Geotechnical Engineering Report
Retaining Walls

Wekiva Parkway (State Road 429/State Road 46) – Section 6
From West of Old McDonald Road to River Oaks Circle
Lake and Seminole Counties, Florida
FDOT FIN: 238275-7-32-02

December 12, 2014
Terracon Project No. H1135080

Prepared for:
GAI Consultants, Inc.
Orlando, Florida

Prepared by:
Terracon Consultants, Inc.
Winter Park, Florida

December 12, 2014

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Attn.: Mr. Stephen A. Boylan, P.E.
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Re: Geotechnical Engineering Report – Retaining Walls
Wekiva Parkway (State Road 429/State Road 46) – Section 6
From West of Old McDonald Road to River Oaks Circle
FDOT FIN: 238275-7-32-02
Lake and Seminole Counties, Florida
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Dear Mr. Boylan:

Terracon Consultants, Inc. (Terracon) is pleased to present this Geotechnical Engineering Report for the above-referenced project. This evaluation was performed in general accordance with our Subconsultant Agreement dated June 20, 2013. This report presents the results of our field exploration, laboratory testing and geotechnical engineering recommendations for the proposed Mechanically Stabilized Earth (MSE) retaining walls, for the subject project.

Terracon appreciates the opportunity to be of service to you on this project. If you should have any questions concerning the contents of this report, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,

TERRACON CONSULTANTS, INC.
Certificate of Authorization No. 8830

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FDOT FIN: 238275-7-32-02
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1.0 PROJECT DESCRIPTION

The proposed improvements consist of the construction of Wekiva Parkway (SR 429/SR 46) – Section 6 from West of Old McDonald Road to River Oaks Circle in Lake and Seminole Counties, Florida. The proposed alignment is located along/near existing State Road 46. A vicinity map showing the proposed alignment is presented on the attached **Exhibit A-1** in the **Appendix**. Based on plans and information, it is our understanding that this project consists of the construction of the State Road 429 roadway, which consists of a four (4) lane expressway; and two (2) lanes for service roads, which parallel the proposed expressway. The project also includes the construction of ramps at the west end of the project alignment; and access roads and connector roads. Based on the cross sections, the proposed grades for the project alignment, ramps, and auxiliary roadways range from about 5 feet below to about 30 feet above existing grades.

Geotechnical reports addressing the proposed bridges, and roadway embankment and stormwater areas are presented under separate covers. All stationing in this report is referenced from centerline of construction of State Road 429, unless otherwise noted.

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Site Layout	See **Appendix, Exhibit A-1**.
Structures	The project will include the construction of multiple MSE retaining walls throughout the project alignment. Retained embankment heights of up to about 34 feet are proposed.

A summary of the proposed MSE retaining wall approximate locations and heights is presented below:

Wall Limits	Reference	Maximum Wall Height
Station 656+00 to 661+70, LT	SR 429 Centerline	16 feet
Station 660+00 to 661+70, RT	SR 429 Centerline	12 feet
Station 680+00 to 697+00, LT & RT	SR 429 Centerline	28 feet
Station 740+00 to 758+14, RT	SR 429 Centerline	34 feet
Station 745+00 to 757+88, LT	SR 429 Centerline	28 feet
Station 759+42 to 769+00, LT	SR 429 Centerline	23 feet
Station 759+70 to 765+00, RT	SR 429 Centerline	26 feet
Station 1140+40 to 1150+67, LT	Service Road 2 Baseline	18 feet
Station 1189+86 to 1196+21, LT	Service Road 2 Baseline	17 feet
Station 852+00 to 865+50, LT	SR 429 Centerline	22 feet
Station 866+65 to 868+00, RT	SR 429 Centerline	21 feet
Station 117+26 to 124+20, RT	Service Road 1 Baseline	17 feet
Station 125+80 to 134+80, RT	Service Road 1 Baseline	17 feet
Station 889+00 to 899+16, RT	SR 429 Centerline	26 feet
Station 900+68 to 908+35, RT	SR 429 Centerline	20 feet
Station 141+66 to 148+02, RT	Service Road 1 Baseline	12 feet
Station 929+63 to 931+20, LT & RT	SR 429 Centerline	28 feet
Station 1+40 to 5+00, LT & RT	Access Road 1 Centerline	21 feet

2.2 Site Location and Description

Item	Description
Location	The project alignment is located along/near State Road 46 from West of Old McDonald Road to River Oaks Circle in Lake and Seminole Counties, Florida.
Existing Topography	The USGS topographic quadrangle maps "Sorrento, Florida" and "Sanford SW, Florida" depict the ground surface elevations range from about +5 to +30 feet, NGVD, throughout the project alignment.
Surface Water	The USGS topographic quadrangle maps "Sorrento, Florida" and "Sanford SW, Florida" depict multiple wetland areas throughout the project alignment. The Wekiva River crosses the project alignment near the eastern limit.

3.0 SUBSURFACE CONDITIONS

3.1 Soil Survey

The Soil Surveys of Lake and Seminole Counties, Florida as prepared by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS; later renamed the Natural Resource Conservation Service - NRCS), identifies multiple soil types along the project alignment. Descriptions of the mapped soil units are included in **Appendix A** as **Exhibit A-3**. It should be

noted that the Soil Survey is not intended as a substitute for site-specific geotechnical exploration; rather it is a useful tool in planning a project scope in that it provides information on soil types likely to be encountered. Boundaries between adjacent soil types on the Soil Survey maps are approximate (included in **Appendix** as **Exhibit A-2**).

Based on review of the St. John's River Water Management District (SJRWMD) potentiometric maps of the upper Floridan Aquifer for this project area, the estimated elevation of the artesian head appears to range from approximately +20 to +40 feet, NGVD, for the project alignment.

3.2 Fieldwork Program

Subsurface conditions were explored along the proposed retaining wall alignments by performing Standard Penetration Test (SPT) borings to depths ranging from about 15 to 120 feet below the existing ground surface. An undisturbed Shelby Tube sample of buried organic soils was obtained from two (2) of the borings performed. Cone Penetration Test (CPT) soundings were also performed to depths of about 31.7 to 52.5 feet below the existing ground surface throughout the project alignment. The approximate SPT and CPT locations are shown on the location plans on **Exhibits A-4 through A-13** in the **Appendix**. The results of the soil borings are presented on **Exhibits A-14 through A-51** in the **Appendix**. The CPT soundings are presented on the attached **Exhibits A-52 through A-54** in the **Appendix.**

Stations, offsets and elevations are approximate and were obtained by scaling from site plans and cross sections. GPS coordinates were also obtained and are shown adjacent to the boring profiles.

Standard Penetration Tests (SPT) were generally performed continuously in the SPT borings to a depth of about 10 feet and at 5-foot intervals thereafter. At several locations, a hand auger boring was initially performed to depths of about 4 to 6 feet due to suspected nearby underground utilities. Each sample was removed from the sampler in the field and was examined and visually classified by an Engineering Technician. Representative portions of each sample were packaged and sealed for transportation to our laboratory for further examination and visual classification. Water levels were measured in the boreholes at the time of our field exploration to evaluate the depth to groundwater. The SPT borings were backfilled upon completion and sealed with cement grout.

Adjacent to the SPT boring profiles are the "N" values. These "N" values are the number of hammer blows required to advance the split spoon sampler a distance of 12 inches. The "N" values have been empirically correlated with various soil properties and are considered to be indicative of the relative density of cohesionless soils and consistency of cohesive soils. Based on the results of the SPT borings, relative densities ranged from very loose to very dense for the encountered cohesionless soils; and the consistencies of encountered cohesive soils ranged from very soft to very stiff.

A CME automatic SPT hammer was used to advance the split-barrel sampler in the majority of the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the SPT-N value. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

The CPT soundings, performed in general accordance with ASTM Specification D-3441, consisted of pushing a cone penetrometer into the soil and electronically measuring the corresponding tip resistance, sleeve friction resistance, and dynamic pore water pressure. These measured properties can be used to classify soils, estimate soil shear strength, and analyze the hydro-geologic characteristics of the explored area. CPT data was obtained continuously in the soundings as the cone was pushed from the ground surface to the depths previously indicated. The CPT equipment and technique is limited if very dense materials (i.e. limestone) are encountered.

4.0 GENERAL SUBSURFACE CONDITIONS

The soil samples obtained from the borings were visually classified in accordance with the Unified Soil Classification System (USCS) and limited laboratory testing. Stratification boundaries between soil types should be considered approximate as the actual transition between soil types may be gradual.

In general, the soil borings typically encountered fine sand (SP), fine sand with silt (SP-SM), silty fine sand (SM), and clayey fine sand (SC) to the boring termination depths. Sandy clay and clay (CL, CH) was encountered in many of the borings at deeper depths. Surficial and buried organic soils were encountered in several borings (B-12, B-12A, B-15, B-24, B-50 and B-82) at various depths and thicknesses.

For details at individual boring locations, refer to the boring profiles on **Exhibits A-14 through A-51** in the **Appendix.** The results of the CPT soundings are presented on **Exhibits A-52 through A-54** in the **Appendix.**

Groundwater was observed during our exploration ranging from existing grade to depths of about 9 feet below the existing ground surface. Several of the SPT borings did not encounter groundwater to a depth of about 10 feet. These borings are denoted *GNE-10'* on the soil boring profile sheets. Groundwater levels will fluctuate with the amount of local rainfall and site development, and therefore, may be different at other times. Encountered groundwater levels and estimated normal seasonal high groundwater levels are shown adjacent to the soil profiles, where applicable, on the boring profile sheets in the **Appendix.** A seasonal high groundwater level was not estimated for the borings that did not encounter groundwater.

Seasonal high groundwater levels were estimated based on observed groundwater levels, USDA Lake County and Seminole County Soil Surveys, the existing profile grades, rainfall history and geotechnical engineering judgment.

5.0 LABORATORY TESTING

The soil samples retrieved from the boring locations were transported to our laboratory for visual examination and selective soil testing. The results of our laboratory testing are presented adjacent to the soil boring profiles on the attached **Report of SPT Borings for Structures** sheets **(Exhibits A-14 through A-51)** in the **Appendix.** Laboratory testing was performed in general accordance with the appropriate Florida methods.

5.1 Corrosion Series Testing

A series of 31 corrosion tests were performed on soil samples obtained from the soil borings performed along the project alignment. These results indicate that the subsurface environment ranges from slightly to extremely aggressive (pH = 4.3) for use in selection of an appropriate class of concrete or steel in accordance with the Florida Department of Transportation (FDOT) Standards. The environmental classifications are based on the Structures Design Guidelines. The corrosion series test results are summarized on **Table 1** in the **Appendix**.

5.2 Consolidation Testing

Consolidation testing was performed on selected undisturbed samples. **Consolidation Test Reports** are presented in the **Appendix,** presenting a summary of key parameters interpreted from consolidation tests plotted against depth.

6.0 EVALUATION AND RECOMMENDATIONS

The following conclusions and recommendations are based on the project characteristics previously described, the data obtained in our field exploration and our experience with similar subsurface conditions and construction types. If the final structure locations or grades are significantly different from those previously described, or if subsurface conditions different from those disclosed by the borings are encountered during construction, we should be notified immediately so that we might review the following recommendations regarding such changes.

6.1 MSE Retaining Walls

The wall and earth geometry in the proposed MSE wall locations were based on information supplied by GAI Consultants. MSE walls are proposed throughout the project alignment and at bridge abutments. External stability analysis for the walls was performed. The results of our analyses for the MSE walls are presented below.

Based on the borings and assuming that select backfills are to be placed behind the walls, three (3) generalized subsurface soil profiles were estimated for the project alignment. It should be noted that these three (3) "profiles" are general in nature. For individual or detailed design, the wall geometry and associated soil boring data at specific locations should be reviewed.

The soil parameters estimated for the three (3) generalized profiles are presented below:

Profile 1:

	Reinforced Soil and Random Backfill	Loose Fine Sand	Medium Dense Silty and Clayey Fine Sand	Very Loose Fine Sand and Silty Fine Sand	Loose Silty Fine Sand
Depth Below Existing Ground Line for Walls	-	0 - 8 feet	8 - 38 feet	38 - 58 feet	58 - 60 feet
Effective Unit Weight (pcf)	105 pcf Moist Weight In-Place	105 pcf	58 pcf	43 pcf	48 pcf
Cohesion (psf)	0	0	0	0	0
Internal Friction	30°	30°	32°	29°	30°

Profile 2:

	Reinforced Soil and Random Backfill	Loose Fine Sand	Medium Dense Fine Sand	Dense Fine Sand and Silty Fine Sand	Very Loose Silty Fine Sand	Soft Muck or Clay	Loose Clayey Fine Sand
Depth Below Existing Ground Line for Walls	-	0 - 8 feet	8 - 13 feet	13 - 28 feet	28 - 33 feet	33 - 53 feet	53 - 75 feet
Effective Unit Weight (pcf)	105 pcf Moist Weight In-Place	105 pcf	53 pcf	58 pcf	38 pcf	38 pcf	48 pcf
Cohesion (psf)	0	0	0	0	0	250 psf	0
Internal Friction	30°	30°	30°	32°	28°	0°	30°

Profile 3:

	Reinforced Soil and Random Backfill	Loose Fine Sand	Very Loose Silty Fine Sand	Soft Muck	Very Loose Fine Sand and Silty Fine Sand	Medium Dense Fine Sand	Very Loose Fine Sand and Silty Fine Sand	Very Dense Silty Fine Sand and Rock
Depth Below Existing Ground Line for Walls	-	0 - 4 feet	4 - 18 feet	18 - 33 feet	33 - 48 feet	48 - 53 feet	53 - 68 feet	68 - 83 feet
Effective Unit Weight (pcf)	105 pcf Moist Weight In-Place	48 pcf	38 pcf	38 pcf	38 pcf	53 pcf	38 pcf	68 pcf
Cohesion (psf)	0	0	0	250 psf	0	0	0	0
Internal Friction	30°	30°	28°	0°	28°	30°	28°	34°

The following is a summary table of the profiles as designated along the project alignment:

Station(s)	Center to Left Offset	Center to Right Offset
656+00 to 660+50	Profile 2	Profile 2
660+50 to 661+70	Profile 2	Profile 1
680+00 to 683+00	Profile 1	Profile 1
684+50 to 687+00*	Profile 3	Profile 2
687+50 to 688+00	Profile 2	Profile 2
688+50 to 689+00	Profile 1	Profile 1
689+50 to 693+00	Profile 2	Profile 2
693+00 to 694+00	Profile 3	Profile 2
694+00 to 696+50	Profile 2	Profile 2
696+50 to 697+00	Profile 1	Profile 1
740+00 to 746+00	Profile 1	Profile 1
747+50 to 752+00	Profile 2	Profile 2
752+00 to 756+00	Profiles 1 & 2	Profiles 1 & 2
756+00 to 757+00	Profile 1	Profile 2
757+00 to 758+14	Profile 2	Profile 2
759+42 to 766+00	Profile 1	Profile 1
766+00 to 769+00	Profile 2	-
786+00 to 791+00	Profile 2	-
791+00 to 793+00	Profile 1	-
793+00 to 796+00	Profile 2	-
836+00 to 840+50	Profile 2	-
840+50 to 842+00	Profile 1	-
852+00 to 865+50	Profile 1	-
866+65 to 868+00	-	Profile 2
877+00 to 880+00	-	Profile 1
880+00 to 882+50	-	Profile 2
882+50 to 883+50	-	Profile 1
883+50 to 884+00	-	Profile 2
886+00 to 889+50	-	Profile 2
889+50 to 891+00	-	Profile 1
891+00 to 892+50	-	Profile 2
892+50 to 898+00	-	Profile 1
898+00 to 899+16	-	Profile 2
900+68 to 907+00	-	Profile 1
907+00 to 908+35	-	Profile 2
929+63 to 931+20	Profile 2	Profile 2

* *Including MSE walls at Access Road 1*

An external stability analysis was performed to evaluate the minimum reinforcement lengths. Minimum reinforcement lengths were calculated for varying wall heights up to 34 feet. The global stability was analyzed using the computer program STABL6. The external stability analysis also utilized the spreadsheet program MSE Wall-LRFD, version 2.5 developed by the FDOT. The computer outputs, for the maximum wall height for each of the profiles evaluated, have been included in the **Appendix**.

The results of the analyses for the Profile 1 areas are summarized in the table below:

Maximum Wall Height (feet)	Minimum Reinforcement Length (feet)	Capacity Demand Ratio For				Calculated Factor of Safety for Global Stability (≥ 1.5)	Factored Bearing Resistance (psf)
		Overturning (≥ 1)	Eccentricity (≤ 1)	Sliding (≥ 1)	Bearing Resistance (≥ 1)		
34	24	2.4	0.8	1.3	1.0	1.5	8,650
30	21	2.3	0.9	1.2	1.0	1.6	7,900
26	19	2.4	0.8	1.2	1.2	1.6	7,550
22	16	2.3	0.9	1.2	1.2	1.6	6,800
18	13	2.1	0.9	1.1	1.2	1.8	6,050
14	10	1.9	1.0	1.1	1.2	1.7	5,250
≤ 10	8	2.0	0.9	1.1	1.6	1.9	5,000

The results of the analyses for the Profile 2 areas are summarized in the table below:

Maximum Wall Height (feet)	Minimum Reinforcement Length (feet)	Capacity Demand Ratio For				Calculated Factor of Safety for Global Stability (≥ 1.5)	Factored Bearing Resistance (psf)
		Overturning (≥ 1)	Eccentricity (≤ 1)	Sliding (≥ 1)	Bearing Resistance (≥ 1)		
34	26	2.8	0.7	1.4	1.0	1.5	7,850
30	23	2.8	0.7	1.3	1.0	1.5	7,250
26	20	2.7	0.7	1.3	1.1	1.5	6,600
22	17	2.6	0.8	1.3	1.1	1.6	6,000
18	13	2.1	0.9	1.1	1.0	1.7	5,000
14	10	1.9	1.0	1.1	1.0	1.7	4,400
≤ 10	8	2.1	0.9	1.1	1.3	1.9	4,150

The results of the analyses for the Profile 3 areas are summarized in the table below:

Maximum Wall Height (feet)	Minimum Reinforcement Length (feet)	Capacity Demand Ratio For				Calculated Factor of Safety for Global Stability (≥ 1.5)	Factored Bearing Resistance (psf)
		Overturning (≥ 1)	Eccentricity (≤ 1)	Sliding (≥ 1)	Bearing Resistance (≥ 1)		
28	37	8.1	0.3	2.3	2.0	1.5	10,450
24	31	7.4	0.3	2.2	1.9	1.5	9,100
20	25	6.6	0.3	2.0	1.9	1.5	7,750
16	14	3.0	0.7	1.3	1.2	1.5	4,900
12	9	2.0	1.0	1.1	1.0	1.7	3,750
≤ 10	8	2.1	0.9	1.1	1.2	1.8	3,650

These minimum reinforcement lengths were calculated for external stability only. An internal stability analysis may require longer reinforcement lengths than recommended in this evaluation.

Wall heights presented in the table above represent the distance from top of leveling pad to top of wall. Based on the Structures Design Guidelines, the reinforcement lengths recommended in the table above meet the minimum length criteria required. We recommend that the reinforced earth wall straps/mesh be placed to avoid conflict with end bent piles and end bent caps at the locations where the MSE walls are at the abutments of bridges.

Settlement estimates were made using the method outlined in the FHWA Soils and Foundations Workshop Manual to determine total and differential movements that should be anticipated in the wall system. A detailed settlement estimate is initially presented in the **Appendix** for one of the soil "profiles" evaluated. The remainder of the settlement estimates for the soil "profiles" evaluated are presented in summary using a spreadsheet based on FHWA methods.

The soil "profiles" used to evaluate for settlement are based on a general assessment of the soil boring profiles and densities or consistencies of the soil borings. Profile no. 1 generally consists of medium dense sandy soils. Profile no. 2 generally consists of sandy soils with occasional clayey strata, with loose densities or soft to firm consistencies. Profile no. 3 generally consists of sandy and clayey soils with occasional organic strata, with very loose densities or very soft to soft consistencies.

Due to the mostly granular nature of the soils, a majority of the short-term settlement is anticipated to occur during wall fill placement (approximately 30 to 90 days). The long-term settlement is measured from the end of wall fill placement. Settlement calculations are attached in the **Appendix**. The following is a summary of estimated settlements for each of the three (3) profiles:

Profile No.	Maximum Wall Height (feet)	Long-Term (inches)	Short-Term (inches)	Differential (%) (ft/100 ft)
1	34	< 0.5 to 1	6.5 to 9	0.6 to 0.8
	30	< 0.5 to 1	6 to 8	0.5 to 0.8
	25	< 0.5 to 1	5.5 to 7	0.5 to 0.7
	20	< 0.5 to 1	4.5 to 6	0.4 to 0.6
	15	< 0.5 to 1	3.5 to 5	0.3 to 0.5
	10	< 0.5 to 1	3 to 4	0.3 to 0.4
2	34	0.5 to 14	9 to 11	0.8 to 2.1
	30	0.5 to 13	8.5 to 10.5	0.8 to 2.0
	25	< 0.5 to 12	8 to 10	0.7 to 1.8
	20	< 0.5 to 11	7 to 9	0.6 to 1.7
	15	< 0.5 to 9	5.5 to 8	0.5 to 1.4
	10	< 0.5 to 7	4 to 6.5	0.4 to 1.1
3	28	< 0.5 to 25	11 to 19	1.0 to 3.7
	25	< 0.5 to 24	10 to 18	0.9 to 3.5
	20	< 0.5 to 22	9 to 16	0.8 to 3.2
	15	< 0.5 to 19	8 to 14	0.7 to 2.7
	10	< 0.5 to 15	6 to 11	0.5 to 2.2

Note: total settlement exceeding 6 inches and differential settlement exceeding 0.5% requires project specific design.

6.2 "Depression" Areas

Two (2) locations along the proposed project alignment were identified as "depression" areas. Multiple SPT borings were performed to depths ranging between about 40 to 120 feet below the existing ground surface, to evaluate subsurface conditions in these areas. This report presents the results of the designated wall borings performed in the "depression" areas. Borings originally designated for the "depression" areas, as well as additional borings performed during our fieldwork program, are presented under separate cover in the Soil Survey Report prepared for this project.

West "Depression" Area: Several of the borings performed at the "depression" area observed at about Station 686+00 encountered surficial and buried organic soils. Based on cross sections, up to about 28 feet of new embankment is proposed at this area. A significant amount of settlement is anticipated. Mitigation for this area may include:

- Construction of a bridge structure (extension of the nearby Wildlife Crossing bridge),
- Performing a surcharge program for the area,
- Subsoil grouting and/or ground improvements.

East "Depression" Area: The borings performed at the "depression" area observed at about Station 741+00 primarily encountered fine sand (A-3, SP, SP-SM), silty fine sand (A-2-4, SM), and clayey fine sand (A-2-6, SC) from the existing ground surface to the boring termination depths of about 60 feet. Standard construction is anticipated for this area.

7.0 REPORT LIMITATIONS

This report is based on the results of a limited number of borings and may not accurately reflect conditions between or away from boring locations. Variations of the subsoil conditions between or away from boring locations may occur. If conditions not discussed in this report are observed, we request the opportunity to review our recommendations.

APPENDIX

INDEX TO APPENDIX

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TERRACON PROJECT NO. H1135080

TABLE

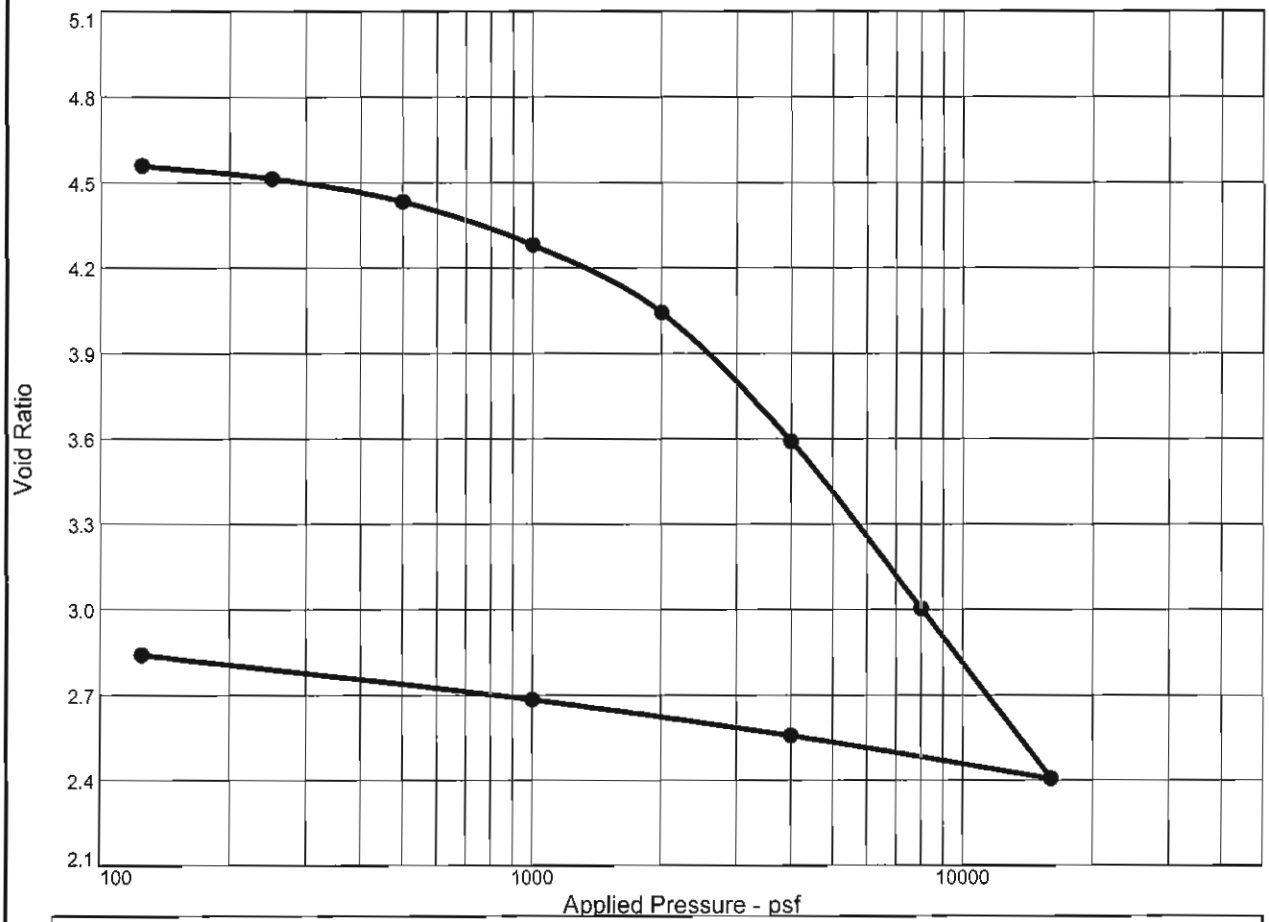
TABLE 1
CORROSION SERIES TESTING RESULTS - WALL BORINGS
WEKIVA PARKWAY (STATE ROAD 429/STATE ROAD 46) - SECTION 6
LAKE AND SEMINOLE COUNTIES, FLORIDA
FPID: 238275-7-32-02
TERRACON PROJECT NO. H1135080

Boring Number	Station & Offset	Sample Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	Substructural Environmental Classification	
							Concrete	Steel
A-7	651+00; 50' LT	4.0	5.2	15,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-6	659+20; 140' LT	0.5	4.5	4,100	60	< 5	Extremely Aggressive	Extremely Aggressive
A-21	660+00; 60' LT	6.0	5.4	41,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-9	681+50; 68' RT	3.0	6.2	83,000	60	72.3	Slightly Aggressive	Moderately Aggressive
B-28	696+65; 160' LT	3.0	5.0	15,000	60	< 5	Moderately Aggressive	Extremely Aggressive
A-27	700+00; Centerline	2.0	4.8	21,000	60	< 5	Extremely Aggressive	Extremely Aggressive
B-39	713+00; 180' LT	2.0	5.1	32,000	60	< 5	Moderately Aggressive	Extremely Aggressive
A-36	719+85; 60' RT	4.0	5.0	2,000	60	265.8	Moderately Aggressive	Extremely Aggressive
B-59	735+00; 180' LT	5.0	6.4	80,000	60	< 5	Slightly Aggressive	Moderately Aggressive
B-66	744+00; 180' LT	1.0	4.3	31,000	60	< 5	Extremely Aggressive	Extremely Aggressive
B-71	749+00; 60' RT	3.0	6.0	101,000	60	< 5	Moderately Aggressive	Moderately Aggressive
B-84	756+70; 180' LT	6.0	4.8	34,000	60	37.5	Extremely Aggressive	Extremely Aggressive
A-59	761+50; 20' RT	2.0	7.4	50,000	60	< 5	Slightly Aggressive	Slightly Aggressive
B-91	763+20; 75' RT	4.0	7.2	52,000	60	< 5	Slightly Aggressive	Slightly Aggressive
A-65	767+00; 60' LT	4.0	7.6	19,000	60	37.5	Slightly Aggressive	Slightly Aggressive
A-77	777+00; 20' RT	4.0	5.8	160,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-113	790+00; 90' RT	1.0	4.0	15,000	60	96.3	Extremely Aggressive	Extremely Aggressive
A-93	794+00; 40' LT	2.0	4.9	55,000	60	< 5	Extremely Aggressive	Extremely Aggressive
B-117	836+50; 140' LT	1.0	5.1	6,200	60	< 5	Moderately Aggressive	Extremely Aggressive
A-99	845+00; 60' LT	2.0	4.8	9,800	60	49.5	Extremely Aggressive	Extremely Aggressive
B-136	861+00; 75' RT	1.0	5.8	19,000	60	< 5	Moderately Aggressive	Extremely Aggressive
A-131	875+00; Centerline	2.0	5.7	37,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-152	878+50; 185' RT	1.0	6.1	39,000	60	< 5	Slightly Aggressive	Moderately Aggressive
B-155	881+50; 180' RT	7.0	4.6	9,400	60	72.3	Extremely Aggressive	Extremely Aggressive
A-136	882+50; 40' LT	4.0	5.7	57,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-162	890+50; 60' RT	3.0	5.4	62,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-169	896+00; 155' RT	1.5	4.3	5,400	60	100.8	Extremely Aggressive	Extremely Aggressive
B-172	902+00; 68' RT	1.5	6.2	71,000	60	47.4	Slightly Aggressive	Moderately Aggressive
A-145	903+80; 70' RT	4.5	5.6	13,000	60	< 5	Moderately Aggressive	Extremely Aggressive
B-182	931+00; 135' RT	1.0	7.0	15,000	60	< 5	Slightly Aggressive	Moderately Aggressive
SDB-2	3+00; 20' RT*	2.0	5.4	81,000	60	< 5	Moderately Aggressive	Extremely Aggressive

* *References Centerline of Access Road 1*

FIGURES

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125.00	0.959	0.001	9	4000	0.153					
2	250.00	0.924	0.003	10	1000.00	0.099					
3	500.00	1.327	0.004	11	125.00	0.010					
4	1000.00	0.351	0.006								
5	2000	0.421	0.009								
6	4000	0.244	0.021								
7	8000	0.141	0.024								
8	16000	0.100	0.021								

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
70.7 %	188.4 %	23.7			1.72		2438	2.01	0.21	4.585

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Brown Muck		

Project No. H1135080 **Client:**

Project: Wekiva-6

Location: B-50-2 **Depth:** 36-36.5

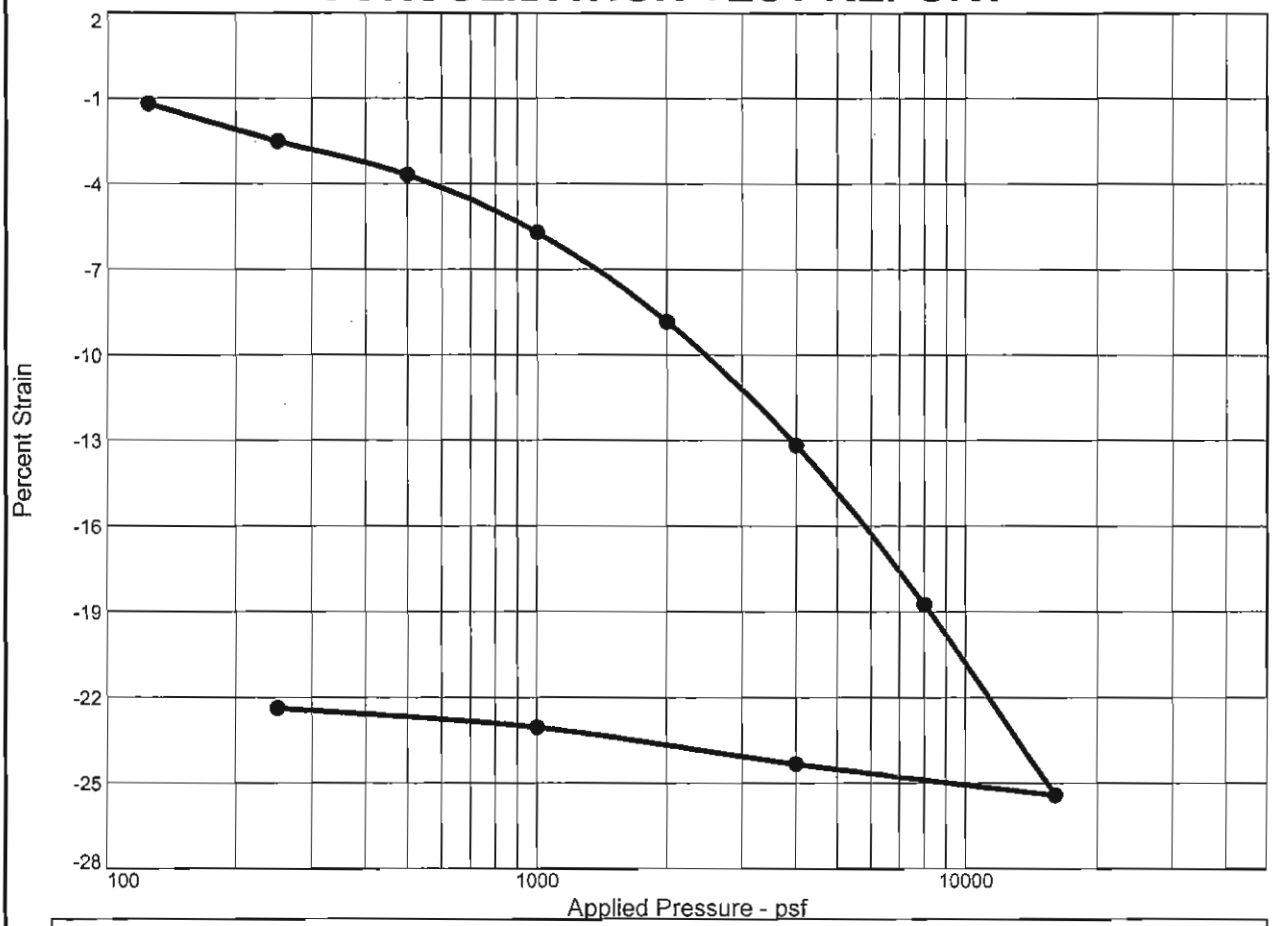
Remarks:

Organic Content = 57.0%

Terracon Consultants, Inc.

