on soil and groundwater conditions in the project area, GEC reviewed available data including USGS Quadrangle Maps, the Natural Resources Conservation Service (NRCS) Soil Survey of Seminole County, the geotechnical Preliminary Report for Structures performed for the FDOT Wekiva Parkway Line & Grade Study and other published sources. A summary of this information is presented in the following report sections.

2.1 NRCS Soil Survey

The Natural Resources Conservation Service (NRCS) Soil Survey of Seminole County was reviewed to obtain near-surface soils information in the vicinity of the proposed bridge sites. According to the NRCS map, the soils in the vicinity of the proposed bridge sites are summarized below. The NRCS Soil Survey map of the project area is shown on **Figure 1** in the **Appendix**.

Table 2
NRCS Soil Survey Classifications

Unit No.	Soil Name	Depth (inches)	Soil Description	Unified Soil Classification Symbol	Depth to Seasonal High Groundwater (feet)
2	Adamsville fine sand	0 – 4 4 – 80	Fine sand Fine sand, sand	SP-SM SP, SP-SM	2.0 – 3.5
	Sparr fine sand	0 – 41 41 – 43 43 – 72 72 – 80	Fine sand, sand Sandy loam, sandy clay loam Sandy clay, sandy clay loam Sandy loam, sandy clay loam	SP-SM, SM SM, SC-SM, SM SC-SM, SC SM, SC-SM, SC	1.5 – 3.5
6	Astatula fine sand, 0 to 5 percent slopes	0 – 80	Fine sand, sand	SP, SP-SM	> 6.0
	Apopka fine sand, 0 to 5 percent slopes	0 – 64 64 – 80	Fine sand Sandy clay loam, sandy loam, sandy clay	SP, SP-SM SC-SM, SC	
10	Basinger soil, depressional	0 – 6 6 – 80	Mucky fine sand Fine sand, sand	SP, SP-SM SP, SP-SM	+2.0 – 0.0
	Hontoon soil, depressional	0 – 80	Muck	PT	
	Samsula soil, depressional	0 – 30 30 – 80	Muck Fine sand, loamy sand	PT SP, SP-SM, SM	

Unit No.	Soil Name	Depth (inches)	Soil Description	Unified Soil Classification Symbol	Depth to Seasonal High Groundwater (feet)
20	Myakka fine sand	0 – 28 28 – 45 45 – 80	Fine sand, sand Fine sand, sand, loamy fine sand Fine sand, sand	SP, SP-SM SP-SM, SM SP, SP-SM	0.5 – 1.5
	EauGallie fine sand	0 – 18 18 – 30 30 – 41 41 – 60 60 – 80	Fine sand Fine sand, sand Fine sand, sand Sandy clay loam, sandy loam Loamy sand, sand	SP, SP-SM SP-SM, SM SP, SP-SM SM, SC-SM, SC SP-SM, SM	
27	Pomello fine sand, 0 to 5 percent slopes	0 – 31 31 – 40 40 – 80	Fine sand Fine sand, sand Fine sand, sand	SP, SP-SM SP-SM, SM SP, SP-SM	2.0 – 3.5
31	Tavares fine sand, 0 to 5 percent slopes	0 – 80	Fine sand, sand	SP, SP-SM	3.5 – 6.0
	Millhopper fine sand, 0 to 5 percent slopes	0 – 45 45 – 54 54 – 80	Fine sand Sandy loam, loamy fine sand Sandy clay loam, sandy loam	SP-SM, SM SM SM, SC-SM, SC	

In general, the NRCS soil survey map depicts sandy soils with seasonal high groundwater levels ranging from 0.5 to greater than 6.0 feet below the natural ground surface. The soils classifying as SP, SP-SM and SM can be treated as Select (S) soil types and are generally appropriate for use as fill material to support structures, roadways and embankments. However, the clayey soils classifying as SC and SC-SM have limited suitability for use as fill material.

At the Lake Markham Road bridge site the NRCS soil survey map depicts Basinger, Samsula and Hontoon soils, depressional (10).

At the Lake Markham Road bridge site the NRCS soil survey map depicts Basinger, Samsula and Hontoon soils, depressional (10). This soil type contains high organic content soils that are generally classified as PT in the USCS and can have severe limitations for roadway construction. In addition, the NRCS predicts seasonal high groundwater levels for this soil type to range from 2 feet above the existing ground surface to at the existing ground surface.

Information contained in the NRCS Soil Survey is very general and may be outdated. It may not therefore be reflective of actual soil and groundwater conditions, particularly if recent

development in the site vicinity has modified soil conditions or surface/subsurface drainage. The soils and groundwater data collected as part of this study should be considered a more accurate representation of soil conditions along the project alignment.

2.2 USGS Quadrangle Map

Based on our review of the USGS Sanford and Sanford Southwest, Florida Quadrangle maps and the project plans, the existing ground surface elevations along the project alignment typically range from approximate elevation +34 to +74 feet NAVD88. In addition, the quadrangle map indicates that portions of the project alignment were historically used for citrus groves and that the proposed alignment crosses in the vicinity of several topographically lower swamp features near the proposed Glade View Drive bridge site.

…several circular depression features and circular lakes, indicative of relic sinkholes… are… in the vicinity of the project alignment.

Also of note are several circular depression features and circular lakes, indicative of relic sinkholes, which are depicted on the quadrangle map in the vicinity of the project alignment. Lakes in the vicinity of the project alignment include Miranda Lake, Ross Lake, Yankee Lake, and Sylvan Lake.

The project alignment and proposed bridge sites are depicted on an excerpt of the U.S. Geological Survey (USGS) Sanford and Sanford Southwest, Florida Quadrangle Maps (**Figure 1**) in the **Appendix**.

Based on our review of the project plans and available topographic survey information at our boring locations, the existing ground surface elevation at the proposed bridge sites is summarized in the following table:

Table 3
Summary of Ground Surface Elevations at Bridge Sites

Proposed Bridge Site	Approximate Existing Ground Surface Elevation Range (ft NAVD88)
SR 429 over Longwood Markham Road	+54 to +57
SR 429 over Yankee Lake Road	+53 to +56
SR 429 over Lake Markham Road	+35 to +38
SR 429 over Glade View Drive	+47 to +51

Proposed Bridge Site	Approximate Existing Ground Surface Elevation Range (ft NAVD88)
SR 429 over EB Frontage Road	+60 to +65
SR 429 over Orange Ave./Orange Blvd.	+72 to +74

2.3 USGS Potentiometric Map Data

GEC reviewed the September 2008 USGS Map, "Potentiometric Surface of The Upper Floridan Aquifer in the St. Johns River Water Management District and Vicinity, Florida," to evaluate the potentiometric surface elevation of the Floridan Aquifer at the proposed bridge sites. The following table summarizes the anticipated maximum elevation of the potentiometric surface at the proposed bridge sites:

Table 4
Summary of Potentiometric Surface Elevation
of the Floridan Aquifer at Proposed Bridge Sites

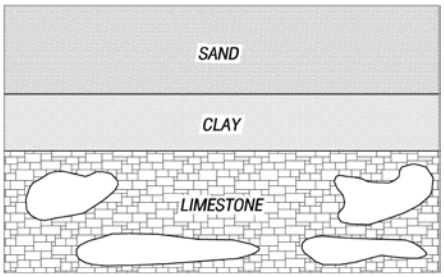
Proposed Bridge Site	Approximate Potentiometric Surface Elevation (ft NAVD88)	Approximate Existing Ground Surface Elevation Range (ft NAVD88)
SR 429 over Longwood Markham Road	+19	+54 to +57
SR 429 over Yankee Lake Road	+19	+53 to +56
SR 429 over Lake Markham Road	+21	+35 to +38
SR 429 over Glade View Drive	+22	+47 to +51
SR 429 over EB Frontage Road	+23	+60 to +65
SR 429 over Orange Ave./Orange Blvd.	+23	+72 to +74

…artesian flow conditions are not anticipated at the proposed bridge sites.

Since the existing ground surface elevations at the proposed bridge sites are above the predicted potentiometric surface, artesian flow conditions are not anticipated at the proposed bridge sites. Artesian conditions were not encountered in any of the bridge boring locations.

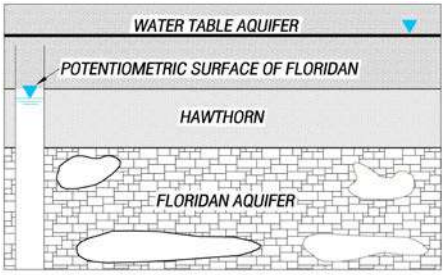
2.4 Regional Geology

Due to its prevalent geology, referred to as karst, Central Florida is prone to the formation of sinkholes, or large, circular depressions created by local subsidence of the ground surface. The nature and relationship of the three sedimentary layers typical of Central Florida geology cause sinkholes. The deepest, or basement, layer is a massive cavernous limestone formation known as



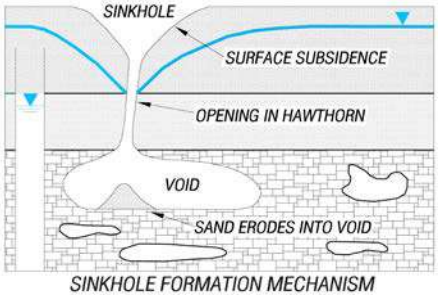
KARST GEOLOGY OF CENTRAL FLORIDA

the Floridan aquifer. The Floridan aquifer limestone is overlain by a silty or clayey sand, clay, phosphate, and limestone aquitard (or flow-retarding layer) ranging in thickness from nearly absent to greater than 100 feet and locally referred to as the Hawthorn formation. The Hawthorn formation is in turn overlain by a 40 to 70-foot thick surficial layer of sand, bearing the water table aquifer. The likelihood of sinkhole occurrence at a given site within the region is determined by the relationship among these three layers, specifically by the water (and soil)-transmitting capacity of the Hawthorn formation at that location.



CENTRAL FLORIDA AQUIFER SYSTEMS

The water table aquifer is comprised of Recent and Pleistocene sands and is separated from the Eocene limestone of the Floridan aquifer by the Miocene sands, clays and limestone of the Hawthorn formation. Since the thickness and consistency of the Hawthorn layer is variable across Central Florida, the likelihood of groundwater flow from the upper to the lower aquifer (known as aquifer recharge) will also vary by geographical location. In areas where the Hawthorn formation is absent, water table groundwater (and associated sands) can flow downward to cavities within the limestone aquifer, like sand through an hourglass, recharging the Floridan aquifer, and sometimes causing the formation of surface sinkholes. This process of subsurface erosion associated with recharging the Floridan aquifer is known as raveling. Thus, in Central Florida, areas of effective groundwater recharge to the Floridan aquifer have a higher potential for the formation of surface sinkholes.



SINKHOLE FORMATION MECHANISM

No method of geological, geotechnical, or geophysical exploration is known that can accurately predict the occurrence of sinkholes. It is common geotechnical practice in Central Florida to make a qualitative prediction of sinkhole risk on the basis of local geological conditions in the vicinity of a particular site.

Based on our review of the U.S. Geological Survey Map entitled "Recharge and Discharge Areas of the Floridan Aquifer in the St. Johns River Water Management District and Vicinity, Florida," 1984, the extent of recharge to the Floridan Aquifer at the proposed bridge sites is summarized in the following table:

Table 5
Summary of Recharge to the Floridan Aquifer
at Proposed Bridge Sites

Proposed Bridge Site	Recharge to Floridan Aquifer
SR 429 over Longwood Markham Road	None
SR 429 over Yankee Lake Road	Low to Moderate
SR 429 over Lake Markham Road	High
SR 429 over Glade View Drive	High
SR 429 over EB Frontage Road	High
SR 429 over Orange Ave./Orange Blvd.	High

We can conclude based solely on the available recharge data that the proposed bridge structures are located in an area where the relative risk of sinkhole formation ranges from low to high compared to the overall risk across Central Florida.

2.5 Previously Performed Geotechnical Investigations

In addition to the geotechnical data gathered during the subsurface exploration program performed for this study, GEC also utilized geotechnical data relevant to the project area from geotechnical investigations performed by others. This existing geotechnical data included an SPT boring performed during the FDOT Wekiva Parkway Line and Grade Study, which was documented in the Preliminary Report for Structures, dated July 2, 2012 prepared by Ardaman and Associates, Inc. The location and depth of the Line & Grade Study SPT boring is summarized in the following table:

Table 6
Previously Performed SPT Boring Location and Depth

Bridge Site	Boring No.	Date Performed	Station	Offset (ft)	Ground Surface Elevation (ft NAVD88)	Boring Depth (ft)
SR 429 over Glade View Drive	TH-1058	1/12/12	1058+04	4 RT	+47.7	125

The Report of SPT Boring for Structures sheet with the encountered boring profile as documented in the Line & Grade Study Report are included in the **Appendix** of this Report.

3.0 SUBSURFACE EXPLORATION

GEC evaluated subsurface conditions at the proposed bridge sites by performing one Standard Penetration Test (SPT) boring at each of the bridge bent/pier locations. GEC completed a total of 43 SPT borings to depths ranging from 90.5 feet to 225.5 feet below existing ground surface. The locations and depths of our borings are summarized in the following table:

Table 7
Bridge SPT Boring Locations and Depths

Bridge Site	SR 429 Direction	Boring No.	Station	Offset (ft)	Ground Surface Elevation (ft NAVD88)	Boring Depth (ft)
SR 429 over Osprey Hammock Trail – No Longer Within Project Limits	EB	BR-1	940+00	67 RT	+34.9	80.5
	EB	BR-2	941+89	19 RT	+39.0	80.5
	EB	BR-3	943+67	34 RT	+43.8	95.5
	WB	BR-4	940+00	9 LT	+34.3	85.5
	WB	BR-5	941+98	19 LT	+41.0	85.5
	WB	BR-6	943+70	16 LT	+44.9	90.5
SR 429 over Longwood Markham Road	EB	BR-7	964+03	43 RT	+54.7	115.5
	EB	BR-8	965+78	39 RT	57.0	140.0
	EB	BR-9	968+61	42 RT	53.7	105.5
SR 429 over Longwood Markham Road	WB	BR-10	964+05	55 LT	+55.5	138.0
	WB	BR-11	965+99	65 LT	+56.4	145.5
	WB	BR-12	967+58	67 LT	+55.8	135.5
SR 429 over Yankee Lake Road	EB	BR-13	978+45	32 RT	+55.2	120.0
	EB	BR-14	980+05	39 RT	+56.4	170.5
	EB	BR-15	982+00	43 RT	+52.5	110.5
	WB	BR-16	978+47	6 LT	+54.2	120.5
	WB	BR-17	980+40	5 LT	+55.8	120.5
	WB	BR-18	981+97	12 LT	+55.3	100.5
SR 429 over Lake Markham Road	EB	BR-19	1021+28	6 RT	+37.7	120.5
	EB	BR-20	1023+09	32 RT	+38.2	130.5
	EB	BR-21	1024+76	20 RT	+36.0	153.0
	WB	BR-22	1021+37	40 LT	+36.1	210.5
	WB	BR-23	1023+19	46 LT	+36.3	225.5
	WB	BR-24	1024+86	30 LT	+35.4	168.0
SR 429 over Glade View Drive	EB	BR-25	1055+96	46 RT	+46.6	95.5
	EB	BR-26	1059+56	63 RT	+47.0	90.5
	WB	BR-27	1056+05	40 LT	+48.0	90.5
	WB	BR-28	1057+87	39 LT	+50.3	120.5
	WB	BR-29	1059+60	33 LT	+50.9	130.5

Bridge Site	SR 429 Direction	Boring No.	Station	Offset (ft)	Ground Surface Elevation (ft NAVD88)	Boring Depth (ft)
SR 429 over Frontage Road	EB	BR-30B	1081+64	45 RT	+62.2	115.5
	EB	BR-31B	1083+12	45 RT	+62.6	110.5
	WB	BR-30A	1082+55	30 LT	+61.7	115.5
	WB	BR-31A	1084+04	51 LT	+64.5	110.5
SR 429 over Orange Ave. / Orange Blvd.	EB	BR-32	1103+84	9 RT	+72.4	115.5
	EB	BR-33	1105+20	48 RT	+72.5	125.5
	EB	BR-34	1106+60	55 RT	+73.7	123.0
	EB	BR-35	1108+24	36 RT	+71.5	120.5
	EB	BR-36	1110+00	36 RT	+71.6	130.5
	WB	BR-37	1104+63	33 LT	+72.4	120.5
	WB	BR-38	1105+69	1 RT	+72.8	135.5
	WB	BR-39	1106+69	80 LT	+73.7	125.5
	WB	BR-40	1107+47	45 LT	+73.0	125.5
	WB	BR-41	1109+14	39 LT	+74.0	120.5

The locations of the borings drilled for this study are shown on the Boring Location Plan sheets in the **Appendix**. Boring locations were established in the field using project plans and a handheld, sub-meter accuracy, Global Positioning Satellite (GPS) unit (Trimble GeoXT 500 Series) and were later surveyed for horizontal and vertical control by AECOM. Boring locations reference the SR 429 centerline.

3.1 SPT Borings

SPT borings were drilled in general accordance with ASTM Procedure D-1586. The boreholes were advanced by the rotary wash method with bentonite-based mud used as the circulating fluid to stabilize the borehole. Casing was used as necessary to stabilize the borehole and prevent loose surficial sands from raveling into the lower more stable portions of the borehole. GEC's field crew obtained SPT samples continuously in the borings to a depth of 10 feet and at 5-foot depth intervals thereafter. However, some boring locations were hand augered to a depth of 6 feet to avoid damage to underground utilities. A GEC engineering technician monitored the drilling operation, and collected, examined and visually classified each sample. He then packaged representative portions of each sample for transport to our laboratory for further examination and laboratory testing.

3.2 Groundwater Measurement

Since all SPT borings were grout-sealed upon completion, a GEC engineering technician performed a hand auger boring adjacent to the grouted borehole to obtain a stabilized groundwater depth. Once a 24-hour groundwater measurement was recorded, the hand auger boreholes were then backfilled with soil cuttings to prevailing ground surface.

3.3 Undisturbed Samples

Undisturbed samples of compressible soils at the proposed bridge sites were collected using a thin-walled "Shelby" tube sampler. The sampler was hydraulically pushed into the soil at the desired sample depth. After allowing the sampler to sit for a short period of time it was retrieved from the borehole where the soil at the top and bottom of the tube was sampled and classified. The 3-inch diameter tube was moisture sealed in the field immediately after sampling and returned to our laboratory for further examination and testing. The sample depth is noted on the Report of SPT Borings for Structures sheets in the **Appendix**.

4.0 LABORATORY TESTING

Selected soil samples obtained from the borings were tested in accordance with Florida Standard Testing Methods (FM). Florida Standard Testing Methods are adaptations of recognized standard methods, e.g., ASTM and AASHTO, which have been modified to accommodate Florida's geological conditions. The GEC laboratory is reviewed annually by the Construction Materials Engineering Council, Inc. (CMEC) to verify compliance with FM. Our laboratory testing program is summarized in the following table:

Table 8
Summary of Laboratory Testing Program

Type of Test	Number of Tests
Percent Fines (FM 1-T88)	189
Atterberg Limits (FM 1-T89/90)	41
Natural Moisture Content (FM 1-T265)	49
Organic Content (FM 1-T 267)	7
Corrosion Series (FM 5-550/551/552/553)	14
Unit Weight (ASTM D7263-09)	3
Specific Gravity (FM 1-T100)	3
Consolidation Test (ASTM D-2435)	3

The results of our laboratory tests are shown adjacent to the soil profiles on the Report of SPT Borings for Structures sheets in the **Appendix**.

Corrosion series tests were performed on representative soil samples obtained at the bridge sites to evaluate the substructure environmental classification. In accordance with the FDOT Structure Design Guidelines and the results of our corrosion series test results, which are included in **Table 15** in the **Appendix**, the substructure environmental classification for each bridge site is summarized in the following table. The superstructure environmental classification is estimated to be slightly aggressive for concrete and steel bridge components at all bridge sites.

Table 9
Substructure Environmental Classification Summary

Bridge Site	Substructure Environmental Classification	
	Concrete	Steel
SR 429 over Longwood Markham Road	Moderately Aggressive	Extremely Aggressive
SR 429 over Yankee Lake Road	Moderately Aggressive	Extremely Aggressive
SR 429 over Lake Markham Road	Moderately Aggressive	Extremely Aggressive
SR 429 over Glade View Drive	Moderately Aggressive	Extremely Aggressive
SR 429 over EB Frontage Road	Moderately Aggressive	Extremely Aggressive
SR 429 over Orange Ave./Orange Blvd.	Slightly Aggressive	Slightly Aggressive

4.1 Consolidation Testing

A portion of the undisturbed samples obtained at the boring locations were sampled for one-dimensional consolidation testing in general accordance with ASTM-D2435. Undisturbed samples selected for testing are carefully trimmed and placed in the fixed ring consolidometer. A seating pressure of about 100 psf is applied and the sample is inundated in water. The sample submergence is maintained throughout the test.

The sample is then incrementally loaded and deflections are monitored. Each incremental load is maintained until internal pore pressures are dissipated as indicated by a flattening of the time-deflection curve. A rebound of the sample is provided at a selected load increment when the sample is unloaded and reloaded to obtain further details of the loading characteristics of the soil.

The data obtained during incremental loading is reduced and a semi-log plot of sample void ratio versus applied stress is created. A copy of this curve is included in the **Appendix** of this report. This curve is utilized to estimate the magnitude of settlement that will be induced by anticipated site loadings. The curve is also used to estimate the pre-consolidation pressure (P_C) and the over-consolidation ratio (OCR) of the soils tested. The results of our consolidation test and associated laboratory soil classification tests are summarized in the following table.

Table 10
Summary of Consolidation Test Results

Bridge Site	Boring No.	USCS Soil Type	Test Depth (feet)	N-Value (blows/ft)	e_O	Overburden Pressure (tsf)	P_c (tsf)	OCR	C_c	C_r
SR 429 over Lake Markham Road	BR-24	PT	20.5 – 22.5	2	2.57	0.49	1.06	2.16	0.38	0.04
SR 429 over Frontage Road	BR-30B	CH	38 - 40	4	1.80	1.60	2.09	1.31	0.37	0.06
SR 429 over Orange Ave. / Orange Blvd.	BR-32	CH	43 - 45	7	2.60	1.35	3.85	2.85	0.89	0.11

5.0 SUBSURFACE CONDITIONS

The results of the SPT borings are shown on the Report of SPT Borings for Structures sheets in the **Appendix**. The boring logs describe the soil layers using the Unified Soil Classification System (USCS) symbol (e.g., SP-SM) and ASTM soil descriptions (e.g., sand with silt). We based our soil classifications and descriptions on visual examination and the limited laboratory testing shown adjacent to the boring profiles on the Report of SPT Borings for Structures sheets.

The boring logs indicate subsurface conditions only at the specific boring locations at the time of our field exploration. Subsurface conditions, including groundwater levels, at other locations of the subject site may differ from conditions we encountered at the boring locations. Moreover, conditions at the boring locations can change over time. Groundwater levels fluctuate seasonally, and soil conditions can be altered by earthmoving operations.

The depths and thicknesses of the subsurface strata indicated on the boring logs were interpolated between samples obtained at different depths in the borings. The actual transition between soil

layers may be different than indicated. *These stratification lines were used for our analytical purposes. Quantity estimates based on the results of the borings will vary from the actual quantities measured during construction.*

The following report sections describe the subsurface conditions encountered in our soil borings. For specific subsurface conditions encountered at each boring location, please refer to the Report of SPT Borings for Structures sheets in the **Appendix**.

5.1 SPT Boring Results for SR 429 over Osprey Hammock Trail

In general, the SPT borings (BR-1 through BR-6) performed for the SR 429 Bridges over Osprey Hammock Trail encountered the generalized subsurface profile summarized in the following table:

Table 11A
Generalized Subsurface Profile
SR 429 over Osprey Hammock Trail

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+45 to +15	Loose to medium dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	8	4 - 20
2	+15 to +5	Very loose to loose fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	3	W/H - 5
3	+5 to 0	Loose to medium dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	8	3 - 17
4	0 to -10	Stiff to very stiff fat clay to fat clay with sand (CH) and medium dense clayey fine sand (SC)	12	6 - 21
5	-10 to -15	Medium dense silty fine sand (SM), trace to some shell and phosphate	12	9 - 14
6	-15 to -20	Very stiff to hard lean clay to lean clay with sand (CL), fat clay with sand (CH), elastic silt sand (MH) and sandy silt (ML)	66	18 - 50/1”
7	-20 to -50	Dense to very dense silty fine sand (SM), some to abundant weathered limestone, cemented sand and phosphate	94	32 - 50/0”

Notable exceptions to this generalized profile include:

- A layer of very dense sand was encountered in Layer 1 at boring location BR-5 from elevation +26 to +22 feet NAVD88.

- A layer of soft elastic silt was encountered in Layer 2 at boring location BR-1 from elevation +7 to +4 feet NAVD88.
- A layer of very dense silty fine sand was encountered at boring location BR-5 from elevation -12 to -25 feet NAVD88.
- Loss of drilling fluid circulation occurred at boring location BR-4 at elevation -20 feet NAVD88.
- Loss of drilling fluid circulation occurred at boring location BR-3 at elevations -18 and -26 feet NAVD88.
- Occasional layers of very dense or very hard material that the sampler could not penetrate were encountered at several of the boring locations between elevations -20 to -45 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.2 SPT Boring Results for SR 429 over Longwood Markham Road

In general, the SPT borings (BR-7 through BR-12) performed for the SR 429 Bridges over Longwood Markham Road encountered the generalized subsurface profile summarized in the following table:

Table 11B
Generalized Subsurface Profile
SR 429 over Longwood Markham Road

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+57 to 0	Very loose to medium dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	12	2 - 23
2	0 to -20	Medium dense to very dense fine sand with silt (SP-SM)	25	13 - 51
3	-20 to -28	Very soft to stiff sandy silt to silt to elastic sandy silt (ML, MH) and sandy lean clay (CL), some cemented sand and trace phosphate	4	W/R - 12
4	-28 to -40	Very loose to medium dense silty fine sand (SM), trace to abundant cemented sand and phosphate	9	W/R - 13
5	-40 to -88	Medium dense to very dense silty fine sand (SM), trace to some shell and phosphate	57	13 - 50/1”

Notable exceptions to this generalized profile include:

- At boring location BR-10, Layer 1 extended to elevation -22 feet NAVD88.
- Medium dense to very dense clayey fine sand (SC) was encountered in Layer 5 at boring location BR-12.
- Layers of very loose to very dense weathered limestone were encountered in Layer 5 at boring locations BR-10, BR-11 and BR-12.
- Losses of drilling fluid circulation occurred in Layer 5 at boring locations BR-10, BR-8 and BR-12.
- A possible void with no sample recovery was encountered at boring location BR-8 from elevation -35 to -42 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.3 SPT Boring Results for SR 429 over Yankee Lake Road

In general, the SPT borings (BR-13 through BR-18) performed for the SR 429 Bridges over Yankee Lake Road encountered the generalized subsurface profile summarized in the following table:

Table 11C
Generalized Subsurface Profile
SR 429 over Yankee Lake Road

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+56 to +5	Loose to dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	12	3 - 33
2	+5 to -3	Very loose to medium dense fine sand with silt (SP-SM) to silty fine sand (SM)	4	2 - 12
3	-3 to -10	Medium dense to dense fine sand with silt to silty fine sand (SP-SM, SM)	18	9 - 29
4	-10 to -20	Very loose to loose silty fine sand (SM), trace to abundant cemented sand and phosphate	4	W/H - 7
5	-20 to -52	Medium dense to very dense silty fine sand (SM), trace to some shell and phosphate	62	18 - 50/3”
6	-52 to -114	Medium dense to very dense weathered limestone, occasional cemented sand, shell and phosphate	68	16 - 50/3”

Notable exceptions to this generalized profile include:

- Layer 1 included thin layers of loose to medium dense clayey fine sand (SC) at boring locations BR-13, BR-15 and BR-18.
- A 2.5 foot layer of firm fat clay (CH) was encountered at an elevation of -19.5 feet NAVD88 at boring location BR-17.
- A layer of dense weathered limestone was encountered in Layer 5 at boring location BR-15 from elevation -25 to -28 feet NAVD88.
- A very loose layer of fine sand with silt to silty fine sand (SP-SM, SM) or void was encountered at boring locations BR-14 and BR-16 from elevation -50 to -55 feet NAVD88.
- Loss of drilling fluid circulation occurred at every boring location, with the exception of BR-18, from elevation -45 to -55 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.4 SPT Boring Results for SR 429 over Lake Markham Road

The SPT borings (BR-19 through BR-24) performed for the SR 429 Bridges over Lake Markham Road can be summarized into two different generalized profiles. The borings for the eastbound bridge (BR-19, BR-20 and BR-21) have a significantly different profile than the westbound bridge borings (BR-22, BR-23 and BR-24). The eastbound borings encountered the generalized subsurface profile summarized in the following table:

Table 11D
Generalized Subsurface Profile
SR 429 Eastbound over Lake Markham Road Bridge
Borings BR-19, BR-20, BR-21

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+38 to -30	Very loose to medium dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	9	1 - 23
2	-30 to -45	Medium dense to very dense fine sand with silt (SP-SM) to silty fine sand (SM) with intermixed layers of very dense weathered limestone	49	9 - 50/1”

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
3	-45 to -56	Very stiff to hard silt with sand (ML) and very dense weathered limestone	70	14 - 50/2”
4	-56 to -76	Very loose to very dense weathered limestone	23	2 - 57
5	-76 to -87	Dense to very dense weathered limestone	58	23 - 50/2”
6	-87 to -91	Medium dense weathered limestone	20	15 - 27
7	-91 to -107	Very dense weathered limestone	68	47 - 50/5”
8	-107 to -117	Medium dense weathered limestone	22	10 - 35

Notable exceptions to this generalized profile include:

- In general, encountered soil layers at boring location BR-21 dropped in elevation in comparison to boring locations BR-19 and BR-20, suggesting past sinkhole activity near this boring location.
- 2 to 7.5 foot layers of very loose mucky fine sand (PT) (Organic Content = 24%) were encountered at boring location BR-21 between approximate elevation +32 and +12 feet NAVD88.
- Layer 3 was not encountered at boring location BR-19.
- Loss of drilling fluid circulation was encountered at boring location BR-19 at elevation -37 feet NAVD88 and at boring location BR-21 at elevations +27, -58 and -66 feet NAVD88.

The westbound borings at the SR 429 over Lake Markham Road bridge site encountered the generalized subsurface profile summarized in the following table:

Table 11E
Generalized Subsurface Profile
SR 429 Westbound over Lake Markham Road Bridge
Borings BR-22, BR-23, BR-24

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+36 to -70	Very loose to medium dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	10	1 - 22
2	-70 to -95	Very loose to medium dense weathered limestone with intermixed layers of very loose silty fine sand (SM), occasional trace shell and phosphate	21	1 - 50/3”

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
3	-95 to -105	Loose to dense fine sand with silt to silty fine sand (SP-SM, SM)	13	7 - 31
4	-105 to -110	Very soft to firm sandy fat to lean clay (CH, CL), trace phosphate, limestone and cemented sand	2	W/R - 5
5	-110 to -137	Very loose to loose fine sand with silt to silty fine sand (SP-SM, SM), trace clay and limestone	3	W/R - 9
6	-137 to -145	Very soft to stiff fat clay with sand (CH), trace shell, limestone and cemented sand	2	W/R - 7
7	-145 to -154	Very loose to medium dense fine sand with silt to silty fine sand (SP-SM, SM), trace limestone, phosphate and cemented sand	6	W/R - 16
8	-154 to -189	Dense to very dense weathered limestone, trace phosphate and cemented sand	70	27 - 50/1”

Notable exceptions to this generalized profile include:

- In general, encountered soil layers at boring location BR-24 dropped in elevation in comparison to boring locations BR-22 and BR-23, suggesting past sinkhole activity near this boring location.
- A 2.5 foot layer of very soft muck (PT) (Organic Content = 44%) was encountered at boring location BR-22 at approximate elevation +11 feet NAVD88.
- 4 and 4.5 foot layers of very soft to soft muck to sandy muck (Organic Content = 36%) were encountered at boring location BR-24 at approximate elevations of +31 and +17 feet NAVD88, respectively.
- 2.5 and 3 foot layers of loose to medium dense mucky fine sand (PT) (Organic Content = 16%) were encountered at boring location BR-24 at approximate elevations of +13 and +6 feet NAVD88, respectively.
- Layers of sandy fat clay (CH) and clayey fine sand (SC) were encountered in Layer 1 at boring locations BR-22 and BR-23.
- A void was encountered at boring location BR-22 from elevation -78 to -85 feet NAVD88.
- Layers 2 and 4 were not encountered at boring location BR-24.
- A dense weathered limestone layer was encountered from elevation -112 to -136 feet NAVD88 at boring location BR-23.
- Loss of drilling fluid circulation occurred at boring location BR-22 at elevations -79 and -109 feet NAVD88 and at boring location BR-23 at elevation -128 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.5 SPT Boring Results for SR 429 over Glade View Drive

In general, the SPT borings (BR-25 through BR-29 and TH-1058) performed for the SR 429 Bridges over Glade View Drive encountered the generalized subsurface profile summarized in the following table:

Table 11F
Generalized Subsurface Profile
SR 429 over Glade View Drive

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+52 to +28	Loose to dense fine sand with silt to silty fine sand (SP-SM, SM)	13	4 - 30
2	+28 to 0	Very loose to medium dense fine sand with silt (SP-SM), silty fine sand (SM) and clayey fine sand (SC)	3	W/R - 17
3	0 to -40	Dense to very dense silty fine sand (SM) with cemented fine sand, trace phosphate and shell	78	16 - 50/3”
4	-40 to -80	Medium dense to very dense weathered limestone	74	12 - 50/1”

Notable exceptions to this generalized profile include:

- A layer of firm sandy fat clay was encountered at boring location BR-29 from elevation +7 to +5 feet NAVD88.
- At boring location BR-29, Layer 3 extended to elevation -75 feet NAVD88.
- At boring locations TH-1085 and BR-29 potential subsurface voids were encountered from approximate elevation -38 to -42 feet NAVD88.
- The sampler could not penetrate very dense material at boring location BR-28 from elevation -22 to -28 feet NAVD88.
- Loss of drilling fluid circulation occurred at boring locations TH-1058, BR-28 and BR-29 at approximate elevations of -40 to -45 feet NAVD88.
- A loss of drilling fluid circulation occurred at boring location BR-26 at elevation -3 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.6 SPT Boring Results for SR 429 over Eastbound Frontage Road

In general, the SPT borings (BR-30A, BR-30B, BR-31A and BR-31B) performed for the SR 429 Bridges over the Eastbound Frontage Road encountered the generalized subsurface profile summarized in the following table:

Table 11G
Generalized Subsurface Profile
SR 429 over Eastbound Frontage Road

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+64 to +28	Very loose to dense fine sand to fine sand with silt to silty fine sand (SP, SP-SM, SM)	13	1 - 34
2	+28 to +11	Layers of soft to stiff fat clay to fat clay with sand (CH), soft to stiff sandy elastic silt to elastic silt (MH) and loose to medium dense silty fine sand (SM), trace to some shell	5	2 - 11
3	+11 to +1	Very loose to very dense fine sand with silt to silty fine sand (SP-SM, SM), trace phosphate	34	2 - 50/6”
4	+1 to -7	Stiff to hard weathered limestone, trace to abundant phosphate and trace shell	29	8 - 50/4”
5	-7 to -14	Medium dense to dense fine sand with silt to silty fine sand to sandy silt (SP-SM, SM, ML), some to abundant phosphate and trace shell	22	9 - 37
6	-14 to -17	Very stiff fat clay to lean clay to sandy elastic silt (CH, CL, MH)	14	12 - 17
7	-17 to -53	Medium dense to very dense silty fine sand (SM), some to abundant cemented sand and phosphate and trace shell	150	20 - 50/0”

Notable exceptions to this generalized profile include:

- Boring location BR-30B did not encounter Layer 4.
- A 2.5 foot layer of stiff elastic silt (MH) was encountered at an elevation of +38.6 feet NAVD88 at boring location BR-31B.
- Loss of drilling fluid circulation occurred at every boring location between approximate elevations -8 and -23 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.7 SPT Boring Results for SR 429 over Orange Avenue and Orange Boulevard

In general, the SPT borings (BR-30 through BR-41) performed for the SR 429 Bridges over Orange Avenue and Orange Boulevard encountered the generalized subsurface profile summarized in the following table:

Table 11H
Generalized Subsurface Profile
SR 429 over Orange Avenue and Orange Boulevard

Layer Number	Layer Elevation (ft. NAVD88)	Description	Average N-Value	Typical Range of N-Values
1	+73 to +50	Very loose to medium dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	8	1 - 21
2	+50 to + 12	Loose to very dense fine sand, fine sand with silt and silty fine sand (SP, SP-SM, SM)	23	6 - 57
3	+12 to -5	Very loose to medium dense fine sand with silt to silty fine sand (SP-SM, SM) with intermixed layers of firm to stiff fat to lean clay (CH, CL), elastic silt to sandy elastic silt (MH), occasional trace shell	5	W/H - 14
4	-5 to -21	Intermixed layers of medium dense to very dense silty fine sand to clayey fine sand (SM, SC), medium dense to very dense cemented sand to weathered limestone, hard sandy fat clay to fat clay to lean clay (CH), hard silt with sand to sandy silt to sandy elastic silt (ML, MH), trace to abundant cemented sand, shell and phosphate	32	11 - 50/1.5”
5	-21 to -60	Medium dense to very dense silty fine sand (SM), trace to abundant shell, cemented sand and phosphate with occasional layers of cemented sand, phosphate and shell	162	17 - 50/0”

Notable exceptions to this generalized profile include:

- A 2.5-foot layer of medium dense mucky fine sand (Organic Content = 6%) was encountered at boring location BR-36 at approximate elevation +57 feet NAVD88.
- 2.5 to 5.5 foot layers of soft to hard elastic silt with sand to elastic silt to fat clay (MH, CH) were encountered at boring locations BR-32, BR-33, BR-34 and BR-37 between approximate elevations +31 to +21 feet NAVD88.

- A possible void with no sample recovery was encountered at boring location BR-33 from elevation +7 to -7 feet NAVD88.
- At boring locations BR-35 and BR-36 potential subsurface voids were encountered from approximate elevation -5 to -10 feet NAVD88.
- The sampler could not penetrate very dense material at boring locations BR-37, BR-38 and BR-41 encountered within Layers 4 and 5 between approximate elevations -12 and -37 feet NAVD88.
- Loss of drilling fluid circulation occurred at boring locations BR-33, BR-36, BR-37, BR-39 and BR-40 between approximate elevations +7 to -24 feet NAVD88.

For detailed subsurface profiles encountered at each of the boring locations see the Report of SPT Borings for Structures sheets in the **Appendix**.

5.8 Groundwater Levels

GEC measured groundwater levels at the boring locations 24-hours after the completion of the borings. The encountered, 24-hour stabilized groundwater levels at the SPT boring locations are summarized in the following **Table 12**.

Groundwater levels can vary seasonally and with changes in subsurface conditions between boring locations. Alterations in surface and/or subsurface drainage brought about by site development can also affect groundwater levels. *Therefore, groundwater depths measured at different times or at different locations on the site can be expected to vary from those measured by GEC during this investigation.*

For purposes of this report, estimated seasonal high groundwater levels are defined as groundwater levels that are anticipated at the end of the wet season during a "normal rainfall" year under current site conditions. We define a "normal rainfall" year as a year in which rainfall quantity and distribution were at or near historical averages.

GEC estimated seasonal high groundwater elevations at each boring location as summarized in the following table.

Table 12
Summary of Encountered and Estimated
Seasonal High Groundwater Levels

Bridge Site	Encountered Groundwater Elevation Range (ft NAVD88)	Estimated Seasonal High Groundwater Elevation Range (ft NAVD88)
SR 429 over Longwood Markham Road	+39.0 to +41.8	+42.0 to +44.8
SR 429 over Yankee Lake Road	+41.5 to +43.7	+44.5 to +46.7
SR 429 over Lake Markham Road	+30.5 to +31.5	+33.5 to +34.5
SR 429 over Glade View Drive	+39.0 to +40.1	+42.0 to +43.1
SR 429 over EB Frontage Road	+39.7 to +51.1	+56.2 to +59.5
SR 429 over Orange Ave. & Orange Blvd.	+60.1 to +67.5	+65.5 to +70.1

The encountered and estimated seasonal high groundwater levels are depicted adjacent to the boring profiles on the Report of SPT Borings for Structures sheets in the **Appendix**.

6.0 ANALYSES AND RECOMMENDATIONS

As a part of the Bridge Development Report (BDR), GEC performed an evaluation of foundation alternatives that included shallow spread footings, drilled shafts, steel pipe piles, steel H-piles and driven precast prestressed concrete (PPC) piles. The results of these foundation analyses are included in our Preliminary Geotechnical Engineering Report for Bridge Development Report, dated July 11, 2014.

We understand that 24-inch Precast Prestressed Concrete (PPC) piles have been selected as the preferred foundation systems for the Longwood Markham Road, Yankee Lake Road, Glade View Drive, Eastbound Frontage Road and Orange Ave./Orange Blvd. bridge sites. In addition, we understand that 24-inch steel pipe piles have been selected as the preferred foundation system for the Lake Markham Road bridge site. The following report sections provide analysis and recommendations for the selected foundation systems.

6.1 Axial Load Analysis – Steel Pipe Piles

GEC analyzed axial capacity for 24-inch steel pipe piles for the Lake Markham Road Bridge using the FDOT computer program FB-Deep Version 2.04, which is based on FDOT Research Bulletin RB-121. Graphs of Davisson Pile Capacity vs. Pile Tip Elevation for this pile type are included in the **Appendix**.

Based upon the generated Davisson Pile Capacity vs. Pile Tip Elevation curves and pile loading conditions provided by IDA, we recommend the following pile design parameters for 24-inch steel pipe piles at the Lake Markham Road Bridge site:

Table 13
Lake Markham Road
24-Inch Steel Pipe Pile Design Parameters

[1]Bridge No.	[2]Bent	Boring No.	Nominal Bearing Resistance (tons)	Approximate Pile Cut Off Elevation (ft NAVD88)	Anticipated Pile Tip Elevation (ft NAVD88)	[3]Minimum Pile Tip Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Anticipated Production Pile Length (ft)
3	EB-1 (WB)	BR-22	256	+67.2	-155	-145	N/A	222
	P-2 (WB)	BR-23	238	+42.0	-165	-155	N/A	207
	EB-3 (WB)	BR-24	256	+66.1	-111	0	N/A	177
	EB-1 (EB)	BR-19	251	+69.5	-47	-30	N/A	117
	P-2 (EB)	BR-20	242	+42.0	-72	-35	N/A	114
	EB-3 (EB)	BR-21	251	+68.3	-96	-75	N/A	164

1. 3 = SR 429 over Lake Markham Road
2. EB-# = End Bent No.; P-# = Pier No.; (EB) = Eastbound; (WB); Westbound.
3. Minimum pile tip elevations required to limit pile settlement.

…splicing of piles will be required at the Lake Markham Road Bridge site…

Based on the anticipated pile cut off elevations and pile tip elevations summarized in **Table 13** above, pile production lengths are anticipated to range from 117 to 222 feet. Based on the anticipated pile lengths, splicing of piles will be required at the Lake Markham Road Bridge site and should be performed in accordance with Section 455-8.3 of the FDOT Standard Specifications for Road and Bridge Construction.

The substructure environmental classification for steel substructure is extremely aggressive at the Lake Markham Road bridge site, which must be considered with the use of steel sections. Additional sacrificial steel thickness should be specified in accordance with FDOT Structures Design Guidelines.

Elevations and capacities recommended in this report are for individual piles. The analyses and recommendations apply for piles spaced at minimum distances of three pile widths as measured from center to center. Group reductions would be required for more closely spaced piles.

Minimum pile tip elevations are recommended to penetrate the soft soil strata encountered at the proposed Lake Markham Road bridge site. The following note should be added to the Pile Data Table sheets for this bridge in the project plan set:

- *Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.*

…we recommend a greater than usual number of test piles due to the highly variable soil conditions.

We recommend a test pile program be established for the proposed structures. The test piles should be dynamically monitored in accordance with FDOT Specification 455. In addition, we recommend a greater than usual number of test piles due to the highly variable soil conditions.

The Pile Data Table for the 24-inch steel pipe piles is included in the **Appendix**. Factored design loads listed in the Pile Data Table assume a Soil Resistance Factor of 0.75.

6.2 Axial Load Analysis - Driven PPC Piles

GEC analyzed axial capacity for 24-inch concrete piles using the FDOT computer program FB-Deep Version 2.04. Graphs of Davisson Pile Capacity vs. Pile Tip Elevation for the 24-inch concrete piles are included in the **Appendix**. For the Orange Avenue/Orange Boulevard bridge site the Davisson Pile Capacity graphs reflect reduction in capacity due to recommended preform requirements.

Based upon the generated Davisson Pile Capacity vs. Pile Tip Elevation curves and pile loading conditions provided by AECOM and IDA, we recommend the following pile design parameters for 24-inch concrete piles:

Table 14
24-inch PPC Pile Design Parameters

[1]Bridge No.	[2]Bent	Boring No.	Nominal Bearing Resistance (tons)	Approximate Pile Cut Off Elevation (ft NAVD88)	Anticipated Pile Tip Elevation (ft NAVD88)	[3]Minimum Pile Tip Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Anticipated Production Pile Length (ft)
1	EB-1 (WB)	BR-10	295	+72.9	-36	-35	N/A	109
	P-2 (WB)	BR-11	262	+52.0	-57	-35	N/A	109
	EB-3 (WB)	BR-12	295	+77.3	-26	-25	N/A	103
	EB-1 (EB)	BR-7	295	+72.8	-13	-5	N/A	86
	P-2 (EB)	BR-8	262	+52.0	-56	-55	N/A	108
	EB-3 (EB)	BR-9	295	+77.2	-25	-15	N/A	102
2	EB-1 (WB)	BR-16	339	+78.0	-28	-15	N/A	106
	P-2 (WB)	BR-17	219	+50.5	-34	-25	N/A	85
	EB-3 (WB)	BR-18	339	+73.1	-24	-17	N/A	97
	EB-1 (EB)	BR-13	339	+78.0	-22	-15	N/A	100
	P-2 (EB)	BR-14	219	+52.5	-19	-18	N/A	72
	EB-3 (EB)	BR-15	339	+73.1	-34	-20	N/A	107
4	EB-1 (WB)	BR-27	272	+70.2	-14	0	N/A	84
	P-2 (WB)	BR-28	259	+44.5	-11	0	N/A	56
	EB-3 (WB)	BR-29	272	+71.8	-14	0	N/A	86
	EB-1 (EB)	BR-25	274	+68.0	-11	0	N/A	79
	P-2 (EB)	TH-1058	252	+44.5	-12	0	N/A	57
	EB-3 (EB)	BR-26	274	+69.6	-23	0	N/A	93
5	EB-1 (WB)	BR-30A	410	+81.1	-21	-5	N/A	102
	EB-2 (WB)	BR-31A	410	+81.6	-23	-15	N/A	105
	EB-1 (EB)	BR-30B	379	+79.7	-22	-10	N/A	102
	EB-2 (EB)	BR-31B	379	+80.5	-17	-15	N/A	98
6	EB-1 (WB)	BR-37	252	+91.3	-16	-14	+20	107
	P-2 (WB)	BR-38	276	+64.5	-25	-24	+20	90
	P-3 (WB)	BR-39	288	+64.5	-25	-8	+44	90
	P-4 (WB)	BR-40	292	+66.0	-23	-14	+29	89
	EB-5 (WB)	BR-41	303	+93.3	-23	0	+35	116
	EB-1 (EB)	BR-32	288	+89.7	-19	+3	+20	109
	P-2 (EB)	BR-33	272	+61.5	-14	-7	+50	76
	P-3 (EB)	BR-34	271	+64.0	-15	0	+28	79
	P-4 (EB)	BR-35	302	+66.5	-24	-10	+27	91
	EB-5 (EB)	BR-36	290	+92.3	-21	-20	+27	114

1. 1 = SR 429 over Longwood Markham Road; 2 = SR 429 over Yankee Lake Road; 3 = SR 429 over Lake Markham Road; 4 = SR 429 over Glade View Drive; 5 = SR 429 over Eastbound Frontage Road; 6 = SR 429 over Orange Ave. & Orange Blvd.
2. EB-# = End Bent No.; P-# = Pier No.; (EB) = Eastbound; (WB); Westbound.
3. Minimum pile tip elevations required to limit pile settlement.

Based on the anticipated pile cut off elevations and pile tip elevations summarized in **Table 14** above, pile production lengths are anticipated to range from 56 to 116 feet. Therefore, pile splicing should not be required to achieve the recommended maximum nominal bearing capacities at the bridge locations summarized in **Table 14**.

Elevations and capacities recommended in this report are for individual piles. The analyses and recommendations apply for piles spaced at minimum distances of three pile widths as measured from center to center. Group reductions would be required for more closely spaced piles.

Minimum pile tip elevations are recommended to penetrate the soft soil strata encountered at the proposed bridge sites. The following note should be added to the Pile Data Table sheets in the project plan set:

- *Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.*

...at the Orange Avenue/Orange Boulevard bridge site, a note alerting the contractor that preforming will be required should be added to the plans.

Since intermittent dense to very dense near-surface layers are present at the Orange Avenue/Orange Boulevard bridge site, a note alerting the contractor that preforming will be required should be added to the plans. Required preform elevations are presented on the **Pile Data Table** in the **Appendix**.

We recommend a test pile program be established for the proposed structures. The test piles should be dynamically monitored in accordance with FDOT Specification 455.

The Pile Data Tables for the 24-inch square PPC piles are included in the **Appendix**. Factored design loads listed in the Pile Data Tables assume a Soil Resistance Factor of 0.75.

6.3 Downdrag Settlement Considerations

Based on project plans, embankment fill will be placed at the bridge abutments to heights of up to 30 to 38 feet above existing ground surface. This fill will need to be placed after the abutment piles are driven. Therefore, soil settlement caused by fill loads at the end bent pile locations could generate downdrag loads on the piles.

As previously described, the soil profiles encountered at the boring locations are composed primarily of loose to medium dense fine sands with occasional, thin layers of soft to stiff sandy fat clay to elastic silt. Due to the cohesionless, granular nature of the majority of the subsurface profile, settlement of the sand profile caused by placement of the new embankment fill will occur concurrently during embankment construction. Once the embankment fill is complete, subsoil settlement will essentially cease and the superstructure can be constructed with negligible post-construction abutment fill settlement. Therefore, we do not anticipate that downdrag will be a significant factor in pile performance at the majority of the proposed bridge sites.

…we do not anticipate that downdrag will be a significant factor in pile performance at the majority of the proposed bridge sites…

However, at the Lake Markham Road bridge site layers of very soft to soft sandy muck to muck (PT) were encountered at elevations ranging from +32 to +5 feet NAVD88. High primary settlements can be expected for embankments constructed on the very weak compressible organic soils. Surcharging, or presettling, of the roadway embankment can be conducted to make roadway and bridge construction feasible and limit long-term embankment settlement at the bridge end bents. With the application of a surcharge program at the Lake Markham Road bridge site, the total long-term settlements after application of the bridge structure loads can be significantly reduced such that the pile foundation proposed for this structure can be designed and installed with acceptable foundation settlement. GEC performed an evaluation of settlement of the proposed embankment at the Lake Markham Road bridge site, which is discussed under separate cover in our Report of Geotechnical Engineering Investigation for Muck Surcharge.

…settlement of the proposed embankment at the Lake Markham Road bridge site… is discussed under separate cover in our Report of Geotechnical Engineering Investigation for Muck Surcharge.

With the application of the surcharge program at the Lake Markham Road bridge site, the total long-term settlements after removal of the surcharge and construction of the roadway embankment and Lake Markham Road Bridge are estimated to be less than 1 inch. Based on this relatively minor post-construction abutment fill settlement, the pile foundation proposed for this structure can be designed and installed with acceptable foundation settlement. This recommendation is dependent on the application of the recommended surcharge.

6.4 Noise and Vibration Considerations

Due to the presence of gas lines and residential structures in the surrounding area, consideration should be given to the noise and vibrations that will be generated from the use of an impact hammer to drive the piles at the proposed bridge sites. Based on the proximity of the existing structures to the proposed bridge sites, as detailed in **Section 1.0**, it is our opinion that vibration from pile driving will not damage the nearby structures. However, vibrations will likely be perceptible to occupants of the structures.

GEC performed a field reconnaissance of existing structures along the project alignment on May 4, 2016. Based on the results of that field reconnaissance and coordination with AECOM, GEC has developed a list of recommended structures that were identified outside of the distances specified in Article 108-2 of the FDOT Specifications that we recommend monitoring. Protection of existing structures should be performed in accordance with Section 108 of the FDOT Specifications. Please refer to the Summary of Monitor Existing Structures table in the **Appendix**.

Gas utility owners should be notified of pile driving operations and should be present to monitor gas pipelines during pile driving operations.

6.5 FB-Multi Pier Soil Parameters

GEC generated soil parameters based on encountered soil conditions at our boring locations for the structural engineer's use in bridge foundation design using the computer program, FB-Multi Pier. The recommend FB-Multi Pier soil parameters are tabulated in the **Appendix**.

7.0 SINKHOLE RISK

…the eastern portion of the project alignment would be considered to exhibit a high risk of sinkhole activity.

The western portion of the project alignment, including the Longwood Markham Road and Yankee Lake Road bridge sites is classified by the USGS as an area of no to moderate recharge. Since recharge corresponds to sinkhole risk on a regional basis, the western portion of the project alignment would be considered to exhibit a low to moderate risk of sinkhole activity. However, the eastern portion of the project alignment, including the Lake Markham Road, Glade View Drive, Eastbound Frontage Road and Orange Boulevard/Wayside Drive bridge sites is classified by the USGS as an area of high recharge. Therefore, the eastern portion of the project alignment would be considered to exhibit a high risk of sinkhole activity.

Strong indicators of ongoing sinkhole formation including soil voids, extensive loose zones and drilling fluid losses in the upper soils were encountered at the bridge boring locations.

The USGS maps also indicate the Floridan aquifer potentiometric surface at an elevation ranging from +19 to +23 feet NAVD88 in the site vicinity. Based on the water table elevation ranging from +30.5 to +67.5 feet NAVD88, a downward hydraulic gradient may exist at the bridge sites. When a downward hydraulic gradient is present, it can promote soil raveling associated with sinkhole activity. Strong indicators of ongoing sinkhole formation including soil voids, extensive loose zones and drilling fluid losses in the upper soils were encountered at the bridge boring locations.

In addition to reviewing readily available sources of geological information to make a qualitative evaluation of sinkhole risk, a further evaluation can be made by performing deep borings at a given site. The purpose of the borings is to evaluate the thickness and consistency of the upper surface of the Hawthorn formation and overlying sands to determine whether raveled soils are present. Obvious indicators of ongoing raveling and potential future sinkhole activity include extensive zones of very soft or loose soils, and losses of drilling fluid circulation. Very soft or loose soil zones and/or significant drilling fluid circulation losses, that typically require installation of borehole casing to restore circulation, are generally indicators that the confining layer has been fully or partially breached at the depth at which losses occur. Evaluation of sinkhole risk by deep borings is typically performed for significant structures and in most cases borings performed for design of significant structures are drilled to a depth such that the borings can also be utilized in evaluation of sinkhole risk. However, evaluation of sinkhole risk by deep borings is not usually performed for horizontal facilities such as highway embankments. It is generally considered that the cost of performing such an evaluation for that type of facility would not be cost-effective when compared to the benefit derived.

Based on the results of this study, it does not appear that the cost of additional investigations for sinkhole risk evaluation would be warranted unless shallow foundations are the selected foundation alternative. GEC does not recommend shallow foundations due to the elevated sinkhole risk.

Supporting the bridges on deep pile foundations provides the most positive mitigation of sinkhole risk to the structure.

8.0 USE OF THIS REPORT

GEC has prepared this report for the exclusive use of our client, AECOM and FDOT, and for specific application to our client's project. GEC will not be held responsible for any other party's interpretation or use of this report's subsurface data or engineering analysis without our written authorization.

The sole purpose of the borings performed by GEC at this site was to obtain indications of subsurface conditions as part of a geotechnical exploration program. GEC has not subjected any soil samples to analysis for contaminants.

GEC has strived to provide the services described in this report in a manner consistent with that level of care and skill ordinarily exercised by members of our profession currently practicing in Central Florida. No other representation is made or implied in this document.

The conclusions or recommendations of this report should be disregarded if the nature, design, or location of the facilities is changed. If such changes are contemplated, GEC should be retained to review the new plans to assess the applicability of this report in light of proposed changes.

APPENDIX

PILE DATA TABLE &
DAVISSON PILE CAPACITY CURVES

SR 429 OVER LONGWOOD MARKHAM ROAD

Pile Data Tables
Wekiva Parkway (SR 429) – Section 7A
FPID No. 240200-2-52-01
GEC Project No. 3520G

SR 429 over Longwood-Markham Road
24-inch Square PPC Pile Design Table

PILE DATA TABLE														
	Installation Criteria							Design Criteria						
Bent No.	PPC Pile Size (in)	* NBR (tons)	Nominal Uplift Resistance (tons)	**** Min. Tip Elevation (ft NAVD88)	** Test Pile Length (ft)	Required Jet Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Factored Design Load (tons)	Down Drag (tons)	Total Scour Resistance (tons)	Net Scour Resistance (tons)	100-Year Scour Elevation (ft. NAVD88)	Long-Term Scour Elevation (ft. NAVD88)	*** Soil Resistance Factor ϕ
EB-1 (WB)	24	295	N/A	-35	120	N/A	N/A	221	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (WB)	24	262	N/A	-35	120	N/A	N/A	196	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (WB)	24	295	N/A	-25	120	N/A	N/A	221	N/A	N/A	N/A	N/A	N/A	0.75
EB-1 (EB)	24	295	N/A	-5	105	N/A	N/A	221	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (EB)	24	262	N/A	-55	120	N/A	N/A	196	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (EB)	24	295	N/A	-15	120	N/A	N/A	221	N/A	N/A	N/A	N/A	N/A	0.75

Notes:

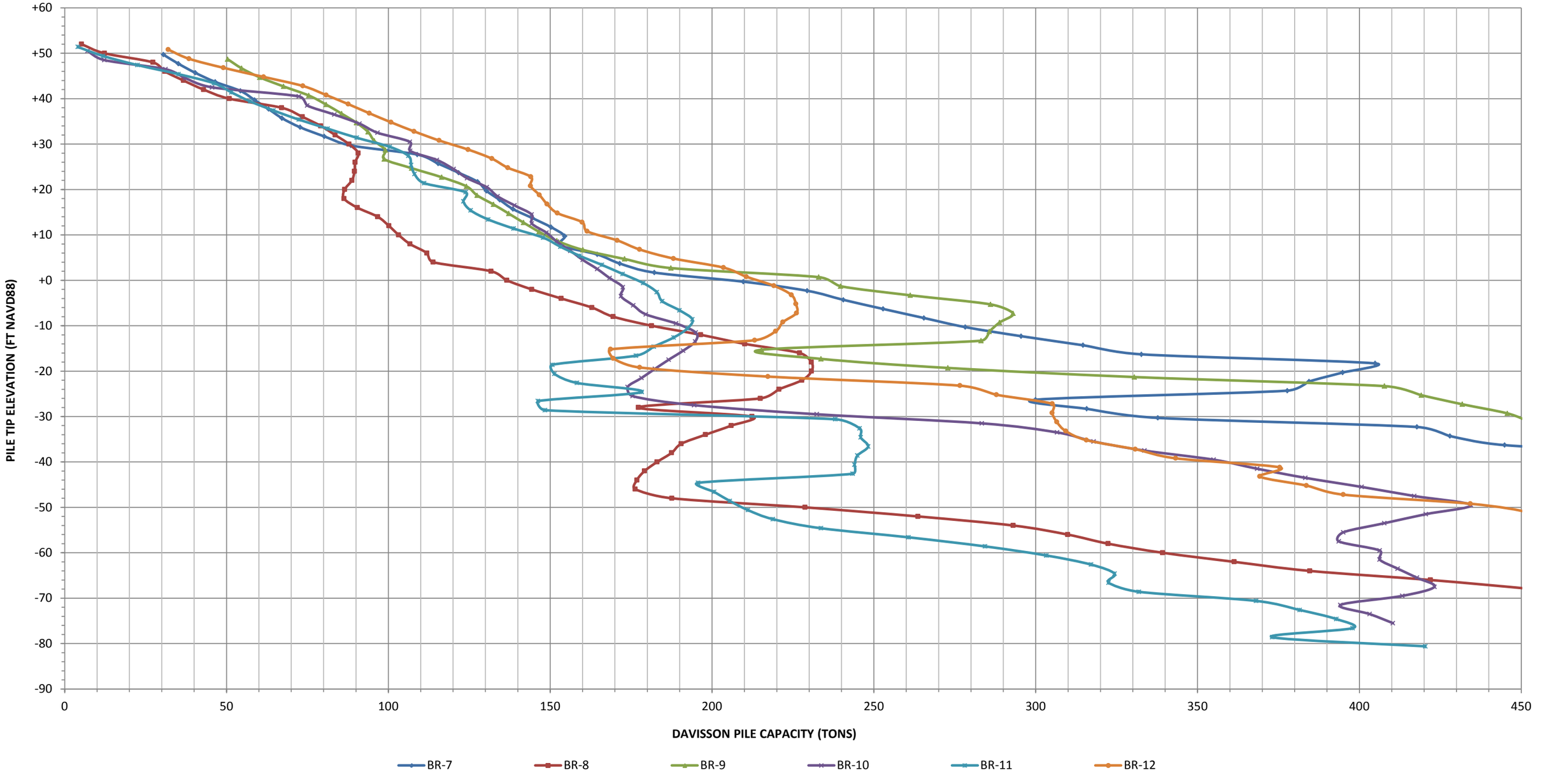
* Recommended Nominal Bearing Resistance: NBR ≥ $\frac{\text{Factored Design Load + Net Scour + Downdrag}}{\phi}$

** Test pile locations shown on plans.

*** All piles shall be dynamically monitored during installation in accordance with Section 455-5.13 of the Specifications.

**** Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.

24-IN SQUARE PPC PILES
Wekiva Parkway Section 7A
SR 429 at Longwood Markham Road
GEC Project No. 3520G



PILE DATA TABLE &
DAVISSON PILE CAPACITY CURVES

SR 429 OVER YANKEE LAKE ROAD

Pile Data Tables
Wekiva Parkway (SR 429) – Section 7A
FPID No. 240200-2-52-01
GEC Project No. 3520G

SR 429 over Yankee Lake Road
24-inch Square PPC Pile Design Table

PILE DATA TABLE														
	Installation Criteria							Design Criteria						
Bent No.	PPC Pile Size (in)	* NBR (tons)	Nominal Uplift Resistance (tons)	**** Min. Tip Elevation (ft NAVD88)	** Test Pile Length (ft)	Required Jet Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Factored Design Load (tons)	Down Drag (tons)	Total Scour Resistance (tons)	Net Scour Resistance (tons)	100-Year Scour Elevation (ft. NAVD88)	Long-Term Scour Elevation (ft. NAVD88)	*** Soil Resistance Factor ϕ
EB-1 (WB)	24	339	N/A	-15	120	N/A	N/A	254	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (WB)	24	219	N/A	-25	100	N/A	N/A	164	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (WB)	24	339	N/A	-17	115	N/A	N/A	254	N/A	N/A	N/A	N/A	N/A	0.75
EB-1 (EB)	24	339	N/A	-15	115	N/A	N/A	254	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (EB)	24	219	N/A	-18	90	N/A	N/A	164	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (EB)	24	339	N/A	-20	120	N/A	N/A	254	N/A	N/A	N/A	N/A	N/A	0.75

Notes:

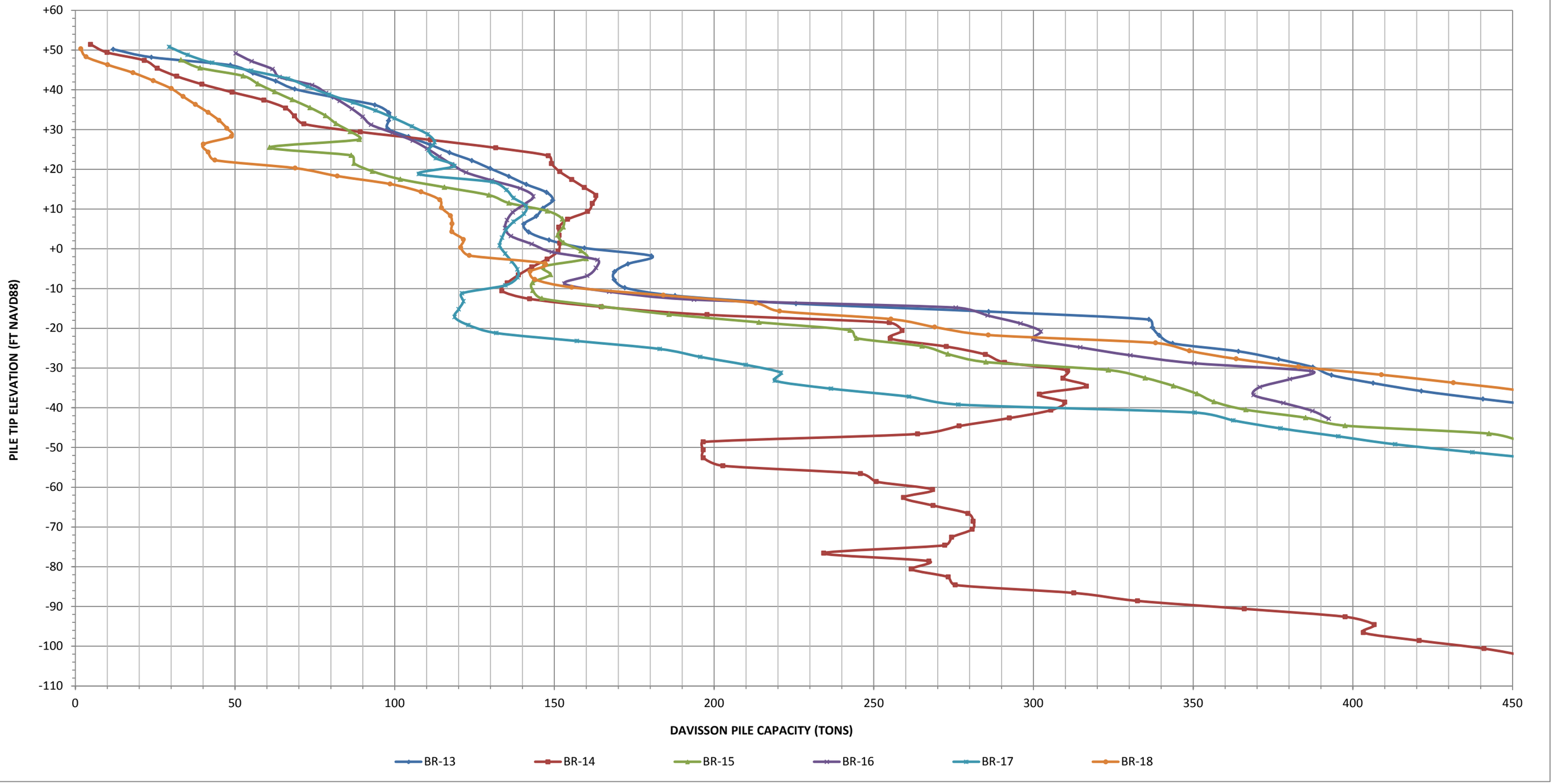
* Recommended Nominal Bearing Resistance: NBR ≥ $\frac{\text{Factored Design Load + Net Scour + Downdrag}}{\phi}$

** Test pile locations shown on plans.

*** All piles shall be dynamically monitored during installation in accordance with Section 455-5.13 of the Specifications.

**** Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.

24-IN SQUARE PPC PILES
Wekiva Parkway Section 7A
SR 429 at Yankee Lake Road
GEC Project No. 3520G



PILE DATA TABLE &
DAVISSON PILE CAPACITY CURVES

SR 429 OVER LAKE MARKHAM ROAD

Pile Data Tables
Wekiva Parkway (SR 429) – Section 7A
FPID No. 240200-2-52-01
GEC Project No. 3520G

SR 429 over Lake Markham Road
24-inch Steel Pipe Pile Design Table

PILE DATA TABLE														
	Installation Criteria							Design Criteria						
Bent No.	Steel Pipe Pile Size (in)	* NBR (tons)	Nominal Uplift Resistance (tons)	**** Min. Tip Elevation (ft NAVD88)	** Test Pile Length (ft)	Required Jet Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Factored Design Load (tons)	Down Drag (tons)	Total Scour Resistance (tons)	Net Scour Resistance (tons)	100-Year Scour Elevation (ft. NAVD88)	Long-Term Scour Elevation (ft. NAVD88)	*** Soil Resistance Factor ϕ
EB-1 (WB)	24	256	N/A	-145	240	N/A	N/A	192	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (WB)	24	238	N/A	-155	225	N/A	N/A	178	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (WB)	24	256	N/A	0	195	N/A	N/A	192	N/A	N/A	N/A	N/A	N/A	0.75
EB-1 (EB)	24	251	N/A	-30	135	N/A	N/A	188	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (EB)	24	242	N/A	-35	130	N/A	N/A	181	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (EB)	24	251	N/A	-75	180	N/A	N/A	188	N/A	N/A	N/A	N/A	N/A	0.75

Notes:

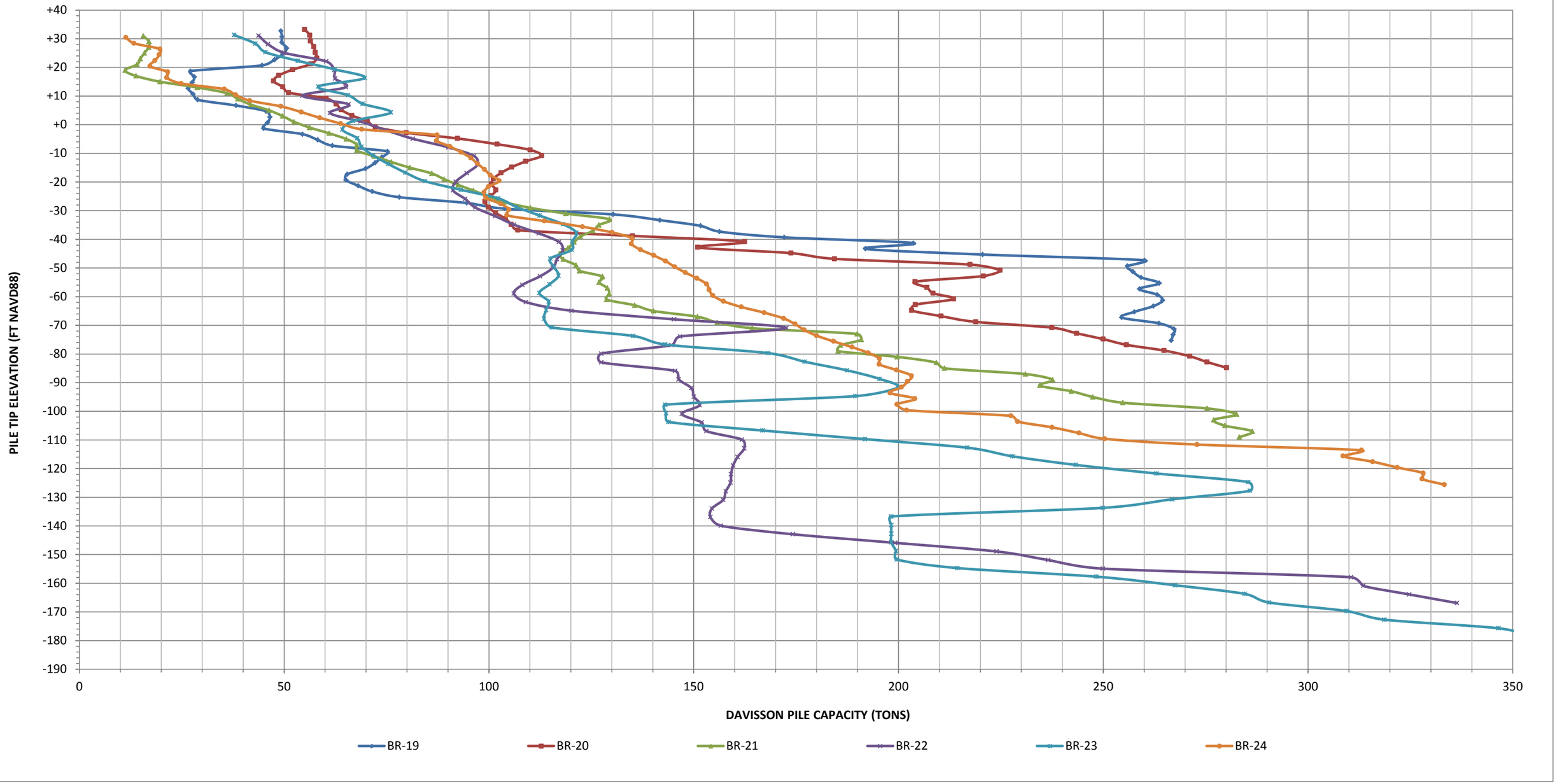
* Recommended Nominal Bearing Resistance: NBR ≥ $\frac{\text{Factored Design Load + Net Scour + Downdrag}}{\phi}$

** Test pile locations shown on plans.

*** All piles shall be dynamically monitored during installation in accordance with Section 455-5.13 of the Specifications.

**** Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.

24 -IN STEEL PIPE PILES
Wekiva Parkway Section 7A
SR 429 at Lake Markham Road
GEC Project No. 3520G



PILE DATA TABLE &
DAVISSON PILE CAPACITY CURVES

SR 429 OVER GLADE VIEW DRIVE

Pile Data Tables
Wekiva Parkway (SR 429) – Section 7A
FPID No. 240200-2-52-01
GEC Project No. 3520G

SR 429 over Glade View Drive
24-inch Square PPC Pile Design Table

PILE DATA TABLE														
	Installation Criteria							Design Criteria						
Bent No.	PPC Pile Size (in)	* NBR (tons)	Nominal Uplift Resistance (tons)	**** Min. Tip Elevation (ft NAVD88)	** Test Pile Length (ft)	Required Jet Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Factored Design Load (tons)	Down Drag (tons)	Total Scour Resistance (tons)	Net Scour Resistance (tons)	100-Year Scour Elevation (ft. NAVD88)	Long-Term Scour Elevation (ft. NAVD88)	*** Soil Resistance Factor ϕ
EB-1 (WB)	24	272	N/A	0	100	N/A	N/A	204	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (WB)	24	259	N/A	0	75	N/A	N/A	194	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (WB)	24	272	N/A	0	105	N/A	N/A	204	N/A	N/A	N/A	N/A	N/A	0.75
EB-1 (EB)	24	274	N/A	0	95	N/A	N/A	205	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (EB)	24	252	N/A	0	75	N/A	N/A	189	N/A	N/A	N/A	N/A	N/A	0.75
EB-3 (EB)	24	274	N/A	0	110	N/A	N/A	205	N/A	N/A	N/A	N/A	N/A	0.75

Notes:

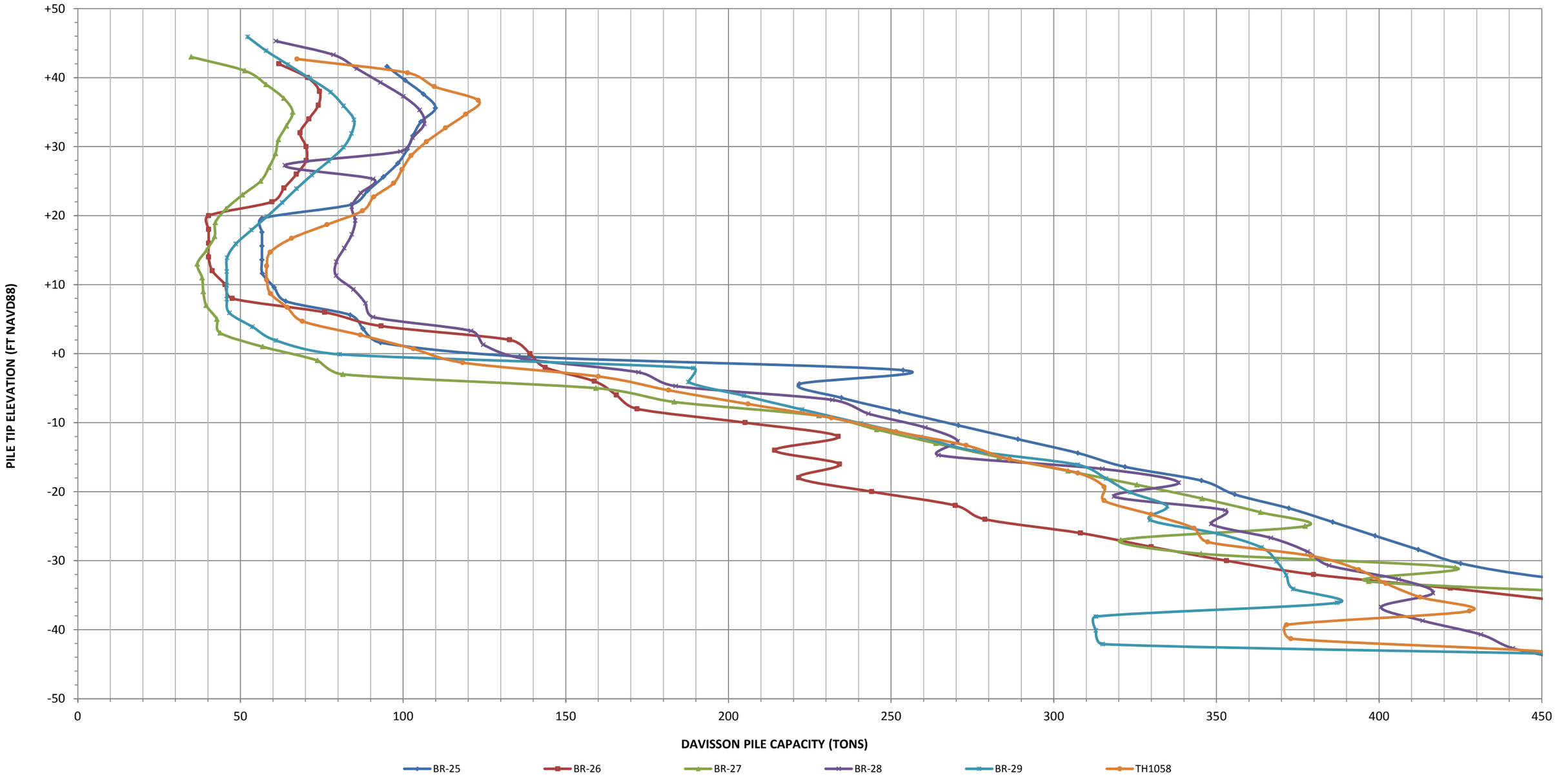
* Recommended Nominal Bearing Resistance: NBR ≥ $\frac{\text{Factored Design Load + Net Scour + Downdrag}}{\phi}$

** Test pile locations shown on plans.

*** All piles shall be dynamically monitored during installation in accordance with Section 455-5.13 of the Specifications.

**** Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.

24-IN SQUARE PPC PILES
Wekiva Parkway Section 7A
SR 429 at Glade View Drive
GEC Project No. 3520G



PILE DATA TABLE &
DAVISSON PILE CAPACITY CURVES

SR 429 OVER EASTBOUND FRONTAGE ROAD

Pile Data Tables
Wekiva Parkway (SR 429) – Section 7A
FPID No. 240200-2-52-01
GEC Project No. 3520G

SR 429 over Eastbound Frontage Road
24-inch Square PPC Pile Design Table

PILE DATA TABLE														
	Installation Criteria							Design Criteria						
Bent No.	PPC Pile Size (in)	* NBR (tons)	Nominal Uplift Resistance (tons)	**** Min. Tip Elevation (ft NAVD88)	** Test Pile Length (ft)	Required Jet Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Factored Design Load (tons)	Down Drag (tons)	Total Scour Resistance (tons)	Net Scour Resistance (tons)	100-Year Scour Elevation (ft. NAVD88)	Long-Term Scour Elevation (ft. NAVD88)	*** Soil Resistance Factor ϕ
EB-1 (WB)	24	410	N/A	-5	120	N/A	N/A	307	N/A	N/A	N/A	N/A	N/A	0.75
EB-2 (WB)	24	410	N/A	-15	120	N/A	N/A	307	N/A	N/A	N/A	N/A	N/A	0.75
EB-1 (EB)	24	379	N/A	-10	120	N/A	N/A	284	N/A	N/A	N/A	N/A	N/A	0.75
EB-2 (EB)	24	379	N/A	-15	120	N/A	N/A	284	N/A	N/A	N/A	N/A	N/A	0.75

Notes:

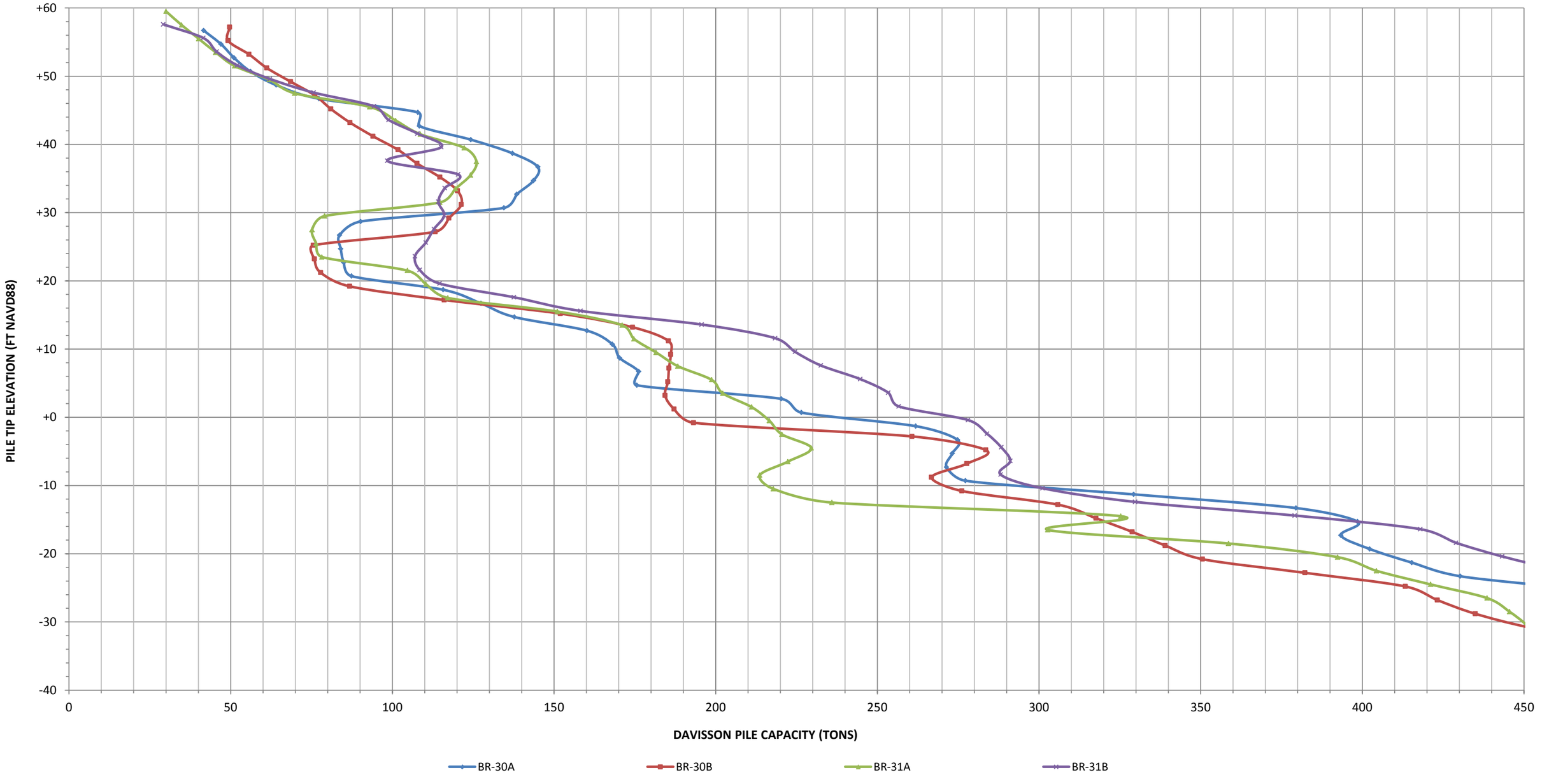
* Recommended Nominal Bearing Resistance: NBR ≥ $\frac{\text{Factored Design Load + Net Scour + Downdrag}}{\phi}$

** Test pile locations shown on plans.

*** All piles shall be dynamically monitored during installation in accordance with Section 455-5.13 of the Specifications.

**** Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.

24-IN SQUARE PPC PILES
Wekiva Parkway Section 7A
SR 429 at Eastbound Frontage Road
GEC Project No. 3520G



PILE DATA TABLE &
DAVISSON PILE CAPACITY CURVES

SR 429 OVER ORANGE AVENUE & ORANGE BOULEVARD

Pile Data Tables
Wekiva Parkway (SR 429) – Section 7A
FPID No. 240200-2-52-01
GEC Project No. 3520G

SR 429 over Orange Avenue & Orange Boulevard
24-inch Square PPC Pile Design Table

PILE DATA TABLE														
	Installation Criteria							Design Criteria						
Bent No.	PPC Pile Size (in)	* NBR (tons)	Nominal Uplift Resistance (tons)	**** Min. Tip Elevation (ft NAVD88)	** Test Pile Length (ft)	Required Jet Elevation (ft NAVD88)	Required Preform Elevation (ft NAVD88)	Factored Design Load (tons)	Down Drag (tons)	Total Scour Resistance (tons)	Net Scour Resistance (tons)	100-Year Scour Elevation (ft. NAVD88)	Long-Term Scour Elevation (ft. NAVD88)	*** Soil Resistance Factor ϕ
EB-1 (WB)	24	252	N/A	-14	120	N/A	+20	189	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (WB)	24	276	N/A	-24	105	N/A	+20	207	N/A	N/A	N/A	N/A	N/A	0.75
P-3 (WB)	24	288	N/A	-8	105	N/A	+44	216	N/A	N/A	N/A	N/A	N/A	0.75
P-4 (WB)	24	292	N/A	-14	105	N/A	+29	219	N/A	N/A	N/A	N/A	N/A	0.75
EB-5 (WB)	24	303	N/A	0	120	N/A	+35	227	N/A	N/A	N/A	N/A	N/A	0.75
EB-1 (EB)	24	288	N/A	+3	120	N/A	+20	216	N/A	N/A	N/A	N/A	N/A	0.75
P-2 (EB)	24	272	N/A	-7	95	N/A	+50	204	N/A	N/A	N/A	N/A	N/A	0.75
P-3 (EB)	24	271	N/A	0	95	N/A	+28	203	N/A	N/A	N/A	N/A	N/A	0.75
P-4 (EB)	24	302	N/A	-10	110	N/A	+27	226	N/A	N/A	N/A	N/A	N/A	0.75
EB-5 (EB)	24	290	N/A	-20	120	N/A	+27	217	N/A	N/A	N/A	N/A	N/A	0.75

Notes:

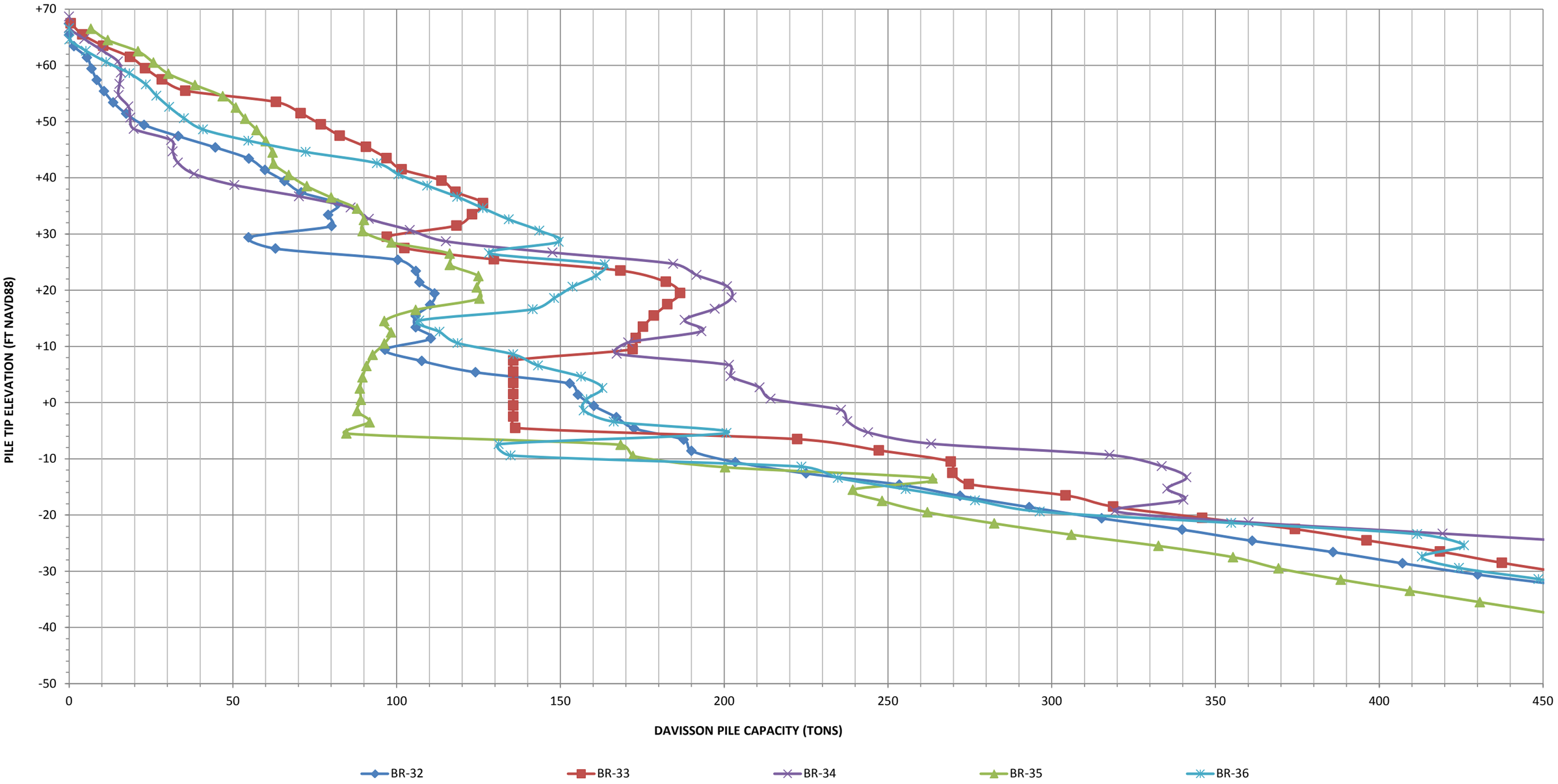
* Recommended Nominal Bearing Resistance: NBR ≥ $\frac{\text{Factored Design Load + Net Scour + Downdrag}}{\phi}$

** Test pile locations shown on plans.

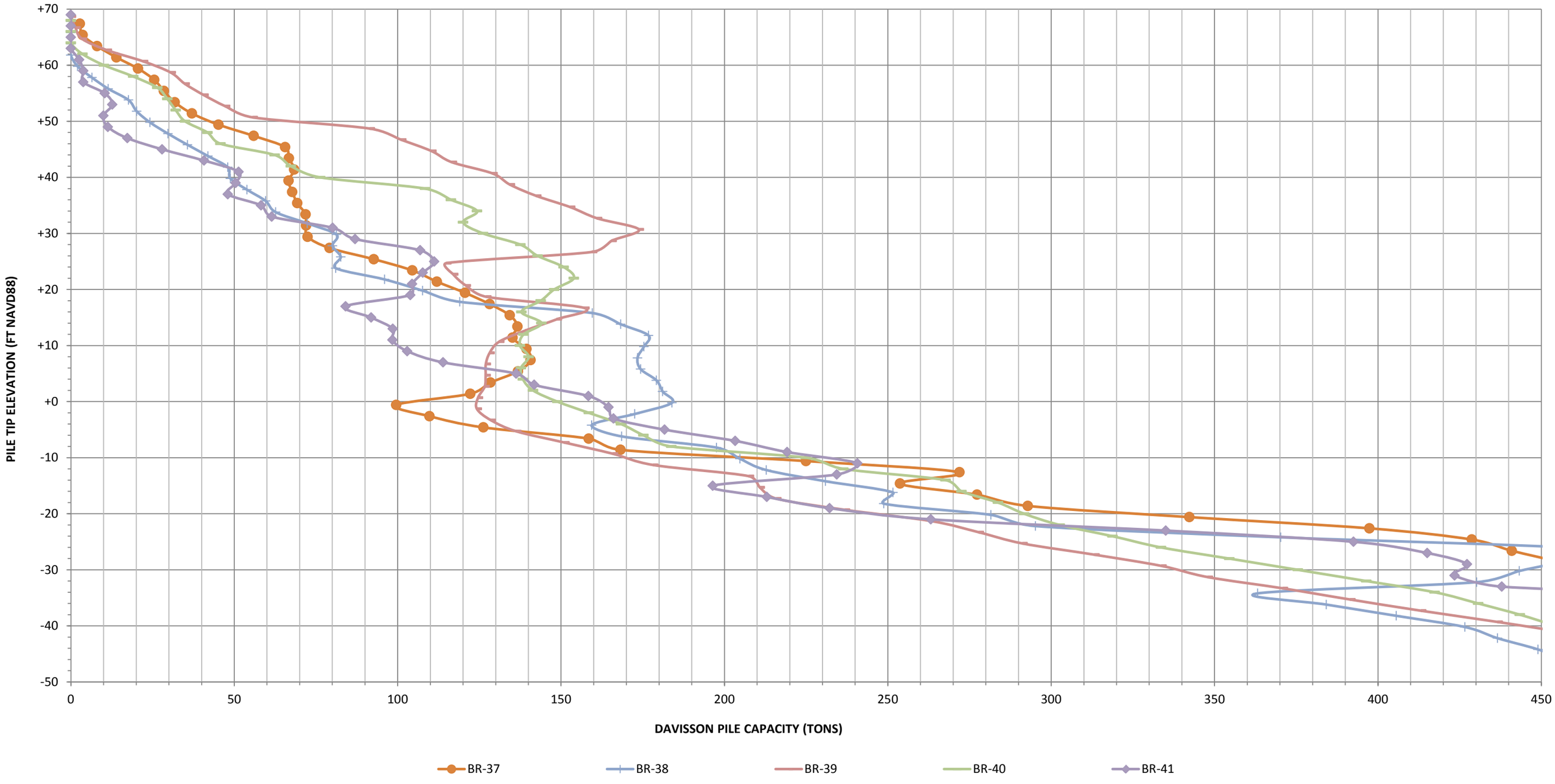
*** All piles shall be dynamically monitored during installation in accordance with Section 455-5.13 of the Specifications.

**** Minimum tip elevation is required to penetrate soft soil strata and limit pile settlement.

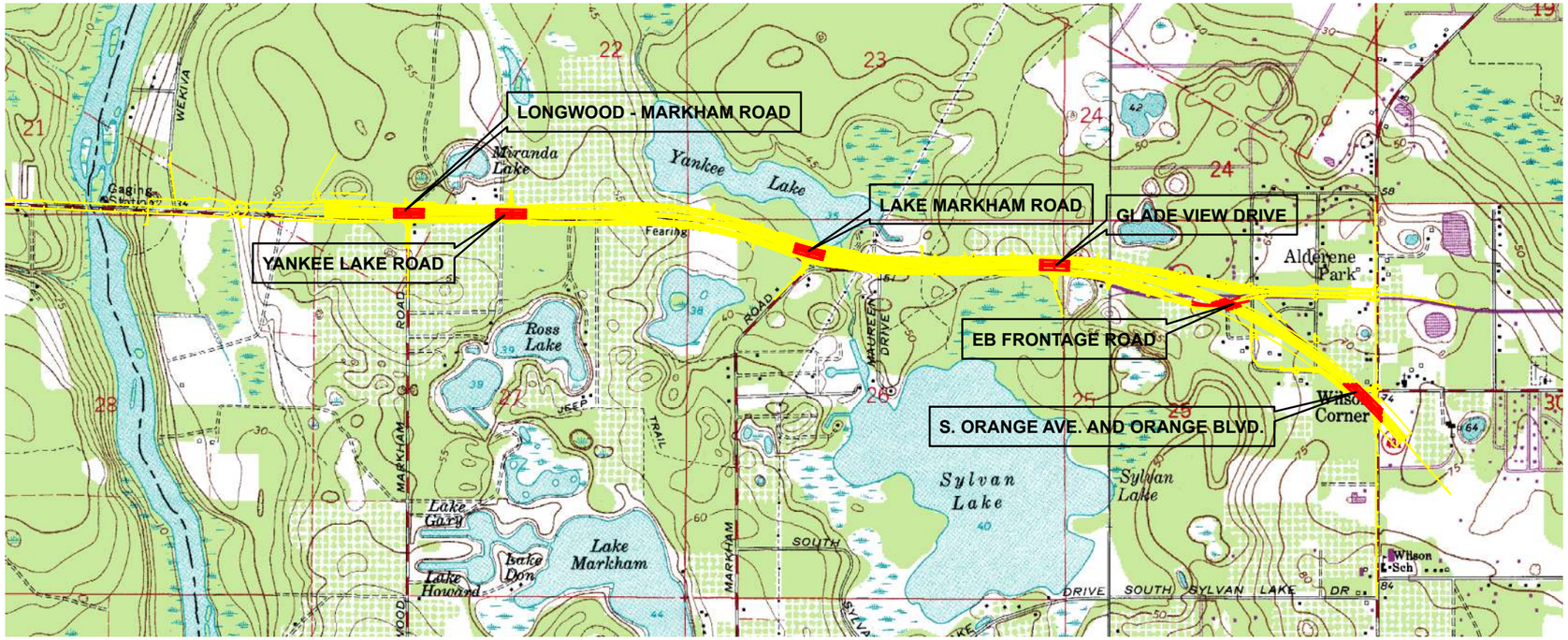
24-IN SQUARE PPC PILES
Wekiva Parkway Section 7A
SR 429 EB at Orange Blvd. & Orange Avenue
GEC Project No. 3520G



24-IN SQUARE PPC PILES
Wekiva Parkway Section 7A
SR 429 WB at Orange Blvd. & Orange Ave.
GEC Project No. 3520G

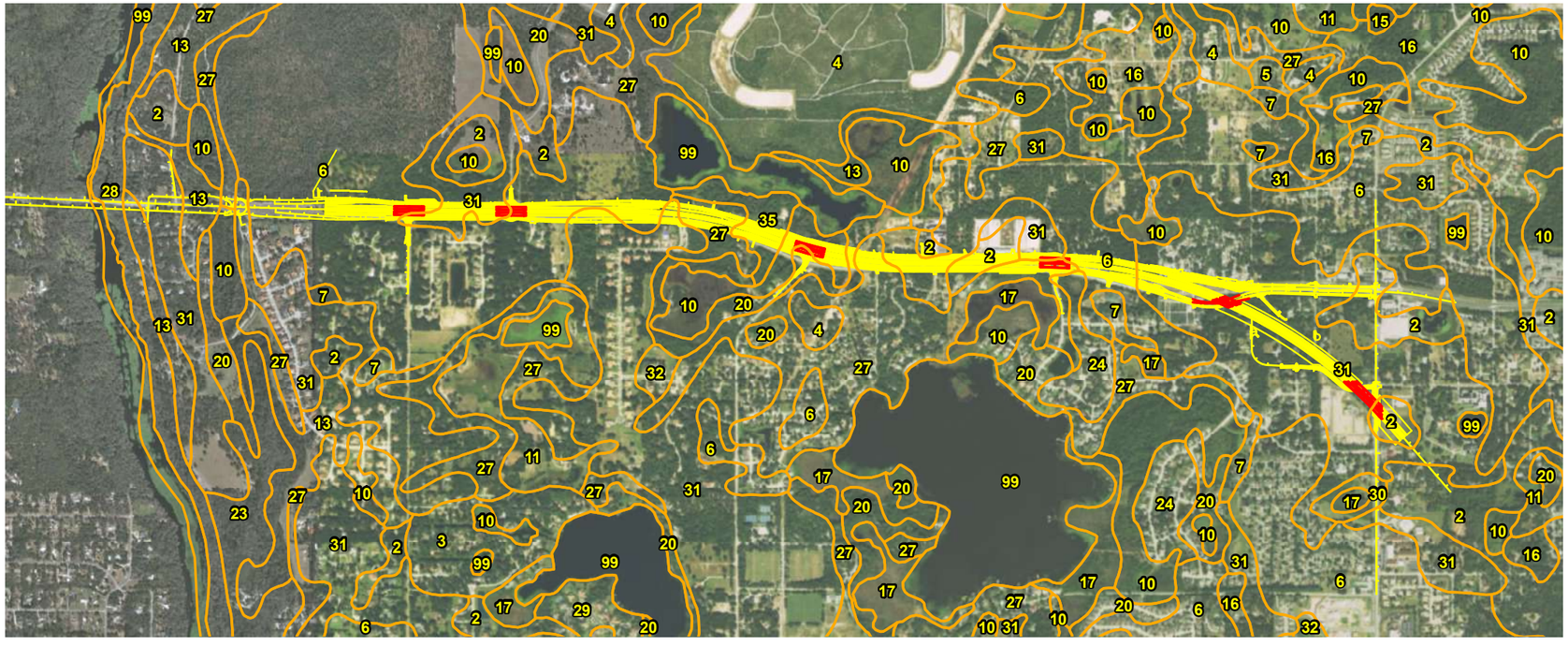


USGS QUADRANGLE AND
NRCS SOIL SURVEY MAPS



PREPARED FROM:
USGS Sanford SW, FL Quadrangle Map
USGS Sanford, FL Quadrangle Map
Sections: 22, 23, 25, 26, 27, 28, 39
Township: 19 South
Range: 29 East

Section: 30
Townsip: 19 South
Range: 30 East



PREPARED FROM:
NRCS Soil Survey of Seminole County, FL
Seminole County Map Unit Legend
2 - Adamsville-Sparr fine sands
6 - Astatula-Apopka fine sands, 0 to 5 percent slopes
10 - Basinger, Samsula, and Hontoon soils, depressional
20 - Myakka and EauGallie fine sands
27 - Pomello fine sand, 0 to 5 percent slopes
31 - Tavares-Millhopper fine sands, 0 to 5 percent slopes

0 950 1,900
Feet

N W E S

Geotechnical and Environmental Consultants, Inc.
919 Lake Baldwin Lane
Orlando, FL 32814
PH (407) 898-1818 FAX (407) 898-1837
Certificate of Authorization No. 00005882
DANIEL C. STANFILL P.E. NO. 42763
GEC

PROJECT NO.	DATE	DRAWN BY	CHECKED BY	CHECKED BY
3520G	5-3-17	SKR	CGB 71571	DCS 42763

USGS QUADRANGLE AND NRCS SOIL SURVEY MAPS

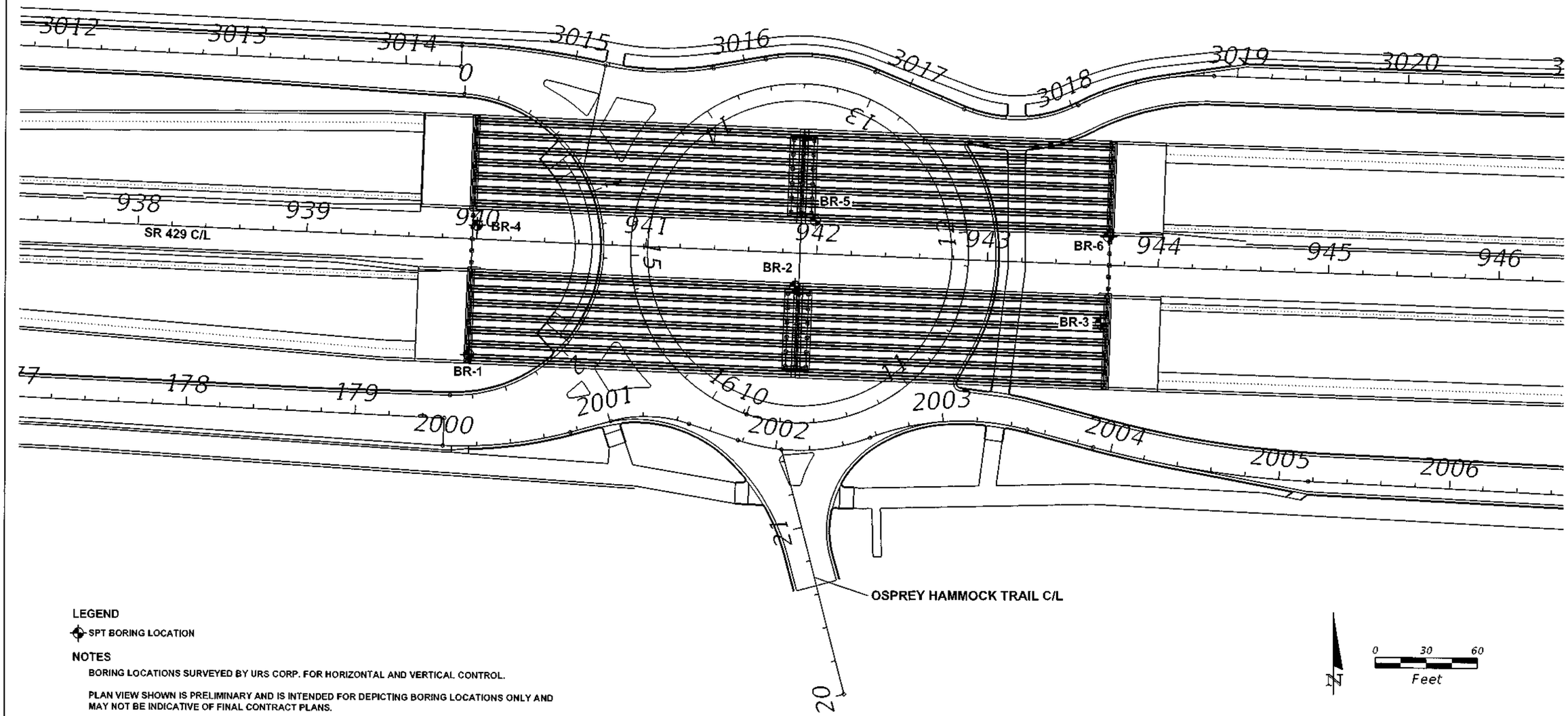
WEKIVA PARKWAY (SR 429) SECTION 7A

FIGURE NO. -

J:\D107\3520E Wekiva 7A\5-3-17\3520Gquad.mxd 5/3/2017

BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER OSPREY HAMMOCK TRAIL



LEGEND

SPT BORING LOCATION

NOTES

BORING LOCATIONS SURVEYED BY URS CORP. FOR HORIZONTAL AND VERTICAL CONTROL.

PLAN VIEW SHOWN IS PRELIMINARY AND IS INTENDED FOR DEPICTING BORING LOCATIONS ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.

Bridge Nos. 770097 & 770098

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SKR	CGB 71571	CGB 71571	DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: BORING LOCATION PLAN

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT OSPREY HAMMOCK TRAIL

SHEET NO.:

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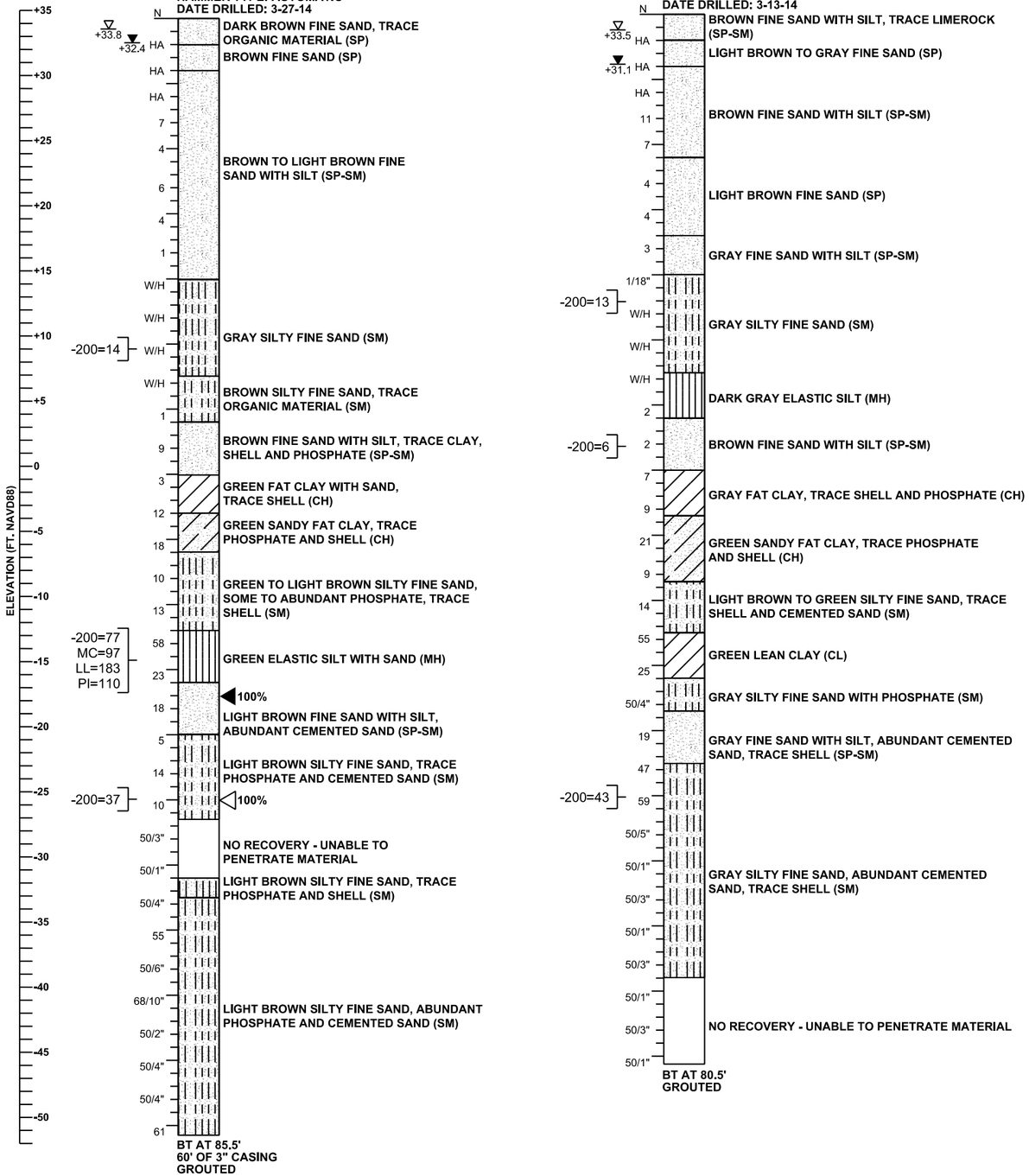

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
+33.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
+31.1	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND | SILT | SAND AND CLAY | SAND AND SILT | CLAY

GENERAL NOTES

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INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: SLIGHTLY AGGRESSIVE (pH=7.8)
CONCRETE: SLIGHTLY AGGRESSIVE (pH=7.8)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 21
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770097 & 770098

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
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DANIEL C. STANFILL PE NO. 42763

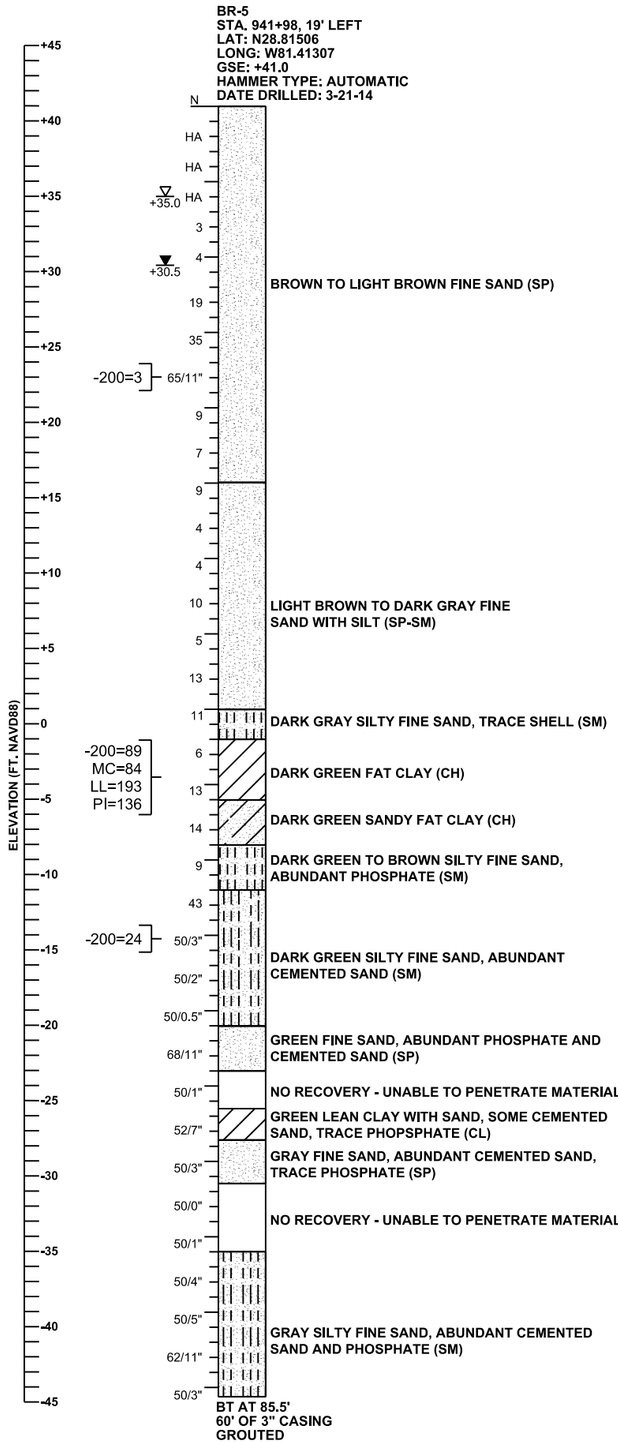
DRAWN BY: SKR
CHECKED BY: CGB 71571
DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

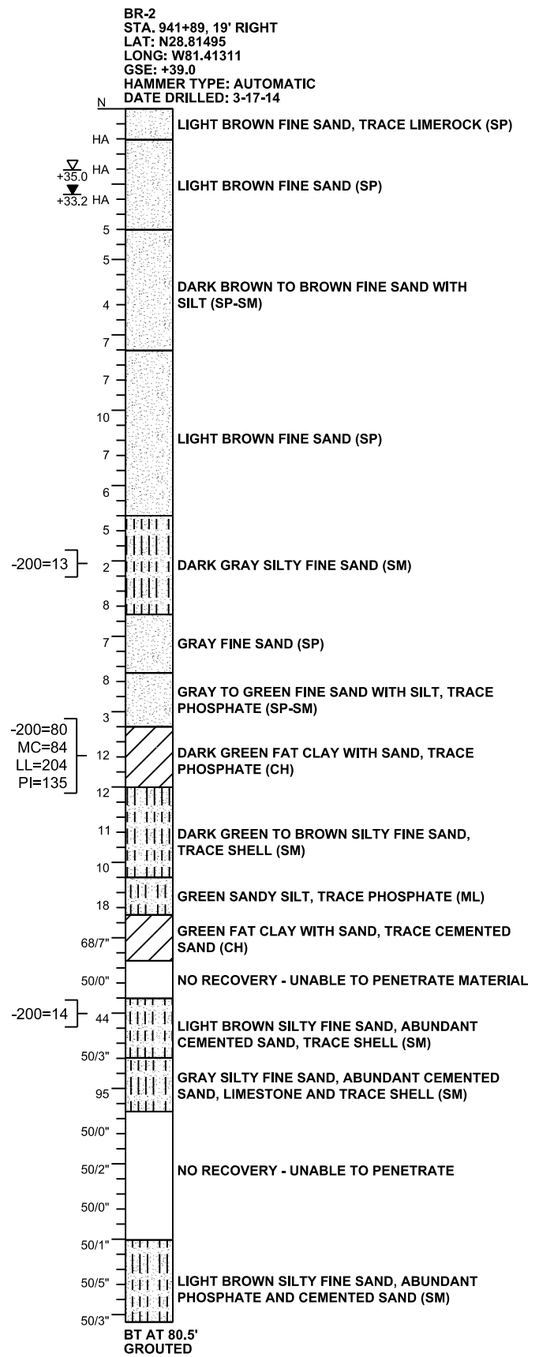
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT OSPREY HAMMOCK TRAIL
SHEET NO. B1-4

scott 5/13/2015 2:05:07 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn





LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +35.0	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +33.2	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND — SAND AND CLAY
SAND AND SILT — CLAY

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
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OUTSIDE DIAMETER: 2.0 IN.
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HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
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CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 21
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770097 & 770098

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.:
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT OSPREY HAMMOCK TRAIL
SHEET NO.: B1-5

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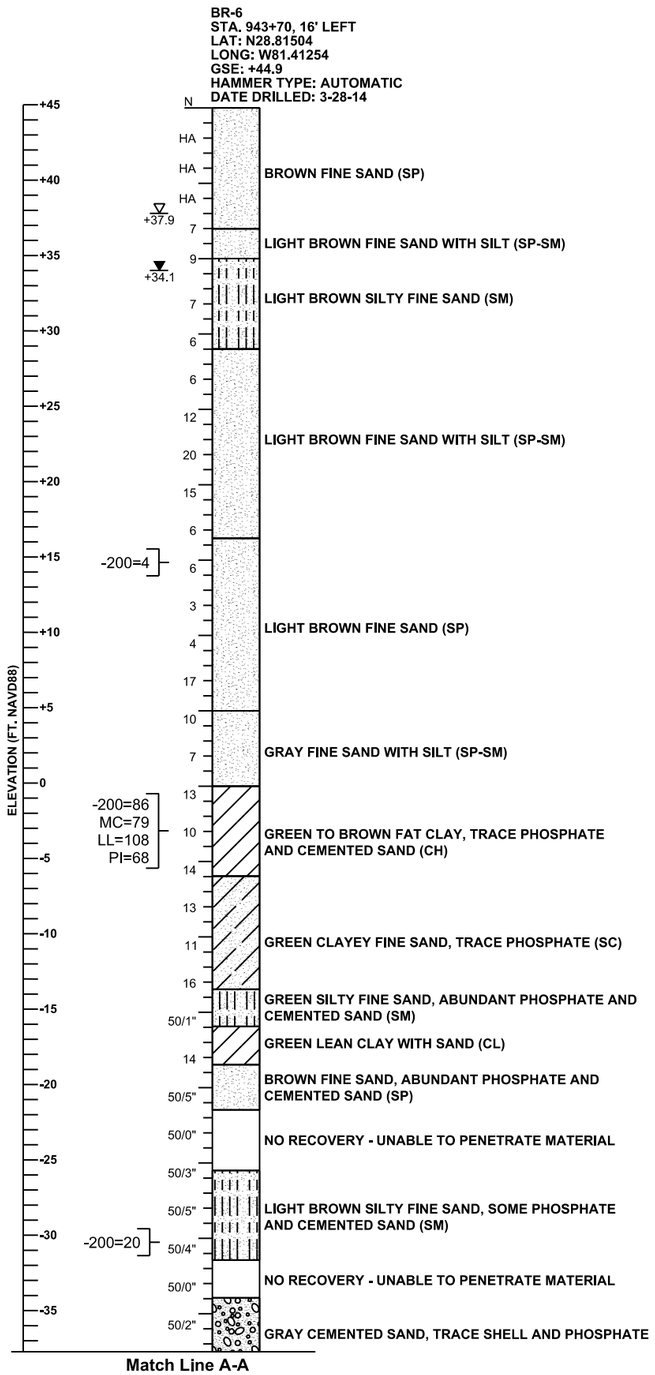

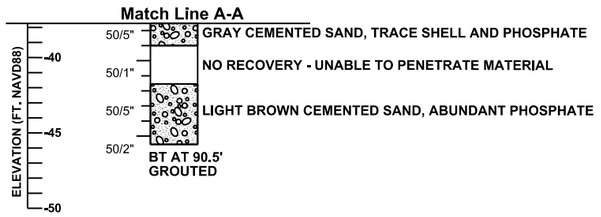

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +37.9	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +34.1	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
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	3-8	LOOSE
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	OVER 40	VERY DENSE

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SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 21
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770097 & 770098

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
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DANIEL C. STANFILL PE NO. 42763

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DESIGNED BY: CGB 71571
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: *REPORT OF SPT BORINGS FOR STRUCTURES*

REF. DWG. NO.:

PROJECT NAME: *WEKIVA PARKWAY (SR 429) SECTION 7A AT OSPREY HAMMOCK TRAIL*

SHEET NO.: *B1-6*

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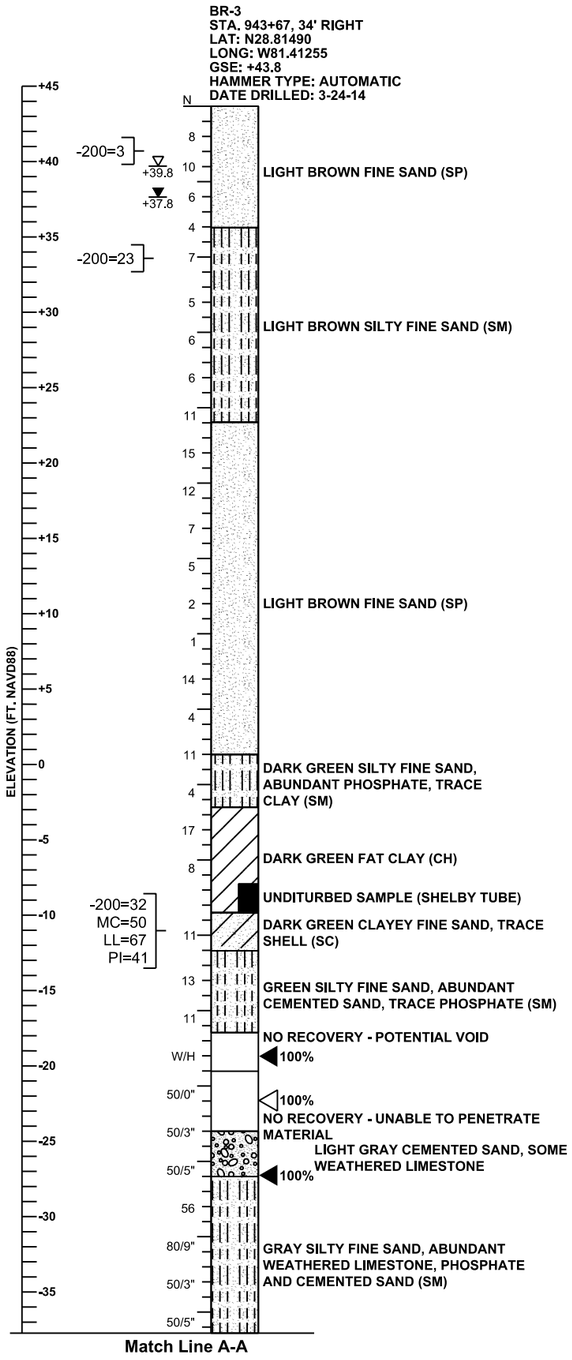

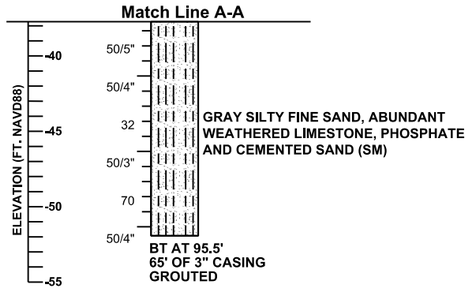

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
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	24-40	DENSE
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	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 21
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770097 & 770098

REVISIONS

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT OSPREY HAMMOCK TRAIL

SHEET NO. B1-7

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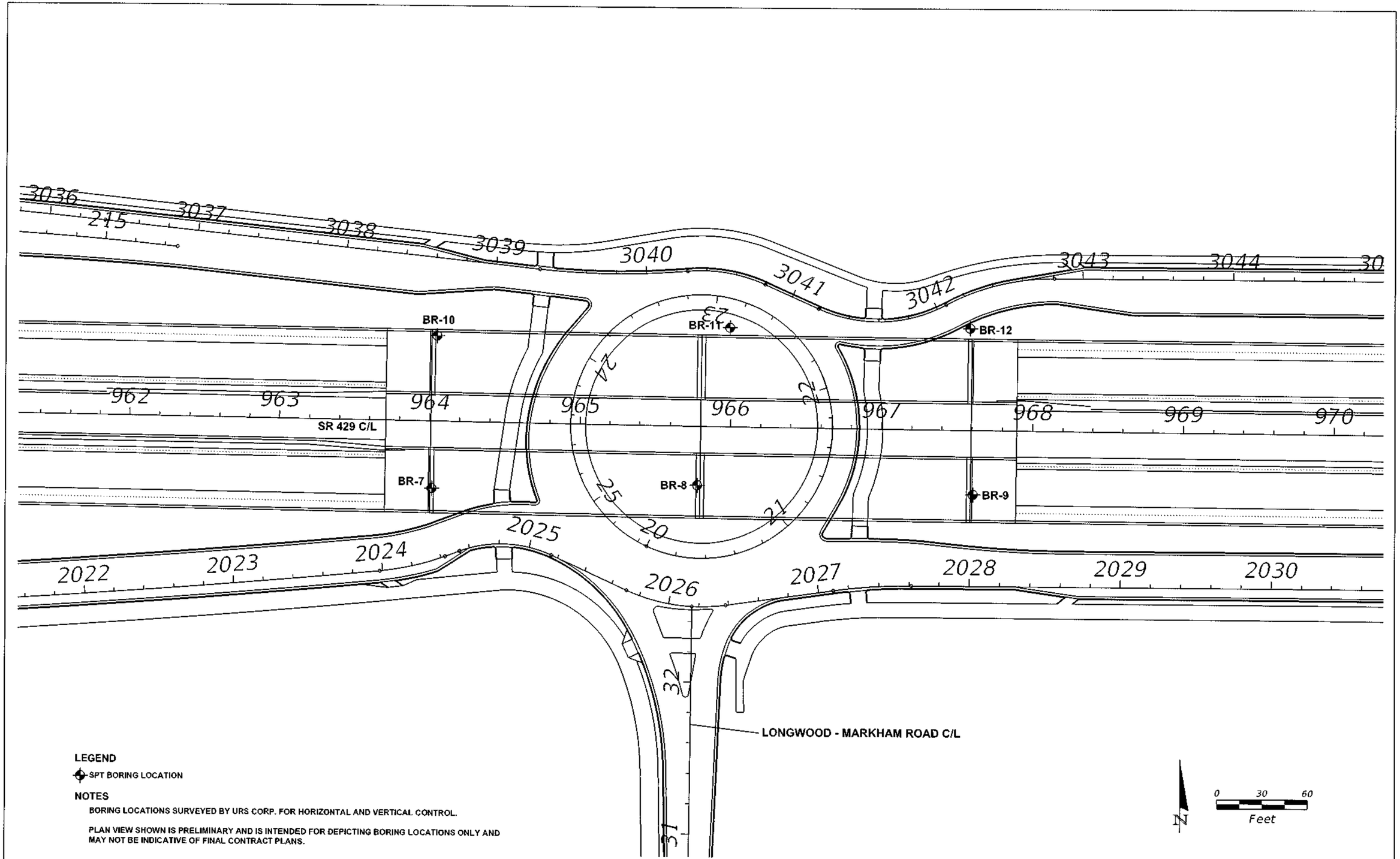
BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER LONGWOOD MARKHAM ROAD



LEGEND

SPT BORING LOCATION

NOTES

BORING LOCATIONS SURVEYED BY URS CORP. FOR HORIZONTAL AND VERTICAL CONTROL.

PLAN VIEW SHOWN IS PRELIMINARY AND IS INTENDED FOR DEPICTING BORING LOCATIONS ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.

Bridge Nos. 770099 & 770100

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SKR	CGB 71571	CGB 71571	DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

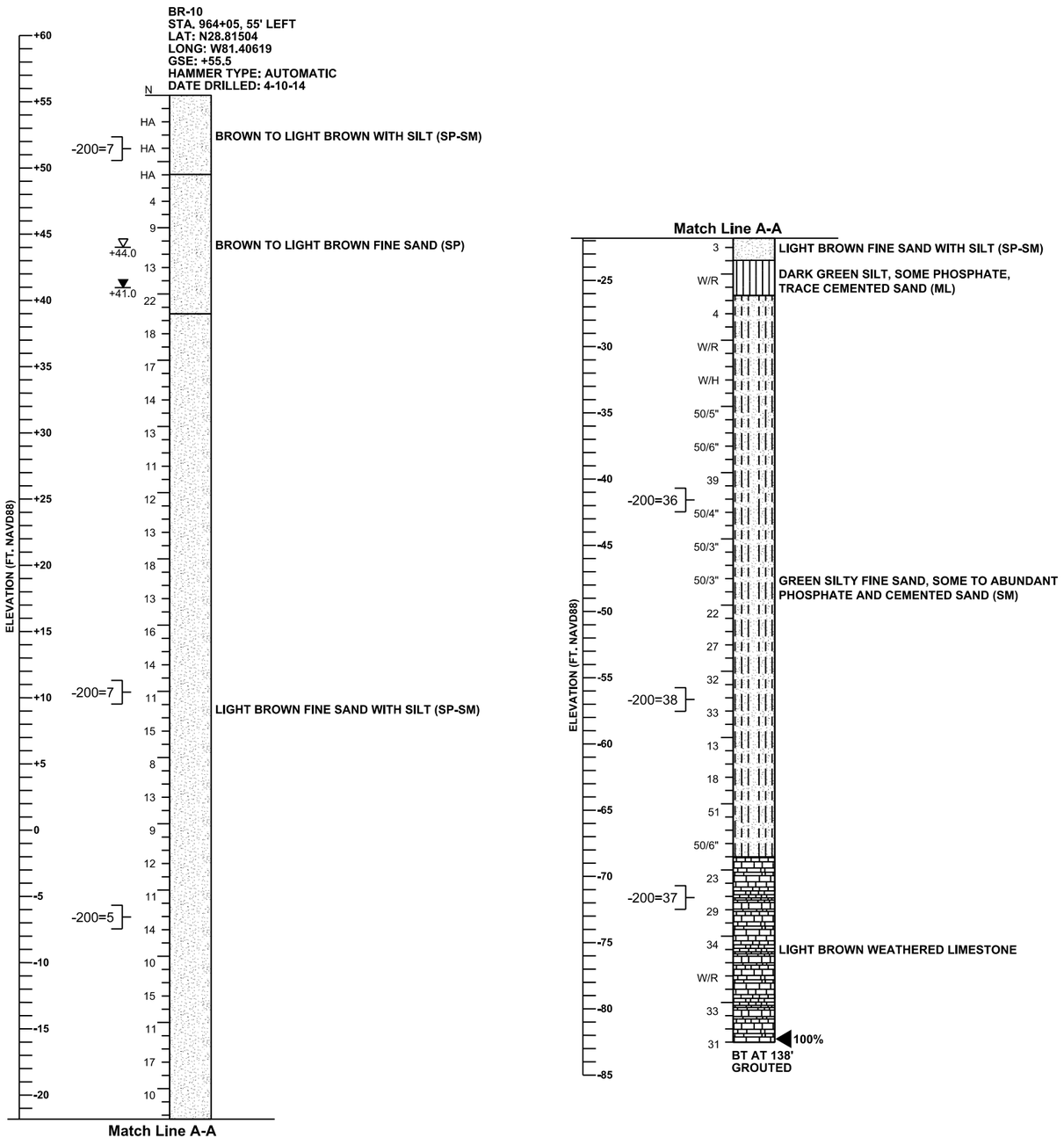
SHEET TITLE: BORING LOCATION PLAN

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)

SHEET NO.:

scott 2/6/2015 3:30:53 PM J:\D107\3520E Wekiva 7A\b1boring02.dgn



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/R	WEIGHT OF ROD
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +44.0	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +41.0	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — SILT

SAND AND SILT — LIMESTONE

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
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HAMMER WEIGHT: 140 LBS.
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CONCRETE: MODERATELY AGGRESSIVE (pH=5.7)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 39
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770099 & 770100

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.:
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)
SHEET NO.: B2-4

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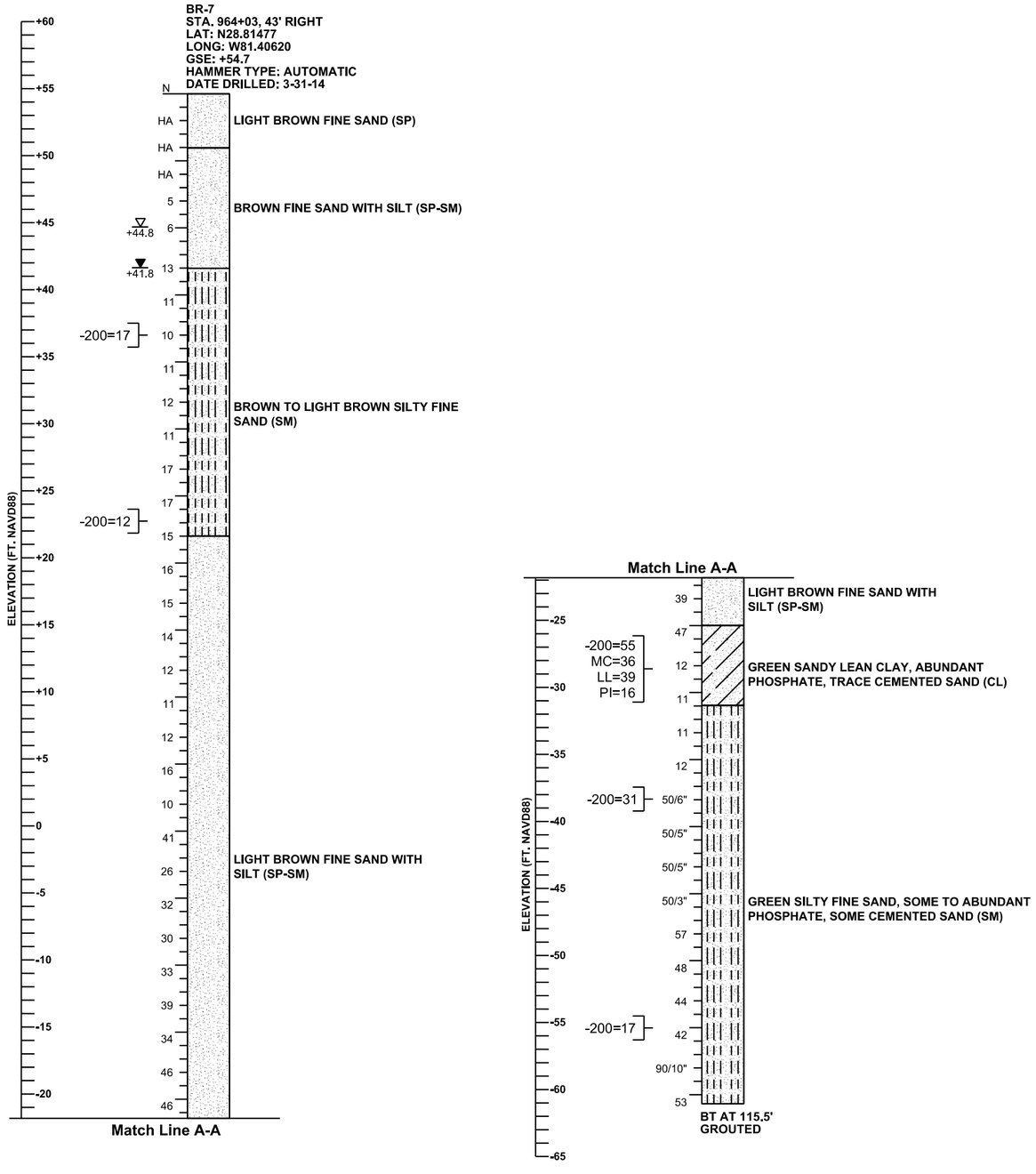

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +44.8	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +41.8	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND — SAND AND CLAY — SAND AND SILT

GENERAL NOTES

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SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 39
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RANGE: 29 EAST

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PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)
SHEET NO. B2-5

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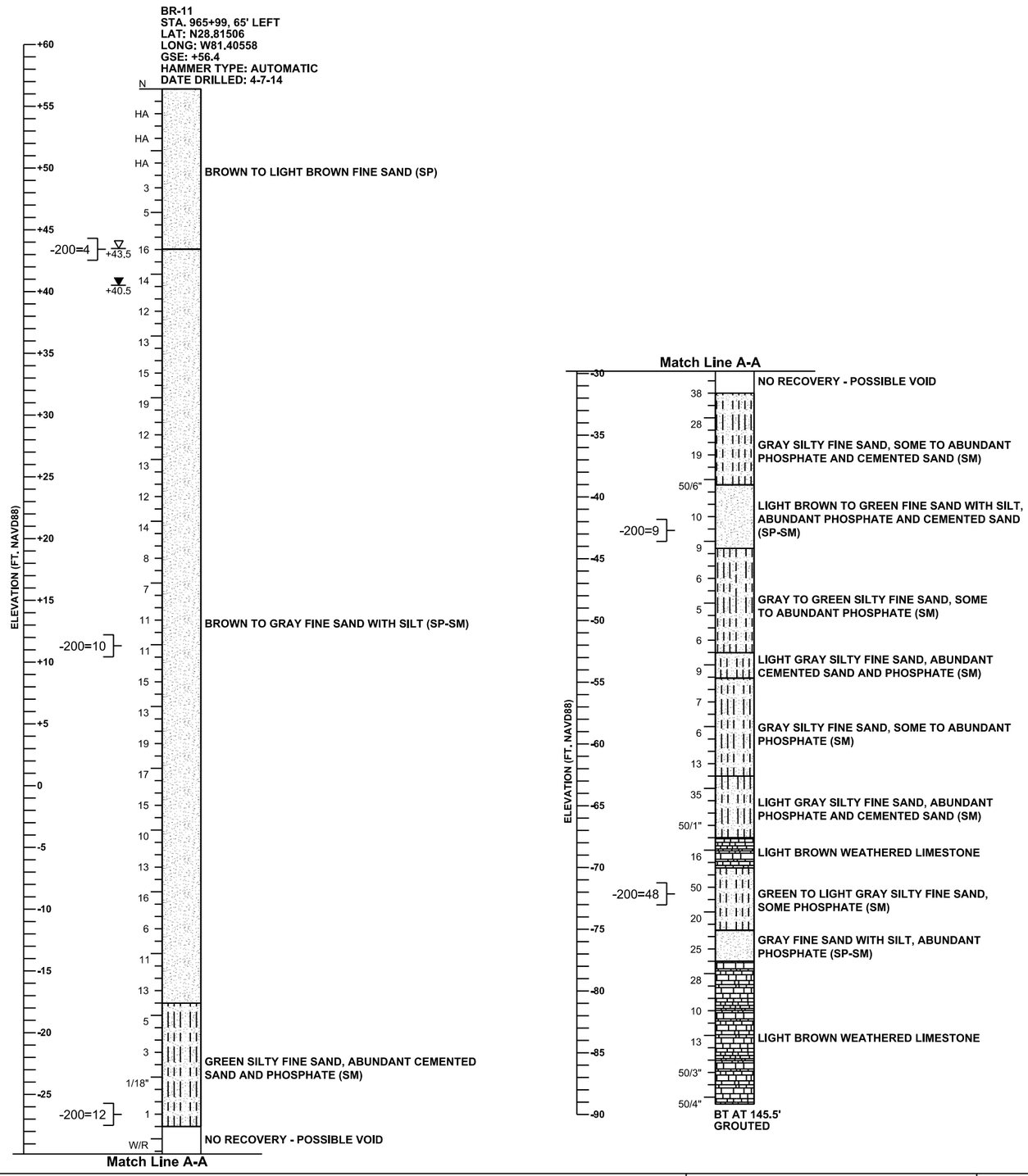

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/R	WEIGHT OF ROD
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +33.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +40.5	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — LIMESTONE — SAND AND SILT

GENERAL NOTES

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	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 39
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)
SHEET NO. B2-6

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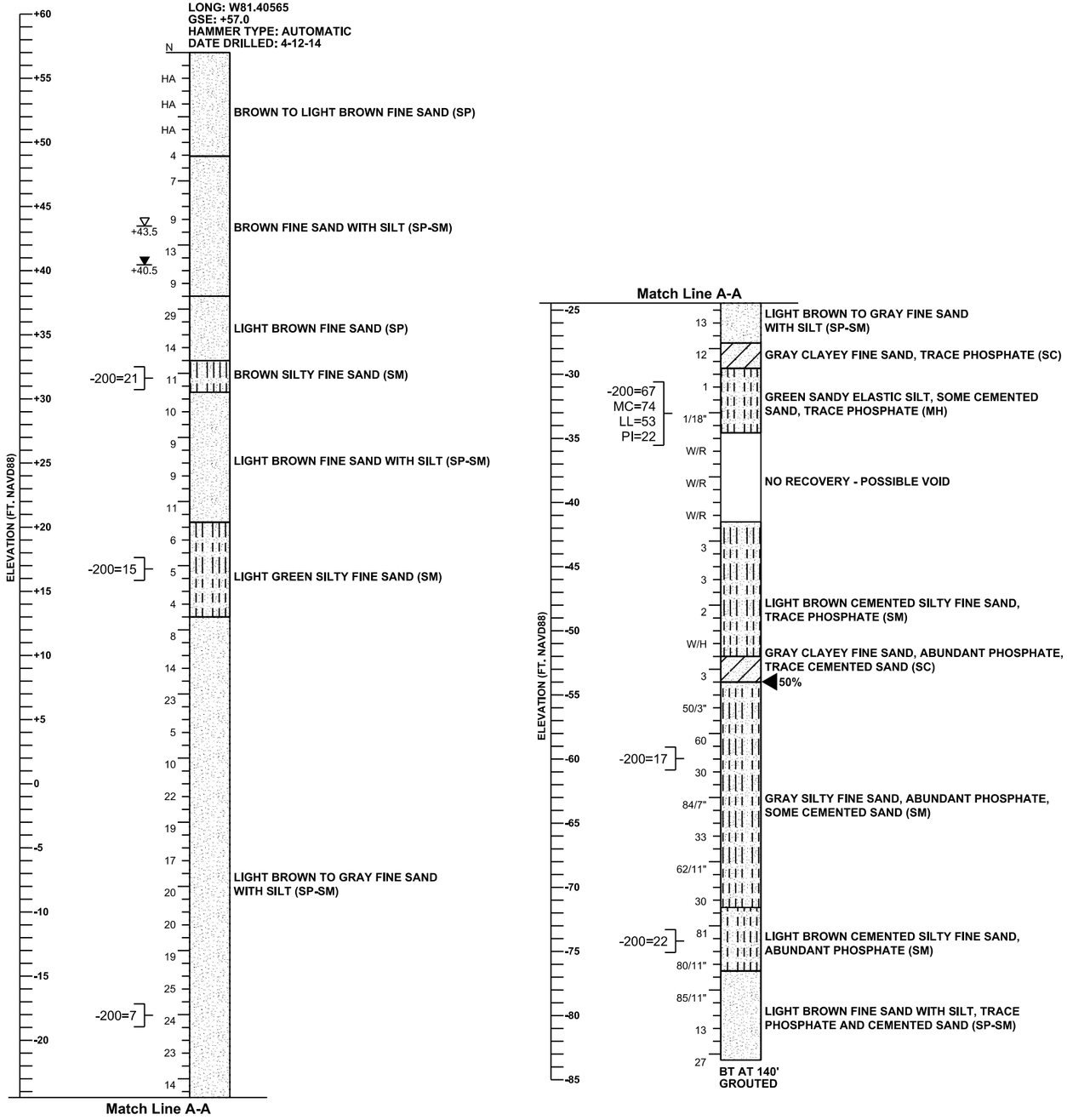

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
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W/H	WEIGHT OF HAMMER
W/R	WEIGHT OF ROD
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SECTION: 39
TOWNSHIP: 19 SOUTH
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PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)
SHEET NO.: B2-7

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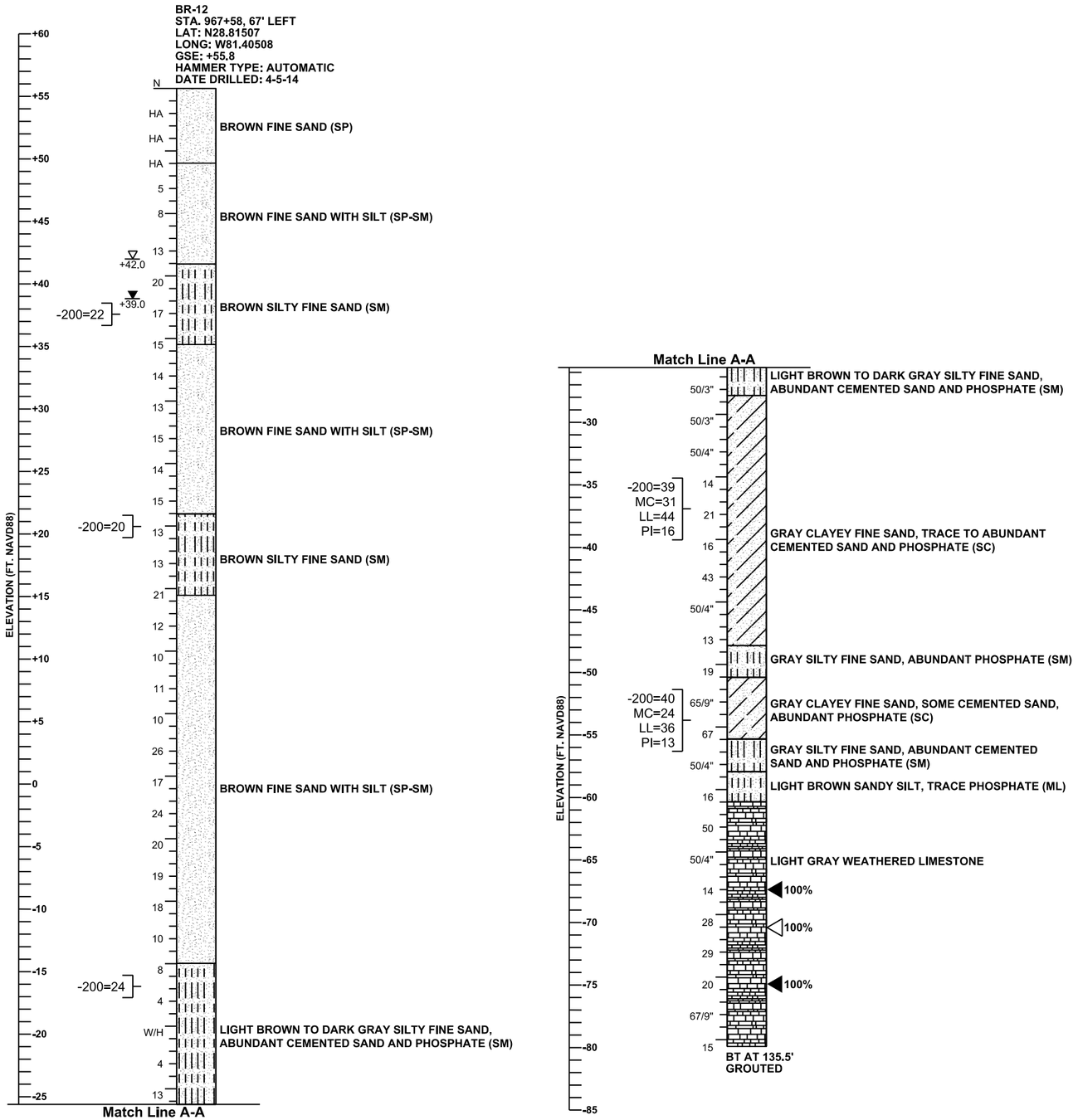

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HA	HAND AUGERED FOR UTILITY CLEARANCE
W/H	WEIGHT OF HAMMER
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REF. DWG. NO.
PROJECT NAME: *WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)*
SHEET NO. *B2-8*

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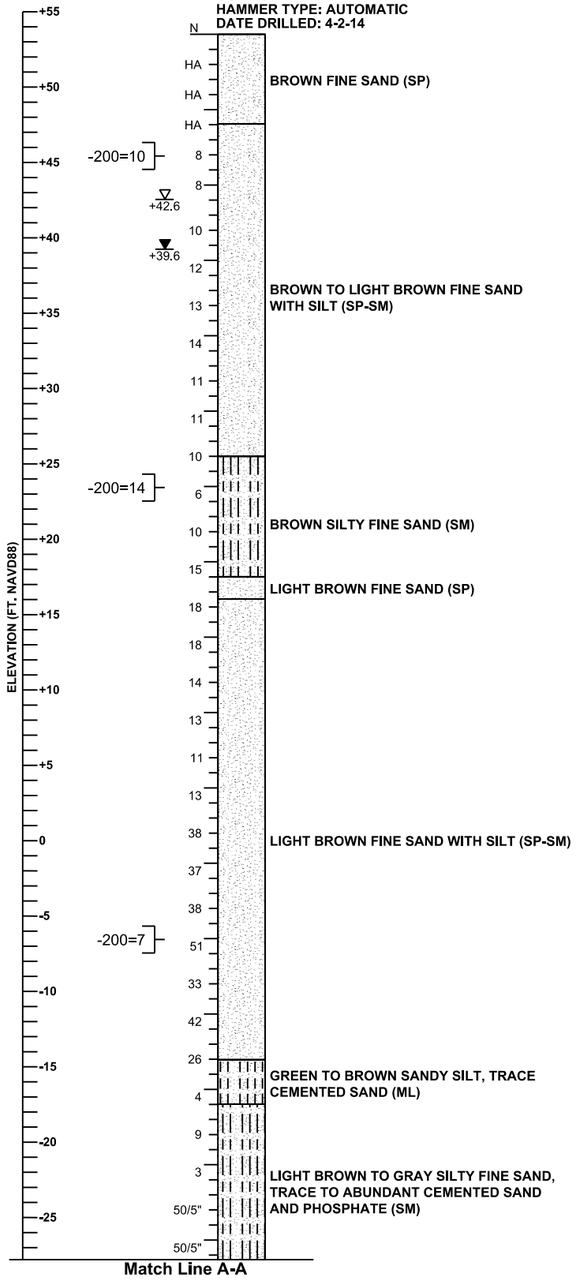

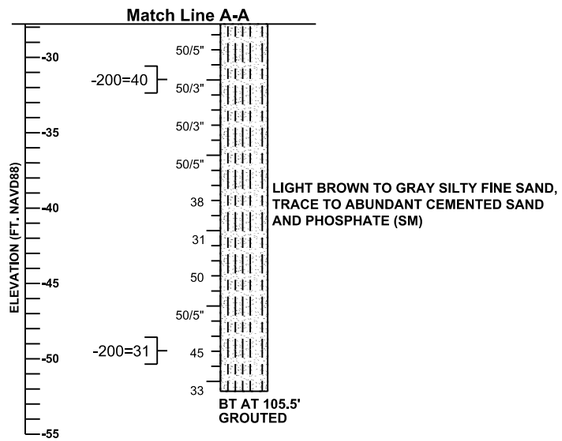

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-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND

SAND AND SILT

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

STANDARD PENETRATION TEST BORINGS WERE PERFORMED IN ACCORDANCE WITH ASTM D-1586. STANDARD PENETRATION RESISTANCES ARE SHOWN ON THE BORINGS AT THE TEST DEPTHS IN IN BLOWS PER FOOT UNLESS OTHERWISE NOTED.

THE BORING LOCATIONS WERE SURVEYED BY URS CORP. FOR VERTICAL AND HORIZONTAL CONTROL. BORING LOCATIONS REFERENCE THE SR 429 CENTERLINE.

BASED ON REVIEW OF THE U.S. GEOLOGICAL SURVEY MAP ENTITLED "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER IN ST. JOHNS RIVER WATER MANAGEMENT DISTRICT AND VICINITY, FLORIDA, SEPTEMBER 2008" FOR THE PROJECT AREA, THE MAXIMUM ELEVATION OF THE ARTESIAN HEAD IS ESTIMATED TO BE +19 FT. NAVD88. THE CONTRACTOR SHALL BE PREPARED TO HANDLE ARTESIAN HEAD LEVELS UP TO +19 FT. NAVD88.

SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.7)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.7)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 39
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770099 & 770100

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

DRAWN BY: SKR
CHECKED BY: CGB 71571
DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LONGWOOD-MARKHAM ROAD (CR 46A)

SHEET NO. B2-9

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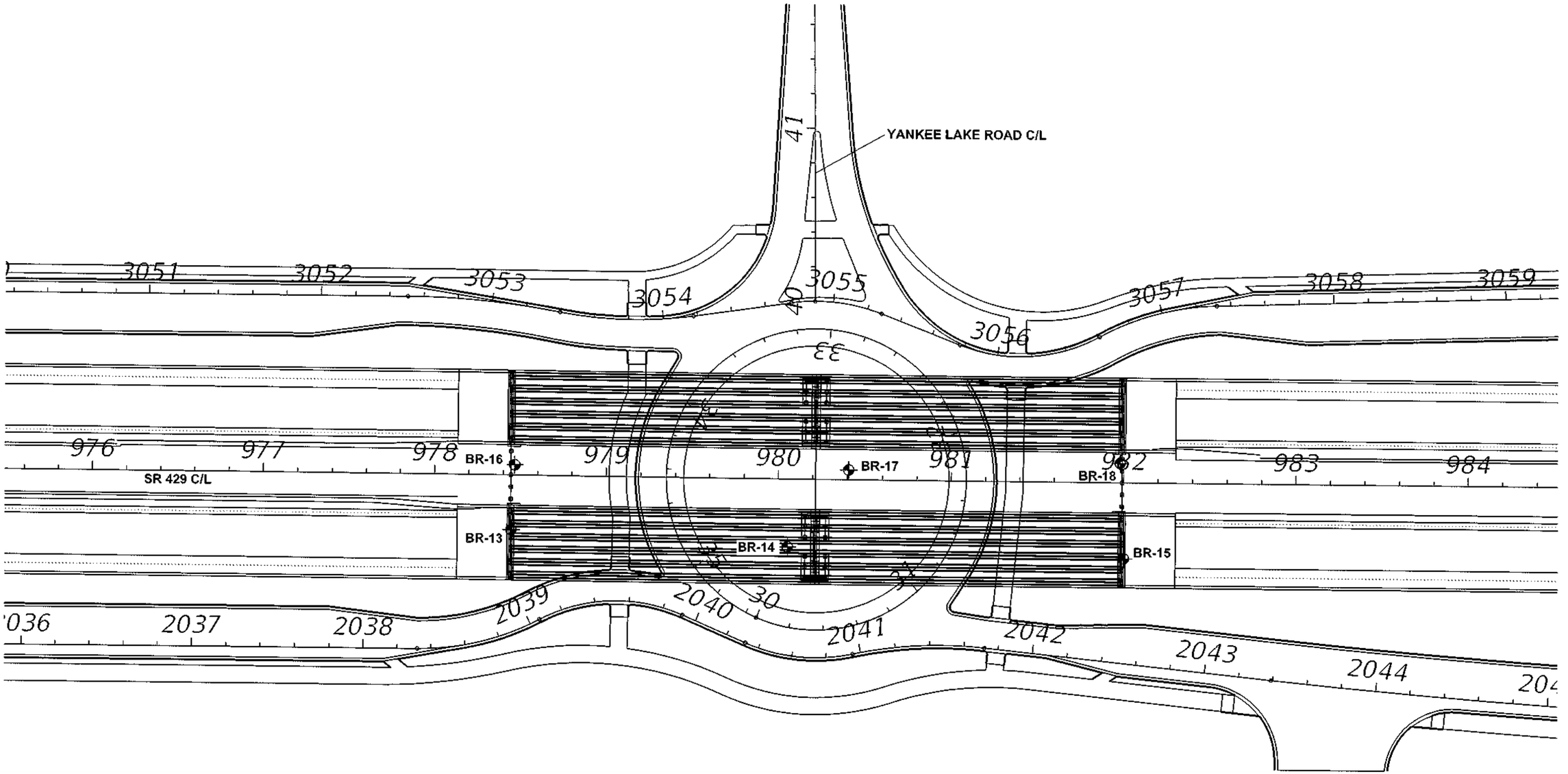
BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER YANKEE LAKE ROAD



LEGEND

SPT BORING LOCATION

NOTES

BORING LOCATIONS SURVEYED BY URS CORP. FOR HORIZONTAL AND VERTICAL CONTROL.

PLAN VIEW SHOWN IS PRELIMINARY AND IS INTENDED FOR DEPICTING BORING LOCATIONS ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.

Bridge Nos. 770101 & 770102

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: BORING LOCATION PLAN

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD

SHEET NO.:

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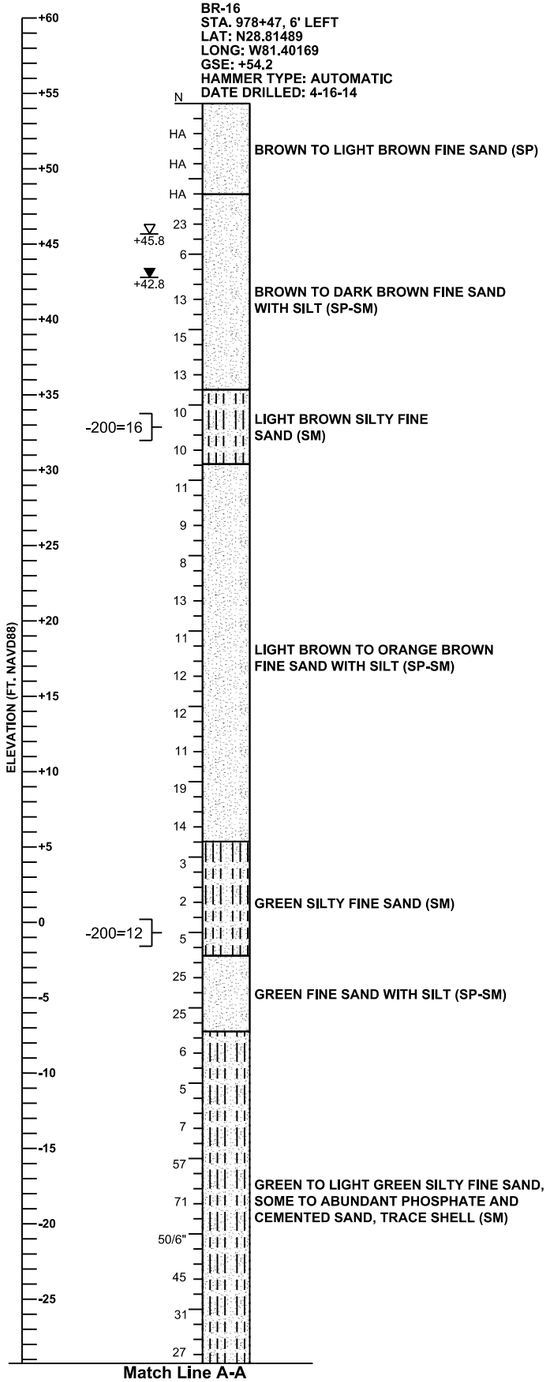

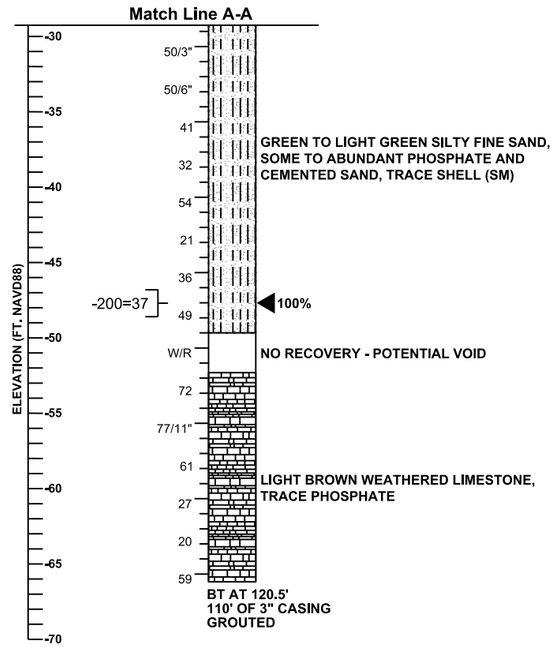

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/R	WEIGHT OF ROD
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +45.8	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +42.8	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — LIMESTONE — SAND AND SILT

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
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OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.6)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.6)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 22
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770101 & 770102

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
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DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD
SHEET NO. B3-4

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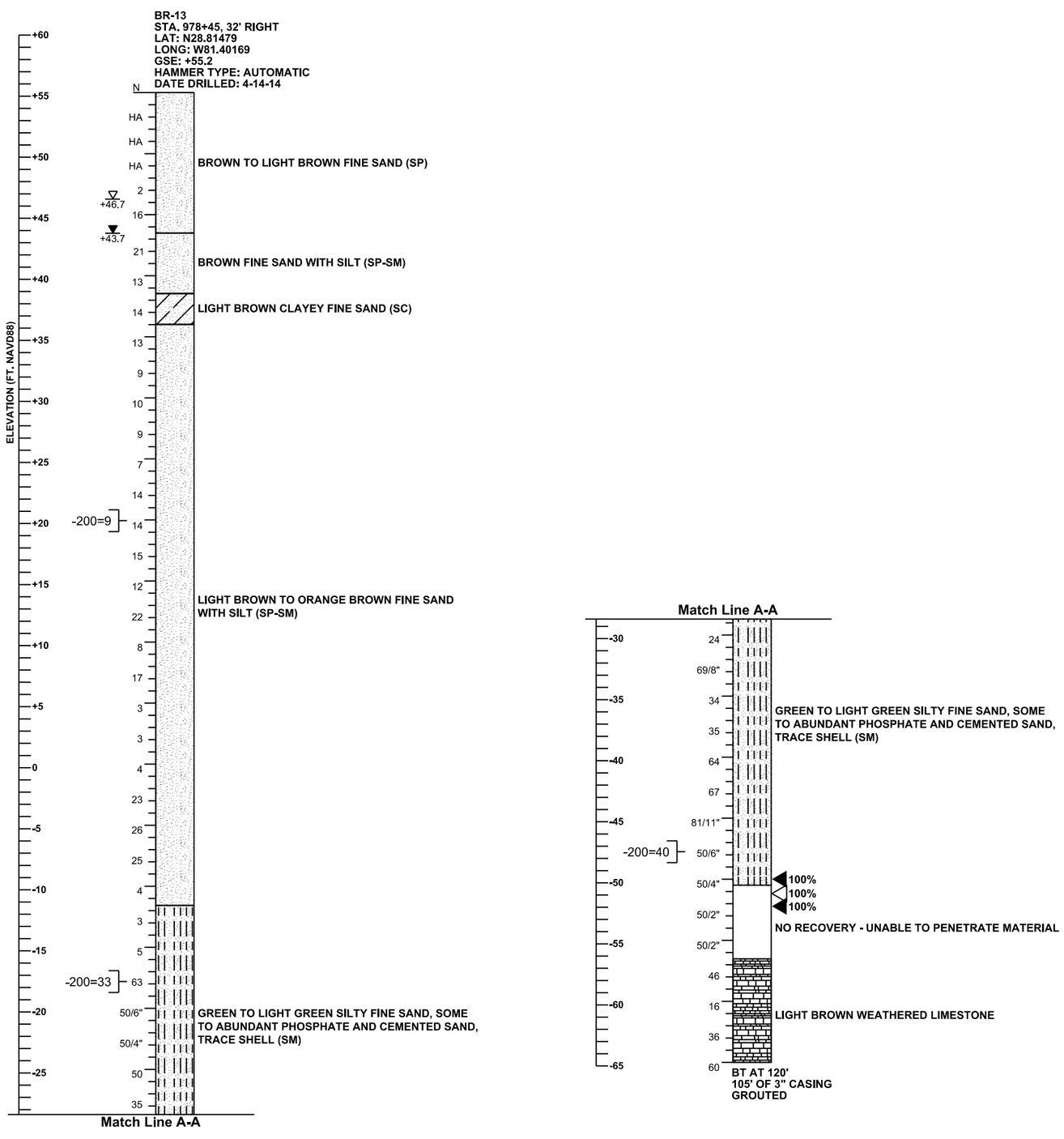

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/4"	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
▽ +46.7	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +43.7	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — SAND AND CLAY
SAND AND SILT — LIMESTONE

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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HAMMER WEIGHT: 140 LBS.
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	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 22
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770101 & 770102

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD
SHEET NO. B3-5

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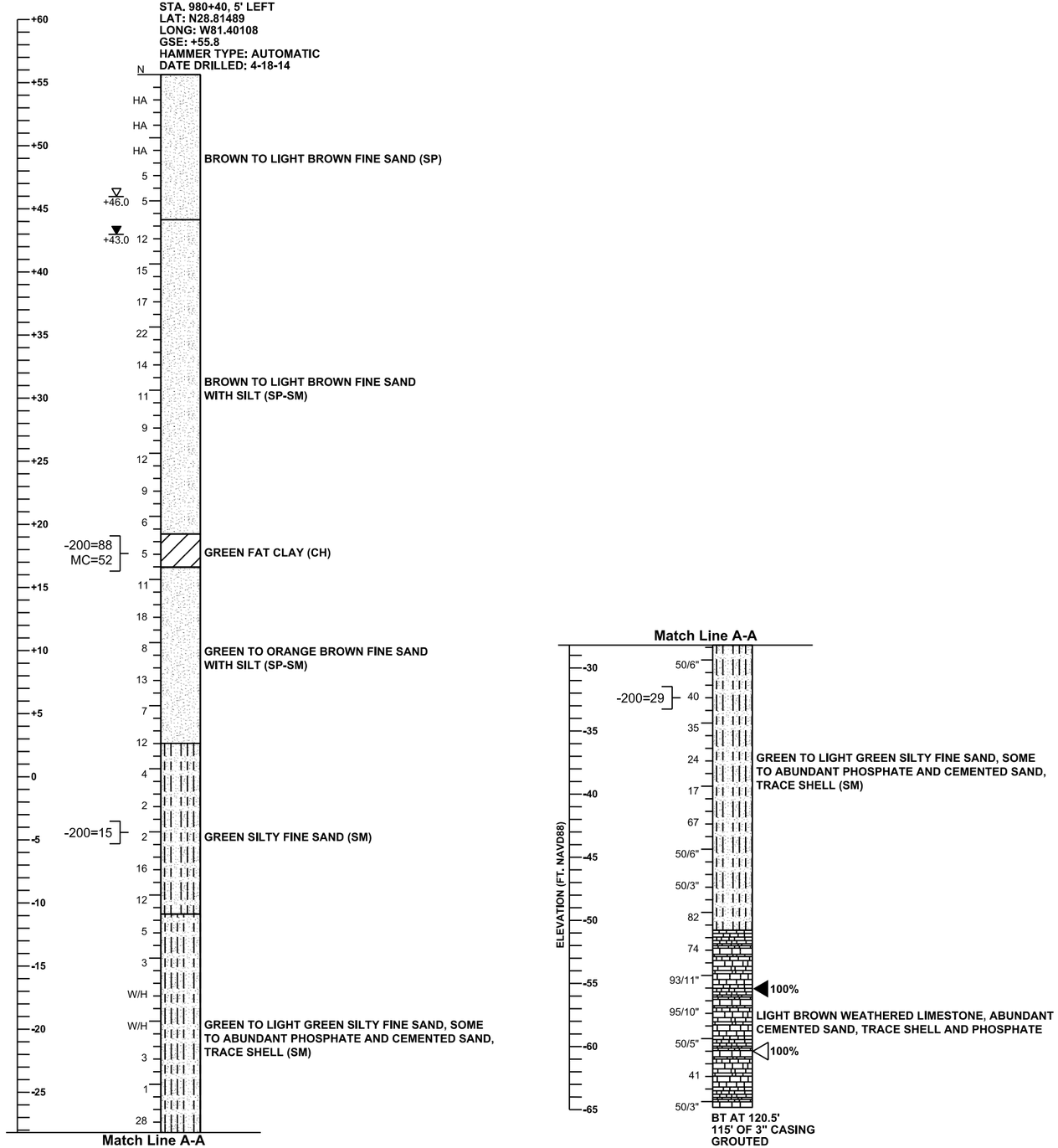

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +46.0	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +43.0	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT

SAND — LIMESTONE
SAND AND SILT — CLAY

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 22
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770101 & 770102

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.:
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD
SHEET NO.: B3-6

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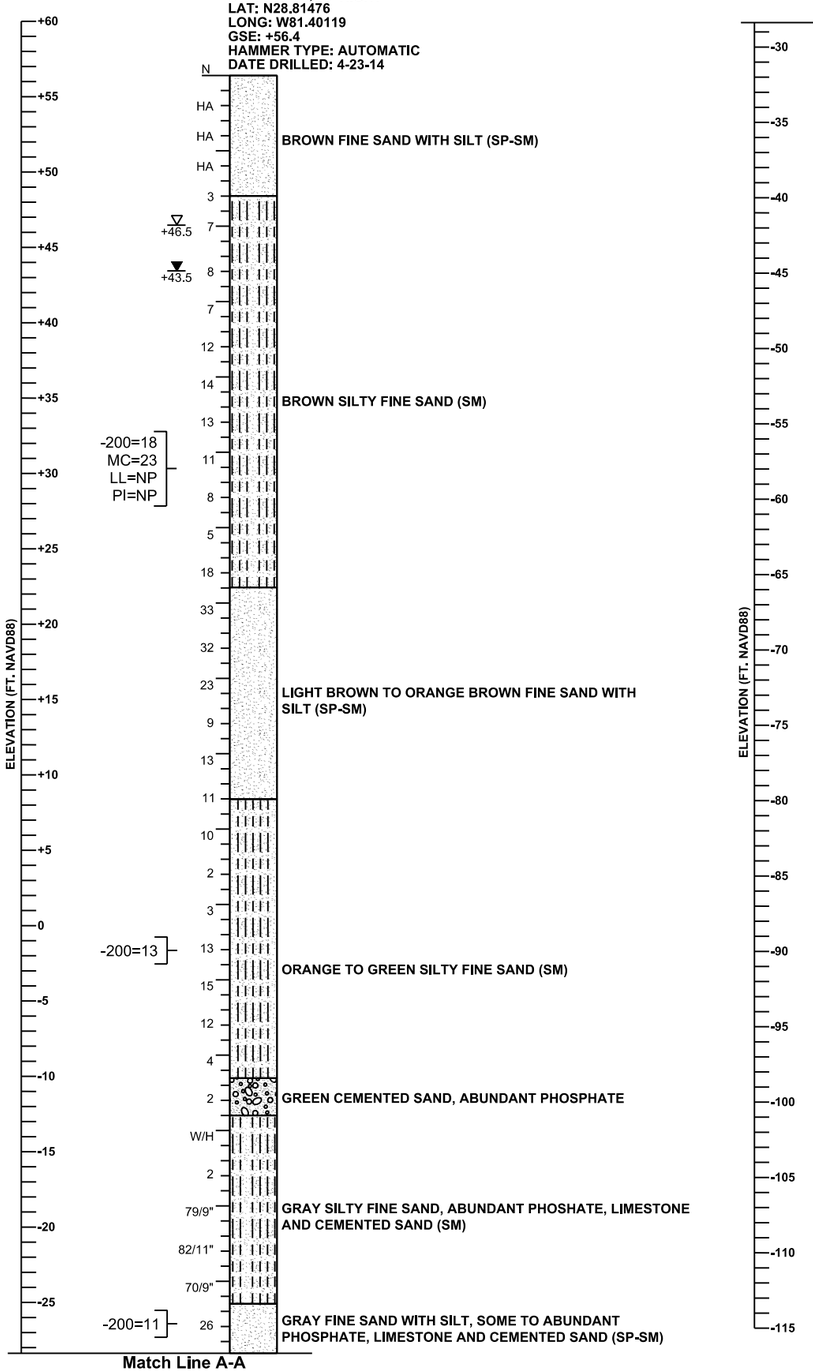

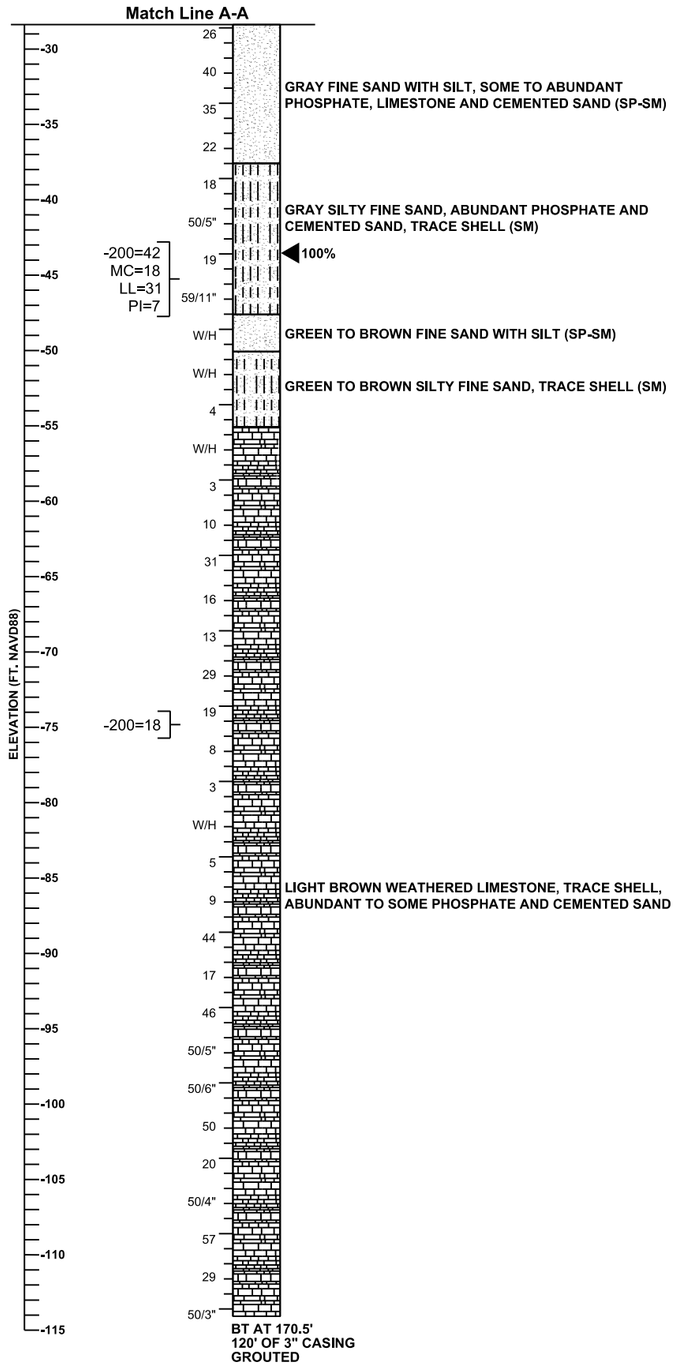

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
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▼ +31.1	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX
NP=	NON-PLASTIC

SAND — CEMENTED SAND
SAND AND SILT — LIMESTONE

GENERAL NOTES

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	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

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SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 22
TOWNSHIP: 19 SOUTH
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Bridge Nos. 770101 & 770102

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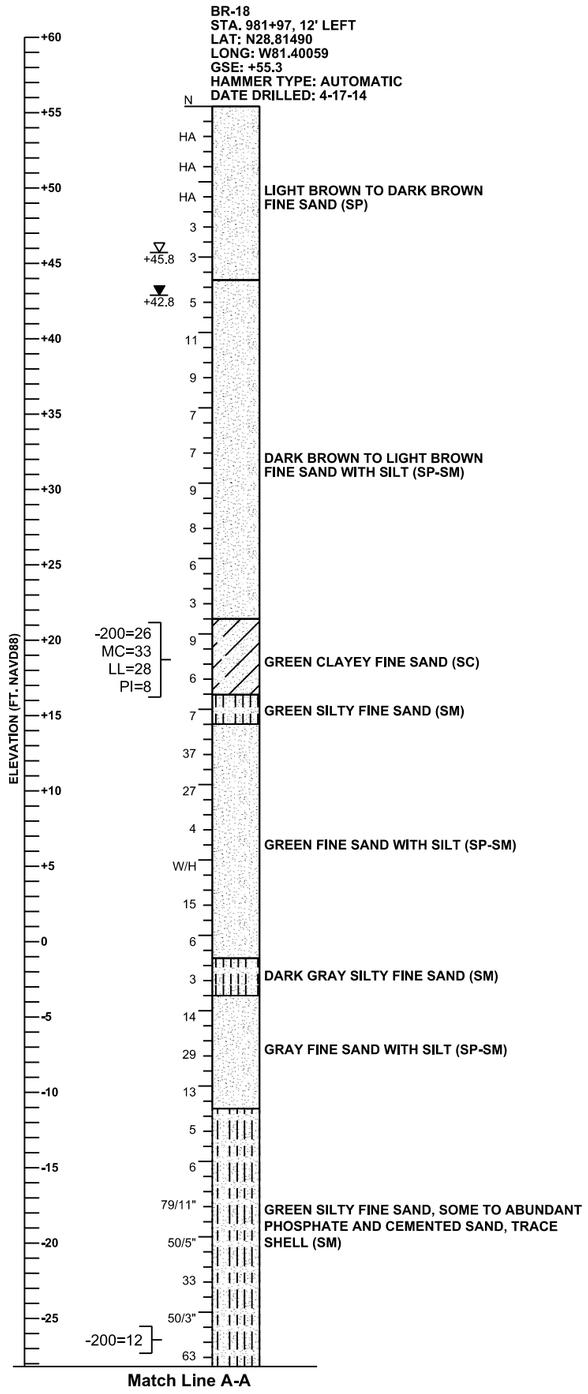
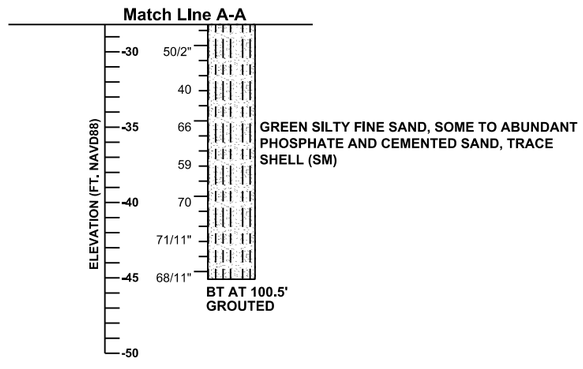
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD
SHEET NO. B3-7

scott 5/12/2015 2:27:20 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn





LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
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W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +45.8	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +42.8	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND — SAND AND CLAY — SAND AND SILT

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.6)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.6)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 22
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770101 & 770102

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

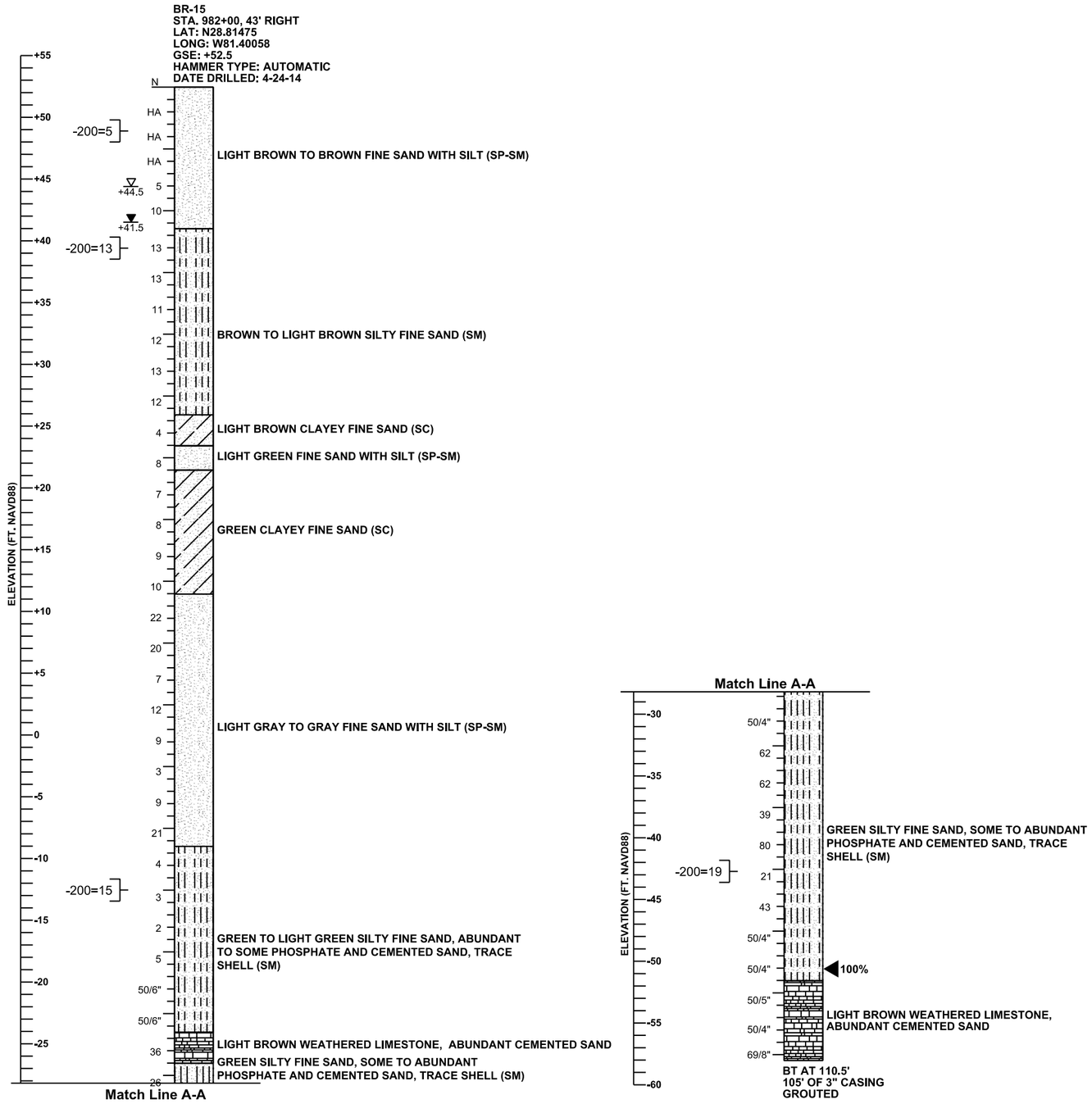
DRAWN BY: SKR
CHECKED BY: CGB 71571
DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.:
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD
SHEET NO.: B3-8

scott 5/12/2015 2:28:37 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +44.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +41.5	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — SAND AND CLAY

SAND AND SILT — LIMESTONE

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SPLIT SPOON SAMPLER:
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- OUTSIDE DIAMETER: 2.0 IN.
- AVERAGE HAMMER DROP: 30 IN.
- HAMMER WEIGHT: 140 LBS.
- HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
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- SUBSTRUCTURE:
  - STEEL: EXTREMELY AGGRESSIVE (pH=5.6)
  - CONCRETE: MODERATELY AGGRESSIVE (pH=5.6)

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	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 22
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770101 & 770102

REVISIONS

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT YANKEE LAKE ROAD

SHEET NO. B3-9

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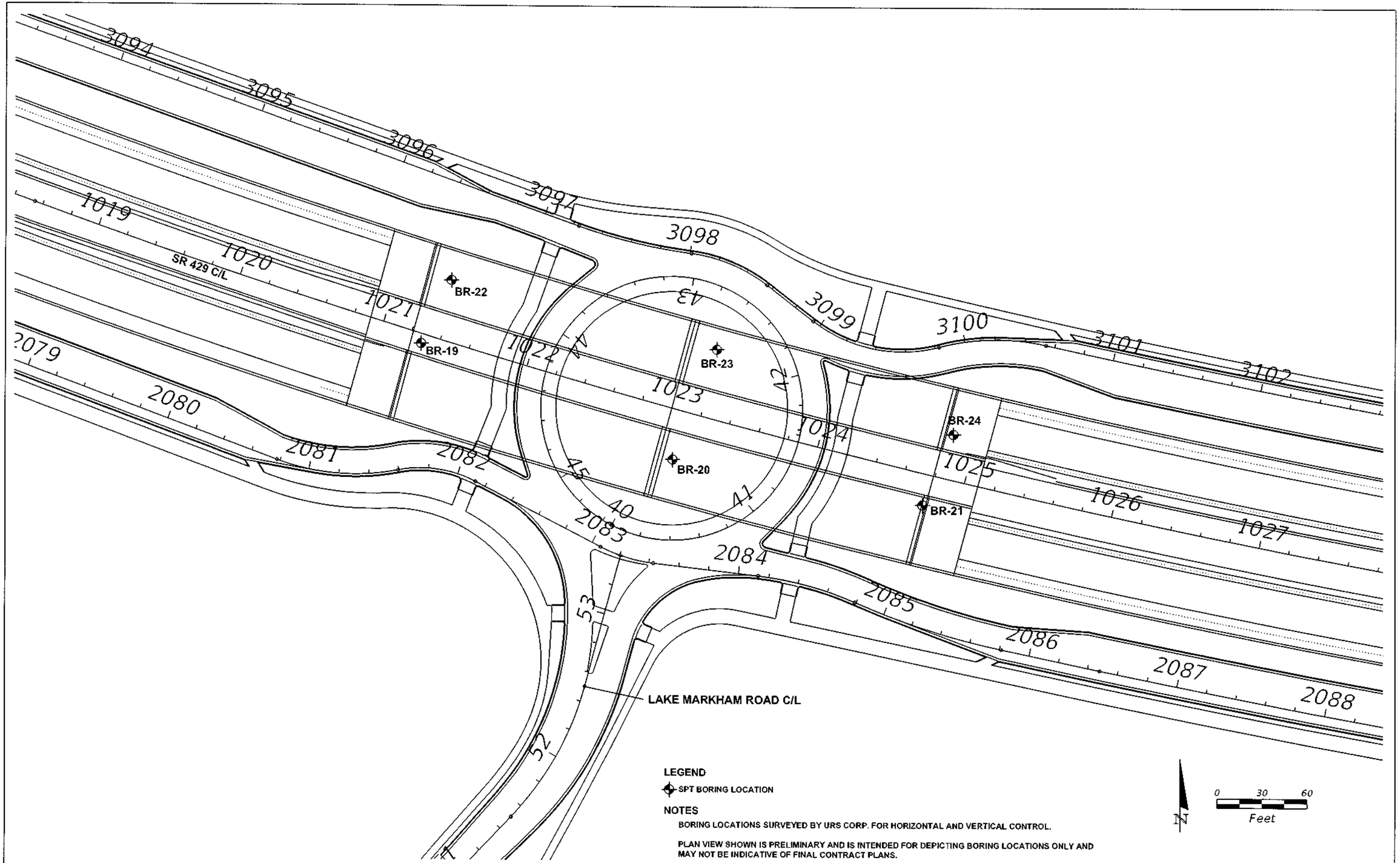
BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER LAKE MARKHAM ROAD



Bridge Nos. 770103 & 770104

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
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SKR	CGB 71571	CGB 71571	DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: BORING LOCATION PLAN

REF DWG NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD

SHEET NO.:

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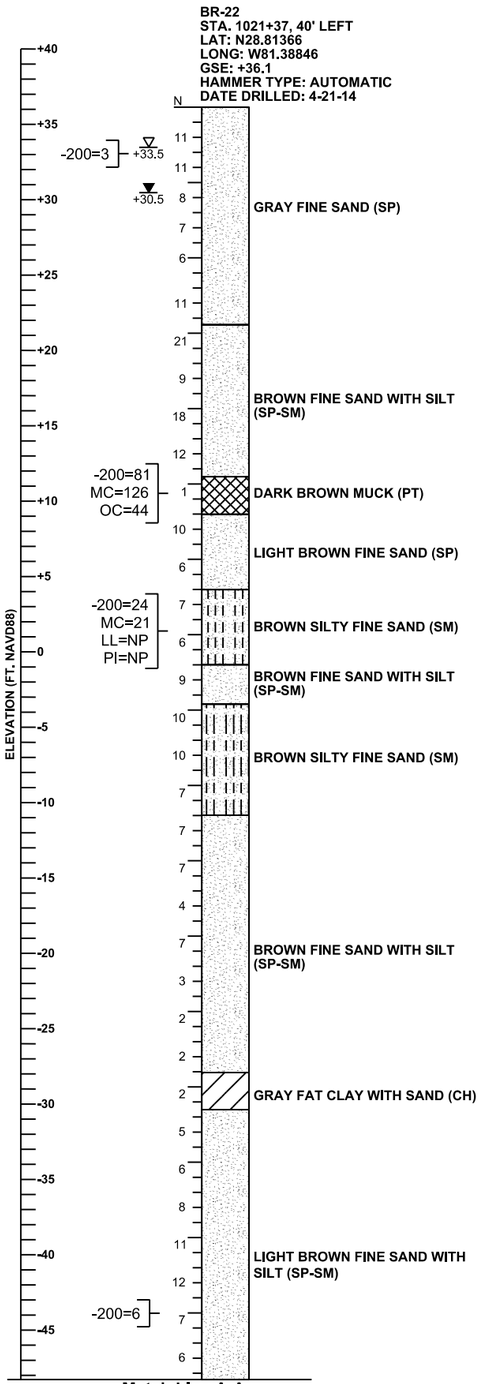

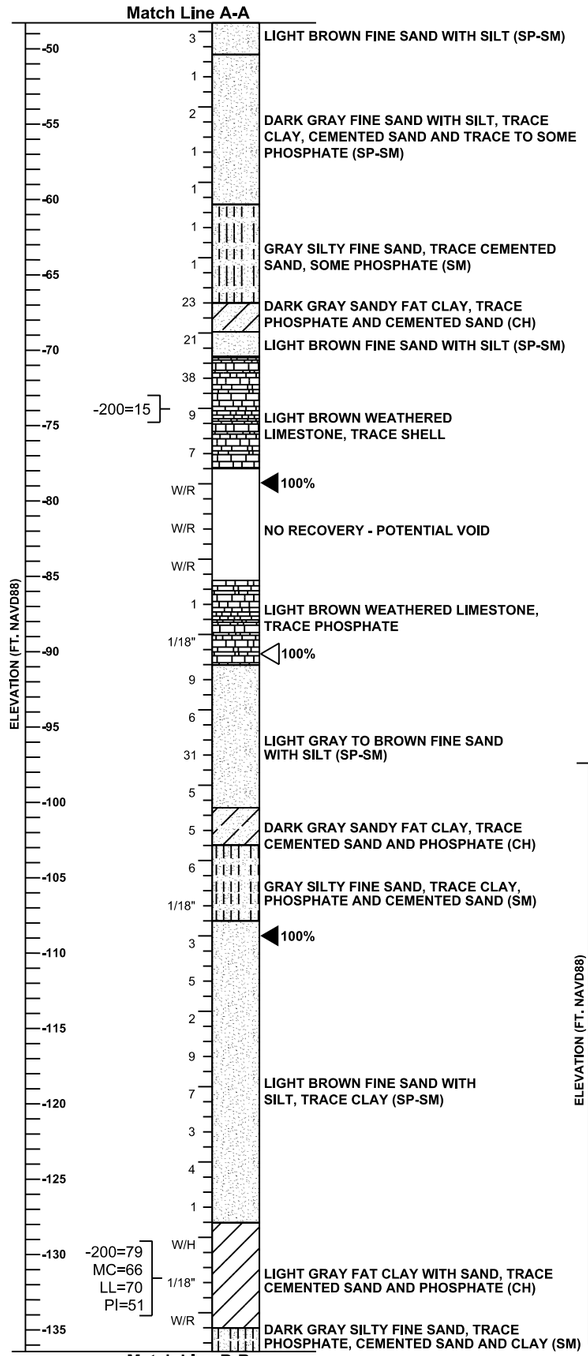

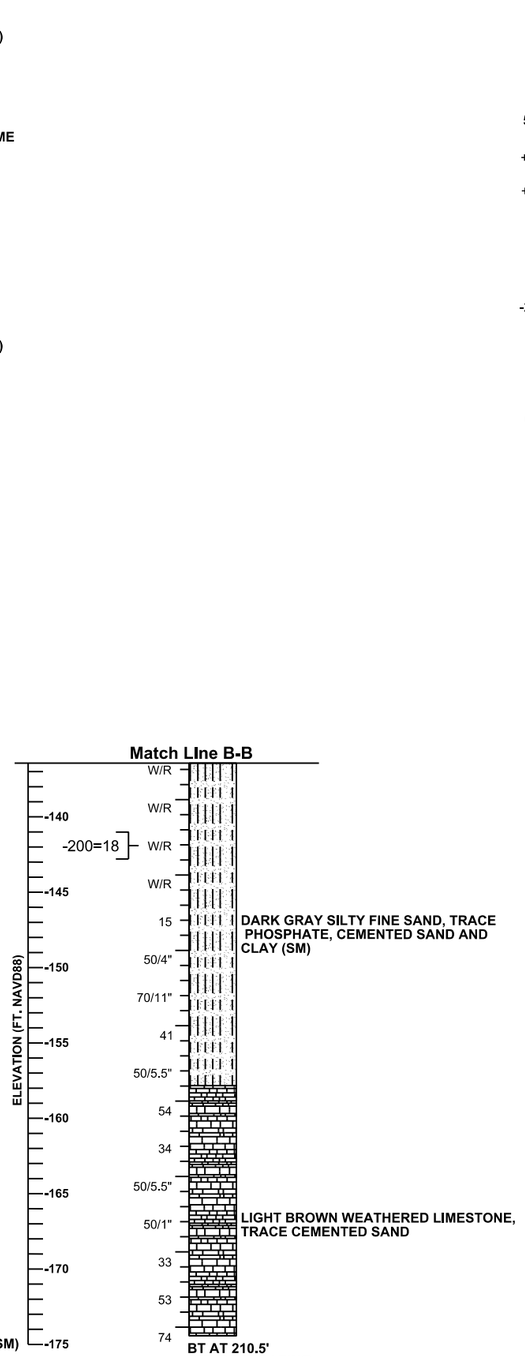

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/R	WEIGHT OF ROD
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +33.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +30.5	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX
OC=	PERCENT ORGANIC CONTENT
NP=	NON-PLASTIC

SAND | SAND AND CLAY | MUCK
SAND AND SILT | CLAY | LIMESTONE

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SUBSTRUCTURE:
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	3-8	LOOSE
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	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770103 & 770104

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
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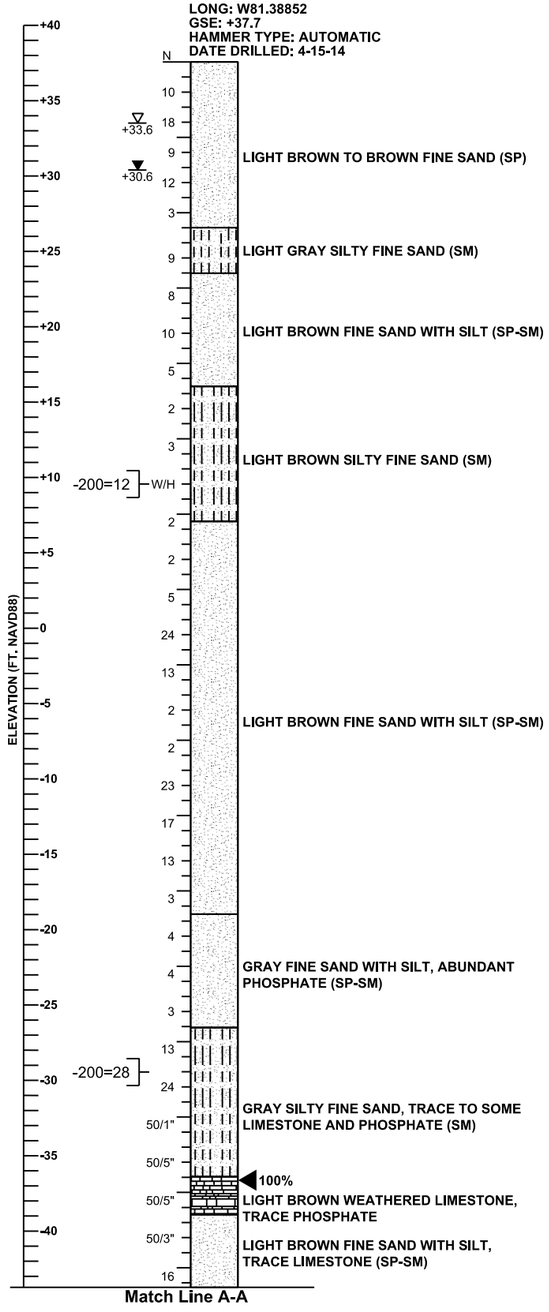
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

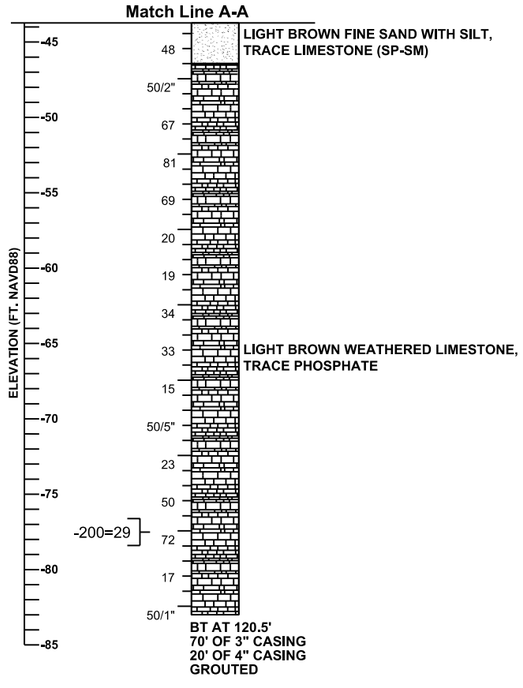
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT PF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD
SHEET NO. B4-4

scott 5/12/2015 1:49:28 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn

BR-19
STA. 1021+28, 6' RIGHT
LAT: N28.81354
LONG: W81.38852
GSE: +37.7
HAMMER TYPE: AUTOMATIC
DATE DRILLED: 4-15-14





LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +33.6	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +30.6	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND
LIMESTONE
SAND AND SILT

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	3-8	LOOSE
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	24-40	DENSE
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	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
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SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770103 & 770104

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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919 Lake Baldwin Lane
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: *REPORT OF SPT BORINGS FOR STRUCTURES*
REF. DWG. NO.
PROJECT NAME: *WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD*
SHEET NO. *B4-5*

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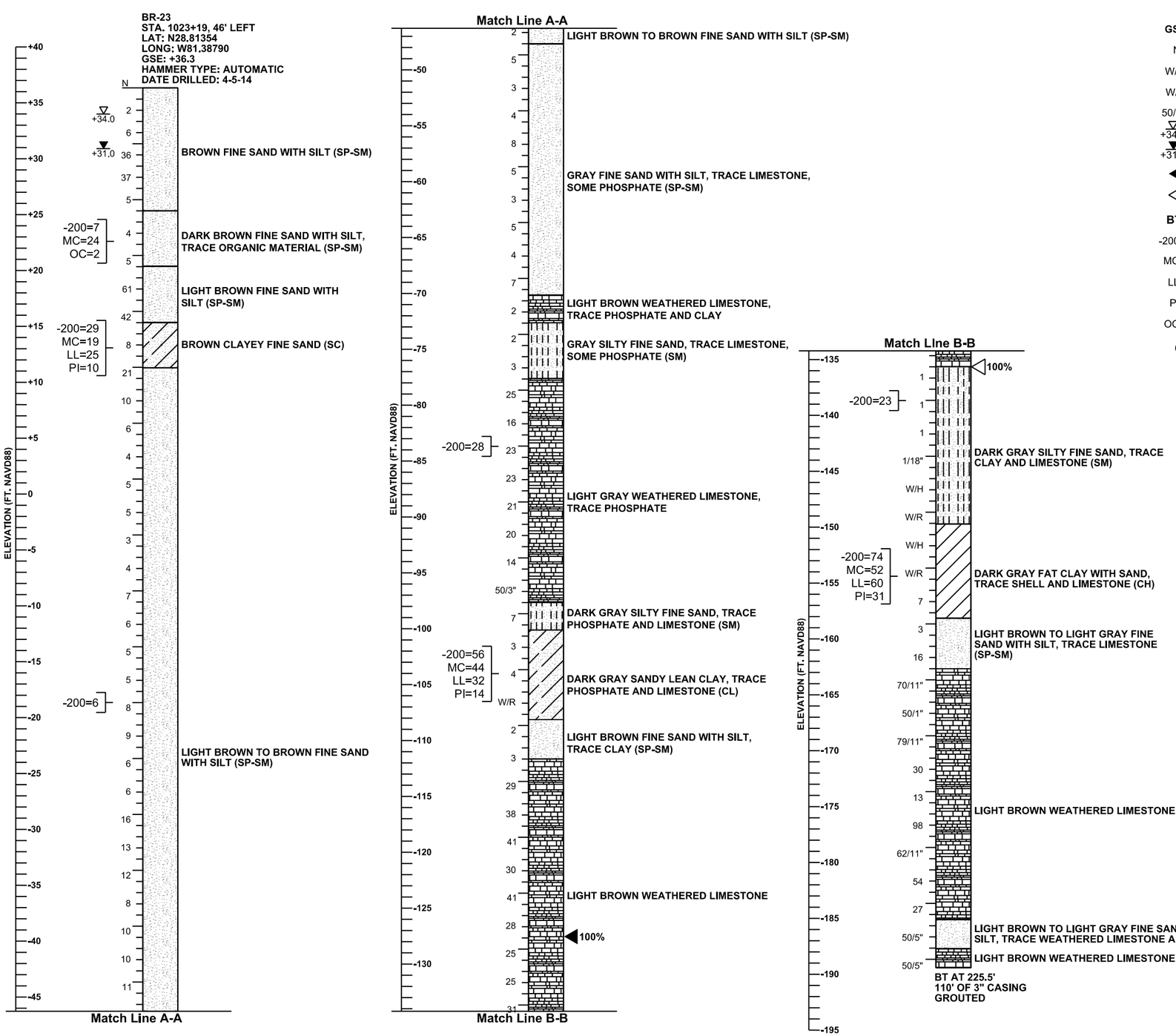

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/R	WEIGHT OF ROD
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
+34.0 ▽	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
+31.0 ▼	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
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SAND
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	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

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	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770103 & 770104

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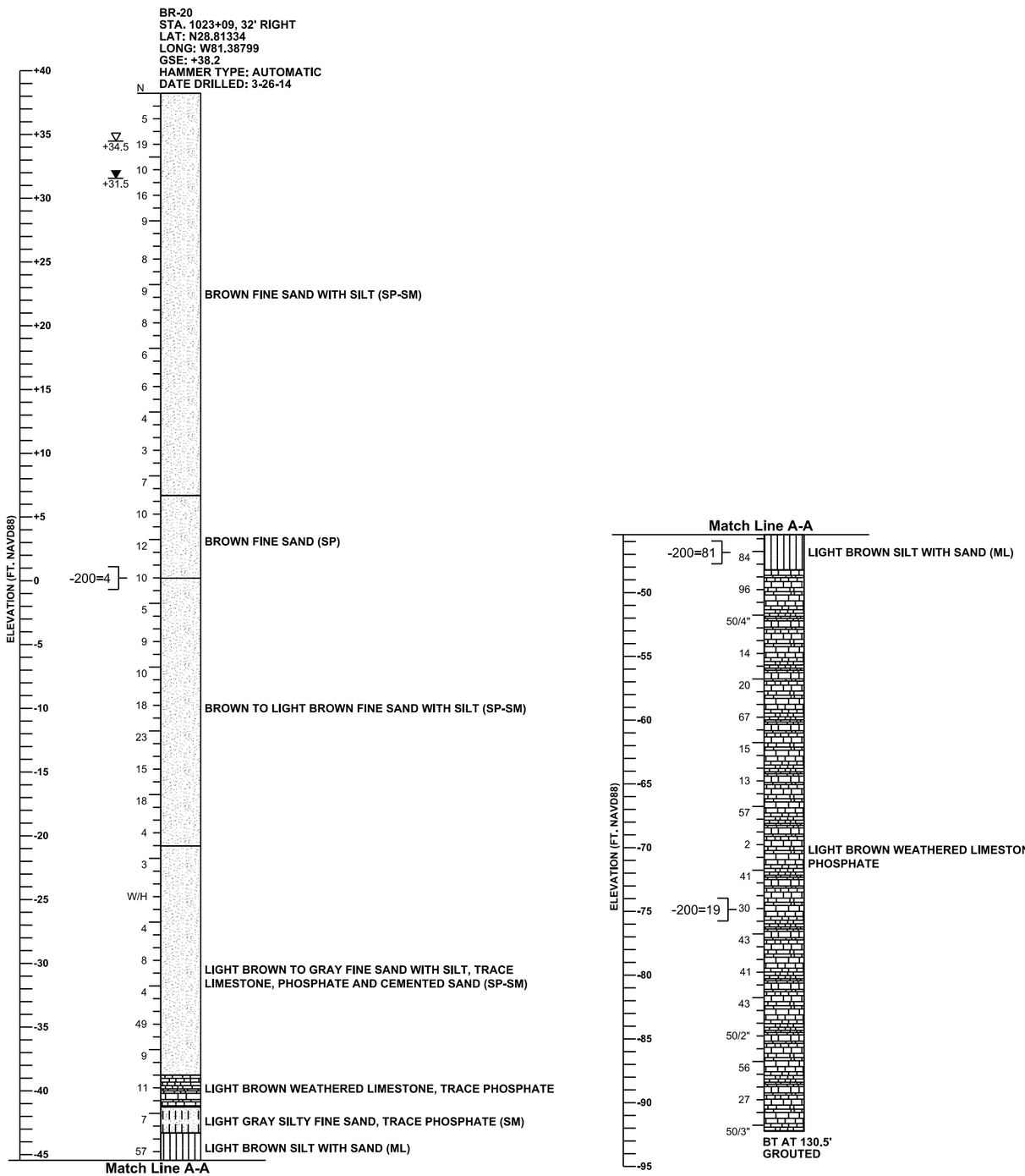
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD
SHEET NO. B4-6

scott 5/12/2015 1:50:31 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/H	WEIGHT OF HAMMER
50/4"	NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
▽ +34.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +31.5	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — SILT — SAND AND SILT — LIMESTONE

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

STANDARD PENETRATION TEST BORINGS WERE PERFORMED IN ACCORDANCE WITH ASTM D-1586. STANDARD PENETRATION RESISTANCES ARE SHOWN ON THE BORINGS AT THE TEST DEPTHS IN IN BLOWS PER FOOT UNLESS OTHERWISE NOTED.

THE BORING LOCATIONS WERE SURVEYED BY URS CORP. FOR VERTICAL AND HORIZONTAL CONTROL. BORING LOCATIONS REFERENCE THE SR 429 CENTERLINE.

BASED ON REVIEW OF THE U.S. GEOLOGICAL SURVEY MAP ENTITLED "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER IN ST. JOHNS RIVER WATER MANAGEMENT DISTRICT AND VICINITY, FLORIDA, SEPTEMBER 2008" FOR THE PROJECT AREA, THE MAXIMUM ELEVATION OF THE ARTESIAN HEAD IS ESTIMATED TO BE +21 FT. NAVD88. THE CONTRACTOR SHALL BE PREPARED TO HANDLE ARTESIAN HEAD LEVELS UP TO +21 FT. NAVD88.

SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.8)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.8)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770103 & 770104

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

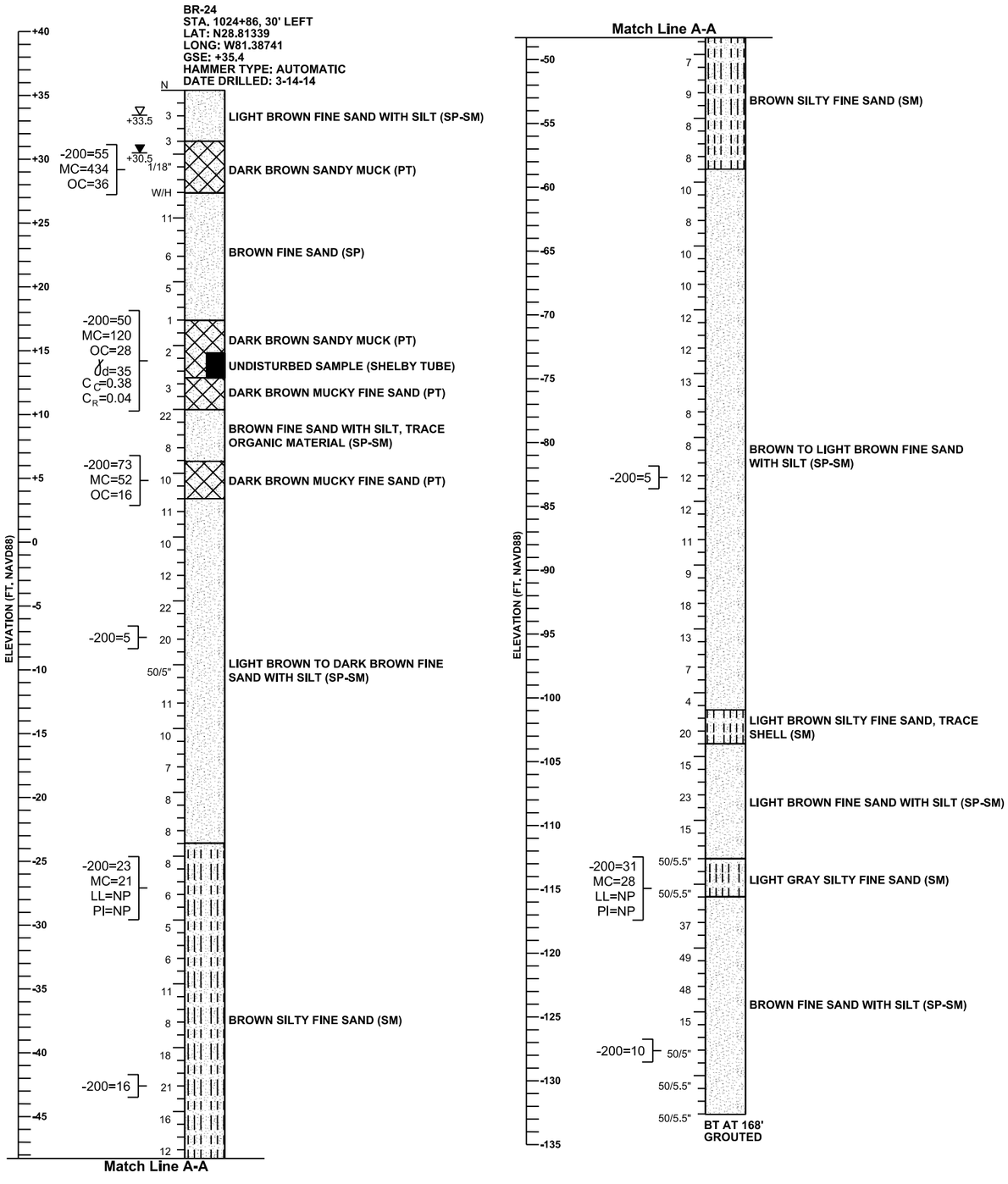
DRAWN BY:	SKR
CHECKED BY:	CGB 71571
DESIGNED BY:	CGB 71571
CHECKED BY:	DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD
SHEET NO. B4-7

scott 5/12/2015 1:49:55 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +33.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +30.5	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX
OC=	PERCENT ORGANIC CONTENT
γd=	DRY UNIT WEIGHT (pcf)
C_C=	COMPRESSION INDEX
C_R=	RECOMPRESSION INDEX
NP=	NON-PLASTIC

SAND

SAND AND MUCK

SAND AND SILT

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.8)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.8)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770103 & 770104

REVISIONS

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
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DANIEL C. STANFILL PE NO. 42763

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DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

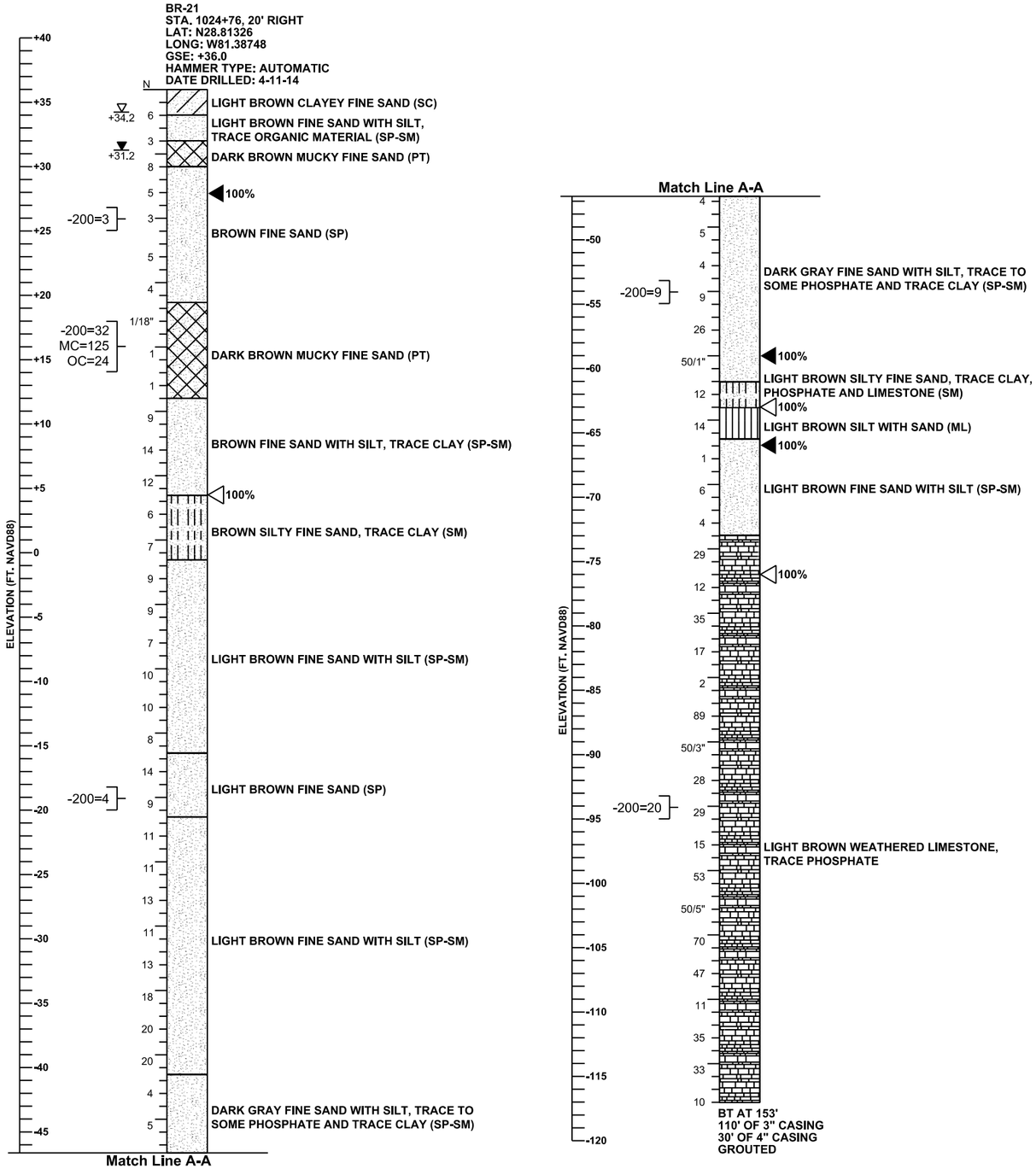
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD

SHEET NO. B4-8



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +34.2	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +31.2	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
OC=	PERCENT ORGANIC CONTENT

SAND | SAND AND CLAY | LIMESTONE
SAND AND SILT | SILT | SAND AND MUCK

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.8)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.8)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770103 & 770104

REVISIONS

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
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DANIEL C. STANFILL PE NO. 42763

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DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT LAKE MARKHAM ROAD
SHEET NO. B4-9

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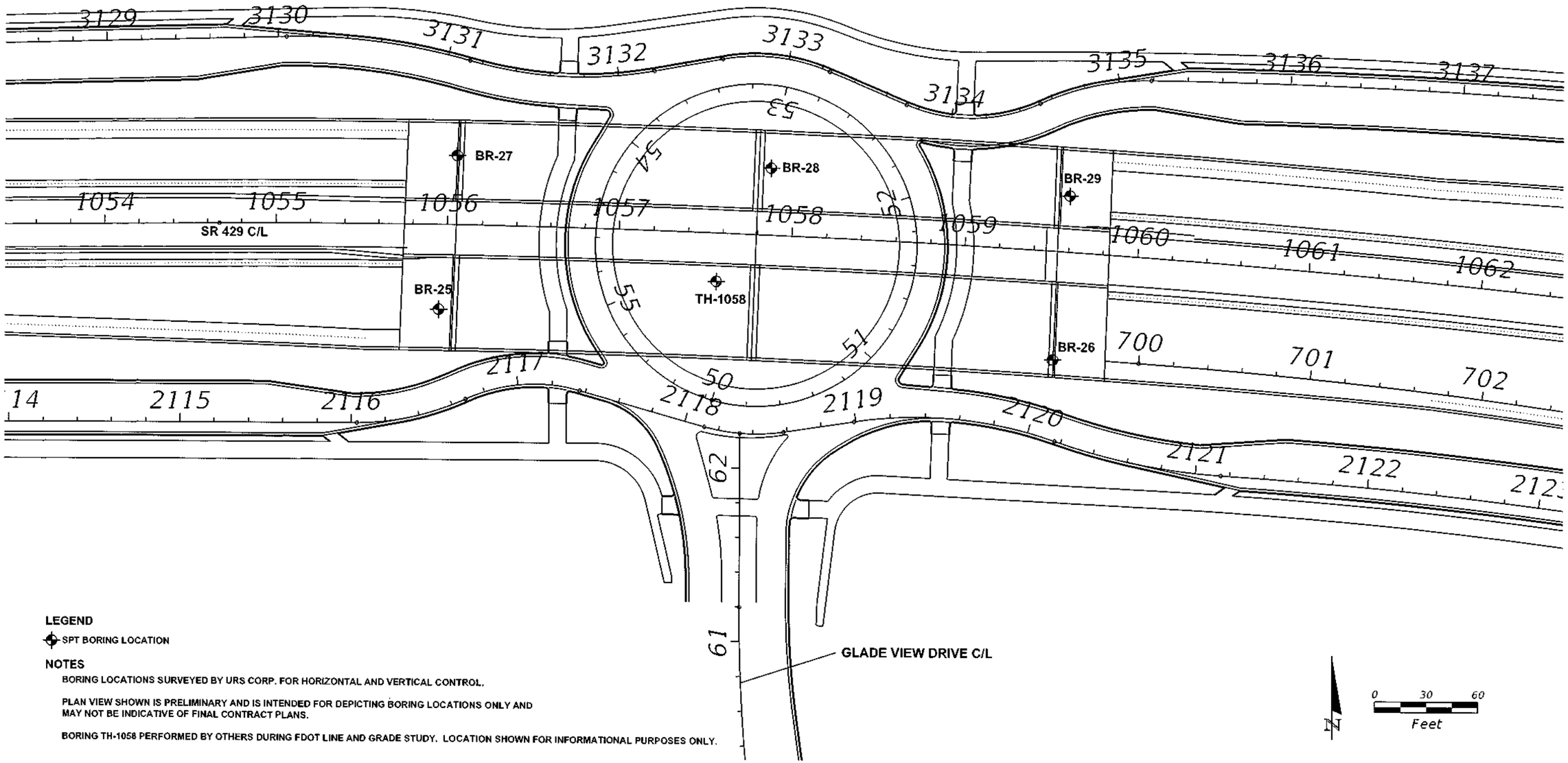
BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER GLADE VIEW DRIVE



LEGEND

SPT BORING LOCATION

NOTES

BORING LOCATIONS SURVEYED BY URS CORP. FOR HORIZONTAL AND VERTICAL CONTROL.

PLAN VIEW SHOWN IS PRELIMINARY AND IS INTENDED FOR DEPICTING BORING LOCATIONS ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.

BORING TH-1058 PERFORMED BY OTHERS DURING FDOT LINE AND GRADE STUDY. LOCATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.