Figure 1

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α	No.	Load (psf)	C_v (ft.2/day)	C_α
1	125.00	0.622	0.002	9	4000	0.868					
2	250.00	0.090	0.002	10	1000.00	0.070					
3	500.00	0.358	0.003	11	250.00	0.838					
4	1000.00	1.067	0.004								
5	2000	0.488	0.006								
6	4000	1.131	0.006								
7	8000	0.627	0.017								
8	16000	0.563	0.016								

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
100.9 %	162.1 %	29.2			1.89		1978	0.90	0.07	3.035

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Brown Muck		

Project No. H1135080 **Client:**

Project: Wekiva-6

Location: B-12a @ 26-28'

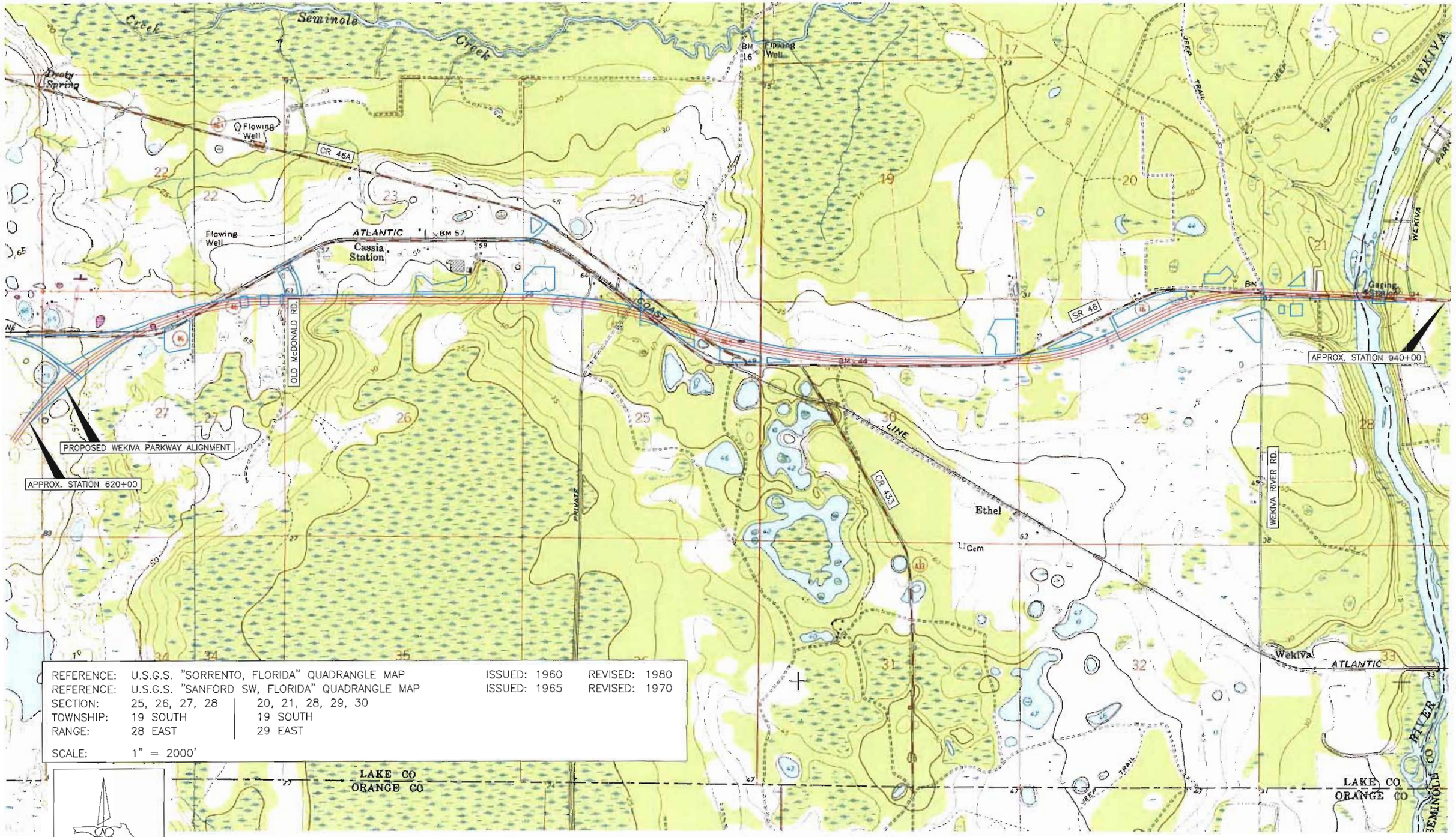
Remarks:

Organic Content = 46.4%
-200 = 91.8%

Terracon Consultants, Inc.

Figure 2

EXHIBITS



REFERENCE:	U.S.G.S. "SORRENTO, FLORIDA" QUADRANGLE MAP	ISSUED: 1960	REVISED: 1980
REFERENCE:	U.S.G.S. "SANFORD SW, FLORIDA" QUADRANGLE MAP	ISSUED: 1965	REVISED: 1970
SECTION:	25, 26, 27, 28 | 20, 21, 28, 29, 30		
TOWNSHIP:	19 SOUTH | 19 SOUTH		
RANGE:	28 EAST | 29 EAST		

SCALE: 1" = 2000'

Project Mngr:	ENJ
Drawn By:	SW
Checked By:	ENJ
Approved By:	RGA

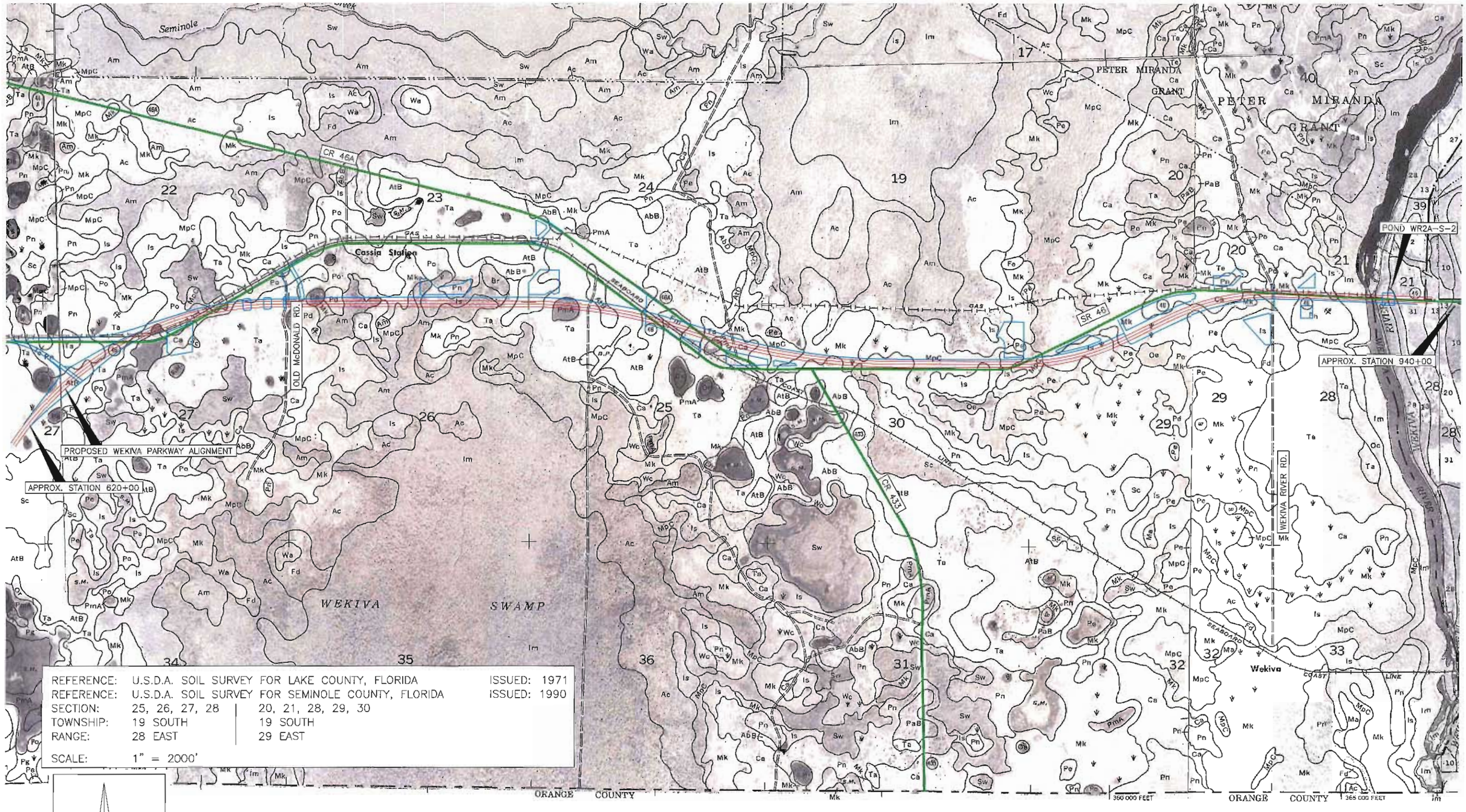
Project No.	H1135080
Scale:	AS SHOWN
File No.	H1135080-1
Date:	12-8-14

Terracon
Consulting Engineers and Scientists
1675 LEE ROAD WINTER PARK, FLORIDA 32789
PH. (407) 740-6110 FAX. (407) 740-6112

U.S.G.S. TOPOGRAPHIC MAP
GEOTECHNICAL ENGINEERING EVALUATION
WEKIVA PARKWAY (SR 429 / SR 46)
FROM OLD McDONALD RD. TO RIVER OAKS CIRCLE
LAKE AND SEMINOLE COUNTIES, FLORIDA

EXHIBIT
A-1

Dec 08, 2014 - 3:50pm N:\Projects\2013\H1135080\PROJECT DOCUMENTS (Reports-Letters-Drafts to Clients)\Cad\wells\usgs1.dwg



REFERENCE:	U.S.D.A. SOIL SURVEY FOR LAKE COUNTY, FLORIDA		ISSUED: 1971
REFERENCE:	U.S.D.A. SOIL SURVEY FOR SEMINOLE COUNTY, FLORIDA		ISSUED: 1990
SECTION:	25, 26, 27, 28	20, 21, 28, 29, 30	
TOWNSHIP:	19 SOUTH	19 SOUTH	
RANGE:	28 EAST	29 EAST	
SCALE:	1" = 2000'		

Project Mngr:	ENJ
Drawn By:	SW
Checked By:	ENJ
Approved By:	RGA

Project No.	H1135080
Scale:	AS SHOWN
File No.	H1135080-2
Date:	12-8-14

Terracon
Consulting Engineers and Scientists
1675 LEE ROAD WINTER PARK, FLORIDA 32789
PH. (407) 740-6110 FAX. (407) 740-6112

U.S.D.A. SOILS MAP
GEOTECHNICAL ENGINEERING EVALUATION
WEKIVA PARKWAY (SR 429 / SR 46)
FROM OLD McDONALD RD. TO RIVER OAKS CIRCLE
LAKE AND SEMINOLE COUNTIES, FLORIDA

EXHIBIT
A-2

Dec 08, 2014-3:30p.m N:\Projects\2013\H1135080\PROJECT DOCUMENTS (Reports-Letters-Drafts to Clients)\Cad\walls\usda2.dwg

Soil Survey Descriptions

Lake County

AbB / 1 – Sparr sand, 0 to 5 percent slopes. This soil type is nearly level to gently sloping and somewhat poorly drained. It is typically found on uplands of the Coastal Plain. This soil type has a seasonal high water table at a depth of 18 to 42 inches (1.5 to 3.5 feet). This soil type is predominantly sandy to a depth of 48 inches (4 feet). Thereafter, to the maximum defined depth of 99 inches (8.3 feet), this soil type exists as sandy clay or loam.

Ac / 3 – Anclote fine sand. This soil type is nearly level and very poorly drained. It is typically found in depressions, drainageways, and swamps in the Lower Coastal Plain. In its natural state and during years of normal rainfall, groundwater is at the surface to 2 feet above the surface of this soil type from June through December (apparent water table). This soil type is generally predominantly sandy through the defined profile of 80 inches. The upper 16 inches of Anclote fine sand typically has an organic content of between 2 and 9 percent.

Am / 4 – Anclote and Myakka soils. This soil type is nearly level and very poorly drained. It is typically found in depressions, drainageways, and swamps in the Lower Coastal Plain and on the flatwoods. In its natural state and during years of normal rainfall, groundwater is at the surface to 2 feet above the surface of this soil type from June through December (apparent water table). This soil type is generally predominantly sandy through the defined profile of 80 inches.

AtB / 8 – Candler sand, 0 to 5 percent slopes. This soil type is nearly level to gently sloping and excessively drained. It is typically found on rolling uplands of the central ridge. This soil type has a seasonal high water table at a depth of greater than 120 inches (10 feet). This soil type is predominantly sandy to a typical depth of 95 inches (7.9 feet). Thereafter, to the maximum defined depth of 99 inches (8.3 feet), this soil type exists as silty sand.

Ca / 12 – Cassia sand. This soil type is nearly level and somewhat poorly drained. It is typically found on low ridges and knolls that are slightly higher than nearby flatwoods. This soil type has a seasonal high water table at a depth of 10 to 40 inches (0.8 to 3.3 feet). This soil type is predominantly sandy through the defined profile of 80 inches.

Fm / 17 – Arents. This soil type consists of heterogenous soil that has been excavated, reworked, and reshaped by earth-moving equipment. Arents occur as areas of filled-in sloughs, marshes, shallow depressions, swamps and other low-lying areas, or as final cover for sanitary landfills. In normal rainfall years, the seasonal high water table is typically between depths of 24 and 36 inches (2.0 and 3.0 feet) for 2 to 4 months. During extended dry periods, the water table recedes to below a depth of 5 feet (60 inches). Although the composition somewhat variable, Arents are generally predominantly sandy throughout the defined depth of 60 inches (5.0 feet).

Im / 19 – Bluff and Manatee soils, frequently flooded. This soil type is nearly level and very poorly drained. It is typically found in low areas and is covered with shallow water during much of the rainy season. Organic matter is typically found within the surficial 18 inches (1.5 feet) of this soil type. In its natural state and during years of normal precipitation, this soil type has a seasonal high water table at or above the surface.

Is / 20 – Immokalee sand. This soil type is nearly level and poorly drained. It is typically found in broad areas in the flatwoods and in low areas between sand ridges and lakes, ponds, and sloughs. In its natural state and during years of normal precipitation, this soil type has a seasonal high water table within 10 inches (0.8 feet) of the surface.

Mk / 28 – Myakka sand. This soil map unit consists of areas of poorly drained soils. This soil map unit is typically found on the flatwoods. In its natural state, during years of normal rainfall, the groundwater table is normally between depths of about 6 to 18 inches (0.5 to 1.5 feet) below the ground surface from June through November. This soil type is predominantly sandy throughout the defined profile of 80 inches (6.7 feet).

MpC / 29 – Myakka and Placid sand, 2 to 8 percent slopes. This soil group is nearly level to gently sloping and very poorly drained and poorly drained. It is typically found in low depressional areas. In its natural state and during years of normal precipitation, the water table is at or near the surface most of the year. This soil is predominantly sandy throughout the defined profile of 80 inches (6.7 feet). The upper 20 inches (1.7 feet) of Placid soils have a typical organic content of between 2 and 10 percent. The upper 6 inches of Myakka soils have a typical organic content of between 2 and 7 percent.

Pe / 38 – Placid sand, depressional. This soil type is nearly level and very poorly drained and poorly drained. It is typically found in low depressional areas. In its natural state and during years of normal precipitation, the water table is within 12 inches (1 foot) of the surface most of the year. This soil is predominantly sandy throughout the defined profile of 80 inches (6.7 feet). The upper 20 inches (1.7 feet) have a typical organic content of between 2 and 10 percent.

PmA / 40 Placid and Myakka sands, depressional. This soil group is nearly level and very poorly drained and poorly drained. It is typically found in low depressional areas. In its natural state and during years of normal precipitation, the water table is at or near the surface most of the year. This soil is predominantly sandy throughout the defined profile of 80 inches (6.7 feet). The upper 20 inches (1.7 feet) of Placid soils have a typical organic content of between 2 and 10 percent. The upper 6 inches of Myakka soils have a typical organic content of between 2 and 7 percent.

Pn / 41 – Pomello sand, 0 to 5 percent slopes. This soil type is nearly level to gently sloping and moderately well drained. It is typically found throughout the flatwoods. This soil type has a seasonal high water table at depth of about 45 inches (3.8 feet) during years of normal rainfall.

Po / 42 – Pompano sand. This soil type is nearly level and poorly drained. It is typically found on broad, low flats and in poorly defined drainageways on the flatwoods. During years of normal precipitation, this soil type has a seasonal high water table within 10 inches (0.8 feet) of the surface for 2 to 6 months, and within a depth of 30 inches (2.5 feet) for more than 9 months. This soil type is predominantly sand throughout the defined profile.

Ta / 45 – Tavares sand, 0 to 5 percent slopes. This soil type is nearly level to gently sloping and moderately well drained. In its natural state and during years of normal precipitation, this soil type has a seasonal high water table between depths of 40 and 60 inches (3.3 and 5.0 feet) of the surface for 6 months. This soil is predominantly sandy throughout the defined profile of 80 inches (6.7 feet).

Te / 46 – Orsino sand. This soil type is nearly level to gently sloping and moderately well drained. In its natural state and during years of normal precipitation, this soil type has a seasonal high water table between depths of 24 and 42 inches (2 and 3.5 feet) of the surface for 6 months. This soil is predominantly sandy throughout the defined profile of 80 inches (6.7 feet).

Seminole County

13 – EauGallie and Immokalee fine sands. This soil type is nearly level and poorly drained. It is typically found in broad plains on the flatwoods areas. During years of normal precipitation, this soil type has a seasonal high water table within 12 inches (1.0 foot) of the surface for 1 to 4 months.

28 – Pompano fine sand, occasionally flooded. This soil type is nearly level and poorly drained. It is typically found on the floodplains. During years of normal precipitation, this soil type has a seasonal high water table within 12 inches (1.0 foot) of the surface for 2 to 6 months. This soil type is subject to occasional flooding, typically following heavy rains.

31 – Tavares-Millhopper fine sands, 0 to 5 percent slopes. This soil type is nearly level to gently sloping and moderately well drained. It is typically found on low ridges and knolls on the uplands. In its natural state and during years of normal rainfall, the soils in this map unit have a seasonal high water table at a depth of between 36 and 60 inches (3.0 and 5.0 feet) for 2 to 6 months. The seasonal high water table is apparent in Tavares soil but perched in Millhopper soil.

LOCATION PLAN
SCALE IN FEET

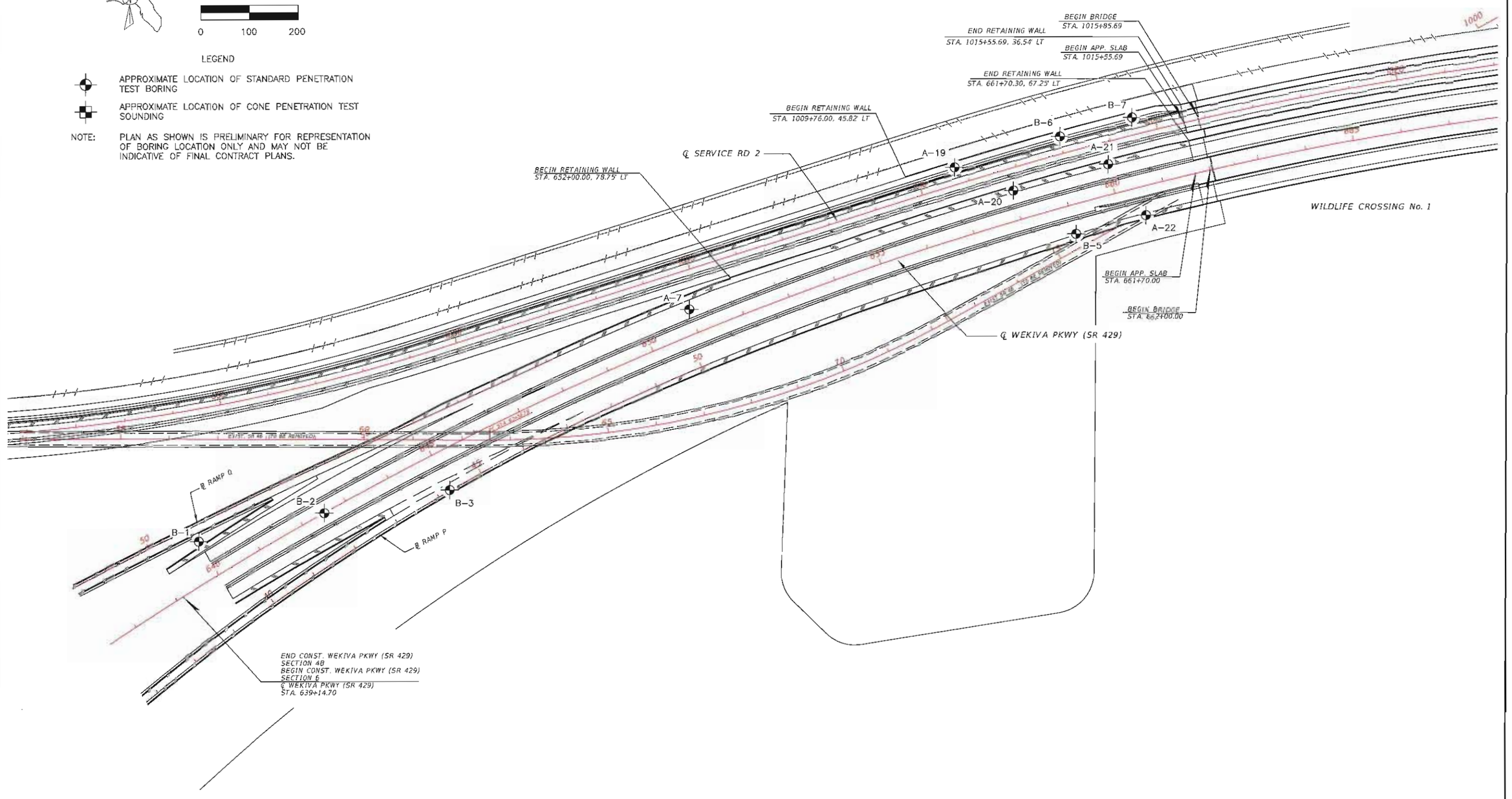
0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

NOTE: PLAN AS SHOWN IS PRELIMINARY FOR REPRESENTATION OF BORING LOCATION ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.



WALLS AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14	STATE OF FLORIDA DEPARTMENT OF TRANSPORATATION		
CHECKED BY: ENJ 11-26-14	ROAD NO.	COUNTY	FINANCIAL PROJECT ID
DESIGNED BY:	SR 429	LAKE SEMINOLE	238275-7-32-02
CHECKED BY:			

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

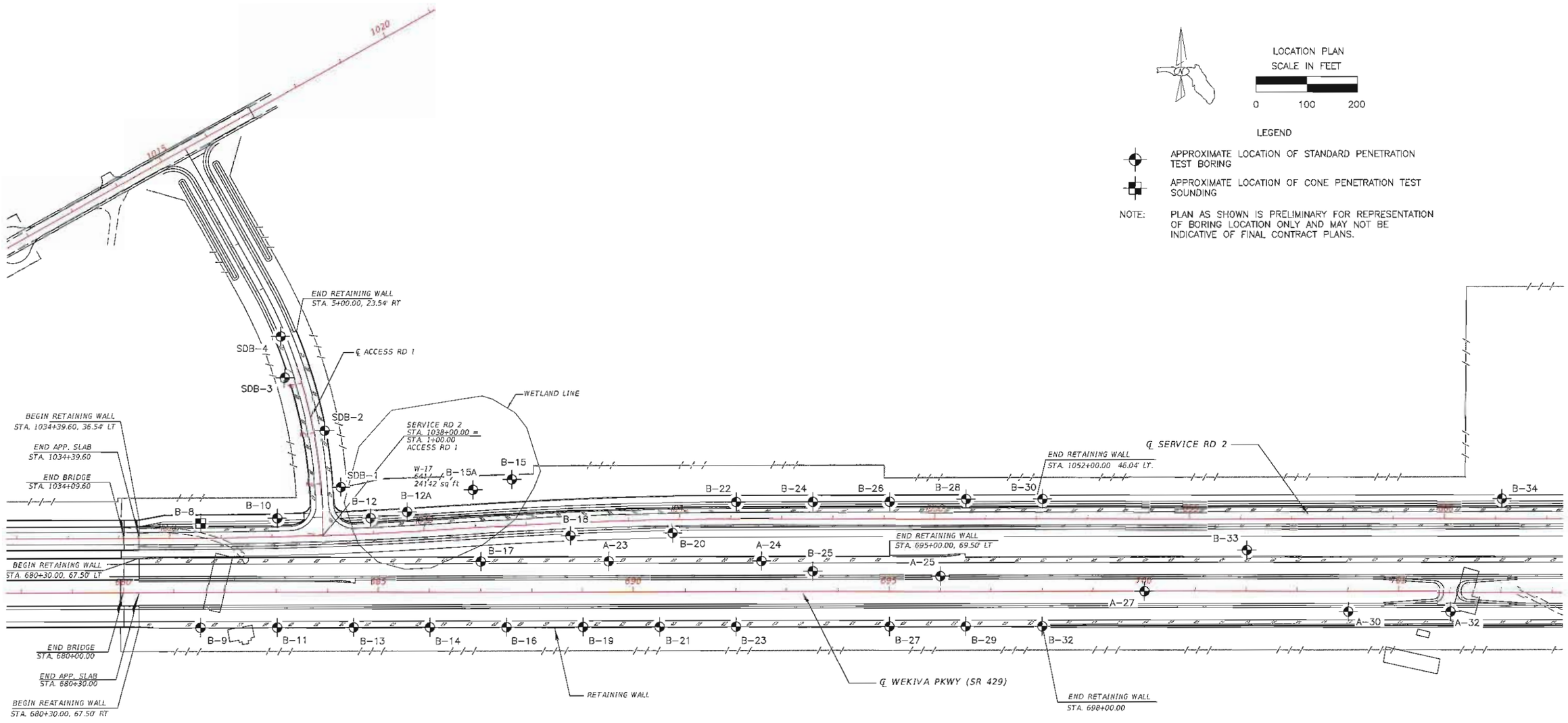
REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

SHEET NO.: –

TERRACON No. H1 13 5080 EXHIBIT: A-4

Nov26, 2014-11:00am



WALLS AND HIGH FILL BORINGS

Nov26, 2014 - 11:01am

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	SW 11-26-14
CHECKED BY:	ENJ 11-26-14
DESIGNED BY:	
CHECKED BY:	

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. –

TERRACON No. H1 13 5080 EXHIBIT: A-5

LOCATION PLAN
SCALE IN FEET

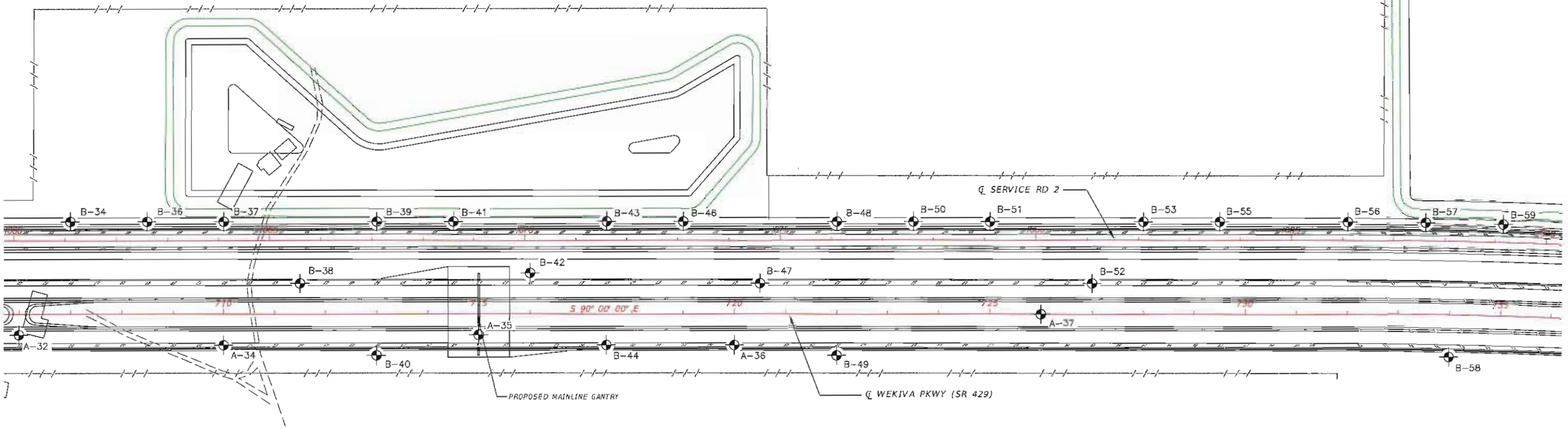
0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

NOTE: PLAN AS SHOWN IS PRELIMINARY FOR REPRESENTATION OF BORING LOCATION ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.



WALLS AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

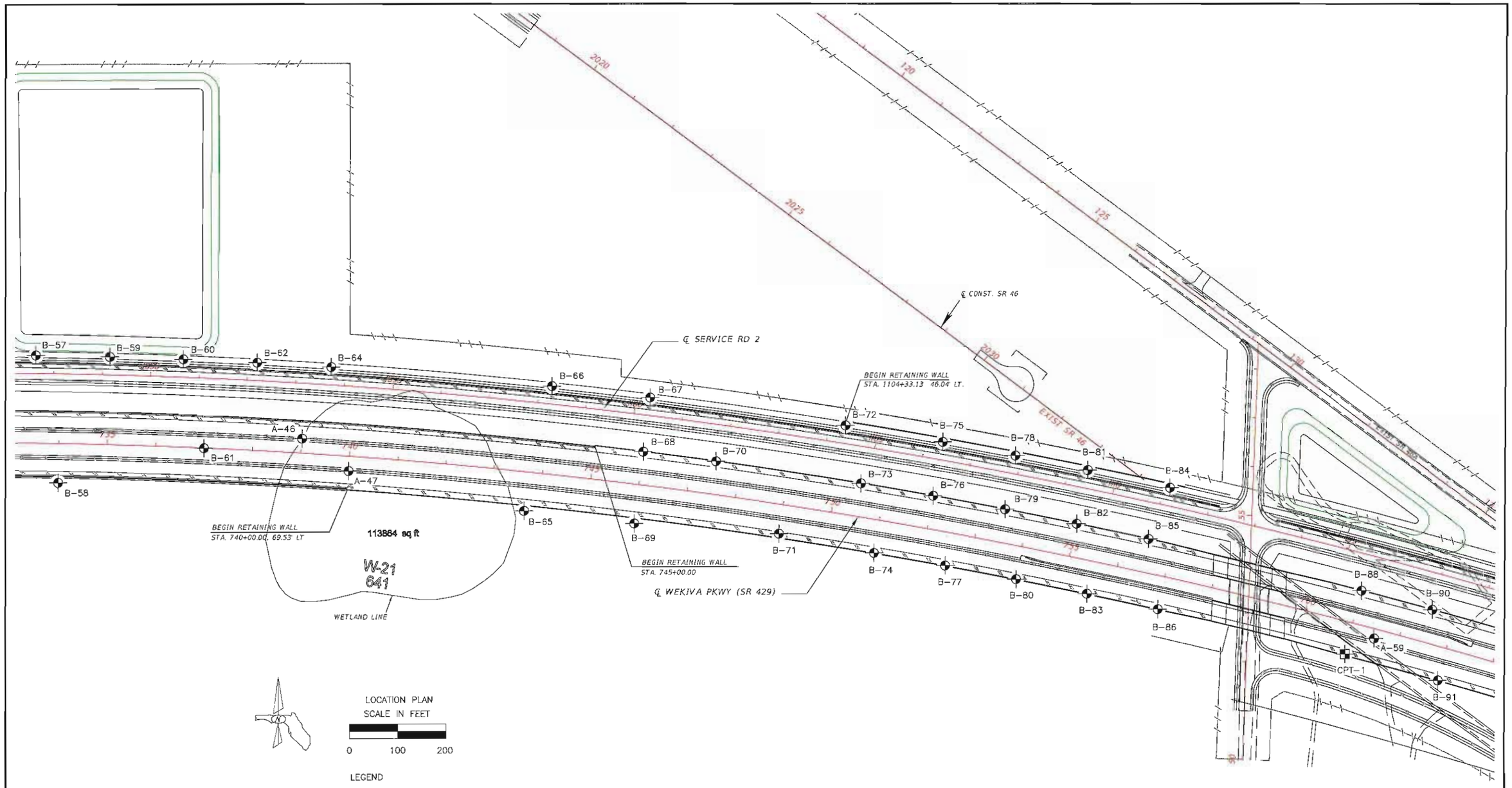
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. –

TERRACON No. H1 13 5080 EXHIBIT: A-6

Nov26, 2014-11:01am



LOCATION PLAN
SCALE IN FEET

0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

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WALLS AND HIGH FILL BORINGS

REVISIONS

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TERRACON
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DRAWN BY: SW 11-26-14
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CHECKED BY:

STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

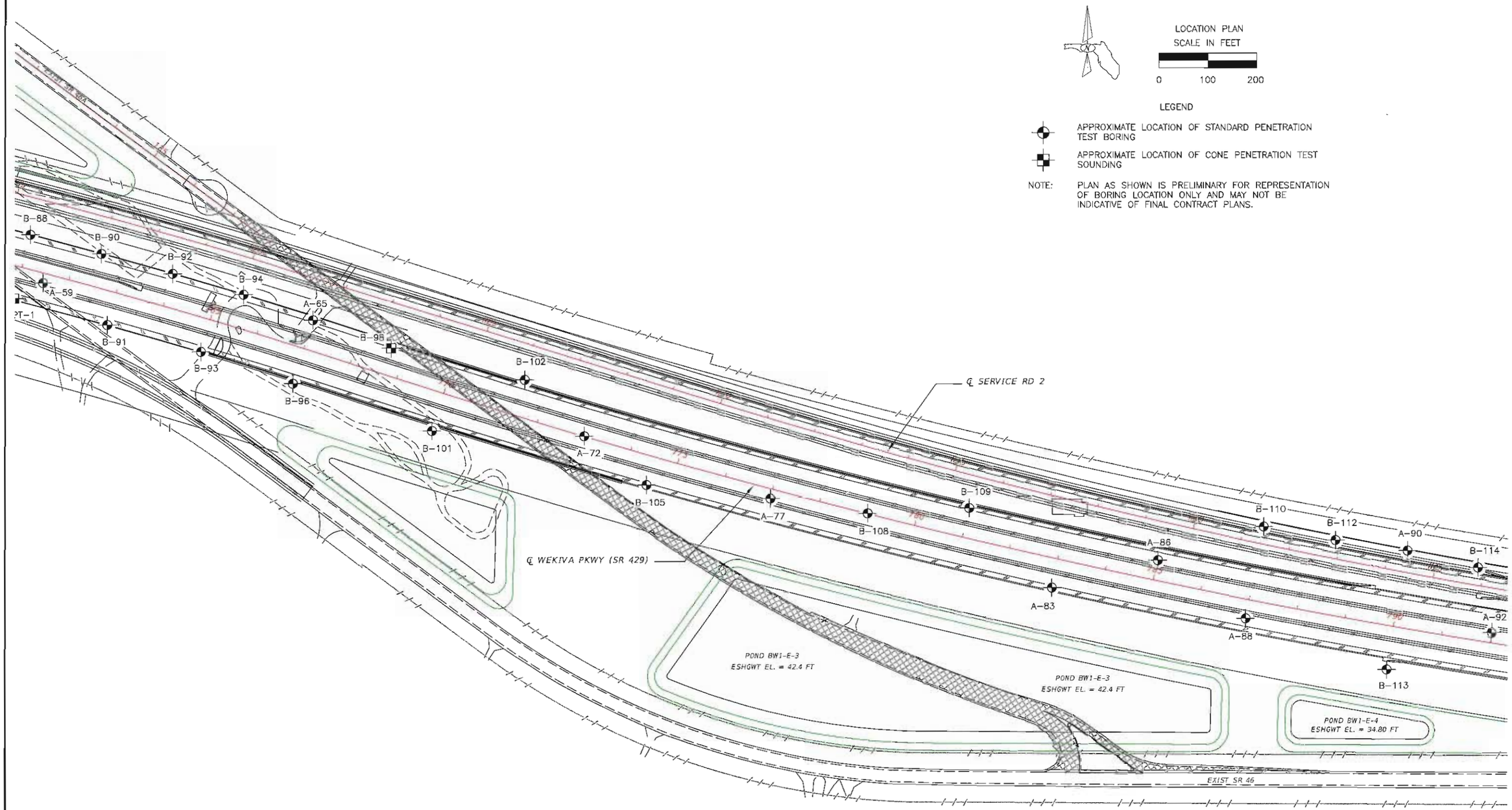
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. —

TERRACON No. H1 13 5080 EXHIBIT: A-7

Nov26, 2014-11:01am



LOCATION PLAN
SCALE IN FEET

0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

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WALLS AND HIGH FILL BORINGS

Nov26, 2014–11:02am

REVISIONS					
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P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	STATE OF FLORIDA DEPARTMENT OF TRANSPORATATION			SHEET TITLE:	REF. DWG. NO.
SW 11-26-14				REPORT OF SPT BORINGS FOR STRUCTURES	
CHECKED BY: ENJ 11-26-14	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME:	SHEET NO.
DESIGNED BY:	SR 429	LAKE SEMINOLE	238275-7-32-02	WEKIVA PARKWAY (SR 429/SR 46) SECTION 6	–
CHECKED BY:					

TERRACON No. H1 13 5080 EXHIBIT: A-8

LOCATION PLAN
SCALE IN FEET

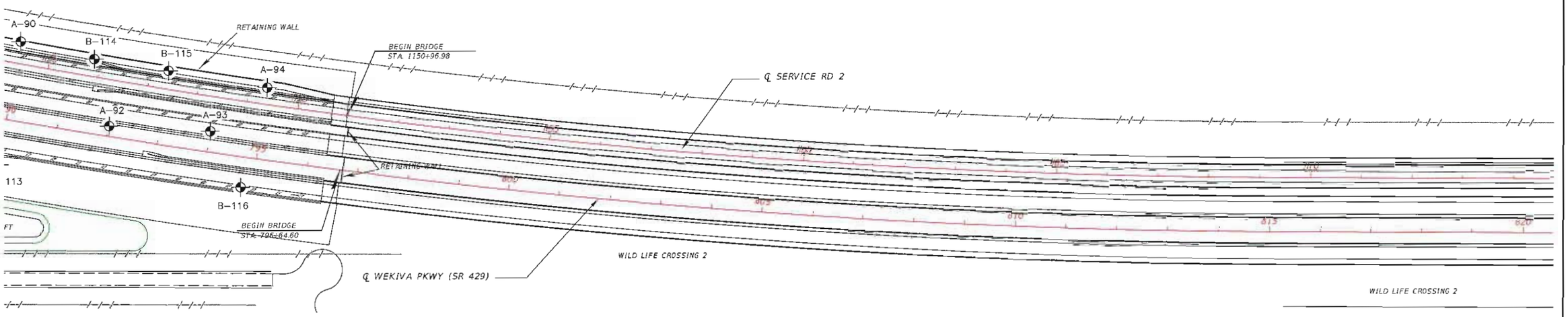
0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

NOTE: PLAN AS SHOWN IS PRELIMINARY FOR REPRESENTATION OF BORING LOCATION ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.



WALLS AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SW 11-4-14	ENJ 11-26-14		

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. –

TERRAÇON No. H1 13 5080 EXHIBIT: A-9

Nov26, 2014-11:03am

LOCATION PLAN
SCALE IN FEET

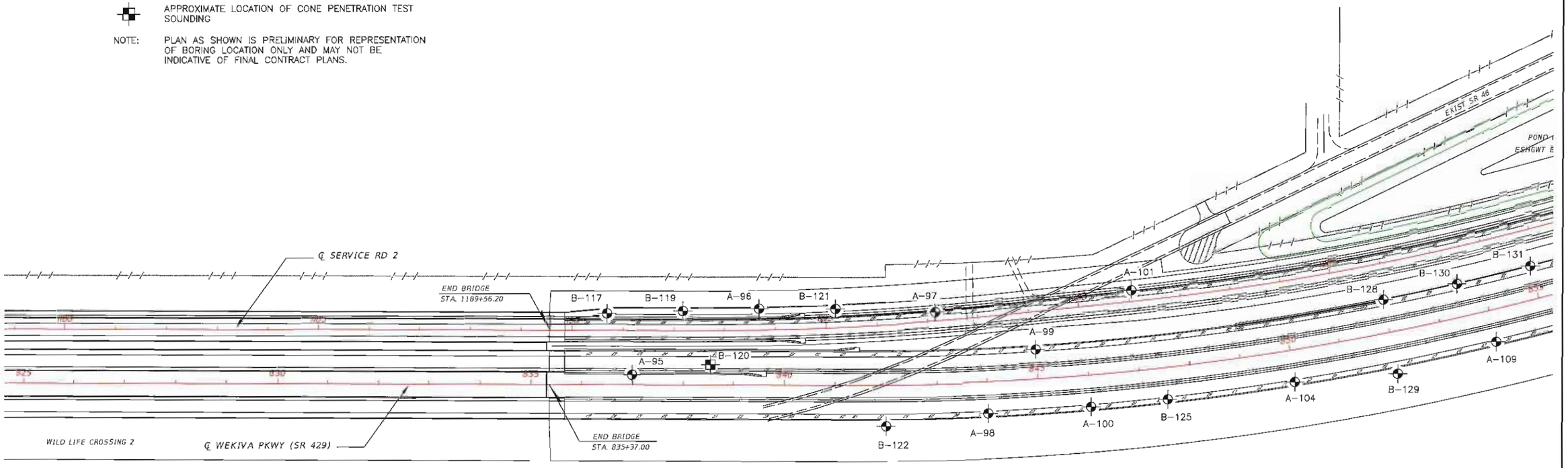
0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

NOTE: PLAN AS SHOWN IS PRELIMINARY FOR REPRESENTATION OF BORING LOCATION ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.



WALLS AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14	
CHECKED BY: ENJ 11-26-14	
DESIGNED BY:	
CHECKED BY:	

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. –

TERRACON No. H1 13 5080 EXHIBIT: A-10

Nov26, 2014-11:03am

LOCATION PLAN
SCALE IN FEET

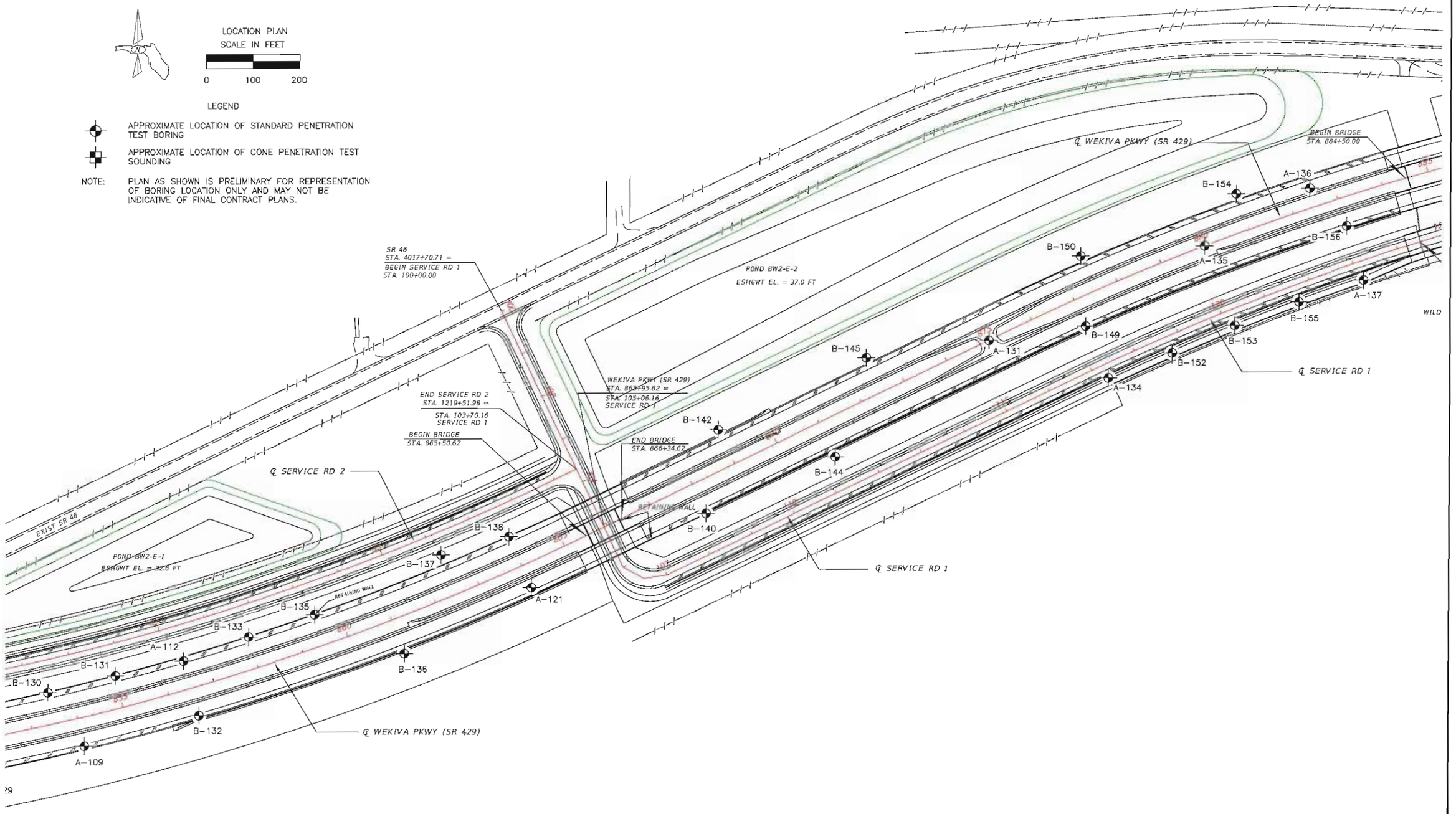
0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

NOTE: PLAN AS SHOWN IS PRELIMINARY FOR REPRESENTATION OF BORING LOCATION ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.



WALLS AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	SW 11-26-14
CHECKED BY:	ENJ 11-26-14
DESIGNED BY:	
CHECKED BY:	

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

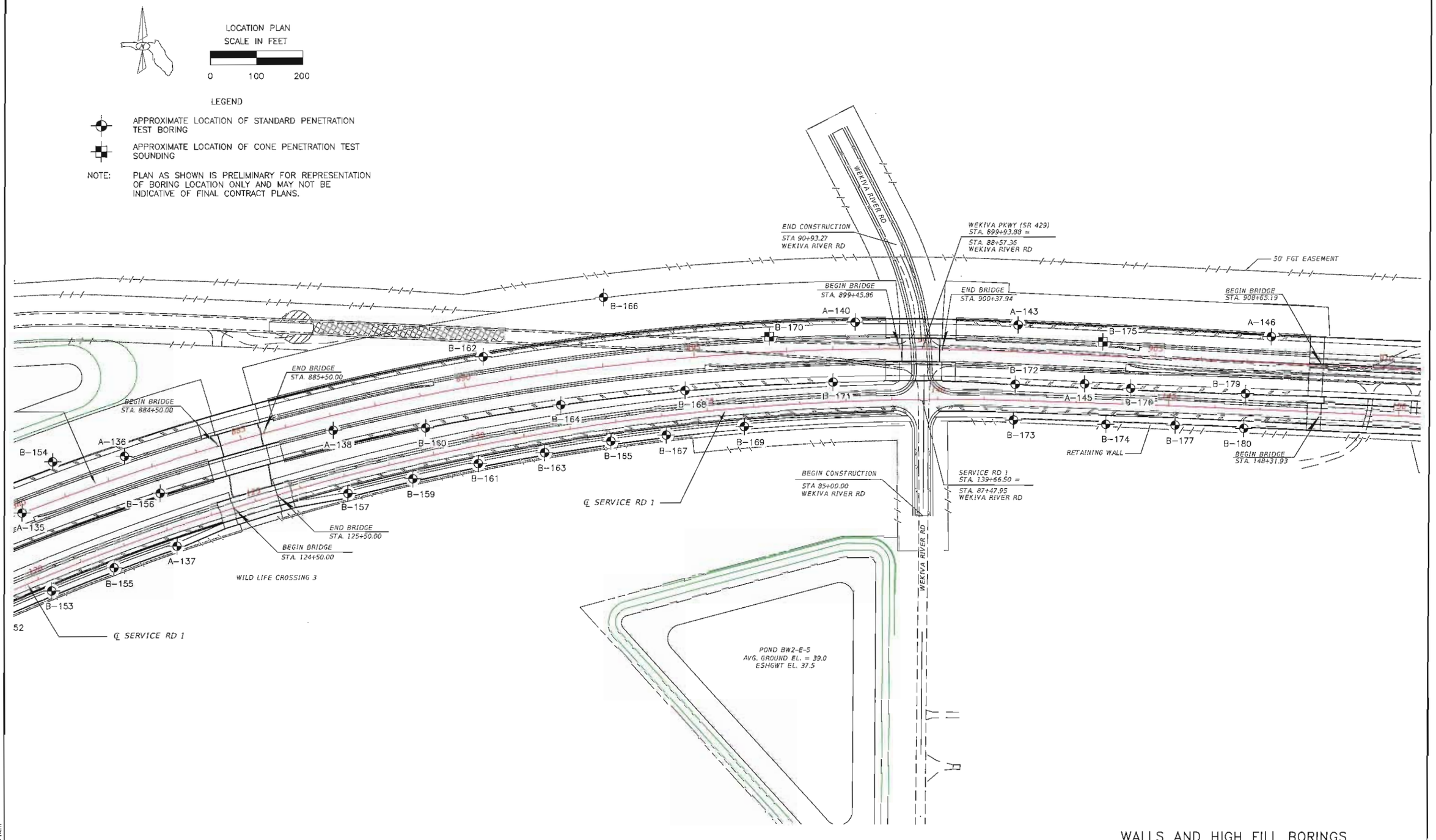
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.:

SHEET NO.: –

TERRACON No. H1 13 5080 EXHIBIT: A-11

Nov26, 2014-11:03am



WALLS AND HIGH FILL BORINGS

Nov26, 2014—11:04am

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	SW 11-26-14
CHECKED BY:	ENJ 11-26-14
DESIGNED BY:	
CHECKED BY:	

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

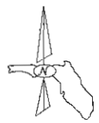
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46)
SECTION 6

SHEET NO.: —

TERRACON No. H1 13 5080 EXHIBIT: A-12



LOCATION PLAN
SCALE IN FEET

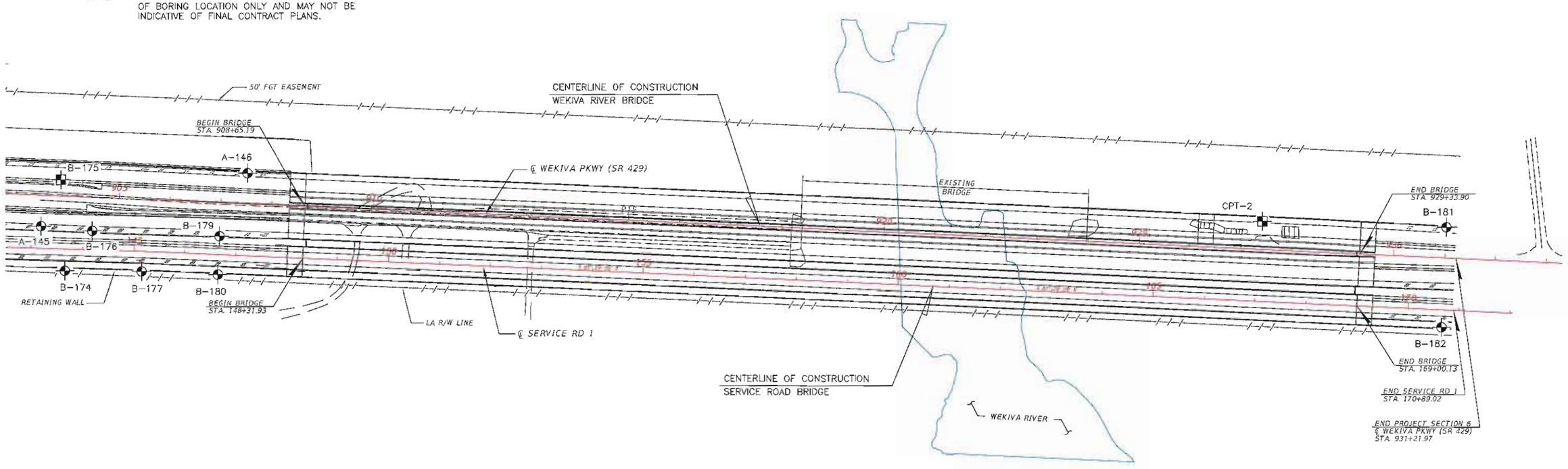
0 100 200

LEGEND

APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

APPROXIMATE LOCATION OF CONE PENETRATION TEST SOUNDING

NOTE: PLAN AS SHOWN IS PRELIMINARY FOR REPRESENTATION OF BORING LOCATION ONLY AND MAY NOT BE INDICATIVE OF FINAL CONTRACT PLANS.



WALLS AND HIGH FILL BORINGS

Dec08, 2014 - 3:40pm

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

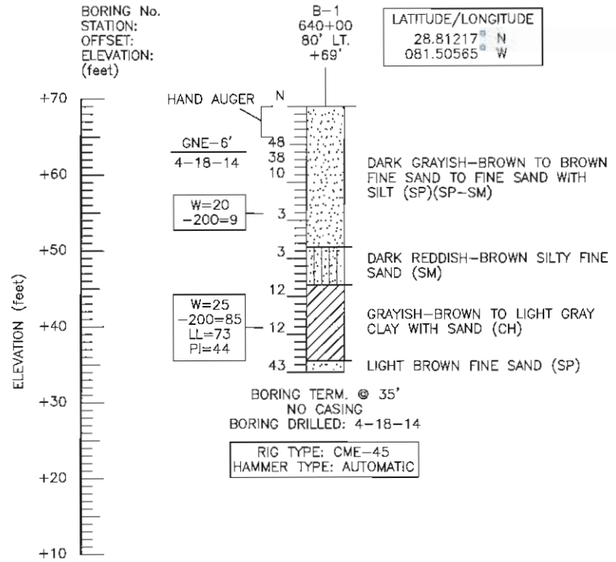
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

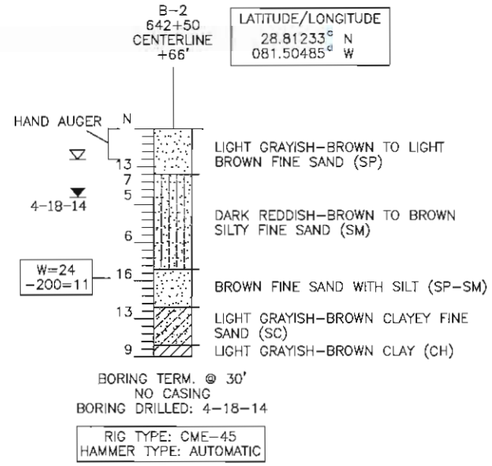
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

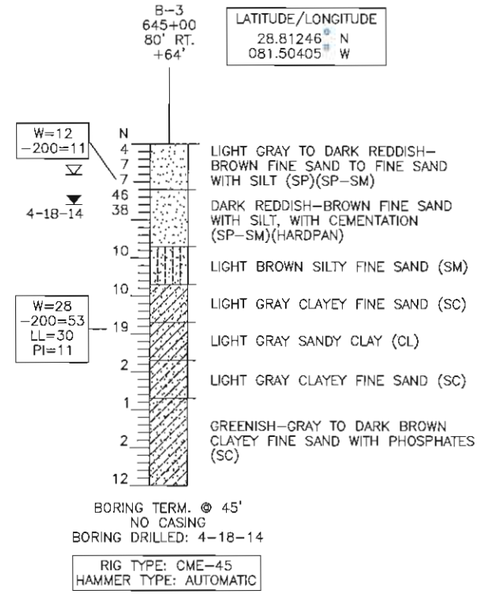
REF. DWG. NO.

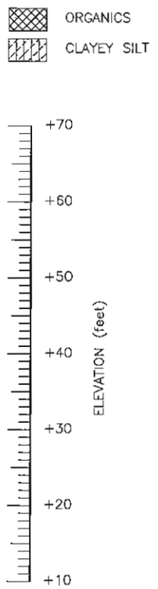
SHEET NO. ~

TERRACON No. H1 13 5080 EXHIBIT: A-13









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

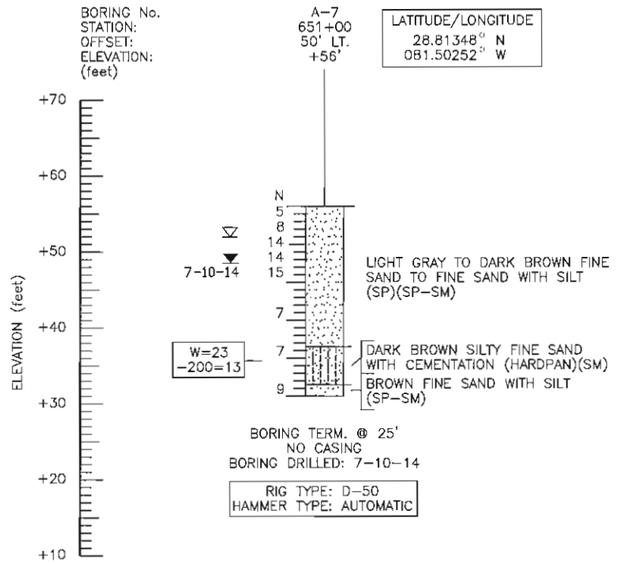
SILTS AND CLAYS

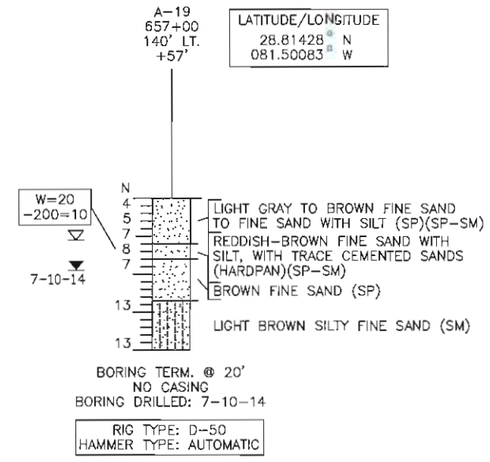
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

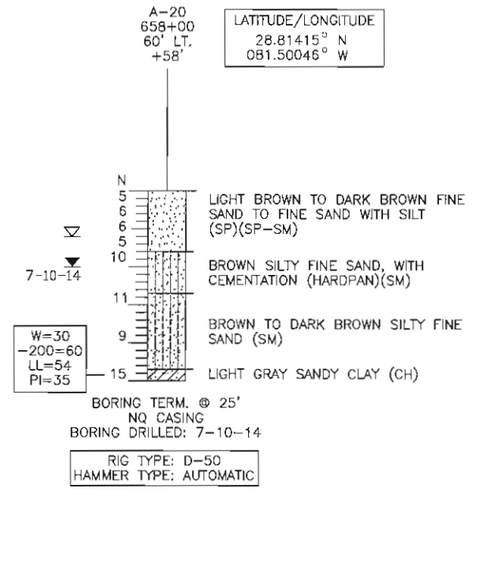
ENVIRONMENTAL CLASSIFICATION:

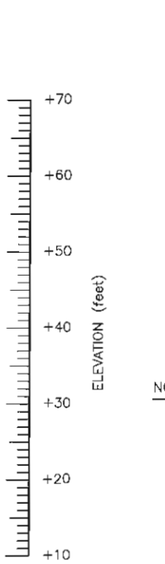
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.2









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-11:21am

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	SW 11-26-14
CHECKED BY:	ENJ 11-26-14
DESIGNED BY:	
CHECKED BY:	

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

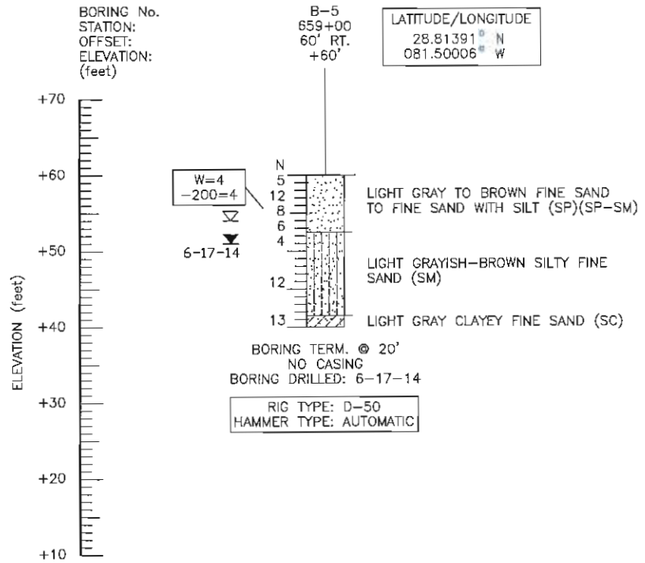
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

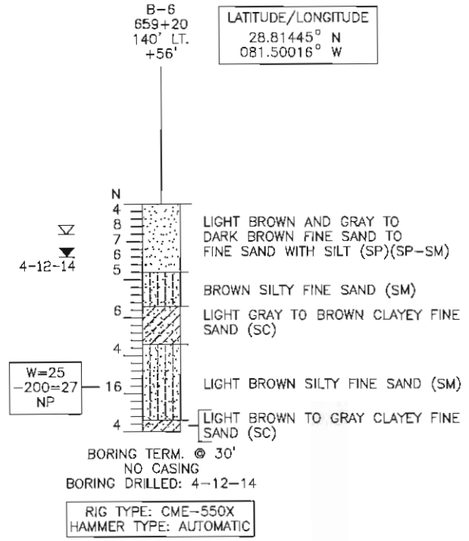
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

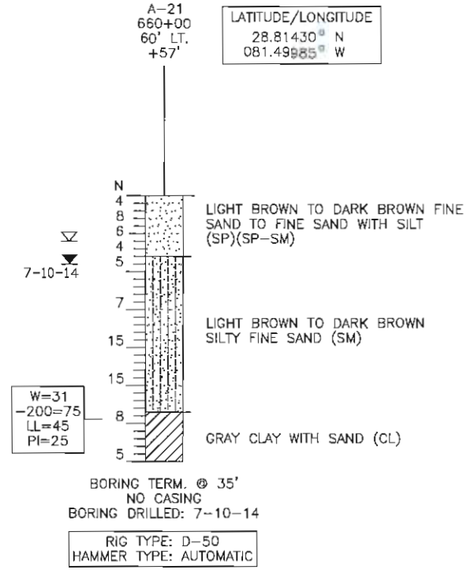
REF. DWG. NO.

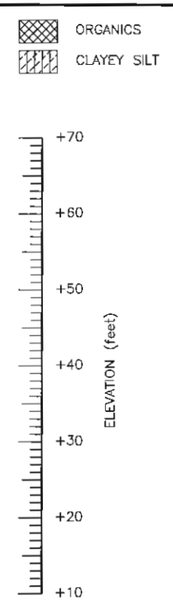
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-14









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
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STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

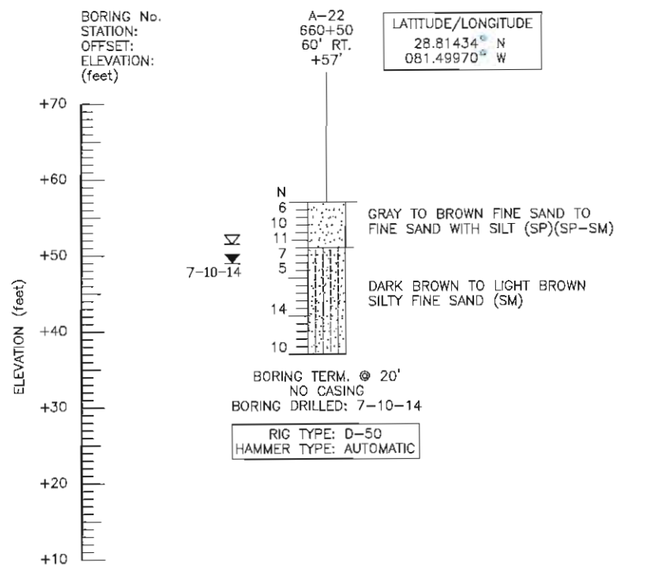
SILTS AND CLAYS

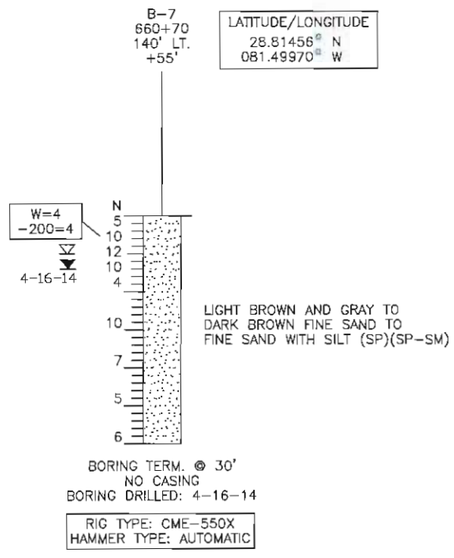
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

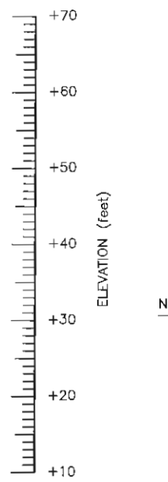
ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.5







100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJEGT PLANS.

WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

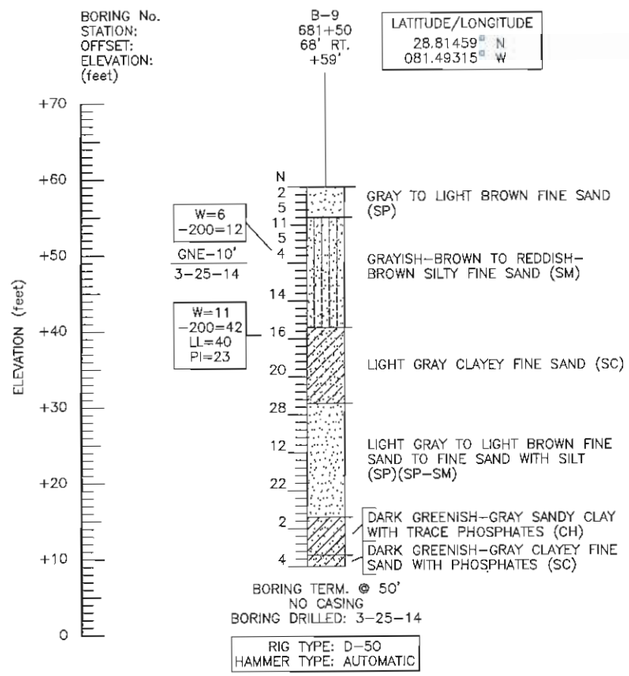
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

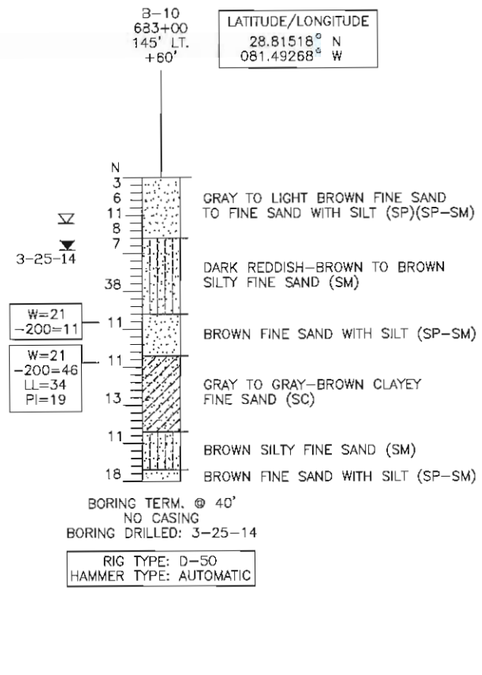
REF. DWG. NO.

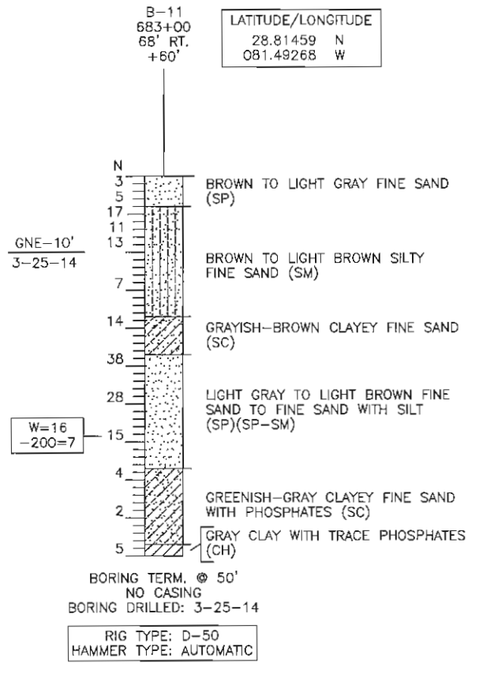
SHEET NO. -

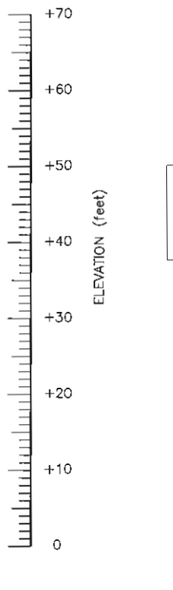
TERRACON No. H1 13 5080 EXHIBIT: A-15

Nov26, 2014-11:22am









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: MODERATELY AGGRESSIVE
pH=6.2

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

Nov26, 2014—11:23am

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

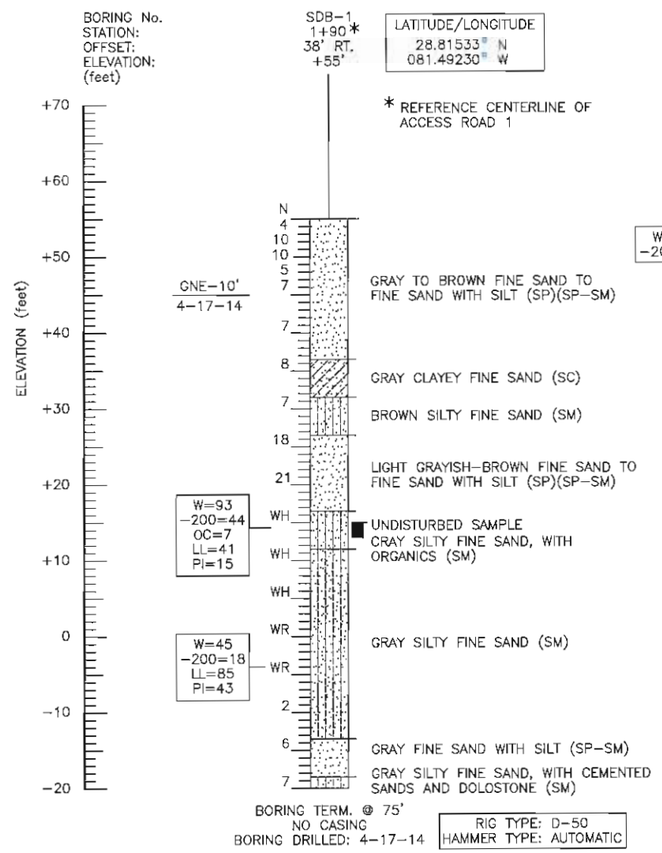
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

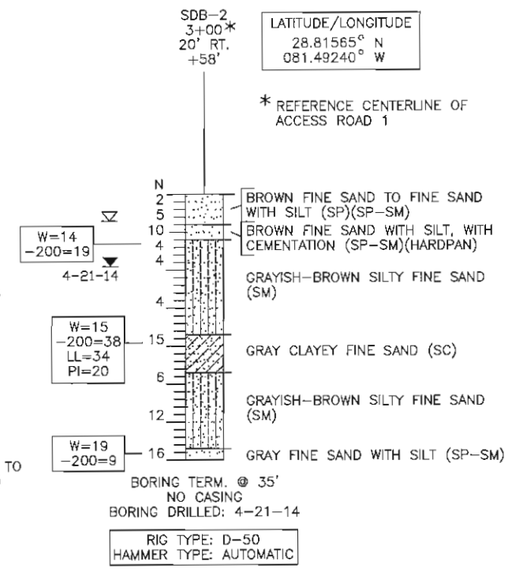
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

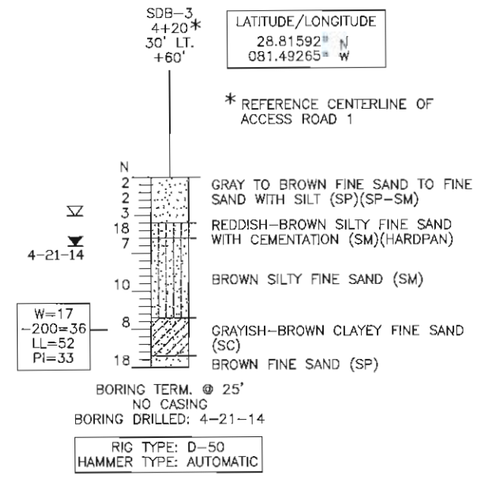
REF. DWG. NO.