Bridge Nos. 770105 & 770106

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: BORING LOCATION PLAN

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT GLADE VIEW DRIVE

SHEET NO.:

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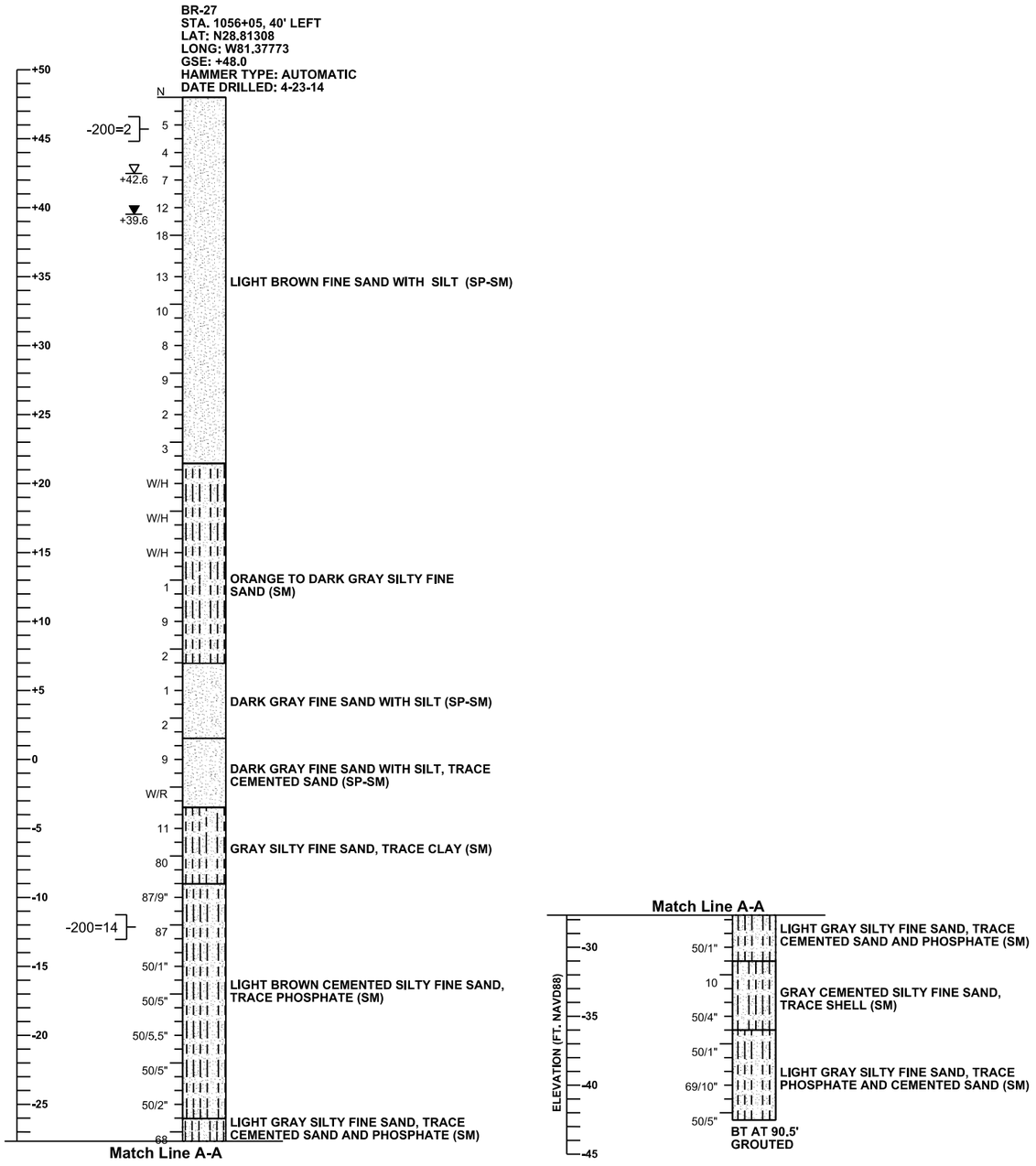

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/R	WEIGHT OF ROD
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +42.6	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +39.6	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND

SAND AND SILT

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.3)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.3)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770105 & 770106

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
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CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

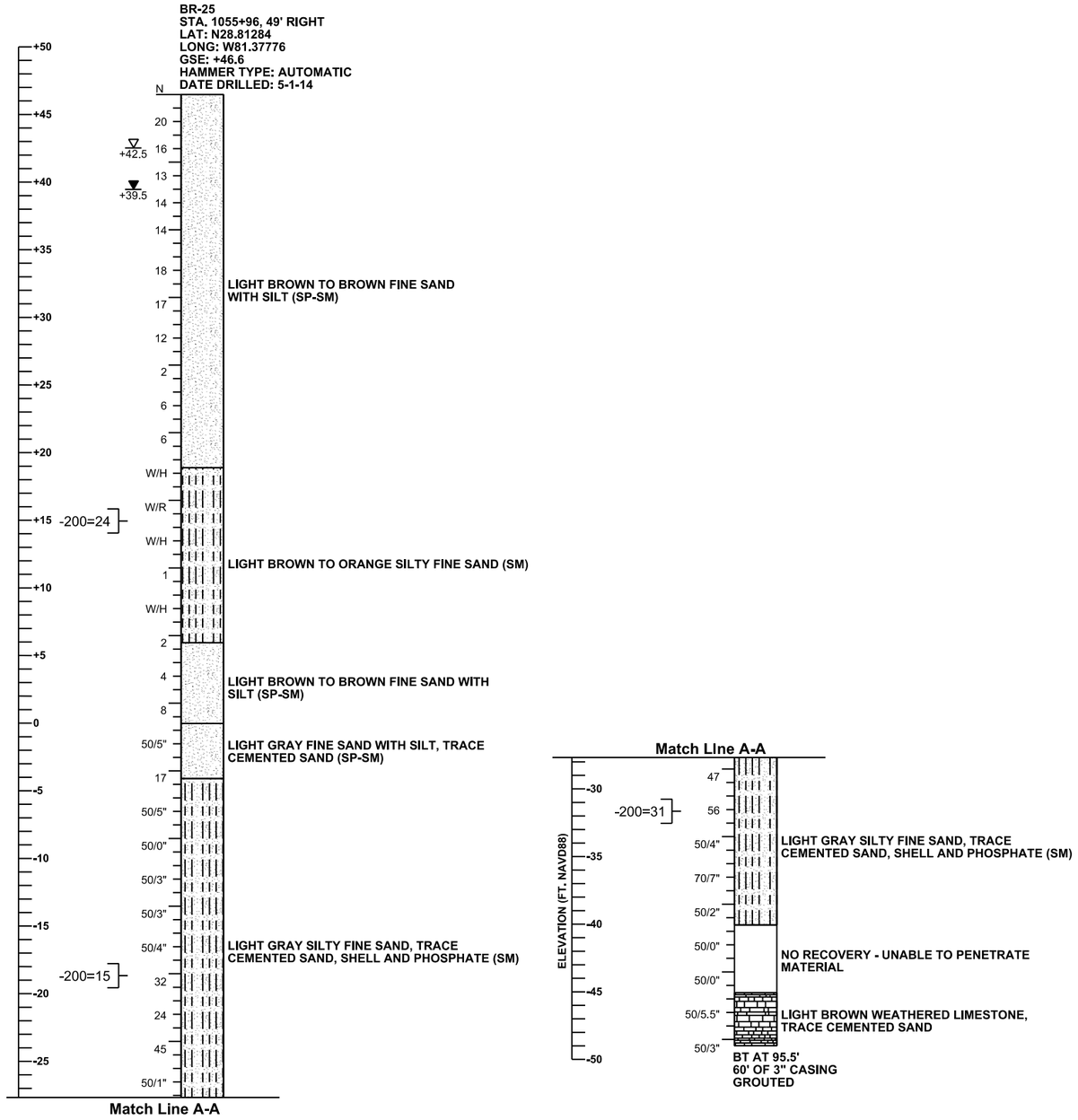
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT GLADE VIEW DRIVE

SHEET NO. B5-4



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/R	WEIGHT OF ROD
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +42.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +39.5	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — LIMESTONE — SAND AND SILT

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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HAMMER WEIGHT: 140 LBS.
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	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770105 & 770106

REVISIONS

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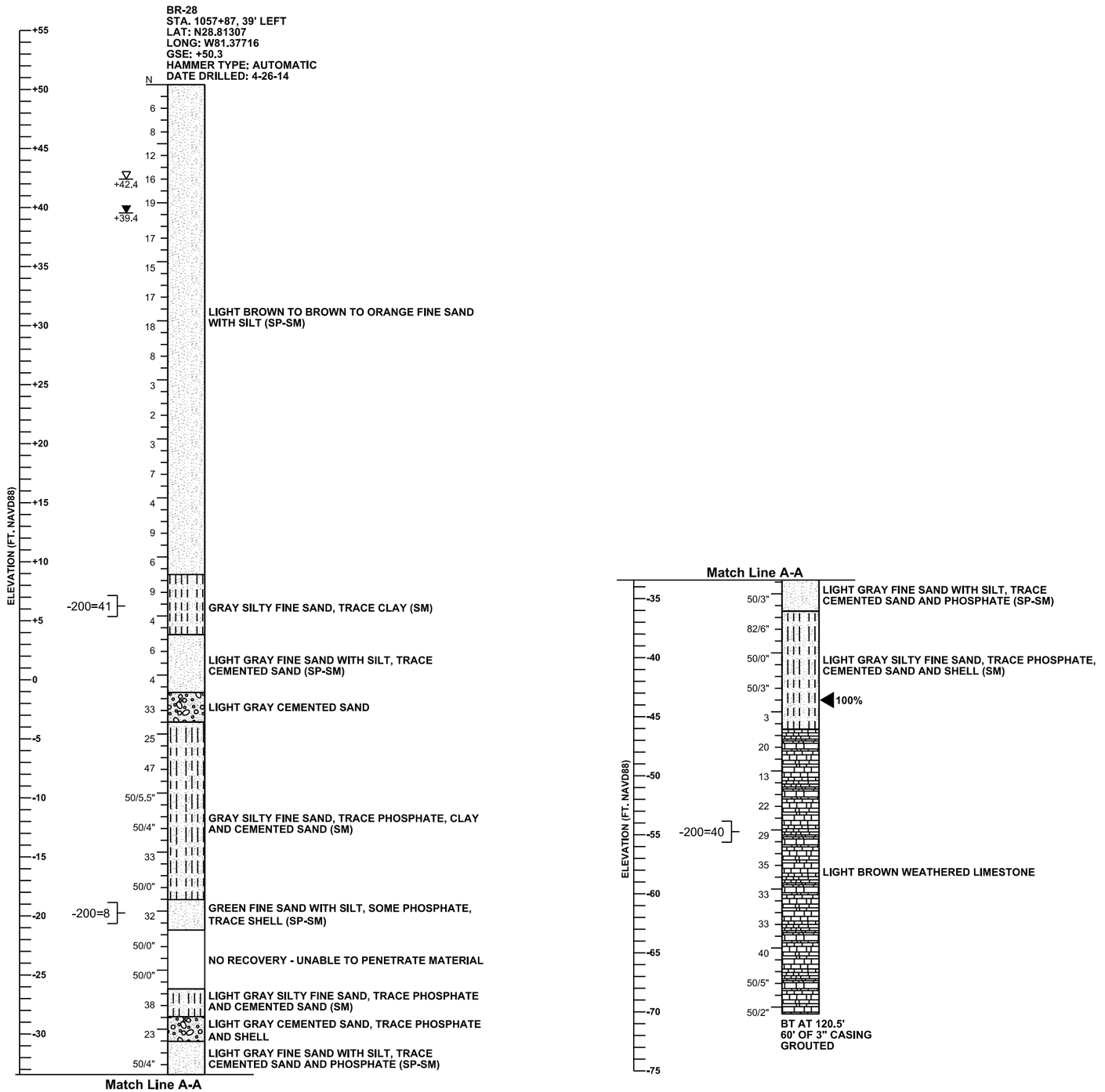
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.:
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT GLADE VIEW DRIVE
SHEET NO.: B5-5

scott 5/12/2015 1:43:05 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring08.dgn



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
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◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — CEMENTED SAND

SAND AND SILT — LIMESTONE

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

STANDARD PENETRATION TEST BORINGS WERE PERFORMED IN ACCORDANCE WITH ASTM D-1586. STANDARD PENETRATION RESISTANCES ARE SHOWN ON THE BORINGS AT THE TEST DEPTHS IN IN BLOWS PER FOOT UNLESS OTHERWISE NOTED.

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BASED ON REVIEW OF THE U.S. GEOLOGICAL SURVEY MAP ENTITLED "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER IN ST. JOHNS RIVER WATER MANAGEMENT DISTRICT AND VICINITY, FLORIDA, SEPTEMBER 2008" FOR THE PROJECT AREA, THE MAXIMUM ELEVATION OF THE ARTESIAN HEAD IS ESTIMATED TO BE +22 FT. NAVD88. THE CONTRACTOR SHALL BE PREPARED TO HANDLE ARTESIAN HEAD LEVELS UP TO +22 FT. NAVD88.

SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: EXTREMELY AGGRESSIVE (pH=5.3)
CONCRETE: MODERATELY AGGRESSIVE (pH=5.3)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 26
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770105 & 770106

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

DRAWN BY: SKR
CHECKED BY: CGB 71571
DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT GLADE VIEW DRIVE

SHEET NO.: B5-6

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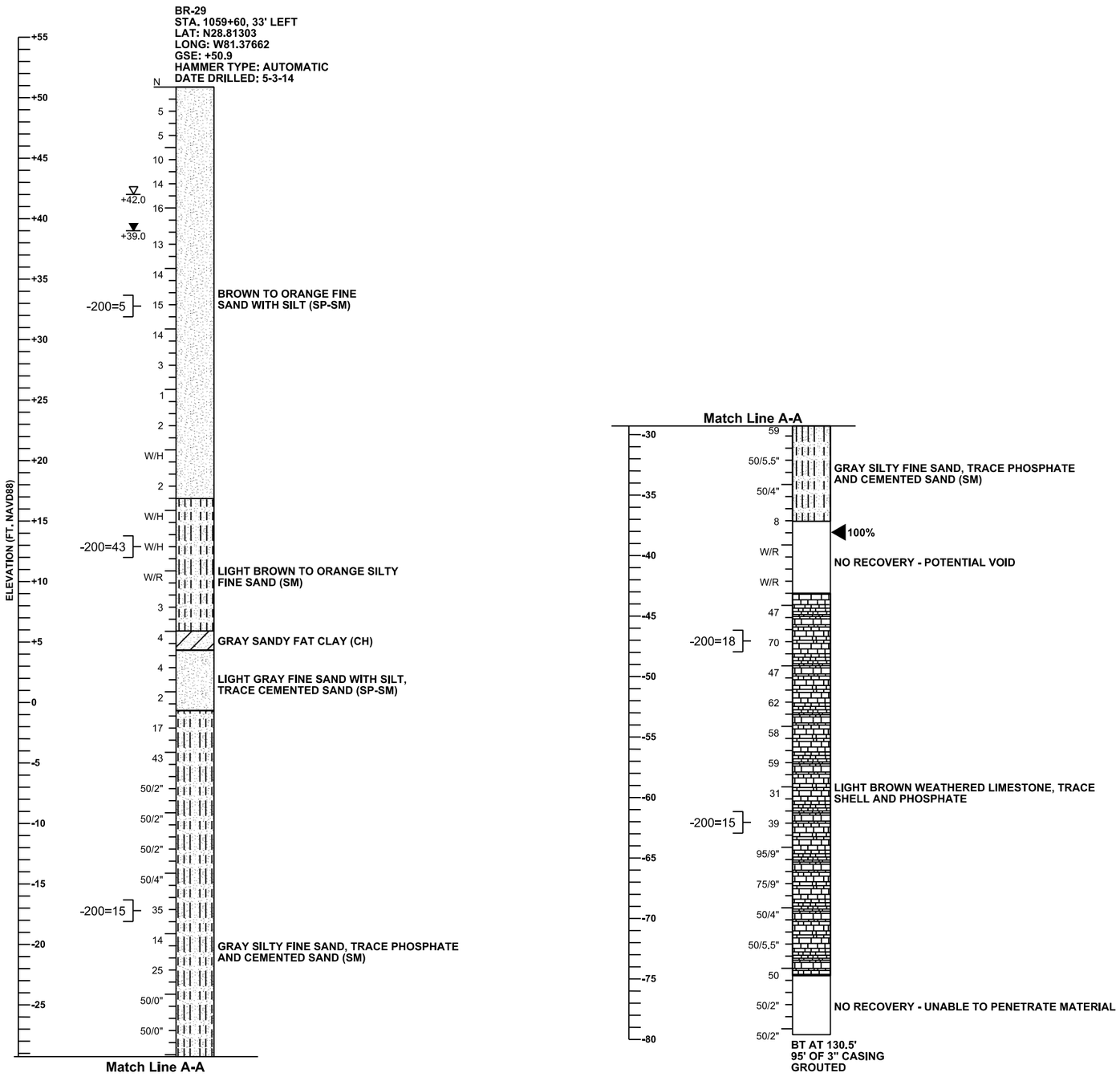

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/R	WEIGHT OF ROD
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
+43.1 ▽	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
+41.0 ▼	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE

SAND — SAND AND CLAY

SAND AND SILT — LIMESTONE

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

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CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770105 & 770106

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

DRAWN BY: SKR
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DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.:
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT GLADE VIEW DRIVE
SHEET NO.: B5-7

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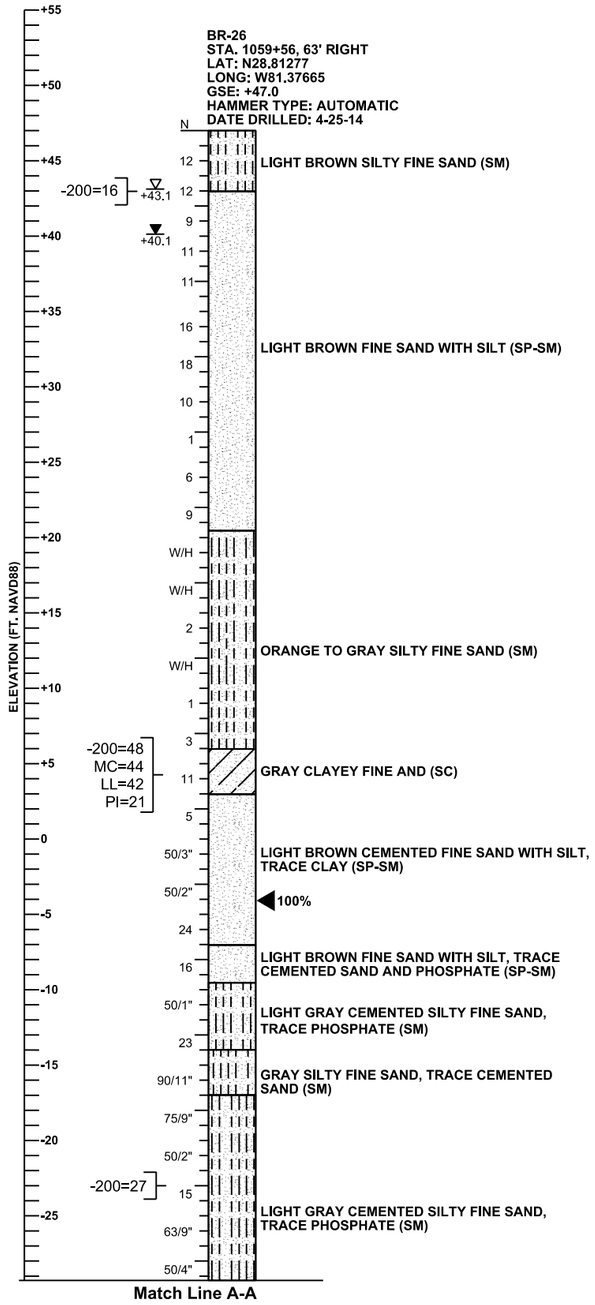

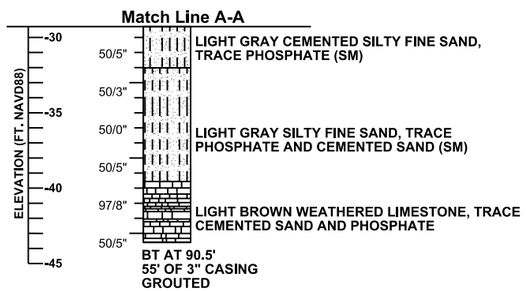

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/H	WEIGHT OF HAMMER
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +43.1	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +40.1	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND — SAND AND CLAY

SAND AND SILT — LIMESTONE

GENERAL NOTES

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OUTSIDE DIAMETER: 2.0 IN.
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HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
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CONCRETE: MODERATELY AGGRESSIVE (pH=5.3)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770105 & 770106

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

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CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A AT GLADE VIEW DRIVE

SHEET NO.: B5-8

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BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER EASTBOUND FRONTAGE ROAD

610 611 612 613 614 615 616 617

3156 3157 3158 3159 3160 3161

1078 1079 1080 1081 1082 1083 1084 1085 1086 1087

2139 2140 2141 2142 2145 2146 2147

BR-30A BR-30B BR-31A BR-31B

EB FRONTAGE ROAD C/L

SR 429 C/L

0 30 60
Feet

N

LEGEND

SPT BORING LOCATION

NOTES

BORING LOCATIONS SURVEYED BY URS CORP. FOR HORIZONTAL AND VERTICAL CONTROL.

PLAN VIEW IS PRELIMINARY AND IS INTENDED FOR DEPICTING BORING LOCATIONS ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.

Bridge Nos. 770107 & 770110

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
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Orlando, FL 32814
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: BORING LOCATION PLAN

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER EASTBOUND FRONTAGE ROAD

SHEET NO.:

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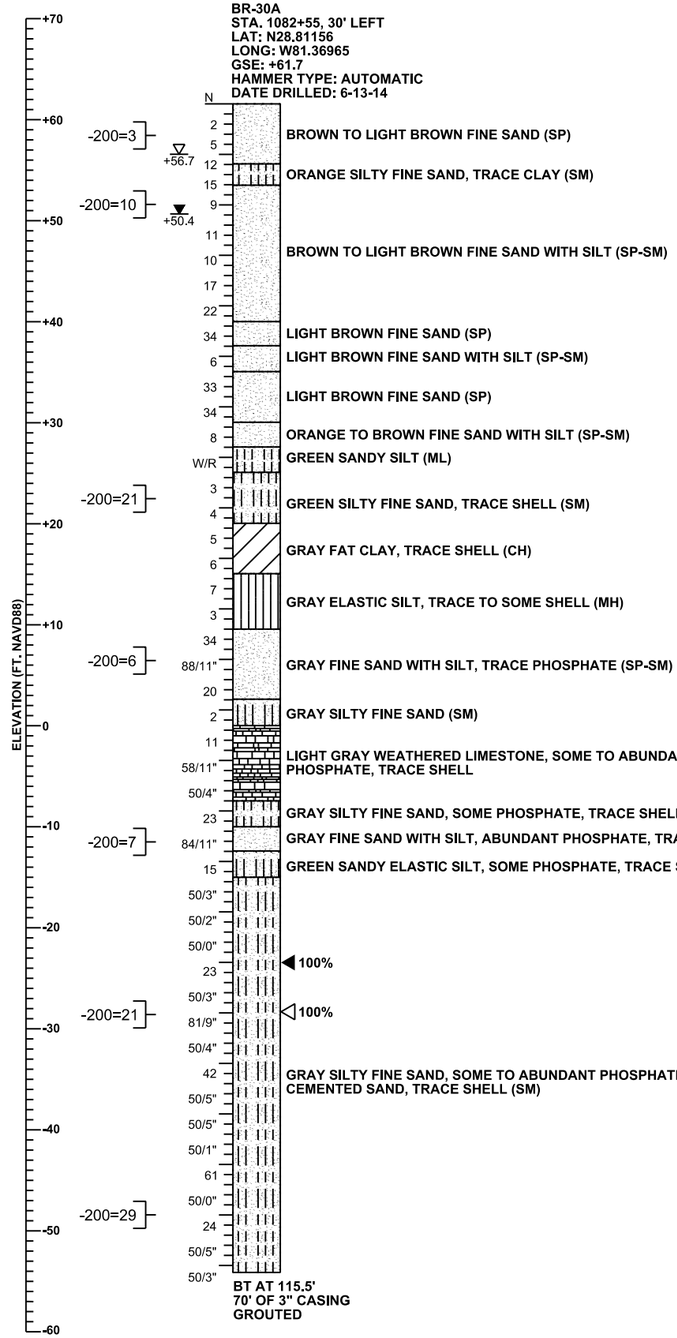

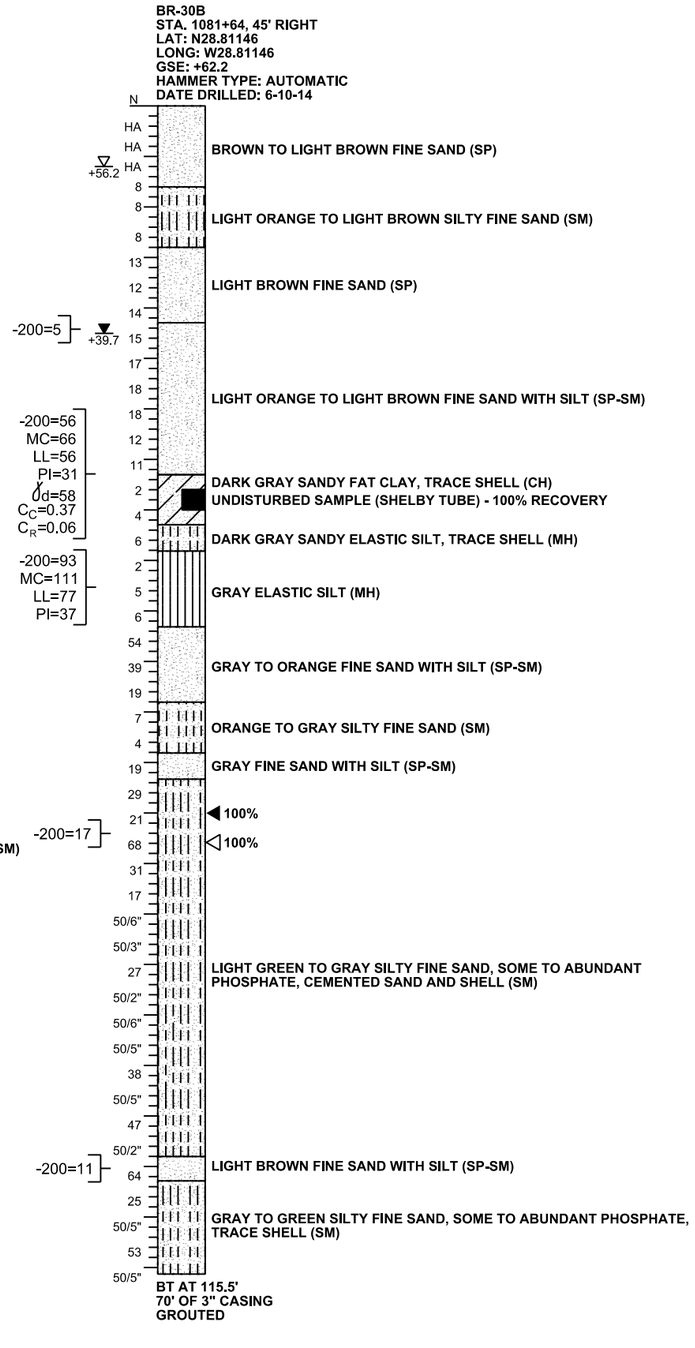

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
W/R	WEIGHT OF ROD
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +56.7	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +50.4	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX
γ_d=	DRY UNIT WEIGHT (pcf)
C_C=	COMPRESSION INDEX
C_R=	RECOMPRESSION INDEX

SAND · CLAY · SAND AND CLAY · SAND AND SILT · SILT · LIMESTONE

GENERAL NOTES

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
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	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770107 & 770110

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
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DANIEL C. STANFILL PE NO. 42763

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER EASTBOUND FRONTAGE ROAD

SHEET NO.: B6-4

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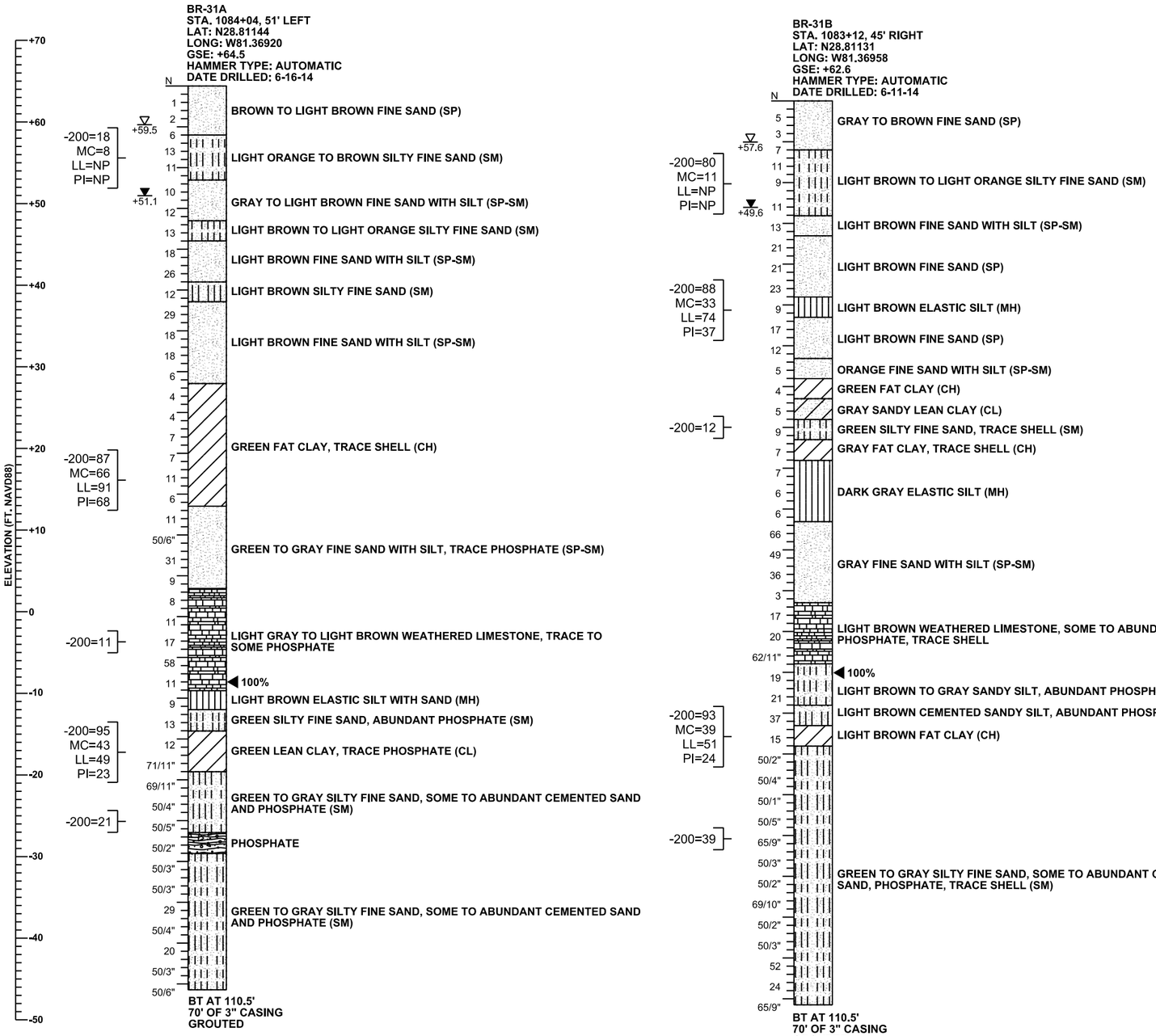

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +59.5	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +51.1	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX
NP=	NON-PLASTIC

SAND · CLAY · LIMESTONE · SAND AND SILT · SILT · PHOSPHATE · SAND AND CLAY

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	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770107 & 770110

REVISIONS

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

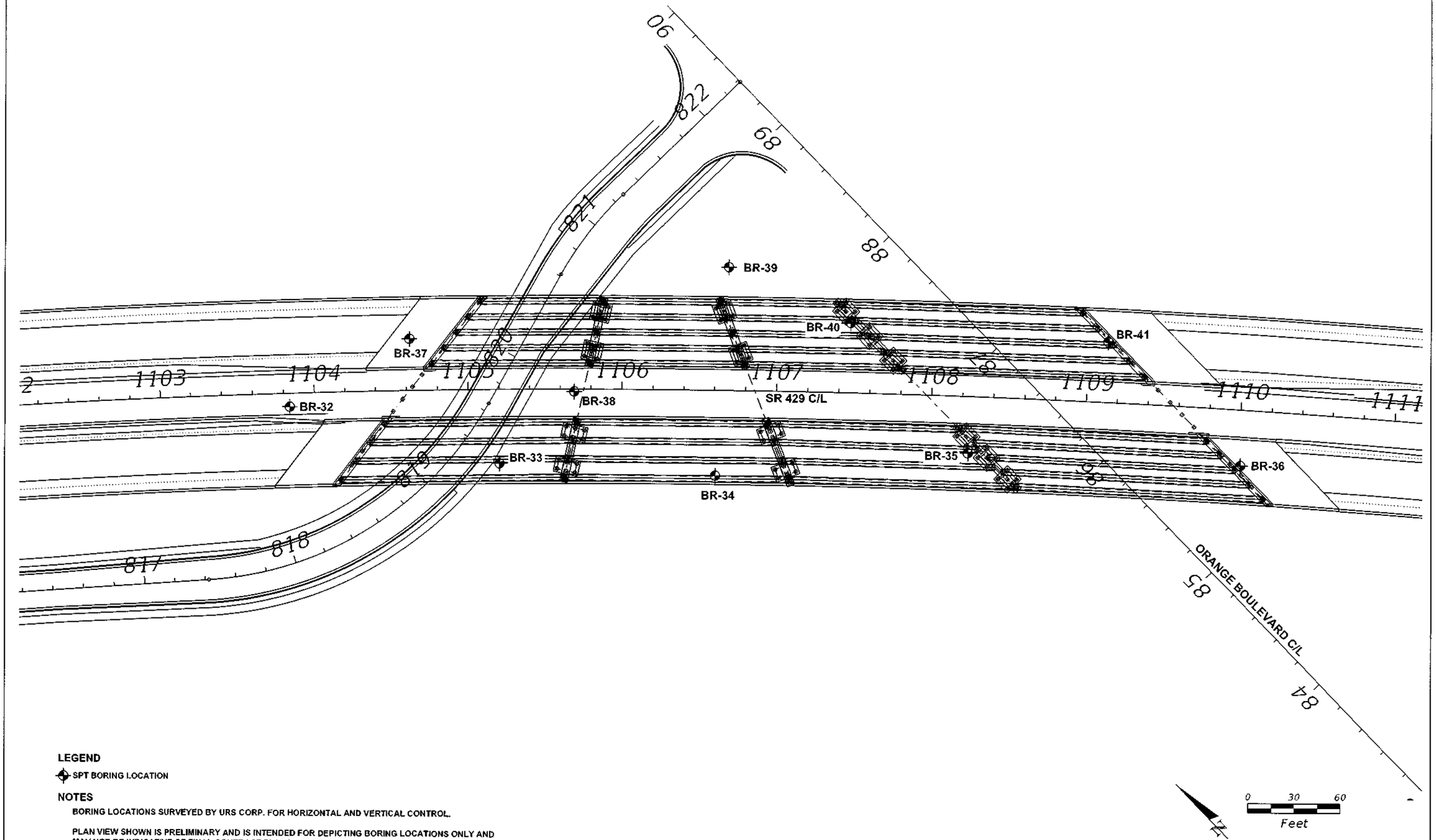
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER EASTBOUND FRONTAGE ROAD
SHEET NO. B6-5

scott 5/12/2015 1:38:39 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring12.dgn

BORING LOCATION PLAN AND
REPORT OF SPT BORINGS

SR 429 OVER ORANGE AVENUE & ORANGE BOULEVARD



LEGEND

SPT BORING LOCATION

NOTES

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Bridge Nos. 770108 & 770109

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Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SKR	CGB 71571	CGB 71571	DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

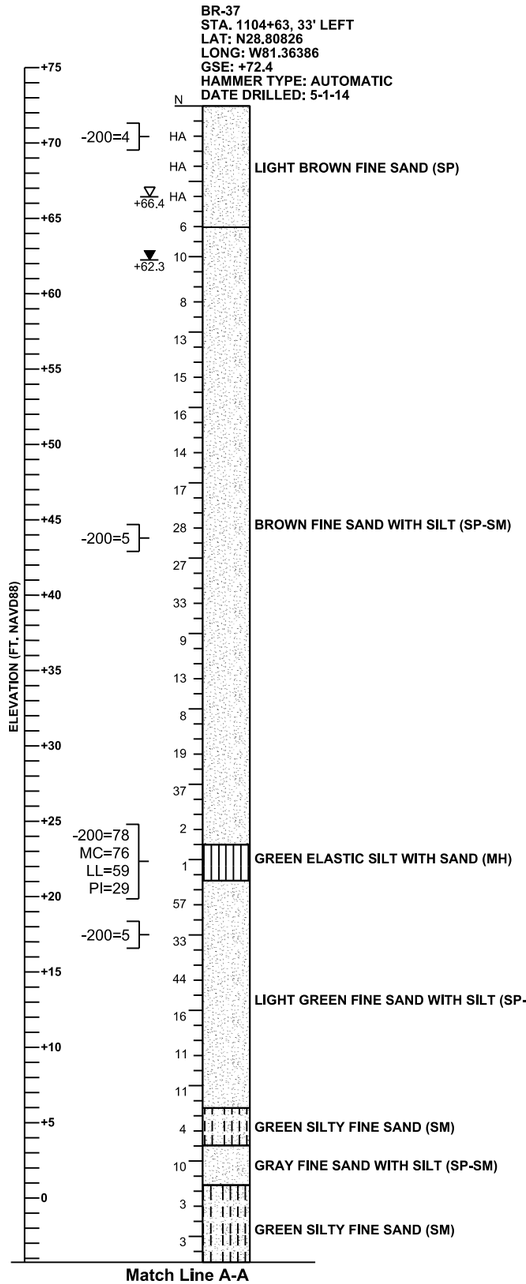
SHEET TITLE: BORING LOCATION PLAN

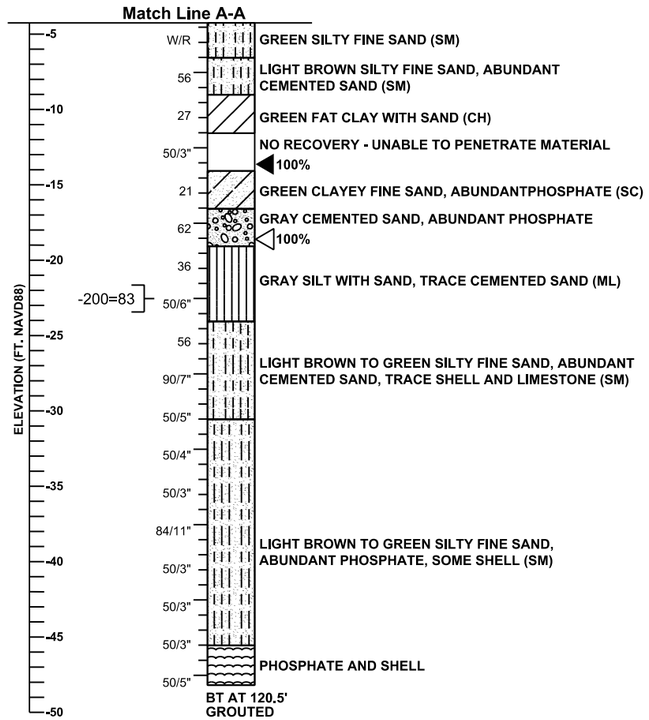
REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER S. ORANGE AVE. & ORANGE BLVD. (CR 431)

SHEET NO.:

scott 2/6/2015 4:22:27 PM J:\D107\3520E Wekiva 7A\b1boring06.dgn





LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
W/R	WEIGHT OF ROD
+66.4	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
+62.3	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND | SAND AND CLAY | CEMENTED SAND
SAND AND SILT | CLAY | SILT
PHOSPHATE AND SHELL

GENERAL NOTES

SUBSURFACE CONDITIONS SHOWN ON THE BORINGS REPRESENT THE CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS. ACTUAL CONDITIONS BETWEEN THE BORINGS MAY VARY FROM THOSE SHOWN. UNIFIED SOIL CLASSIFICATIONS SHOWN ON THE BORINGS ARE BASED ON VISUAL EXAMINATION AND THE LABORATORY TESTING SHOWN.

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SPLIT SPOON SAMPLER:
INSIDE DIAMETER: 1.375 IN.
OUTSIDE DIAMETER: 2.0 IN.
AVERAGE HAMMER DROP: 30 IN.
HAMMER WEIGHT: 140 LBS.
HAMMER TYPE: AUTOMATIC

ENVIRONMENTAL CLASSIFICATION:
SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE
SUBSTRUCTURE:
STEEL: SLIGHTLY AGGRESSIVE (pH=7.4)
CONCRETE: SLIGHTLY AGGRESSIVE (pH=7.4)

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY OF SOIL

GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770108 & 770109

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.
919 Lake Baldwin Lane
Orlando, FL 32814
T 407-898-1818 F 407-898-1837
Certificate of Authorization No. 5882
DANIEL C. STANFILL PE NO. 42763

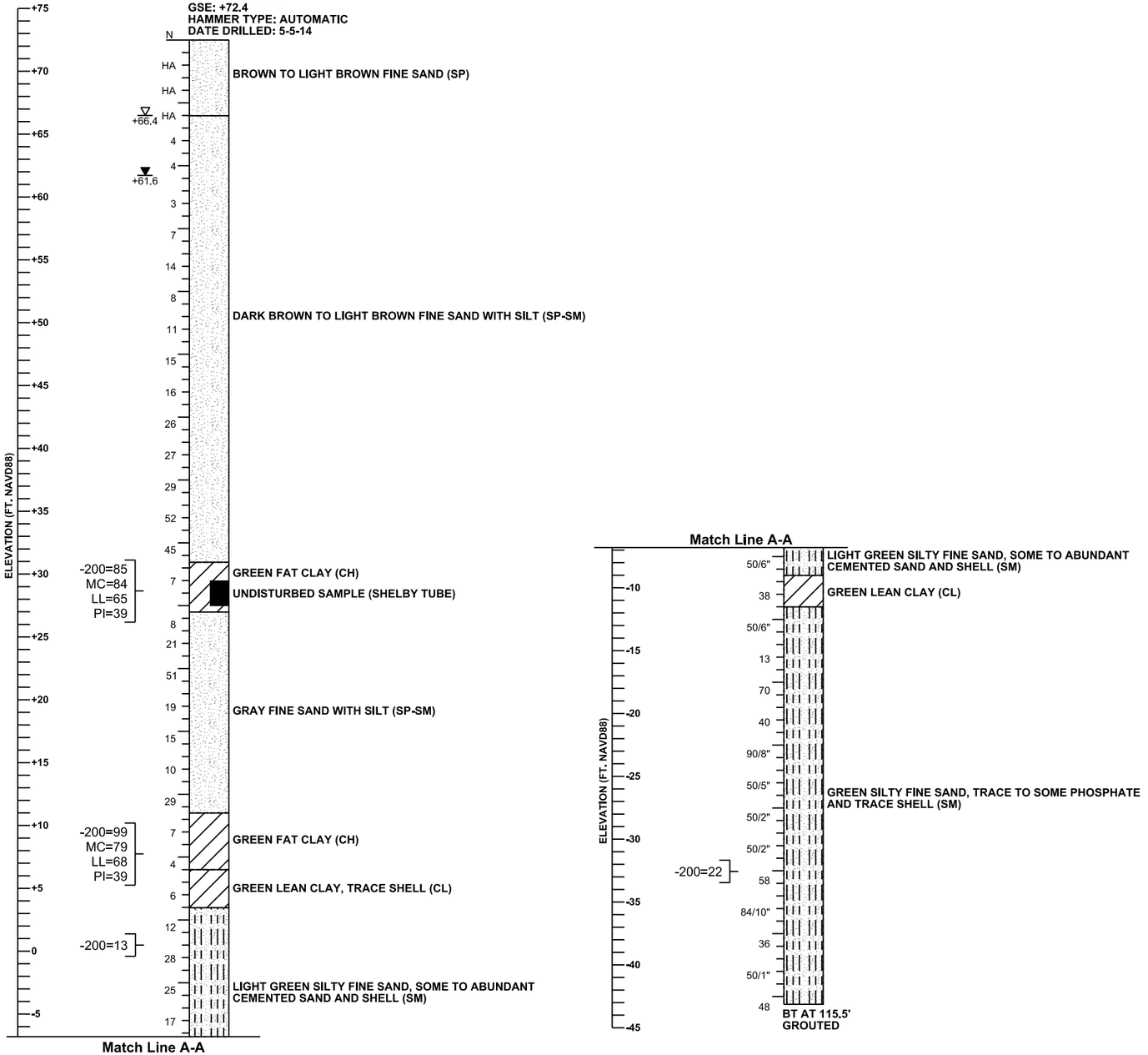
DRAWN BY: SKR
CHECKED BY: CGB 71571
DESIGNED BY: CGB 71571
CHECKED BY: DCS 42763

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER S. ORANGE AVE. & SR 431 (ORANGE BLVD.)
SHEET NO. B7-6

scott 5/13/2015 2:34:32 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring09.dgn



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
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50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
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▼ +61.6	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND CLAY

SAND AND SILT

GENERAL NOTES

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	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770108 & 770109

REVISIONS

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER S. ORANGE AVE. & SR 431 (ORANGE BLVD.)

SHEET NO. B7-7

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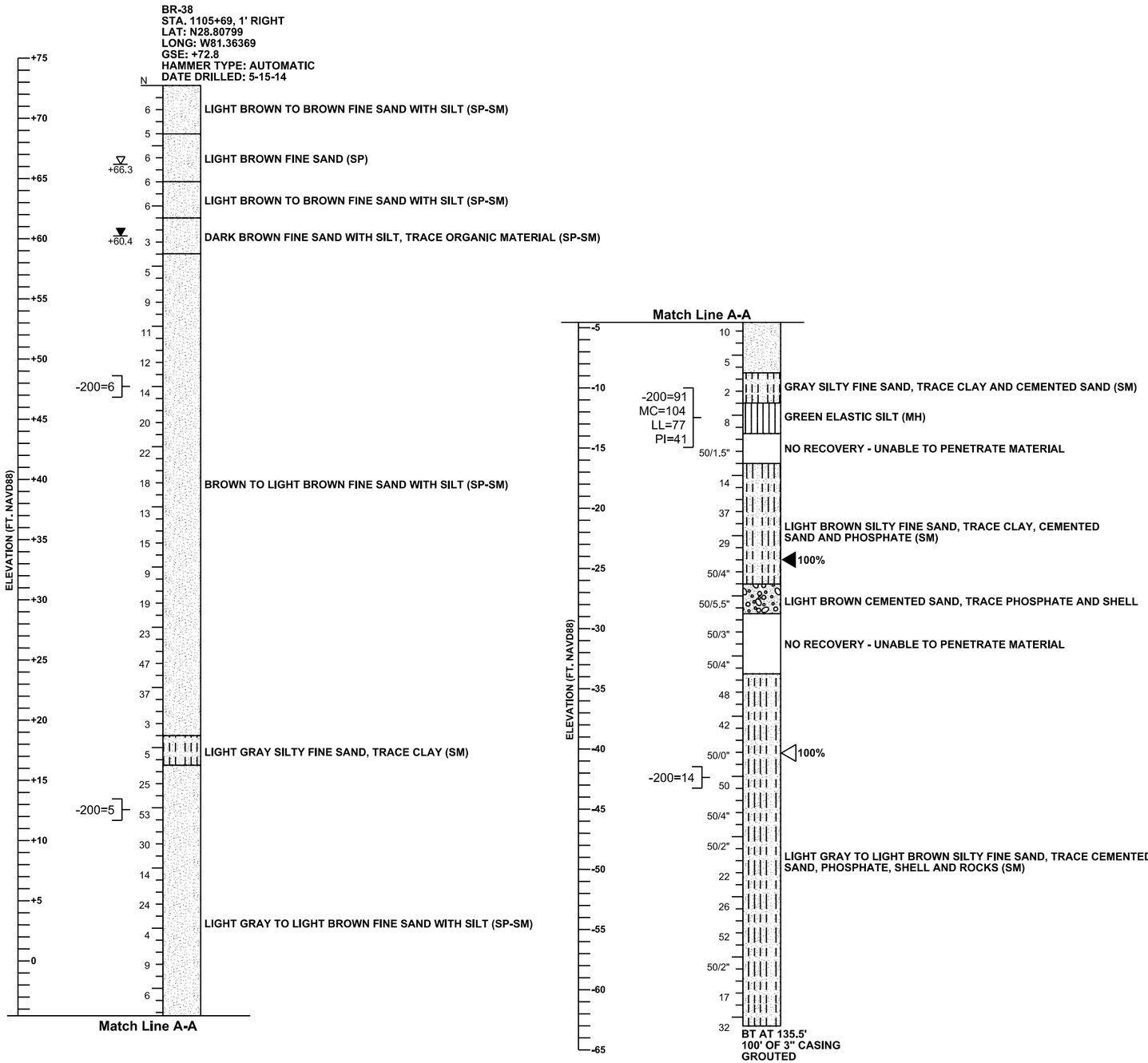

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
+66.3	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
+60.4	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND — CEMENTED SAND

SAND AND SILT — SILT

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	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770108 & 770109

REVISIONS

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STATE OF FLORIDA
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429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.:

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SR 429 OVER S. ORANGE AVE. & SR 431 (ORANGE BLVD.)

SHEET NO.: B7-8

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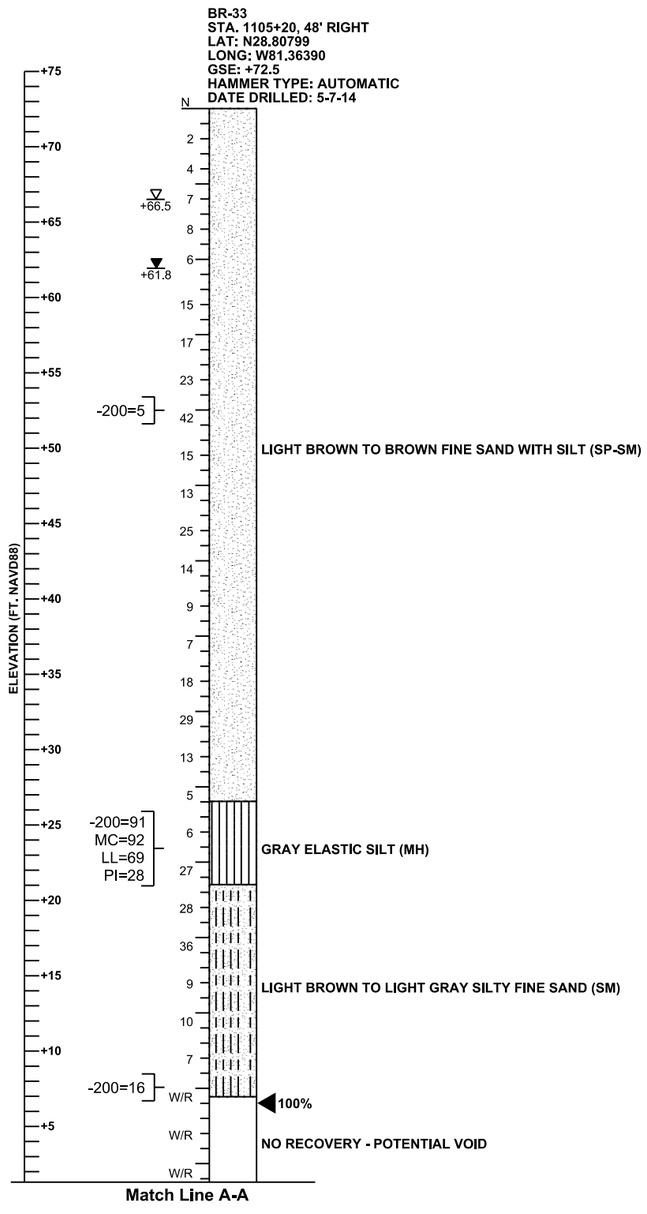

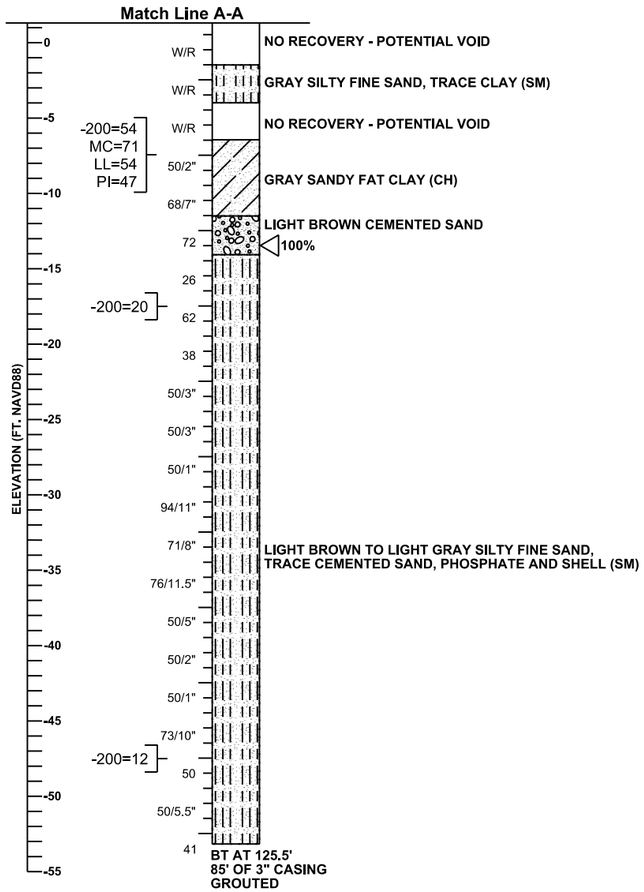

LEGEND

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W/R	WEIGHT OF ROD
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SAND | SAND AND CLAY | CEMENTED SAND
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	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
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Bridge Nos. 770108 & 770109

REVISIONS

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
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SHEET NO. B7-9

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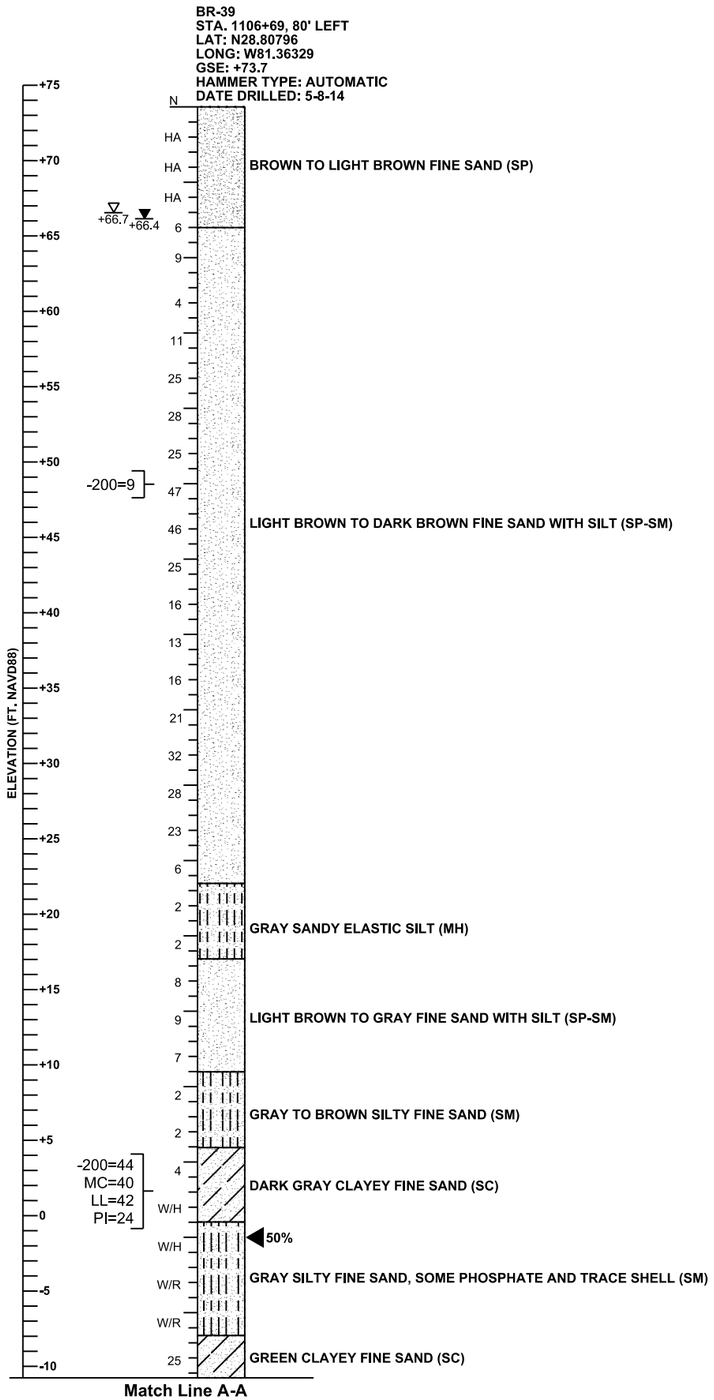

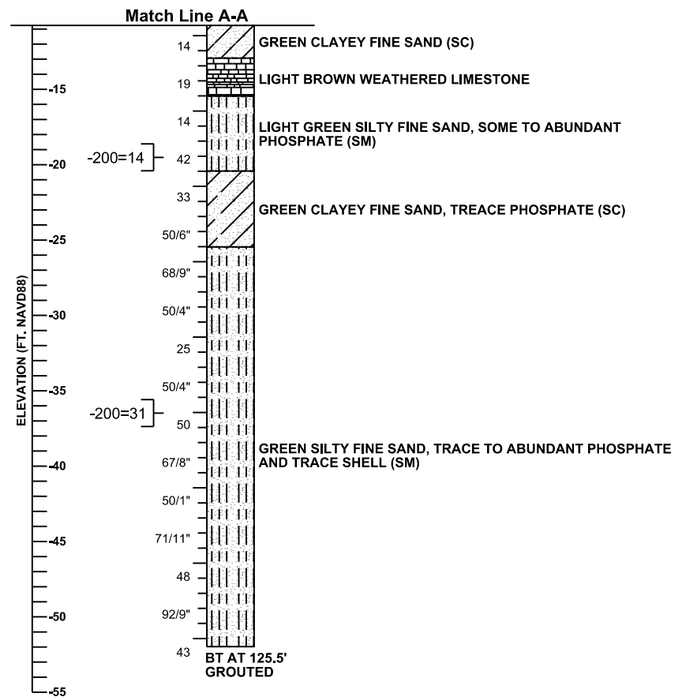

LEGEND

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SAND — SAND AND CLAY
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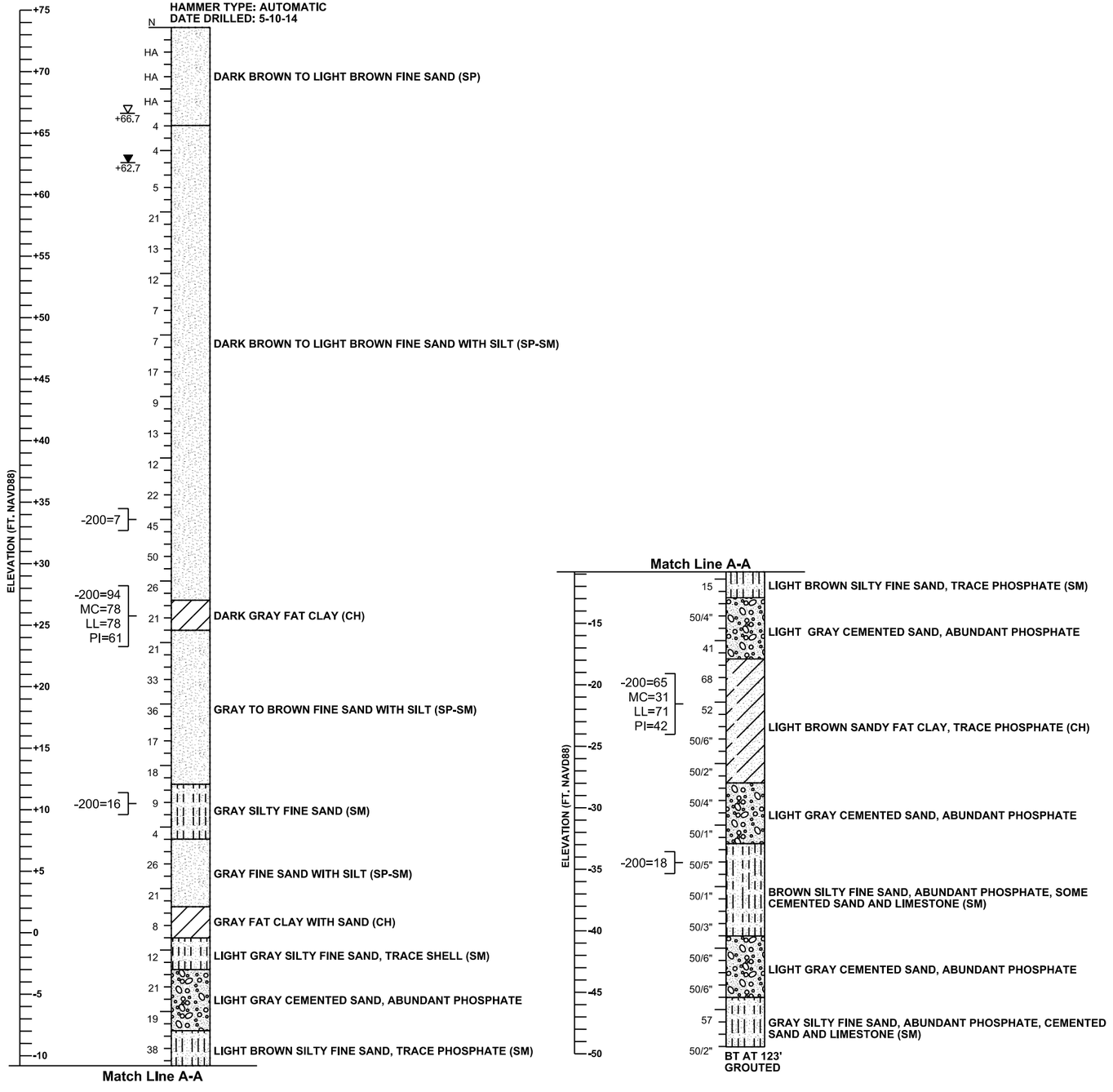
SHEET NO. B7-10

scott 5/13/2015 2:37:42 PM J:\D109\3520G Wekiva Parkway Section 7A\b1boring09.dgn

BR-34
STA. 1106+60, 55' RIGHT
LAT: N28.80771
LONG: W81.36360
GSE: +73.7
HAMMER TYPE: AUTOMATIC
DATE DRILLED: 5-10-14



LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
▽ +66.7	ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION (FT. NAVD88)
▼ +62.7	ENCOUNTERED GROUNDWATER ELEVATION (FT. NAVD88) 24 HRS. AFTER DATE DRILLED
BT	BORING TERMINATED AT DEPTH INDICATED
-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
MC=	PERCENT NATURAL MOISTURE CONTENT
LL=	LIQUID LIMIT
PI=	PLASTICITY INDEX

SAND | SAND AND CLAY | CEMENTED SAND
SAND AND SILT | CLAY

GENERAL NOTES

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SUBSTRUCTURE:
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CONCRETE: SLIGHTLY AGGRESSIVE (pH=7.4)

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GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	RELATIVE DENSITY
SANDS	0-3	VERY LOOSE
	3-8	LOOSE
	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

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SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 25
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770108 & 770109

REVISIONS

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919 Lake Baldwin Lane
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DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
429	SEMINOLE	240200-2-52-01

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER S. ORANGE AVE. & SR 431 (ORANGE BLVD.)
SHEET NO. B7-11

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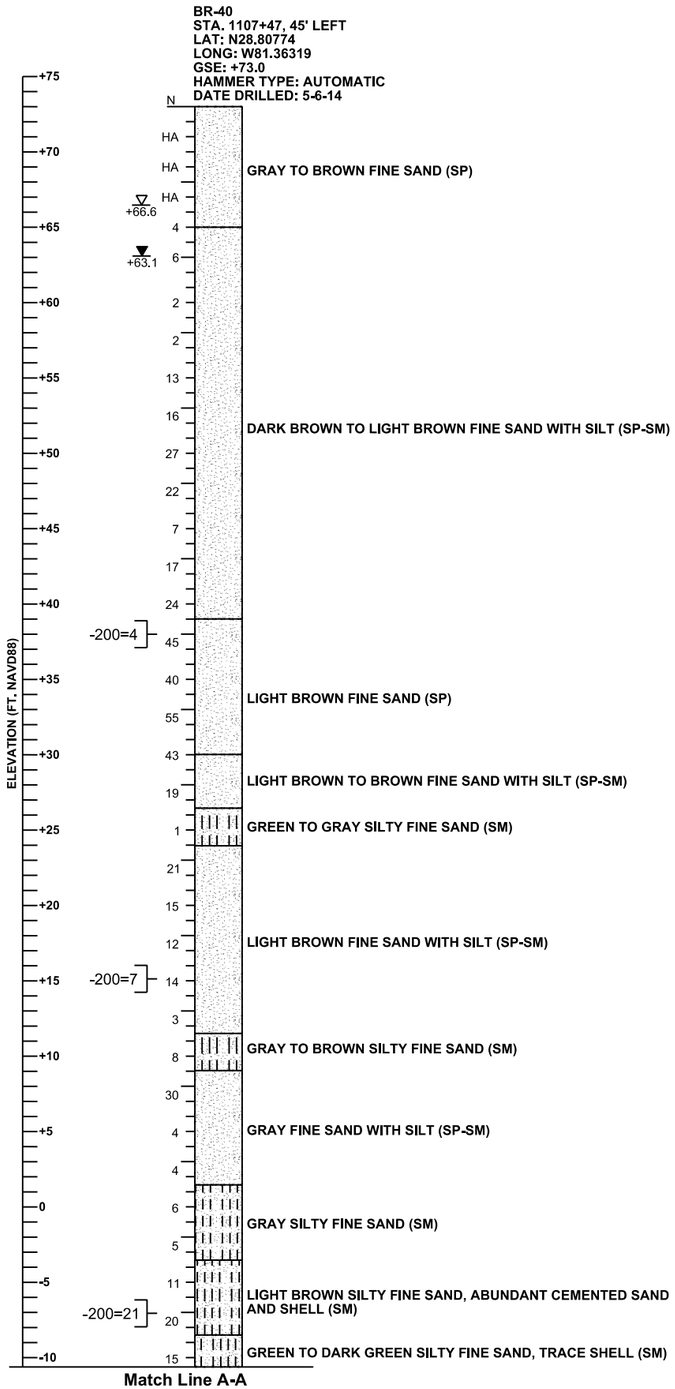

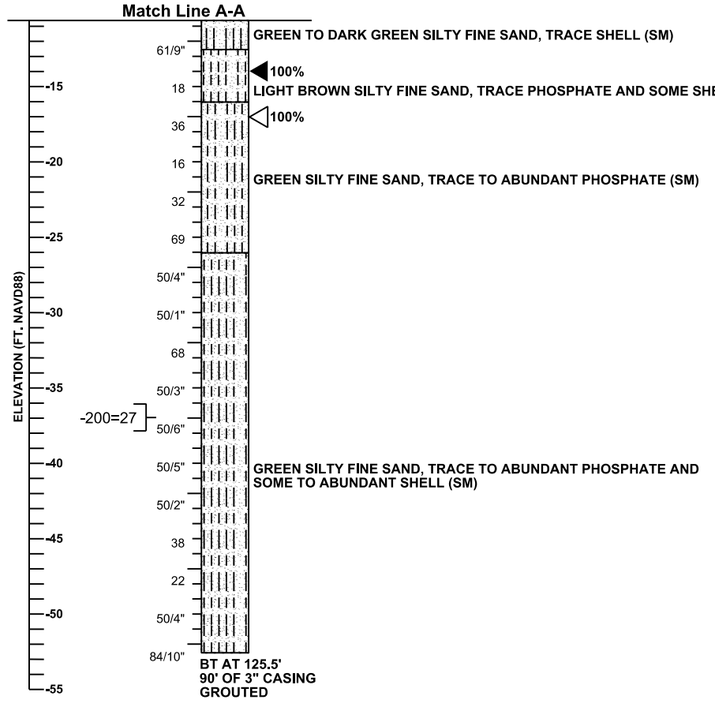

LEGEND

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HA	HAND AUGERED FOR UTILITY CLEARANCE
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
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◀	PERCENT LOSS OF DRILLING FLUID CIRCULATION
◁	PERCENT RETURN OF DRILLING FLUID CIRCULATION
BT	BORING TERMINATED AT DEPTH INDICATED
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SAND

SAND AND SILT

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	8-24	MEDIUM DENSE
	24-40	DENSE
	OVER 40	VERY DENSE

NON-GRANULAR SOILS	AUTOMATIC HAMMER N VALUE (blows per foot)	CONSISTENCY
SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

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SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429) SECTION 7A
SR 429 OVER S. ORANGE AVE. & SR 431 (ORANGE BLVD.)

SHEET NO.: B7-12

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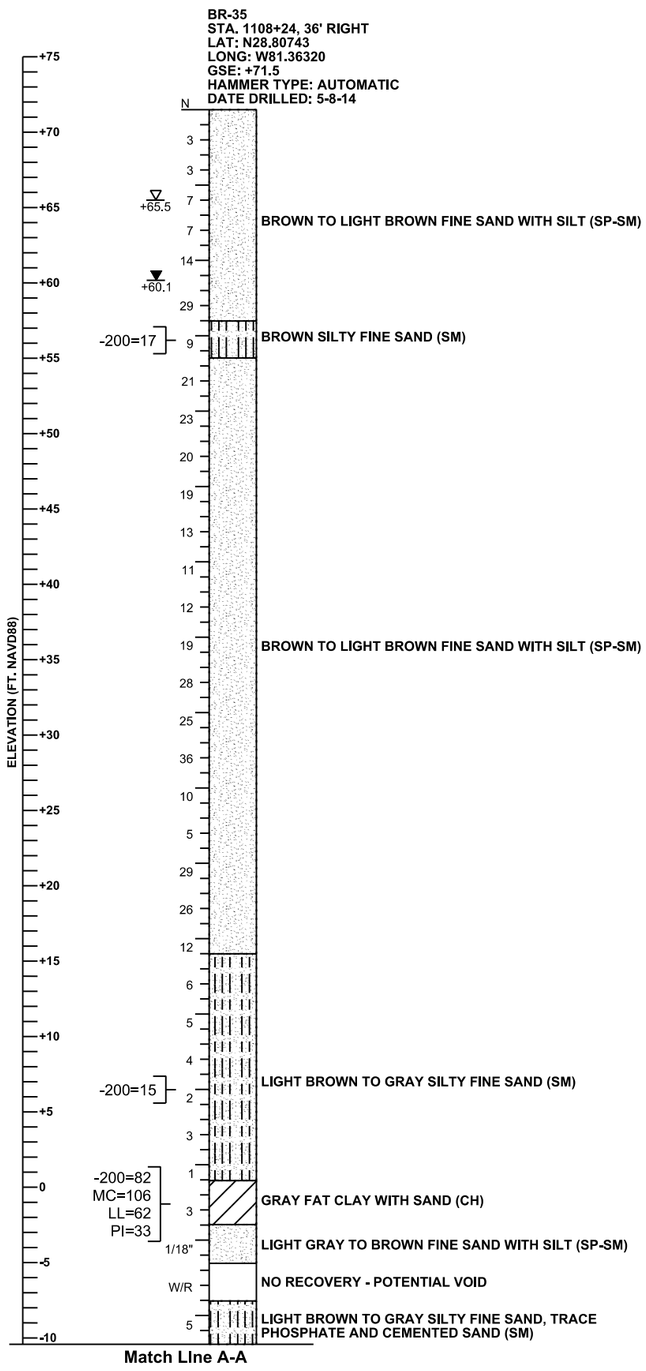

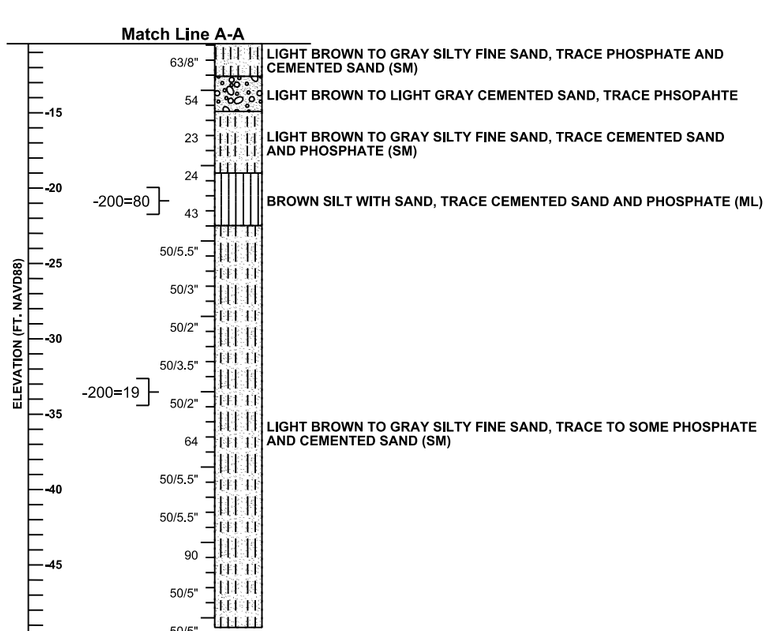

LEGEND

GSE	GROUND SURFACE ELEVATION (FT. NAVD88)
N	STANDARD PENETRATION RESISTANCE, BLOWS PER FOOT
W/R	WEIGHT OF ROD
50/3"	NUMBER OF BLOWS FOR 3 INCHES OF PENETRATION
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-200=	PERCENT PASSING NO. 200 U.S. STANDARD SIEVE
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SAND · CLAY · SILT · SAND AND SILT · CEMENTED SAND

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	24-40	DENSE
	OVER 40	VERY DENSE

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SILTS, CLAYS, MUCK, PEAT	0-1	VERY SOFT
	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

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TOWNSHIP: 19 SOUTH
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Bridge Nos. 770108 & 770109

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SHEET NO.: B7-13

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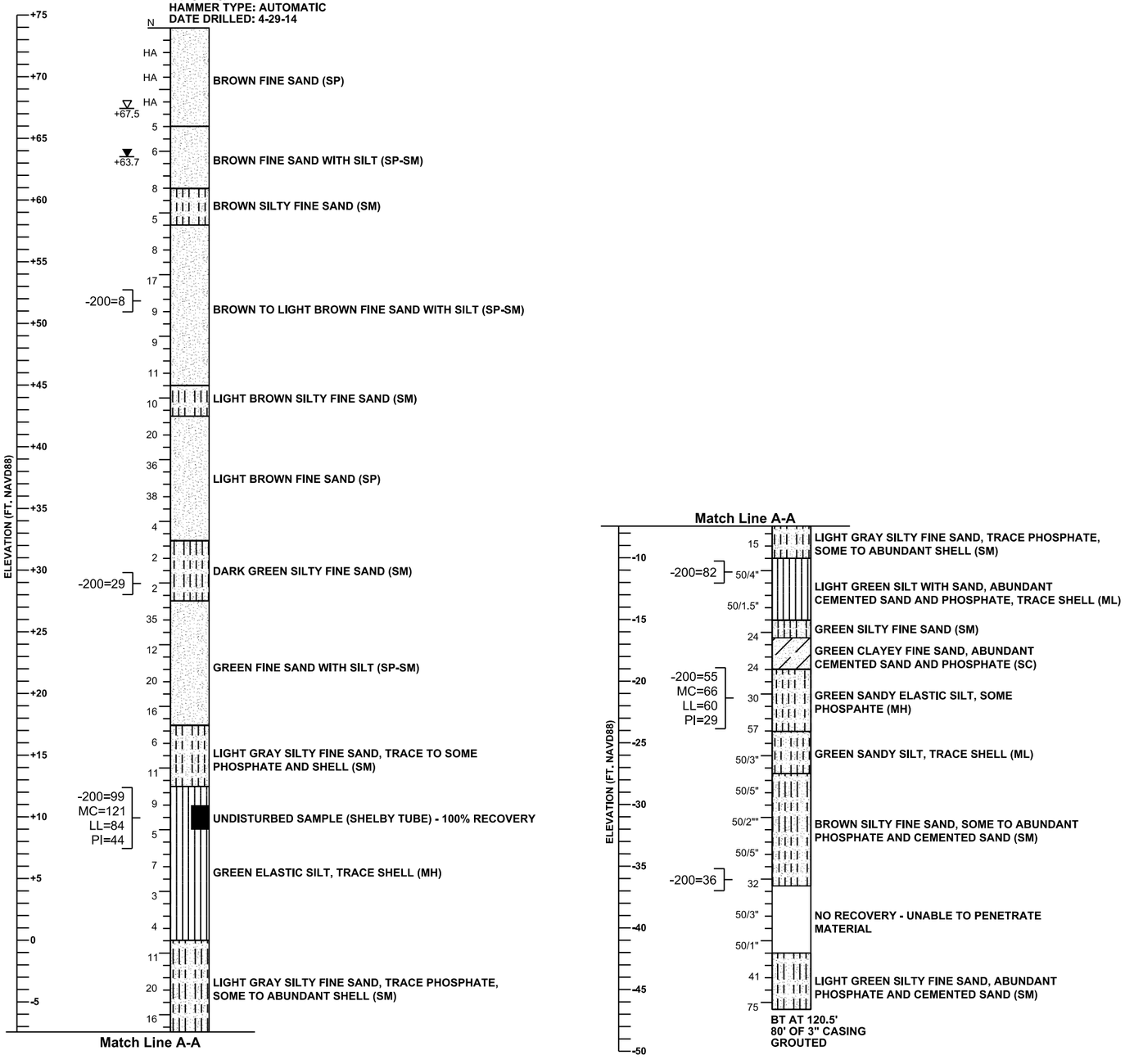

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	1-3	SOFT
	3-6	FIRM
	6-12	STIFF
	12-24	VERY STIFF
	OVER 24	HARD

SECTION: 30
TOWNSHIP: 19 SOUTH
RANGE: 29 EAST

Bridge Nos. 770108 & 770109

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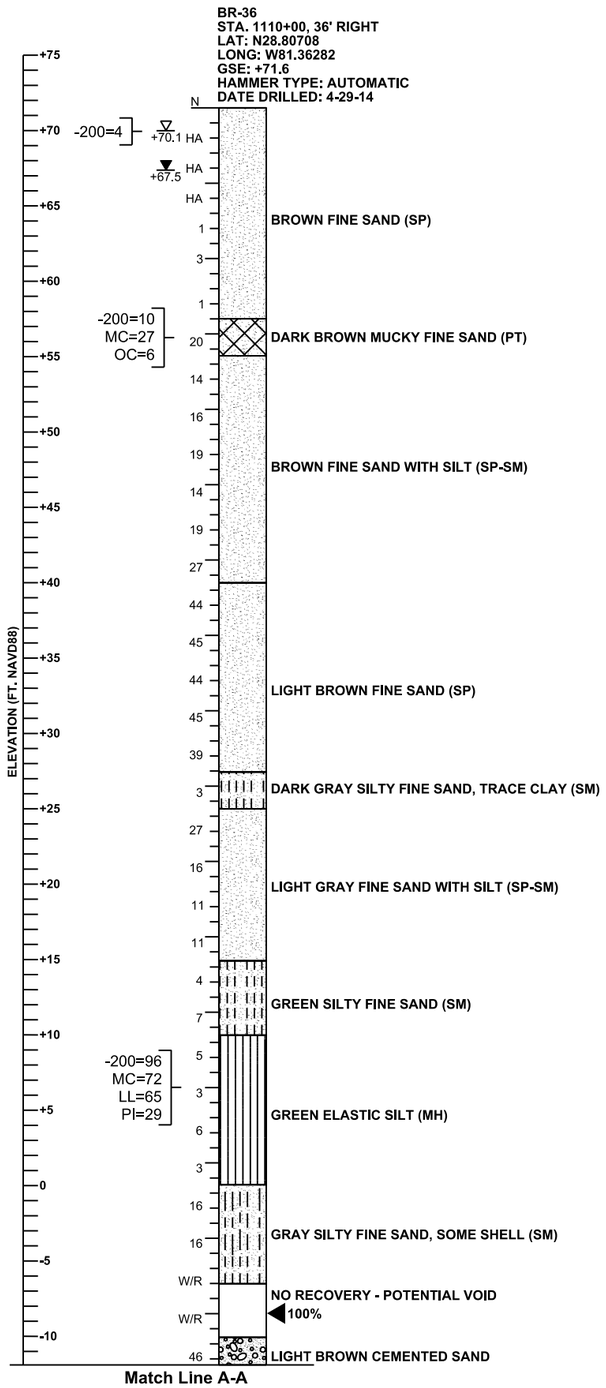

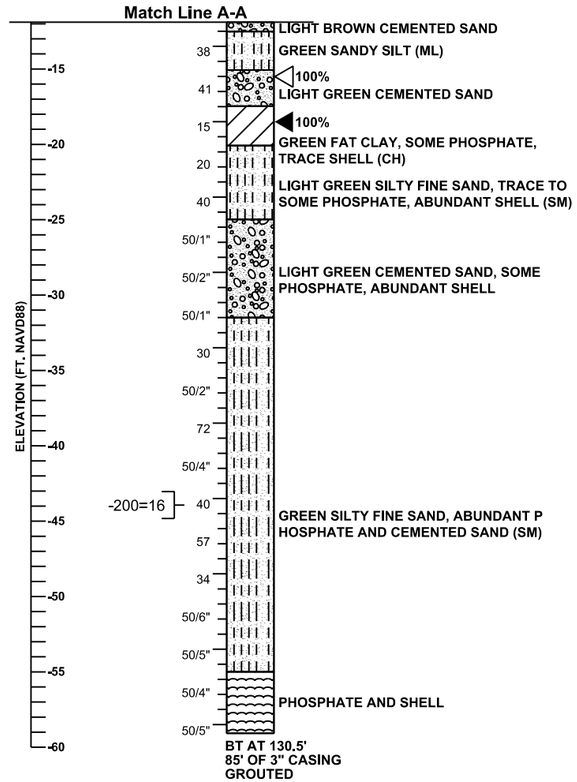

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SAND | SILT | SAND AND MUCK | PHOSPHATE AND SHELL
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SHEET NO. B7-15

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CORROSION SERIES
TEST RESULTS

Table 15

Summary of Bridge Corrosion Series Test Results

Wekiva Parkway (SR 429) - Section 7A

FPID No. 240200-2-52-01

GEC Project No. 3520G

Bridge Site	Boring No.	Soil Classification	Sample Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	Substructural Environmental Classification	
								Concrete	Steel
SR 429 at Osprey Hammock Trail	BR-3	SP	2 - 4	7.9	26,000	45	< 5	Slightly Aggressive	Slightly Aggressive
	BR-3	SM	8 - 10	7.8	5,100	60	20	Slightly Aggressive	Slightly Aggressive
SR 429 at Longwood Markham Road	BR-9	SP-SM	6 - 13	5.7	16,000	45	< 5	Moderately Aggressive	Extremely Aggressive
	BR-10	SP-SM	0 - 6	5.7	66,000	45	< 5	Moderately Aggressive	Extremely Aggressive
SR 429 at Yankee Lake Road	BR-15	SP-SM	0 - 6	7.6	32,000	30	30	Slightly Aggressive	Slightly Aggressive
	BR-15	SM	11.5 - 13	5.6	9,200	45	68	Moderately Aggressive	Extremely Aggressive
SR 429 at Lake Markham Road	BR-21	SP	6 - 10	6.0	10,000	45	15	Moderately Aggressive	Moderately Aggressive
	BR-22	SP	0 - 6	5.8	11,000	45	< 5	Moderately Aggressive	Extremely Aggressive
SR 429 at Glade View Drive	BR-26	SC	0 - 6	5.3	22,000	75	15	Moderately Aggressive	Extremely Aggressive
	BR-27	SP	0 - 6	6.7	21,000	45	< 5	Slightly Aggressive	Moderately Aggressive
SR 429 at EB Frontage Road	BR-30A	SP	0 - 6	6.2	58,000	60	25	Slightly Aggressive	Moderately Aggressive
	BR-30A	SP-SM	8 - 15.5	5.4	17,000	45	39	Moderately Aggressive	Extremely Aggressive
SR 429 at Orange Blvd. & Wayside Dr.	BR-36	SP	0 - 6	7.4	32,000	60	< 5	Slightly Aggressive	Slightly Aggressive
	BR-37	SP	0 - 6	7.4	43,000	45	66	Slightly Aggressive	Slightly Aggressive

SUMMARY OF MONITOR EXISTING STRUCTURES

Wekiva Parkway (SR 429) - Section 7A
Financial Project ID 240200-2-52-01
GEC Project No. 3520G

SUMMARY OF MONITOR EXISITNG STRUCTURES										
Site No.	**LOCATION ADDRESS (or Station)**	**STRUCTURE USAGE**	**INSPECTION & SETTLEMENT MONITORING**		**VIBRATION MONITORING**		**GROUNDWATER MONITORING**		**DESIGN NOTES**	**CONSTRUCTION REMARKS**
			0108 1		0108 2		0108 3			
			LS		LS		LS			
			P	F	P	F	P	F		
1	100 Ross Lake Ln, Sanford FL 32771 CL Const SR 429 STA 981+45, 260' RT	Residential			X				Pile driving operations	
2	500 Cinder Pt, Sanford FL 32771 CL Const SR 429 STA 1106+05, 227' RT	Residential			X				Pile driving operations	
3	509 Cinder Pt, Sanford FL 32771 CL Const SR 429 STA 1108+45, 231' RT	Residential			X				Pile driving operations	
4	5700 Red Anchor Cv, Sanford FL 32771 CL Const SR 429 STA 1109+90, 237' RT	Residential			X				Pile driving operations	
5	5680 Wayside Dr, Sanford FL 32771 CL Const SR 429 STA 1106+75, 395' LT	Eye Doctor			X				Pile driving operations	
6	170 S. Orange Ave, Sanford FL 32771 CL Const S Orange Ave Ext STA 807+00, 170' LT	Residential					X		Subsoil excavation of Pond CC	
		TOTAL:	1		1		1			

Note: This list includeds existing structures (as determined by the department) located outside the limits specified in aritle 108-2 of the FDOT Specifications that are reuiqre to be monitored. This list should not be considered all inclusive and does not contain existing structures to be monitored that are located within the distances specified in Article 108-2.