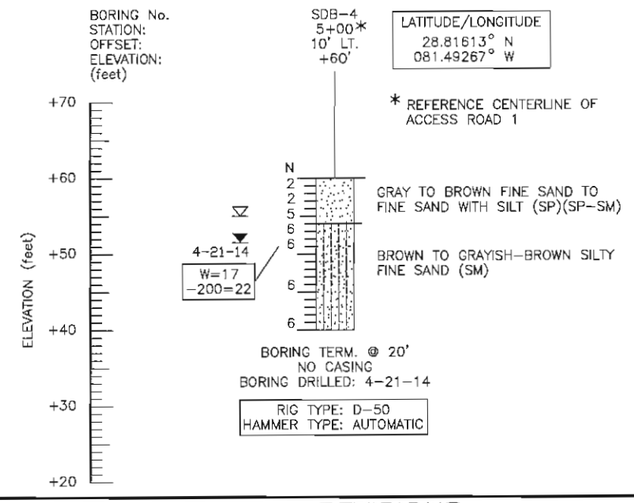
SHEET NO. —

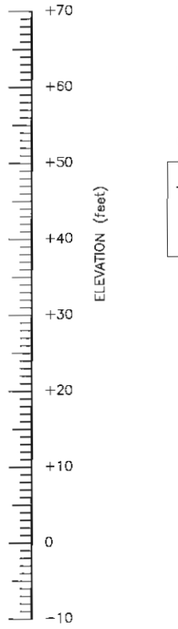
TERRACON No. H1 13 5080 EXHIBIT: A-16











ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0
-200=0
LL=0
PI=0
NP
OC=0

NATURAL MOISTURE CONTENT (%)
FINES PASSING No. 200 SIEVE (%)
LIQUID LIMIT (%)
PLASTICITY INDEX
NON-PLASTIC
ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.4

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

Nov26, 2014-11:24am

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

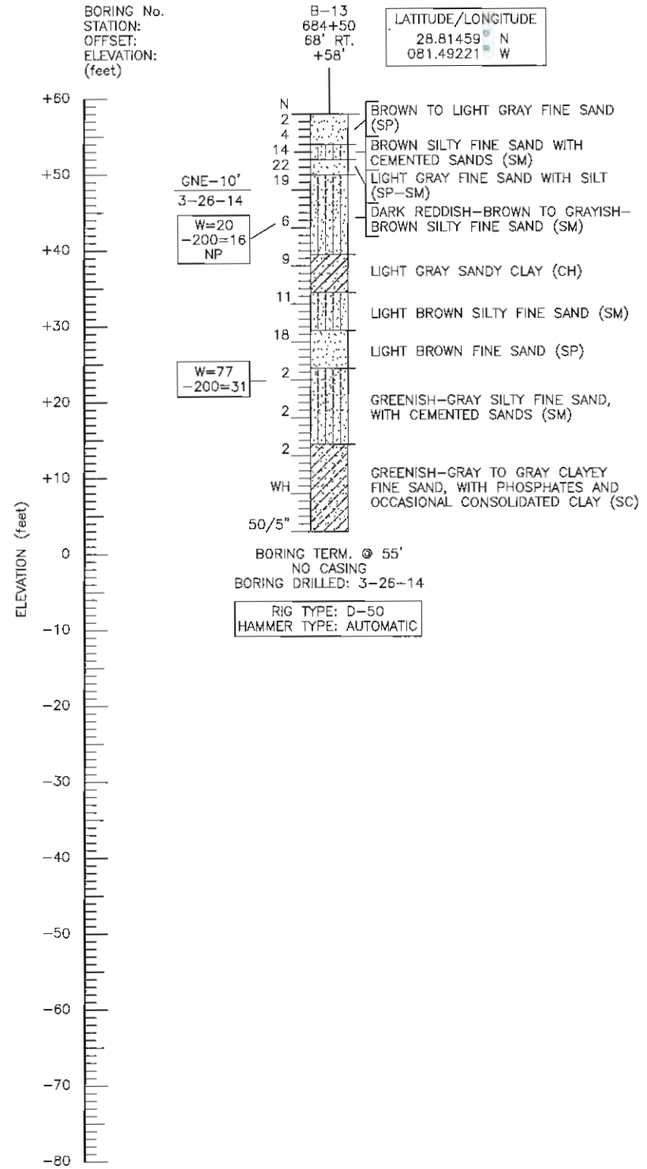
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

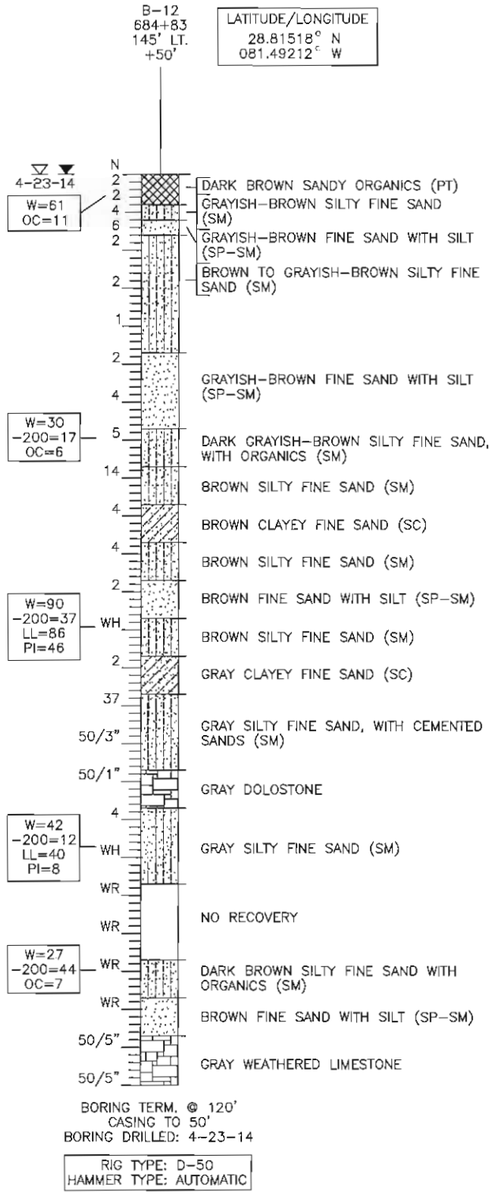
REF. DWG. NO.

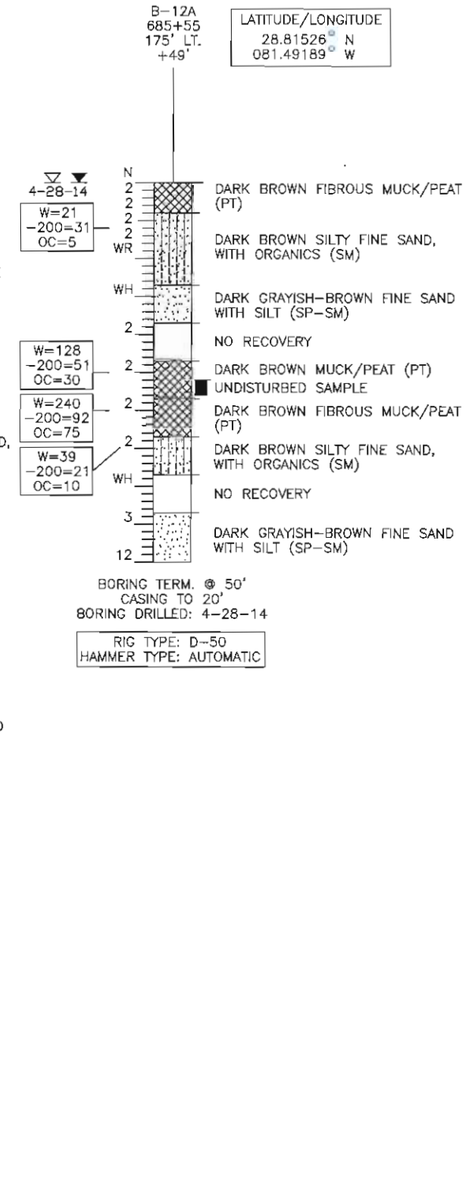
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

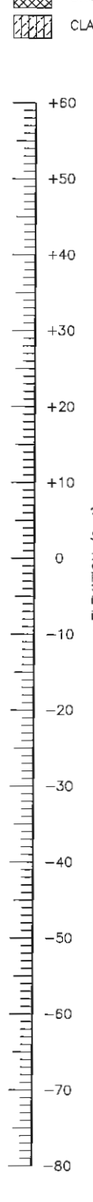
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-17









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

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AUTOMATIC HAMMER

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ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

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VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
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STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
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NOTES:

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

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UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

Nov26, 2014-11:25am

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

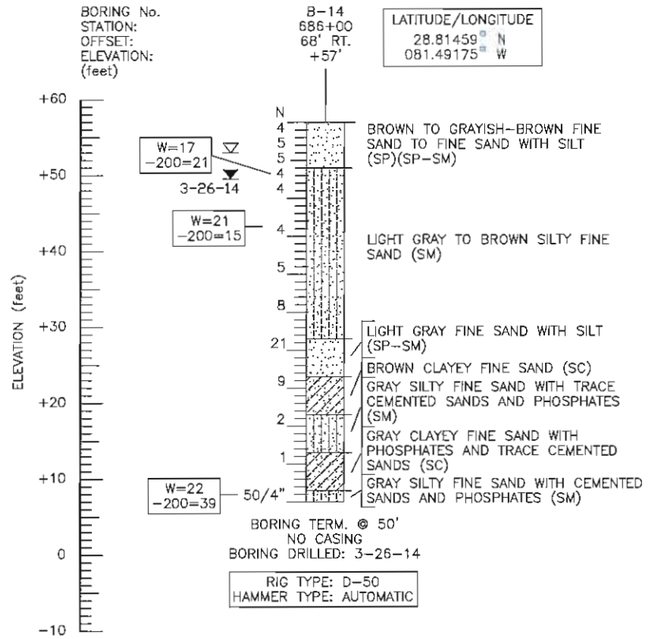
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

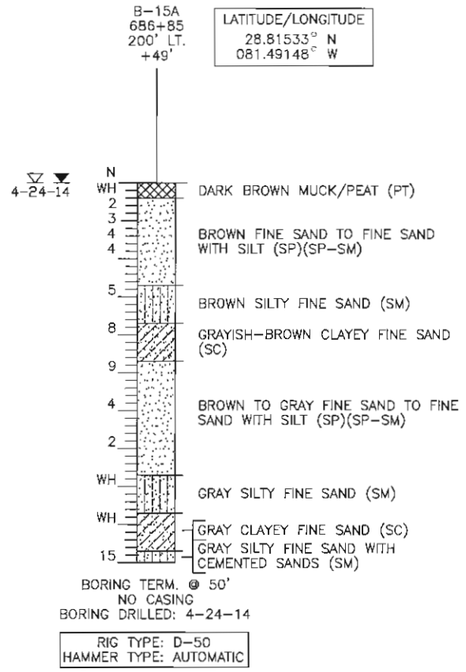
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

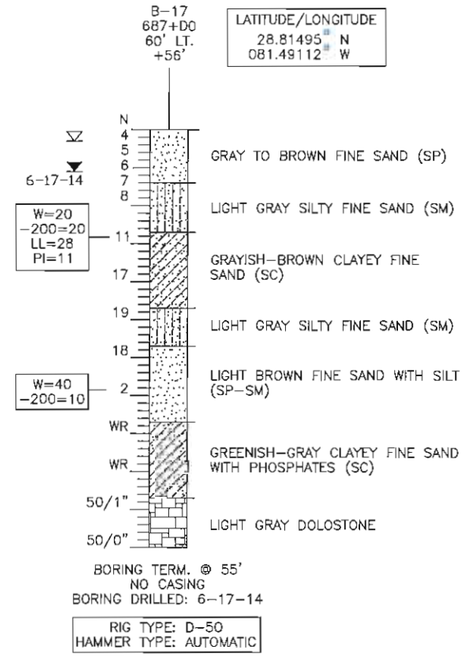
REF. DWG. NO.

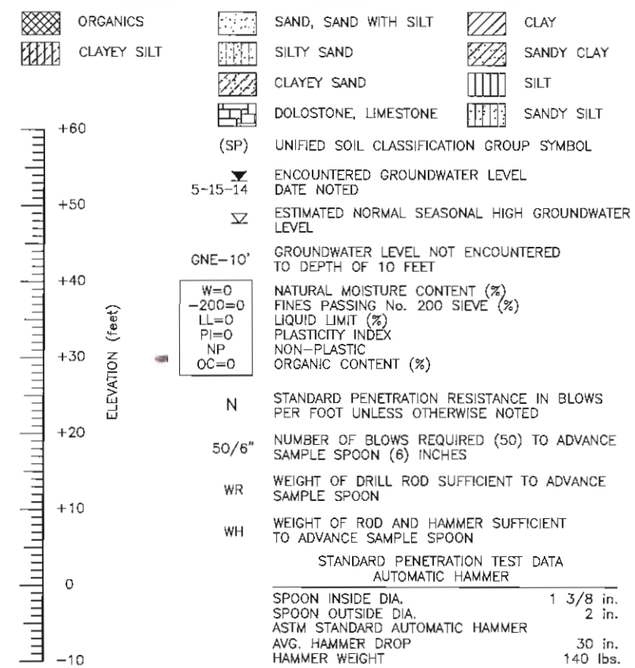
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-18









STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
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NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

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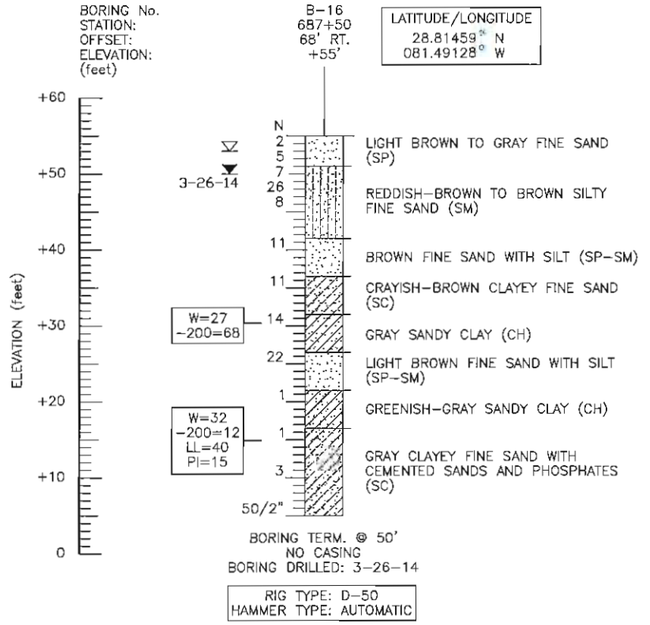
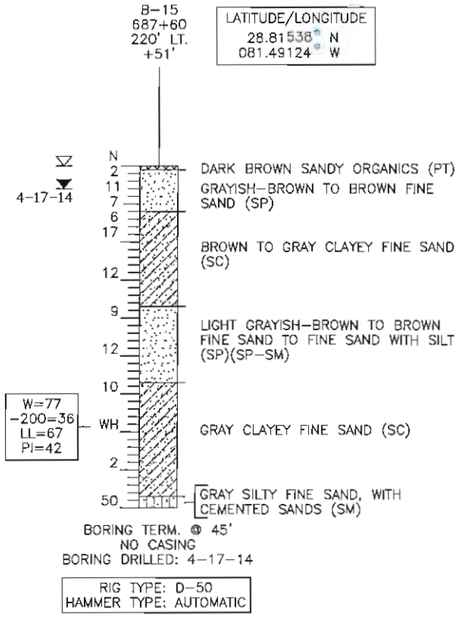
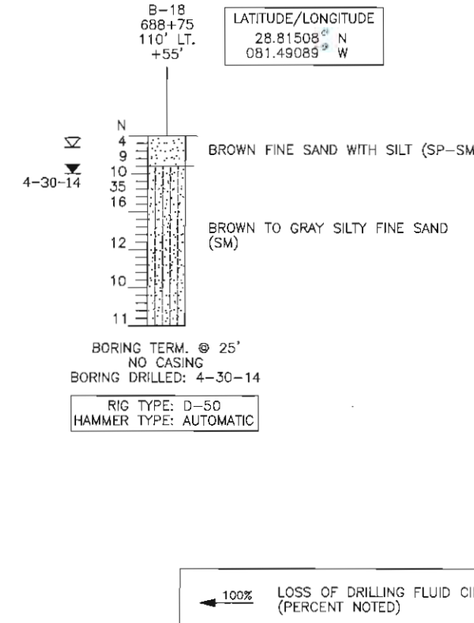
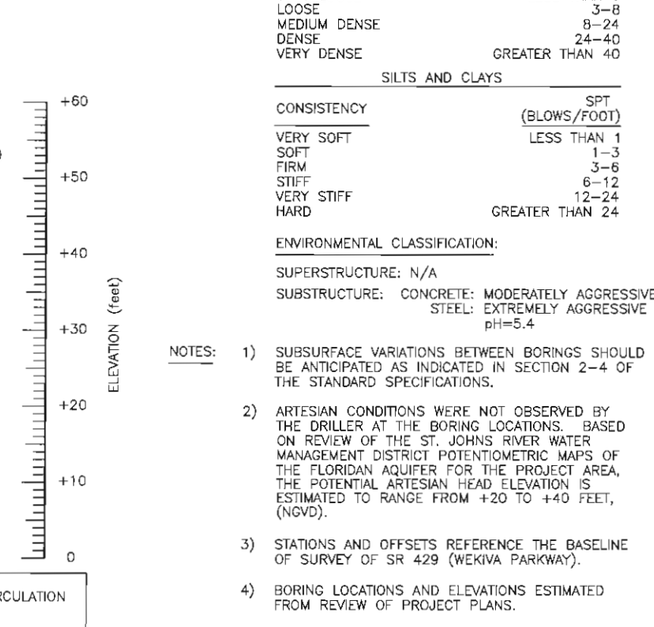
4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.









WALL AND HIGH FILL BORINGS

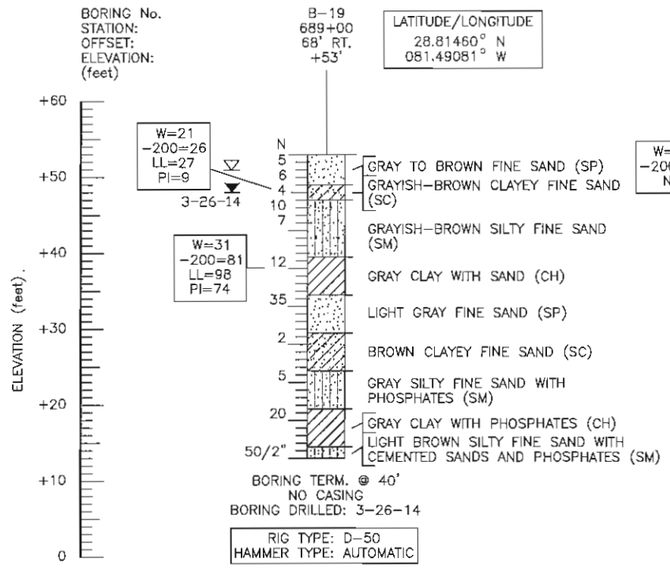
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

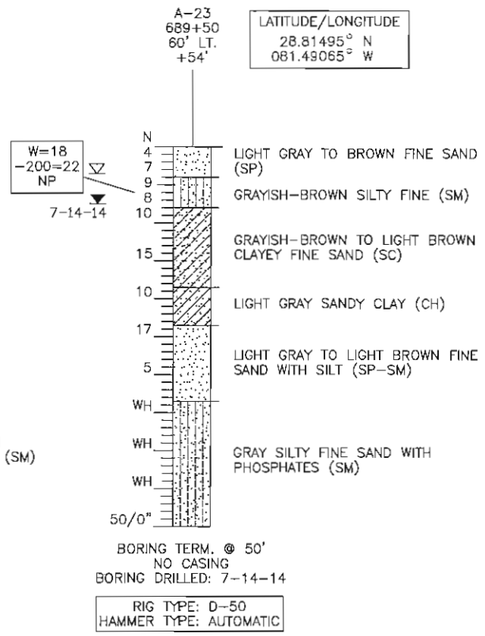
RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

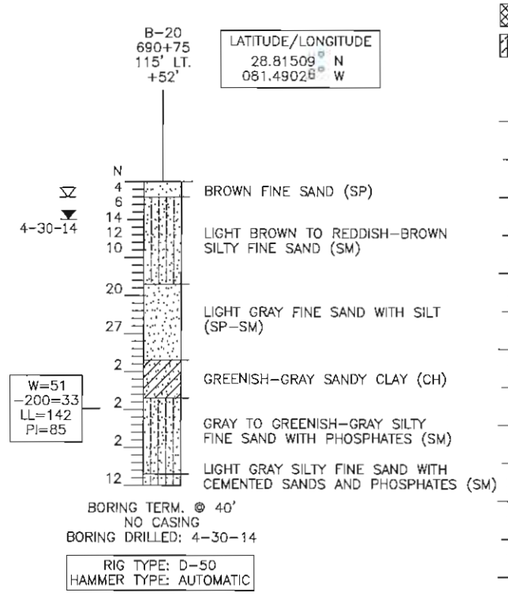
DRAWN BY: SW 11-26-14	STATE OF FLORIDA DEPARTMENT OF TRANSPORATATION	SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES	REF. DWG. NO.
CHECKED BY: ENJ 11-26-14			
DESIGNED BY:	ROAD NO. / COUNTY / FINANCIAL PROJECT ID	PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6	SHEET NO.
CHECKED BY:	SR 429 / LAKE SEMINOLE / 238275-7-32-02		-

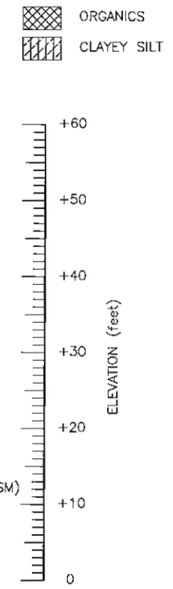
TERRACON No. H1 13 5D80 EXHIBIT: A-19

Nov26, 2014-11:28am









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
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50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
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STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
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AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

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RELATIVE DENSITY	SPT (BLOWS/FOOT)
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CONSISTENCY	SPT (BLOWS/FOOT)
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ENVIRONMENTAL CLASSIFICATION:

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SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
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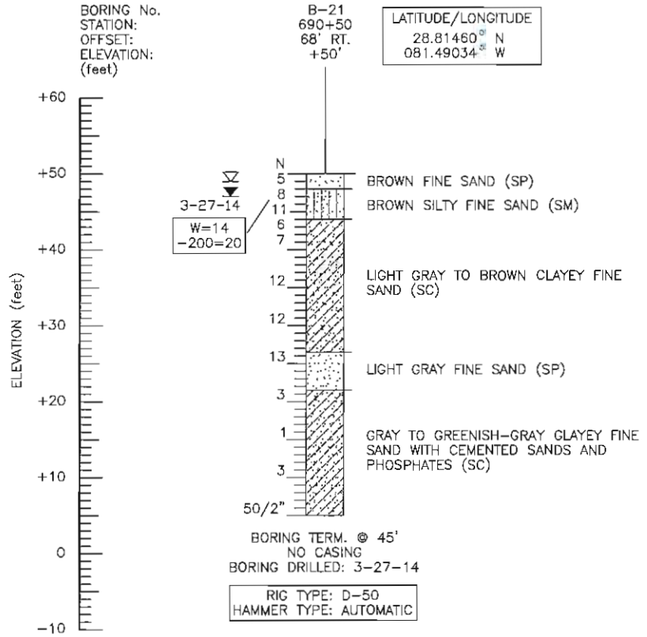

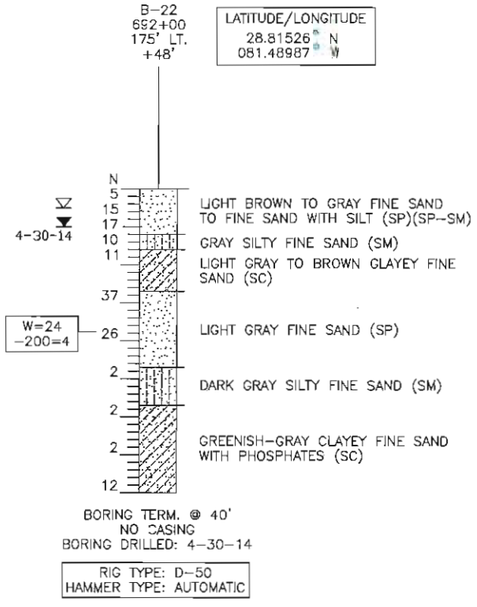

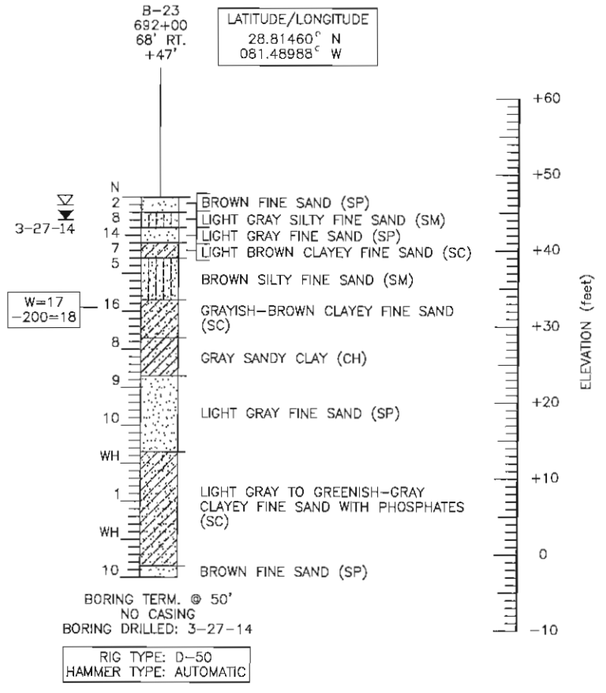

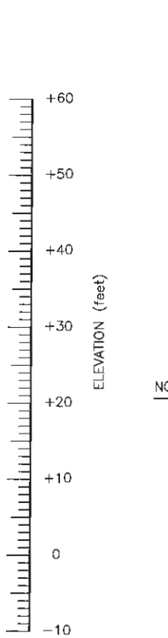

NOTES:

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

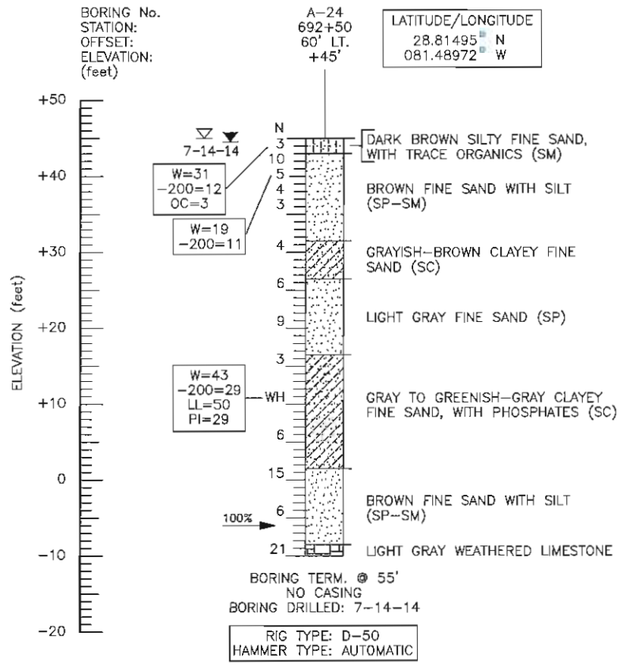
REF. DWG. NO.

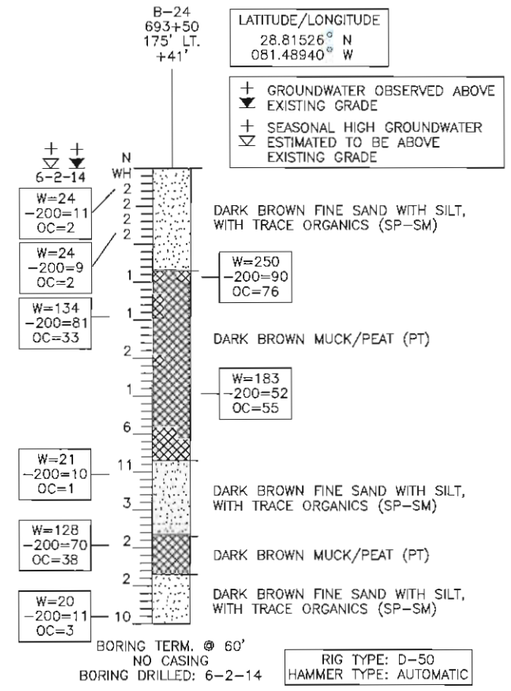
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

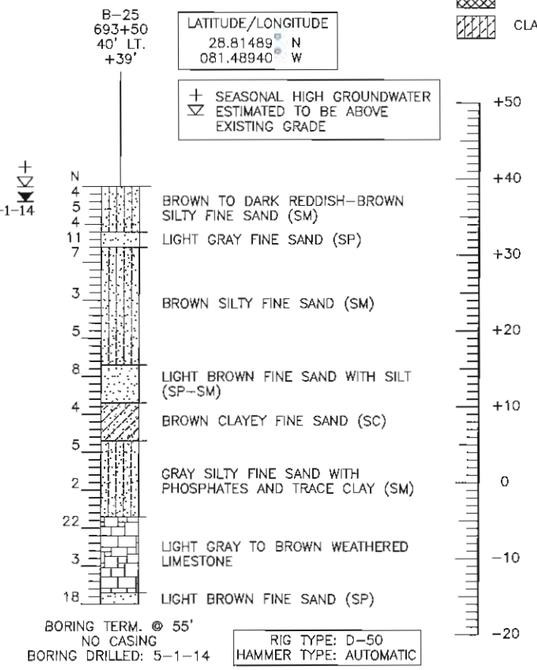
SHEET NO. -

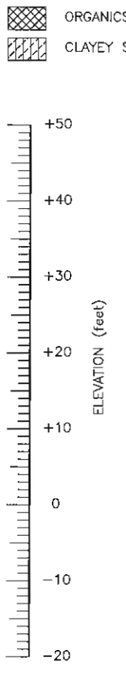
TERRACON No. H1 13 5080 EXHIBIT: A-20

Nov26, 2014-11:29am









ORGANICS
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SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

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ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

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W=0 -200=0 LL=0 PI=0 NP OC=0 — NATURAL MOISTURE CONTENT (%); FINES PASSING No. 200 SIEVE (%); LIQUID LIMIT (%); PLASTIGITY INDEX; NON-PLASTIC; ORGANIC CONTENT (%)

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WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

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AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.0

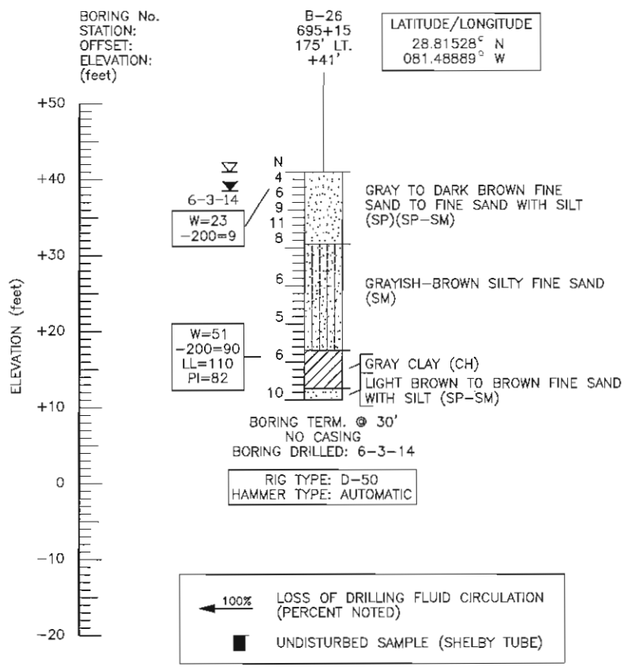
NOTES:

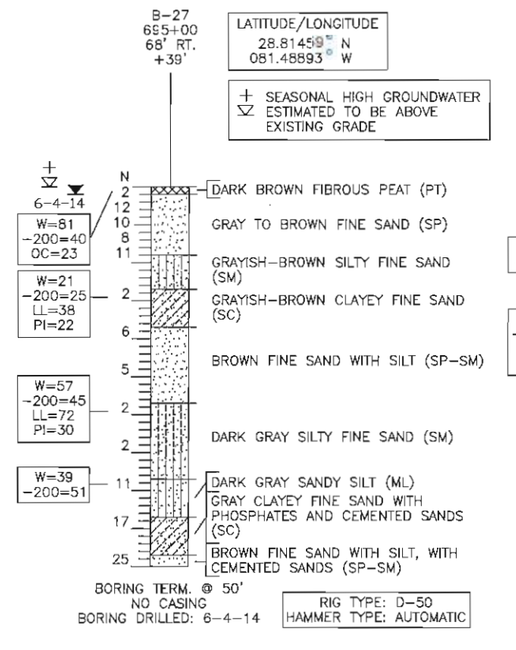
1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

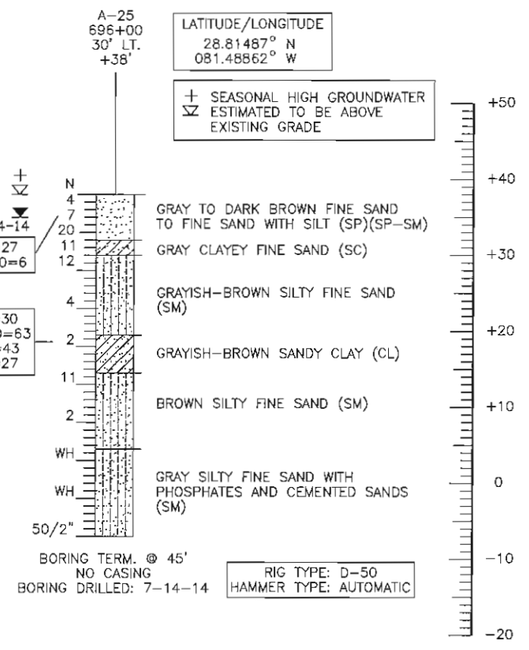
2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

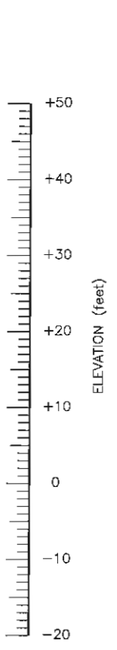
3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.









WALL AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	SW 11-26-14
CHECKED BY:	ENJ 11-26-14
DESIGNED BY:	
CHECKED BY:	

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

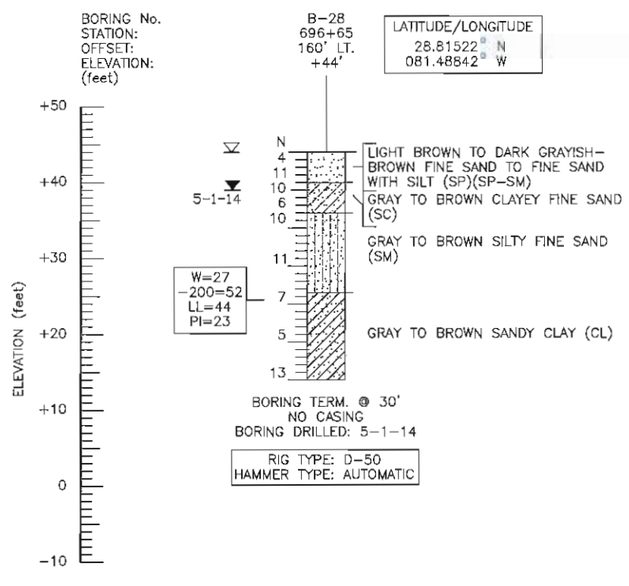
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

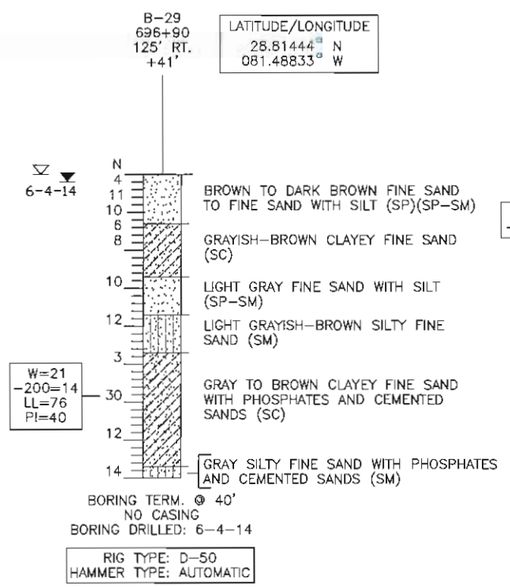
REF. DWG. NO.

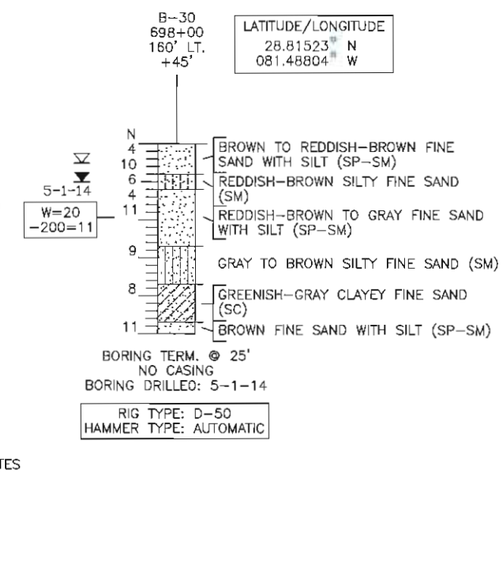
SHEET NO. -

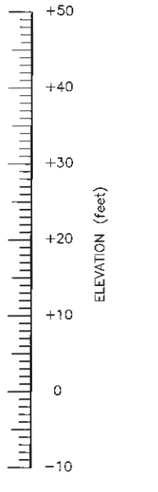
TERRACON No. H1 13 508D EXHIBIT: A-21

Nov26, 2014-11:42am









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0
-200=0
LL=0
PI=0
NP
OC=0

NATURAL MOISTURE CONTENT (%)
FINES PASSING No. 200 SIEVE (%)
LIQUID LIMIT (%)
PLASTICITY INDEX
NON-PLASTIC
ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

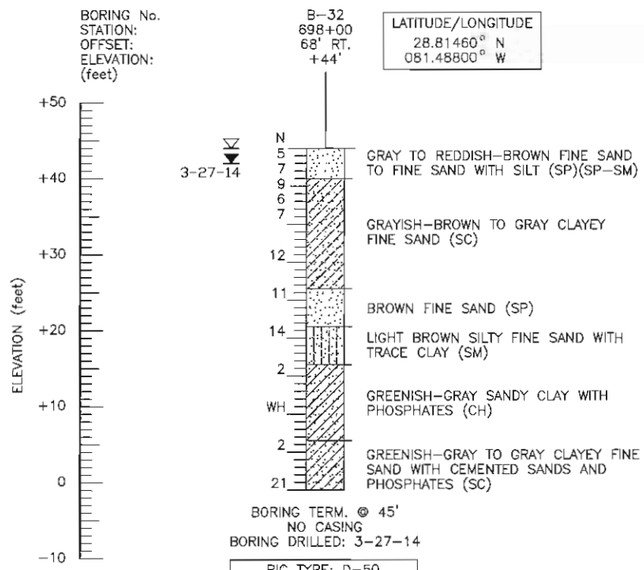
SILTS AND CLAYS

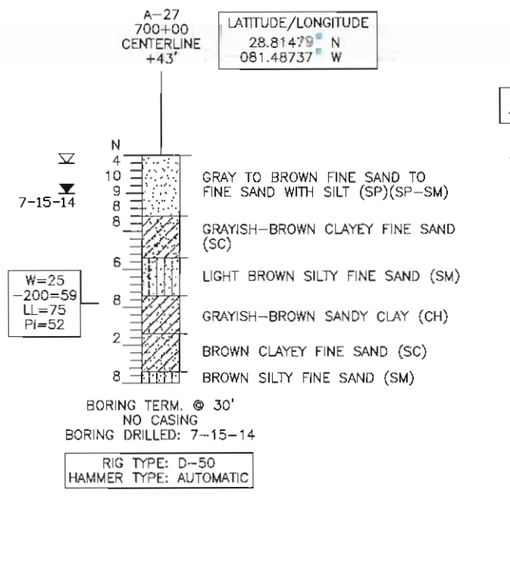
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

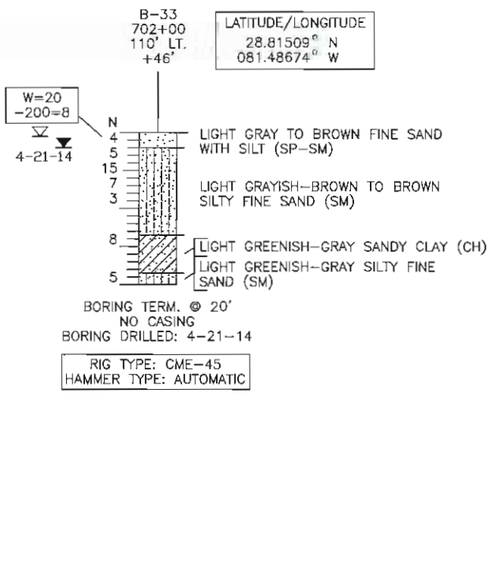
ENVIRONMENTAL CLASSIFICATION:

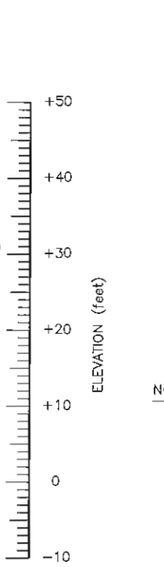
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.8









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-11:43am

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

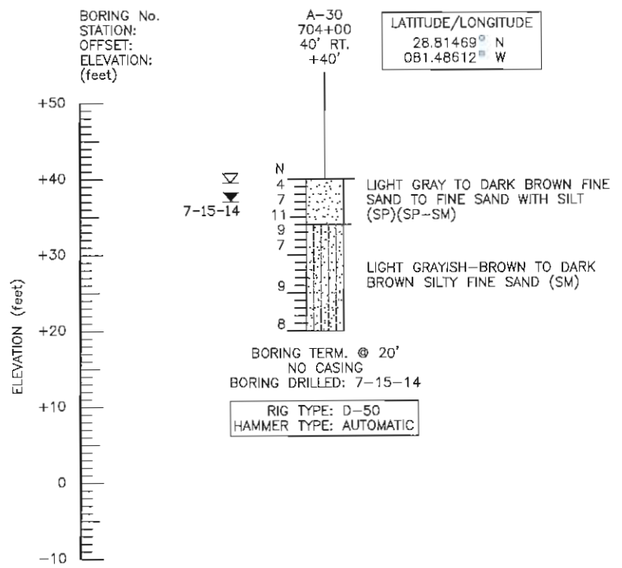
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

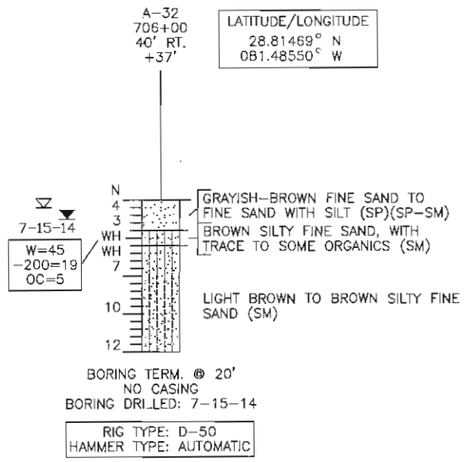
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

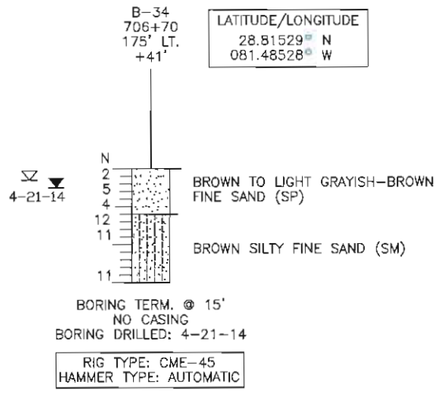
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

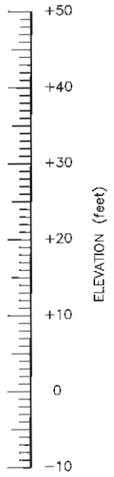
REF. DWG. NO.

SHEET NO. -









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL, DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

5D/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

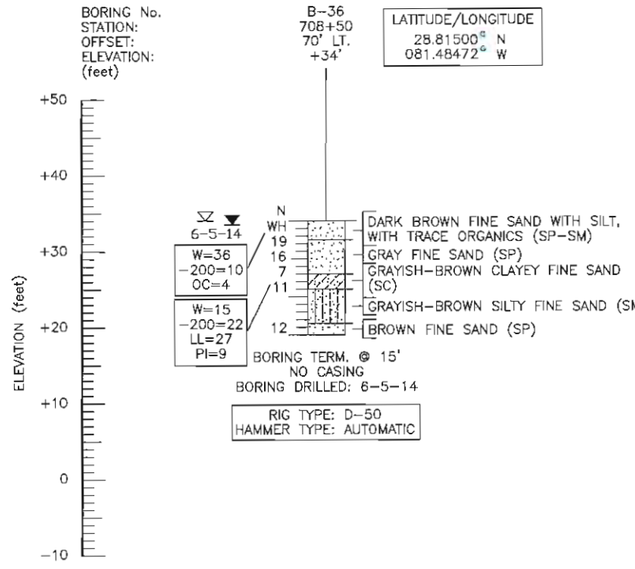
SILTS AND CLAYS

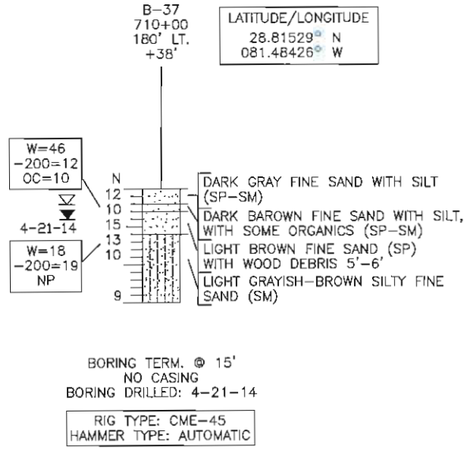
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

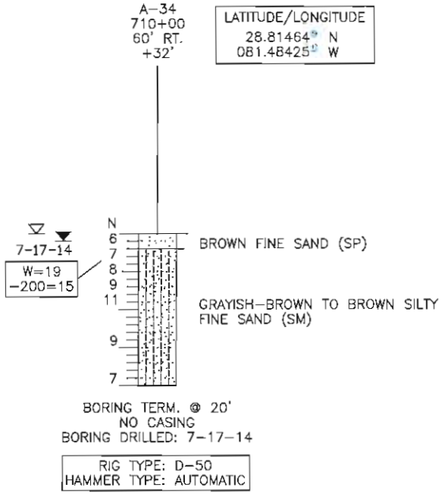
ENVIRONMENTAL CLASSIFICATION:

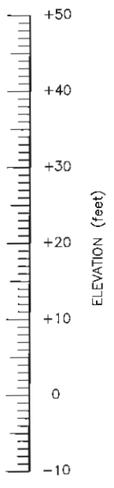
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.8









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov25, 2014-11:44am

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

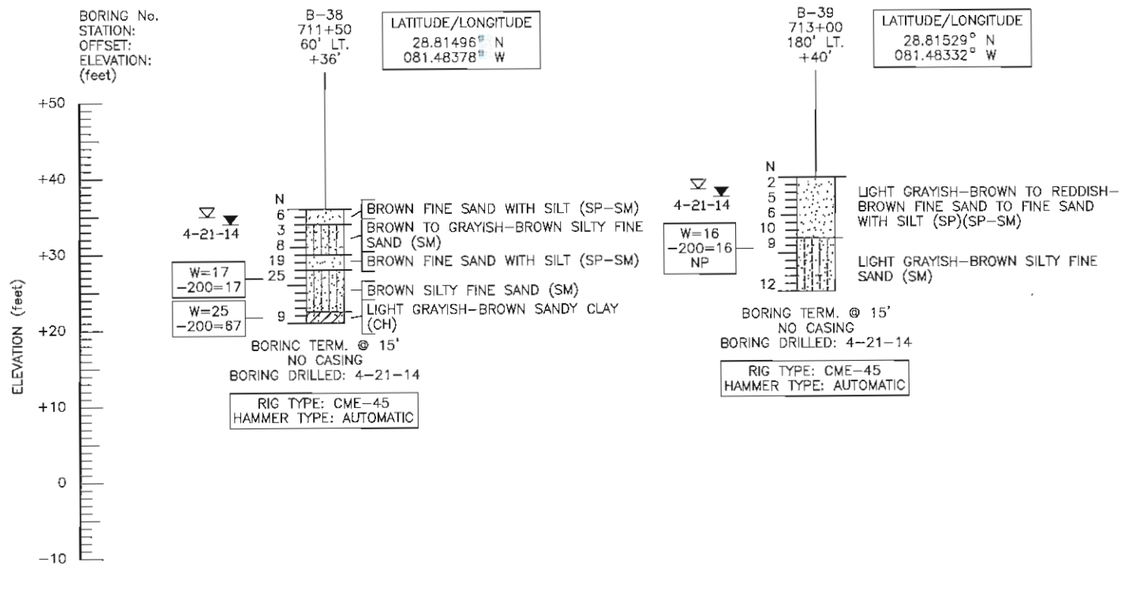
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

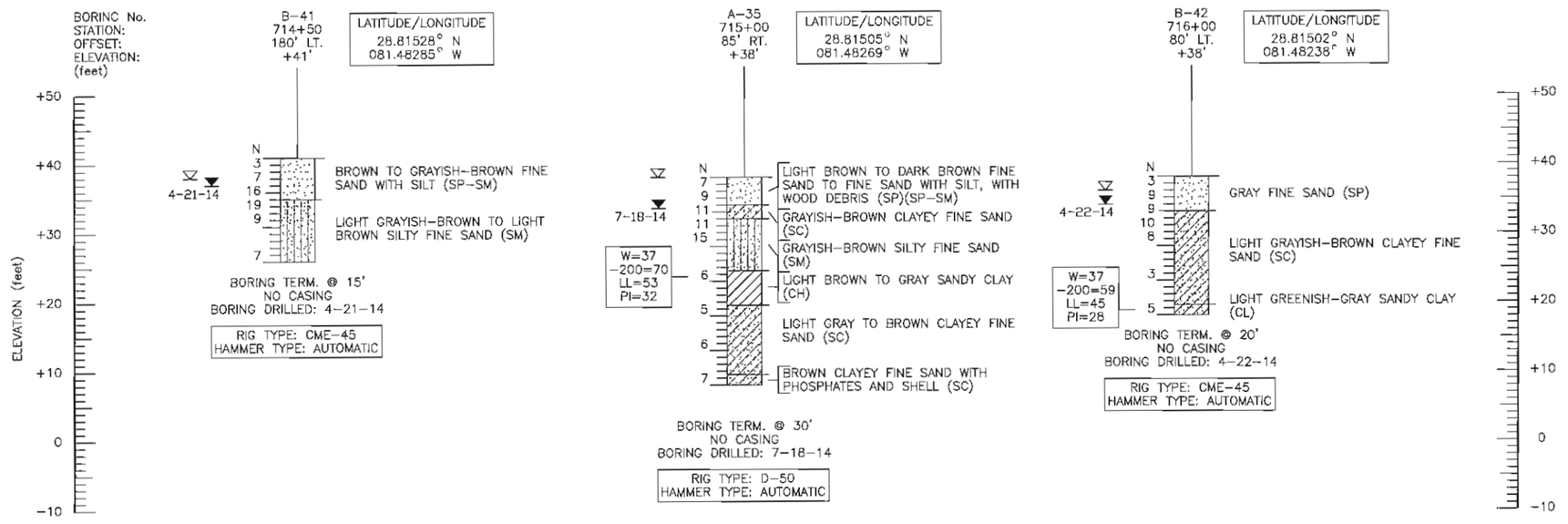
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-23





NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014−1:29pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

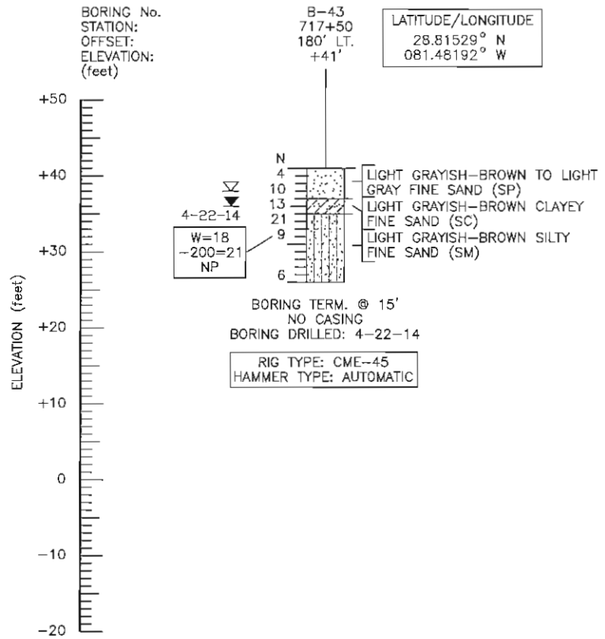
DRAWN BY: SW 11−26−14
CHECKED BY: ENJ 11−26−14
DESIGNED BY:
CHECKED BY:

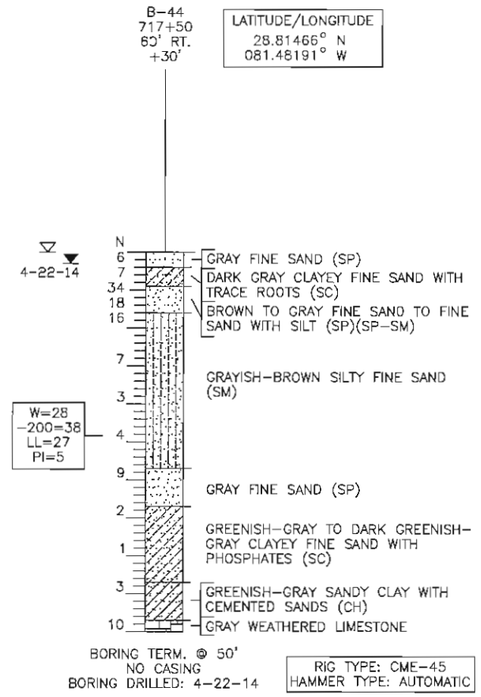
STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

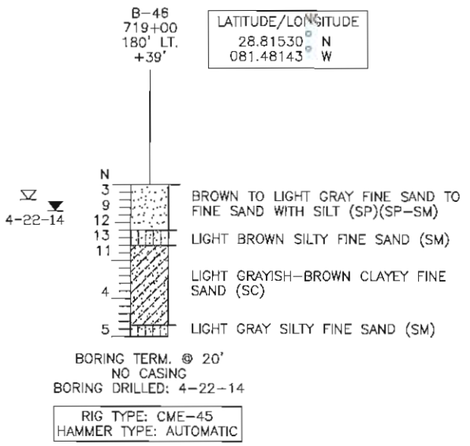
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275−7−32−02

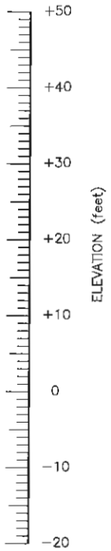
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6
REF. DWG. NO.
SHEET NO. −

TERRACON No. H1 13 5080 EXHIBIT: A−24









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
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N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LODSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
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VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
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FIRM	3-6
STIFF	6--12
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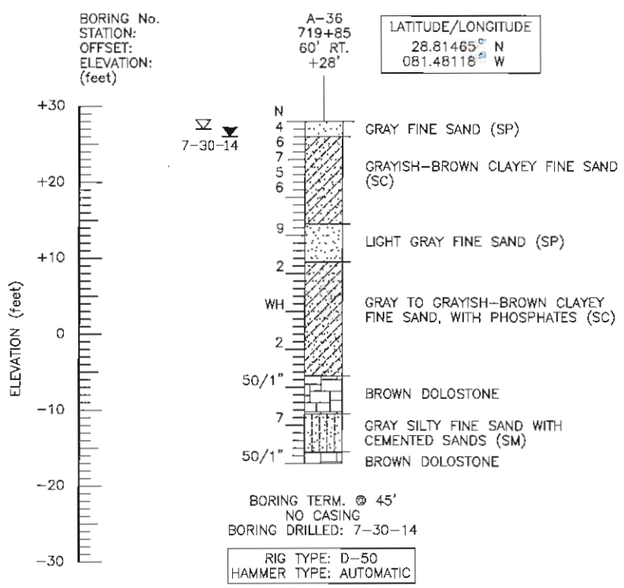
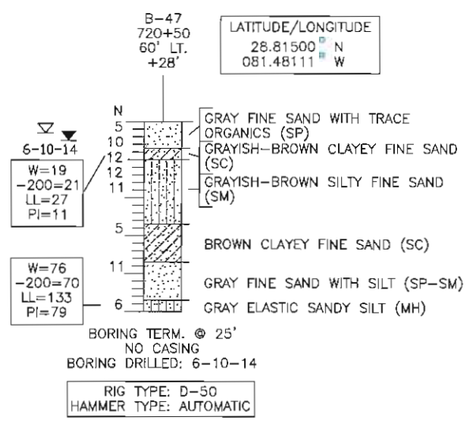
HARD	GREATER THAN 24

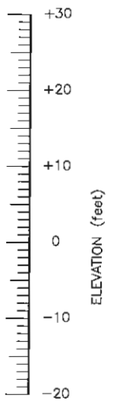
ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.0







100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

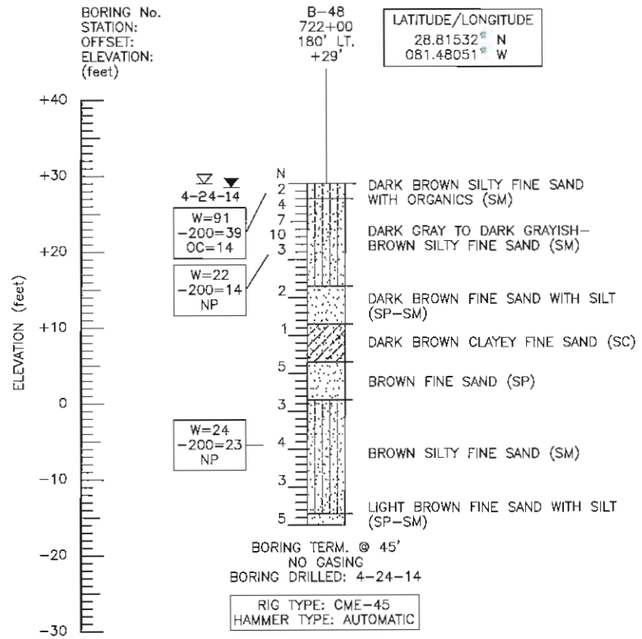
REF. DWG. NO.

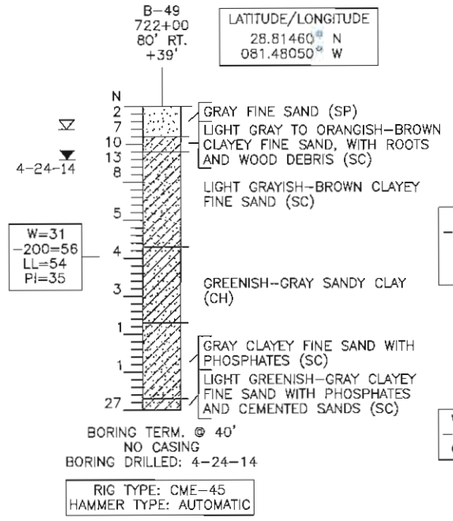
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

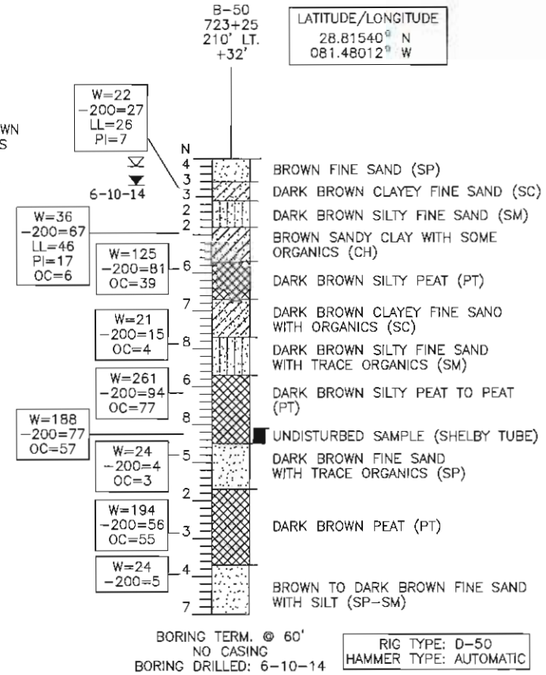
SHEET NO. -

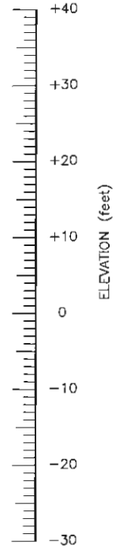
TERRACON No. H1 13 50B0 EXHIBIT: A-25

Nov26, 2014-1:30pm









ORGANICS
CLAYEY SILT

SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

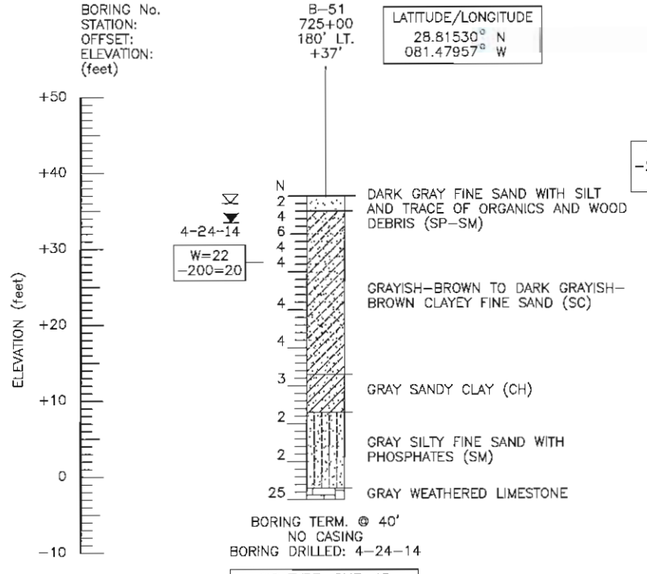
SILTS AND CLAYS

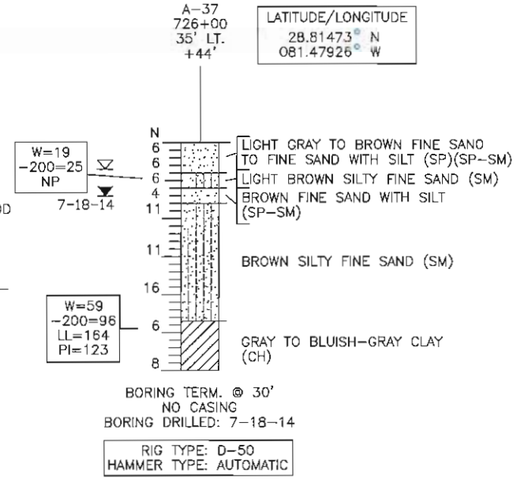
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

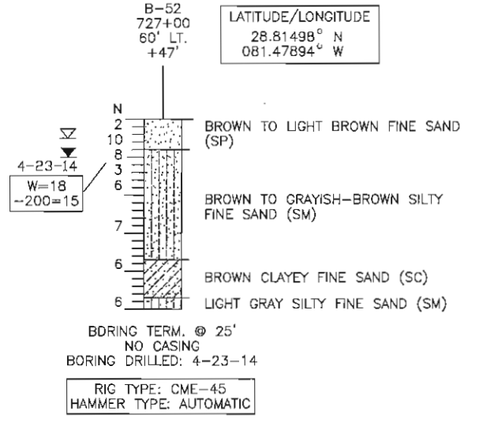
ENVIRONMENTAL CLASSIFICATION:

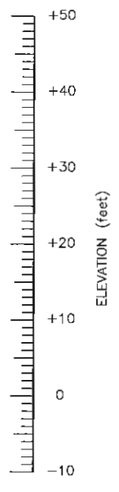
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.0









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

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4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:32pm

REVISIONS

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

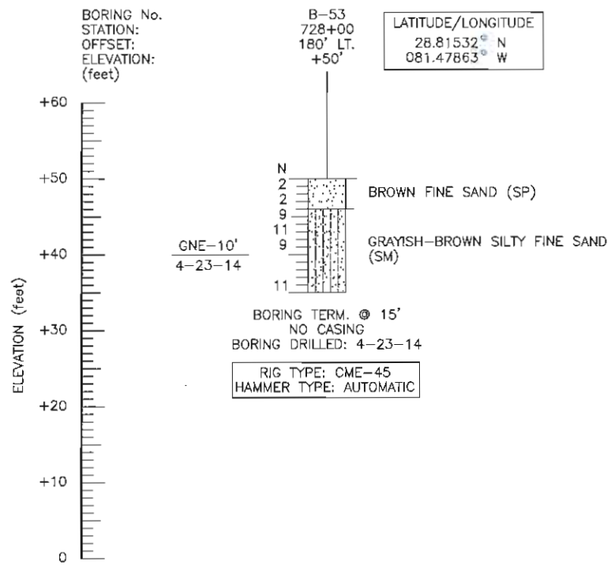
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

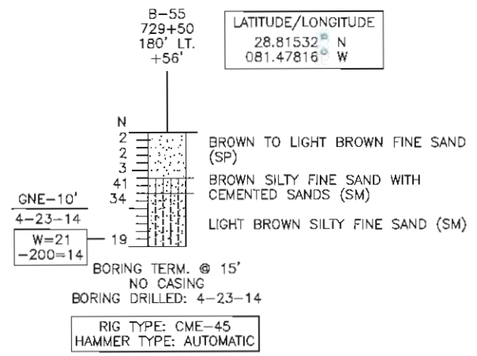
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

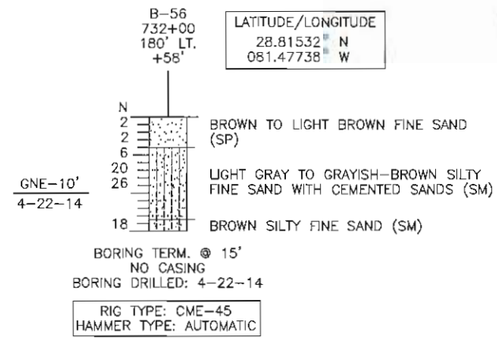
REF. DWG. NO.

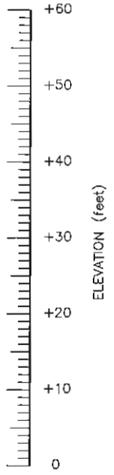
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-26









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CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
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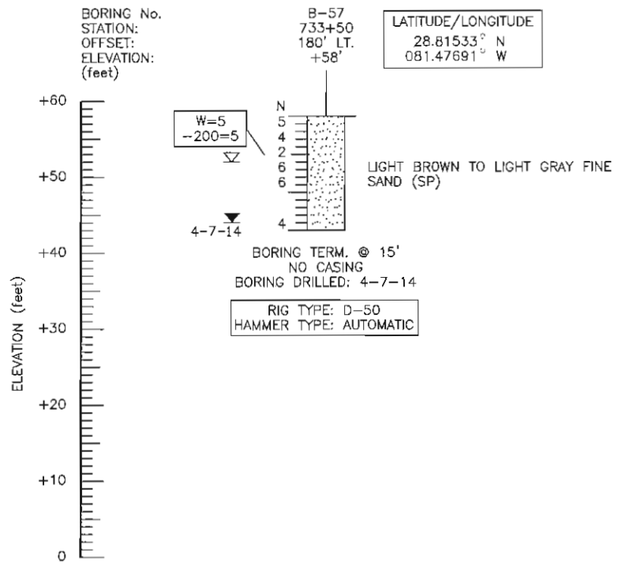
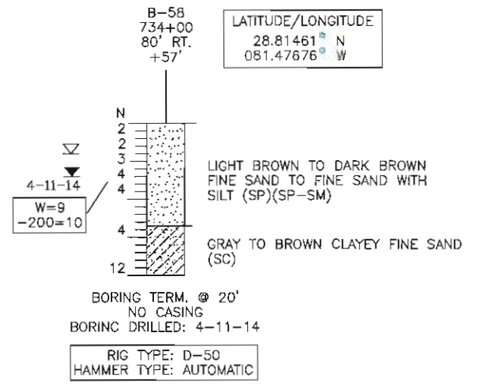
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

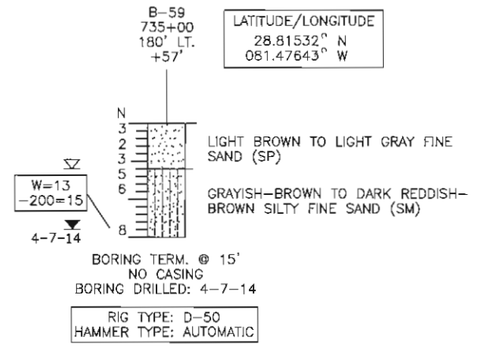
ENVIRONMENTAL CLASSIFICATION:

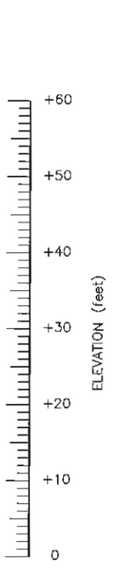
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: MODERATELY AGGRESSIVE
pH=6.4









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

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WALL AND HIGH FILL BORINGS

Nov26, 2014 - 1:33pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
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1675 LEE ROAD
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TERRACON
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DRAWN BY: SW 11-26-14
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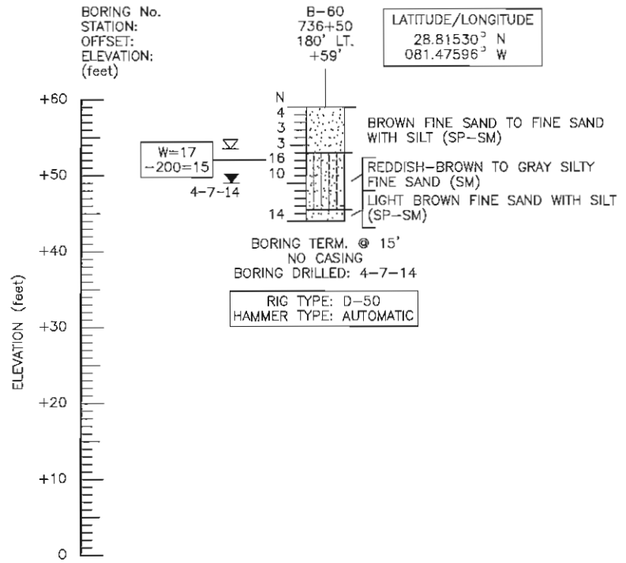
SR 429	LAKE SEMINOLE	238275-7-32-02

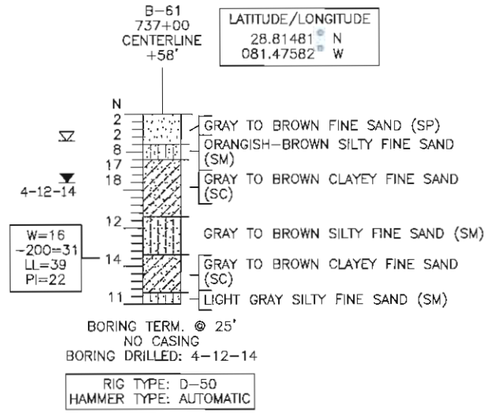
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

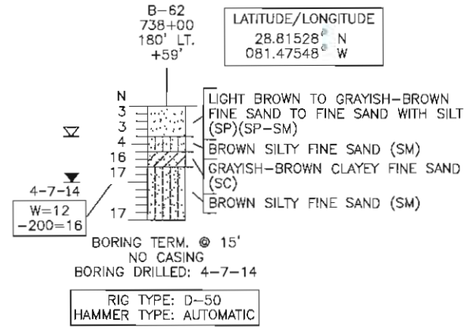
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

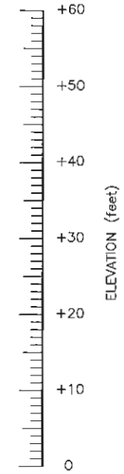
REF. DWG. NO.