FB-MULTI PIER SOIL PARAMETERS

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+54.7	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+44.8	Foundation:	770100 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-13.0	Reference Boring(s):	BR-7

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**
Soil Description ID*	SND	SND	SND	SND	CLY	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+73	+55	+45	0	-25	-31	-37
Layer Bottom Elevation (ft)	+55	+45	0	-25	-31	-37	-61
Layer Thickness (ft)	18	10	45	25	6	6	24
Average N-Value, N_{avg} (bpf)[2]	10	3	13	46	14	14	60
Corrected N-Value, N_{60} (bpf)	10	2	12	41	13	13	54
Lateral Properties							
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	92	107	127	117	107	132
Angle of Internal Friction, ϕ (degrees)	30	26	30	34	---	30	36
Subgrade Modulus, K (pci)	60	15	60	110	500	60	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	1,733	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	0.007	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	1,733	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---
Axial/Torsional Properties							
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.13	0.67	2.03	0.42	0.72	2.59
Poisson's Ratio, ν	---	0.10	0.25	0.40	0.45	0.25	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	1,733	---	---
Angle of Internal Friction, ϕ (degrees)	---	26	30	34	---	30	36
Youngs Modulus, E (psf)	---	40,000	240,000	820,000	---	260,000	1,080,000
Concrete [1]Ultimate Unit Skin Friction, T_f (psf)	---	76	456	1558	1259	494	2052
Tip Model							
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.13	0.67	2.03	0.42	0.72	2.59
Poisson's Ratio, ν	---	0.10	0.25	0.40	0.45	0.25	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---
24" Square PPC Pile **Bearing Failure, Q_f (kips)	---	---	---	1,050	73	333	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+55.5	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+44.0	Foundation:	770099 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-36.0	Reference Boring(s):	BR-10

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Soil Description ID*	SND	SND	SND	SND	SND	SND	SND	WLS
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+73	+55	+46	-23	-34	-49	-64	-68
Layer Bottom Elevation (ft)	+55	+46	-23	-34	-49	-64	-68	-83
Layer Thickness (ft)	18	9	69	11	15	15	4	15
Average N-Value, N_{avg} (bpf)[2]	10	5	17	2	60	30	60	37
Corrected N-Value, N_{60} (bpf)	10	3	15	2	54	27	54	33
Lateral Properties								
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	97	112	92	132	117	132	122
Angle of Internal Friction, ϕ (degrees)	30	28	31	26	36	32	36	39
Subgrade Modulus, K (pci)	60	20	70	15	125	80	125	250
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---
Axial/Torsional Properties								
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.18	0.81	0.13	2.59	1.44	2.59	8.81
Poisson's Ratio, ν	---	0.15	0.28	0.10	0.45	0.30	0.45	0.30
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	28	31	26	36	32	36	39
Youngs Modulus, E (psf)	---	60,000	300,000	40,000	1,080,000	540,000	1,080,000	3,300,000
Concrete [1]Ultimate Unit Skin Friction, T_f (psf)	---	114	570	76	2052	1026	2052	660
Tip Model								
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.18	0.81	0.13	2.59	1.44	2.59	8.81
Poisson's Ratio, ν	---	0.15	0.28	0.10	0.45	0.30	0.45	0.30
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
24" Square PPC Pile **Bearing Failure, Q_f (kips)	---	---	---	---	1,382	691	1,382	950

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+57.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+43.5	Foundation:	770099-100 (P2)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-56.0	Reference Boring(s):	BR-8

Layer No.	**1**	**2**	**3**	**4**	**5**	**6**
Soil Description ID*	SND	SND	SND	SIL	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+52	+48	+10	-30	-54	-80
Layer Bottom Elevation (ft)	+48	+10	-30	-54	-80	-83
Layer Thickness (ft)	4	38	40	24	26	3
Average N-Value, N_{avg} (bpf)[2]	5	12	21	3	60	25
Corrected N-Value, N_{60} (bpf)	3	11	19	3	54	23
Lateral Properties						
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	97	107	112	102	132	117
Angle of Internal Friction, ϕ (degrees)	28	30	31	14	36	32
Subgrade Modulus, K (pci)	20	60	70	50	125	80
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---
Axial/Torsional Properties						
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.18	0.61	1.03	0.09	2.59	1.23
Poisson's Ratio, ν	0.15	0.25	0.28	0.20	0.45	0.30
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	28	30	31	14	36	32
Youngs Modulus, E (psf)	60,000	220,000	380,000	30,000	1,080,000	460,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	114	418	722	280	2052	874
Tip Model						
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.18	0.61	1.03	0.09	2.59	1.23
Poisson's Ratio, ν	0.15	0.25	0.28	0.20	0.45	0.30
Uncorrected N-value (bpf)	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	1,382	589

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+55.8	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+42.0	Foundation:	770099-100 (EB3)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-26.0	Reference Boring(s):	BR-12

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soil Description ID*	SND	SND	SND	SND	SIL	SIL	SIL	SIL	SIL
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+77	+56	+44	-15	-26	-33	-41	-46	-51
Layer Bottom Elevation (ft)	+56	+44	-15	-26	-33	-41	-46	-51	-60
Layer Thickness (ft)	21	12	59	11	7	8	5	5	9
Average N-Value, N_{avg} (bpf)[2]	10	8	19	3	60	21	53	19	60
Corrected N-Value, N_{60} (bpf)	10	5	17	3	54	19	48	17	54
Lateral Properties									
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	102	112	97	127	117	127	117	127
Angle of Internal Friction, ϕ (degrees)	30	29	31	28	32	24	32	24	32
Subgrade Modulus, K (pci)	60	30	70	20	300	200	300	200	300
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties									
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.29	0.92	0.18	1.29	0.49	1.15	0.44	1.29
Poisson's Ratio, ν	---	0.20	0.28	0.15	0.45	0.35	0.45	0.35	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	29	31	28	32	24	32	24	32
Youngs Modulus, E (psf)	---	100,000	340,000	60,000	540,000	190,000	480,000	170,000	540,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	---	190	646	114	2639	1509	2597	1380	2639
Tip Model									
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.29	0.92	0.18	1.29	0.49	1.15	0.44	1.29
Poisson's Ratio, ν	---	0.20	0.28	0.15	0.45	0.35	0.45	0.35	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	691	243	614	218	691

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
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14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+54.2	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+45.8	Foundation:	770101-2 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-18.0	Reference Boring(s):	BR-16

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soil Description ID*	SND	SND	SND	SND	SND	SND	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+76	+54	+5	-2	-7	-15	-23	-30	-35
Layer Bottom Elevation (ft)	+54	+5	-2	-7	-15	-23	-30	-35	-50
Layer Thickness (ft)	22	49	7	5	8	8	7	5	15
Average N-Value, N_{avg} (bpf)[2]	10	15	4	31	7	60	25	60	44
Corrected N-Value, N_{60} (bpf)	10	14	4	28	6	54	23	54	40
Lateral Properties									
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	107	102	117	102	132	117	132	127
Angle of Internal Friction, ϕ (degrees)	30	30	29	32	29	36	32	36	34
Subgrade Modulus, K (pci)	60	60	30	80	30	125	80	125	110
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties									
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.78	0.23	1.50	0.35	2.59	1.23	2.59	1.98
Poisson's Ratio, ν	---	0.25	0.20	0.30	0.20	0.45	0.30	0.45	0.40
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	30	29	32	29	36	32	36	34
Youngs Modulus, E (psf)	---	280,000	80,000	560,000	120,000	1,080,000	460,000	1,080,000	800,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	---	532	152	1064	228	2052	874	2052	1520
Tip Model									
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.78	0.23	1.50	0.35	2.59	1.23	2.59	1.98
Poisson's Ratio, ν	---	0.25	0.20	0.30	0.20	0.45	0.30	0.45	0.40
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	---	1,382	589	1,382	1,024

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+55.8	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+46.0	Foundation:	770101-2 (P2)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-24.0	Reference Boring(s):	BR-17

Layer No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Soil Description ID*	SND	SND	SND	CLY	SND	SND	SND	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+54	+45	+32	+21	+18	+3	-6	-11	-26	-88
Layer Bottom Elevation (ft)	+45	+32	+21	+18	+3	-6	-11	-26	-42	-51
Layer Thickness (ft)	9	13	11	3	15	9	5	15	16	-37
Average N-Value, N_{avg} (bpf)[2]	6	19	11	6	14	3	17	3	35	60
Corrected N-Value, N_{60} (bpf)	4	16	10	5	13	3	15	3	32	54
Lateral Properties										
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	102	112	107	112	107	97	112	97	122	132
Angle of Internal Friction, ϕ (degrees)	29	31	30	---	30	28	31	28	33	36
Subgrade Modulus, K (pci)	30	70	60	100	60	20	70	20	90	125
Undrained Shear Strength, c_u (psf)	---	---	---	667	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	0.01	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	667	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties										
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.23	0.87	0.56	0.16	0.72	0.18	0.81	0.18	1.65	2.59
Poisson's Ratio, ν	0.20	0.28	0.25	0.45	0.25	0.15	0.28	0.15	0.35	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	667	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	29	31	30	---	30	28	31	28	33	36
Youngs Modulus, E (psf)	80,000	320,000	200,000	---	260,000	60,000	300,000	60,000	640,000	1,080,000
Concrete [1]Ultimate Unit Skin Friction, T_f (psf)	152	608	380	524	494	114	570	114	1216	2052
Tip Model										
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.23	0.87	0.56	0.16	0.72	0.18	0.81	0.18	1.65	2.59
Poisson's Ratio, ν	0.20	0.28	0.25	0.45	0.25	0.15	0.28	0.15	0.35	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
24" Square PPC Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	77	819	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+52.5	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+44.5	Foundation:	770101-2 (EB3)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-24.0	Reference Boring(s):	BR-15

Layer No.	**[3]MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Soil Description ID*	SND	SND	SIL	SND	SND	SND	SND	LST
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Rock
Layer Top Elevation (ft)	+71	+53	+26	+12	+7	-9	-20	-52
Layer Bottom Elevation (ft)	+53	+26	+12	+7	-9	-20	-52	-58
Layer Thickness (ft)	19	27	14	5	16	11	32	6
Average N-Value, N_{avg} (bpf)[2]	10	13	9	26	12	4	60	60
Corrected N-Value, N_{60} (bpf)	10	11	8	23	11	4	54	54
Lateral Properties								
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Limestone (McVay)
Total Unit Weight, γ (pcf)	105	107	112	117	107	102	132	145
Angle of Internal Friction, ϕ (degrees)	30	30	22	32	30	29	36	40
Subgrade Modulus, K (pci)	60	60	100	80	60	30	125	2,000
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	80,000
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	0.0001
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	80,000
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	160,000
Axial/Torsional Properties								
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.61	0.21	1.23	0.61	0.23	2.59	27.78
Poisson's Ratio, ν	---	0.25	0.30	0.30	0.25	0.20	0.45	0.35
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	80,000
Angle of Internal Friction, ϕ (degrees)	---	30	22	32	30	29	36	40
Youngs Modulus, E (psf)	---	220,000	80,000	460,000	220,000	80,000	1,080,000	10,800,000
Concrete [1]Ultimate Unit Skin Friction, T_f (psf)	---	418	712	874	418	152	2052	1080
Tip Model								
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.61	0.21	1.23	0.61	0.23	2.59	27.78
Poisson's Ratio, ν	---	0.25	0.30	0.30	0.25	0.20	0.45	0.35
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
24" Square PPC Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	1,382	1,555

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+37.7	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+33.6	Foundation:	770104 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-47.0	Reference Boring(s):	BR-19

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Soil Description ID*	SND	SND	SND	SND	SND	SND	SND	SND	SND	LST
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Rock
Layer Top Elevation (ft)	+70	+38	+12	+1	-5	-10	-17	-26	-31	-46
Layer Bottom Elevation (ft)	+38	+18	+1	-5	-10	-17	-26	-31	-46	-57
Layer Thickness (ft)	32	20	11	6	5	7	9	5	15	11
Average N-Value, N_{avg} (bpf)[2]	10	12	4	22	2	21	4	22	60	60
Corrected N-Value, N_{60} (bpf)	10	9	4	20	2	19	4	20	54	54
Lateral Properties										
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Limestone (McVay)
Total Unit Weight, γ (pcf)	105	102	102	117	92	112	102	117	132	145
Angle of Internal Friction, ϕ (degrees)	30	29	29	32	26	31	29	32	36	40
Subgrade Modulus, K (pci)	60	30	30	80	15	70	30	80	125	2,000
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	80,000
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---	---	0.0001
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---	---	80,000
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	160,000
Axial/Torsional Properties										
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.52	0.23	1.07	0.13	1.03	0.23	1.07	2.59	27.78
Poisson's Ratio, ν	---	0.20	0.20	0.30	0.10	0.28	0.20	0.30	0.45	0.35
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	80,000
Angle of Internal Friction, ϕ (degrees)	---	29	29	32	26	31	29	32	36	40
Youngs Modulus, E (psf)	---	180,000	80,000	400,000	40,000	380,000	80,000	400,000	1,080,000	10,800,000
Steel [1]Ultimate Unit Skin Friction, T_f (psf)	---	338	127	743	39	709	127	743	1390	1080
Tip Model										
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.52	0.23	1.07	0.13	1.03	0.23	1.07	2.59	27.78
Poisson's Ratio, ν	---	0.20	0.20	0.30	0.10	0.28	0.20	0.30	0.45	0.35
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
24" Steel Pipe Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	0.33

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
24" Steel Pipe Pile (closed end):	452.4

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+38.2	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+34.5	Foundation:	770104 (P2)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-70.0	Reference Boring(s):	BR-20

Layer No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Soil Description ID*	SND	SND	SND	SND	SND	SIL	LST	WLS	WLS
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Rock	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+38	+29	-8	-19	-33	-43	-49	-54	-66
Layer Bottom Elevation (ft)	+29	-8	-19	-33	-43	-49	-54	-66	-92
Layer Thickness (ft)	9	37	11	14	10	6	5	12	26
Average N-Value, N_{avg} (bpf)[2]	15	9	22	5	11	60	60	19	44
Corrected N-Value, N_{60} (bpf)	10	8	20	5	10	54	54	17	40
Lateral Properties									
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Limestone (McVay)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	107	102	117	102	107	127	145	117	127
Angle of Internal Friction, ϕ (degrees)	30	29	32	29	30	32	40	37	40
Subgrade Modulus, K (pci)	60	30	80	30	60	300	2,000	200	300
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	80,000	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	0.0001	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	80,000	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	160,000	---	---
Axial/Torsional Properties									
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.56	0.46	1.07	0.29	0.56	1.29	27.78	4.80	10.29
Poisson's Ratio, ν	0.25	0.20	0.30	0.20	0.25	0.45	0.35	0.23	0.35
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	80,000	---	---
Angle of Internal Friction, ϕ (degrees)	30	29	32	29	30	32	40	37	40
Youngs Modulus, E (psf)	200,000	160,000	400,000	100,000	200,000	540,000	10,800,000	1,700,000	4,000,000
Steel [1]Ultimate Unit Skin Friction, T_f (psf)	378	297	743	171	378	1621	1080	340	800
Tip Model									
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.56	0.46	1.07	0.29	0.56	1.29	27.78	4.80	10.29
Poisson's Ratio, ν	0.25	0.20	0.30	0.20	0.25	0.45	0.35	0.23	0.35
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
24" Steel Pipe Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	0.24

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
24" Steel Pipe Pile (closed end):	452.4

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+36.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+34.2	Foundation:	770104 (EB3)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-96.0	Reference Boring(s):	BR-21

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Soil Description ID*	SND	SND	SMK	SND	SND	SND	SIL	SND	WLS	WLS
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+69	+36	+19	+12	-41	-53	-61	-65	-73	-86
Layer Bottom Elevation (ft)	+36	+19	+12	-41	-53	-61	-65	-73	-86	-117
Layer Thickness (ft)	33	17	7	53	12	8	4	8	13	31
Average N-Value, N_{avg} (bpf)[2]	10	6	1	14	5	21	16	4	23	48
Corrected N-Value, N_{60} (bpf)	10	5	1	13	5	19	14	4	21	43
Lateral Properties										
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	102	72	107	102	112	112	102	117	127
Angle of Internal Friction, ϕ (degrees)	30	29	10	30	29	31	22	29	38	40
Subgrade Modulus, K (pci)	60	30	15	60	30	70	100	30	200	300
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties										
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.29	0.03	0.72	0.29	1.03	0.37	0.23	5.83	11.06
Poisson's Ratio, ν	---	0.20	0.10	0.25	0.20	0.28	0.30	0.20	0.25	0.35
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	29	10	30	29	31	22	29	38	40
Youngs Modulus, E (psf)	---	100,000	10,000	260,000	100,000	380,000	140,000	80,000	2,100,000	4,300,000
Steel [1]Ultimate Unit Skin Friction, T_f (psf)	---	171	19	495	171	709	712	127	420	860
Tip Model										
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.29	0.03	0.72	0.29	1.03	0.37	0.23	5.83	11.06
Poisson's Ratio, ν	---	0.20	0.10	0.25	0.20	0.28	0.30	0.20	0.25	0.35
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
24" Steel Pipe Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	0.26

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
24" Steel Pipe Pile (closed end):	452.4

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+36.1	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+33.5	Foundation:	770103 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-155.0	Reference Boring(s):	BR-22

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Soil Description ID*	SND	SND	SND	SND	WLS	WLS	SND	CLY	SND	SND	WLS
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+67	+36	+12	-48	-67	-78	-91	-128	-135	-146	-158
Layer Bottom Elevation (ft)	+36	+12	-48	-67	-78	-91	-128	-135	-146	-158	-174
Layer Thickness (ft)	30	24	60	19	11	13	37	7	11	12	16
Average N-Value, N_{avg} (bpf)[2]	10	14	6	3	20	1	6	1	1	60	60
Corrected N-Value, N_{60} (bpf)	10	12	5	3	18	1	5	1	1	54	54
Lateral Properties											
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Soft < Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	107	102	97	117	97	102	102	92	132	127
Angle of Internal Friction, ϕ (degrees)	30	30	29	28	37	34	29	---	26	36	40
Subgrade Modulus, K (pci)	60	60	30	20	200	30	30	15	15	125	300
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	133	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	0.03	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	133	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties											
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.67	0.29	0.18	5.08	0.30	0.29	0.03	0.06	2.59	13.89
Poisson's Ratio, ν	---	0.25	0.20	0.15	0.23	0.15	0.20	0.40	0.10	0.45	0.35
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	133	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	30	29	28	37	34	29	---	26	36	40
Youngs Modulus, E (psf)	---	240,000	100,000	60,000	1,800,000	100,000	100,000	---	20,000	1,080,000	5,400,000
Steel [1]Ultimate Unit Skin Friction, T_f (psf)	---	456	171	83	360	20	171	112	19	1390	1080
Tip Model											
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.67	0.29	0.18	5.08	0.30	0.29	0.03	0.06	2.59	13.89
Poisson's Ratio, ν	---	0.25	0.20	0.15	0.23	0.15	0.20	0.40	0.10	0.45	0.35
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---	---
24" Steel Pipe Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	0.22	0.33

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
24" Steel Pipe Pile (closed end):	452.4

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+36.3	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+34.0	Foundation:	770103 (P2)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-165.0	Reference Boring(s):	BR-23

Layer No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Soil Description ID*	SND	SND	SND	SND	WLS	CLY	WLS	SND	CLY	LST
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesive	Rock
Layer Top Elevation (ft)	+36	+7	-28	-45	-78	-100	-112	-136	-150	-158
Layer Bottom Elevation (ft)	+7	-28	-45	-78	-100	-112	-136	-150	-158	-189
Layer Thickness (ft)	29	35	17	33	22	12	24	14	8	31
Average N-Value, N_{avg} (bpf)[2]	10	7	14	5	23	3	39	1	3	60
Corrected N-Value, N_{60} (bpf)	9	6	13	5	21	3	35	1	3	54
Lateral Properties										
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Soft < Water)	Sand (Reese)	Sand (Reese)	Clay (Soft < Water)	Limestone (McVay)
Total Unit Weight, γ (pcf)	102	102	107	102	117	107	122	92	107	145
Angle of Internal Friction, ϕ (degrees)	29	29	30	29	38	---	39	26	---	40
Subgrade Modulus, K (pci)	30	30	60	30	200	30	250	15	30	2,000
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	400	---	---	400	80,000
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	0.02	---	---	0.02	0.0001
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	400	---	---	400	80,000
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	160,000
Axial/Torsional Properties										
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.52	0.35	0.72	0.29	5.83	0.10	9.35	0.06	0.10	27.78
Poisson's Ratio, ν	0.20	0.20	0.25	0.20	0.25	0.40	0.30	0.10	0.40	0.35
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	400	---	---	400	80,000
Angle of Internal Friction, ϕ (degrees)	29	29	30	29	38	---	39	26	---	40
Youngs Modulus, E (psf)	180,000	120,000	260,000	100,000	2,100,000	---	3,500,000	20,000	---	10,800,000
Steel [1]Ultimate Unit Skin Friction, T_f (psf)	338	213	495	171	420	325	700	19	325	1080
Tip Model										
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.52	0.35	0.72	0.29	5.83	0.10	9.35	0.06	0.10	27.78
Poisson's Ratio, ν	0.20	0.20	0.25	0.20	0.25	0.40	0.30	0.10	0.40	0.35
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
24" Steel Pipe Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	0.33

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
24" Steel Pipe Pile (closed end):	452.4

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+35.4	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+33.5	Foundation:	770103 (EB3)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-111.0	Reference Boring(s):	BR-24

Layer No.	**[3]MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Soil Description ID*	SND	SND	SMK	SND	SND	SND	SND	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+66	+35	+18	+10	-4	-12	-39	-47	-102	-110
Layer Bottom Elevation (ft)	+35	+18	+10	-4	-12	-39	-47	-102	-110	-132
Layer Thickness (ft)	30	17	8	14	8	27	8	55	8	22
Average N-Value, N_{avg} (bpf)[2]	10	9	2	14	26	10	22	12	22	60
Corrected N-Value, N_{60} (bpf)	10	7	2	13	23	9	20	11	20	54
Lateral Properties										
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	107	102	77	107	117	102	117	107	117	132
Angle of Internal Friction, ϕ (degrees)	30	29	14	30	32	29	32	30	32	36
Subgrade Modulus, K (pci)	60	30	25	60	80	30	80	60	80	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties										
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.56	0.41	0.06	0.72	1.23	0.52	1.07	0.61	1.07	2.59
Poisson's Ratio, ν	0.25	0.20	0.15	0.25	0.30	0.20	0.30	0.25	0.30	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	30	29	14	30	32	29	32	30	32	36
Youngs Modulus, E (psf)	200,000	140,000	20,000	260,000	460,000	180,000	400,000	220,000	400,000	1,080,000
Steel [1]Ultimate Unit Skin Friction, T_f (psf)	378	255	39	495	838	338	743	418	743	1390
Tip Model										
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.56	0.41	0.06	0.72	1.23	0.52	1.07	0.61	1.07	2.59
Poisson's Ratio, ν	0.25	0.20	0.15	0.25	0.30	0.20	0.30	0.25	0.30	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---
24" Steel Pipe Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	0.22

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
24" Steel Pipe Pile (closed end):	452.4

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+47.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+42.5	Foundation:	770105-6 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-11.0	Reference Boring(s):	BR-27

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**
Soil Description ID*	SND	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+71	+47	+44	-4
Layer Bottom Elevation (ft)	+47	+26	-4	-43
Layer Thickness (ft)	24	21	48	39
Average N-Value, N_{avg} (bpf)[2]	10	11	3	60
Corrected N-Value, N_{60} (bpf)	10	9	3	54
Lateral Properties				
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	102	97	132
Angle of Internal Friction, ϕ (degrees)	30	29	28	36
Subgrade Modulus, K (pci)	60	30	20	125
Undrained Shear Strength, c_u (psf)	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---
Axial/Torsional Properties				
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.52	0.18	2.59
Poisson's Ratio, ν	---	0.20	0.15	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	29	28	36
Youngs Modulus, E (psf)	---	180,000	60,000	1,080,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	---	342	114	2052
Tip Model				
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.52	0.18	2.59
Poisson's Ratio, ν	---	0.20	0.15	0.45
Uncorrected N-value (bpf)	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+50.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+42.5	Foundation:	770105-6 (P2)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-10.0	Reference Boring(s):	BR-28

Layer No.	**1**	**2**	**3**	**4**
Soil Description ID*	SND	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+45	+26	-1	-7
Layer Bottom Elevation (ft)	+26	-1	-7	-46
Layer Thickness (ft)	19	27	6	39
Average N-Value, N_{avg} (bpf)[2]	16	3	35	60
Corrected N-Value, N_{60} (bpf)	14	3	32	54
Lateral Properties				
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	107	97	122	132
Angle of Internal Friction, ϕ (degrees)	30	28	33	36
Subgrade Modulus, K (pci)	60	20	90	125
Undrained Shear Strength, c_u (psf)	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---
Axial/Torsional Properties				
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.78	0.18	1.65	2.59
Poisson's Ratio, ν	0.25	0.15	0.35	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	30	28	33	36
Youngs Modulus, E (psf)	280,000	60,000	640,000	1,080,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	532	114	1216	2052
Tip Model				
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.78	0.18	1.65	2.59
Poisson's Ratio, ν	0.25	0.15	0.35	0.45
Uncorrected N-value (bpf)	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+47.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+43.0	Foundation:	770105-6 (EB3)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-23.0	Reference Boring(s):	BR-26

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**
Soil Description ID*	SND	SND	SND	SIL	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+69	+47	+44	+6	0	-4	-10
Layer Bottom Elevation (ft)	+47	+20	+6	0	-4	-10	-40
Layer Thickness (ft)	22	27	38	6	4	6	30
Average N-Value, N_{avg} (bpf)[2]	10	13	2	9	60	24	60
Corrected N-Value, N_{60} (bpf)	10	11	2	8	54	22	54
Lateral Properties							
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	107	92	112	132	117	132
Angle of Internal Friction, ϕ (degrees)	30	30	26	22	36	32	36
Subgrade Modulus, K (pci)	60	60	15	100	125	80	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---
Axial/Torsional Properties							
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.61	0.13	0.21	2.59	1.18	2.59
Poisson's Ratio, ν	---	0.25	0.10	0.30	0.45	0.30	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	30	26	22	36	32	36
Youngs Modulus, E (psf)	---	220,000	40,000	80,000	1,080,000	440,000	1,080,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	---	418	76	712	2052	836	2052
Tip Model							
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.61	0.13	0.21	2.59	1.18	2.59
Poisson's Ratio, ν	---	0.25	0.10	0.30	0.45	0.30	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+62.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+56.5	Foundation:	770107-110 (EB1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-12.0	Reference Boring(s):	BR-30B

Layer No.	[3]**MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Soil Description ID*	SND	SND	SND	SIH	SND	SND	SND	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+79	+62	+47	+26	+10	+3	-1	-17
Layer Bottom Elevation (ft)	+62	+47	+26	+10	+3	-1	-17	-53
Layer Thickness (ft)	17	15	21	16	7	4	16	36
Average N-Value, N_{avg} (bpf)[2]	10	9	18	5	46	6	29	60
Corrected N-Value, N_{60} (bpf)	10	7	16	5	41	5	26	54
Lateral Properties								
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	102	112	107	127	102	117	132
Angle of Internal Friction, ϕ (degrees)	30	29	31	---	34	29	32	36
Subgrade Modulus, K (pci)	60	30	70	100	110	30	80	125
Undrained Shear Strength, c_u (psf)	---	---	---	375	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	0.007	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	375	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---
Axial/Torsional Properties								
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.41	0.87	0.10	2.03	0.29	1.39	2.59
Poisson's Ratio, ν	---	0.20	0.28	0.30	0.40	0.20	0.30	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	375	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	29	31	---	34	29	32	36
Youngs Modulus, E (psf)	---	140,000	320,000	---	820,000	100,000	520,000	1,080,000
Concrete [1]Ultimate Unit Skin Friction, T_f (psf)	---	266	608	458	1558	190	988	2052
Tip Model								
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.41	0.87	0.10	2.03	0.29	1.39	2.59
Poisson's Ratio, ν	---	0.20	0.28	0.30	0.40	0.20	0.30	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
24" Square PPC Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	666	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+63.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+58.5	Foundation:	770107-110 (EB2)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-19.0	Reference Boring(s):	BR-31B

Layer No.	**[3]MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soil Description ID*	SND	SND	SND	SND	CLY	SND	WLS	SIL	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+78	+63	+47	+40	+29	+12	+2	-5	-15
Layer Bottom Elevation (ft)	+63	+47	+40	+29	+12	+2	-5	-15	-48
Layer Thickness (ft)	15	16	7	11	17	10	7	10	33
Average N-Value, N_{avg} (bpf)[2]	10	10	26	13	7	47	22	28	60
Corrected N-Value, N_{60} (bpf)	10	8	22	12	6	42	20	25	54
Lateral Properties									
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	102	117	107	112	127	117	117	132
Angle of Internal Friction, ϕ (degrees)	30	29	32	30	---	34	38	24	36
Subgrade Modulus, K (pci)	60	30	80	60	100	110	200	200	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	800	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	0.01	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	800	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties									
Recommended Axial Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.46	1.18	0.67	0.19	2.08	5.56	0.64	2.59
Poisson's Ratio, ν	---	0.20	0.30	0.25	0.45	0.40	0.25	0.35	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	800	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	29	32	30	---	34	38	24	36
Youngs Modulus, E (psf)	---	160,000	440,000	240,000	---	840,000	2,000,000	250,000	1,080,000
Concrete — [1]Ultimate Unit Skin Friction, T_f (psf)	---	304	836	456	623	1596	400	1855	2052
Tip Model									
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.46	1.18	0.67	0.19	2.08	5.56	0.64	2.59
Poisson's Ratio, ν	---	0.20	0.30	0.25	0.45	0.40	0.25	0.35	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
24" Square PPC Pile — **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+72.4	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+66.4	Foundation:	770108-9 (EB 1)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-19.0	Reference Boring(s):	BR-32

Layer No.	**[3]MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Soil Description ID*	SND	SND	SND	SND	SND	CLY	SND	CLY	SND	CLY	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesive	Cohesionless	Cohesive	Cohesionless
Layer Top Elevation (ft)	+91	+72	+58	+44	+36	+31	+27	+11	+4	-9	-12
Layer Bottom Elevation (ft)	+72	+58	+44	+36	+31	+27	+11	+4	-9	-12	-43
Layer Thickness (ft)	19	14	14	8	5	4	16	7	13	3	31
Average N-Value, N_{avg} (bpf)[2]	10	2	7	16	30	4	15	7	25	47	60
Corrected N-Value, N_{60} (bpf)	10	2	6	14	27	4	14	6	23	42	54
Lateral Properties											
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	92	102	107	117	112	107	112	117	122	132
Angle of Internal Friction, ϕ (degrees)	30	26	29	30	32	---	30	---	32	---	36
Subgrade Modulus, K (pci)	60	15	30	60	80	100	60	100	80	2,000	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	533	---	800	---	5,600	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	0.01	---	0.01	---	0.004	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	533	---	800	---	5,600	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties											
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.13	0.35	0.78	1.44	0.13	0.78	0.19	1.23	1.30	2.59
Poisson's Ratio, ν	---	0.10	0.20	0.25	0.30	0.45	0.25	0.45	0.30	0.50	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	533	---	800	---	5,600	---
Angle of Internal Friction, ϕ (degrees)	---	26	29	30	32	---	30	---	32	---	36
Youngs Modulus, E (psf)	---	40,000	120,000	280,000	540,000	---	280,000	---	460,000	---	1,080,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	---	76	228	532	1026	423	532	623	874	2851	2052
Tip Model											
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.13	0.35	0.78	1.44	0.13	0.78	0.19	1.23	1.30	2.59
Poisson's Ratio, ν	---	0.10	0.20	0.25	0.30	0.45	0.25	0.45	0.30	0.50	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	---	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+71.5	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+65.5	Foundation:	770109 (PIERS 2-4)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-21.0	Reference Boring(s):	BR-35

Layer No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Soil Description ID*	SND	SND	SND	SND	CLY	SND	SND	SIL	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+66	+62	+35	+15	0	-2	-10	-15	-22
Layer Bottom Elevation (ft)	+62	+35	+15	0	-2	-10	-15	-22	-49
Layer Thickness (ft)	4	27	20	15	2	8	5	7	27
Average N-Value, N_{avg} (bpf)[2]	3	10	13	4	3	6	60	37	60
Corrected N-Value, N_{60} (bpf)	2	9	12	4	3	5	54	33	54
Lateral Properties									
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Soft < Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	92	102	107	102	107	102	132	122	132
Angle of Internal Friction, ϕ (degrees)	26	29	30	29	---	29	36	28	36
Subgrade Modulus, K (pci)	15	30	60	30	30	30	125	250	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	400	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	0.02	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	400	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties									
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.13	0.52	0.67	0.23	0.10	0.29	2.59	0.82	2.59
Poisson's Ratio, ν	0.10	0.20	0.25	0.20	0.40	0.20	0.45	0.40	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	400	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	26	29	30	29	---	29	36	28	36
Youngs Modulus, E (psf)	40,000	180,000	240,000	80,000	---	100,000	1,080,000	330,000	1,080,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	76	342	456	152	320	190	2052	2218	2052
Tip Model									
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.13	0.52	0.67	0.23	0.10	0.29	2.59	0.82	2.59
Poisson's Ratio, ν	0.10	0.20	0.25	0.20	0.40	0.20	0.45	0.40	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	422	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+73.7	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+66.7	Foundation:	770108 (PIERS 2-4)
FPID No:	240200-2-52-01	Ant. Pile Tip Elevation (ft):	-25.0	Reference Boring(s):	BR-39

Layer No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Soil Description ID*	SND	SND	SIL	SND	SIL	SND	SIL	SND
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+66	+56	+22	+17	+5	-13	-20	-26
Layer Bottom Elevation (ft)	+56	+22	+17	+5	-13	-20	-26	-52
Layer Thickness (ft)	10	34	5	12	18	7	6	26
Average N-Value, N_{avg} (bpf)[2]	4	15	2	6	17	31	41	60
Corrected N-Value, N_{60} (bpf)	3	14	2	5	15	28	37	54
Lateral Properties								
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	97	107	102	102	117	117	122	132
Angle of Internal Friction, ϕ (degrees)	28	30	14	29	24	32	28	36
Subgrade Modulus, K (pci)	20	60	50	30	200	80	250	125
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---
Axial/Torsional Properties								
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	0.18	0.78	0.06	0.29	0.39	1.50	0.92	2.59
Poisson's Ratio, ν	0.15	0.25	0.20	0.20	0.35	0.30	0.40	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	28	30	14	29	24	32	28	36
Youngs Modulus, E (psf)	60,000	280,000	20,000	100,000	150,000	560,000	370,000	1,080,000
Concrete [1]Ultimate Unit Skin Friction, T_f (psf)	114	532	189	190	1244	1064	2357	2052
Tip Model								
Recommended Tip Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	0.18	0.78	0.06	0.29	0.39	1.50	0.92	2.59
Poisson's Ratio, ν	0.15	0.25	0.20	0.20	0.35	0.30	0.40	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---
24" Square PPC Pile **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	474	1,382

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.

FB-MultiPier Soil Parameters

Project Name:	Wekiva Pkwy Section 7A	GSE @ Boring Loc. (ft):	+74.0	Elevation Datum:	NAVD
GEC Project Number:	3520G	Water Table Elevation (ft):	+67.5	Foundation:	770108-9 (EB 5)
FPID No:		Ant. Pile Tip Elevation (ft):	-21.0	Reference Boring(s):	BR-41

Layer No.	**[3]MSE Fill**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Soil Description ID*	SND	SND	SND	SND	SND	SND	SIH	SND	SIL	SIL	SIL
Soil Type	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesionless	Cohesive	Cohesionless	Cohesionless	Cohesionless	Cohesionless
Layer Top Elevation (ft)	+91	+74	+55	+42	+35	+27	+12	0	-10	-15	-23
Layer Bottom Elevation (ft)	+74	+55	+42	+35	+27	+12	0	-10	-15	-23	-47
Layer Thickness (ft)	17	19	13	7	8	15	12	10	5	8	24
Average N-Value, N_{avg} (bpf)[2]	10	3	6	19	3	20	7	19	60	32	60
Corrected N-Value, N_{60} (bpf)	10	2	5	17	3	18	6	17	54	29	54
Lateral Properties											
Recommended Lateral Soil Model	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Clay (Stiff < Water)	Sand (Reese)	Sand (Reese)	Sand (Reese)	Sand (Reese)
Total Unit Weight, γ (pcf)	105	92	102	112	97	112	107	112	127	117	127
Angle of Internal Friction, ϕ (degrees)	30	26	29	31	28	31	---	31	32	24	32
Subgrade Modulus, K (pci)	60	15	30	70	20	70	100	70	300	200	300
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	450	---	---	---	---
Major Principal Strain at 50%, ε_{50}	---	---	---	---	---	---	0.007	---	---	---	---
Average Undrained Shear Strength, C_{avg} (psf)	---	---	---	---	---	---	450	---	---	---	---
Unconfined Compressive Strength, q_u (psf)	---	---	---	---	---	---	---	---	---	---	---
Axial/Torsional Properties											
Recommended Axial Soil Model	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Recommended Torsional Soil Model	---	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic	Hyperbolic
Shear Modulus, G (ksi)	---	0.13	0.29	0.92	0.18	0.98	0.12	0.92	1.29	0.75	1.29
Poisson's Ratio, ν	---	0.10	0.20	0.28	0.15	0.28	0.30	0.28	0.45	0.35	0.45
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	450	---	---	---	---
Angle of Internal Friction, ϕ (degrees)	---	26	29	31	28	31	---	31	32	24	32
Youngs Modulus, E (psf)	---	40,000	100,000	340,000	60,000	360,000	---	340,000	540,000	290,000	540,000
Concrete | [1]Ultimate Unit Skin Friction, T_f (psf)	---	76	190	646	114	684	545	646	2639	2050	2639
Tip Model											
Recommended Tip Soil Model		Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile	Driven Pile
Shear Modulus, G (ksi)	---	0.13	0.29	0.92	0.18	0.98	0.12	0.92	1.29	0.75	1.29
Poisson's Ratio, ν	---	0.10	0.20	0.28	0.15	0.28	0.30	0.28	0.45	0.35	0.45
Uncorrected N-value (bpf)	---	---	---	---	---	---	---	---	---	---	---
Undrained Shear Strength, c_u (psf)	---	---	---	---	---	---	---	---	---	---	---
24" Square PPC Pile | **Bearing Failure, Q_f (kips)	---	---	---	---	---	---	---	---	---	371	691

*ID	General Soil Description
SND	Fine Sand to Fine Sand with Silt to Silty Fine Sand (SP, SP-SM, SM)
CLY	Fat Clay (CH)
SIL	Clayey Fine Sand (SC) to Sandy Silt to Silt (ML)
SIH	Elastic Silt (MH)
WLS	Weathered Limestone
LST	Limestone
MCK	Muck (PT)
SMK	Sandy Muck (PT)

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

**Multiplied by end area of chosen pile type to obtain Ultimate End Bearing as a force.

Pile Type	End Area (in^2)
18" Square PPC Pile:	324.0
24" Square PPC Pile:	576.0
14x89 Steel H Pile:	26.1
20" Steel Pipe Pile (closed end):	314.2

Notes

1. For the input of **vertical failure shear stress** and **torsional shear stress** the ultimate unit skin friction for a pile can be used.
2. Average N-values greater than 60 truncated to a maximum N-value of 60 for calculations.
3. Soil resistance generated by the MSE wall fill should only be included when resisting a lateral load that causes pile deflection into the abutment fill (one direction only). Lateral resistance on the other 3 sides of the end bent piles should be assumed to be zero within the MSE wall fill.

SAMPLE FBDEEP ANALYSES

Florida Bridge Software Institute Date: June 10, 2014
Shaft and Pile Analysis (FB-Deep v.2.04) Time: 10:43:02

General Information:
==========
Input file: C:\Users\cgballock\Desktop\FB-Deep\BR-7_PPC_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
==========
Analysis Type: SPT

Soil Information:
==========
Boring date: 3-31-14, Boring Number: BR-7
Station number: Offset:

Ground Elevation: 54.700(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	5.00	3- Clean sand
2	2.00	5.00	3- Clean sand
3	4.00	5.00	3- Clean sand
4	6.00	5.00	3- Clean sand
5	8.00	6.00	3- Clean sand
6	11.40	0.00	2- Clay and silty sand
7	11.50	13.00	3- Clean sand
8	14.00	11.00	3- Clean sand
9	16.50	10.00	3- Clean sand
10	19.00	11.00	3- Clean sand
11	21.50	12.00	3- Clean sand
12	24.00	11.00	3- Clean sand
13	26.40	0.00	2- Clay and silty sand
14	26.50	17.00	3- Clean sand
15	29.00	17.00	3- Clean sand
16	31.50	15.00	3- Clean sand
17	34.00	16.00	3- Clean sand
18	36.50	15.00	3- Clean sand
19	39.00	14.00	3- Clean sand
20	41.40	0.00	2- Clay and silty sand
21	41.50	12.00	3- Clean sand
22	44.00	11.00	3- Clean sand
23	46.50	12.00	3- Clean sand
24	49.00	16.00	3- Clean sand
25	51.50	10.00	3- Clean sand
26	53.90	0.00	2- Clay and silty sand
27	54.00	41.00	3- Clean sand
28	56.40	0.00	2- Clay and silty sand
29	56.50	26.00	3- Clean sand
30	59.00	32.00	3- Clean sand
31	61.50	30.00	3- Clean sand
32	64.00	33.00	3- Clean sand

33	66.50	39.00	3- Clean sand
34	69.00	34.00	3- Clean sand
35	71.40	0.00	2- Clay and silty sand
36	71.50	46.00	3- Clean sand
37	74.00	46.00	3- Clean sand
38	76.50	39.00	3- Clean sand
39	79.00	47.00	3- Clean sand
40	80.00	12.00	1- Plastic Clay
41	84.00	11.00	1- Plastic Clay
42	86.00	11.00	4- Lime Stone/Very shelly sand
43	89.00	12.00	4- Lime Stone/Very shelly sand
44	91.40	0.00	3- Clean sand
45	91.50	100.00	4- Lime Stone/Very shelly sand
46	94.00	100.00	4- Lime Stone/Very shelly sand
47	96.50	100.00	4- Lime Stone/Very shelly sand
48	99.00	100.00	4- Lime Stone/Very shelly sand
49	101.50	57.00	4- Lime Stone/Very shelly sand
50	104.00	48.00	4- Lime Stone/Very shelly sand
51	106.50	44.00	4- Lime Stone/Very shelly sand
52	109.00	42.00	4- Lime Stone/Very shelly sand
53	111.50	100.00	4- Lime Stone/Very shelly sand
54	114.00	53.00	4- Lime Stone/Very shelly sand
55	115.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	54.70	43.30	11.40	5.30	3-Clean Sand
2	43.30	43.20	0.10	0.00	2-Clay and Silty Sand
3	43.20	28.30	14.90	11.34	3-Clean Sand
4	28.30	28.20	0.10	0.00	2-Clay and Silty Sand
5	28.20	13.30	14.90	15.68	3-Clean Sand
6	13.30	13.20	0.10	0.00	2-Clay and Silty Sand
7	13.20	0.80	12.40	12.22	3-Clean Sand
8	0.80	0.70	0.10	0.00	2-Clay and Silty Sand
9	0.70	-1.70	2.40	41.00	3-Clean Sand
10	-1.70	-1.80	0.10	0.00	2-Clay and Silty Sand
11	-1.80	-16.70	14.90	32.32	3-Clean Sand
12	-16.70	-16.80	0.10	0.00	2-Clay and Silty Sand
13	-16.80	-25.30	8.50	44.06	3-Clean Sand
14	-25.30	-31.30	6.00	11.67	1-Plastic Clay
15	-31.30	-36.70	5.40	11.44	4-Limestone, Very Shelly Sand
16	-36.70	-36.80	0.10	0.00	3-Clean Sand
17	-36.80	-60.80	24.00	75.29	4-Limestone, Very Shelly Sand
18	-60.80	-60.80	0.00	0.00	5-

Driven Pile Data:

Pile unit weight = 150.00(pcf), Section Type: Square

Pile Geometry:

Width	Length	Tip Elev.

(in)	(ft)	(ft)
24.00	5.00	49.70
24.00	7.00	47.70
24.00	9.00	45.70
24.00	11.00	43.70
24.00	13.00	41.70
24.00	15.00	39.70
24.00	17.00	37.70
24.00	19.00	35.70
24.00	21.00	33.70
24.00	23.00	31.70
24.00	25.00	29.70
24.00	27.00	27.70
24.00	29.00	25.70
24.00	31.00	23.70
24.00	33.00	21.70
24.00	35.00	19.70
24.00	37.00	17.70
24.00	39.00	15.70
24.00	41.00	13.70
24.00	43.00	11.70
24.00	45.00	9.70
24.00	47.00	7.70
24.00	49.00	5.70
24.00	51.00	3.70
24.00	53.00	1.70
24.00	55.00	-0.30
24.00	57.00	-2.30
24.00	59.00	-4.30
24.00	61.00	-6.30
24.00	63.00	-8.30
24.00	65.00	-10.30
24.00	67.00	-12.30
24.00	69.00	-14.30
24.00	71.00	-16.30
24.00	73.00	-18.30
24.00	75.00	-20.30
24.00	77.00	-22.30
24.00	79.00	-24.30
24.00	81.00	-26.30
24.00	83.00	-28.30
24.00	85.00	-30.30
24.00	87.00	-32.30
24.00	89.00	-34.30
24.00	91.00	-36.30
24.00	93.00	-38.30
24.00	95.00	-40.30
24.00	97.00	-42.30
24.00	99.00	-44.30
24.00	101.00	-46.30
24.00	103.00	-48.30
24.00	105.00	-50.30
24.00	107.00	-52.30
24.00	109.00	-54.30
24.00	111.00	-56.30
24.00	113.00	-58.30
24.00	115.00	-60.30
24.00	117.00	-62.30
24.00	119.00	-64.30

Driven Pile Capacity:
==========

Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	4.71	25.79	30.50	15.25	82.09
7.00	24.0	5.99	29.14	35.14	17.57	93.42
9.00	24.0	7.39	32.96	40.35	20.17	106.28
11.00	24.0	7.91	38.59	46.50	23.25	123.67
13.00	24.0	13.15	41.18	54.33	27.17	136.70
15.00	24.0	16.82	41.85	58.68	29.34	142.39
17.00	24.0	19.97	43.05	63.03	31.51	149.14
19.00	24.0	23.92	43.24	67.16	33.58	153.64
21.00	24.0	27.02	45.72	72.75	36.37	164.19
23.00	24.0	29.65	50.55	80.20	40.10	181.29
25.00	24.0	31.96	56.45	88.41	44.20	201.30
27.00	24.0	40.39	68.54	108.93	54.46	246.01
29.00	24.0	46.56	68.85	115.41	57.71	253.12
31.00	24.0	52.39	69.28	121.68	60.84	260.24
33.00	24.0	58.05	69.51	127.56	63.78	266.58
35.00	24.0	64.64	65.68	130.32	65.16	261.69
37.00	24.0	70.37	64.07	134.44	67.22	262.58
39.00	24.0	75.80	62.68	138.48	69.24	263.83
41.00	24.0	78.88	65.65	144.52	72.26	275.81
43.00	24.0	82.25	68.03	150.28	75.14	286.33
45.00	24.0	86.51	67.97	154.48	77.24	290.41
47.00	24.0	91.08	61.95	153.03	76.51	276.92
49.00	24.0	96.30	68.23	164.52	82.26	300.97
51.00	24.0	100.12	71.38	171.50	85.75	314.27
53.00	24.0	100.32	81.88	182.20	91.10	345.95
55.00	24.0	111.27	98.40	209.67	104.84	406.47
57.00	24.0	117.24	112.16	229.40	114.70	453.72
59.00	24.0	127.02	113.57	240.59	120.29	467.72
61.00	24.0	135.93	116.91	252.84	126.42	486.66
63.00	24.0	144.69	120.79	265.48	132.74	507.05
65.00	24.0	156.22	122.00	278.22	139.11	522.23
67.00	24.0	164.88	130.60	295.47	147.74	556.67
69.00	24.0	172.80	141.81	314.61	157.31	598.24
71.00	24.0	176.11	156.57	332.68	166.34	645.81
73.00	24.0	213.21	191.66	404.87	202.43	788.19
75.00	24.0	230.28	164.56	394.84	197.42	723.95
77.00	24.0	245.66	138.76	384.42	192.21	661.94
79.00	24.0	262.17	115.57	377.73	188.87	608.87
81.00	24.0	275.02	24.92	299.94	149.97	349.77
83.00	24.0	284.74	31.02	315.76	157.88	377.81
85.00	24.0	293.98	43.75	337.73	168.87	425.24
87.00	24.0	298.55	119.23	417.78	208.89	656.24
89.00	24.0	300.24	127.76	428.00	214.00	683.51
91.00	24.0	301.06	143.83	444.89	222.44	732.55
93.00	24.0	309.73	186.65	496.38	248.19	869.68
95.00	24.0	318.93	188.26	507.19	253.60	883.71
97.00	24.0	327.05	195.52	522.57	261.28	913.60
99.00	24.0	334.66	208.58	543.24	271.62	960.39
101.00	24.0	342.56	224.64	567.20	283.60	1016.48
103.00	24.0	351.00	241.95	592.94	296.47	1076.83
105.00	24.0	360.20	257.17	617.37	308.68	1131.70
107.00	24.0	369.17	274.25	643.42	321.71	1191.93
109.00	24.0	**********	Not enough soil data *******			
111.00	24.0	0.00	0.00	0.00	0.00	0.00

113.00	24.0	0.00	0.00	0.00	0.00	0.00
115.00	24.0	0.00	0.00	0.00	0.00	0.00
117.00	24.0	0.00	0.00	0.00	0.00	0.00
119.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

Florida Bridge Software Institute Date: June 17, 2014
Shaft and Pile Analysis (FB-Deep v.2.04) Time: 15:42:31

General Information:
==========
Input file: C:\Users\cgballock\Desktop\FB-Deep\BR-13_PPC_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 4-14-14, Boring Number: BR-13
Station number: Offset:

Ground Elevation: 55.200(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	2.00	3- Clean sand
2	2.00	2.00	3- Clean sand
3	4.00	2.00	3- Clean sand
4	6.00	2.00	3- Clean sand
5	7.90	0.00	2- Clay and silty sand
6	8.00	16.00	3- Clean sand
7	11.50	21.00	3- Clean sand
8	14.00	13.00	3- Clean sand
9	16.50	14.00	2- Clay and silty sand
10	19.00	13.00	3- Clean sand
11	21.50	9.00	3- Clean sand
12	24.00	10.00	3- Clean sand
13	26.50	9.00	3- Clean sand
14	29.00	7.00	3- Clean sand
15	31.40	0.00	2- Clay and silty sand
16	31.50	14.00	3- Clean sand
17	34.00	14.00	3- Clean sand
18	36.50	15.00	3- Clean sand
19	39.00	12.00	3- Clean sand
20	41.50	22.00	3- Clean sand
21	44.00	8.00	3- Clean sand
22	46.50	17.00	3- Clean sand
23	48.90	0.00	2- Clay and silty sand
24	49.00	3.00	3- Clean sand
25	51.50	3.00	3- Clean sand
26	54.00	4.00	3- Clean sand
27	56.40	0.00	2- Clay and silty sand
28	56.50	23.00	3- Clean sand
29	59.00	26.00	3- Clean sand
30	61.50	25.00	3- Clean sand
31	64.00	4.00	2- Clay and silty sand
32	66.50	3.00	2- Clay and silty sand

33	69.00	5.00	2- Clay and silty sand
34	71.50	63.00	4- Lime Stone/Very shelly sand
35	74.00	60.00	4- Lime Stone/Very shelly sand
36	76.50	60.00	4- Lime Stone/Very shelly sand
37	79.00	50.00	4- Lime Stone/Very shelly sand
38	81.40	0.00	3- Clean sand
39	81.50	35.00	4- Lime Stone/Very shelly sand
40	84.00	24.00	4- Lime Stone/Very shelly sand
41	86.50	35.00	4- Lime Stone/Very shelly sand
42	89.00	34.00	4- Lime Stone/Very shelly sand
43	91.50	35.00	4- Lime Stone/Very shelly sand
44	93.90	0.00	3- Clean sand
45	94.00	64.00	4- Lime Stone/Very shelly sand
46	96.50	67.00	4- Lime Stone/Very shelly sand
47	99.00	81.00	4- Lime Stone/Very shelly sand
48	101.50	60.00	4- Lime Stone/Very shelly sand
49	104.00	60.00	4- Lime Stone/Very shelly sand
50	106.50	100.00	4- Lime Stone/Very shelly sand
51	109.00	100.00	4- Lime Stone/Very shelly sand
52	111.50	46.00	4- Lime Stone/Very shelly sand
53	113.90	0.00	2- Clay and silty sand
54	114.00	16.00	4- Lime Stone/Very shelly sand
55	116.40	0.00	2- Clay and silty sand
56	116.50	36.00	4- Lime Stone/Very shelly sand
57	119.00	60.00	4- Lime Stone/Very shelly sand
58	120.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	55.20	47.30	7.90	2.00	3-Clean Sand
2	47.30	47.20	0.10	0.00	2-Clay and Silty Sand
3	47.20	38.70	8.50	16.59	3-Clean Sand
4	38.70	36.20	2.50	14.00	2-Clay and Silty Sand
5	36.20	23.80	12.40	9.62	3-Clean Sand
6	23.80	23.70	0.10	0.00	2-Clay and Silty Sand
7	23.70	6.30	17.40	14.56	3-Clean Sand
8	6.30	6.20	0.10	0.00	2-Clay and Silty Sand
9	6.20	-1.20	7.40	3.32	3-Clean Sand
10	-1.20	-1.30	0.10	0.00	2-Clay and Silty Sand
11	-1.30	-8.80	7.50	24.67	3-Clean Sand
12	-8.80	-16.30	7.50	4.00	2-Clay and Silty Sand
13	-16.30	-26.20	9.90	58.33	4-Limestone, Very Shelly Sand
14	-26.20	-26.30	0.10	0.00	3-Clean Sand
15	-26.30	-38.70	12.40	32.58	4-Limestone, Very Shelly Sand
16	-38.70	-38.80	0.10	0.00	3-Clean Sand
17	-38.80	-58.70	19.90	72.38	4-Limestone, Very Shelly Sand
18	-58.70	-58.80	0.10	0.00	2-Clay and Silty Sand
19	-58.80	-61.20	2.40	16.00	4-Limestone, Very Shelly Sand
20	-61.20	-61.30	0.10	0.00	2-Clay and Silty Sand
21	-61.30	-65.30	4.00	45.00	4-Limestone, Very Shelly Sand

22	-65.30	-65.30	0.00	0.00	5-

Driven Pile Data:
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Pile unit weight = 150.00(pcf), Section Type: Square

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	5.00	50.20
24.00	7.00	48.20
24.00	9.00	46.20
24.00	11.00	44.20
24.00	13.00	42.20
24.00	15.00	40.20
24.00	17.00	38.20
24.00	19.00	36.20
24.00	21.00	34.20
24.00	23.00	32.20
24.00	25.00	30.20
24.00	27.00	28.20
24.00	29.00	26.20
24.00	31.00	24.20
24.00	33.00	22.20
24.00	35.00	20.20
24.00	37.00	18.20
24.00	39.00	16.20
24.00	41.00	14.20
24.00	43.00	12.20
24.00	45.00	10.20
24.00	47.00	8.20
24.00	49.00	6.20
24.00	51.00	4.20
24.00	53.00	2.20
24.00	55.00	0.20
24.00	57.00	-1.80
24.00	59.00	-3.80
24.00	61.00	-5.80
24.00	63.00	-7.80
24.00	65.00	-9.80
24.00	67.00	-11.80
24.00	69.00	-13.80
24.00	71.00	-15.80
24.00	73.00	-17.80
24.00	75.00	-19.80
24.00	77.00	-21.80
24.00	79.00	-23.80
24.00	81.00	-25.80
24.00	83.00	-27.80
24.00	85.00	-29.80
24.00	87.00	-31.80
24.00	89.00	-33.80
24.00	91.00	-35.80
24.00	93.00	-37.80
24.00	95.00	-39.80
24.00	97.00	-41.80
24.00	99.00	-43.80
24.00	101.00	-45.80
24.00	103.00	-47.80
24.00	105.00	-49.80

24.00	107.00	-51.80
24.00	109.00	-53.80
24.00	111.00	-55.80
24.00	113.00	-57.80
24.00	115.00	-59.80
24.00	117.00	-61.80
24.00	119.00	-63.80
24.00	121.00	-65.80
24.00	123.00	-67.80
24.00	125.00	-69.80

Driven Pile Capacity:
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Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	0.00	11.91	11.91	5.96	35.74
7.00	24.0	0.00	23.82	23.82	11.91	71.46
9.00	24.0	3.16	45.37	48.54	24.27	139.28
11.00	24.0	9.93	45.66	55.59	27.79	146.91
13.00	24.0	16.74	46.03	62.77	31.38	154.82
15.00	24.0	22.49	46.20	68.69	34.35	161.09
17.00	24.0	33.09	47.48	80.58	40.29	175.55
19.00	24.0	40.53	53.25	93.77	46.89	200.27
21.00	24.0	44.72	53.48	98.20	49.10	205.16
23.00	24.0	48.34	49.74	98.08	49.04	197.57
25.00	24.0	52.03	45.83	97.86	48.93	189.52
27.00	24.0	55.49	48.82	104.31	52.15	201.94
29.00	24.0	58.43	52.68	111.11	55.56	216.47
31.00	24.0	59.17	58.01	117.19	58.59	233.21
33.00	24.0	64.03	60.15	124.19	62.09	244.49
35.00	24.0	68.62	61.29	129.91	64.95	252.48
37.00	24.0	73.72	62.07	135.79	67.90	259.93
39.00	24.0	78.37	62.83	141.21	70.60	266.87
41.00	24.0	84.17	63.37	147.54	73.77	274.29
43.00	24.0	92.98	56.48	149.47	74.73	262.44
45.00	24.0	96.86	49.53	146.39	73.19	245.44
47.00	24.0	102.34	42.00	144.34	72.17	228.34
49.00	24.0	104.75	35.65	140.41	70.20	211.71
51.00	24.0	104.75	37.21	141.96	70.98	216.37
53.00	24.0	104.75	43.59	148.34	74.17	235.52
55.00	24.0	104.75	54.67	159.42	79.71	268.77
57.00	24.0	107.16	73.24	180.40	90.20	326.87
59.00	24.0	116.51	56.54	173.05	86.53	286.14
61.00	24.0	126.16	42.68	168.84	84.42	254.20
63.00	24.0	133.48	35.25	168.73	84.36	239.23
65.00	24.0	134.42	37.65	172.06	86.03	247.36
67.00	24.0	134.48	53.30	187.78	93.89	294.39
69.00	24.0	135.89	89.78	225.67	112.84	405.23
71.00	24.0	139.73	146.26	285.99	142.99	578.50
73.00	24.0	152.98	183.19	336.18	168.09	702.56
75.00	24.0	162.83	174.41	337.25	168.62	686.07
77.00	24.0	172.43	166.95	339.39	169.69	673.29
79.00	24.0	182.03	161.54	343.58	171.79	666.66
81.00	24.0	187.63	176.55	364.18	182.09	717.29
83.00	24.0	192.45	184.34	376.78	188.39	745.46
85.00	24.0	196.82	190.67	387.49	193.75	768.83

87.00	24.0	203.37	189.98	393.34	196.67	773.30
89.00	24.0	209.43	196.95	406.38	203.19	800.28
91.00	24.0	215.50	205.96	421.46	210.73	833.38
93.00	24.0	220.04	220.69	440.73	220.37	882.11
95.00	24.0	228.92	231.91	460.83	230.41	924.64
97.00	24.0	238.12	233.78	471.91	235.95	939.47
99.00	24.0	246.89	238.59	485.48	242.74	962.65
101.00	24.0	255.46	246.07	501.54	250.77	993.68
103.00	24.0	264.23	254.40	518.63	259.31	1027.43
105.00	24.0	273.39	261.79	535.19	267.59	1058.77
107.00	24.0	283.61	243.62	527.23	263.61	1014.46
109.00	24.0	293.21	218.45	511.66	255.83	948.56
111.00	24.0	302.62	211.54	514.16	257.08	937.24
113.00	24.0	309.71	209.90	519.60	259.80	939.40
115.00	24.0	********** Not enough soil data *******				
117.00	24.0	0.00	0.00	0.00	0.00	0.00
119.00	24.0	0.00	0.00	0.00	0.00	0.00
121.00	24.0	0.00	0.00	0.00	0.00	0.00
123.00	24.0	0.00	0.00	0.00	0.00	0.00
125.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

Florida Bridge Software Institute — Date: May 14, 2014
Shaft and Pile Analysis (FB-Deep v.2.03) — Time: 08:52:05

General Information:
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Input file: ..... 7A\Geotechnical\6 Miscellaneous\FB-Deep\BR-19_STEEL_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
==========
Boring date: 4-12-14, Boring Number: BR-19
Station number: Offset:

Ground Elevation: 37.700(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	10.00	3- Clean sand
2	2.00	18.00	3- Clean sand
3	4.00	9.00	3- Clean sand
4	6.00	12.00	3- Clean sand
5	8.00	3.00	3- Clean sand
6	11.50	9.00	3- Clean sand
7	14.00	8.00	3- Clean sand
8	16.50	10.00	3- Clean sand
9	18.90	0.00	2- Clay and silty sand
10	19.00	5.00	3- Clean sand
11	21.50	2.00	3- Clean sand
12	24.00	3.00	3- Clean sand
13	26.50	1.00	3- Clean sand
14	29.00	2.00	3- Clean sand
15	31.50	2.00	3- Clean sand
16	34.00	5.00	3- Clean sand
17	36.40	0.00	2- Clay and silty sand
18	36.50	24.00	3- Clean sand
19	39.00	13.00	3- Clean sand
20	41.40	0.00	2- Clay and silty sand
21	41.50	2.00	3- Clean sand
22	44.00	2.00	3- Clean sand
23	46.40	0.00	2- Clay and silty sand
24	46.50	23.00	3- Clean sand
25	49.00	17.00	3- Clean sand
26	51.50	13.00	3- Clean sand
27	53.90	0.00	2- Clay and silty sand
28	54.00	3.00	3- Clean sand
29	56.50	4.00	3- Clean sand
30	59.00	4.00	3- Clean sand
31	61.50	3.00	3- Clean sand
32	65.00	13.00	2- Clay and silty sand

33	66.50	24.00	2- Clay and silty sand
34	68.90	0.00	3- Clean sand
35	69.00	100.00	2- Clay and silty sand
36	71.50	100.00	2- Clay and silty sand
37	74.00	100.00	4- Lime Stone/Very shelly sand
38	76.50	100.00	3- Clean sand
39	78.90	0.00	2- Clay and silty sand
40	79.00	16.00	3- Clean sand
41	81.40	0.00	2- Clay and silty sand
42	81.50	48.00	3- Clean sand
43	84.00	100.00	4- Lime Stone/Very shelly sand
44	86.50	67.00	4- Lime Stone/Very shelly sand
45	89.00	81.00	4- Lime Stone/Very shelly sand
46	91.50	69.00	4- Lime Stone/Very shelly sand
47	93.90	0.00	2- Clay and silty sand
48	94.00	20.00	4- Lime Stone/Very shelly sand
49	96.50	19.00	4- Lime Stone/Very shelly sand
50	99.00	34.00	4- Lime Stone/Very shelly sand
51	101.50	33.00	4- Lime Stone/Very shelly sand
52	104.00	15.00	4- Lime Stone/Very shelly sand
53	106.40	0.00	2- Clay and silty sand
54	106.50	100.00	4- Lime Stone/Very shelly sand
55	108.90	0.00	2- Clay and silty sand
56	109.00	23.00	4- Lime Stone/Very shelly sand
57	111.40	0.00	2- Clay and silty sand
58	111.50	50.00	4- Lime Stone/Very shelly sand
59	114.00	72.00	4- Lime Stone/Very shelly sand
60	116.40	0.00	2- Clay and silty sand
61	116.50	17.00	4- Lime Stone/Very shelly sand
62	118.90	0.00	2- Clay and silty sand
63	119.00	100.00	4- Lime Stone/Very shelly sand
64	120.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	37.70	18.80	18.90	9.26	3-Clean Sand
2	18.80	18.70	0.10	0.00	2-Clay and Silty Sand
3	18.70	1.30	17.40	2.84	3-Clean Sand
4	1.30	1.20	0.10	0.00	2-Clay and Silty Sand
5	1.20	-3.70	4.90	18.61	3-Clean Sand
6	-3.70	-3.80	0.10	0.00	2-Clay and Silty Sand
7	-3.80	-8.70	4.90	2.00	3-Clean Sand
8	-8.70	-8.80	0.10	0.00	2-Clay and Silty Sand
9	-8.80	-16.20	7.40	17.73	3-Clean Sand
10	-16.20	-16.30	0.10	0.00	2-Clay and Silty Sand
11	-16.30	-27.30	11.00	3.45	3-Clean Sand
12	-27.30	-31.20	3.90	19.77	2-Clay and Silty Sand
13	-31.20	-31.30	0.10	0.00	3-Clean Sand
14	-31.30	-36.30	5.00	100.00	2-Clay and Silty Sand
15	-36.30	-38.80	2.50	100.00	4-Limestone, Very Shelly Sand
16	-38.80	-41.20	2.40	100.00	3-Clean Sand
17	-41.20	-41.30	0.10	0.00	2-Clay and Silty Sand
18	-41.30	-43.70	2.40	16.00	3-Clean Sand
19	-43.70	-43.80	0.10	0.00	2-Clay and Silty Sand

20	-43.80	-46.30	2.50	48.00	3-Clean Sand
21	-46.30	-56.20	9.90	79.35	4-Limestone, Very Shelly Sand
22	-56.20	-56.30	0.10	0.00	2-Clay and Silty Sand
23	-56.30	-68.70	12.40	24.27	4-Limestone, Very Shelly Sand
24	-68.70	-68.80	0.10	0.00	2-Clay and Silty Sand
25	-68.80	-71.20	2.40	100.00	4-Limestone, Very Shelly Sand
26	-71.20	-71.30	0.10	0.00	2-Clay and Silty Sand
27	-71.30	-73.70	2.40	23.00	4-Limestone, Very Shelly Sand
28	-73.70	-73.80	0.10	0.00	2-Clay and Silty Sand
29	-73.80	-78.70	4.90	60.78	4-Limestone, Very Shelly Sand
30	-78.70	-78.80	0.10	0.00	2-Clay and Silty Sand
31	-78.80	-81.20	2.40	17.00	4-Limestone, Very Shelly Sand
32	-81.20	-81.30	0.10	0.00	2-Clay and Silty Sand
33	-81.30	-82.80	1.50	100.00	4-Limestone, Very Shelly Sand
34	-82.80	-82.80	0.00	0.00	5-

Driven Pile Data:
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Pile unit weight = 489.00(pcf), Section Type: Pipe

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)	Thickness (in)	Pile End
24.00	5.00	32.70	0.50	CLOSED
24.00	7.00	30.70	0.50	CLOSED
24.00	9.00	28.70	0.50	CLOSED
24.00	11.00	26.70	0.50	CLOSED
24.00	13.00	24.70	0.50	CLOSED
24.00	15.00	22.70	0.50	CLOSED
24.00	17.00	20.70	0.50	CLOSED
24.00	19.00	18.70	0.50	CLOSED
24.00	21.00	16.70	0.50	CLOSED
24.00	23.00	14.70	0.50	CLOSED
24.00	25.00	12.70	0.50	CLOSED
24.00	27.00	10.70	0.50	CLOSED
24.00	29.00	8.70	0.50	CLOSED
24.00	31.00	6.70	0.50	CLOSED
24.00	33.00	4.70	0.50	CLOSED
24.00	35.00	2.70	0.50	CLOSED
24.00	37.00	0.70	0.50	CLOSED
24.00	39.00	-1.30	0.50	CLOSED
24.00	41.00	-3.30	0.50	CLOSED
24.00	43.00	-5.30	0.50	CLOSED
24.00	45.00	-7.30	0.50	CLOSED
24.00	47.00	-9.30	0.50	CLOSED
24.00	49.00	-11.30	0.50	CLOSED
24.00	51.00	-13.30	0.50	CLOSED
24.00	53.00	-15.30	0.50	CLOSED
24.00	55.00	-17.30	0.50	CLOSED
24.00	57.00	-19.30	0.50	CLOSED
24.00	59.00	-21.30	0.50	CLOSED
24.00	61.00	-23.30	0.50	CLOSED
24.00	63.00	-25.30	0.50	CLOSED

24.00	65.00	-27.30	0.50 CLOSED
24.00	67.00	-29.30	0.50 CLOSED
24.00	69.00	-31.30	0.50 CLOSED
24.00	71.00	-33.30	0.50 CLOSED
24.00	73.00	-35.30	0.50 CLOSED
24.00	75.00	-37.30	0.50 CLOSED
24.00	77.00	-39.30	0.50 CLOSED
24.00	79.00	-41.30	0.50 CLOSED
24.00	81.00	-43.30	0.50 CLOSED
24.00	83.00	-45.30	0.50 CLOSED
24.00	85.00	-47.30	0.50 CLOSED
24.00	87.00	-49.30	0.50 CLOSED
24.00	89.00	-51.30	0.50 CLOSED
24.00	91.00	-53.30	0.50 CLOSED
24.00	93.00	-55.30	0.50 CLOSED
24.00	95.00	-57.30	0.50 CLOSED
24.00	97.00	-59.30	0.50 CLOSED
24.00	99.00	-61.30	0.50 CLOSED
24.00	101.00	-63.30	0.50 CLOSED
24.00	103.00	-65.30	0.50 CLOSED
24.00	105.00	-67.30	0.50 CLOSED
24.00	107.00	-69.30	0.50 CLOSED
24.00	109.00	-71.30	0.50 CLOSED
24.00	111.00	-73.30	0.50 CLOSED
24.00	113.00	-75.30	0.50 CLOSED
24.00	115.00	-77.30	0.50 CLOSED
24.00	117.00	-79.30	0.50 CLOSED
24.00	119.00	-81.30	0.50 CLOSED
24.00	121.00	-83.30	0.50 CLOSED
24.00	123.00	-85.30	0.50 CLOSED
24.00	125.00	-87.30	0.50 CLOSED