SHEET NO. -









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

▼ 5-15-14 ENCOUNTERED GROUNDWATER LEVEL, DATE NOTED

▽ ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

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NP	NON-PLASTIC
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WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

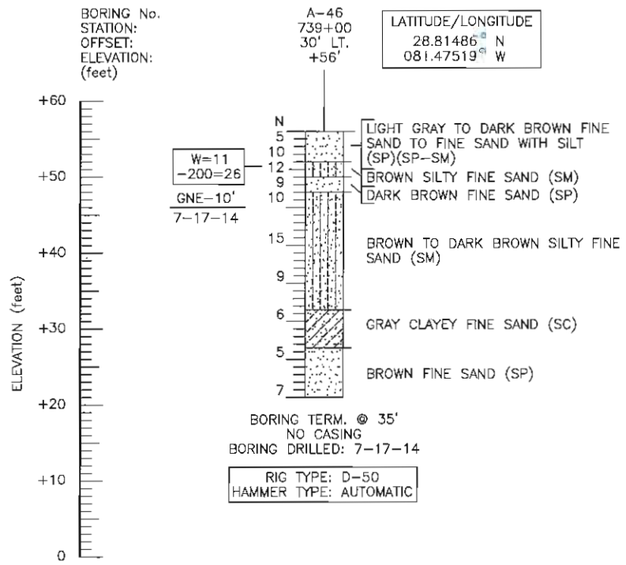
SILTS AND CLAYS

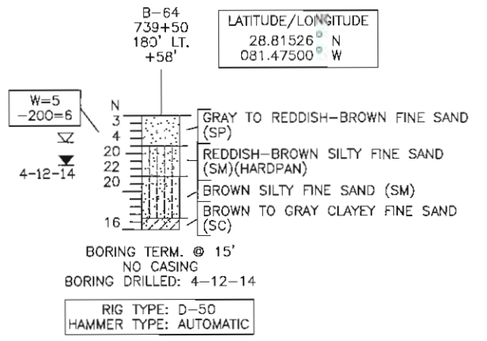
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

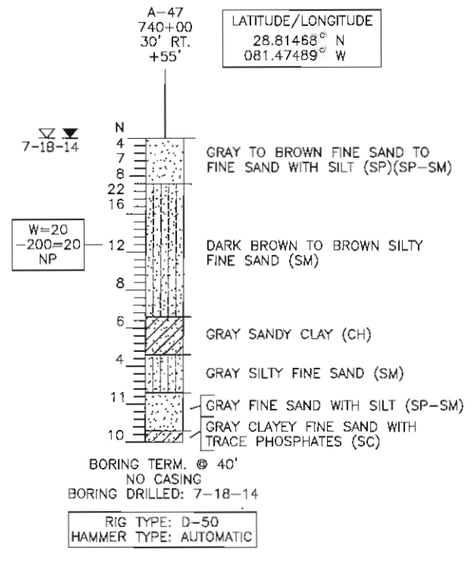
ENVIRONMENTAL CLASSIFICATION:

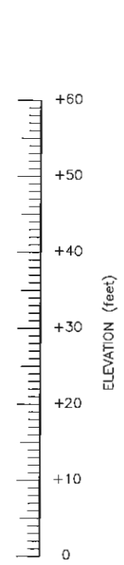
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.3









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:34pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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1675 LEE ROAD
WINTER PARK, FLORIDA 32789
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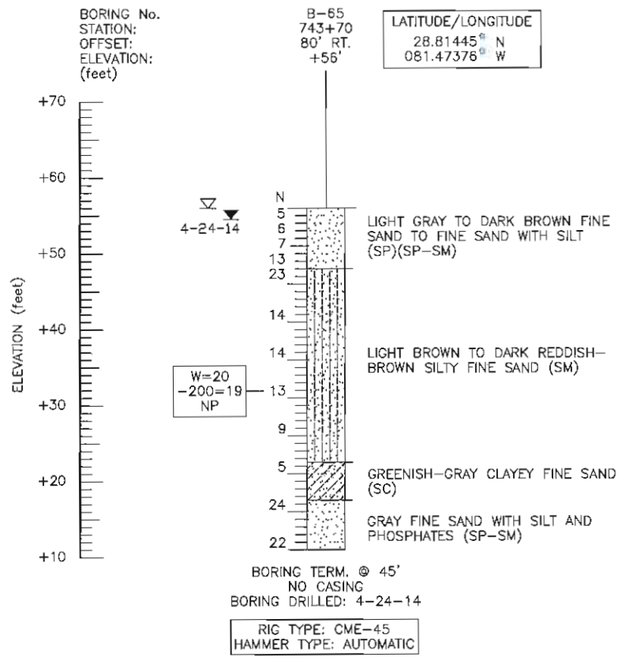
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

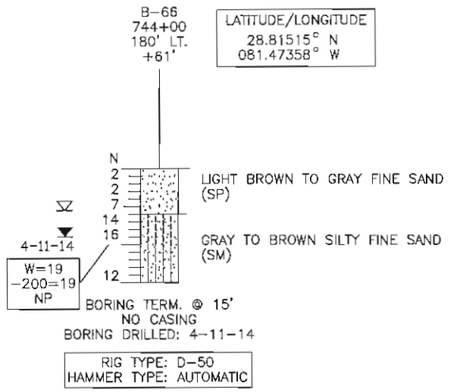
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

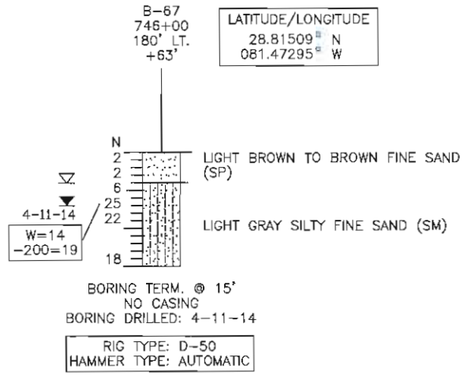
REF. DWG. NO.

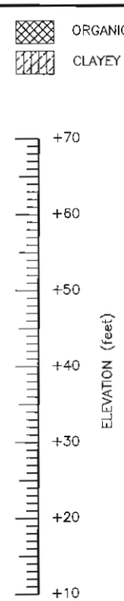
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-28









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(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL
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HAMMER WEIGHT	140 lbs.

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LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.3

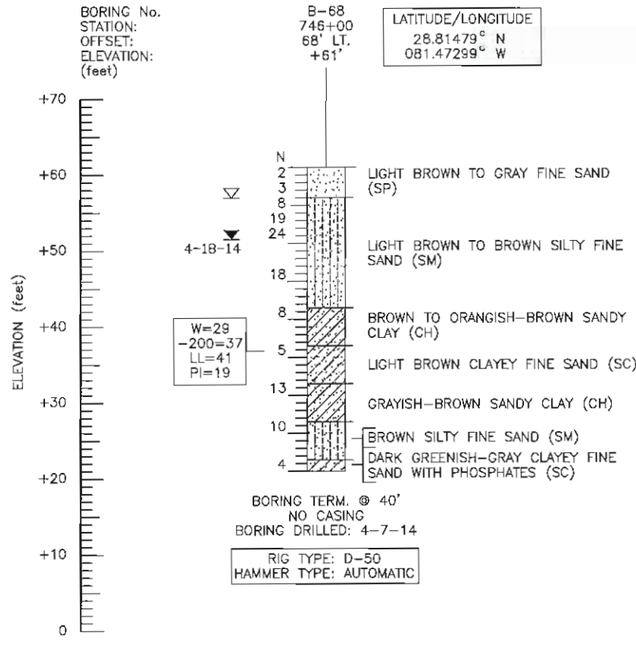
NOTES:

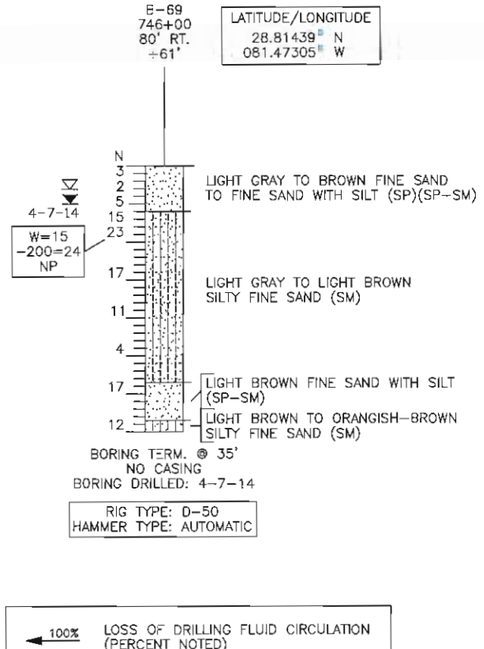
1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

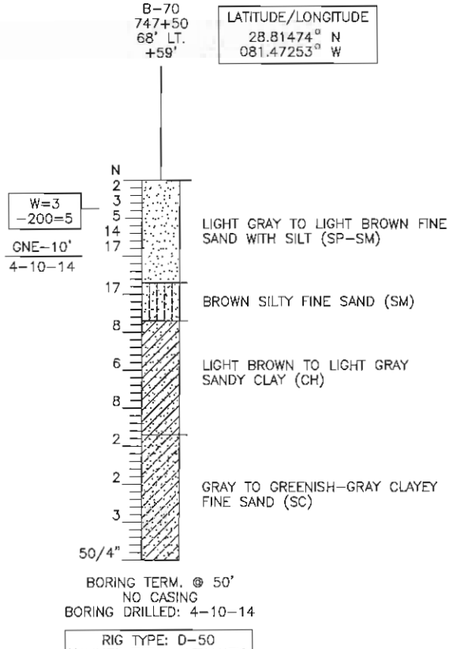
2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

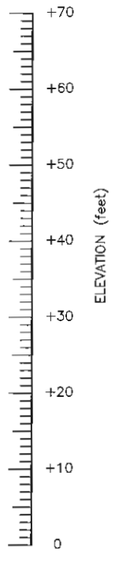
3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

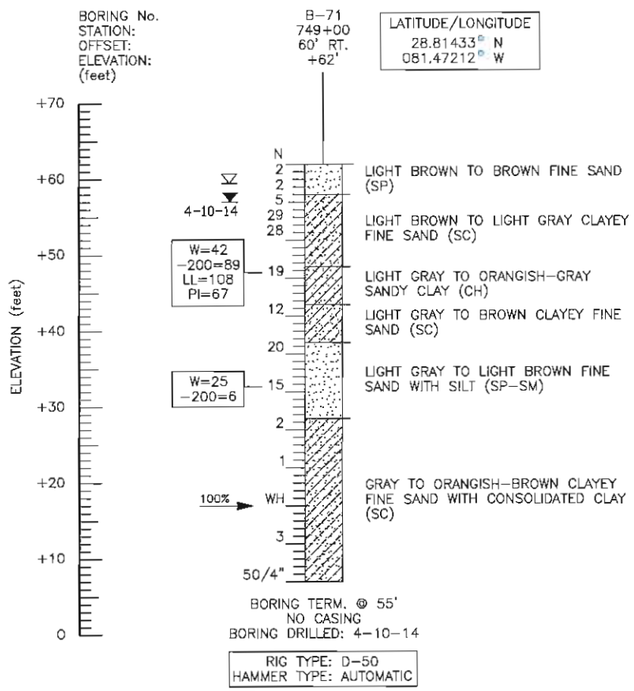
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

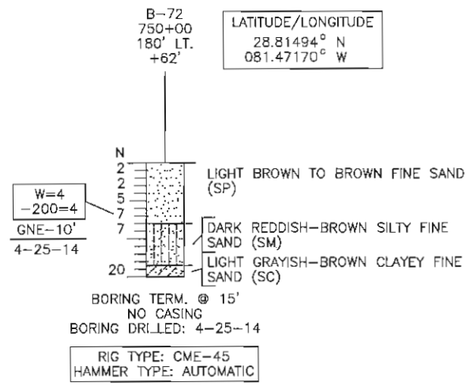
REF. DWG. NO.

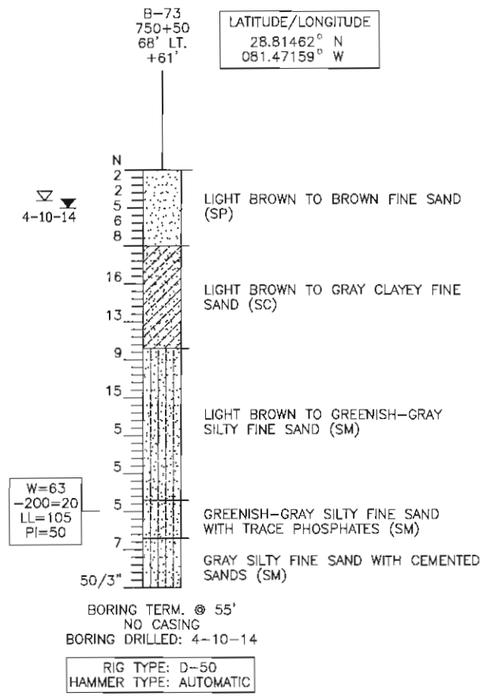
SHEET NO. -

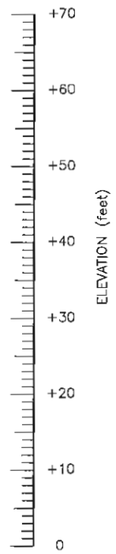
TERRACON No. H1 13 5D8D EXHIBIT: A-29

Nov26, 2014-1:36pm









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=6.0

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:37pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

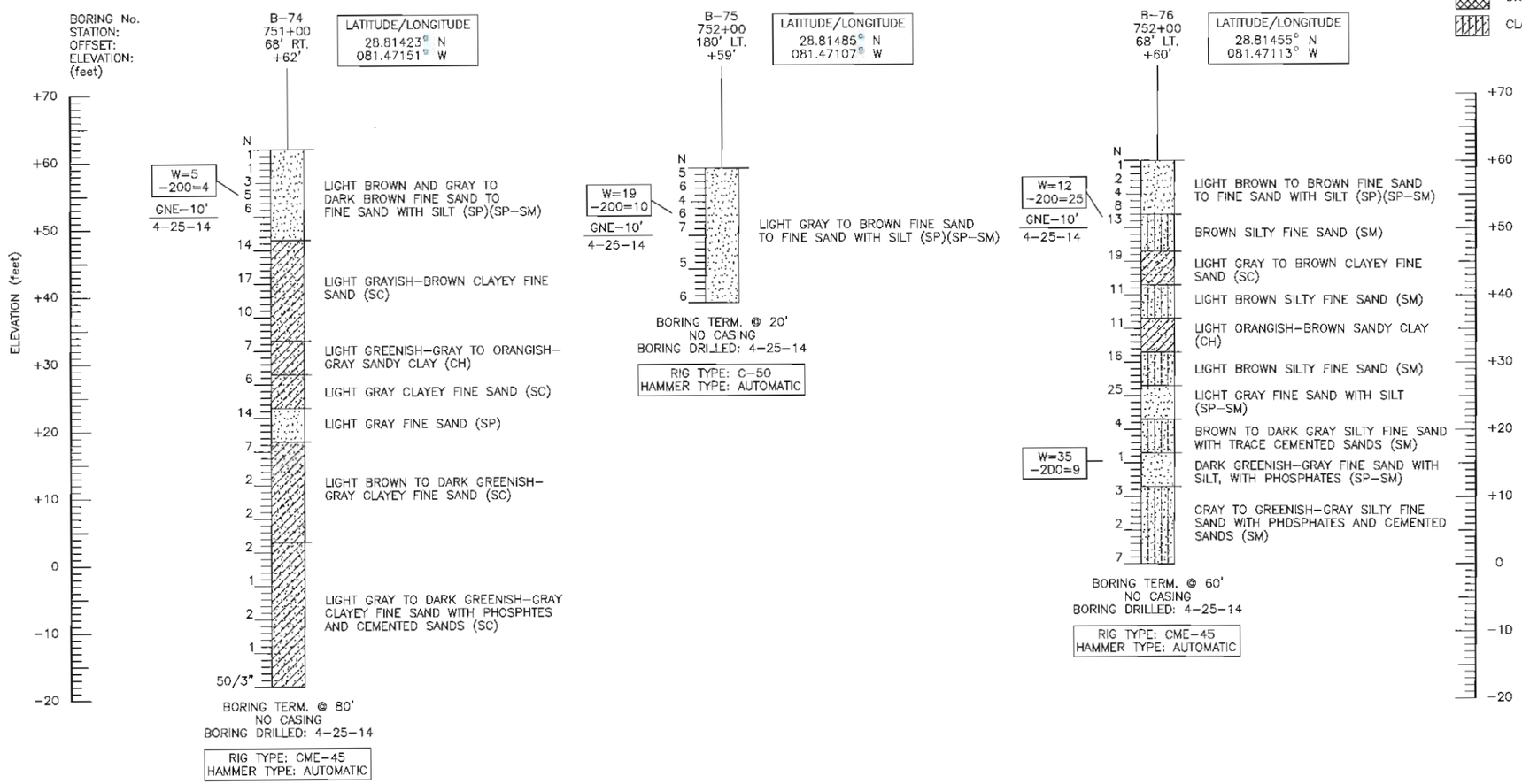
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-30



WALL AND HIGH FILL BORINGS

Nov26, 2014-1:37pm

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

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SR 429	LAKE SEMINOLE	238275-7-32-02

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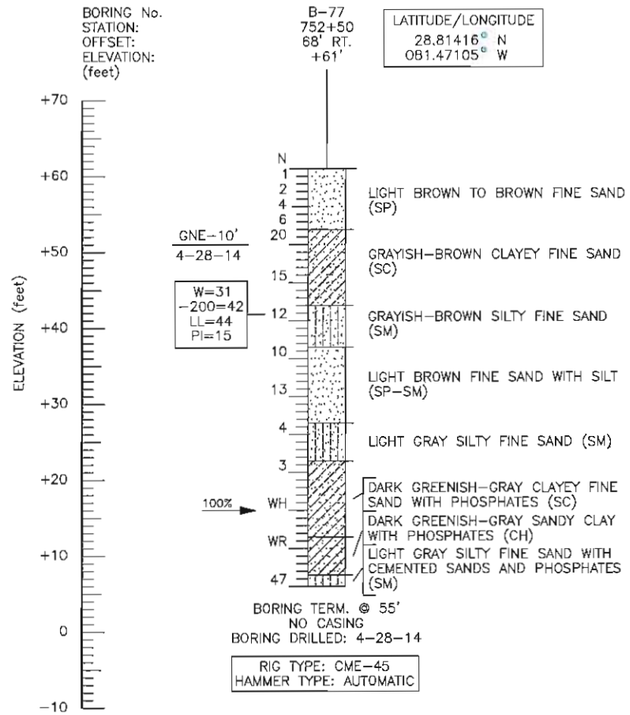

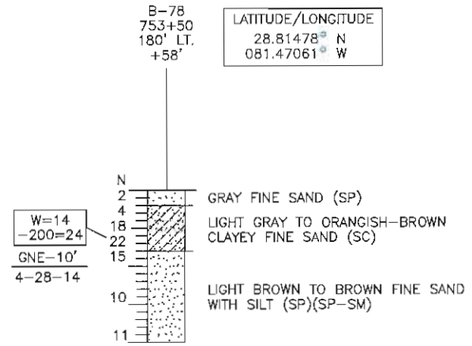

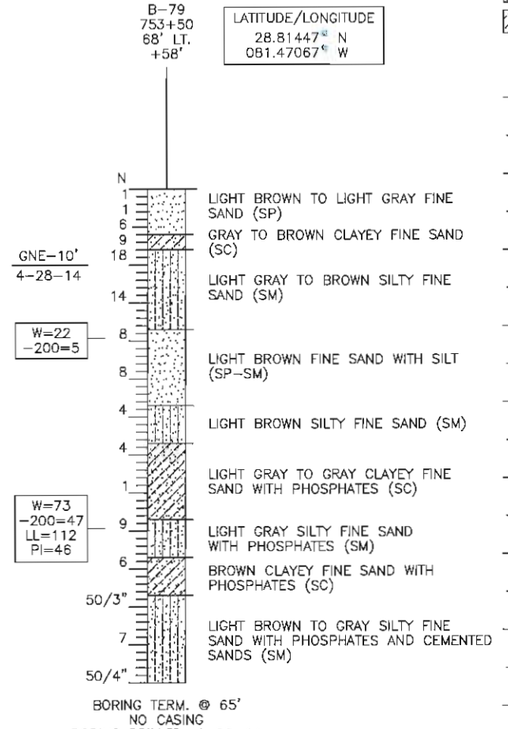

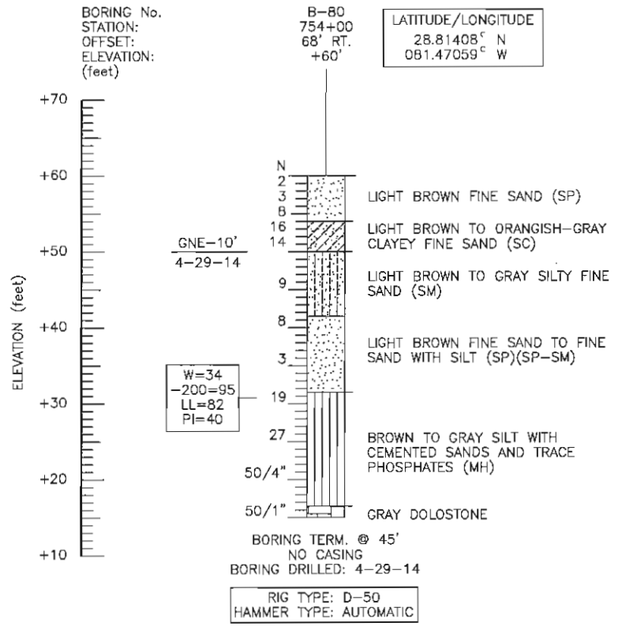

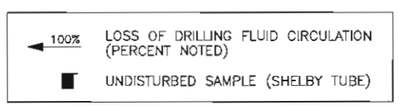

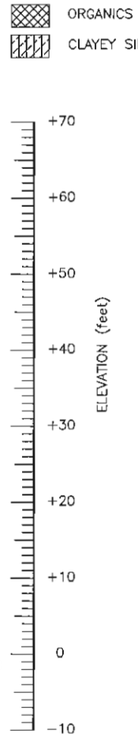

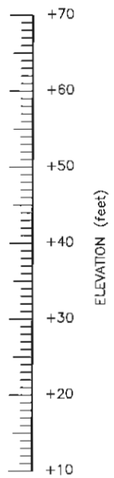

ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0 NATURAL MOISTURE CONTENT (%)
-200=0 FINES PASSING No. 200 SIEVE (%)
LL=0 LIQUID LIMIT (%)
PI=0 PLASTICITY INDEX
NP NON-PLASTIC
OC=0 ORGANIC CONTENT (%)

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WR WEIGHT OF DRILL ROD SUFFICIENT TO AOVANCE SAMPLE SPOON

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STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
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ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=6.0

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:38pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

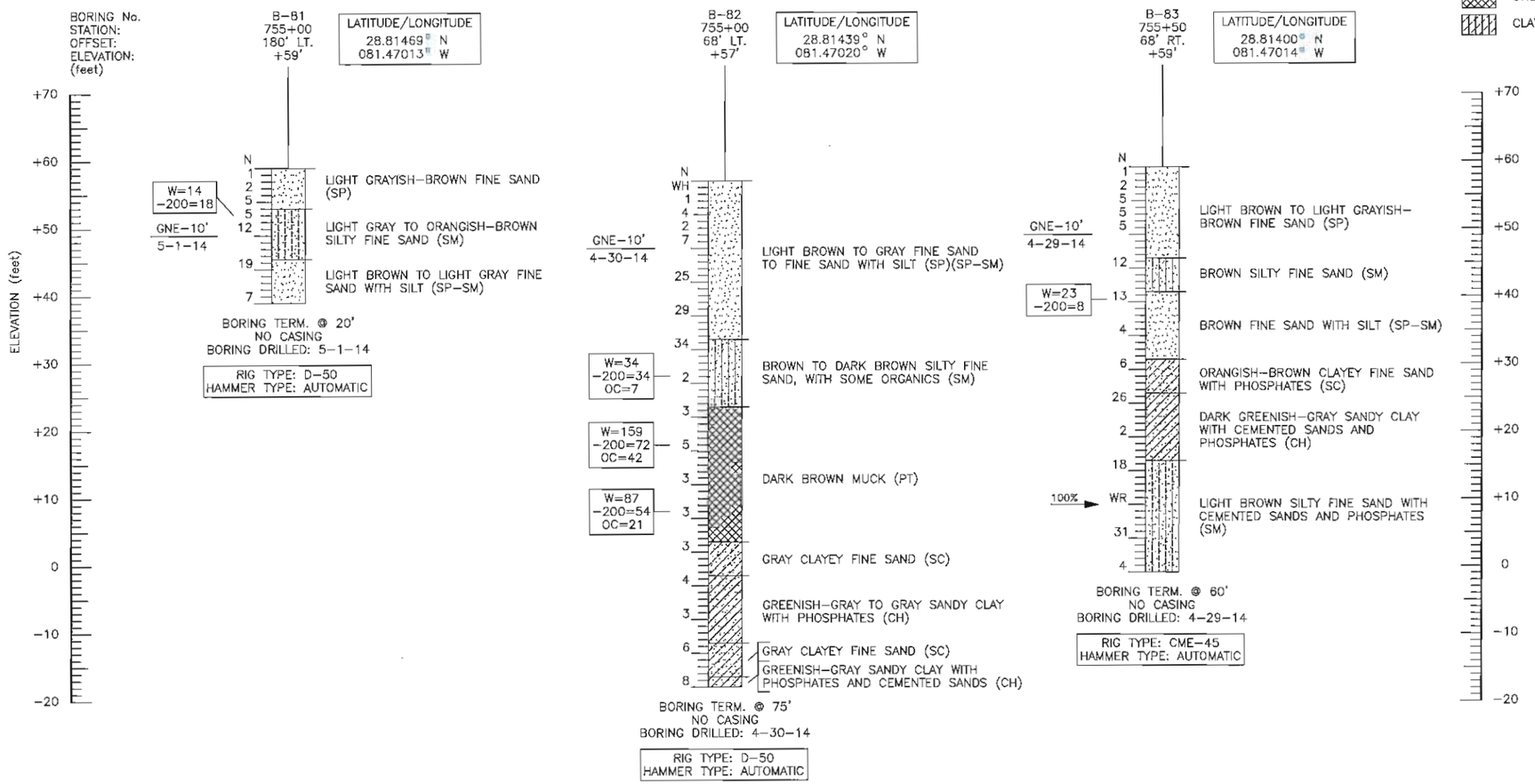
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-32



WALL AND HIGH FILL BORINGS

Nov26, 2014−1:39pm

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

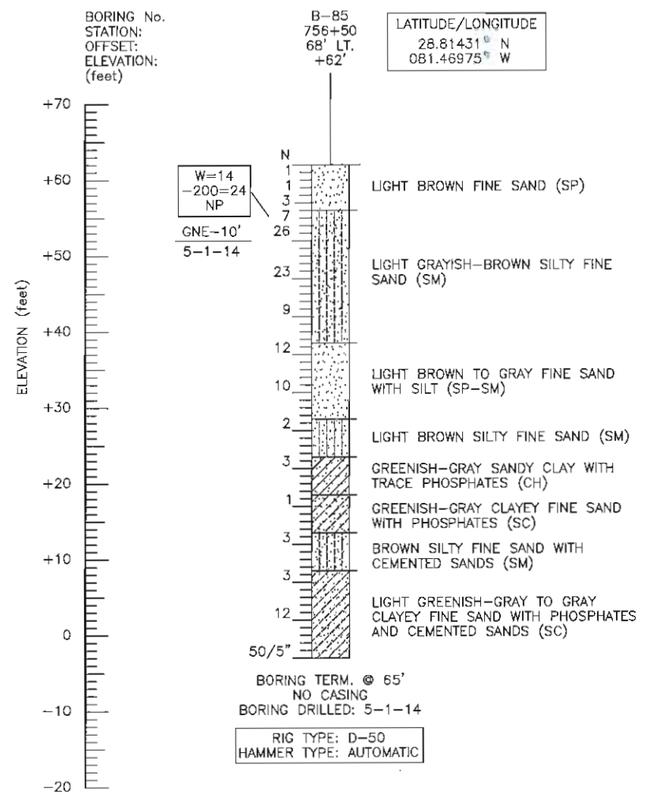
DRAWN BY: SW 11−26−14
CHECKED BY: ENJ 11−25−14
DESIGNED BY:
CHECKED BY:

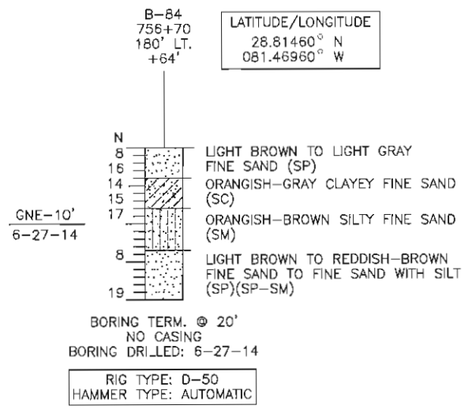
STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

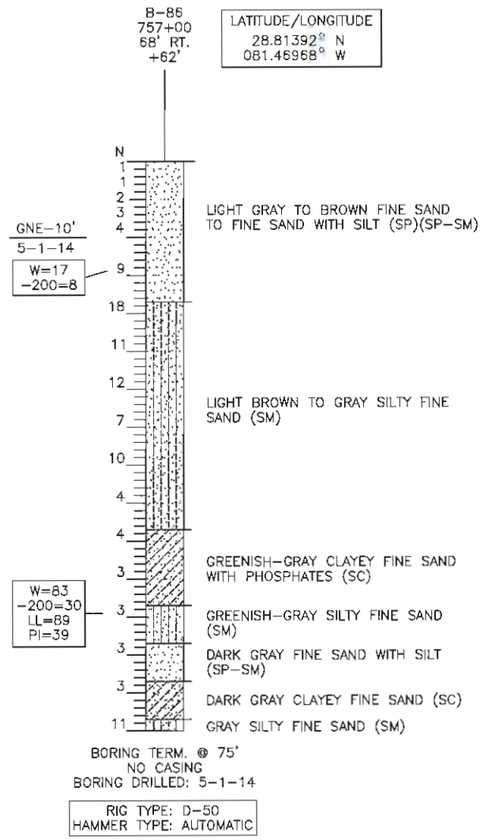
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275−7−32−02

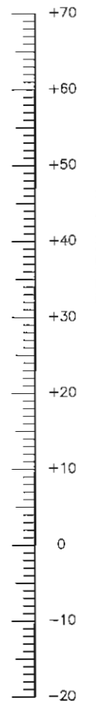
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6
SHEET NO. −

TERRACON No. H1 13 5080 EXHIBIT: A−33









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNOWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0
-200=0
LL=0
PI=0
NP
OC=0

NATURAL MOISTURE CONTENT (%)
FINES PASSING No. 200 SIEVE (%)
LIQUID LIMIT (%)
PLASTICITY INDEX
NON-PLASTIC
ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
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MEDIUM DENSE	8-24
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SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.8

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

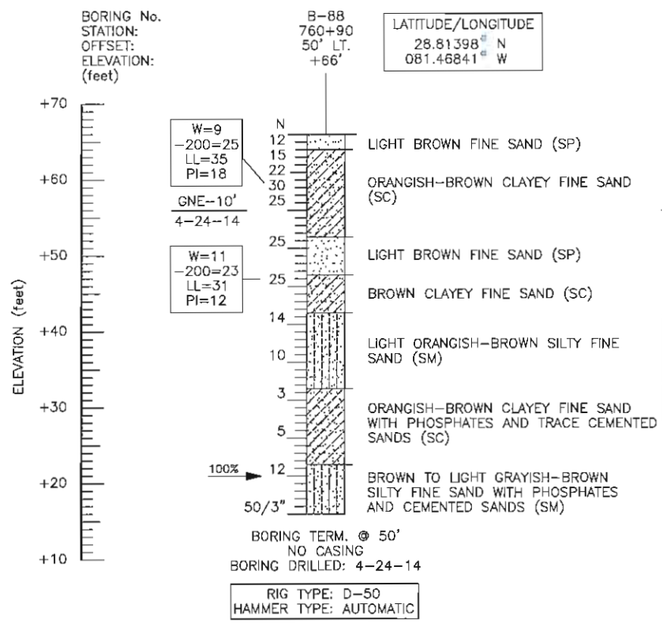
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

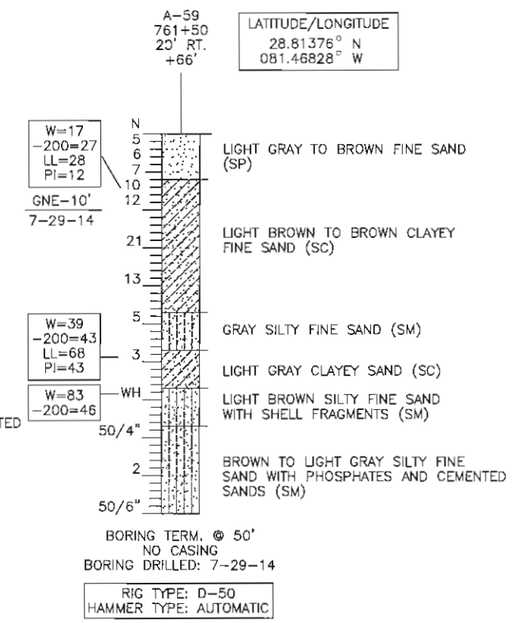
REF. DWG. NO.

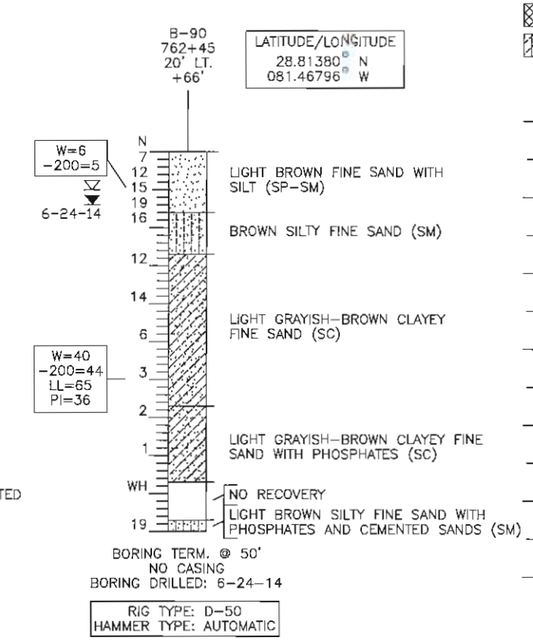
SHEET NO. -

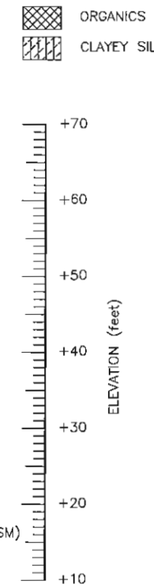
TERRACON No. H1 13 5080 EXHIBIT: A-34

Nov26, 2014-1:41pm









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

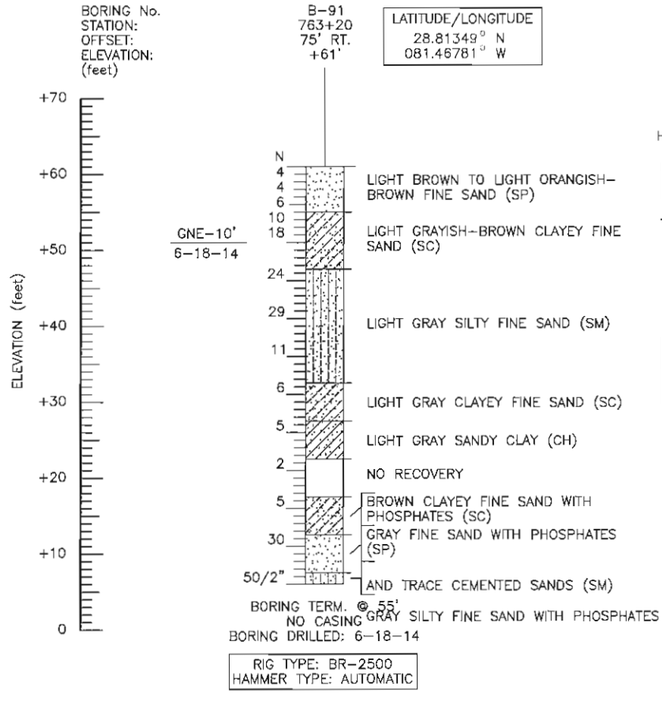
SILTS AND CLAYS

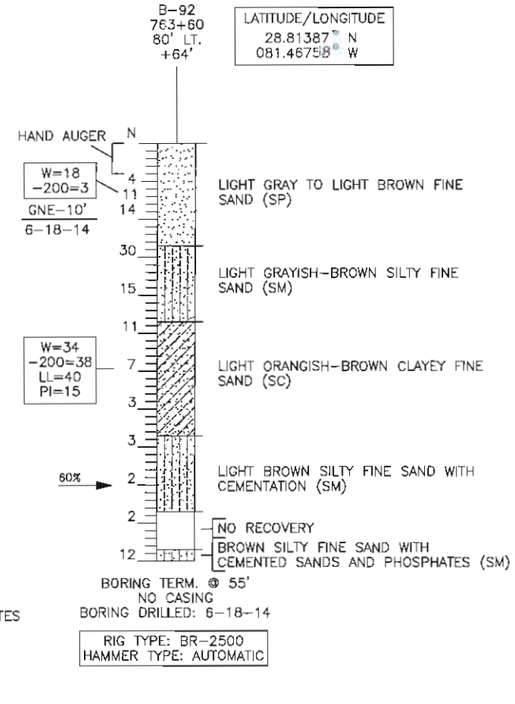
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

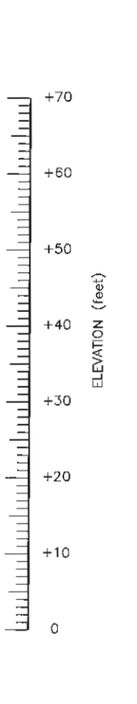
ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: SLIGHTLY AGGRESSIVE







100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014 - 1:42pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE / SEMINOLE	238275-7-32-02

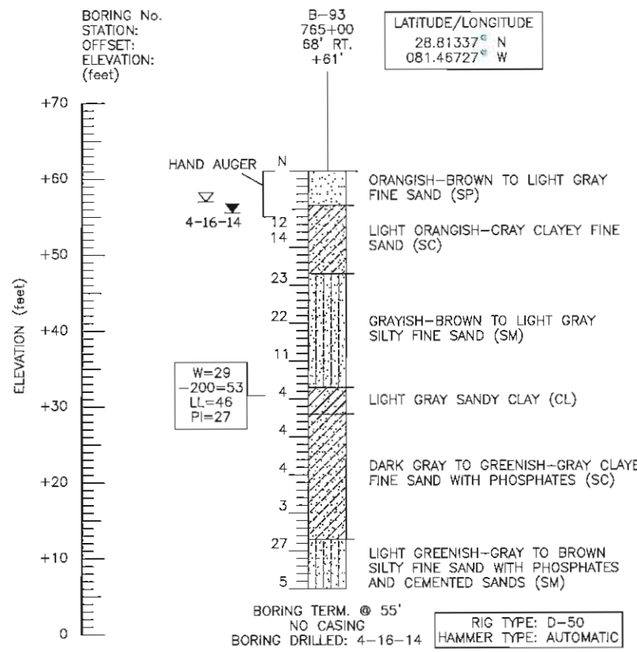
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

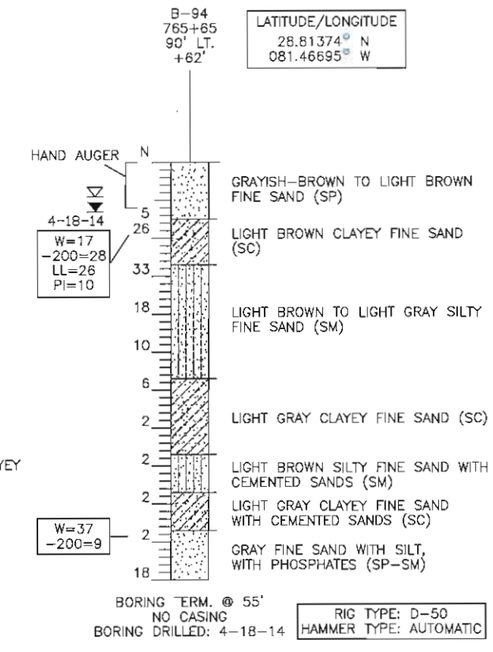
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

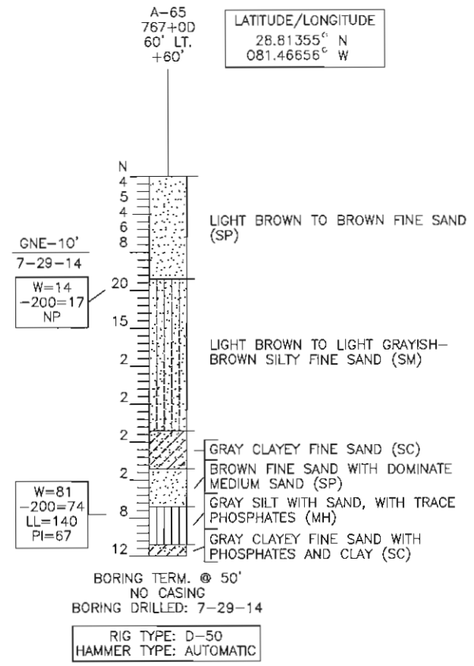
REF. DWG. NO.

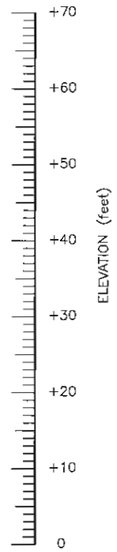
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-35









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
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WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

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AUTOMATIC HAMMER

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ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
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MEDIUM DENSE	8-24
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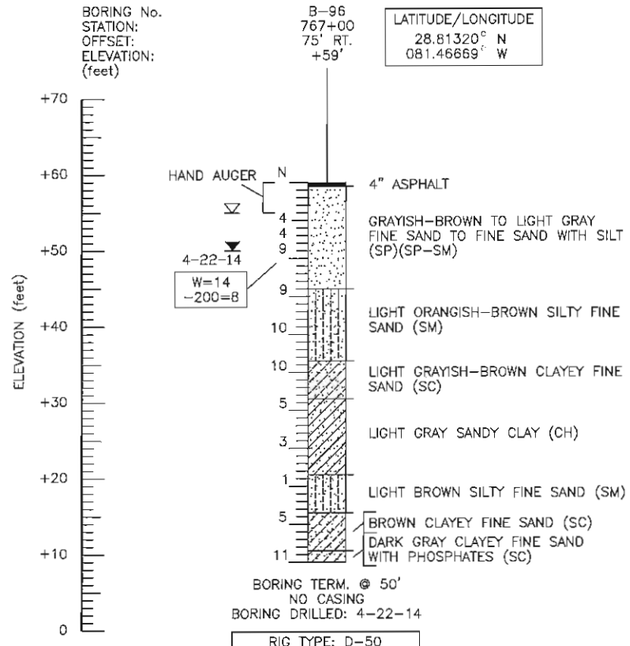
SILTS AND CLAYS

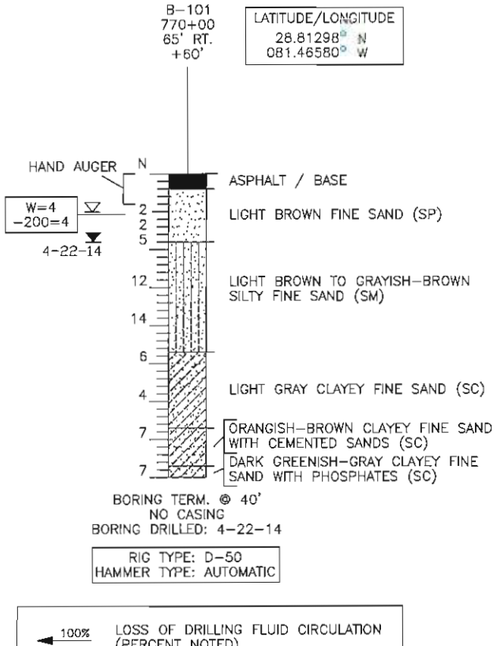
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

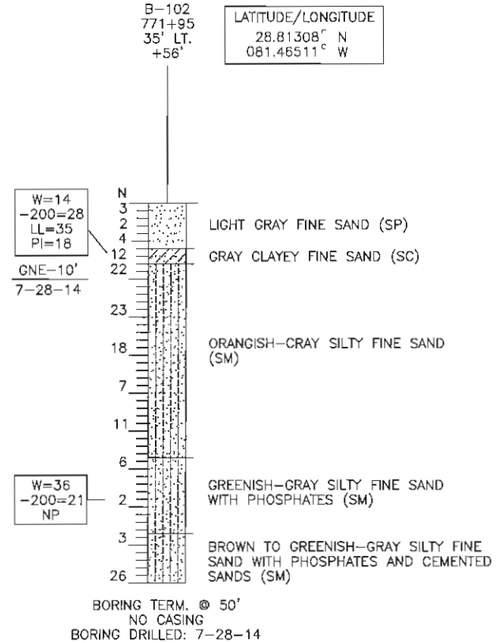
SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: SLIGHTLY AGGRESSIVE

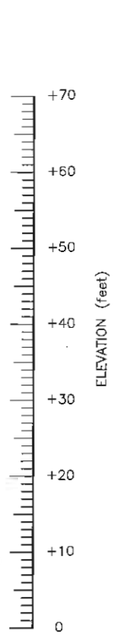




100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)





NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:43pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

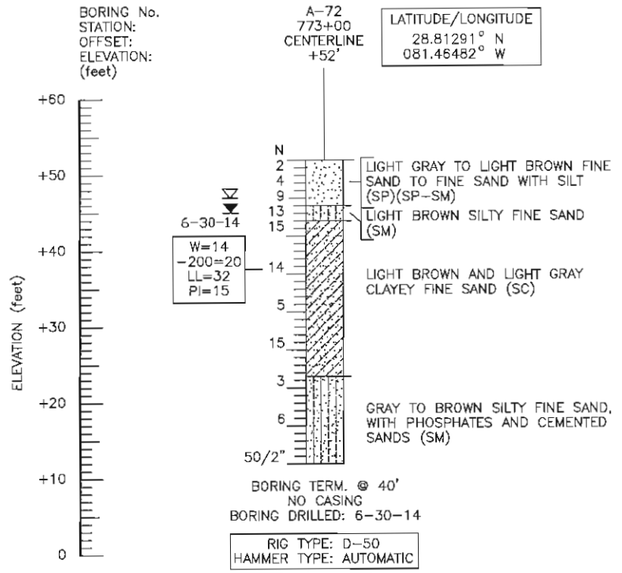
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

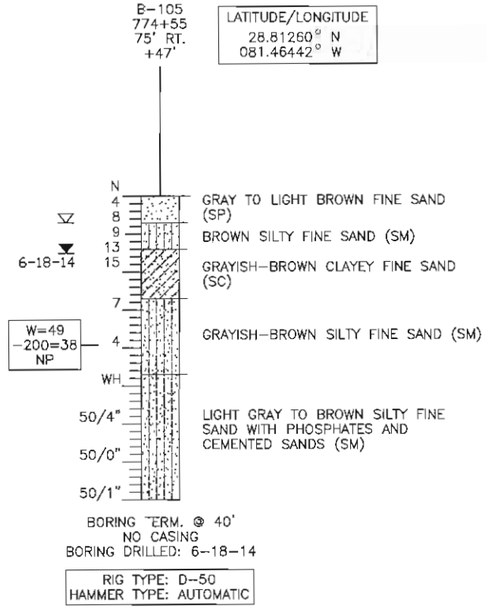
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

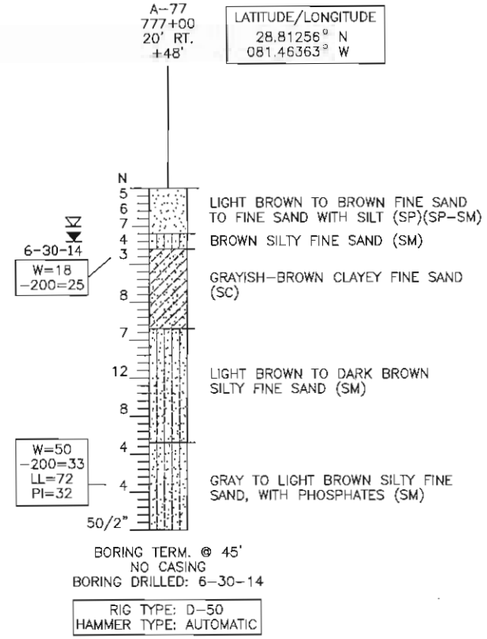
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

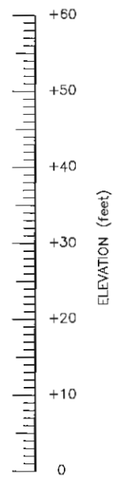
REF. DWG. NO.

SHEET NO. -









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL
DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

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50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

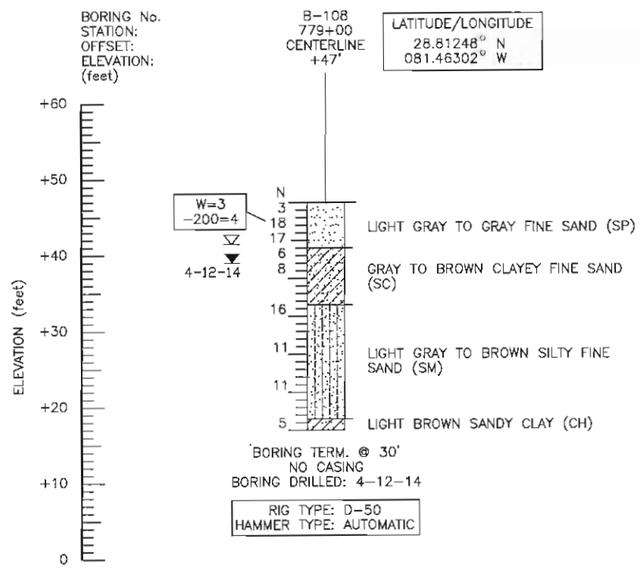
SILTS AND CLAYS

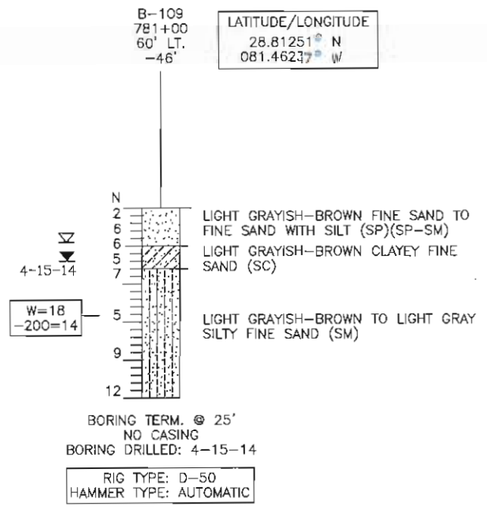
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

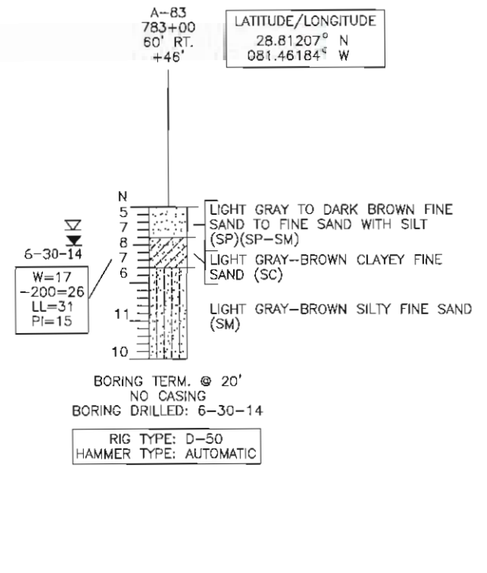
ENVIRONMENTAL CLASSIFICATION:

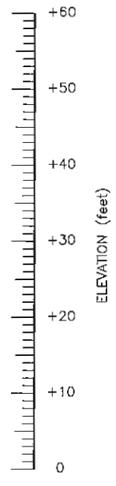
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.8









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014 - 1:43pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

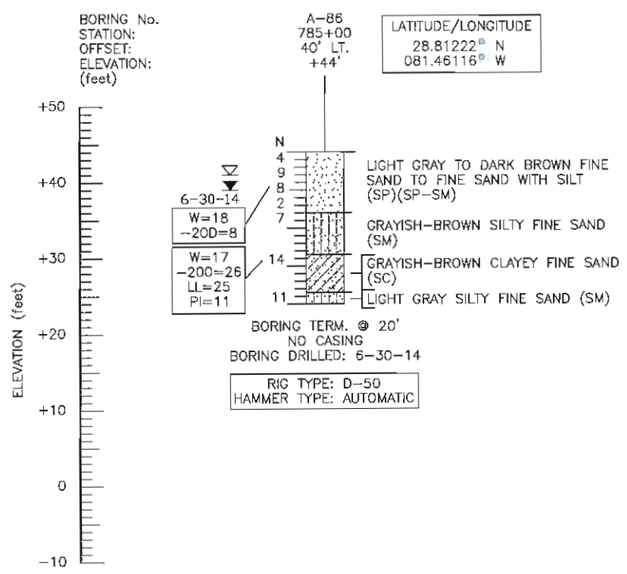
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

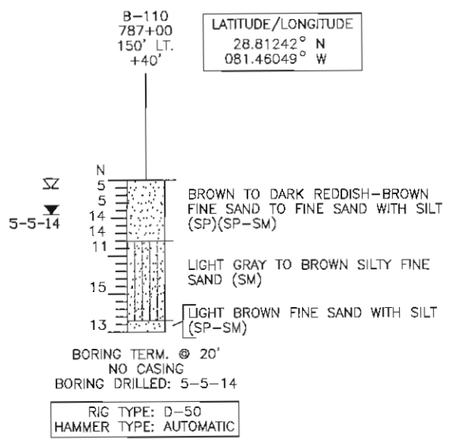
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

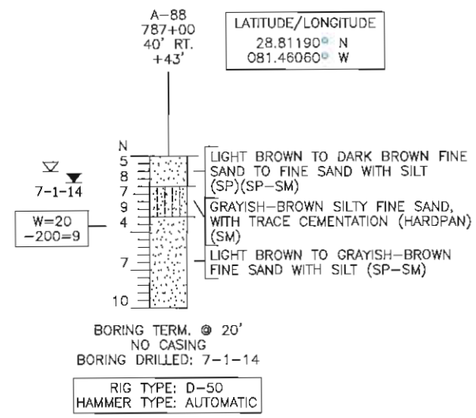
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

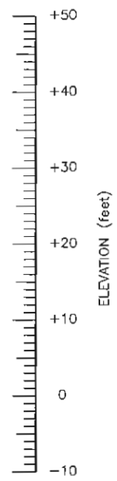
REF. DWG. NO.

SHEET NO. -









ORGANICS
GLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
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N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

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AUTOMATIC HAMMER

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HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

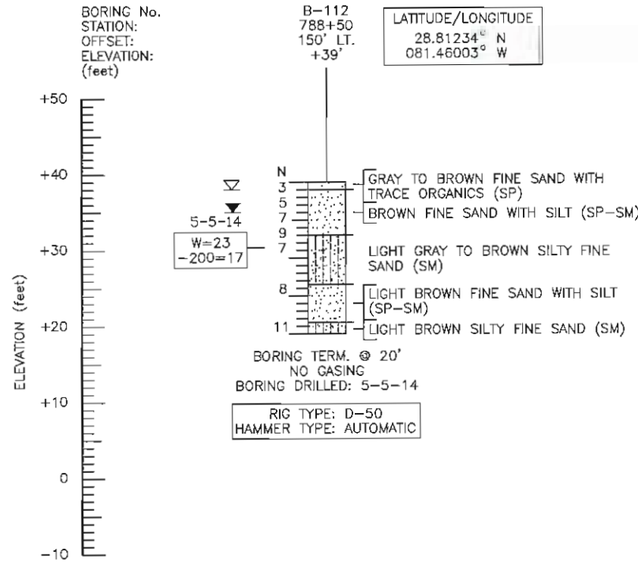
SILTS AND CLAYS

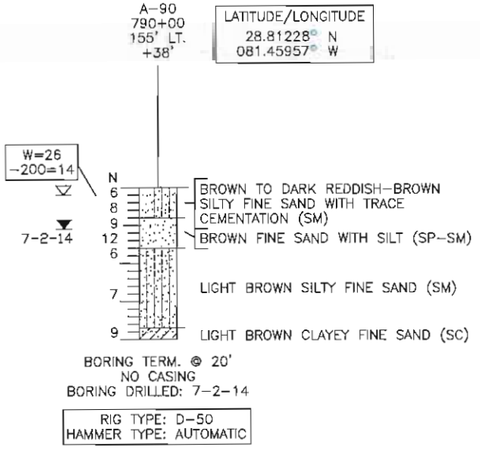
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

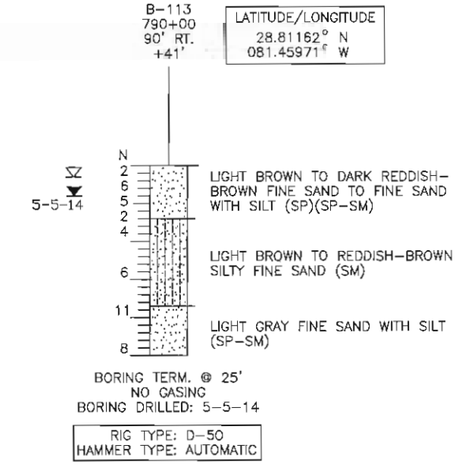
ENVIRONMENTAL CLASSIFICATION:

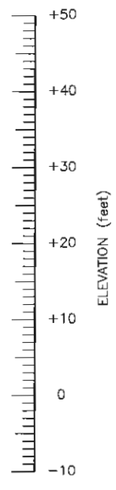
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.0









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
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1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-5-14
CHECKED BY: ENJ 11-5-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

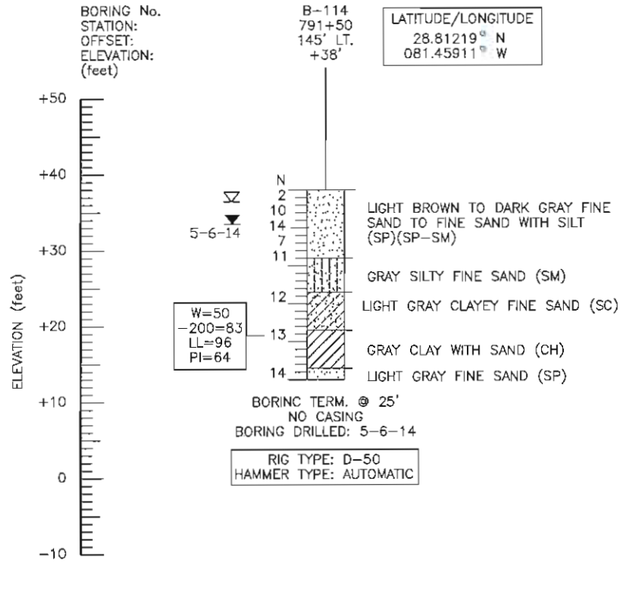
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

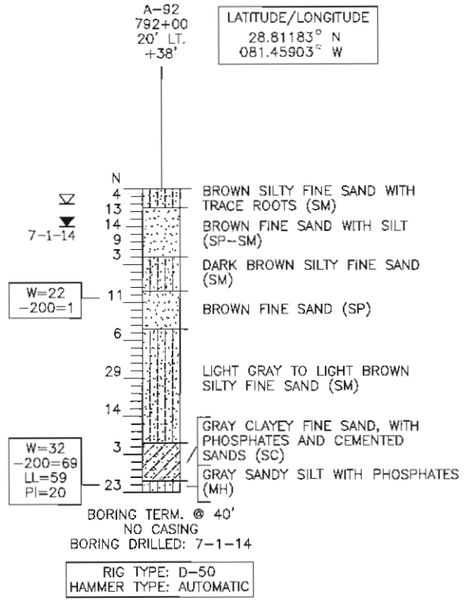
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

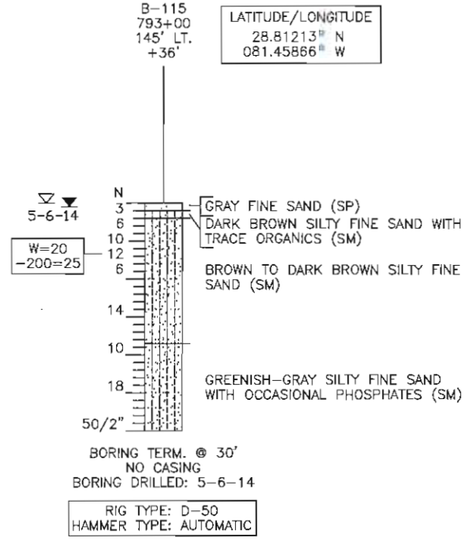
REF. DWG. NO.

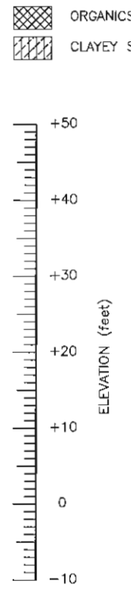
SHEET NO. -

Dec08, 2014-3:41 pm









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

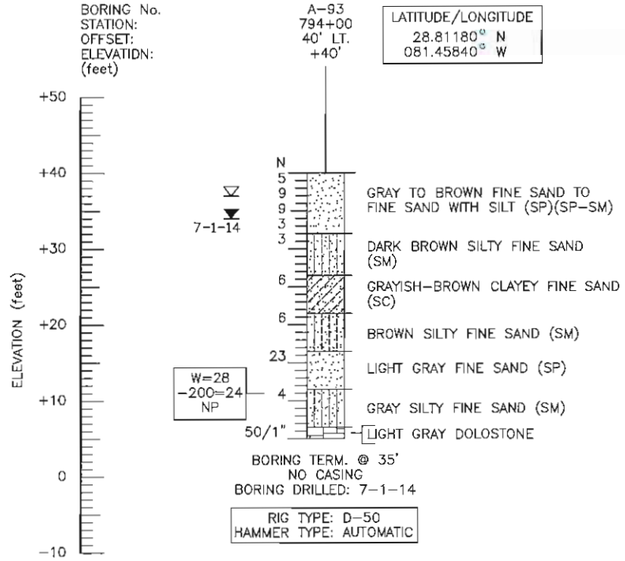
SILTS AND CLAYS

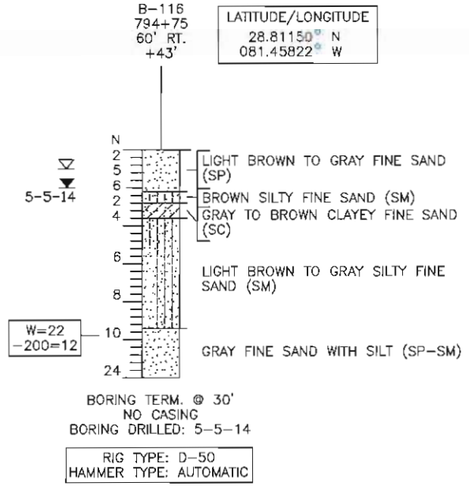
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

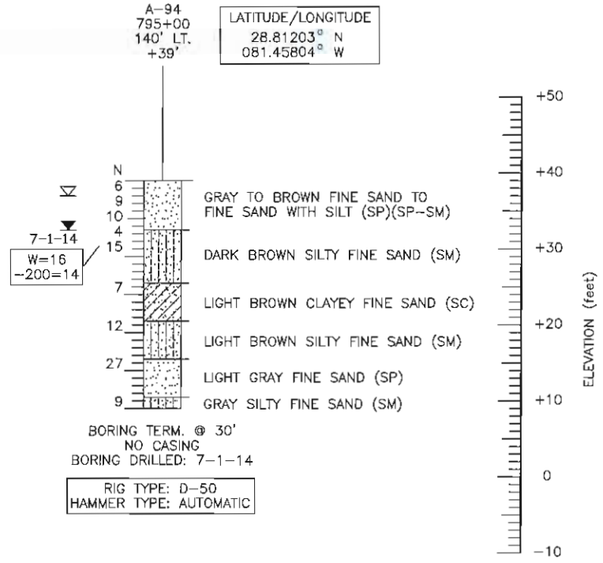
ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.9







100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

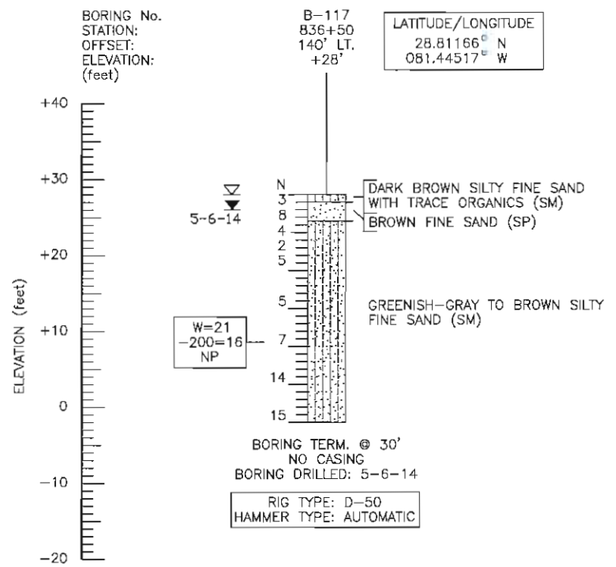
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

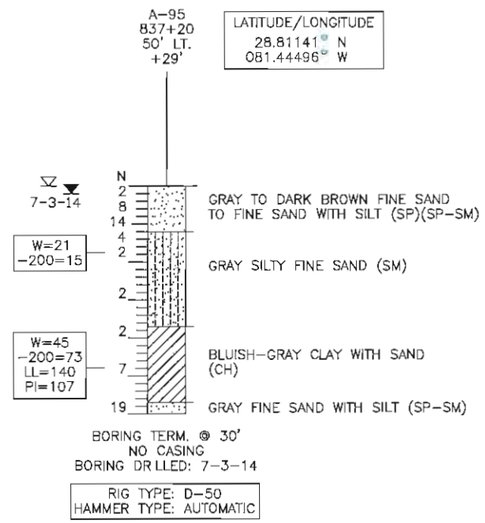
REF. DWG. NO.

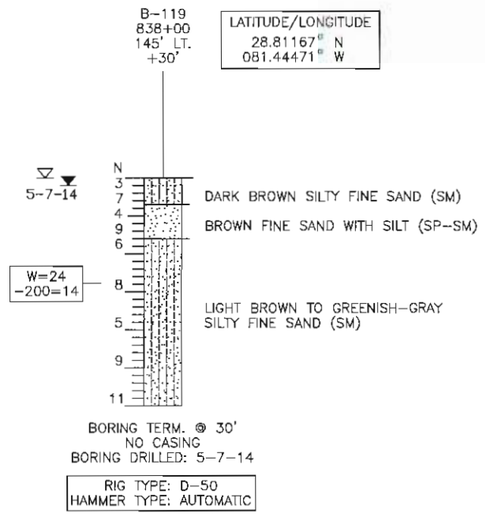
SHEET NO. -

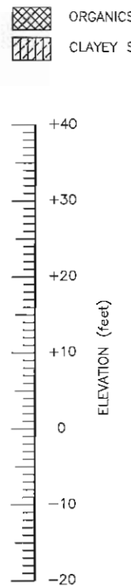
Nov26, 2014-1:46pm

TERRACON No. H1 13 5D80 EXHIBIT: A-39









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

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-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
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WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

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AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

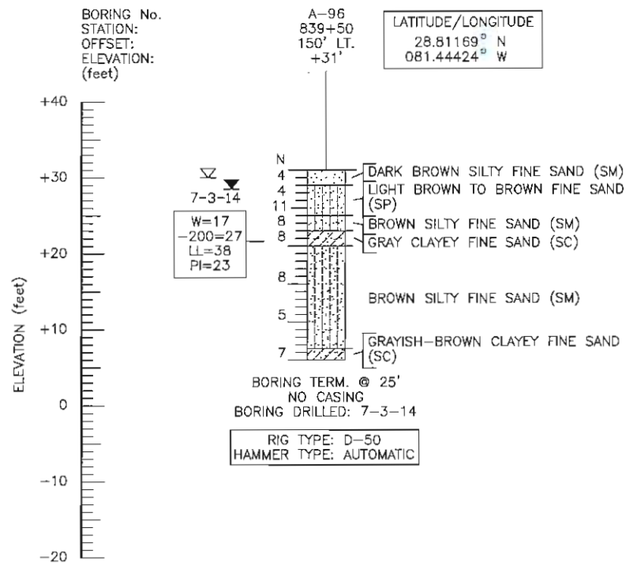
SILTS AND CLAYS

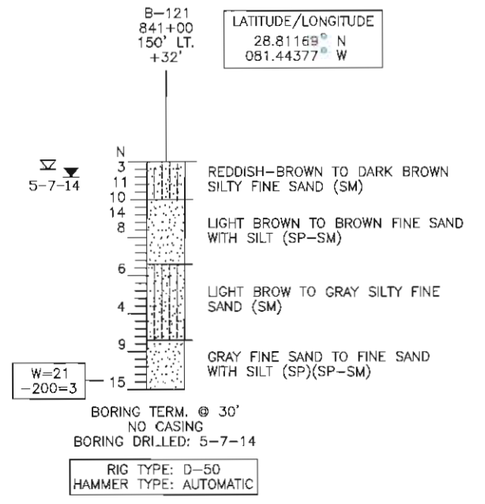
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

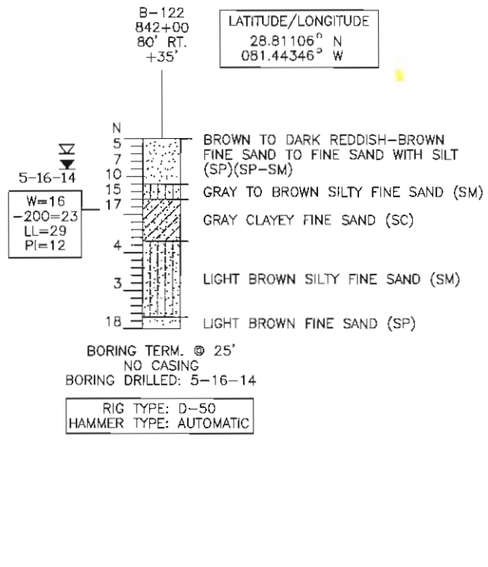
ENVIRONMENTAL CLASSIFICATION:

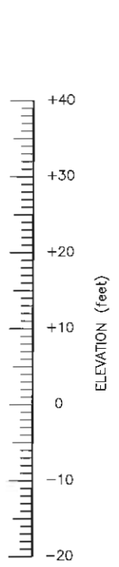
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.1









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

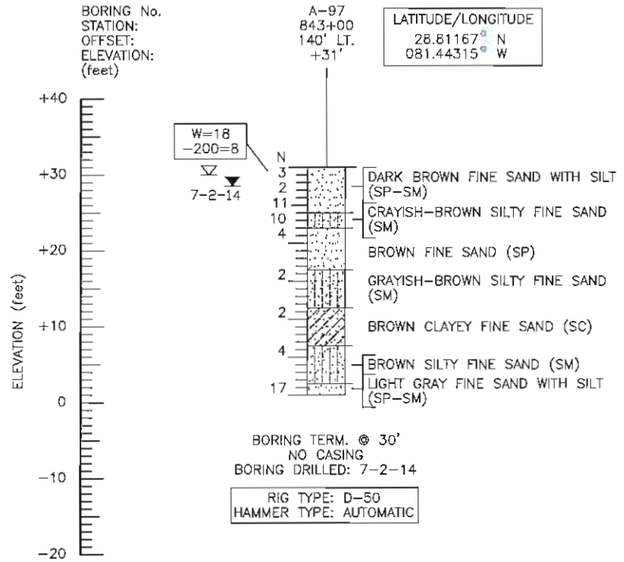
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

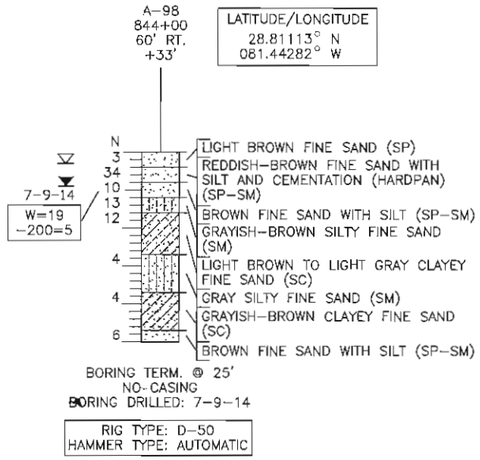
REF. DWG. NO.