Driven Pile Capacity:
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Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	9.39	39.80	49.19	24.60	128.80
7.00	24.0	12.38	37.10	49.48	24.74	123.69
9.00	24.0	13.02	36.44	49.45	24.73	122.32
11.00	24.0	14.54	36.09	50.63	25.32	122.82
13.00	24.0	17.09	32.60	49.69	24.84	114.89
15.00	24.0	19.53	28.15	47.69	23.84	103.99
17.00	24.0	22.28	22.34	44.62	22.31	89.30
19.00	24.0	23.43	3.71	27.14	13.57	34.56
21.00	24.0	23.95	4.14	28.10	14.05	36.38
23.00	24.0	24.30	3.25	27.55	13.77	34.04
25.00	24.0	24.30	2.24	26.54	13.27	31.02
27.00	24.0	24.30	3.48	27.78	13.89	34.74
29.00	24.0	24.18	4.69	28.87	14.43	38.25
31.00	24.0	23.98	14.29	38.27	19.14	66.85
33.00	24.0	24.24	21.37	45.61	22.80	88.34
35.00	24.0	25.09	21.46	46.55	23.27	89.46
37.00	24.0	27.72	18.22	45.95	22.97	82.40
39.00	24.0	32.60	12.38	44.99	22.49	69.75
41.00	24.0	34.84	19.63	54.47	27.23	93.73
43.00	24.0	34.90	23.28	58.18	29.09	104.73

45.00	24.0	34.90	26.86	61.76	30.88	115.48
47.00	24.0	36.59	38.66	75.25	37.62	152.56
49.00	24.0	42.02	31.89	73.91	36.96	137.69
51.00	24.0	46.49	25.71	72.20	36.10	123.63
53.00	24.0	49.45	20.45	69.90	34.95	110.79
55.00	24.0	49.77	15.63	65.40	32.70	96.67
57.00	24.0	49.77	15.32	65.09	32.54	95.72
59.00	24.0	49.77	18.31	68.08	34.04	104.69
61.00	24.0	49.77	21.72	71.49	35.74	114.92
63.00	24.0	50.58	27.55	78.13	39.07	133.24
65.00	24.0	55.79	38.79	94.58	47.29	172.16
67.00	24.0	62.47	41.32	103.79	51.90	186.43
69.00	24.0	67.73	62.62	130.35	65.17	255.59
71.00	24.0	78.10	63.64	141.74	70.87	269.03
73.00	24.0	88.69	62.99	151.69	75.84	277.67
75.00	24.0	96.88	59.42	156.30	78.15	275.13
77.00	24.0	104.72	67.37	172.09	86.04	306.82
79.00	24.0	108.54	95.08	203.62	101.81	393.79
81.00	24.0	111.24	80.69	191.93	95.97	353.32
83.00	24.0	117.54	103.01	220.54	110.27	426.55
85.00	24.0	125.50	134.59	260.08	130.04	529.25
87.00	24.0	133.04	122.88	255.91	127.96	501.67
89.00	24.0	140.58	116.67	257.24	128.62	490.58
91.00	24.0	148.12	111.14	259.26	129.63	481.54
93.00	24.0	153.89	109.79	263.68	131.84	483.27
95.00	24.0	156.09	102.75	258.84	129.42	464.33
97.00	24.0	158.93	104.23	263.16	131.58	471.62
99.00	24.0	163.56	100.94	264.50	132.25	466.37
101.00	24.0	168.80	93.46	262.25	131.13	449.17
103.00	24.0	173.31	84.29	257.61	128.80	426.20
105.00	24.0	175.69	78.84	254.52	127.26	412.20
107.00	24.0	178.04	85.57	263.60	131.80	434.74
109.00	24.0	180.97	86.34	267.30	133.65	439.97
111.00	24.0	183.06	84.00	267.06	133.53	435.07
113.00	24.0	188.96	77.65	266.61	133.31	421.91
115.00	24.0	**********	Not enough soil data *******			
117.00	24.0	0.00	0.00	0.00	0.00	0.00
119.00	24.0	0.00	0.00	0.00	0.00	0.00
121.00	24.0	0.00	0.00	0.00	0.00	0.00
123.00	24.0	0.00	0.00	0.00	0.00	0.00
125.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

Florida Bridge Software Institute — Date: May 14, 2014
Shaft and Pile Analysis (FB-Deep v.2.03) — Time: 08:54:51

General Information:
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Input file: ..... 7A\Geotechnical\6 Miscellaneous\FB-Deep\BR-22_STEEL_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 4-16-14, Boring Number: BR-22
Station number: Offset:

Ground Elevation: 36.100(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	11.00	3- Clean sand
2	2.00	11.00	3- Clean sand
3	4.00	8.00	3- Clean sand
4	6.00	7.00	3- Clean sand
5	8.00	6.00	3- Clean sand
6	11.50	11.00	3- Clean sand
7	13.90	0.00	2- Clay and silty sand
8	14.00	21.00	3- Clean sand
9	16.40	0.00	2- Clay and silty sand
10	16.50	9.00	3- Clean sand
11	19.00	18.00	3- Clean sand
12	21.50	12.00	3- Clean sand
13	24.00	1.00	1- Plastic Clay
14	26.50	10.00	3- Clean sand
15	29.00	6.00	3- Clean sand
16	31.50	7.00	2- Clay and silty sand
17	34.00	6.00	2- Clay and silty sand
18	36.50	9.00	3- Clean sand
19	39.00	10.00	2- Clay and silty sand
20	41.50	10.00	2- Clay and silty sand
21	44.00	7.00	2- Clay and silty sand
22	46.50	7.00	3- Clean sand
23	49.00	10.00	3- Clean sand
24	51.40	0.00	2- Clay and silty sand
25	51.50	4.00	3- Clean sand
26	54.00	7.00	3- Clean sand
27	56.50	3.00	3- Clean sand
28	59.00	2.00	3- Clean sand
29	61.00	2.00	3- Clean sand
30	64.00	2.00	1- Plastic Clay
31	66.50	5.00	3- Clean sand
32	69.00	6.00	3- Clean sand

33	71.50	8.00	3- Clean sand
34	74.00	11.00	3- Clean sand
35	76.50	12.00	3- Clean sand
36	79.00	7.00	3- Clean sand
37	81.50	6.00	3- Clean sand
38	83.90	0.00	2- Clay and silty sand
39	84.00	3.00	3- Clean sand
40	86.50	1.00	3- Clean sand
41	89.00	2.00	3- Clean sand
42	91.50	1.00	3- Clean sand
43	94.00	1.00	3- Clean sand
44	96.50	1.00	2- Clay and silty sand
45	99.00	1.00	2- Clay and silty sand
46	101.40	0.00	3- Clean sand
47	101.50	23.00	2- Clay and silty sand
48	104.00	21.00	1- Plastic Clay
49	105.50	38.00	4- Lime Stone/Very shelly sand
50	108.90	0.00	2- Clay and silty sand
51	109.00	9.00	4- Lime Stone/Very shelly sand
52	111.50	7.00	4- Lime Stone/Very shelly sand
53	114.00	1.00	5- Cavity layer
54	116.50	1.00	5- Cavity layer
55	119.00	1.00	5- Cavity layer
56	121.50	1.00	4- Lime Stone/Very shelly sand
57	124.00	1.00	4- Lime Stone/Very shelly sand
58	126.50	9.00	3- Clean sand
59	129.00	6.00	3- Clean sand
60	131.40	0.00	2- Clay and silty sand
61	131.50	31.00	3- Clean sand
62	133.90	0.00	2- Clay and silty sand
63	134.00	5.00	3- Clean sand
64	136.50	5.00	1- Plastic Clay
65	139.00	6.00	2- Clay and silty sand
66	141.50	1.00	2- Clay and silty sand
67	144.00	3.00	3- Clean sand
68	146.50	5.00	3- Clean sand
69	148.00	2.00	3- Clean sand
70	150.40	0.00	2- Clay and silty sand
71	150.50	9.00	3- Clean sand
72	153.00	7.00	3- Clean sand
73	155.40	0.00	2- Clay and silty sand
74	155.50	3.00	3- Clean sand
75	158.00	4.00	3- Clean sand
76	160.50	1.00	3- Clean sand
77	164.00	1.00	1- Plastic Clay
78	165.50	1.00	1- Plastic Clay
79	168.00	1.00	1- Plastic Clay
80	171.00	1.00	3- Clean sand
81	173.00	1.00	3- Clean sand
82	175.50	1.00	3- Clean sand
83	178.00	1.00	3- Clean sand
84	180.40	0.00	2- Clay and silty sand
85	180.50	15.00	3- Clean sand
86	182.90	0.00	2- Clay and silty sand
87	183.00	100.00	3- Clean sand
88	185.50	100.00	3- Clean sand
89	188.00	41.00	3- Clean sand
90	190.50	100.00	3- Clean sand
91	193.00	54.00	4- Lime Stone/Very shelly sand
92	195.50	34.00	4- Lime Stone/Very shelly sand
93	197.90	0.00	2- Clay and silty sand
94	198.00	100.00	4- Lime Stone/Very shelly sand
95	200.50	100.00	4- Lime Stone/Very shelly sand

96	202.90	0.00	2- Clay and silty sand
97	203.00	33.00	4- Lime Stone/Very shelly sand
98	205.50	53.00	4- Lime Stone/Very shelly sand
99	208.00	74.00	4- Lime Stone/Very shelly sand
100	210.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	36.10	22.20	13.90	8.73	3-Clean Sand
2	22.20	22.10	0.10	0.00	2-Clay and Silty Sand
3	22.10	19.70	2.40	21.00	3-Clean Sand
4	19.70	19.60	0.10	0.00	2-Clay and Silty Sand
5	19.60	12.10	7.50	13.00	3-Clean Sand
6	12.10	9.60	2.50	1.00	1-Plastic Clay
7	9.60	4.60	5.00	8.00	3-Clean Sand
8	4.60	-0.40	5.00	6.50	2-Clay and Silty Sand
9	-0.40	-2.90	2.50	9.00	3-Clean Sand
10	-2.90	-10.40	7.50	9.00	2-Clay and Silty Sand
11	-10.40	-15.30	4.90	8.47	3-Clean Sand
12	-15.30	-15.40	0.10	0.00	2-Clay and Silty Sand
13	-15.40	-27.90	12.50	3.60	3-Clean Sand
14	-27.90	-30.40	2.50	2.00	1-Plastic Clay
15	-30.40	-47.80	17.40	7.87	3-Clean Sand
16	-47.80	-47.90	0.10	0.00	2-Clay and Silty Sand
17	-47.90	-60.40	12.50	1.60	3-Clean Sand
18	-60.40	-65.30	4.90	1.00	2-Clay and Silty Sand
19	-65.30	-65.40	0.10	0.00	3-Clean Sand
20	-65.40	-67.90	2.50	23.00	2-Clay and Silty Sand
21	-67.90	-69.40	1.50	21.00	1-Plastic Clay
22	-69.40	-72.80	3.40	38.00	4-Limestone, Very Shelly Sand
23	-72.80	-72.90	0.10	0.00	2-Clay and Silty Sand
24	-72.90	-77.90	5.00	8.00	4-Limestone, Very Shelly Sand
25	-77.90	-85.40	7.50	1.00	5-Void
26	-85.40	-90.40	5.00	1.00	4-Limestone, Very Shelly Sand
27	-90.40	-95.30	4.90	7.53	3-Clean Sand
28	-95.30	-95.40	0.10	0.00	2-Clay and Silty Sand
29	-95.40	-97.80	2.40	31.00	3-Clean Sand
30	-97.80	-97.90	0.10	0.00	2-Clay and Silty Sand
31	-97.90	-100.40	2.50	5.00	3-Clean Sand
32	-100.40	-102.90	2.50	5.00	1-Plastic Clay
33	-102.90	-107.90	5.00	3.50	2-Clay and Silty Sand
34	-107.90	-114.30	6.40	3.09	3-Clean Sand
35	-114.30	-114.40	0.10	0.00	2-Clay and Silty Sand
36	-114.40	-119.30	4.90	8.02	3-Clean Sand
37	-119.30	-119.40	0.10	0.00	2-Clay and Silty Sand
38	-119.40	-127.90	8.50	2.47	3-Clean Sand
39	-127.90	-134.90	7.00	1.00	1-Plastic Clay
40	-134.90	-144.30	9.40	1.00	3-Clean Sand
41	-144.30	-144.40	0.10	0.00	2-Clay and Silty Sand
42	-144.40	-146.80	2.40	15.00	3-Clean Sand
43	-146.80	-146.90	0.10	0.00	2-Clay and Silty Sand
44	-146.90	-156.90	10.00	85.25	3-Clean Sand

45	-156.90	-161.80	4.90	44.20	4-Limestone, Very Shelly Sand
46	-161.80	-161.90	0.10	0.00	2-Clay and Silty Sand
47	-161.90	-166.80	4.90	100.00	4-Limestone, Very Shelly Sand
48	-166.80	-166.90	0.10	0.00	2-Clay and Silty Sand
49	-166.90	-174.40	7.50	53.33	4-Limestone, Very Shelly Sand
50	-174.40	-174.40	0.00	0.00	5-

Driven Pile Data:
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Pile unit weight = 489.00(pcf), Section Type: Pipe

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)	Thickness (in)	Pile End
24.00	5.00	31.10	0.50	CLOSED
24.00	8.00	28.10	0.50	CLOSED
24.00	11.00	25.10	0.50	CLOSED
24.00	14.00	22.10	0.50	CLOSED
24.00	17.00	19.10	0.50	CLOSED
24.00	20.00	16.10	0.50	CLOSED
24.00	23.00	13.10	0.50	CLOSED
24.00	26.00	10.10	0.50	CLOSED
24.00	29.00	7.10	0.50	CLOSED
24.00	32.00	4.10	0.50	CLOSED
24.00	35.00	1.10	0.50	CLOSED
24.00	38.00	-1.90	0.50	CLOSED
24.00	41.00	-4.90	0.50	CLOSED
24.00	44.00	-7.90	0.50	CLOSED
24.00	47.00	-10.90	0.50	CLOSED
24.00	50.00	-13.90	0.50	CLOSED
24.00	53.00	-16.90	0.50	CLOSED
24.00	56.00	-19.90	0.50	CLOSED
24.00	59.00	-22.90	0.50	CLOSED
24.00	62.00	-25.90	0.50	CLOSED
24.00	65.00	-28.90	0.50	CLOSED
24.00	68.00	-31.90	0.50	CLOSED
24.00	71.00	-34.90	0.50	CLOSED
24.00	74.00	-37.90	0.50	CLOSED
24.00	77.00	-40.90	0.50	CLOSED
24.00	80.00	-43.90	0.50	CLOSED
24.00	83.00	-46.90	0.50	CLOSED
24.00	86.00	-49.90	0.50	CLOSED
24.00	89.00	-52.90	0.50	CLOSED
24.00	92.00	-55.90	0.50	CLOSED
24.00	95.00	-58.90	0.50	CLOSED
24.00	98.00	-61.90	0.50	CLOSED
24.00	101.00	-64.90	0.50	CLOSED
24.00	104.00	-67.90	0.50	CLOSED
24.00	107.00	-70.90	0.50	CLOSED
24.00	110.00	-73.90	0.50	CLOSED
24.00	113.00	-76.90	0.50	CLOSED
24.00	116.00	-79.90	0.50	CLOSED
24.00	119.00	-82.90	0.50	CLOSED
24.00	122.00	-85.90	0.50	CLOSED
24.00	125.00	-88.90	0.50	CLOSED
24.00	128.00	-91.90	0.50	CLOSED
24.00	131.00	-94.90	0.50	CLOSED

24.00	134.00	-97.90	0.50 CLOSED
24.00	137.00	-100.90	0.50 CLOSED
24.00	140.00	-103.90	0.50 CLOSED
24.00	143.00	-106.90	0.50 CLOSED
24.00	146.00	-109.90	0.50 CLOSED
24.00	149.00	-112.90	0.50 CLOSED
24.00	152.00	-115.90	0.50 CLOSED
24.00	155.00	-118.90	0.50 CLOSED
24.00	158.00	-121.90	0.50 CLOSED
24.00	161.00	-124.90	0.50 CLOSED
24.00	164.00	-127.90	0.50 CLOSED
24.00	167.00	-130.90	0.50 CLOSED
24.00	170.00	-133.90	0.50 CLOSED
24.00	173.00	-136.90	0.50 CLOSED
24.00	176.00	-139.90	0.50 CLOSED
24.00	179.00	-142.90	0.50 CLOSED
24.00	182.00	-145.90	0.50 CLOSED
24.00	185.00	-148.90	0.50 CLOSED
24.00	188.00	-151.90	0.50 CLOSED
24.00	191.00	-154.90	0.50 CLOSED
24.00	194.00	-157.90	0.50 CLOSED
24.00	197.00	-160.90	0.50 CLOSED
24.00	200.00	-163.90	0.50 CLOSED
24.00	203.00	-166.90	0.50 CLOSED
24.00	206.00	-169.90	0.50 CLOSED
24.00	209.00	-172.90	0.50 CLOSED
24.00	212.00	-175.90	0.50 CLOSED
24.00	215.00	-178.90	0.50 CLOSED

Driven Pile Capacity:
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Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	7.20	36.56	43.76	21.88	116.88
8.00	24.0	10.14	35.91	46.06	23.03	117.89
11.00	24.0	13.71	36.28	49.99	25.00	122.55
14.00	24.0	16.60	43.66	60.26	30.13	147.58
17.00	24.0	20.90	41.35	62.25	31.12	144.94
20.00	24.0	27.45	34.97	62.43	31.21	132.38
23.00	24.0	32.33	32.73	65.07	32.53	130.54
26.00	24.0	33.87	20.60	54.47	27.24	95.67
29.00	24.0	37.47	28.27	65.74	32.87	122.28
32.00	24.0	42.45	18.71	61.16	30.58	98.59
35.00	24.0	48.48	20.15	68.63	34.31	108.92
38.00	24.0	53.48	21.36	74.84	37.42	117.57
41.00	24.0	61.35	20.08	81.43	40.72	121.60
44.00	24.0	68.22	21.88	90.09	45.05	133.84
47.00	24.0	74.33	22.03	96.36	48.18	140.43
50.00	24.0	78.10	19.12	97.22	48.61	135.46
53.00	24.0	79.16	15.41	94.57	47.28	125.38
56.00	24.0	81.20	10.71	91.91	45.95	113.32
59.00	24.0	81.25	9.98	91.23	45.61	111.18
62.00	24.0	81.25	12.96	94.21	47.10	120.13
65.00	24.0	81.38	15.27	96.66	48.33	127.21
68.00	24.0	83.08	18.45	101.53	50.77	138.44
71.00	24.0	85.05	21.09	106.15	53.07	148.34

74.00	24.0	88.24	23.92	112.16	56.08	160.01
77.00	24.0	93.23	23.90	117.13	58.57	164.93
80.00	24.0	97.42	20.60	118.02	59.01	159.21
83.00	24.0	99.78	16.84	116.62	58.31	150.30
86.00	24.0	101.26	14.39	115.64	57.82	144.42
89.00	24.0	101.26	11.21	112.47	56.23	134.89
92.00	24.0	101.26	6.90	108.16	54.08	121.96
95.00	24.0	101.26	4.82	106.08	53.04	115.72
98.00	24.0	101.26	7.76	109.02	54.51	124.53
101.00	24.0	101.26	18.90	120.16	60.08	157.96
104.00	24.0	113.89	31.32	145.21	72.61	207.86
107.00	24.0	122.78	49.86	172.64	86.32	272.35
110.00	24.0	125.85	20.80	146.66	73.33	188.27
113.00	24.0	127.31	17.28	144.60	72.30	179.16
116.00	24.0	127.42	0.00	127.42	63.71	127.42
119.00	24.0	127.42	0.00	127.42	63.71	127.42
122.00	24.0	127.42	18.03	145.45	72.72	181.50
125.00	24.0	127.69	18.64	146.33	73.16	183.61
128.00	24.0	130.87	18.57	149.44	74.72	186.58
131.00	24.0	132.83	17.23	150.06	75.03	184.53
134.00	24.0	137.68	13.78	151.45	75.73	179.00
137.00	24.0	142.01	5.11	147.12	73.56	157.34
140.00	24.0	146.95	5.01	151.96	75.98	161.97
143.00	24.0	148.35	4.76	153.10	76.55	162.62
146.00	24.0	148.94	12.85	161.79	80.89	187.49
149.00	24.0	149.85	12.50	162.34	81.17	187.34
152.00	24.0	151.78	8.93	160.71	80.36	178.57
155.00	24.0	154.06	5.57	159.63	79.81	170.77
158.00	24.0	154.09	5.04	159.13	79.57	169.22
161.00	24.0	154.09	4.91	159.00	79.50	168.83
164.00	24.0	154.09	3.75	157.84	78.92	165.33
167.00	24.0	154.09	3.12	157.21	78.60	163.44
170.00	24.0	154.09	0.37	154.46	77.23	155.20
173.00	24.0	154.09	0.00	154.09	77.04	154.09
176.00	24.0	154.09	2.50	156.59	78.30	161.60
179.00	24.0	154.09	20.14	174.23	87.11	214.50
182.00	24.0	156.07	43.13	199.20	99.60	285.45
185.00	24.0	164.81	59.14	223.95	111.97	342.22
188.00	24.0	173.47	63.12	236.58	118.29	362.81
191.00	24.0	183.40	66.51	249.92	124.96	382.94
194.00	24.0	203.07	107.45	310.52	155.26	525.42
197.00	24.0	210.64	102.84	313.48	156.74	519.16
200.00	24.0	218.54	106.20	324.74	162.37	537.14
203.00	24.0	225.36	111.03	336.39	168.19	558.46
206.00	24.0	********** Not enough soil data *******				
209.00	24.0	0.00	0.00	0.00	0.00	0.00
212.00	24.0	0.00	0.00	0.00	0.00	0.00
215.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES
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1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

Florida Bridge Software Institute
Shaft and Pile Analysis (FB-Deep v.2.03)

Date: May 07, 2014
Time: 13:00:53

General Information:
==========
Input file: .....on 7A\Geotechnical\6 Miscellaneous\FB-Deep\BR-25_PPC_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 4-30-14, Boring Number: BR-25
Station number: Offset:

Ground Elevation: 47.000(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	20.00	3- Clean sand
2	2.00	16.00	3- Clean sand
3	4.00	13.00	3- Clean sand
4	6.00	14.00	3- Clean sand
5	8.00	14.00	3- Clean sand
6	11.50	18.00	3- Clean sand
7	14.00	17.00	3- Clean sand
8	16.50	12.00	3- Clean sand
9	18.90	0.00	2- Clay and silty sand
10	19.00	2.00	3- Clean sand
11	21.50	6.00	3- Clean sand
12	24.00	6.00	3- Clean sand
13	26.50	1.00	2- Clay and silty sand
14	29.00	1.00	2- Clay and silty sand
15	31.50	1.00	2- Clay and silty sand
16	34.00	1.00	2- Clay and silty sand
17	36.50	1.00	2- Clay and silty sand
18	39.00	2.00	2- Clay and silty sand
19	41.50	4.00	3- Clean sand
20	44.00	8.00	3- Clean sand
21	46.40	0.00	2- Clay and silty sand
22	46.50	100.00	3- Clean sand
23	48.90	0.00	2- Clay and silty sand
24	49.00	17.00	3- Clean sand
25	51.40	0.00	2- Clay and silty sand
26	51.50	100.00	3- Clean sand
27	54.00	100.00	3- Clean sand
28	56.50	100.00	3- Clean sand
29	59.00	100.00	3- Clean sand
30	61.50	100.00	3- Clean sand
31	63.90	0.00	2- Clay and silty sand
32	64.00	32.00	3- Clean sand

33	66.50	24.00	3- Clean sand
34	69.00	45.00	2- Clay and silty sand
35	71.50	100.00	2- Clay and silty sand
36	74.00	47.00	2- Clay and silty sand
37	76.50	56.00	2- Clay and silty sand
38	79.00	100.00	2- Clay and silty sand
39	81.50	100.00	2- Clay and silty sand
40	84.00	100.00	2- Clay and silty sand
41	86.50	100.00	4- Lime Stone/Very shelly sand
42	89.00	100.00	4- Lime Stone/Very shelly sand
43	91.50	100.00	4- Lime Stone/Very shelly sand
44	94.00	100.00	4- Lime Stone/Very shelly sand
45	95.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	47.00	28.10	18.90	15.41	3-Clean Sand
2	28.10	28.00	0.10	0.00	2-Clay and Silty Sand
3	28.00	20.50	7.50	4.67	3-Clean Sand
4	20.50	5.50	15.00	1.17	2-Clay and Silty Sand
5	5.50	0.60	4.90	5.96	3-Clean Sand
6	0.60	0.50	0.10	0.00	2-Clay and Silty Sand
7	0.50	-1.90	2.40	100.00	3-Clean Sand
8	-1.90	-2.00	0.10	0.00	2-Clay and Silty Sand
9	-2.00	-4.40	2.40	17.00	3-Clean Sand
10	-4.40	-4.50	0.10	0.00	2-Clay and Silty Sand
11	-4.50	-16.90	12.40	100.00	3-Clean Sand
12	-16.90	-17.00	0.10	0.00	2-Clay and Silty Sand
13	-17.00	-22.00	5.00	28.00	3-Clean Sand
14	-22.00	-39.50	17.50	78.29	2-Clay and Silty Sand
15	-39.50	-48.50	9.00	100.00	4-Limestone, Very Shelly Sand
16	-48.50	-48.50	0.00	0.00	5-

Driven Pile Data:

Pile unit weight = 150.00(pcf), Section Type: Square

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	5.00	42.00
24.00	7.00	40.00
24.00	9.00	38.00
24.00	11.00	36.00
24.00	13.00	34.00
24.00	15.00	32.00
24.00	17.00	30.00
24.00	19.00	28.00
24.00	21.00	26.00
24.00	23.00	24.00
24.00	25.00	22.00

24.00	27.00	20.00
24.00	29.00	18.00
24.00	31.00	16.00
24.00	33.00	14.00
24.00	35.00	12.00
24.00	37.00	10.00
24.00	39.00	8.00
24.00	41.00	6.00
24.00	43.00	4.00
24.00	45.00	2.00
24.00	47.00	0.00
24.00	49.00	-2.00
24.00	51.00	-4.00
24.00	53.00	-6.00
24.00	55.00	-8.00
24.00	57.00	-10.00
24.00	59.00	-12.00
24.00	61.00	-14.00
24.00	63.00	-16.00
24.00	65.00	-18.00
24.00	67.00	-20.00
24.00	69.00	-22.00
24.00	71.00	-24.00
24.00	73.00	-26.00
24.00	75.00	-28.00
24.00	77.00	-30.00
24.00	79.00	-32.00
24.00	81.00	-34.00
24.00	83.00	-36.00
24.00	85.00	-38.00
24.00	87.00	-40.00
24.00	89.00	-42.00
24.00	91.00	-44.00
24.00	93.00	-46.00
24.00	95.00	-48.00
24.00	97.00	-50.00
24.00	99.00	-52.00

Driven Pile Capacity:
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Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	14.50	80.56	95.06	47.53	256.18
7.00	24.0	19.41	81.25	100.67	50.33	263.18
9.00	24.0	24.69	81.60	106.28	53.14	269.48
11.00	24.0	31.50	78.45	109.95	54.98	266.86
13.00	24.0	38.18	67.31	105.49	52.74	240.11
15.00	24.0	44.43	58.64	103.07	51.54	220.35
17.00	24.0	49.26	51.99	101.25	50.63	205.22
19.00	24.0	50.96	47.46	98.42	49.21	193.33
21.00	24.0	51.87	42.09	93.96	46.98	178.13
23.00	24.0	54.07	35.01	89.09	44.54	159.11
25.00	24.0	56.11	27.99	84.10	42.05	140.08
27.00	24.0	56.62	0.00	56.62	28.31	56.62
29.00	24.0	56.62	0.00	56.62	28.31	56.62
31.00	24.0	56.62	0.00	56.62	28.31	56.62

33.00	24.0	56.62	0.00	56.62	28.31	56.62
35.00	24.0	56.62	0.15	56.77	28.39	57.07
37.00	24.0	56.62	3.78	60.40	30.20	67.96
39.00	24.0	56.62	7.31	63.93	31.96	78.54
41.00	24.0	56.62	27.18	83.80	41.90	138.15
43.00	24.0	57.21	30.48	87.69	43.85	148.66
45.00	24.0	58.82	34.24	93.05	46.53	161.52
47.00	24.0	64.61	71.19	135.81	67.90	278.19
49.00	24.0	71.87	181.82	253.69	126.85	617.33
51.00	24.0	75.61	146.22	221.83	110.92	514.27
53.00	24.0	88.84	145.90	234.75	117.37	526.55
55.00	24.0	103.45	149.10	252.55	126.27	550.74
57.00	24.0	120.76	149.93	270.69	135.34	570.54
59.00	24.0	137.15	151.85	289.00	144.50	592.71
61.00	24.0	155.61	151.80	307.41	153.70	611.01
63.00	24.0	170.15	151.75	321.90	160.95	625.40
65.00	24.0	184.31	161.11	345.42	172.71	667.65
67.00	24.0	193.94	161.68	355.62	177.81	678.97
69.00	24.0	210.67	161.61	372.27	186.14	695.48
71.00	24.0	231.71	154.02	385.74	192.87	693.79
73.00	24.0	252.69	146.11	398.79	199.40	691.01
75.00	24.0	273.71	138.34	412.06	206.03	688.75
77.00	24.0	294.68	130.41	425.09	212.54	685.91
79.00	24.0	315.62	135.30	450.93	225.46	721.54
81.00	24.0	336.57	158.95	495.52	247.76	813.42
83.00	24.0	357.52	181.29	538.80	269.40	901.38
85.00	24.0	377.33	203.22	580.55	290.27	986.99
87.00	24.0	389.45	214.01	603.46	301.73	1031.49
89.00	24.0	********** Not enough soil data *******				
91.00	24.0	0.00	0.00	0.00	0.00	0.00
93.00	24.0	0.00	0.00	0.00	0.00	0.00
95.00	24.0	0.00	0.00	0.00	0.00	0.00
97.00	24.0	0.00	0.00	0.00	0.00	0.00
99.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES
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1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

General Information:
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Input file: .....n 7A\Geotechnical\6 Miscellaneous\FB-Deep\BR-30A_PPC_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 6/13/14, Boring Number: BR-30A
Station number: Offset:

Ground Elevation: 61.700(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	2.00	3- Clean sand
2	2.00	5.00	3- Clean sand
3	3.90	0.00	2- Clay and silty sand
4	4.00	12.00	3- Clean sand
5	6.00	15.00	3- Clean sand
6	8.00	9.00	3- Clean sand
7	11.50	11.00	3- Clean sand
8	14.00	10.00	3- Clean sand
9	16.40	0.00	2- Clay and silty sand
10	16.50	17.00	3- Clean sand
11	19.00	22.00	3- Clean sand
12	21.50	34.00	3- Clean sand
13	23.90	0.00	2- Clay and silty sand
14	24.00	6.00	3- Clean sand
15	26.40	0.00	2- Clay and silty sand
16	26.50	33.00	3- Clean sand
17	29.00	34.00	3- Clean sand
18	31.50	0.00	2- Clay and silty sand
19	31.60	8.00	3- Clean sand
20	34.00	1.00	2- Clay and silty sand
21	36.50	3.00	2- Clay and silty sand
22	39.00	4.00	2- Clay and silty sand
23	41.50	5.00	1- Plastic Clay
24	44.00	6.00	1- Plastic Clay
25	46.50	7.00	1- Plastic Clay
26	49.00	3.00	1- Plastic Clay
27	51.50	34.00	3- Clean sand
28	53.90	0.00	2- Clay and silty sand
29	54.00	88.00	3- Clean sand
30	56.40	0.00	2- Clay and silty sand
31	56.50	20.00	3- Clean sand
32	58.90	0.00	2- Clay and silty sand

33	59.00	2.00	3- Clean sand
34	61.50	11.00	4- Lime Stone/Very shelly sand
35	63.90	0.00	3- Clean sand
36	64.00	58.00	4- Lime Stone/Very shelly sand
37	66.50	100.00	4- Lime Stone/Very shelly sand
38	69.00	23.00	3- Clean sand
39	71.40	0.00	2- Clay and silty sand
40	71.50	84.00	3- Clean sand
41	74.00	15.00	1- Plastic Clay
42	76.50	100.00	4- Lime Stone/Very shelly sand
43	79.00	100.00	4- Lime Stone/Very shelly sand
44	81.50	100.00	4- Lime Stone/Very shelly sand
45	83.90	0.00	3- Clean sand
46	84.00	23.00	4- Lime Stone/Very shelly sand
47	86.40	0.00	3- Clean sand
48	86.50	100.00	4- Lime Stone/Very shelly sand
49	89.00	81.00	4- Lime Stone/Very shelly sand
50	91.50	100.00	4- Lime Stone/Very shelly sand
51	94.00	42.00	4- Lime Stone/Very shelly sand
52	96.50	100.00	4- Lime Stone/Very shelly sand
53	99.00	100.00	4- Lime Stone/Very shelly sand
54	101.50	100.00	4- Lime Stone/Very shelly sand
55	104.00	61.00	4- Lime Stone/Very shelly sand
56	106.50	100.00	4- Lime Stone/Very shelly sand
57	108.90	0.00	3- Clean sand
58	109.00	24.00	4- Lime Stone/Very shelly sand
59	111.40	0.00	3- Clean sand
60	111.50	100.00	4- Lime Stone/Very shelly sand
61	114.00	100.00	4- Lime Stone/Very shelly sand
62	115.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	61.70	57.80	3.90	3.46	3-Clean Sand
2	57.80	57.70	0.10	0.00	2-Clay and Silty Sand
3	57.70	45.30	12.40	11.05	3-Clean Sand
4	45.30	45.20	0.10	0.00	2-Clay and Silty Sand
5	45.20	37.80	7.40	24.20	3-Clean Sand
6	37.80	37.70	0.10	0.00	2-Clay and Silty Sand
7	37.70	35.30	2.40	6.00	3-Clean Sand
8	35.30	35.20	0.10	0.00	2-Clay and Silty Sand
9	35.20	30.20	5.00	33.50	3-Clean Sand
10	30.20	30.10	0.10	0.00	2-Clay and Silty Sand
11	30.10	27.70	2.40	8.00	3-Clean Sand
12	27.70	20.20	7.50	2.67	2-Clay and Silty Sand
13	20.20	10.20	10.00	5.25	1-Plastic Clay
14	10.20	7.80	2.40	34.00	3-Clean Sand
15	7.80	7.70	0.10	0.00	2-Clay and Silty Sand
16	7.70	5.30	2.40	88.00	3-Clean Sand
17	5.30	5.20	0.10	0.00	2-Clay and Silty Sand
18	5.20	2.80	2.40	20.00	3-Clean Sand
19	2.80	2.70	0.10	0.00	2-Clay and Silty Sand
20	2.70	0.20	2.50	2.00	3-Clean Sand
21	0.20	-2.20	2.40	11.00	4-Limestone, Very Shelly Sand

22	-2.20	-2.30	0.10	0.00	3-Clean Sand
23	-2.30	-7.30	5.00	79.00	4-Limestone, Very Shelly Sand
24	-7.30	-9.70	2.40	23.00	3-Clean Sand
25	-9.70	-9.80	0.10	0.00	2-Clay and Silty Sand
26	-9.80	-12.30	2.50	84.00	3-Clean Sand
27	-12.30	-14.80	2.50	15.00	1-Plastic Clay
28	-14.80	-22.20	7.40	100.00	4-Limestone, Very Shelly Sand
29	-22.20	-22.30	0.10	0.00	3-Clean Sand
30	-22.30	-24.70	2.40	23.00	4-Limestone, Very Shelly Sand
31	-24.70	-24.80	0.10	0.00	3-Clean Sand
32	-24.80	-47.20	22.40	87.05	4-Limestone, Very Shelly Sand
33	-47.20	-47.30	0.10	0.00	3-Clean Sand
34	-47.30	-49.70	2.40	24.00	4-Limestone, Very Shelly Sand
35	-49.70	-49.80	0.10	0.00	3-Clean Sand
36	-49.80	-53.80	4.00	100.00	4-Limestone, Very Shelly Sand
37	-53.80	-53.80	0.00	0.00	5-

Driven Pile Data:
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Pile unit weight = 150.00(pcf), Section Type: Square

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	5.00	56.70
24.00	7.00	54.70
24.00	9.00	52.70
24.00	11.00	50.70
24.00	13.00	48.70
24.00	15.00	46.70
24.00	17.00	44.70
24.00	19.00	42.70
24.00	21.00	40.70
24.00	23.00	38.70
24.00	25.00	36.70
24.00	27.00	34.70
24.00	29.00	32.70
24.00	31.00	30.70
24.00	33.00	28.70
24.00	35.00	26.70
24.00	37.00	24.70
24.00	39.00	22.70
24.00	41.00	20.70
24.00	43.00	18.70
24.00	45.00	16.70
24.00	47.00	14.70
24.00	49.00	12.70
24.00	51.00	10.70
24.00	53.00	8.70
24.00	55.00	6.70
24.00	57.00	4.70
24.00	59.00	2.70
24.00	61.00	0.70
24.00	63.00	-1.30

24.00	65.00	-3.30
24.00	67.00	-5.30
24.00	69.00	-7.30
24.00	71.00	-9.30
24.00	73.00	-11.30
24.00	75.00	-13.30
24.00	77.00	-15.30
24.00	79.00	-17.30
24.00	81.00	-19.30
24.00	83.00	-21.30
24.00	85.00	-23.30
24.00	87.00	-25.30
24.00	89.00	-27.30
24.00	91.00	-29.30
24.00	93.00	-31.30
24.00	95.00	-33.30
24.00	97.00	-35.30
24.00	99.00	-37.30
24.00	101.00	-39.30
24.00	103.00	-41.30
24.00	105.00	-43.30
24.00	107.00	-45.30
24.00	109.00	-47.30
24.00	111.00	-49.30
24.00	113.00	-51.30
24.00	115.00	-53.30
24.00	117.00	-55.30
24.00	119.00	-57.30

Driven Pile Capacity:
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Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	4.09	37.55	41.65	20.82	116.75
7.00	24.0	8.22	38.80	47.02	23.51	124.62
9.00	24.0	11.67	39.38	51.05	25.53	129.81
11.00	24.0	14.18	41.92	56.10	28.05	139.93
13.00	24.0	15.84	48.26	64.10	32.05	160.62
15.00	24.0	16.64	60.65	77.29	38.64	198.59
17.00	24.0	27.18	80.74	107.91	53.96	269.39
19.00	24.0	34.72	73.65	108.37	54.18	255.67
21.00	24.0	44.82	79.45	124.27	62.13	283.16
23.00	24.0	53.22	83.93	137.15	68.57	305.01
25.00	24.0	56.55	88.45	145.00	72.50	321.90
27.00	24.0	60.45	83.23	143.67	71.84	310.12
29.00	24.0	73.11	65.39	138.50	69.25	269.28
31.00	24.0	80.80	53.72	134.52	67.26	241.96
33.00	24.0	81.94	8.24	90.18	45.09	106.66
35.00	24.0	83.01	0.67	83.68	41.84	85.02
37.00	24.0	83.01	1.03	84.04	42.02	86.11
39.00	24.0	83.01	1.94	84.95	42.47	88.83
41.00	24.0	84.12	3.24	87.35	43.68	93.83
43.00	24.0	90.29	25.42	115.71	57.85	166.55
45.00	24.0	95.23	32.17	127.40	63.70	191.74
47.00	24.0	101.55	36.22	137.76	68.88	210.20
49.00	24.0	104.57	55.63	160.20	80.10	271.46

51.00	24.0	109.70	58.35	168.06	84.03	284.76
53.00	24.0	120.45	49.86	170.31	85.15	270.03
55.00	24.0	129.21	46.99	176.19	88.10	270.17
57.00	24.0	134.18	41.43	175.61	87.80	258.47
59.00	24.0	137.64	82.65	220.29	110.15	385.59
61.00	24.0	138.29	88.19	226.48	113.24	402.86
63.00	24.0	140.06	121.83	261.89	130.94	505.54
65.00	24.0	145.36	129.44	274.79	137.40	533.67
67.00	24.0	154.93	118.25	273.18	136.59	509.68
69.00	24.0	163.97	107.39	271.37	135.68	486.15
71.00	24.0	168.56	108.71	277.27	138.63	494.68
73.00	24.0	181.01	148.27	329.29	164.64	625.83
75.00	24.0	195.45	184.02	379.47	189.73	747.51
77.00	24.0	206.40	192.14	398.55	199.27	782.84
79.00	24.0	216.00	177.38	393.38	196.69	748.14
81.00	24.0	225.60	176.65	402.26	201.13	755.56
83.00	24.0	232.95	182.34	415.29	207.65	779.96
85.00	24.0	235.59	194.70	430.29	215.14	819.68
87.00	24.0	239.23	227.19	466.42	233.21	920.79
89.00	24.0	248.48	228.81	477.29	238.64	934.90
91.00	24.0	256.91	235.30	492.21	246.10	962.80
93.00	24.0	265.42	241.39	506.81	253.40	989.58
95.00	24.0	273.48	247.52	521.00	260.50	1016.04
97.00	24.0	282.51	252.93	535.44	267.72	1041.31
99.00	24.0	291.86	260.85	552.71	276.35	1074.40
101.00	24.0	301.45	264.08	565.53	282.77	1093.70
103.00	24.0	311.04	246.30	557.34	278.67	1049.95
105.00	24.0	320.63	220.64	541.27	270.64	982.56
107.00	24.0	329.99	221.24	551.23	275.62	993.72
109.00	24.0	********** Not enough soil data *******				
111.00	24.0	0.00	0.00	0.00	0.00	0.00
113.00	24.0	0.00	0.00	0.00	0.00	0.00
115.00	24.0	0.00	0.00	0.00	0.00	0.00
117.00	24.0	0.00	0.00	0.00	0.00	0.00
119.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES
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1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

Florida Bridge Software Institute
Shaft and Pile Analysis (FB-Deep v.2.04)

Date: June 18, 2014
Time: 14:21:49

General Information:
==========
Input file: C:\Users\cgballock\Desktop\FB-Deep\BR-32_PPC_PILES.spc
Project number: 3520G
Job name: WEKIVA 7A
Engineer: CGB
Units: English

Analysis Information:
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Analysis Type: SPT

Soil Information:
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Boring date: 5/5/14, Boring Number: BR-32
Station number: Offset:

Ground Elevation: 72.400(ft)

Hammer type: Automatic Hammer, Correction factor = 1.24

ID	Depth (ft)	No. of Blows (Blows/ft)	Soil Type
1	0.00	2.00	3- Clean sand
2	2.00	2.00	3- Clean sand
3	4.00	2.00	3- Clean sand
4	6.00	2.00	3- Clean sand
5	8.00	2.00	3- Clean sand
6	11.50	1.00	3- Clean sand
7	14.00	0.00	2- Clay and silty sand
8	14.10	3.00	3- Clean sand
9	16.50	7.00	3- Clean sand
10	19.00	4.00	3- Clean sand
11	21.50	5.00	3- Clean sand
12	24.00	7.00	3- Clean sand
13	26.50	8.00	3- Clean sand
14	29.00	0.00	2- Clay and silty sand
15	29.10	13.00	3- Clean sand
16	31.50	13.00	3- Clean sand
17	34.00	14.00	3- Clean sand
18	36.50	0.00	2- Clay and silty sand
19	36.60	26.00	3- Clean sand
20	39.00	22.00	3- Clean sand
21	41.50	3.00	1- Plastic Clay
22	45.50	4.00	3- Clean sand
23	46.50	0.00	2- Clay and silty sand
24	46.60	10.00	3- Clean sand
25	49.00	0.00	2- Clay and silty sand
26	49.10	25.00	3- Clean sand
27	51.50	0.00	2- Clay and silty sand
28	51.60	19.00	3- Clean sand
29	54.00	15.00	3- Clean sand
30	56.50	10.00	3- Clean sand
31	59.00	0.00	2- Clay and silty sand
32	59.10	29.00	3- Clean sand

33	61.50	7.00	1- Plastic Clay
34	64.00	4.00	1- Plastic Clay
35	66.50	6.00	1- Plastic Clay
36	69.00	12.00	4- Lime Stone/Very shelly sand
37	71.50	14.00	4- Lime Stone/Very shelly sand
38	74.00	12.00	4- Lime Stone/Very shelly sand
39	76.50	17.00	4- Lime Stone/Very shelly sand
40	79.00	0.00	3- Clean sand
41	79.10	50.00	4- Lime Stone/Very shelly sand
42	81.50	38.00	1- Plastic Clay
43	84.00	100.00	2- Clay and silty sand
44	86.50	0.00	3- Clean sand
45	86.60	13.00	2- Clay and silty sand
46	89.00	0.00	3- Clean sand
47	89.10	70.00	2- Clay and silty sand
48	91.50	40.00	2- Clay and silty sand
49	94.00	90.00	2- Clay and silty sand
50	96.50	100.00	2- Clay and silty sand
51	99.00	100.00	2- Clay and silty sand
52	101.50	100.00	2- Clay and silty sand
53	104.00	58.00	2- Clay and silty sand
54	106.50	84.00	2- Clay and silty sand
55	109.00	36.00	2- Clay and silty sand
56	111.50	100.00	2- Clay and silty sand
57	114.00	48.00	2- Clay and silty sand
58	115.50	0.00	5- Cavity layer

Blowcount Average Per Soil Layer

Layer Num.	Starting Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Average Blowcount (Blows/ft)	Soil Type
1	72.40	58.40	14.00	1.82	3-Clean Sand
2	58.40	58.30	0.10	0.00	2-Clay and Silty Sand
3	58.30	43.40	14.90	5.68	3-Clean Sand
4	43.40	43.30	0.10	0.00	2-Clay and Silty Sand
5	43.30	35.90	7.40	13.34	3-Clean Sand
6	35.90	35.80	0.10	0.00	2-Clay and Silty Sand
7	35.80	30.90	4.90	23.96	3-Clean Sand
8	30.90	26.90	4.00	3.00	1-Plastic Clay
9	26.90	25.90	1.00	4.00	3-Clean Sand
10	25.90	25.80	0.10	0.00	2-Clay and Silty Sand
11	25.80	23.40	2.40	10.00	3-Clean Sand
12	23.40	23.30	0.10	0.00	2-Clay and Silty Sand
13	23.30	20.90	2.40	25.00	3-Clean Sand
14	20.90	20.80	0.10	0.00	2-Clay and Silty Sand
15	20.80	13.40	7.40	14.61	3-Clean Sand
16	13.40	13.30	0.10	0.00	2-Clay and Silty Sand
17	13.30	10.90	2.40	29.00	3-Clean Sand
18	10.90	3.40	7.50	5.67	1-Plastic Clay
19	3.40	-6.60	10.00	13.75	4-Limestone, Very Shelly Sand
20	-6.60	-6.70	0.10	0.00	3-Clean Sand
21	-6.70	-9.10	2.40	50.00	4-Limestone, Very Shelly Sand
22	-9.10	-11.60	2.50	38.00	1-Plastic Clay
23	-11.60	-14.10	2.50	100.00	2-Clay and Silty Sand
24	-14.10	-14.20	0.10	0.00	3-Clean Sand

25	-14.20	-16.60	2.40	13.00	2-Clay and Silty Sand
26	-16.60	-16.70	0.10	0.00	3-Clean Sand
27	-16.70	-43.10	26.40	76.14	2-Clay and Silty Sand
28	-43.10	-43.10	0.00	0.00	5-

Driven Pile Data:
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Pile unit weight = 150.00(pcf), Section Type: Square

Pile Geometry:

Width (in)	Length (ft)	Tip Elev. (ft)
24.00	5.00	67.40
24.00	7.00	65.40
24.00	9.00	63.40
24.00	11.00	61.40
24.00	13.00	59.40
24.00	15.00	57.40
24.00	17.00	55.40
24.00	19.00	53.40
24.00	21.00	51.40
24.00	23.00	49.40
24.00	25.00	47.40
24.00	27.00	45.40
24.00	29.00	43.40
24.00	31.00	41.40
24.00	33.00	39.40
24.00	35.00	37.40
24.00	37.00	35.40
24.00	39.00	33.40
24.00	41.00	31.40
24.00	43.00	29.40
24.00	45.00	27.40
24.00	47.00	25.40
24.00	49.00	23.40
24.00	51.00	21.40
24.00	53.00	19.40
24.00	55.00	17.40
24.00	57.00	15.40
24.00	59.00	13.40
24.00	61.00	11.40
24.00	63.00	9.40
24.00	65.00	7.40
24.00	67.00	5.40
24.00	69.00	3.40
24.00	71.00	1.40
24.00	73.00	-0.60
24.00	75.00	-2.60
24.00	77.00	-4.60
24.00	79.00	-6.60
24.00	81.00	-8.60
24.00	83.00	-10.60
24.00	85.00	-12.60
24.00	87.00	-14.60
24.00	89.00	-16.60
24.00	91.00	-18.60
24.00	93.00	-20.60
24.00	95.00	-22.60
24.00	97.00	-24.60
24.00	99.00	-26.60

24.00	101.00	-28.60
24.00	103.00	-30.60
24.00	105.00	-32.60
24.00	107.00	-34.60
24.00	109.00	-36.60
24.00	111.00	-38.60
24.00	113.00	-40.60
24.00	115.00	-42.60
24.00	117.00	-44.60
24.00	119.00	-46.60

Driven Pile Capacity:
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Test Pile Length (ft)	Pile Width (in)	Ultimate Side Friction (tons)	Mobilized End Bearing (tons)	Estimated Davisson Capacity (tons)	Allowable Pile Capacity (tons)	Ultimate Pile Capacity (tons)
5.00	24.0	0.00	0.00	0.00	0.00	0.00
7.00	24.0	0.00	0.00	0.00	0.00	0.00
9.00	24.0	0.00	1.49	1.49	0.75	4.48
11.00	24.0	0.00	5.46	5.46	2.73	16.37
13.00	24.0	0.00	6.86	6.86	3.43	20.58
15.00	24.0	0.19	8.26	8.45	4.22	24.96
17.00	24.0	1.56	9.09	10.65	5.32	28.83
19.00	24.0	1.93	11.54	13.47	6.74	36.56
21.00	24.0	2.29	15.12	17.41	8.70	47.65
23.00	24.0	3.54	19.37	22.92	11.46	61.66
25.00	24.0	5.17	28.17	33.34	16.67	89.69
27.00	24.0	7.40	37.25	44.65	22.33	119.16
29.00	24.0	12.66	42.24	54.90	27.45	139.38
31.00	24.0	16.71	43.08	59.79	29.89	145.95
33.00	24.0	20.02	45.73	65.75	32.88	157.21
35.00	24.0	24.17	46.72	70.90	35.45	164.34
37.00	24.0	30.50	51.54	82.04	41.02	185.11
39.00	24.0	39.42	39.71	79.13	39.57	158.56
41.00	24.0	44.40	35.76	80.15	40.08	151.67
43.00	24.0	44.60	10.20	54.80	27.40	75.20
45.00	24.0	44.60	18.38	62.99	31.49	99.75
47.00	24.0	45.39	54.99	100.37	50.19	210.34
49.00	24.0	46.96	58.94	105.90	52.95	223.78
51.00	24.0	52.60	54.39	107.00	53.50	215.78
53.00	24.0	57.64	53.97	111.61	55.81	219.56
55.00	24.0	63.36	46.89	110.25	55.13	204.04
57.00	24.0	67.46	38.37	105.83	52.91	182.56
59.00	24.0	68.96	36.88	105.85	52.92	179.61
61.00	24.0	78.15	32.29	110.45	55.22	175.03
63.00	24.0	82.98	13.46	96.45	48.22	123.38
65.00	24.0	83.51	24.18	107.68	53.84	156.04
67.00	24.0	87.61	36.47	124.08	62.04	197.03
69.00	24.0	93.51	59.34	152.84	76.42	271.51
71.00	24.0	96.05	59.34	155.39	77.69	274.07
73.00	24.0	98.21	62.01	160.22	80.11	284.25
75.00	24.0	100.05	67.03	167.08	83.54	301.14
77.00	24.0	102.81	69.70	172.52	86.26	311.93
79.00	24.0	105.66	81.98	187.64	93.82	351.60
81.00	24.0	120.31	69.71	190.02	95.01	329.44
83.00	24.0	141.72	61.70	203.42	101.71	326.83
85.00	24.0	160.17	64.83	225.00	112.50	354.67

87.00	24.0	168.99	84.51	253.50	126.75	422.53
89.00	24.0	173.43	98.62	272.06	136.03	469.30
91.00	24.0	193.20	99.94	293.14	146.57	493.02
93.00	24.0	212.63	102.64	315.27	157.63	520.54
95.00	24.0	231.18	108.64	339.83	169.91	557.11
97.00	24.0	253.10	108.13	361.23	180.61	577.49
99.00	24.0	274.00	111.92	385.92	192.96	609.76
101.00	24.0	294.94	112.19	407.14	203.57	631.52
103.00	24.0	315.89	114.20	430.09	215.04	658.49
105.00	24.0	336.84	120.25	457.08	228.54	697.57
107.00	24.0	357.77	120.95	478.71	239.36	720.60
109.00	24.0	********** Not enough soil data *******				
111.00	24.0	0.00	0.00	0.00	0.00	0.00
113.00	24.0	0.00	0.00	0.00	0.00	0.00
115.00	24.0	0.00	0.00	0.00	0.00	0.00
117.00	24.0	0.00	0.00	0.00	0.00	0.00
119.00	24.0	0.00	0.00	0.00	0.00	0.00

NOTES

1. MOBILIZED END BEARING IS 1/3 OF THE ORIGINAL RB-121 VALUES.

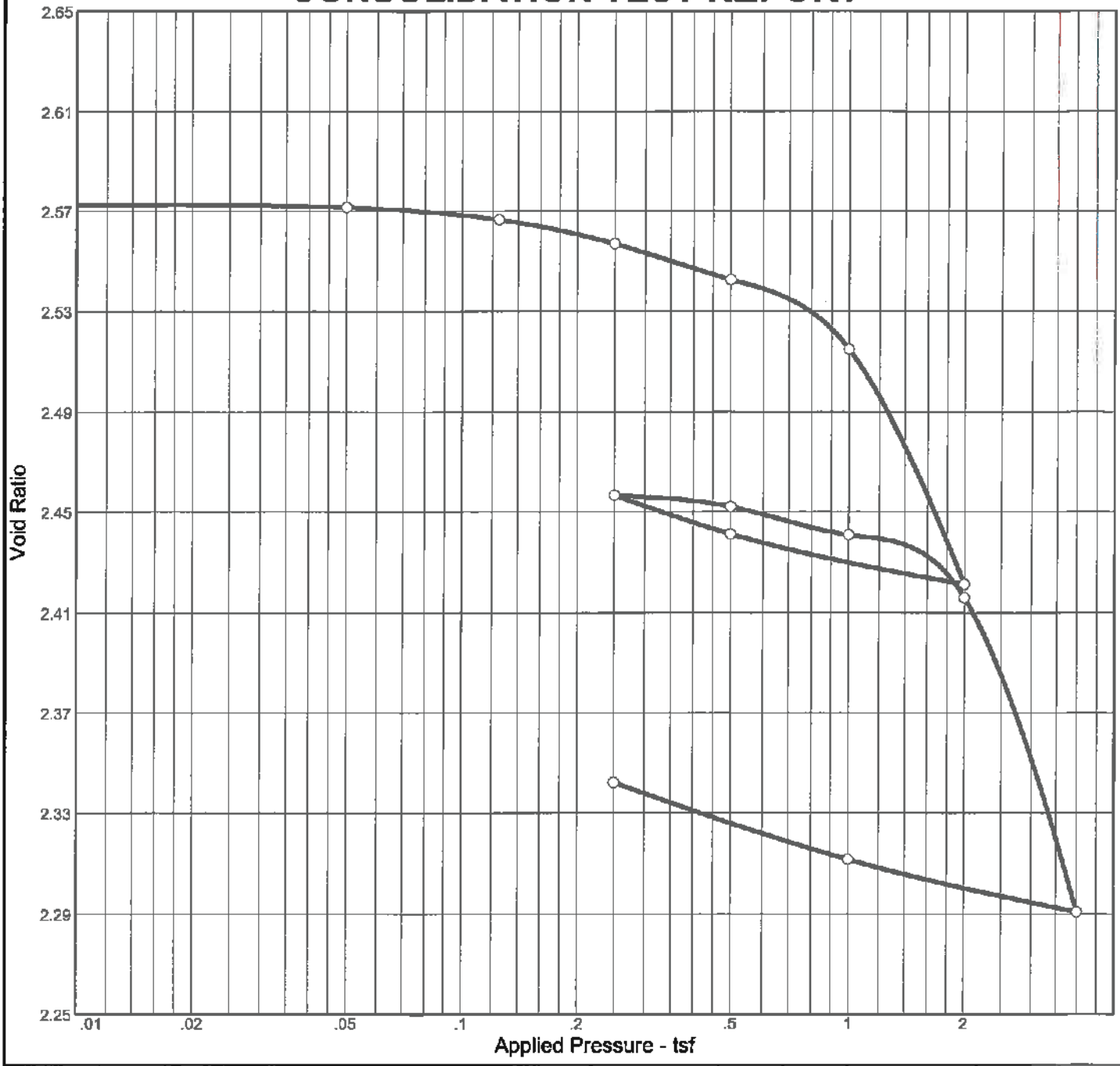
2. DAVISSON PILE CAPACITY IS AN ESTIMATE BASED ON FAILURE CRITERIA, AND EQUALS ULTIMATE SIDE FRICTION PLUS MOBILIZED END BEARING.

3. ALLOWABLE PILE CAPACITY IS 1/2 THE DAVISSON PILE CAPACITY.

4. ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 3 x THE MOBILIZED END BEARING.
   EXCEPTION: FOR H-PILES TIPPED IN SAND OR LIMESTONE, THE ULTIMATE PILE CAPACITY IS ULTIMATE SIDE FRICTION PLUS 2 x THE MOBILIZED END BEARING.

CONSOLIDATION TEST RESULTS

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
95.1 %	120.4 %	35.4			2.03	0.49	1.06	0.38	0.04			2.572

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Brown Mucky Fine Sand	(PT)	

Project No. 3520G **Client:**

Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'

Remarks:

Organic Content= 27.8%
Percent Fines= 49.6%

CONSOLIDATION TEST REPORT

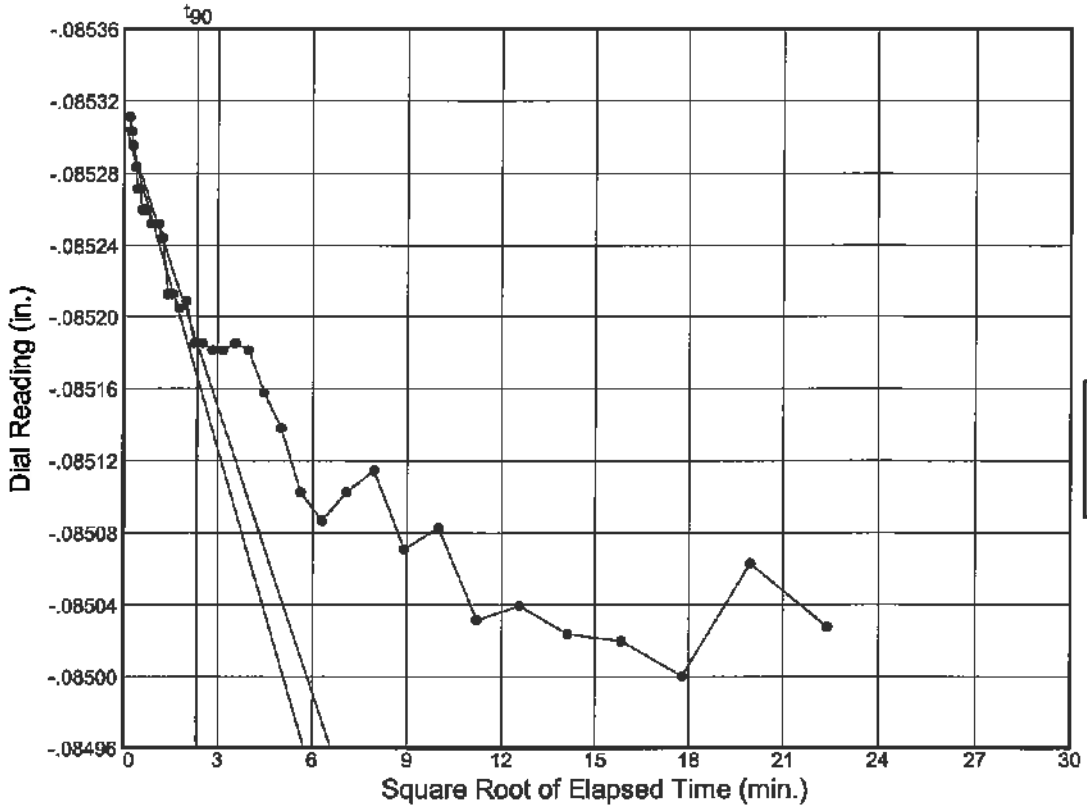
Geotechnical and Environmental Consultants, Inc.

Plate

Dial Reading vs. Time

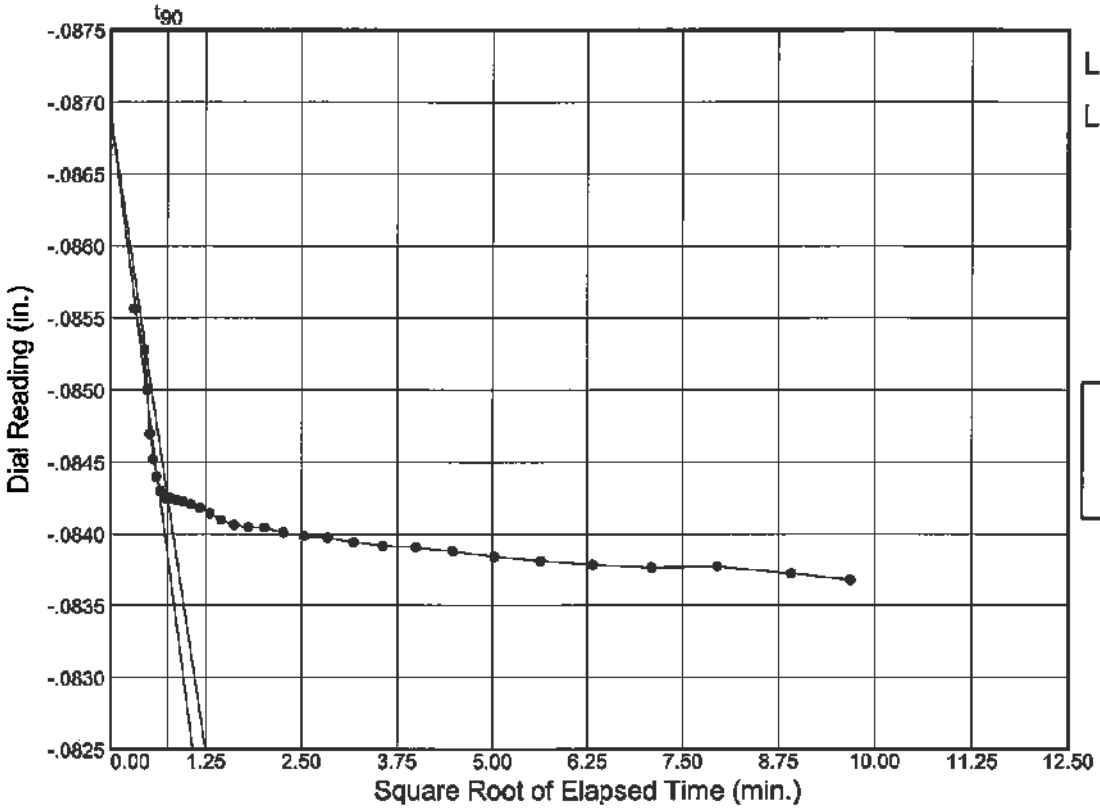
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 1
Load= 0.05 tsf
D_0 = -0.08531
D_{90} = -0.08519
D_{100} = -0.08517
T_{90} = 5.41 min.

C_v @ T_{90}
0.39 ft.^{2}/day



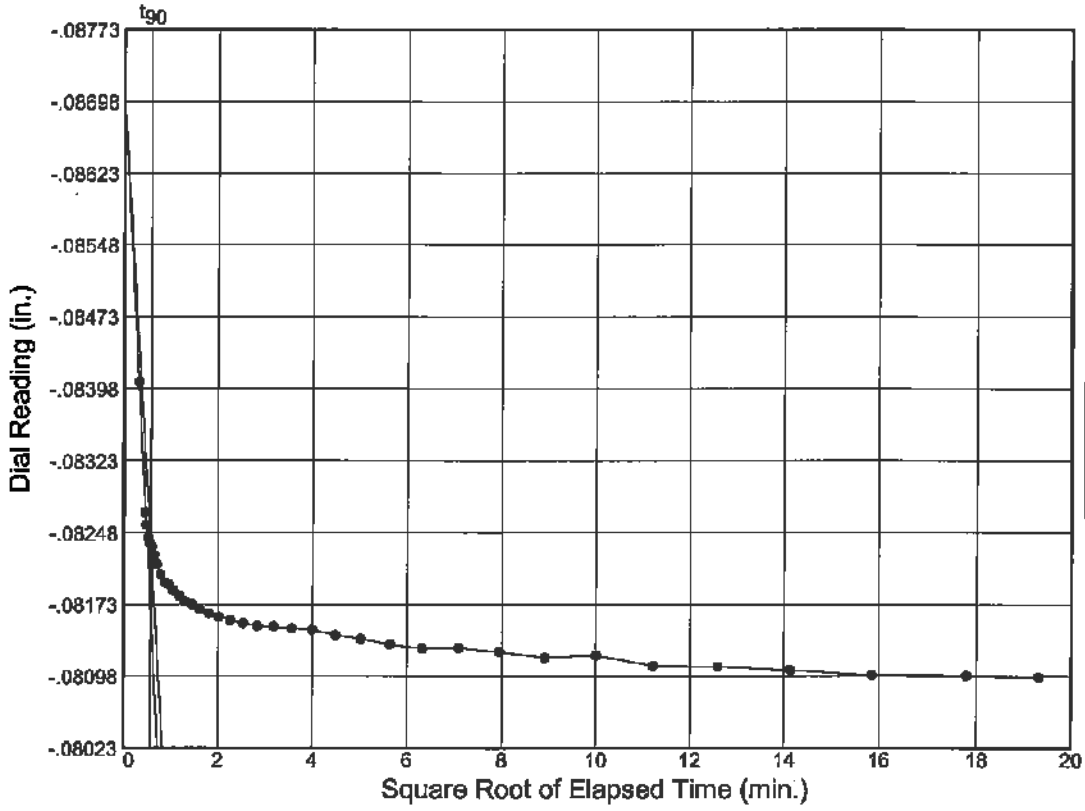
Load No.= 2
Load= 0.13 tsf
D_0 = -0.08692
D_{90} = -0.08425
D_{100} = -0.08395
T_{90} = 0.56 min.

C_v @ T_{90}
3.75 ft.^{2}/day

Dial Reading vs. Time

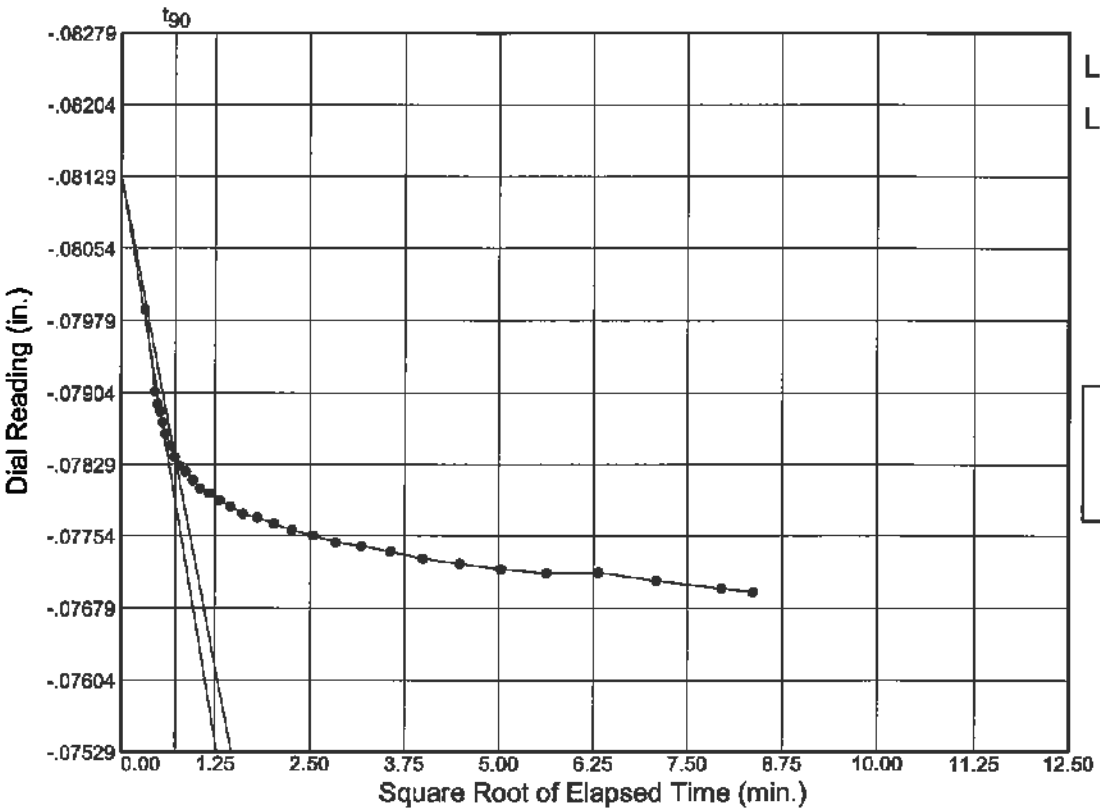
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 3
Load= 0.25 tsf
D_0 = -0.08698
D_{90} = -0.08236
D_{100} = -0.08184
T_{90} = 0.32 min.

C_v @ T_{90}
6.50 ft.^{2}/day



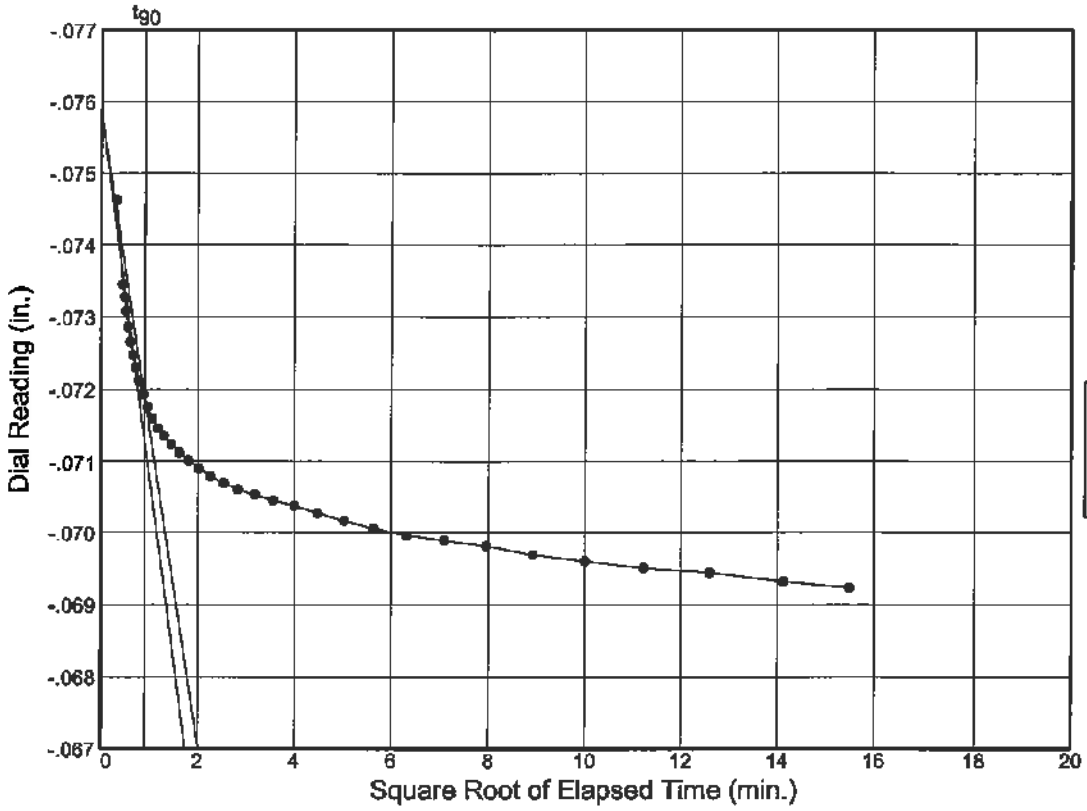
Load No.= 4
Load= 0.50 tsf
D_0 = -0.08129
D_{90} = -0.07835
D_{100} = -0.07802
T_{90} = 0.51 min.

C_v @ T_{90}
4.07 ft.^{2}/day

Dial Reading vs. Time

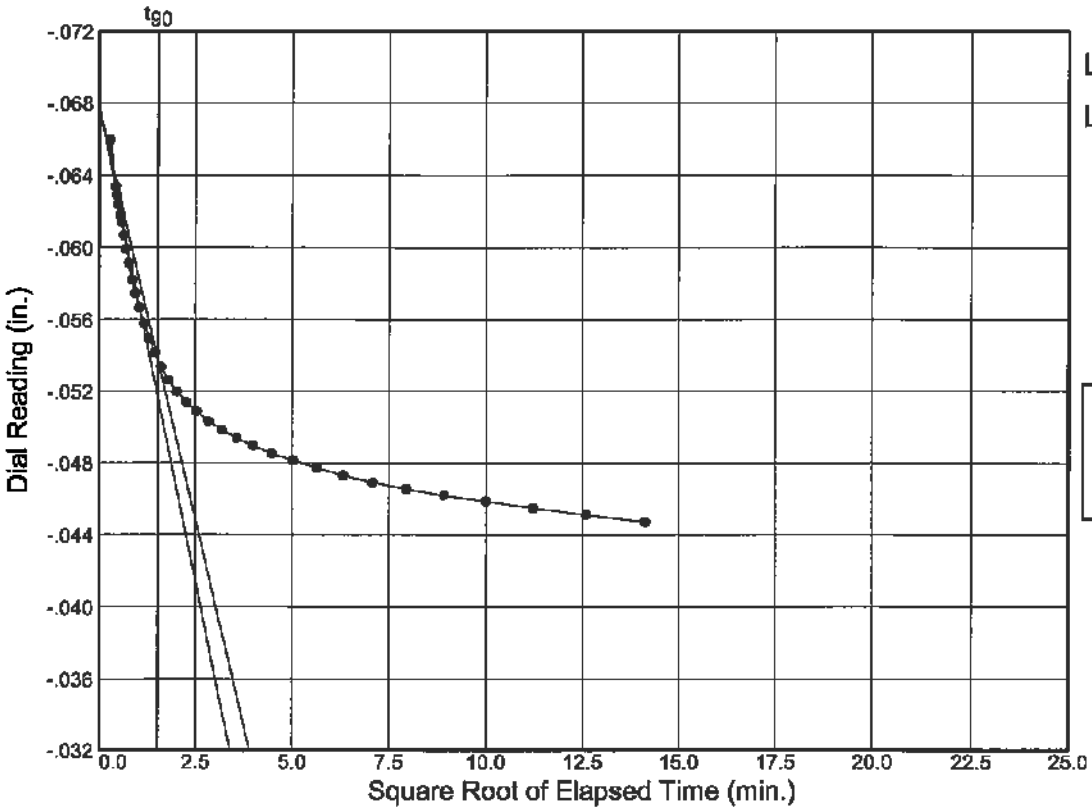
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 5
Load= 1.00 tsf
D_0 = -0.07584
D_{90} = -0.07185
D_{100} = -0.07141
T_{90} = 0.82 min.

C_v @ T_{90}
2.52 ft.^{2}/day



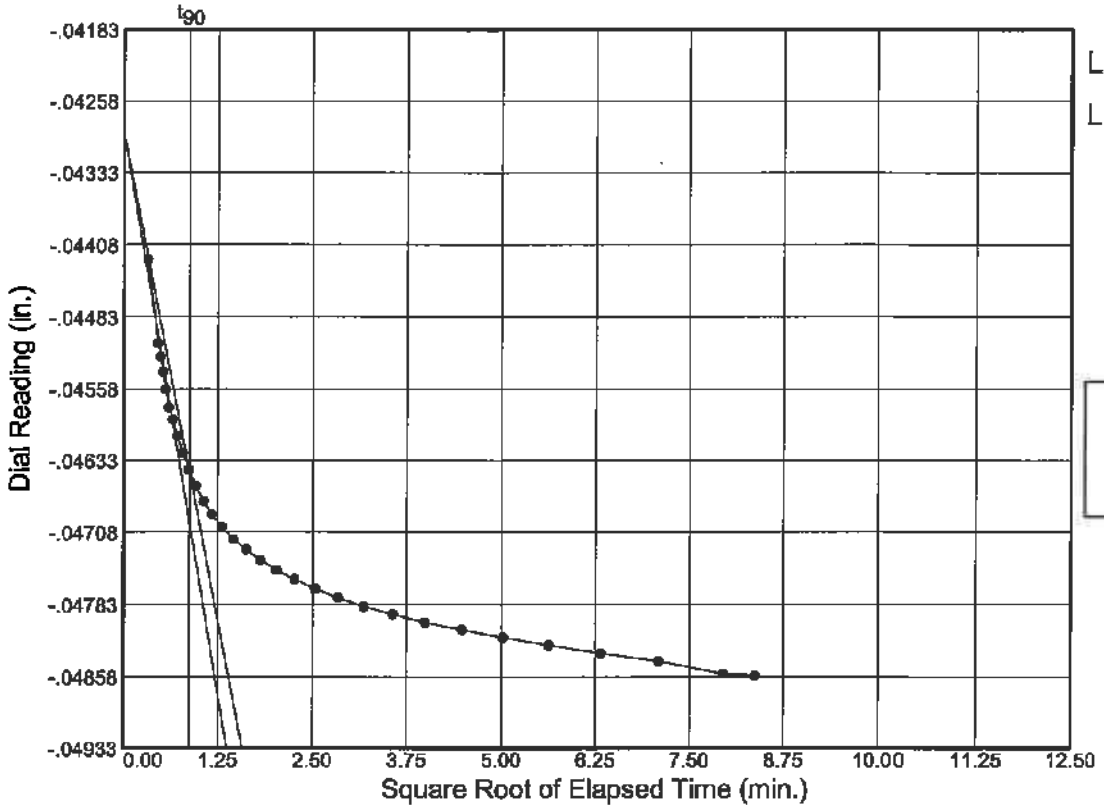
Load No.= 6
Load= 2.00 tsf
D_0 = -0.06777
D_{90} = -0.05378
D_{100} = -0.05223
T_{90} = 2.33 min.

C_v @ T_{90}
0.86 ft.^{2}/day

Dial Reading vs. Time

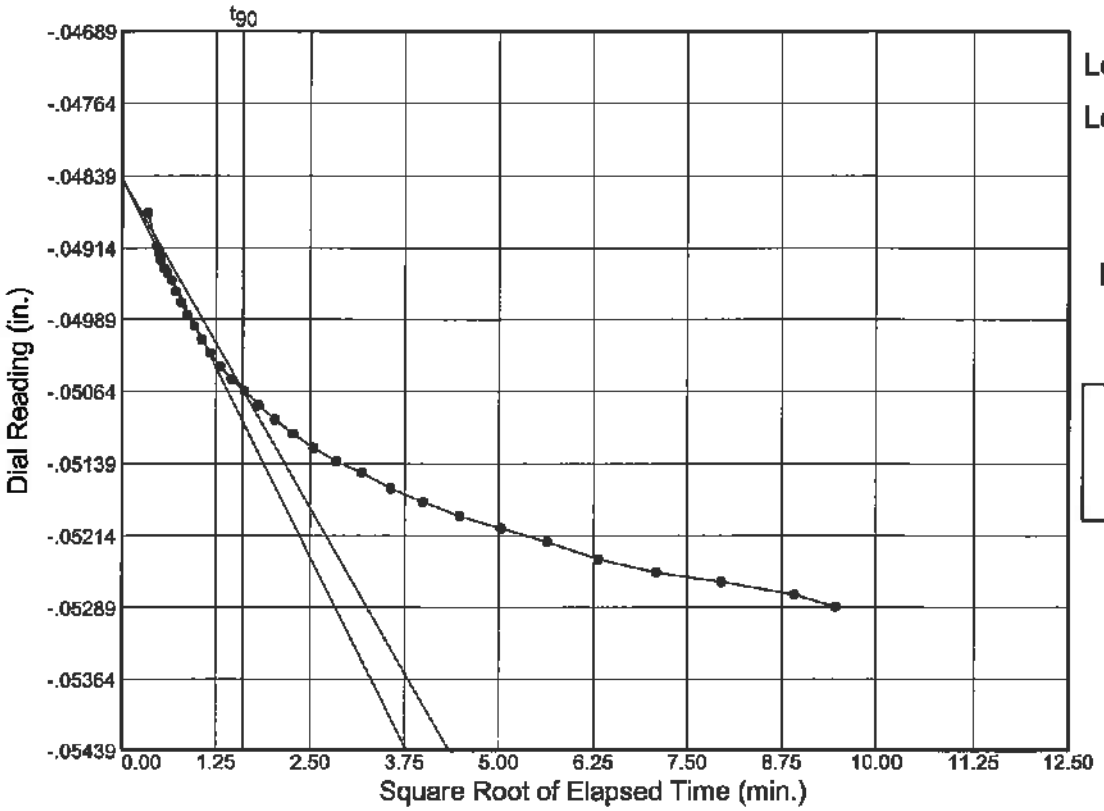
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 7
Load= 0.50 tsf
D_0 = -0.04293
D_{90} = -0.04645
D_{100} = -0.04684
T_{90} = 0.75 min.

C_v @ T_{90}
2.61 ft.^{2}/day



Load No.= 8
Load= 0.25 tsf
D_0 = -0.04842
D_{90} = -0.05062
D_{100} = -0.05087
T_{90} = 2.57 min.

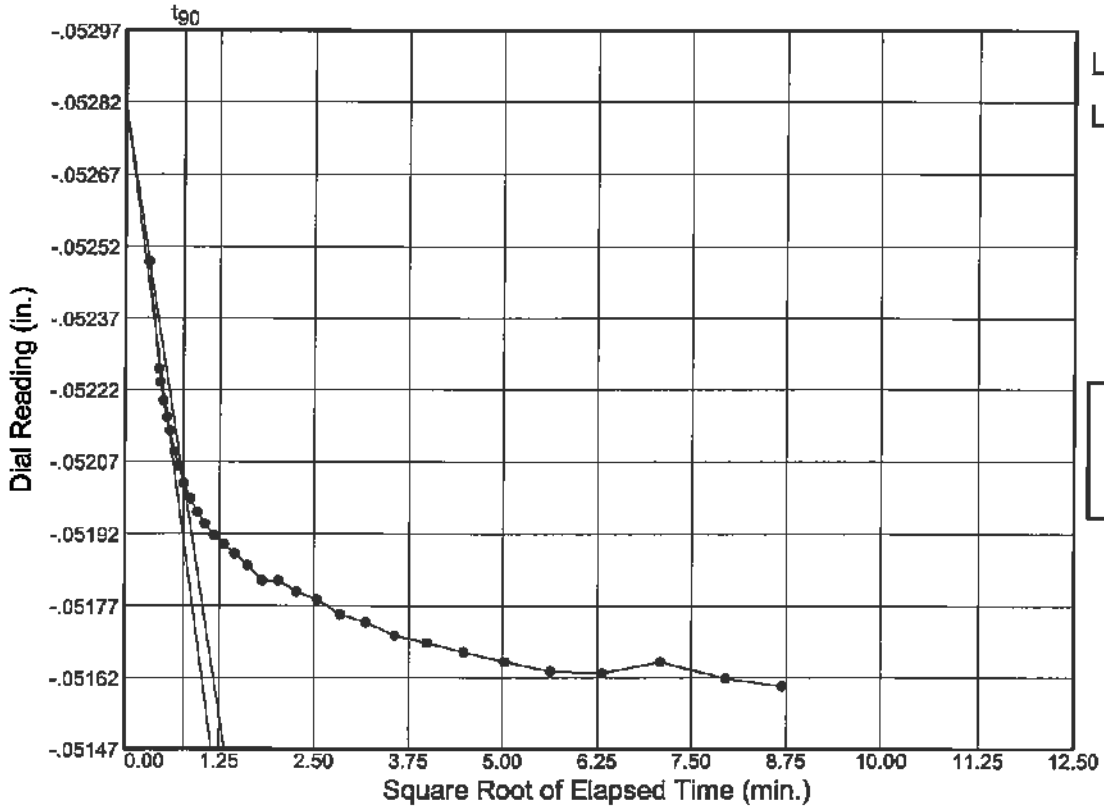
C_v @ T_{90}
0.77 ft.^{2}/day

Plate

Dial Reading vs. Time

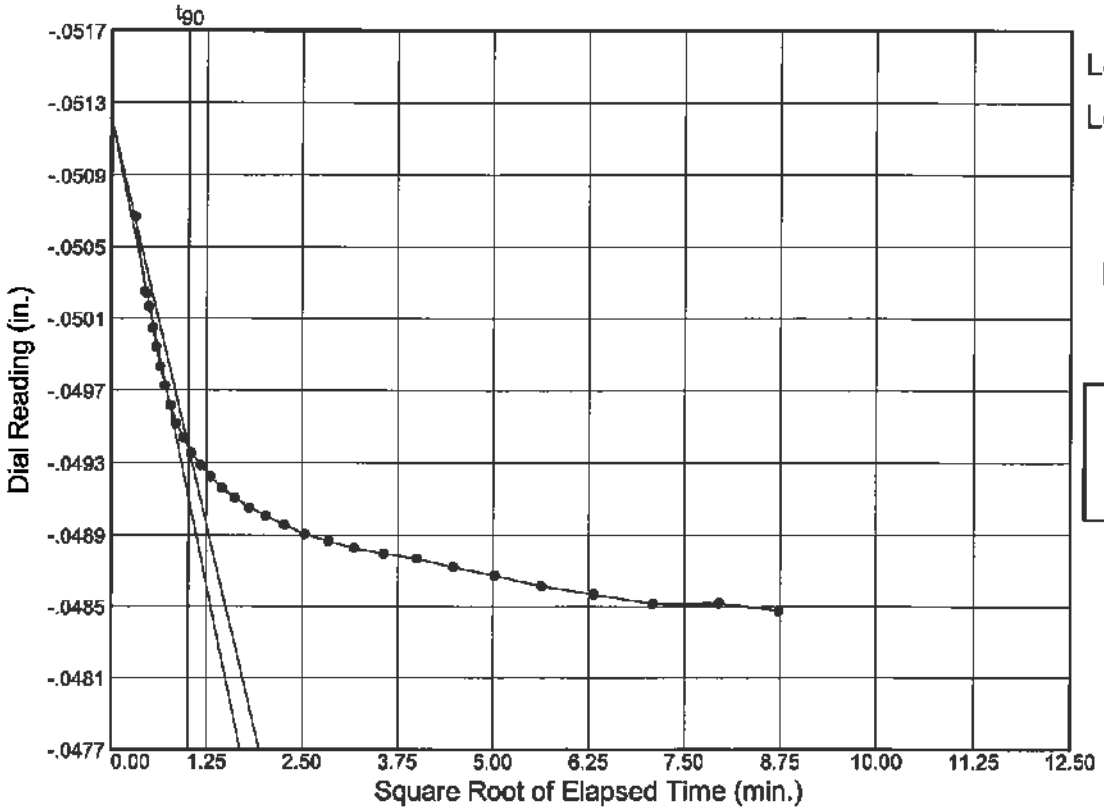
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 9
Load= 0.50 tsf
D_0 = -0.05281
D_{90} = -0.05202
D_{100} = -0.05194
T_{90} = 0.60 min.

C_v @ T_{90}
3.32 ft.^{2}/day



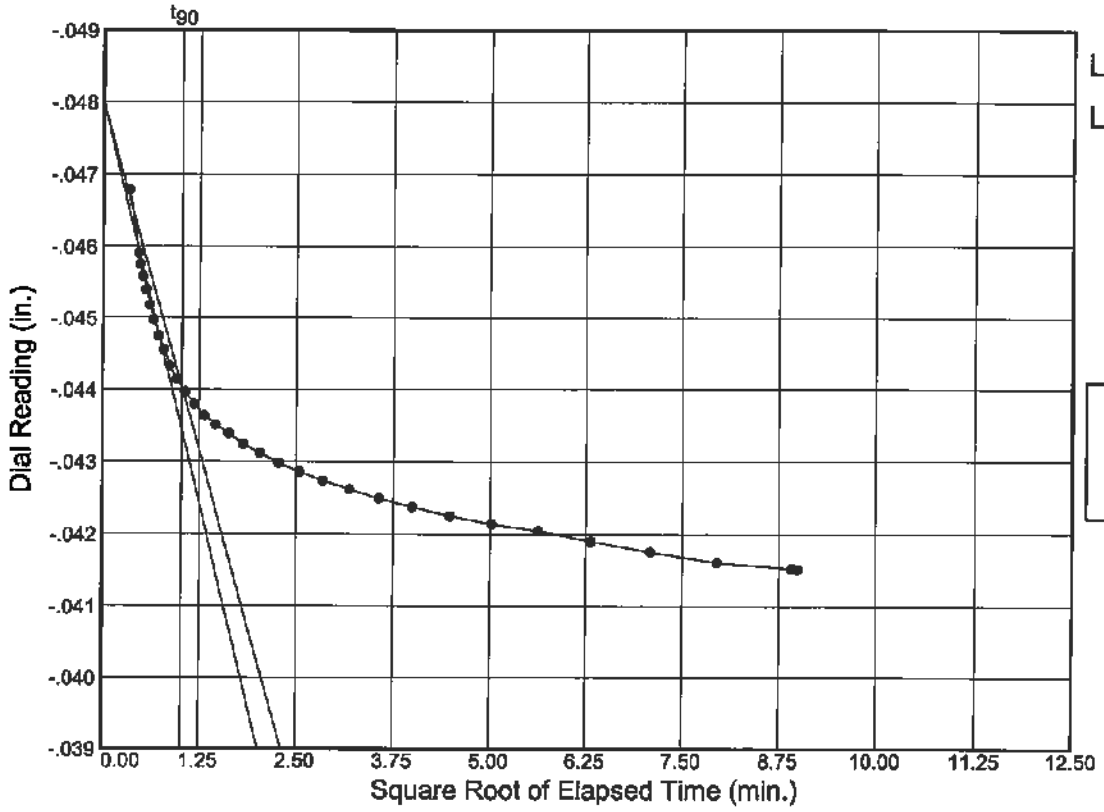
Load No.= 10
Load= 1.00 tsf
D_0 = -0.05122
D_{90} = -0.04939
D_{100} = -0.04918
T_{90} = 1.02 min.

C_v @ T_{90}
1.93 ft.^{2}/day

Dial Reading vs. Time

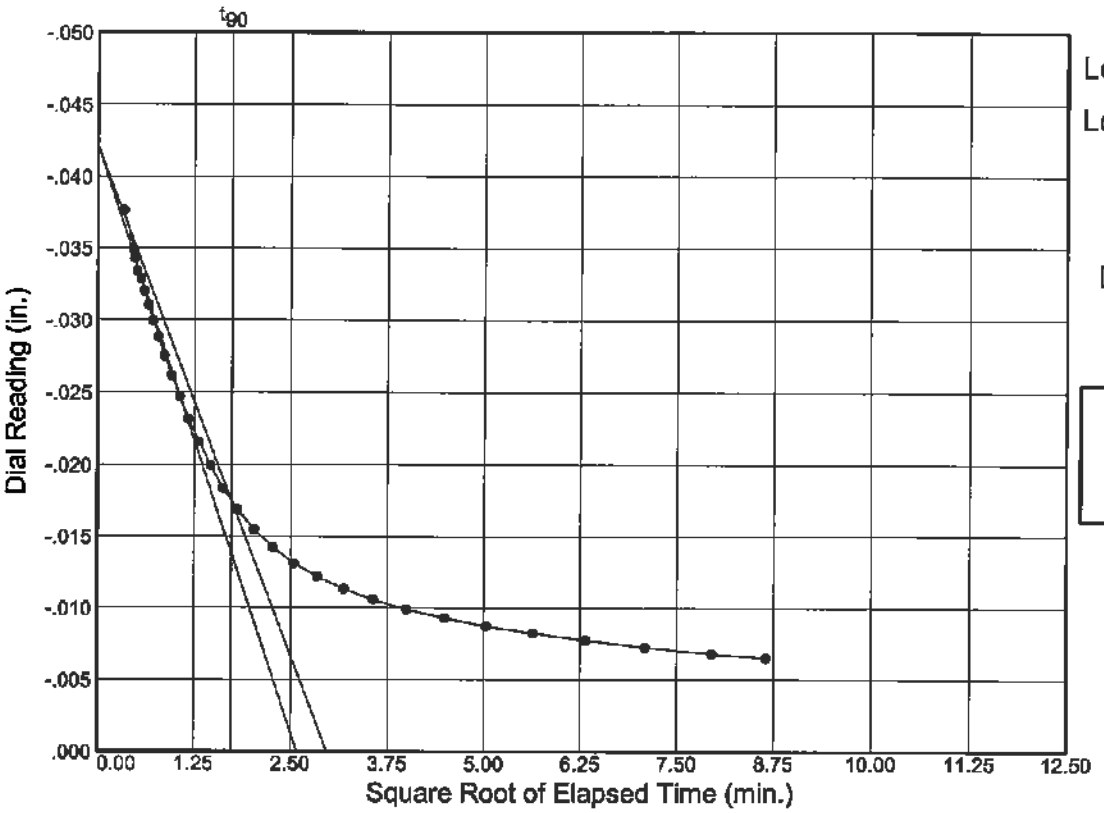
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 11
Load= 2.00 tsf
D_0 = -0.04800
D_{90} = -0.04403
D_{100} = -0.04359
T_{90} = 1.04 min.

C_v @ T_{90}
1.88 ft.^{2}/day



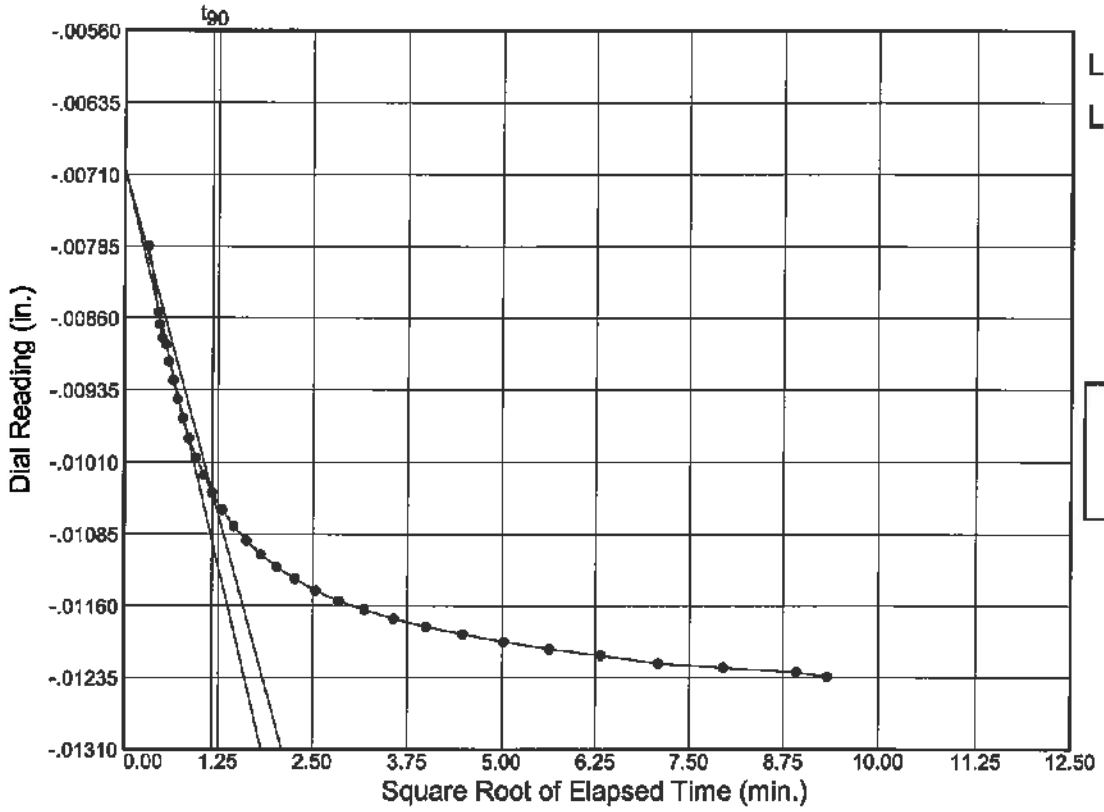
Load No.= 12
Load= 4.00 tsf
D_0 = -0.04210
D_{90} = -0.01752
D_{100} = -0.01479
T_{90} = 3.00 min.

C_v @ T_{90}
0.62 ft.^{2}/day

Dial Reading vs. Time

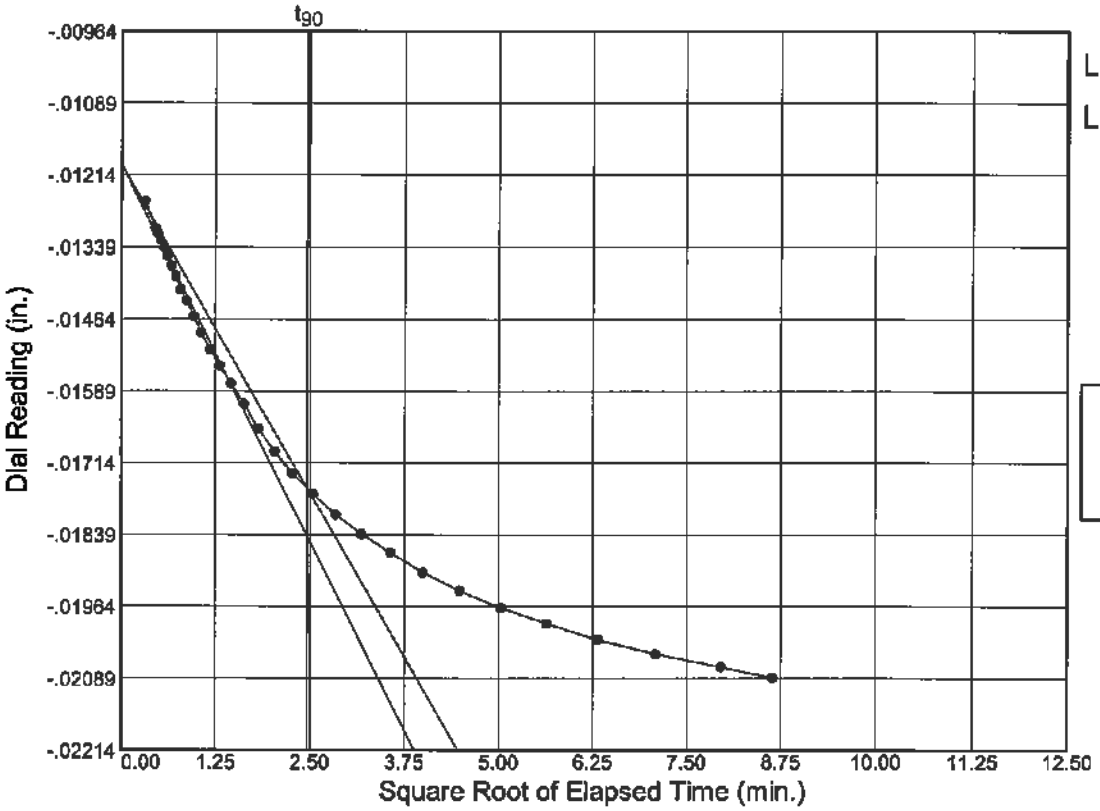
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 13
Load= 1.00 tsf
D_0 = -0.00704
D_{90} = -0.01042
D_{100} = -0.01079
T_{90} = 1.36 min.

C_v @ T_{90}
1.32 ft.^{2}/day



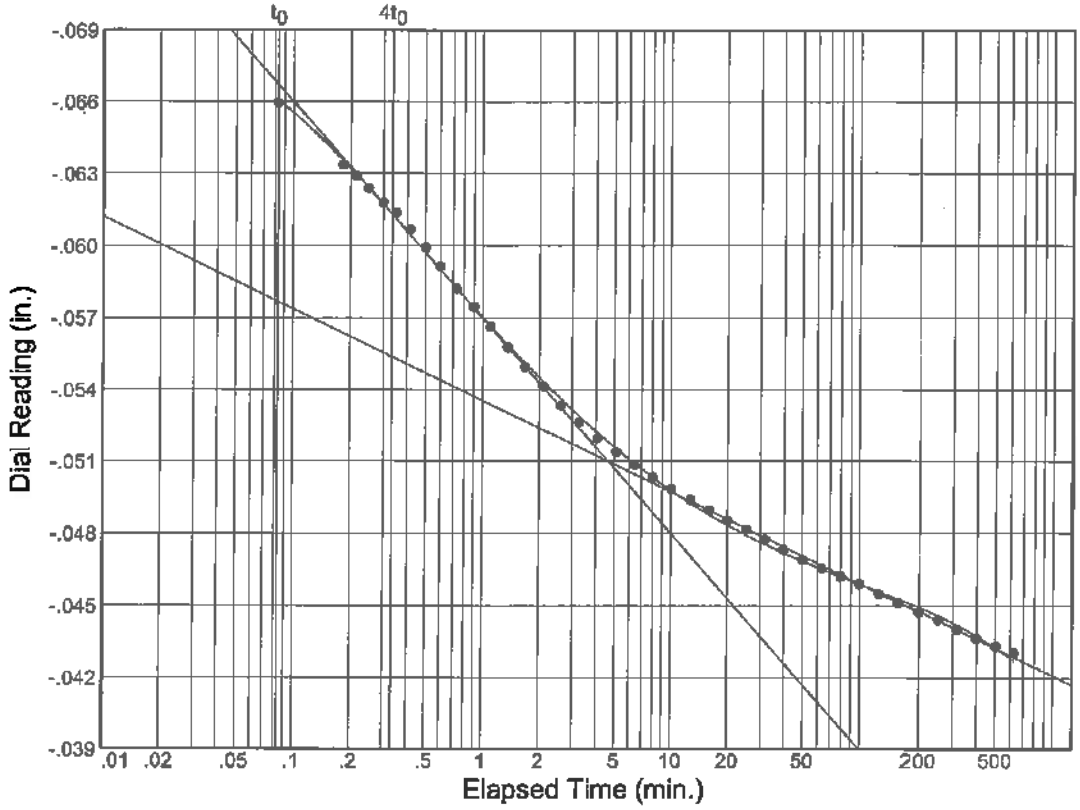
Load No.= 14
Load= 0.25 tsf
D_0 = -0.01196
D_{90} = -0.01759
D_{100} = -0.01821
T_{90} = 6.09 min.

C_v @ T_{90}
0.30 ft.^{2}/day

Dial Reading vs. Time

Project No.: 3520G
Project: Wekiva Parkway 7A

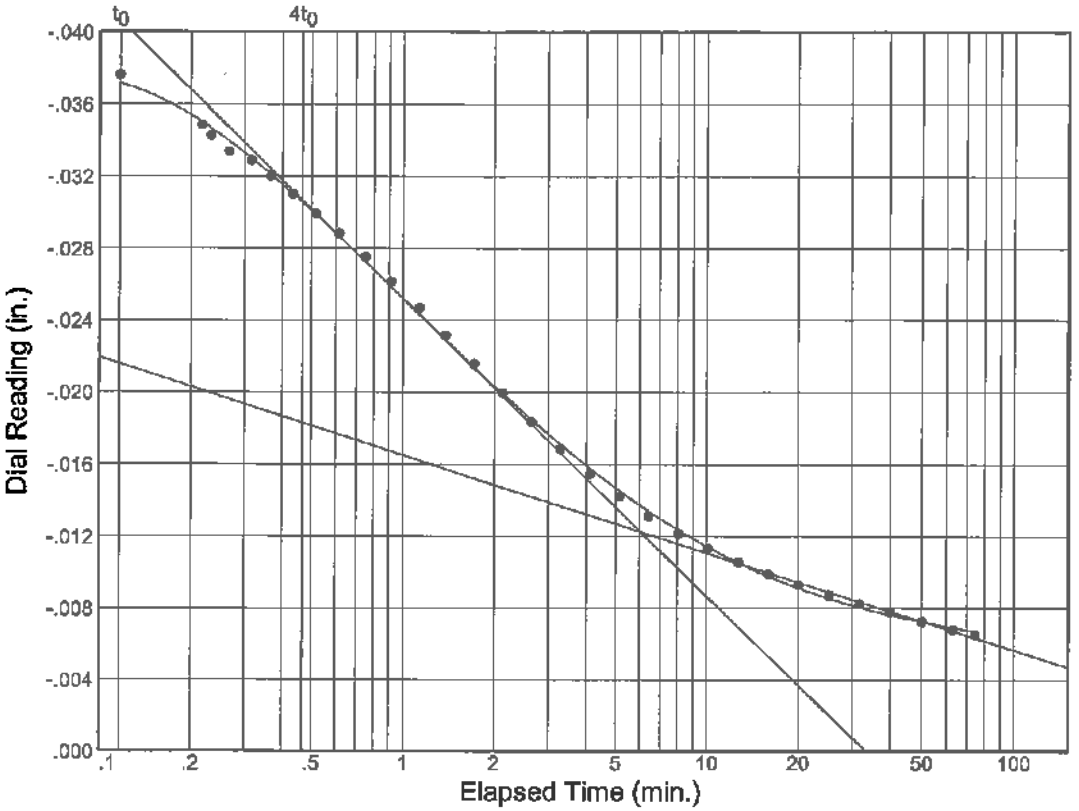
Location: BR-24 20.5'-22.5'



Load No.= 6
Load= 2.00 tsf
D_0 = -0.07084
D_{50} = -0.06092
D_{100} = -0.05100
T_{50} = 0.37 min.

C_v @ T_{50}
1.27 ft.^{2}/day

C_α = 0.004



Load No.= 12
Load= 4.00 tsf
D_0 = -0.04375
D_{50} = -0.02801
D_{100} = -0.01227
T_{50} = 0.67 min.

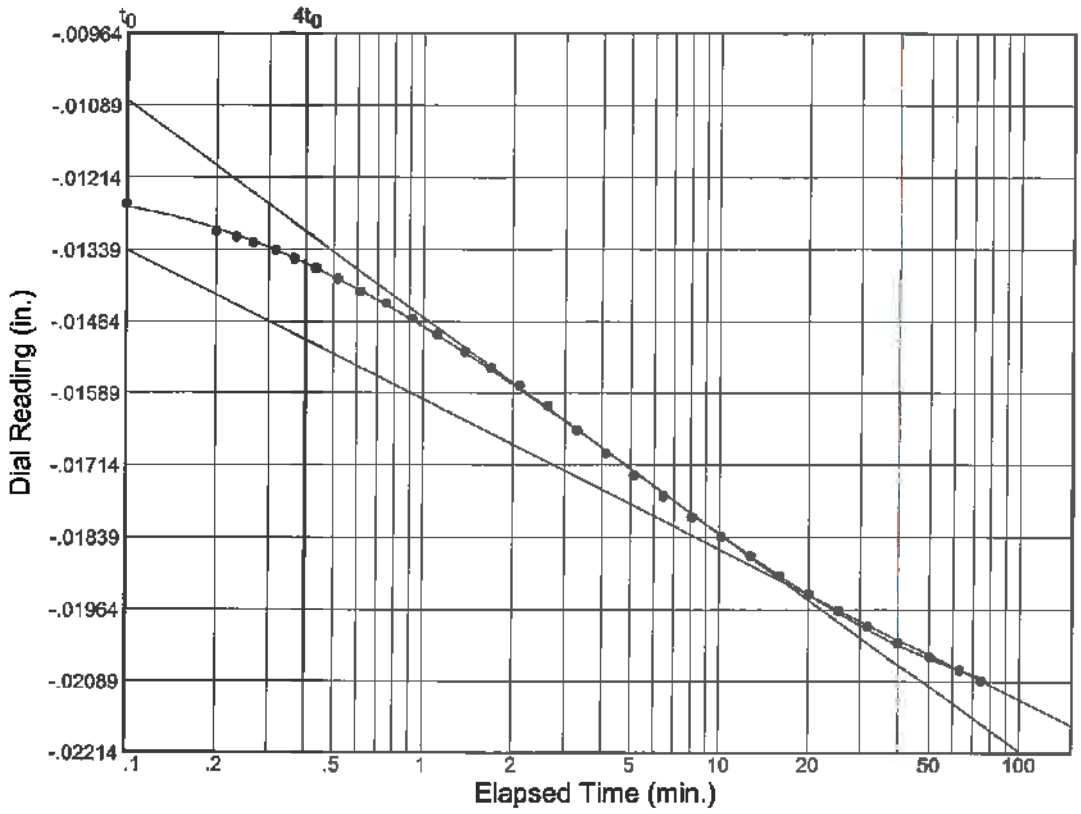
C_v @ T_{50}
0.65 ft.^{2}/day

C_α = 0.006

Dial Reading vs. Time

Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-24 20.5'-22.5'



Load No.= 14

Load= 0.25 tsf

D_0 = -0.01166

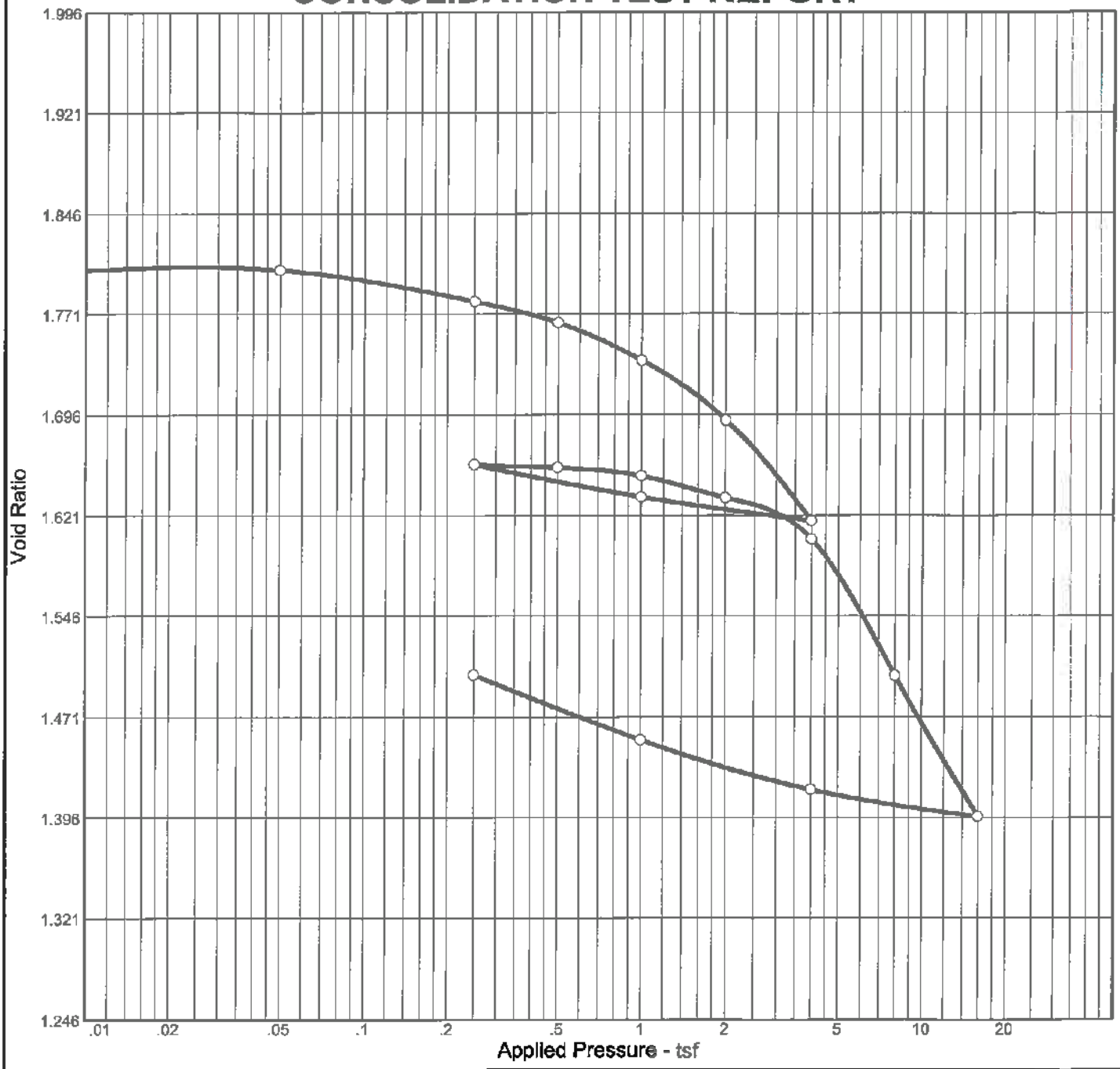
D_{50} = -0.01543

D_{100} = -0.01919

T_{50} = 1.63 min.

C_v @ T_{50}
0.26 ft.^{2}/day

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
95.3 %	65.6 %	58.3	56	31	2.62	1.60	2.09	0.37	0.06			1.804

MATERIAL DESCRIPTION	USCS	AASHTO
Gray Sandy Fat Clay	(CH)	

Project No. 3520G **Client:**

Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'

Remarks:

Fines Content= 56.3%

CONSOLIDATION TEST REPORT

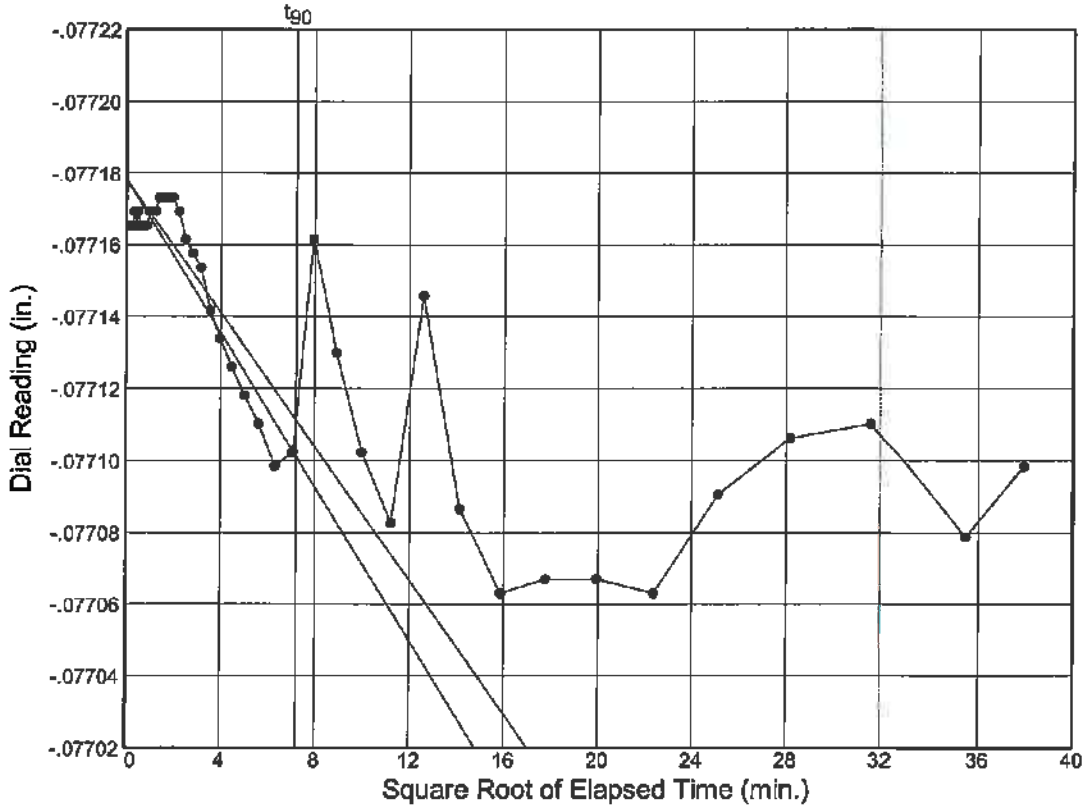
Geotechnical and Environmental Consultants, Inc.

Plate

Dial Reading vs. Time

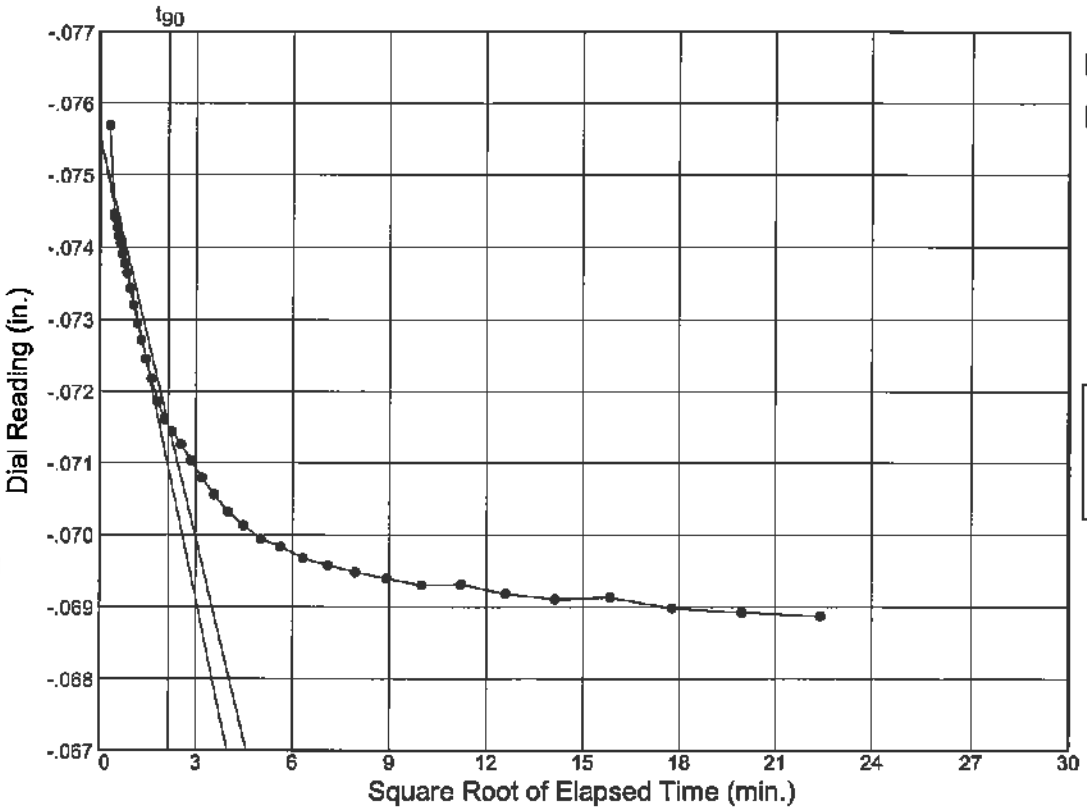
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 1
Load= 0.05 tsf
D_0 = -0.07718
D_{90} = -0.07711
D_{100} = -0.07710
T_{90} = 51.93 min.

C_v @ T_{90}
0.04 ft.^{2}/day



Load No.= 2
Load= 0.25 tsf
D_0 = -0.07554
D_{90} = -0.07152
D_{100} = -0.07108
T_{90} = 4.62 min.

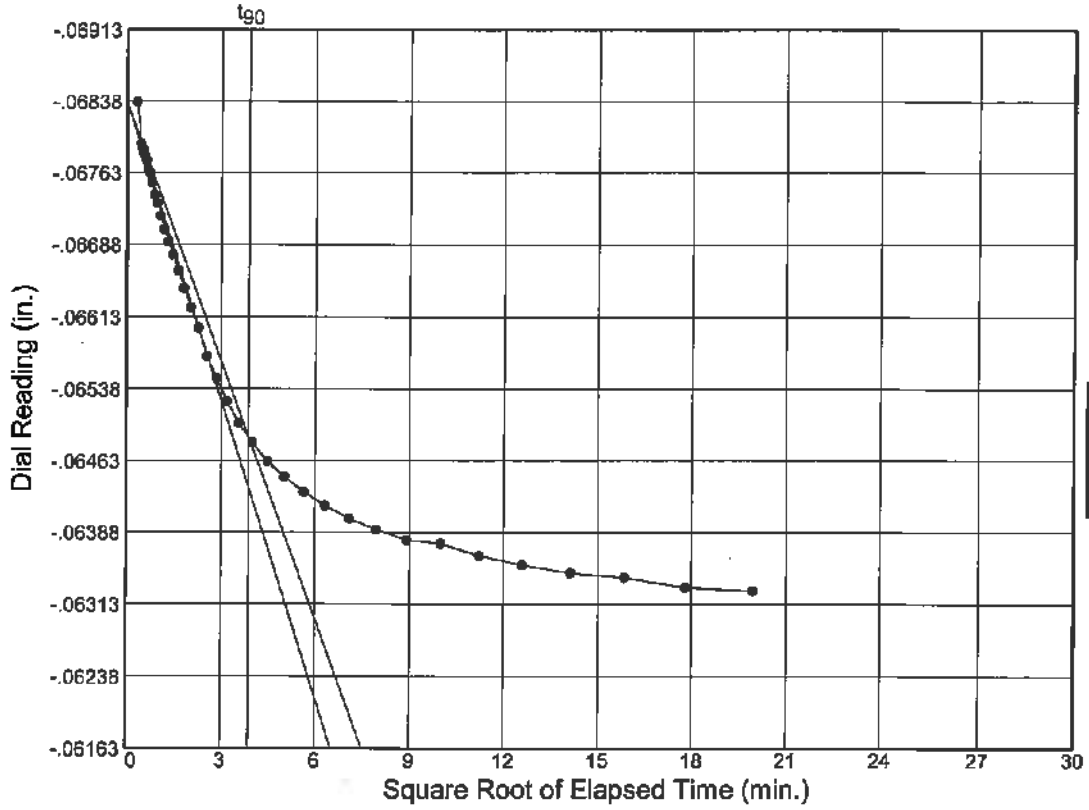
C_v @ T_{90}
0.46 ft.^{2}/day

Plate

Dial Reading vs. Time

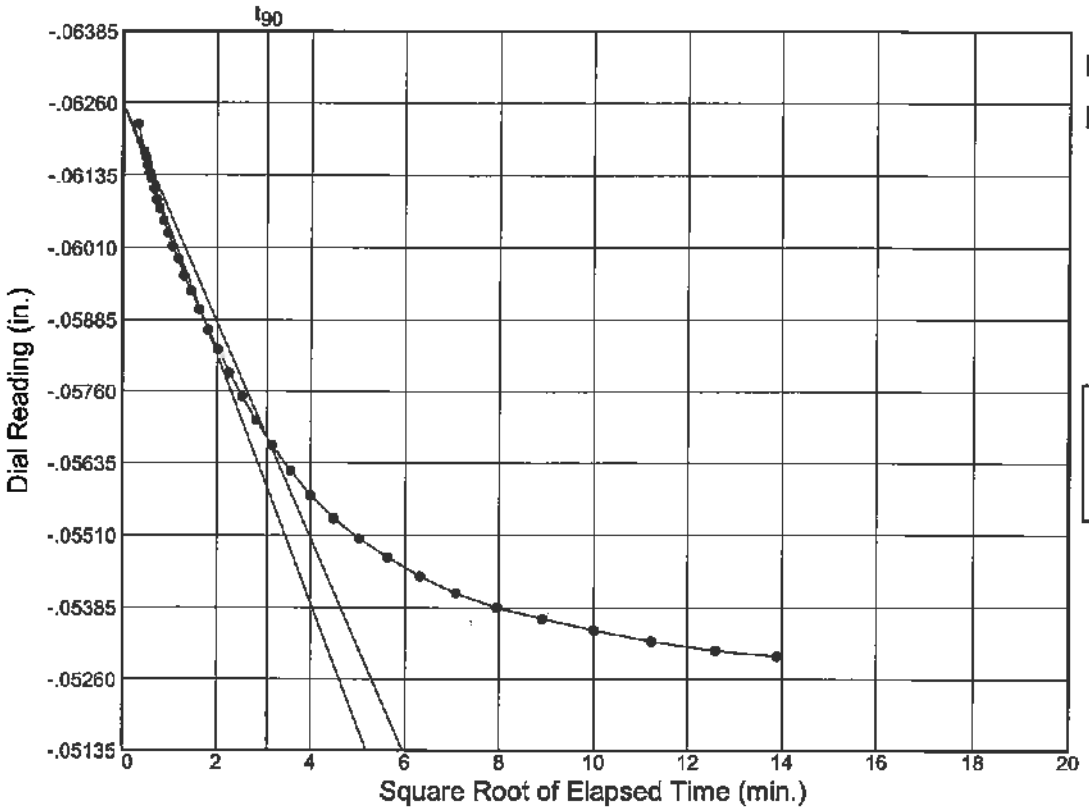
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 3
Load= 0.50 tsf
D_0 = -0.06836
D_{90} = -0.06488
D_{100} = -0.06449
T_{90} = 15.03 min.

C_v @ T_{90}
0.14 ft.^{2}/day



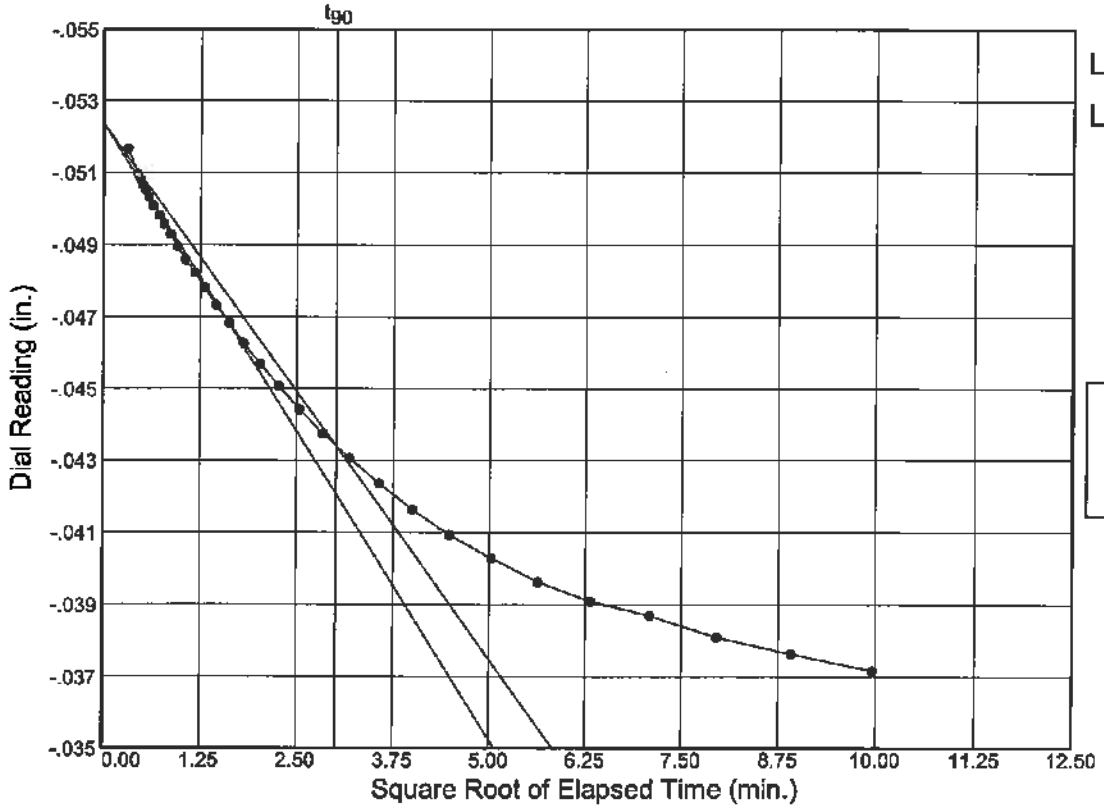
Load No.= 4
Load= 1.00 tsf
D_0 = -0.06259
D_{90} = -0.05680
D_{100} = -0.05615
T_{90} = 9.40 min.

C_v @ T_{90}
0.22 ft.^{2}/day

Dial Reading vs. Time

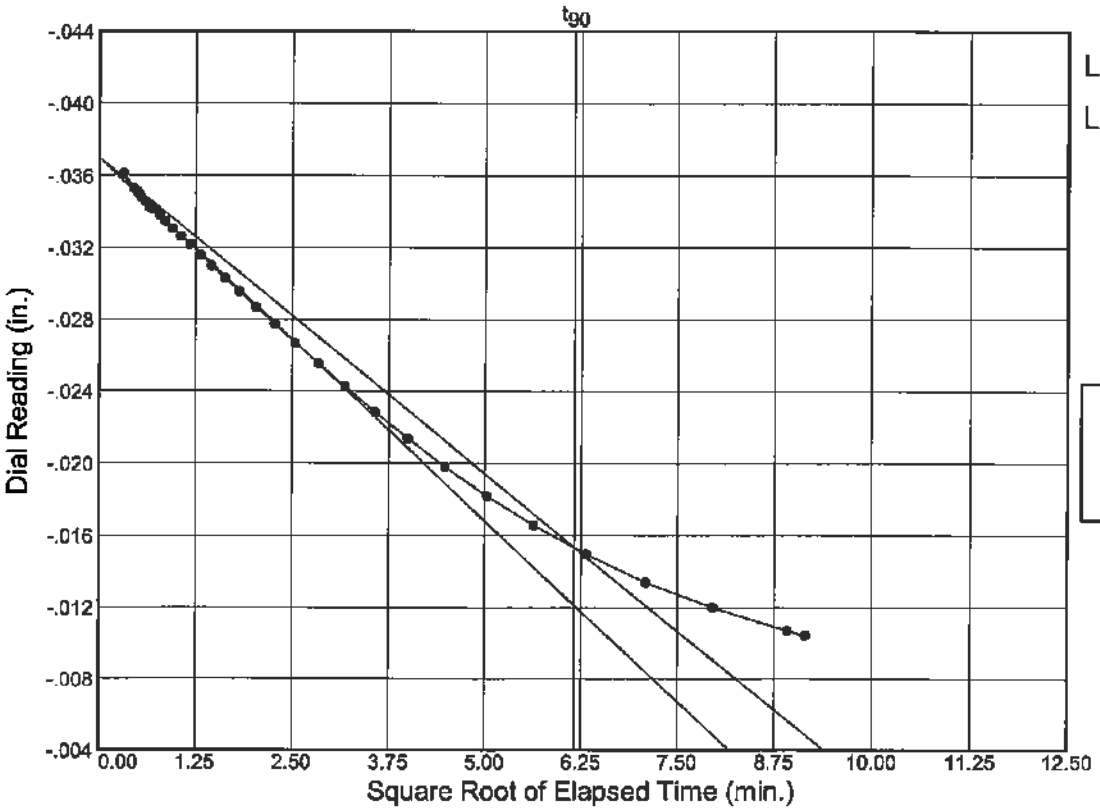
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 5
Load= 2.00 tsf
D_0 = -0.05237
D_{90} = -0.04340
D_{100} = -0.04241
T_{90} = 9.06 min.

C_v @ T_{90}
0.22 ft.^{2}/day



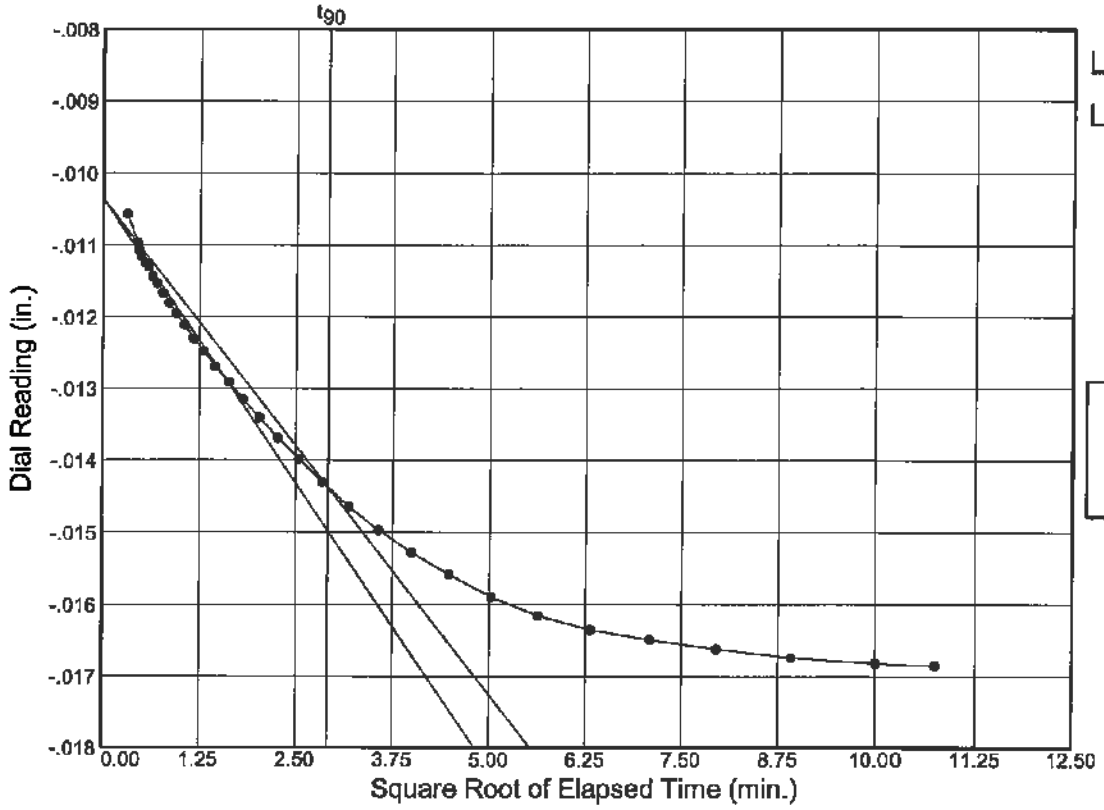
Load No.= 6
Load= 4.00 tsf
D_0 = -0.03698
D_{90} = -0.01535
D_{100} = -0.01295
T_{90} = 37.94 min.

C_v @ T_{90}
0.05 ft.^{2}/day

Dial Reading vs. Time

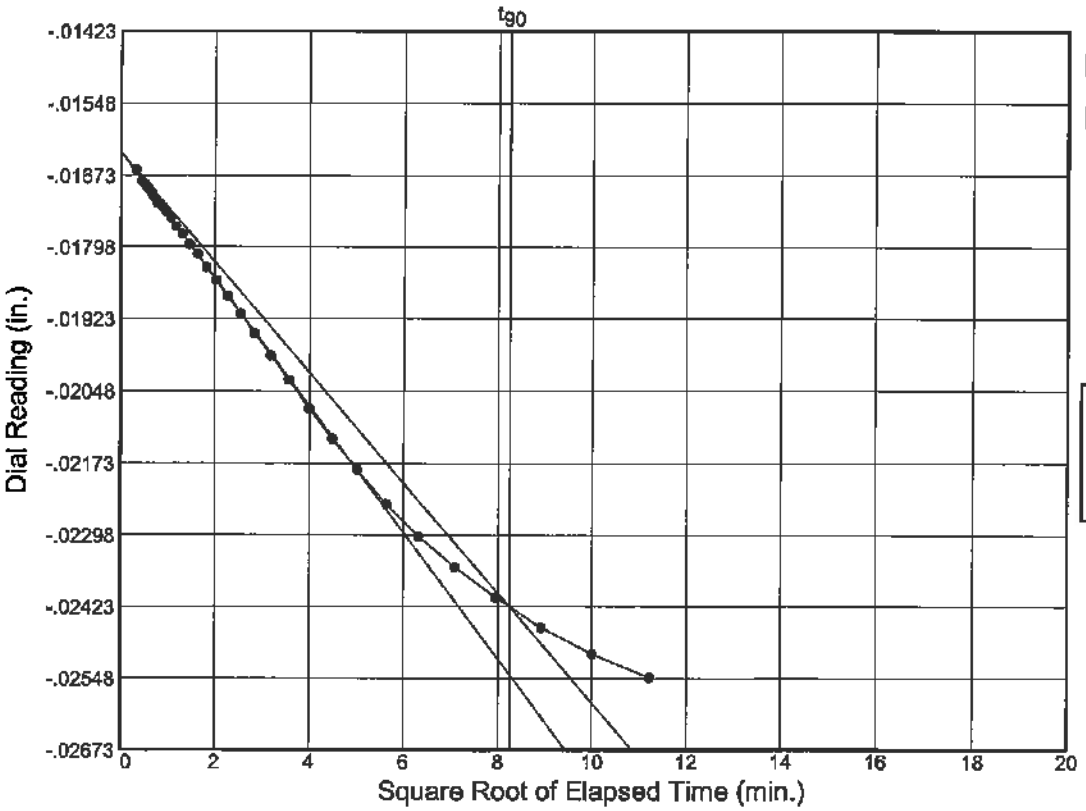
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 7
Load= 1.00 tsf
D_0 = -0.01035
D_{90} = -0.01438
D_{100} = -0.01483
T_{90} = 8.49 min.

C_v @ T_{90}
0.22 ft.^{2}/day



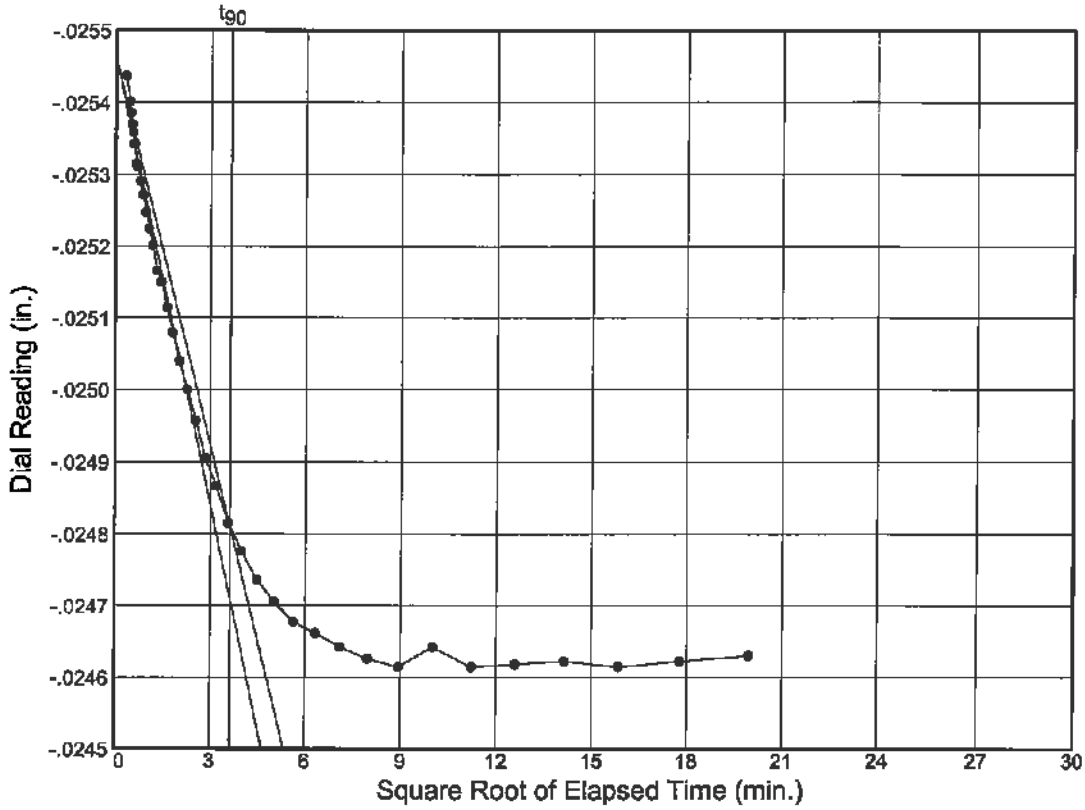
Load No.= 8
Load= 0.25 tsf
D_0 = -0.01633
D_{90} = -0.02423
D_{100} = -0.02511
T_{90} = 67.88 min.

C_v @ T_{90}
0.03 ft.^{2}/day

Dial Reading vs. Time

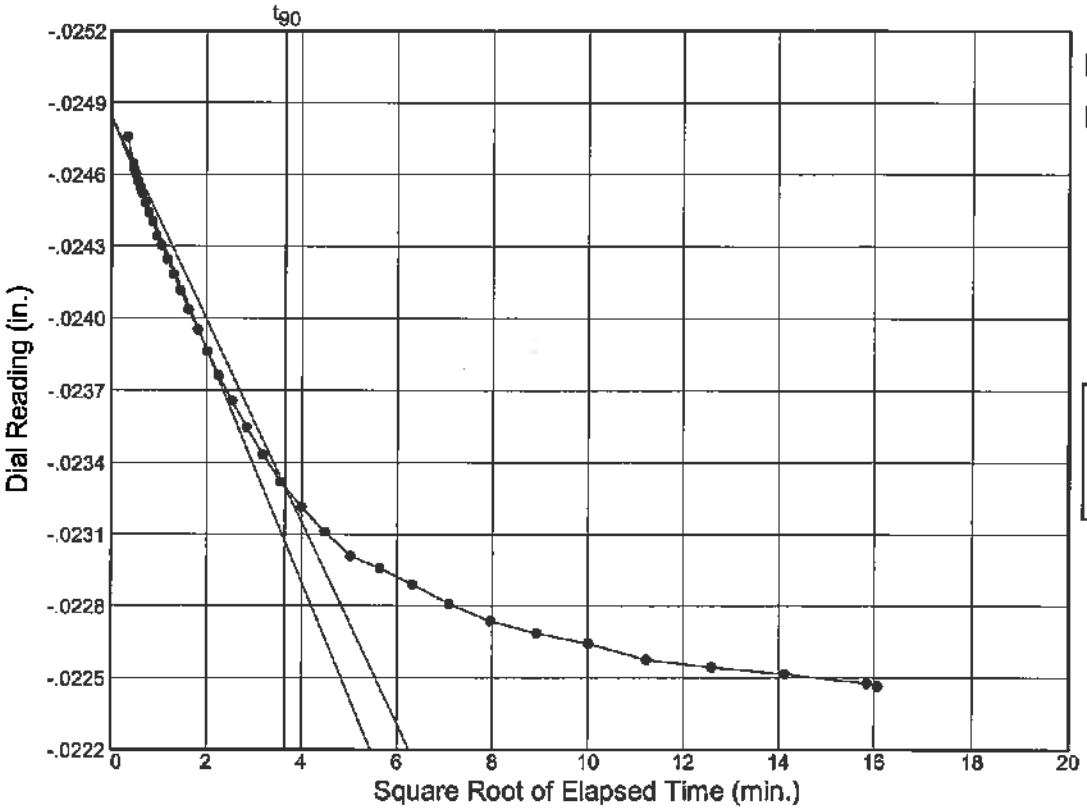
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 9
Load= 0.50 tsf
D_0 = -0.02546
D_{90} = -0.02481
D_{100} = -0.02474
T_{90} = 13.19 min.

C_v @ T_{90}
0.14 ft.^{2}/day



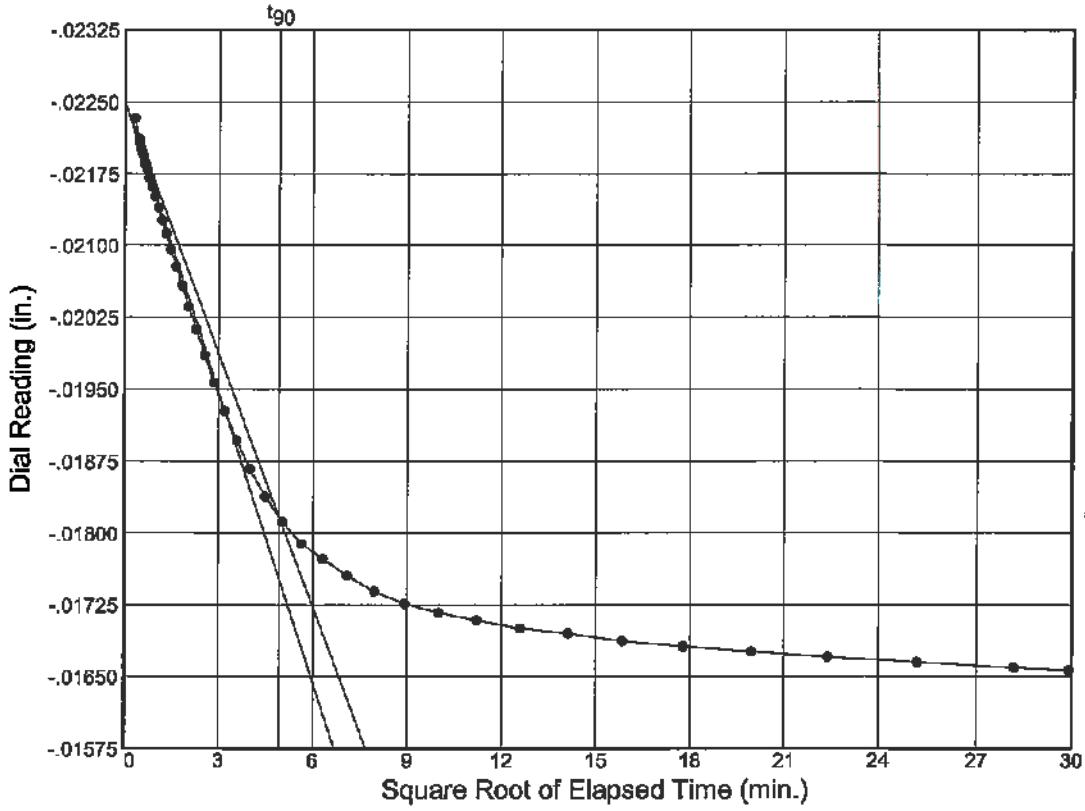
Load No.= 10
Load= 1.00 tsf
D_0 = -0.02484
D_{90} = -0.02330
D_{100} = -0.02313
T_{90} = 13.35 min.

C_v @ T_{90}
0.14 ft.^{2}/day

Dial Reading vs. Time

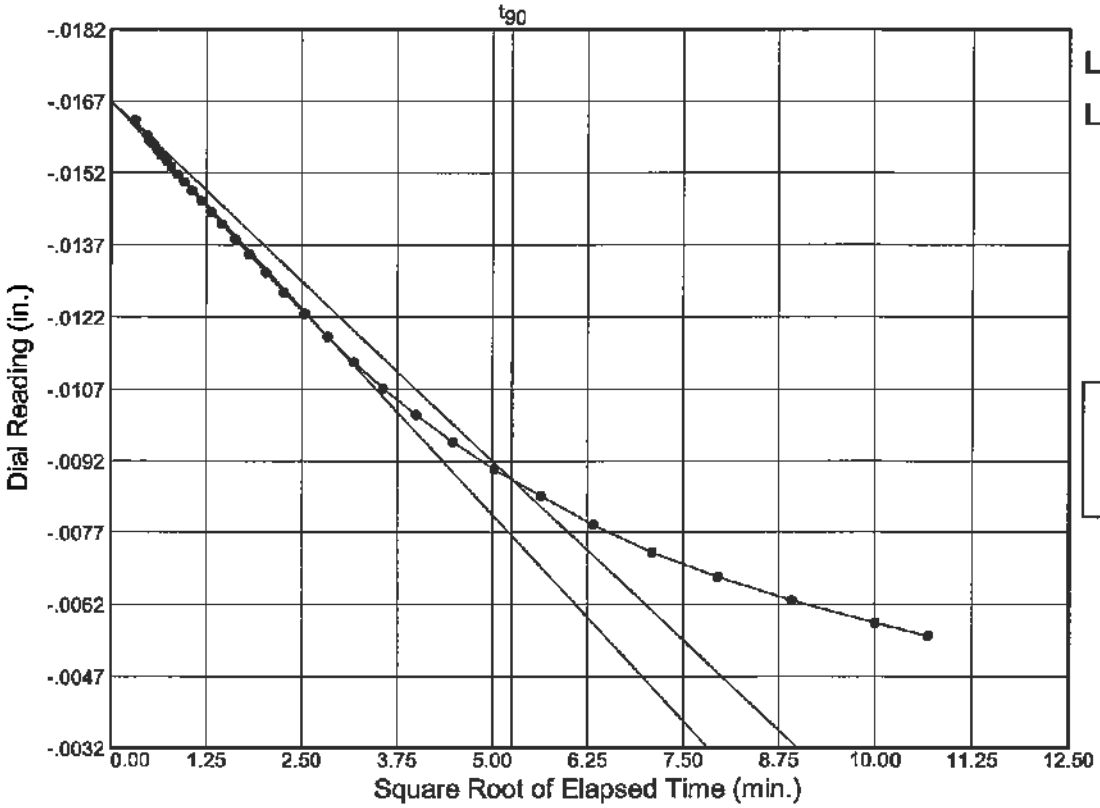
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 11
Load= 2.00 tsf
D_0 = -0.02249
D_{90} = -0.01817
D_{100} = -0.01769
T_{90} = 24.24 min.

C_v @ T_{90}
0.08 ft.^{2}/day



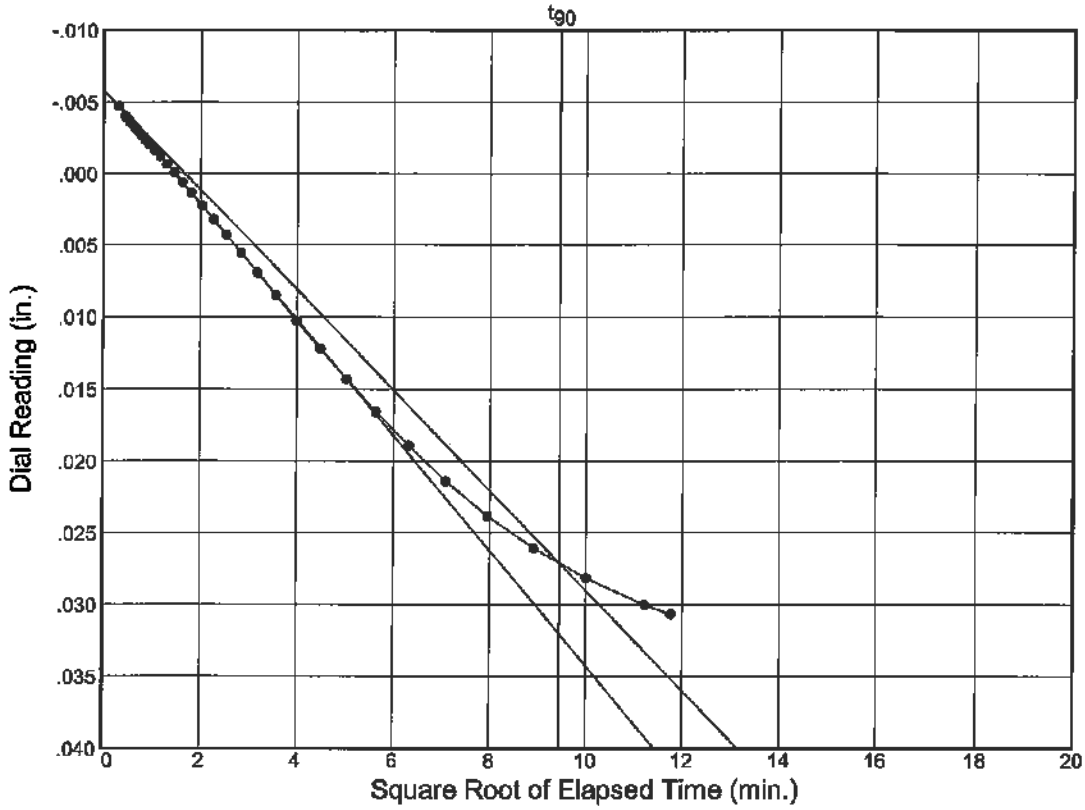
Load No.= 12
Load= 4.00 tsf
D_0 = -0.01670
D_{90} = -0.00881
D_{100} = -0.00794
T_{90} = 27.59 min.

C_v @ T_{90}
0.07 ft.^{2}/day

Dial Reading vs. Time

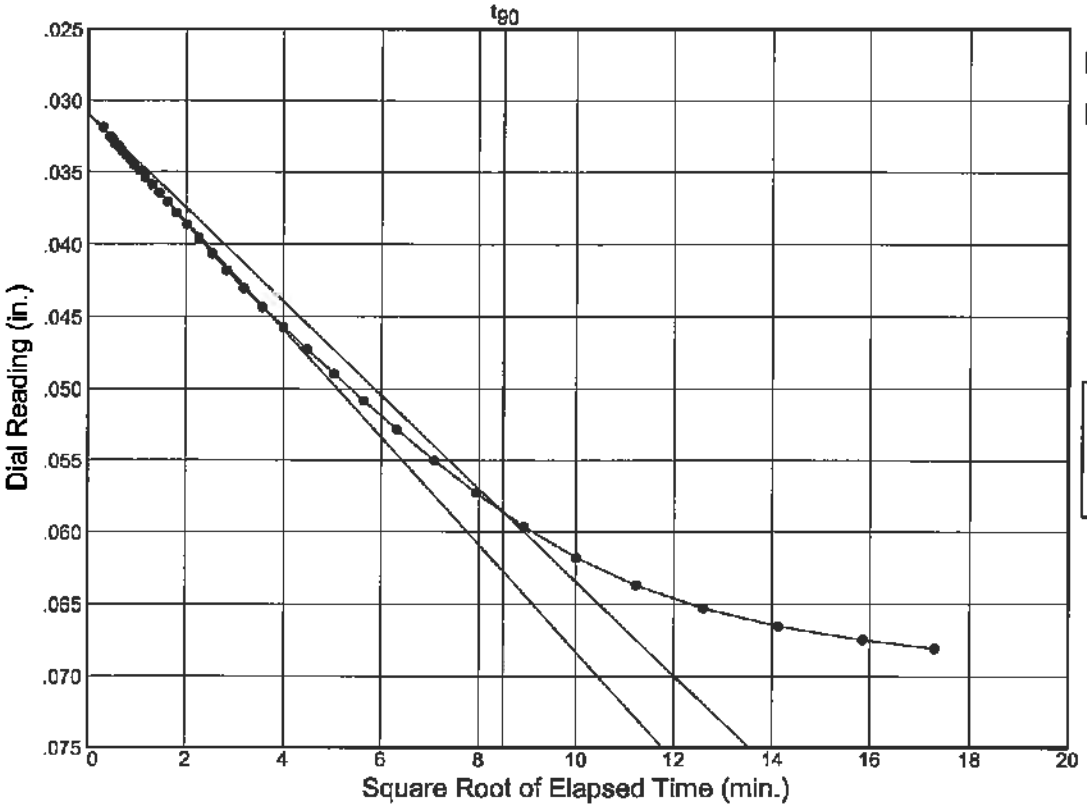
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 13
Load= 8.00 tsf
D_0 = -0.00584
D_{90} = 0.02711
D_{100} = 0.03077
T_{90} = 89.24 min.

C_v @ T_{90}
0.02 ft.^{2}/day



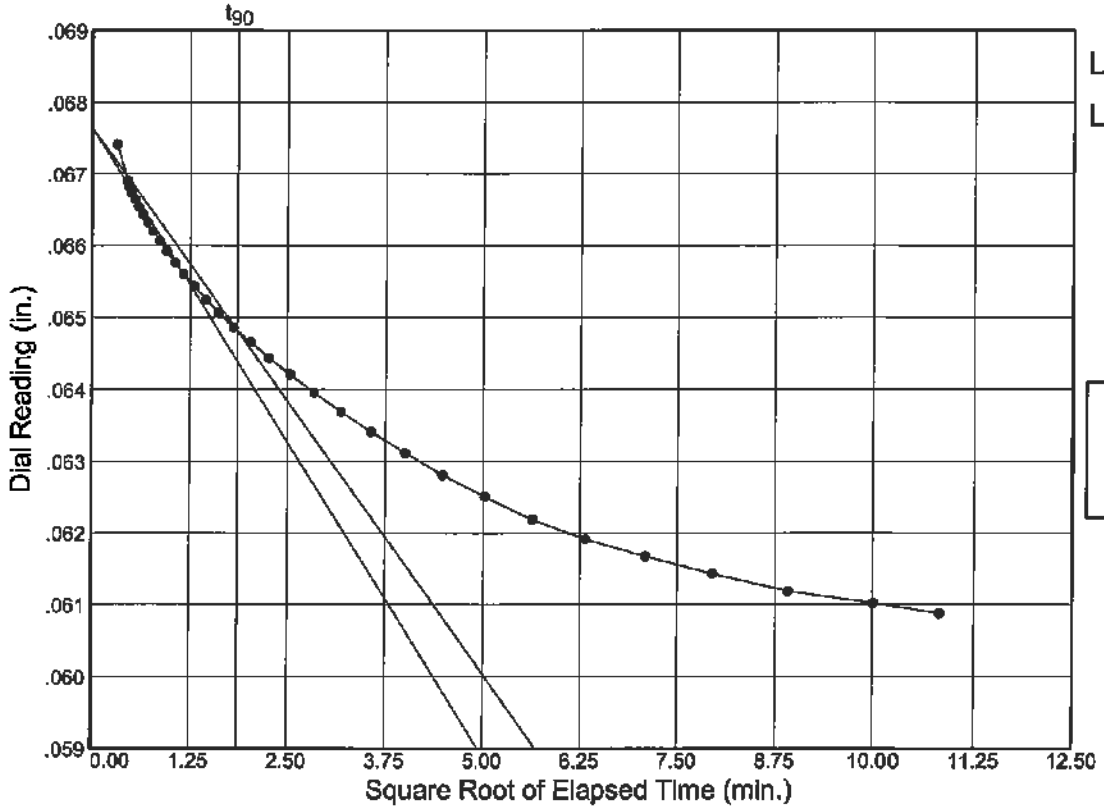
Load No.= 14
Load= 16.00 tsf
D_0 = 0.03095
D_{90} = 0.05861
D_{100} = 0.06169
T_{90} = 72.27 min.

C_v @ T_{90}
0.02 ft.^{2}/day

Dial Reading vs. Time

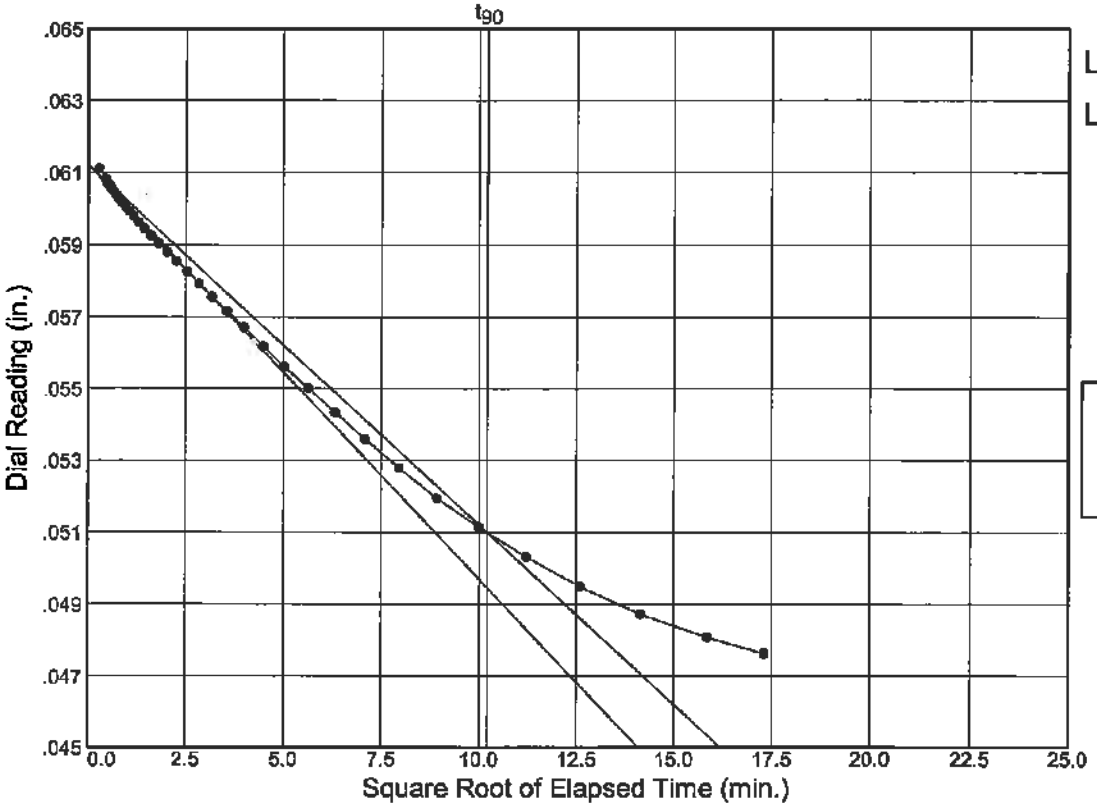
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 15
Load= 4.00 tsf
D_0 = 0.06764
D_{90} = 0.06481
D_{100} = 0.06449
T_{90} = 3.47 min.

C_v @ T_{90}
0.45 ft.^{2}/day



Load No.= 16
Load= 1.00 tsf
D_0 = 0.06121
D_{90} = 0.05099
D_{100} = 0.04985
T_{90} = 104.37 min.

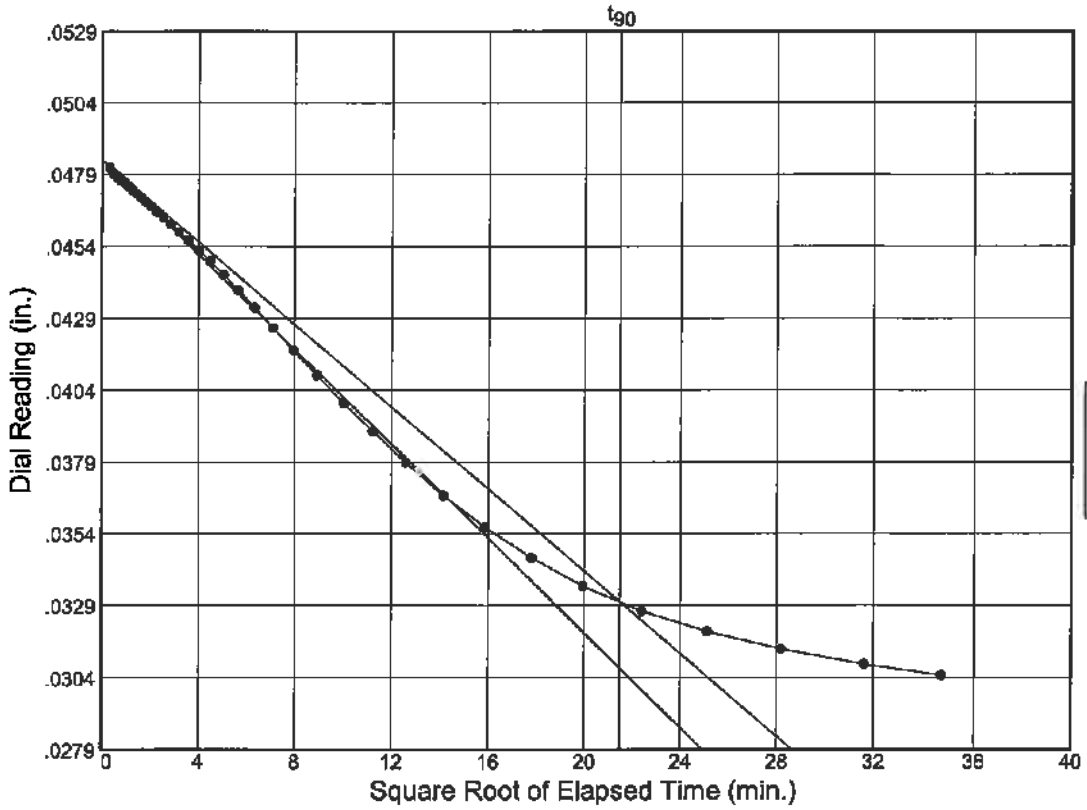
C_v @ T_{90}
0.02 ft.^{2}/day

Plate

Dial Reading vs. Time

Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-30B 38'-40'



Load No.= 17

Load= 0.25 tsf

D_0 = 0.04840

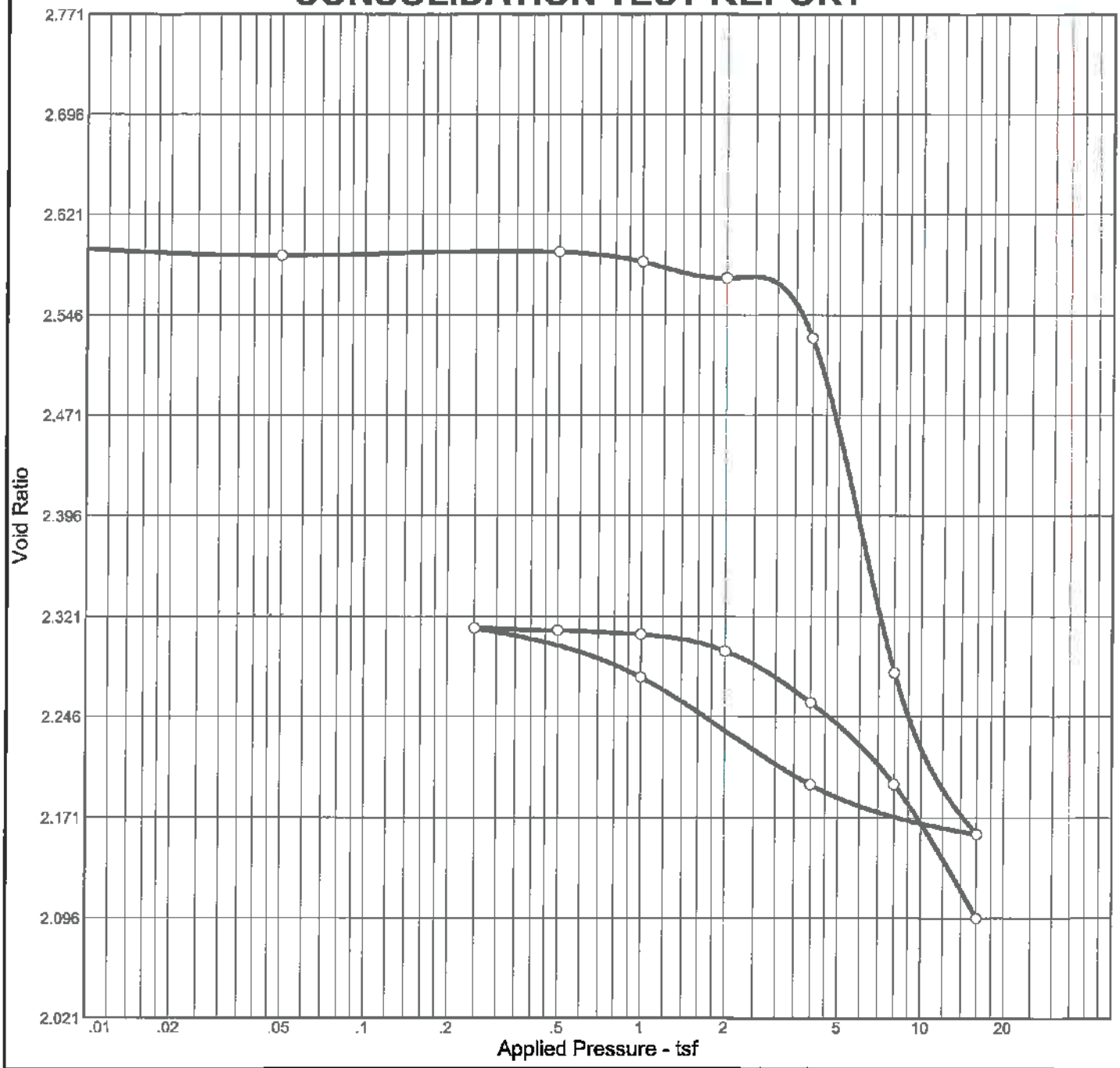
D_{90} = 0.03303

D_{100} = 0.03132

T_{90} = 461.10 min.

C_v @ T_{90}
0.00 $ft.^2/day$

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
97.8 %	98.0 %	44.8	74	40	2.59	1.35	3.85	0.89	0.11			2.595

MATERIAL DESCRIPTION	USCS	AASHTO
Gray Fat Clay	(CH)	

Project No. 3520G **Client:**

Project: Wekiva Parkway 7A

Location: BR-32 43'-45'

Remarks:

Fines Content= 98%

CONSOLIDATION TEST REPORT

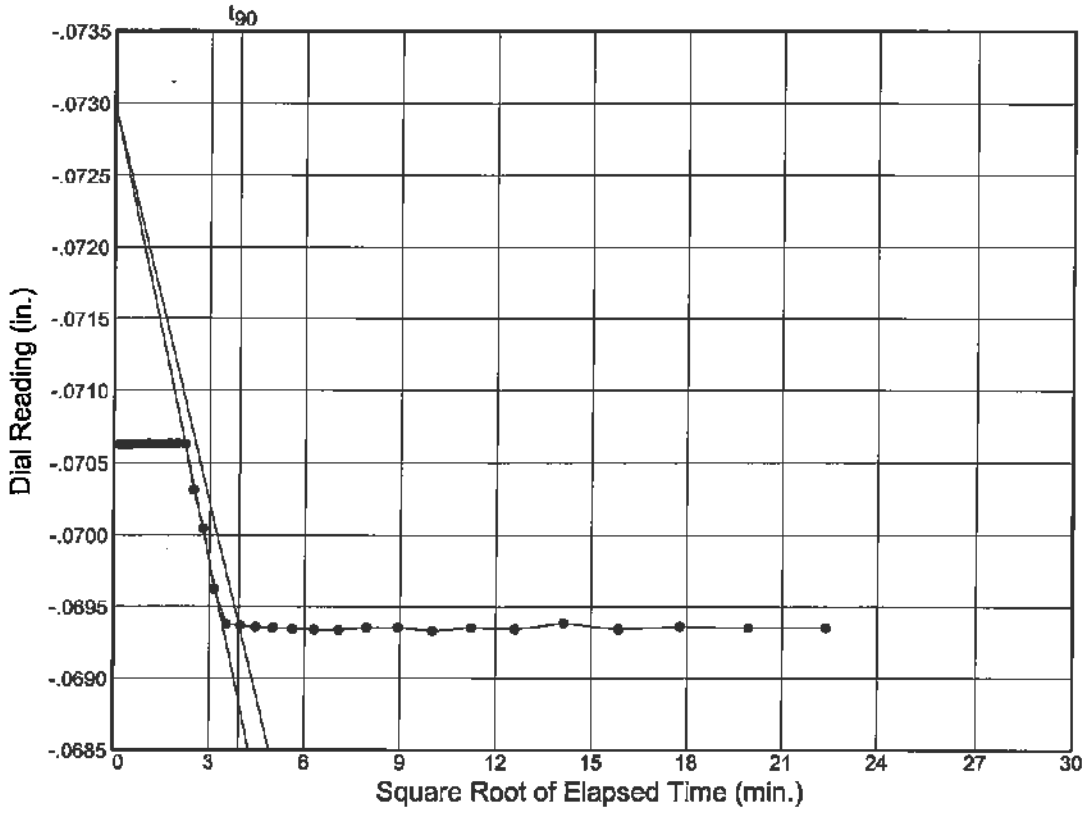
Geotechnical and Environmental Consultants, Inc.

Plate

Dial Reading vs. Time

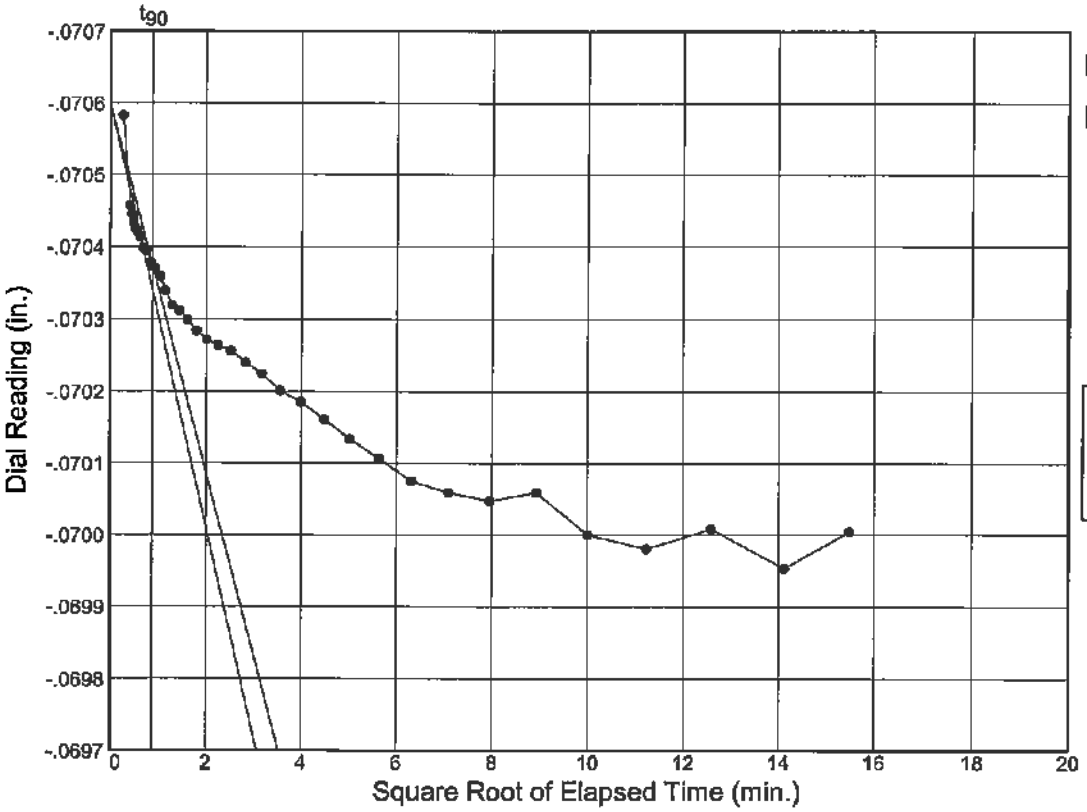
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 1
Load= 0.05 tsf
D_0 = -0.07298
D_{90} = -0.06937
D_{100} = -0.06897
T_{90} = 15.50 min.

C_v @ T_{90}
0.14 ft.^{2}/day



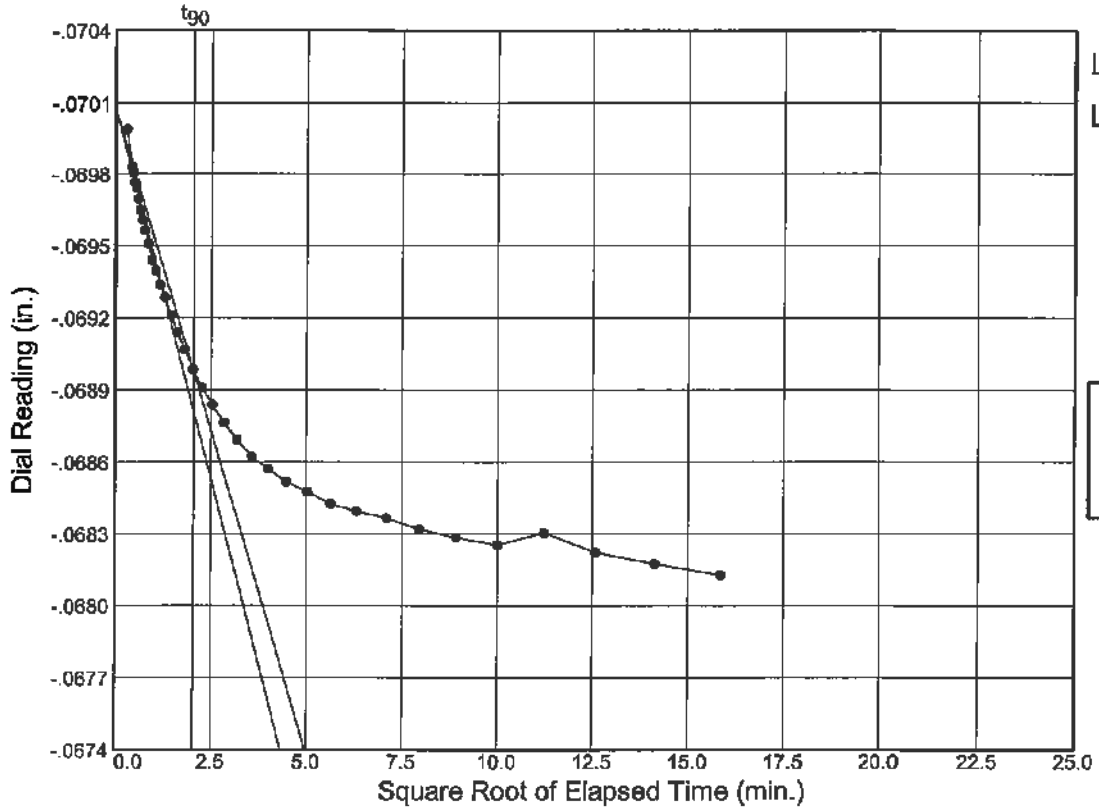
Load No.= 2
Load= 0.50 tsf
D_0 = -0.07060
D_{90} = -0.07037
D_{100} = -0.07035
T_{90} = 0.77 min.

C_v @ T_{90}
2.76 ft.^{2}/day

Dial Reading vs. Time

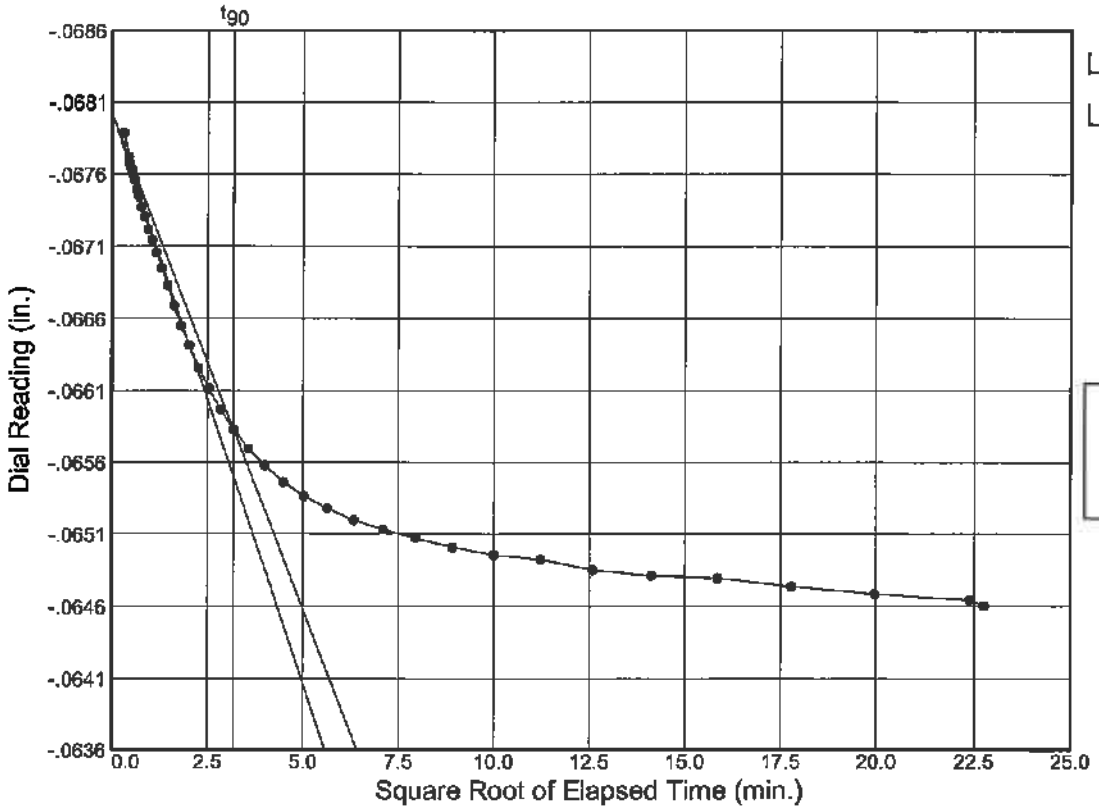
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 3
Load= 1.00 tsf
D_0 = -0.07008
D_{90} = -0.06898
D_{100} = -0.06886
T_{90} = 4.14 min.

C_v @ T_{90}
0.51 ft.^{2}/day



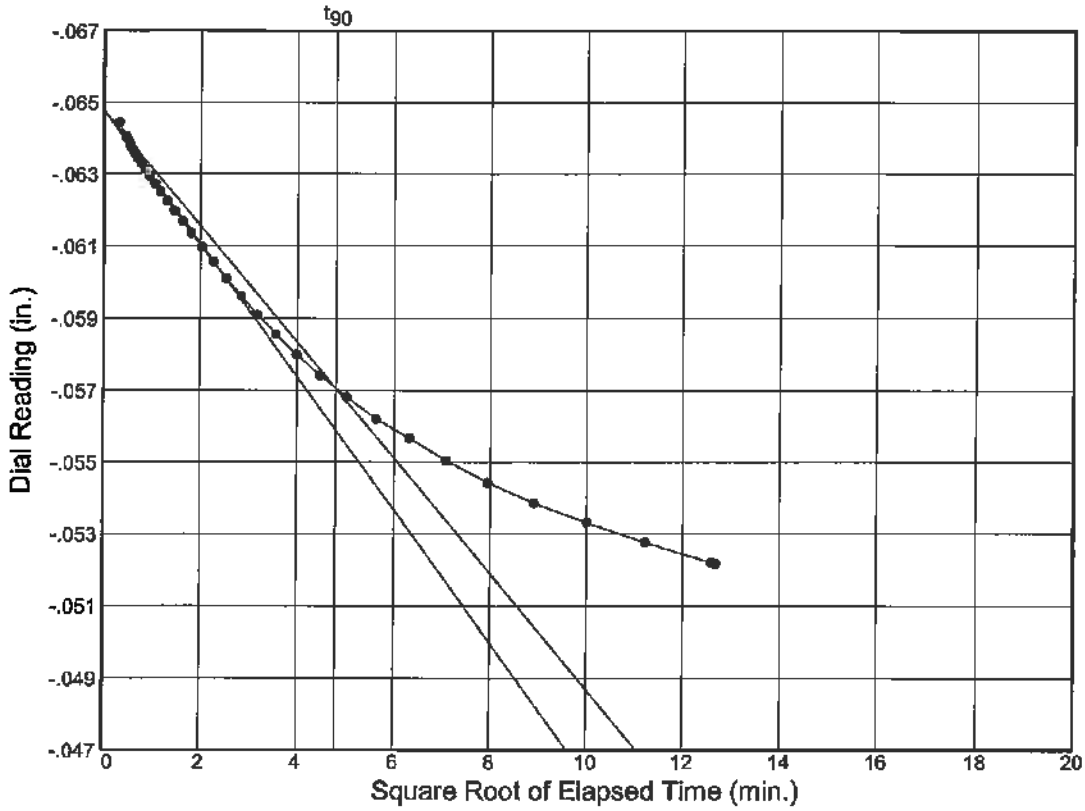
Load No.= 4
Load= 2.00 tsf
D_0 = -0.06802
D_{90} = -0.06583
D_{100} = -0.06559
T_{90} = 10.08 min.

C_v @ T_{90}
0.21 ft.^{2}/day

Dial Reading vs. Time

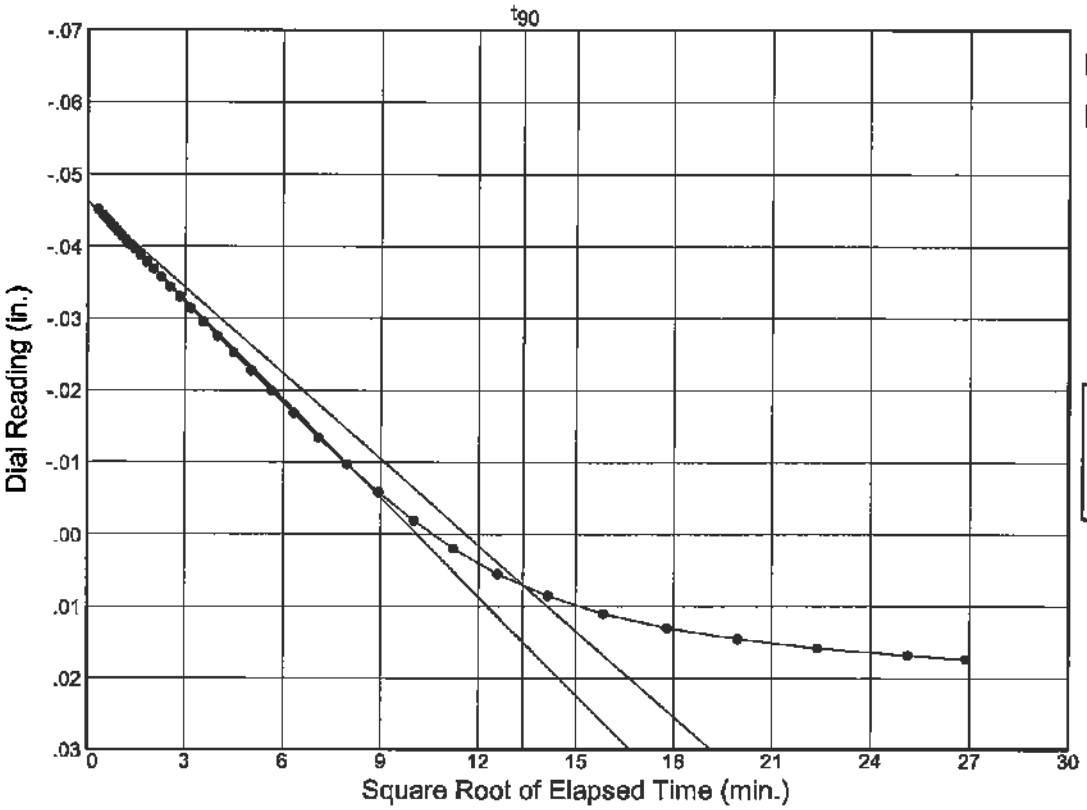
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 5
Load= 4.00 tsf
D_0 = -0.06477
D_{90} = -0.05705
D_{100} = -0.05619
T_{90} = 23.05 min.

C_v @ T_{90}
0.09 ft.^{2}/day



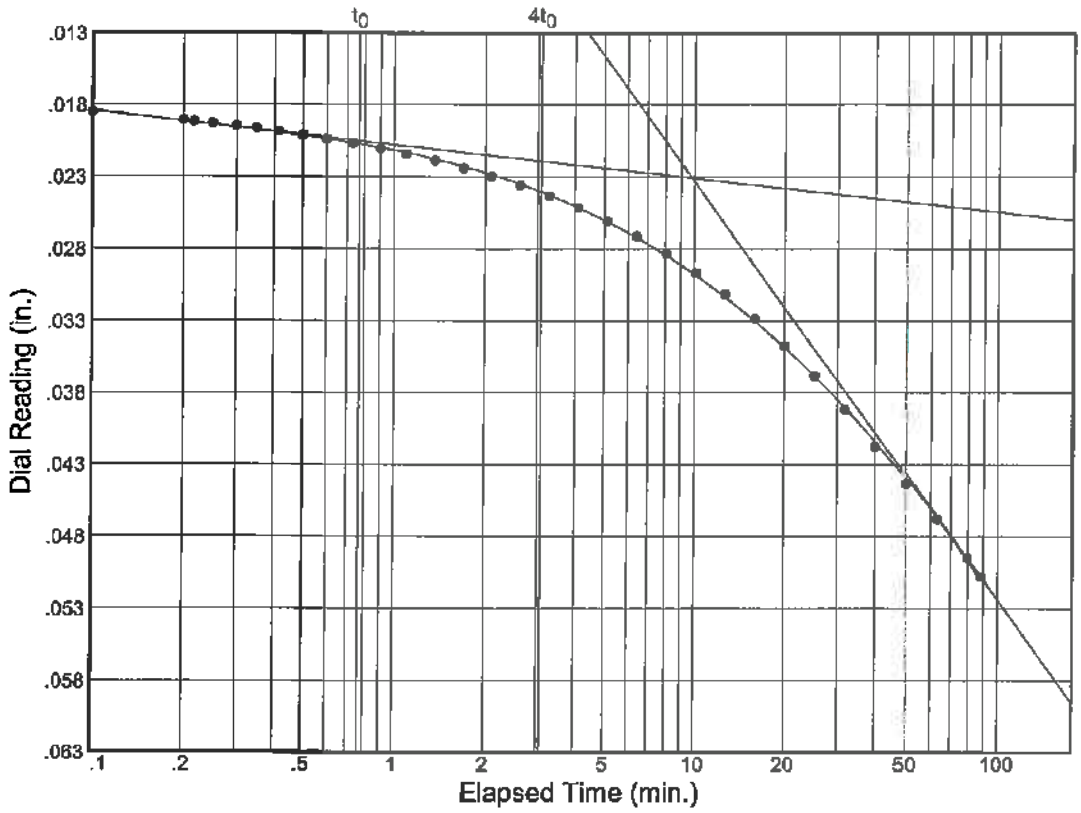
Load No.= 6
Load= 8.00 tsf
D_0 = -0.04627
D_{90} = 0.00705
D_{100} = 0.01297
T_{90} = 179.01 min.

C_v @ T_{90}
0.01 ft.^{2}/day

Dial Reading vs. Time

Project No.: 3520G
Project: Wekiva Parkway 7A

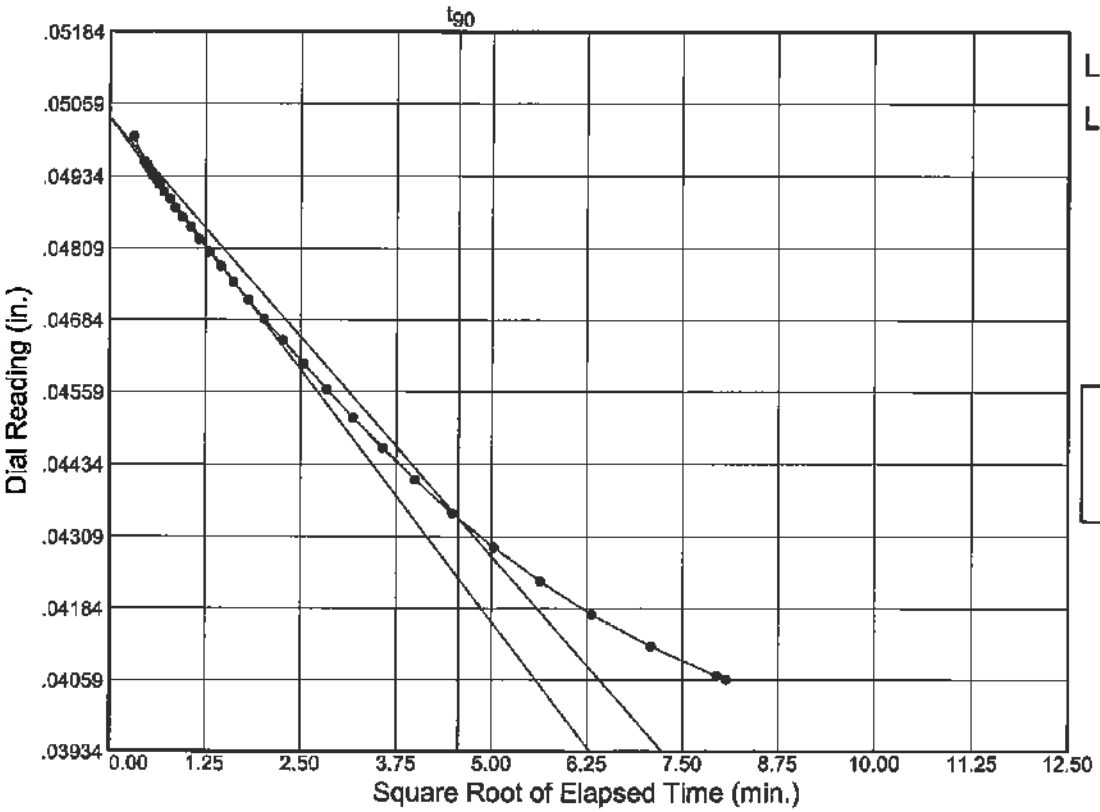
Location: BR-32 43'-45'



Load No.= 7
Load= 16.00 tsf
D_0 = 0.01737
D_{50} = 0.02024
D_{100} = 0.02311
T_{50} = 0.55 min.

C_v @ T_{50}
0.72 ft.^{2}/day

C_α = 0.032



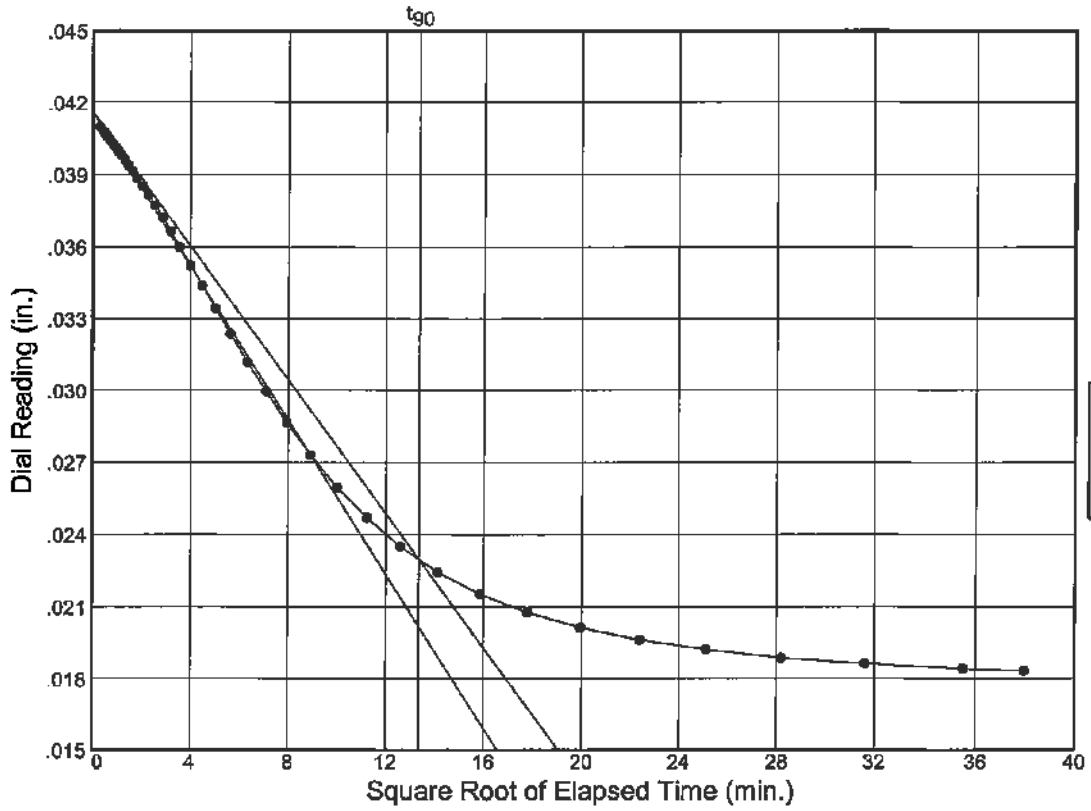
Load No.= 8
Load= 4.00 tsf
D_0 = 0.05035
D_{90} = 0.04340
D_{100} = 0.04263
T_{90} = 20.81 min.

C_v @ T_{90}
0.08 ft.^{2}/day

Dial Reading vs. Time

Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 9

Load= 1.00 tsf

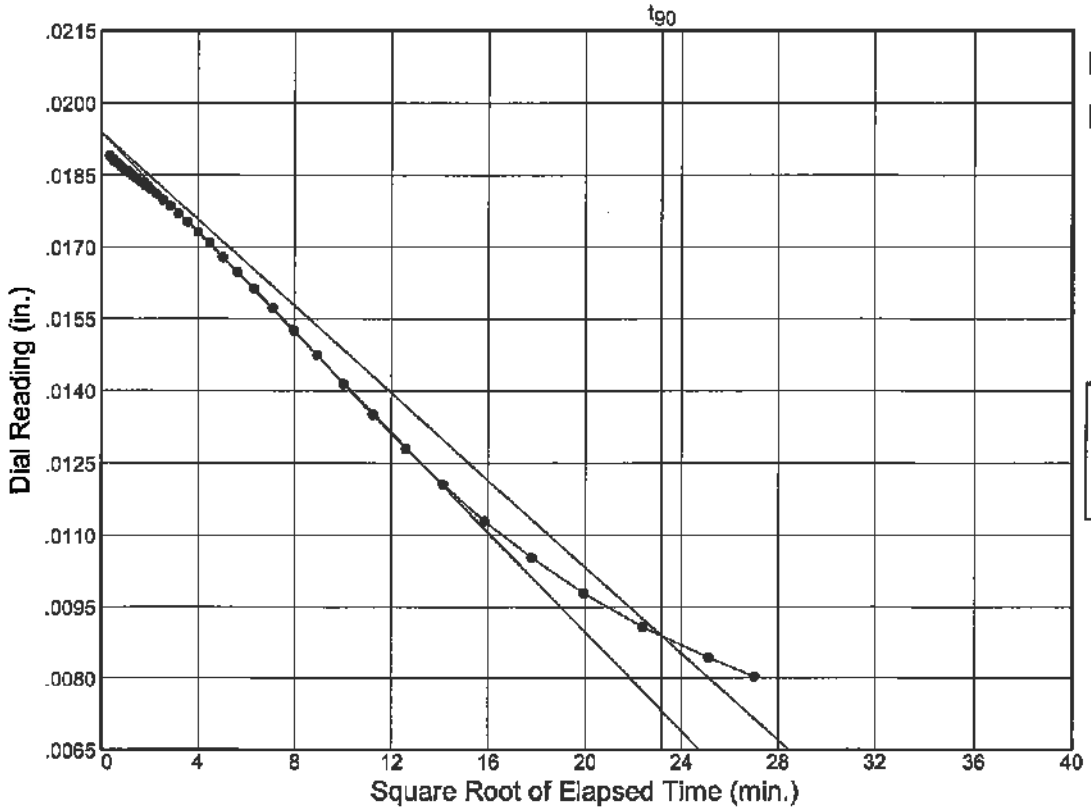
D_0 = 0.04160

D_{90} = 0.02297

D_{100} = 0.02090

T_{90} = 178.17 min.

C_v @ T_{90}
0.01 ft.^{2}/day



Load No.= 10

Load= 0.25 tsf

D_0 = 0.01939

D_{90} = 0.00889

D_{100} = 0.00773

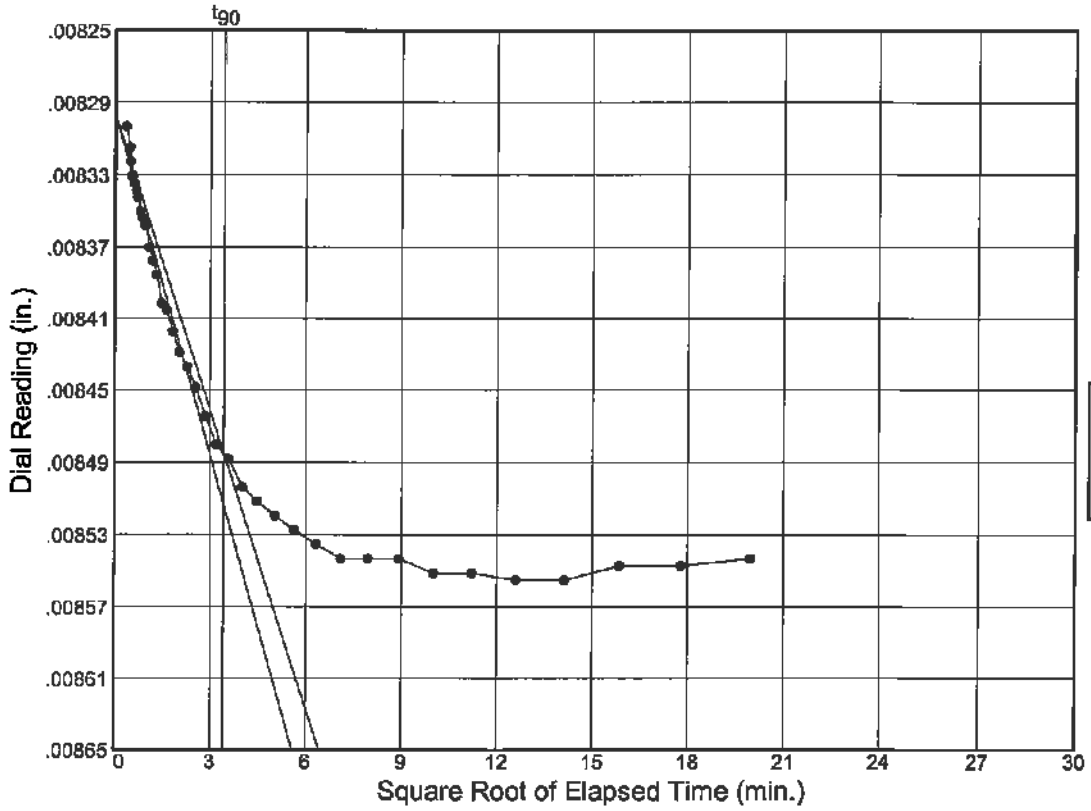
T_{90} = 536.73 min.

C_v @ T_{90}
0.00 ft.^{2}/day

Dial Reading vs. Time

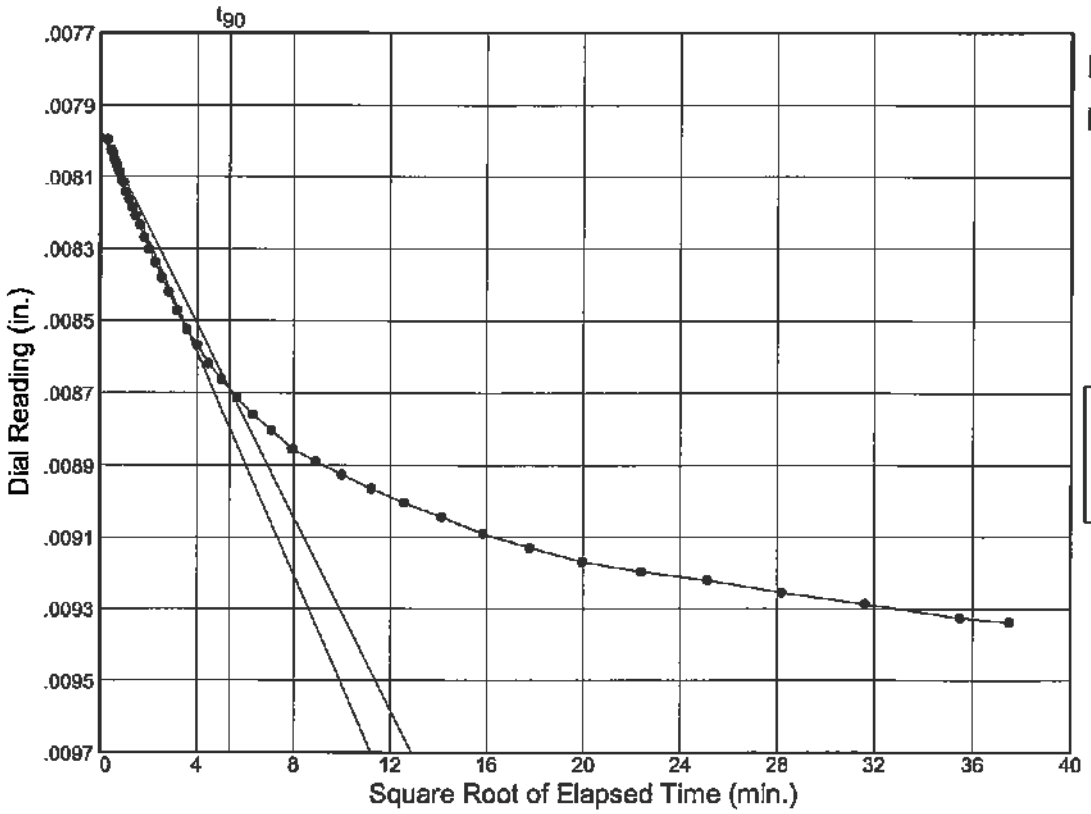
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 11
Load= 0.50 tsf
D_0 = 0.00830
D_{90} = 0.00849
D_{100} = 0.00851
T_{90} = 11.78 min.

C_v @ T_{90}
0.15 ft.^{2}/day



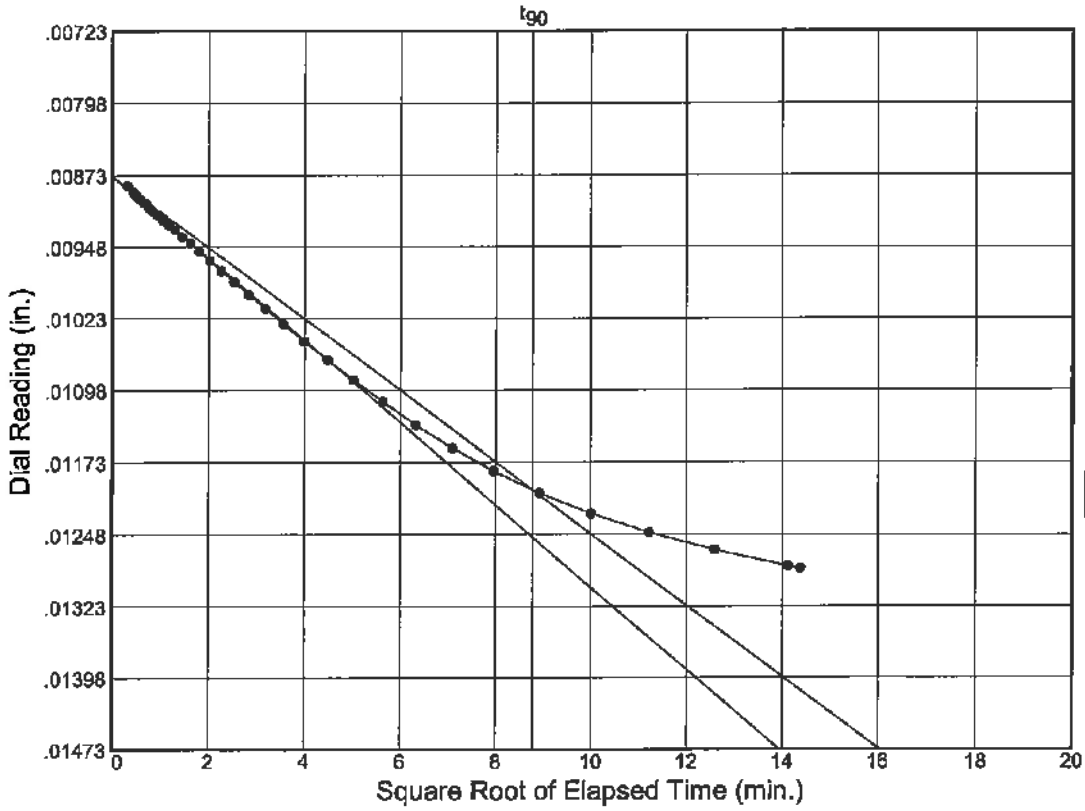
Load No.= 12
Load= 1.00 tsf
D_0 = 0.00797
D_{90} = 0.00869
D_{100} = 0.00877
T_{90} = 28.67 min.

C_v @ T_{90}
0.06 ft.^{2}/day

Dial Reading vs. Time

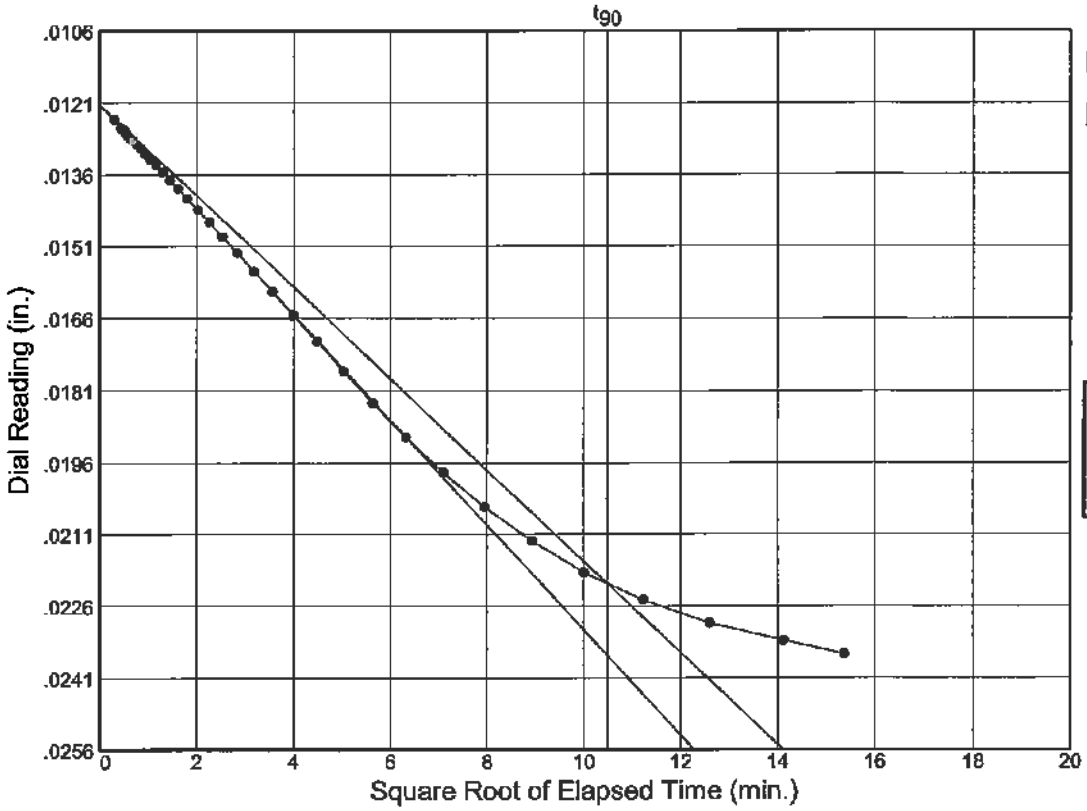
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 13
Load= 2.00 tsf
D_0 = 0.00874
D_{90} = 0.01202
D_{100} = 0.01238
T_{90} = 76.92 min.

C_v @ T_{90}
0.02 ft.^{2}/day



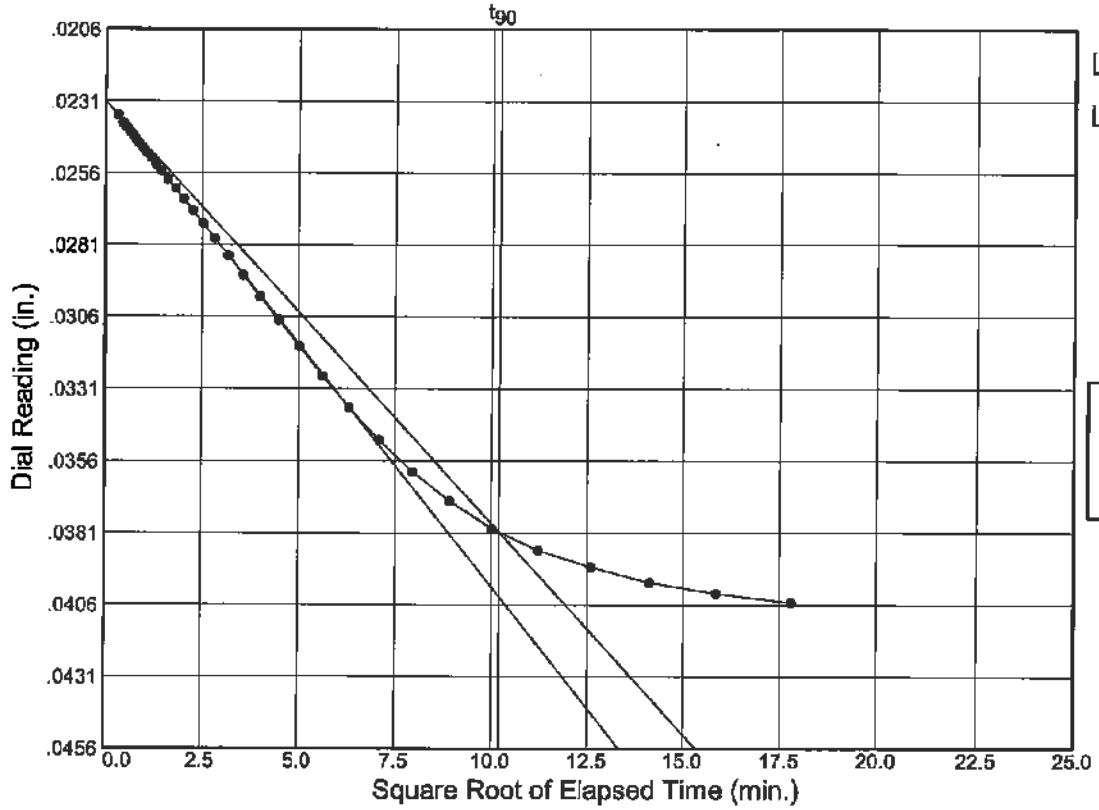
Load No.= 14
Load= 4.00 tsf
D_0 = 0.01212
D_{90} = 0.02214
D_{100} = 0.02325
T_{90} = 109.95 min.

C_v @ T_{90}
0.02 ft.^{2}/day

Dial Reading vs. Time

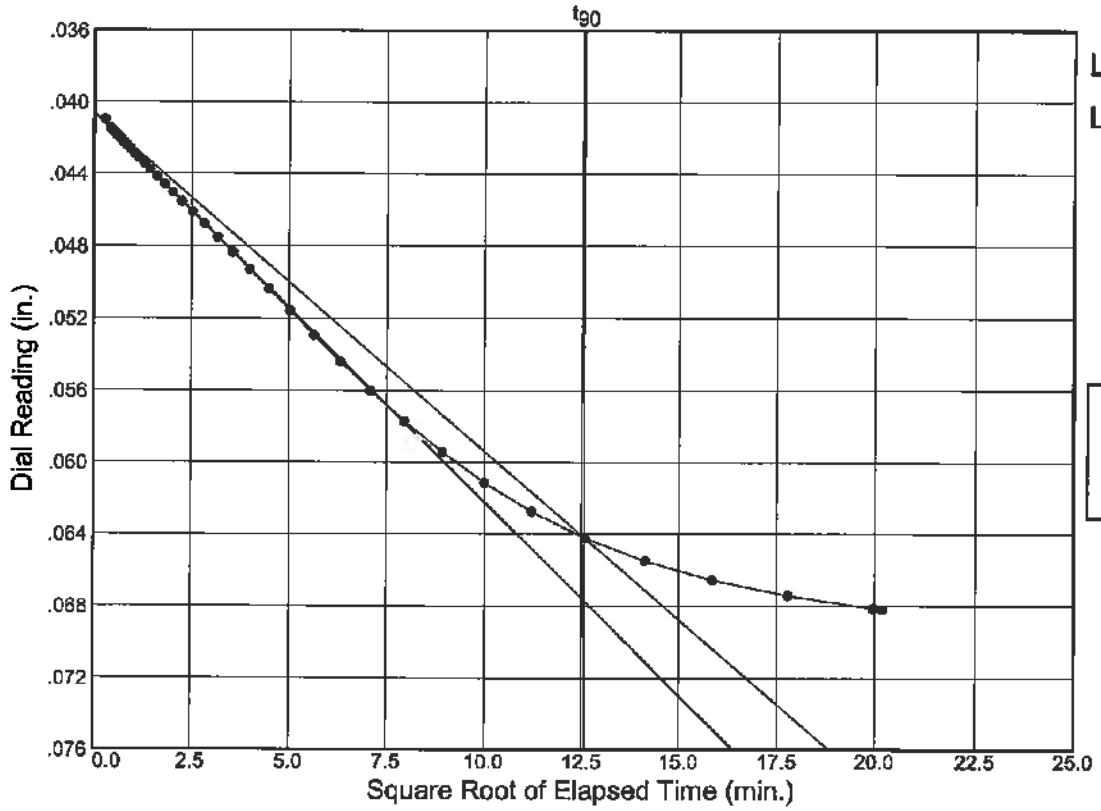
Project No.: 3520G
Project: Wekiva Parkway 7A

Location: BR-32 43'-45'



Load No.= 15
Load= 8.00 tsf
D_0 = 0.02311
D_{90} = 0.03806
D_{100} = 0.03972
T_{90} = 104.03 min.

C_v @ T_{90}
0.02 ft.^{2}/day



Load No.= 16
Load= 16.00 tsf
D_0 = 0.04062
D_{90} = 0.06420
D_{100} = 0.06682
T_{90} = 157.77 min.

C_v @ T_{90}
0.01 ft.^{2}/day

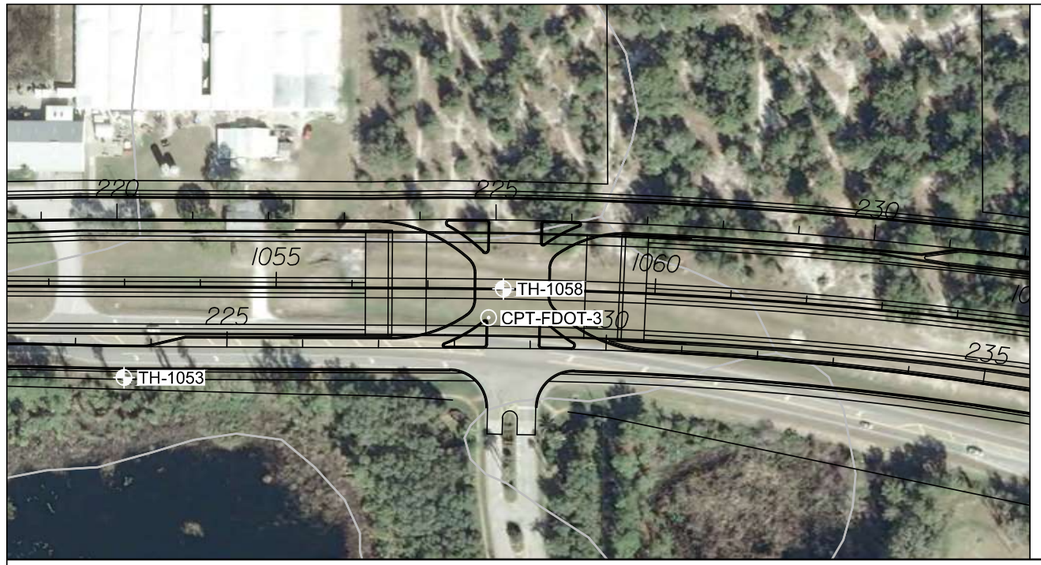
Plate

FDOT LINE & GRADE STUDY
PRELIMINARY REPORT FOR STRUCTURES (7/2/12)

BORING LOCATION PLAN AND REPORT OF
SPT BORING FOR STRUCTURES SHEET

BORING TH-1058 (SR 429 OVER GLADE VIEW DRIVE)

FIGURE 11



LEGEND

FINE SAND

CLAYEY FINE SAND

LIMESTONE

NOTES:

1) UPON COMPLETION OF THE BORING, THE BOREHOLE WAS GROUTED WITH PORTLAND CEMENT GROUT.

2) BORING TERMINATION DEPTH BELOW GROUND SURFACE

3) ARTESIAN CONDITIONS WERE NOT NOTED BY THE DRILLERS DURING BOREHOLE DRILLING. HOWEVER, BASED ON REVIEW OF THE POTENTIOMETRIC MAPS OF THE AREA, IF THE CONTRACTOR SHOULD ENCOUNTERED ARTESIAN CONDITIONS DURING CONSTRUCTION, THE ESTIMATED ELEVATION OF THE ARTESIAN HEAD IS APPROXIMATELY +30 FEET NAVD. THE CONTRACTOR SHALL BE PREPARED TO HANDLE ARTESIAN WATER LEVELS UP TO +30 FEET NAVD.

4) BORING STATION AND OFFSET IS SURVEYED RELATIVE TO CENTERLINE OF CONSTRUCTION.

5) BORING LATITUDE AND LONGITUDE OBTAINED USING HANDHELD GPS.

	STANDARD PENETRATION TEST (SPT) BORING LOCATION
	CONE PENETRATION TEST SOUNDING LOCATION
N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
50/3	50 BLOWS FOR 3–INCHES PENETRATION INTO SOIL
	WATER LEVEL MEASURED ON DATE BORING INITIATED
	ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL
GSE	SURVEYED GROUND SURFACE ELEVATION (FEET NAVD)
–200	PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES) (FM 1–T 88)
	COMPLETE LOSS OF DRILLING FLUID CIRCULATION
	3 1/2–INCH DIAMETER TEMPORARY STEEL CASING
SM,SC,CH	UNIFIED SOIL CLASSIFICATION SYSTEM

STANDARD PENETRATION TEST DATA:
SPOON I.D.= 1.375"
SPOON O.D.= 2.0"
HAMMER DROP= 30"
HAMMER WEIGHT= 140 lbs.
HAMMER TYPE= SAFETY TO 15', AUTOMATIC BELOW

ENVIRONMENTAL CLASSIFICATION

SUBSTRUCTURE:
CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE (pH=5.4)

SUPERSTRUCTURE: SLIGHTLY AGGRESSIVE

SHELL FRAGMENTS: TRACE <5%
FEW 5 TO 10%
LITTLE 15 TO 25%
SOME 30 TO 45%
MOSTLY 50 TO 100%

ENGINEERING CLASSIFICATION

I COHESIONLESS SOILS

DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	0 TO 4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

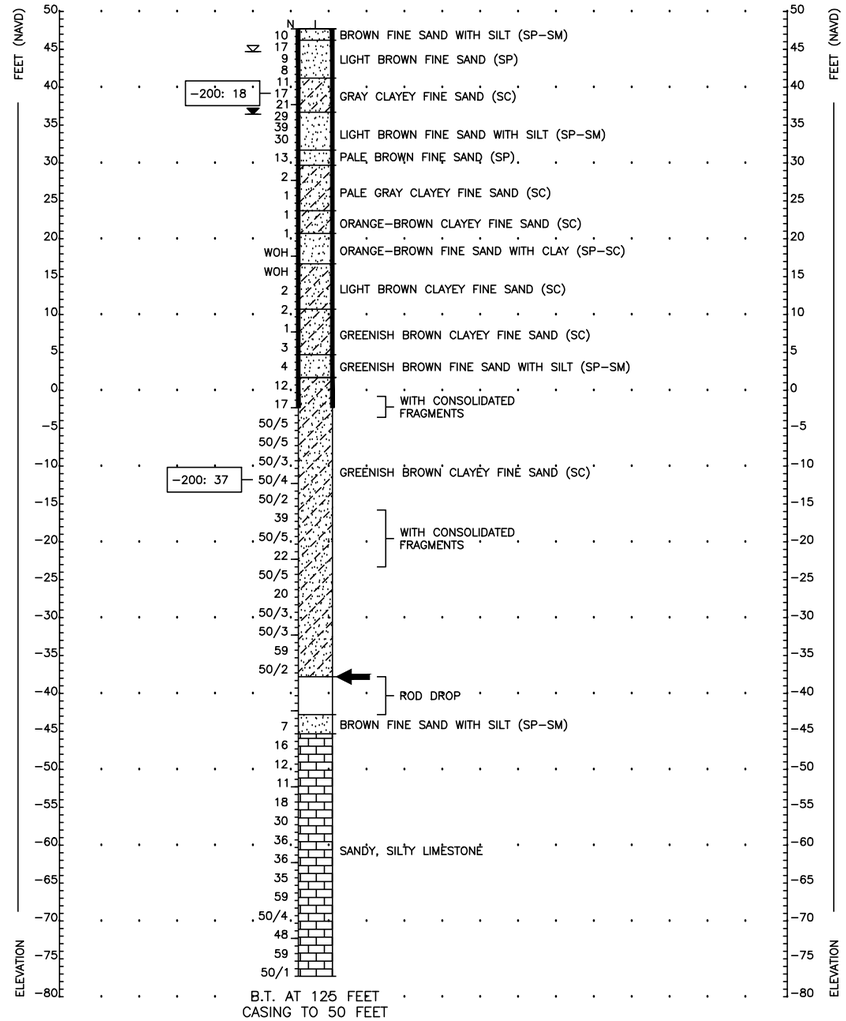
II COHESIVE SOILS

DESCRIPTION	UNCONFINED COMPRESSIVE STRENGTH, QU, TSF	BLOW COUNT "N"
VERY SOFT	<1/4	0 TO 2
SOFT	1/4 TO 1/2	2 TO 4
MEDIUM STIFF	1/2 TO 1	4 TO 8
STIFF	1 TO 2	8 TO 15
VERY STIFF	2 TO 4	15 TO 30
HARD	>4	>30

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.

TH-1058
01/12/12
GSE=47.7
STA: 1058+04
OFFSET: 4R
LATITUDE: 28.81287
LONGITUDE: –81.37724



T:\Orlando\11\11-6501\11650108.dwg 5/13/2015 10:09:40 AM, Chris.Drew

REVISIONS					
No.	By	Description	Date	By	Description

	Name	Date
Drawn by	CT	4/13
Checked by	CT	4/13
Designed by		
Checked by		
Approved by	C.T. JEWSBURY	

ENGINEER OF RECORD
COLIN T. JEWSBURY
FL. REG. NO. 58074
Ardaman & Associates, Inc.
8008 S. ORANGE AVENUE
P.O. BOX 593003
ORLANDO, FL. 32859-3003
CERTIFICATE OF AUTHORIZATION: 5950

LOGO: Ardaman & Associates, Inc.

SEAL:

FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET TITLE: REPORT OF SPT BORING FOR STRUCTURE
ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT AVE: WEKIVA PARKWAY
SR 429	SEMINOLE	431081–4–32–01	SHEET NO. –