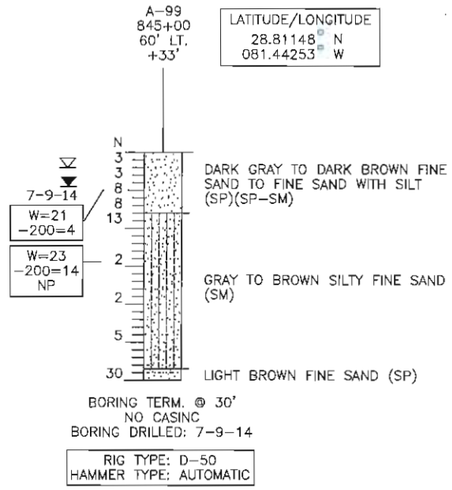
SHEET NO. -

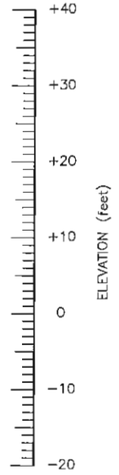
Nov26, 2014-1:47pm

TERRACON No. H1 13 5080 EXHIBIT: A-40









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL, DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

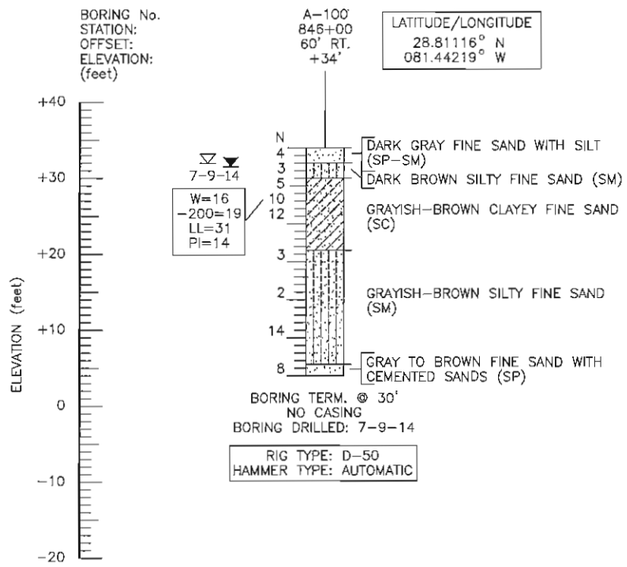
SILTS AND CLAYS

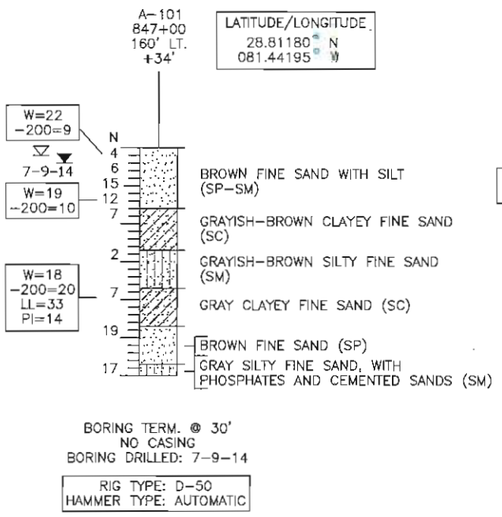
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

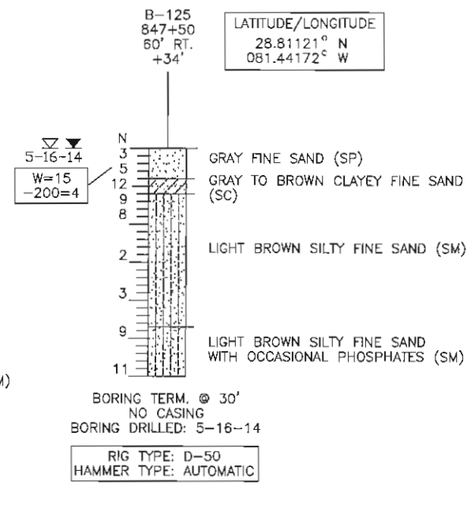
ENVIRONMENTAL CLASSIFICATION:

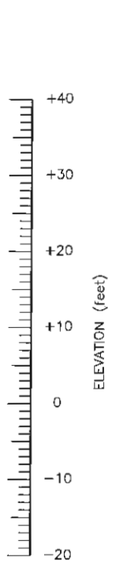
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.8









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:47pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

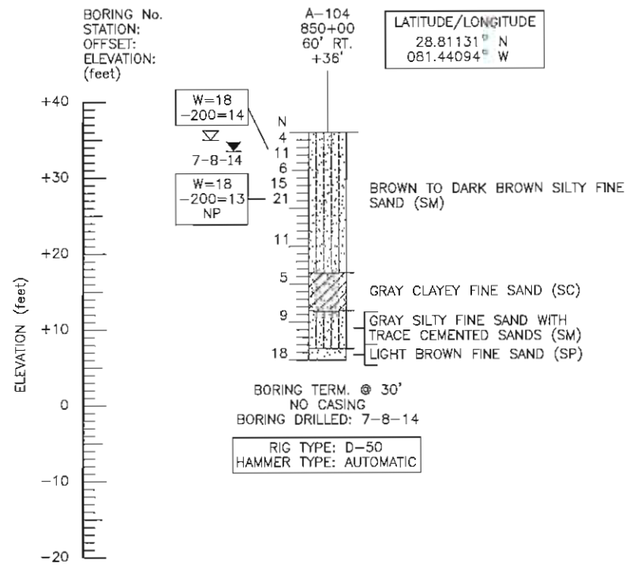
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

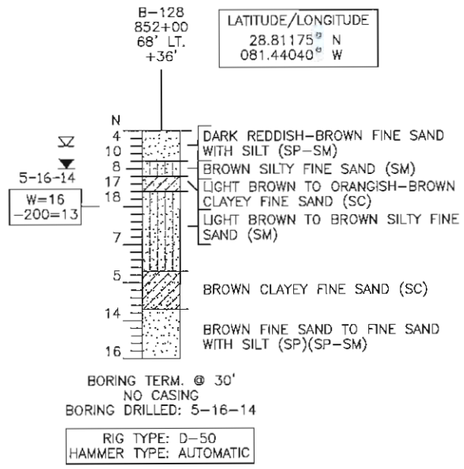
REF. DWG. NO.

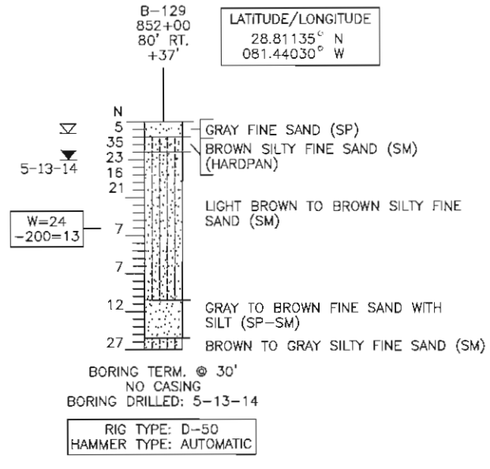
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-41







ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
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SILT
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5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

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SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
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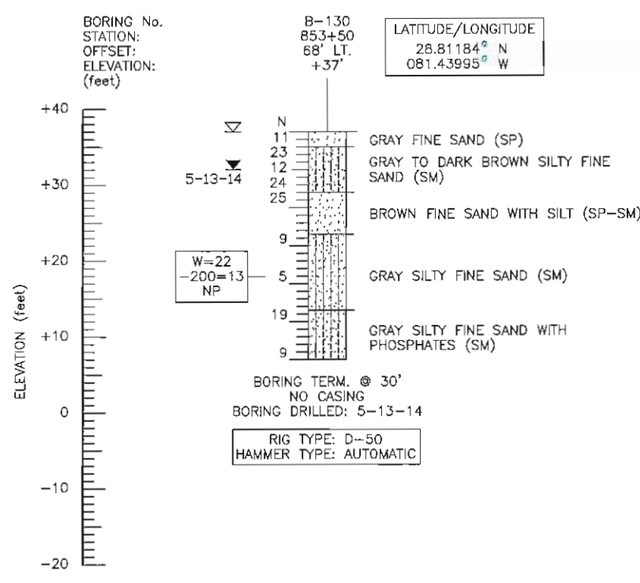
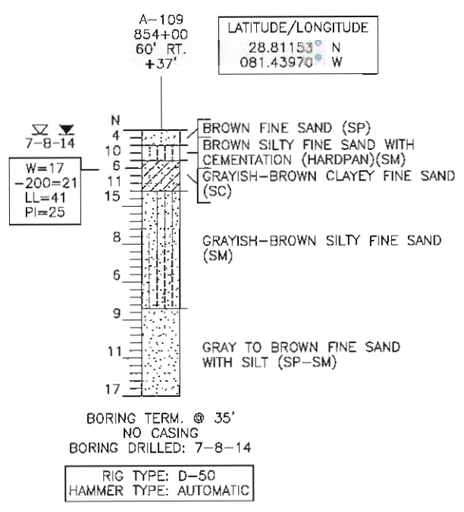
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

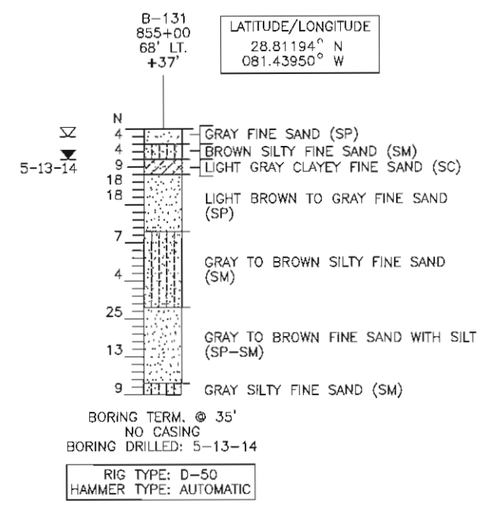
ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.8







100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:48pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

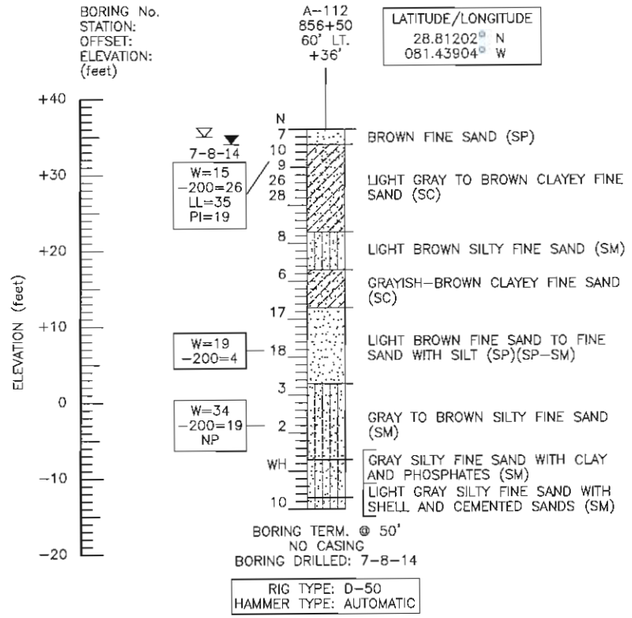
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

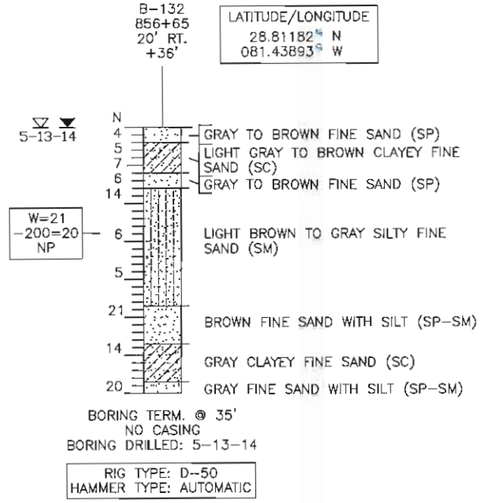
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

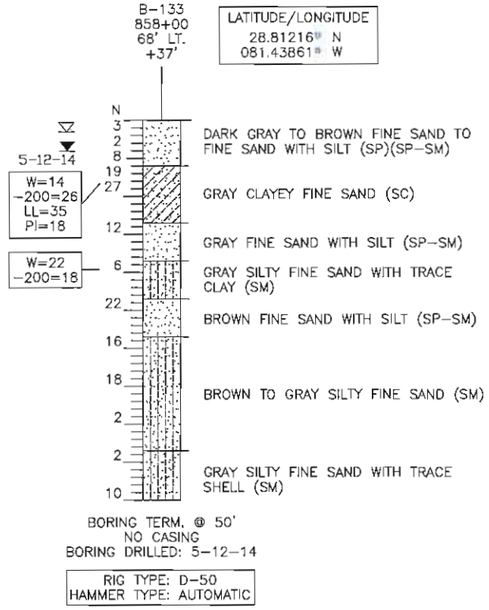
REF. DWG. NO.

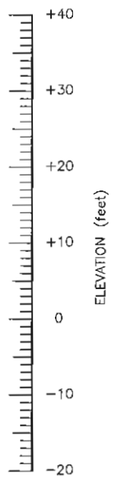
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-42









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

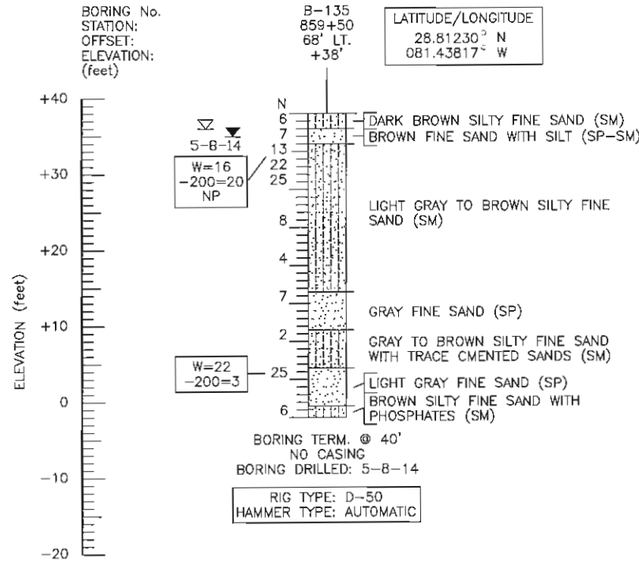
SILTS AND CLAYS

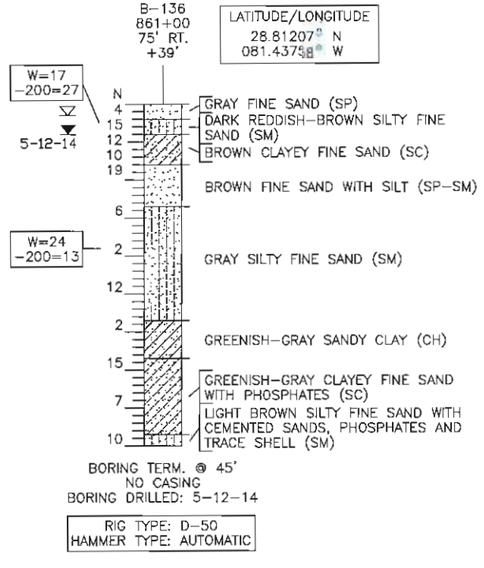
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

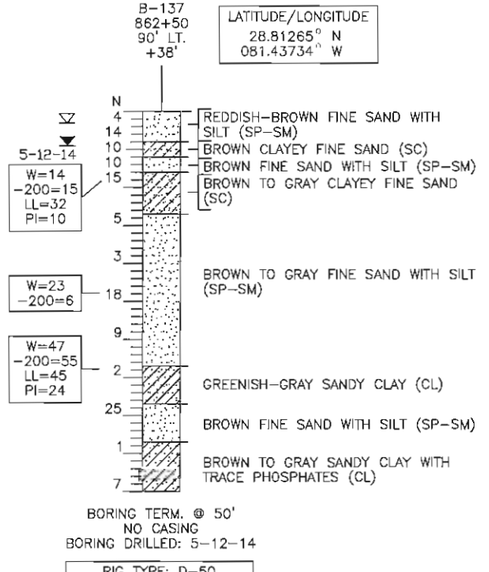
ENVIRONMENTAL CLASSIFICATION:

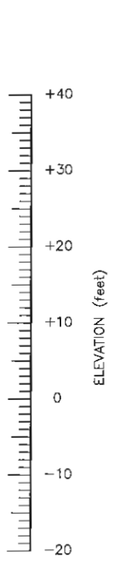
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.8









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014 - 1:51pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

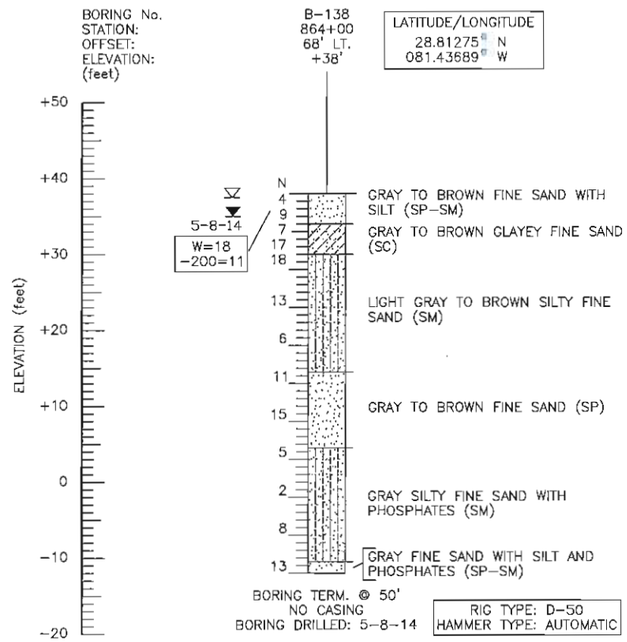
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

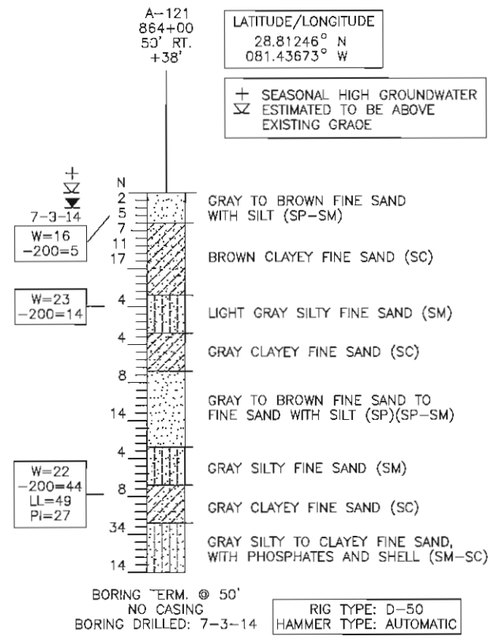
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

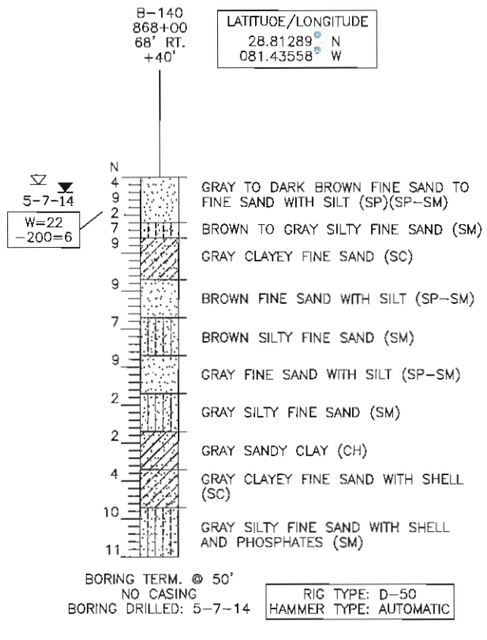
REF. DWG. NO.

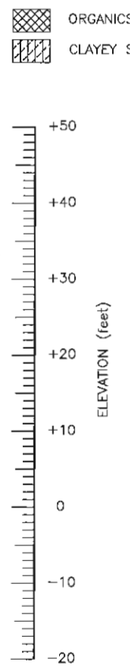
SHEET NO. -

TERRACON No. H1 13 5D80 EXHIBIT: A-43









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
OOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

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DENSE	24-40
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CONSISTENCY	SPT (BLOWS/FOOT)
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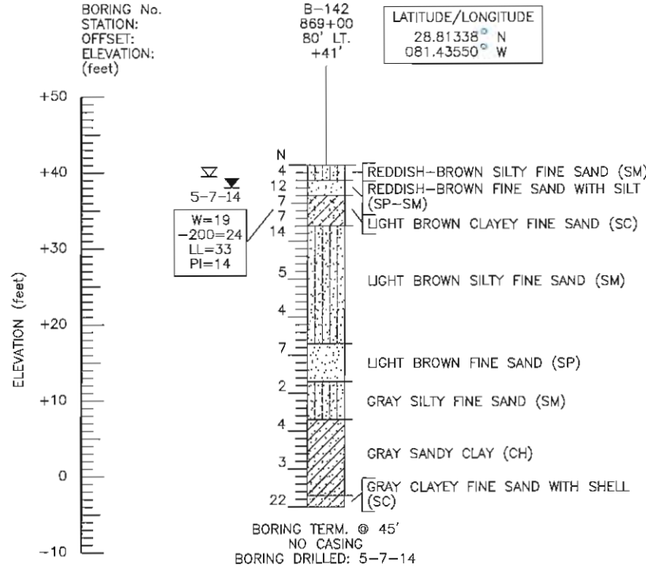
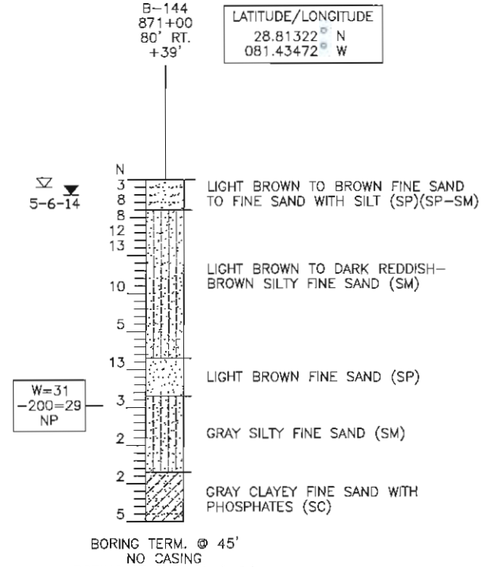
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

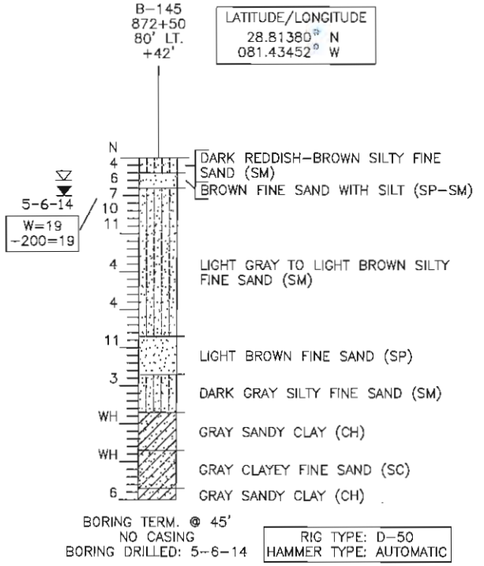
ENVIRONMENTAL CLASSIFICATION:

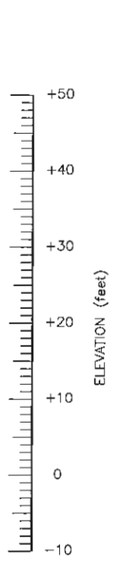
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.8









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

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WALL AND HIGH FILL BORINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

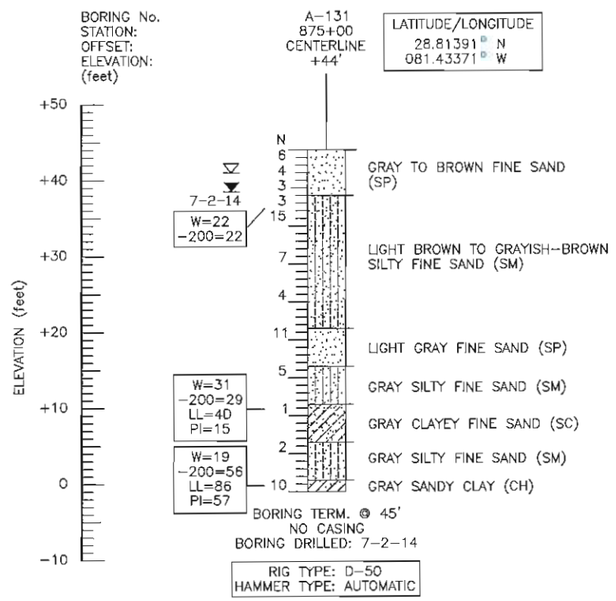
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

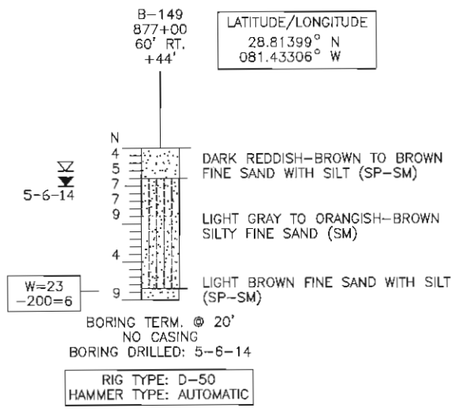
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

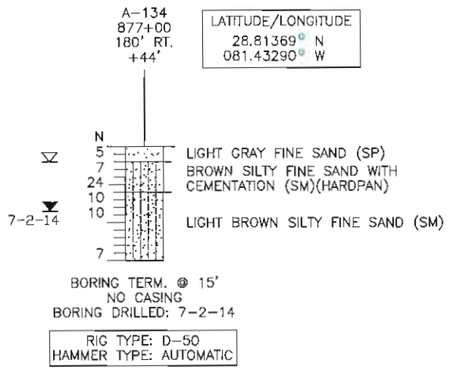
REF. DWG. NO.

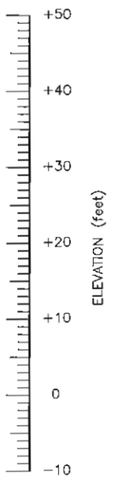
SHEET NO. -

Nov26, 2014 - 1:54pm









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL
DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
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N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

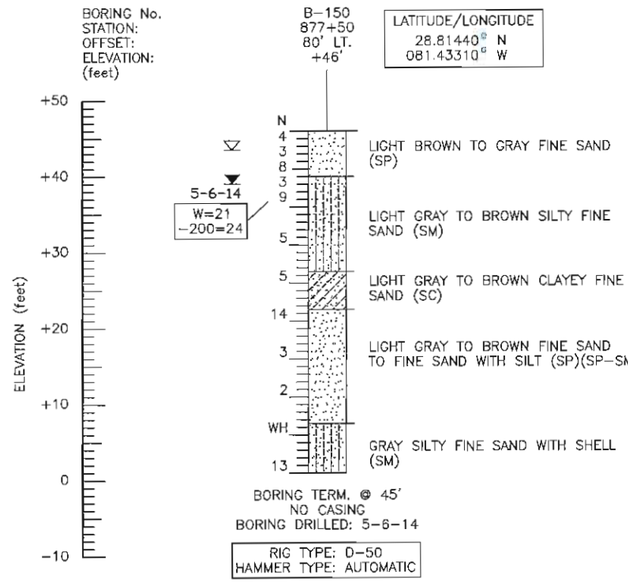
SILTS AND CLAYS

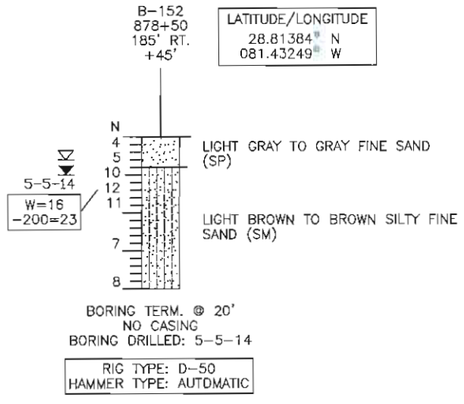
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

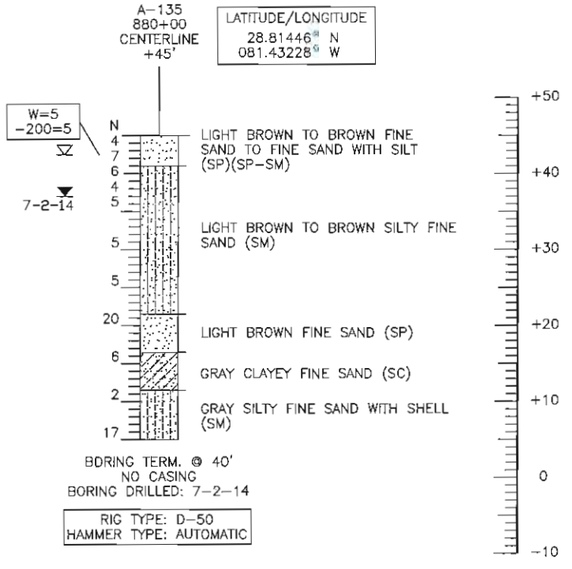
ENVIRONMENTAL CLASSIFICATION:

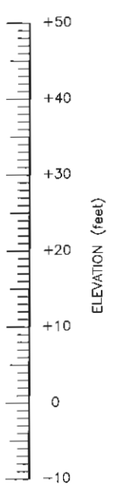
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: MODERATELY AGGRESSIVE
pH=6.1









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:55pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1575 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

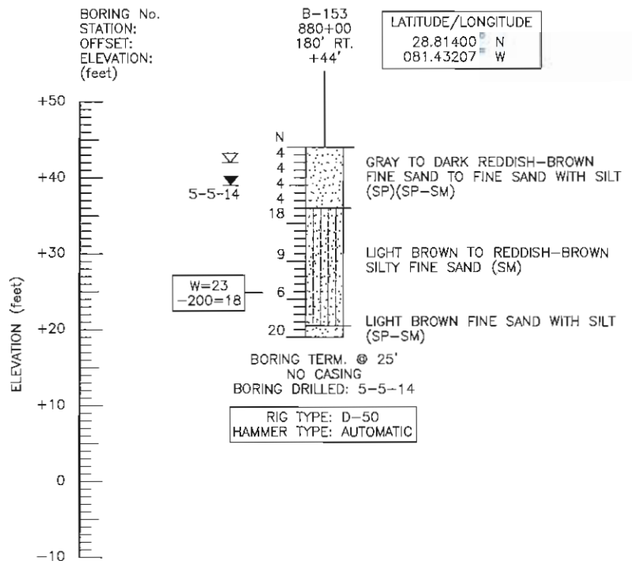
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

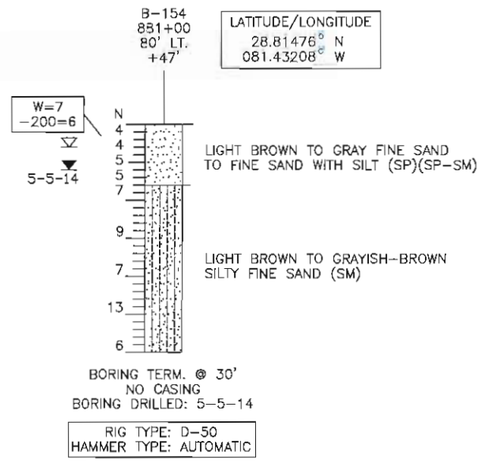
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

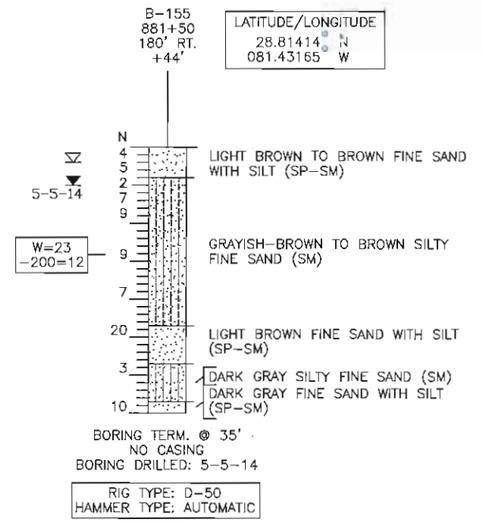
REF. DWG. NO.

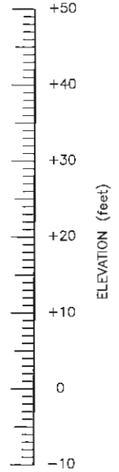
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-45









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
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SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

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SPOON OUTSIDE DIA.	2 in.
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AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

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DENSE	24-40
VERY DENSE	GREATER THAN 40

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CONSISTENCY	SPT (BLOWS/FOOT)
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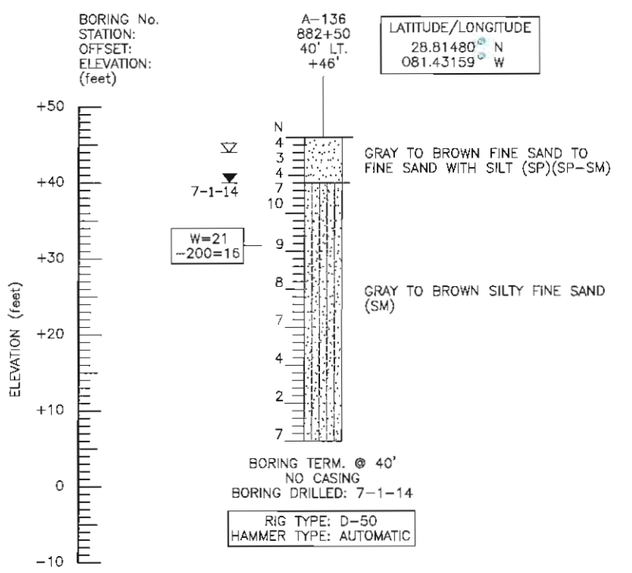
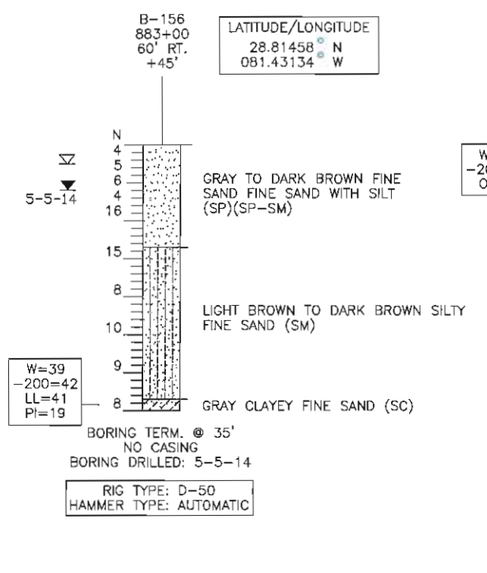
VERY STIFF	12-24
HARD	GREATER THAN 24

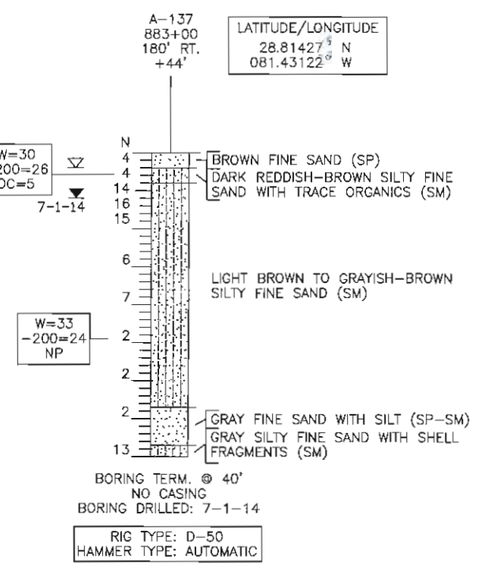
ENVIRONMENTAL CLASSIFICATION:

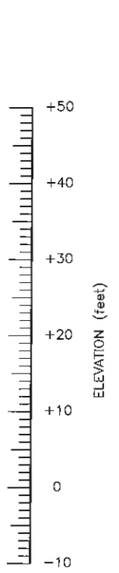
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: EXTREMELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=4.6









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014 - 1:56pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

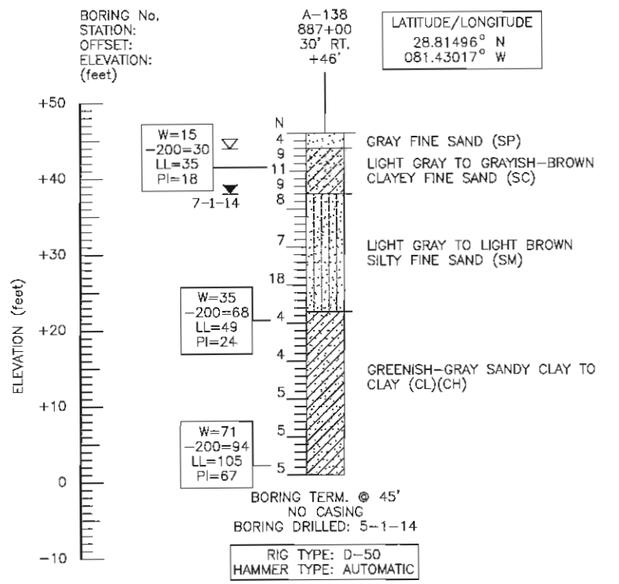
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

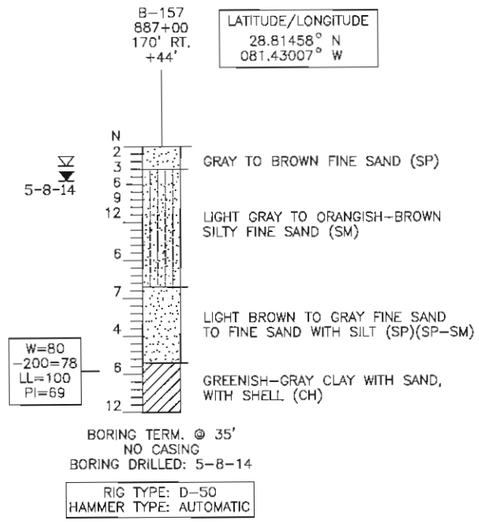
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

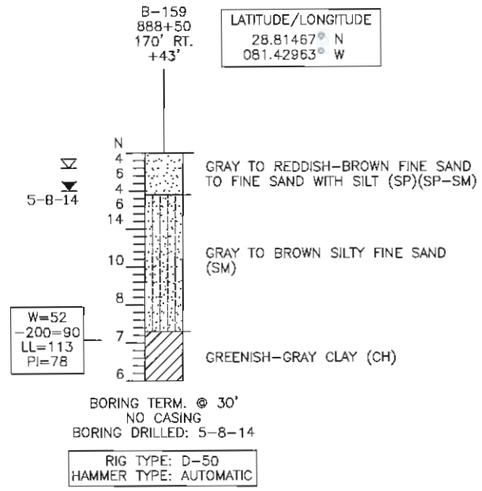
REF. DWG. NO.

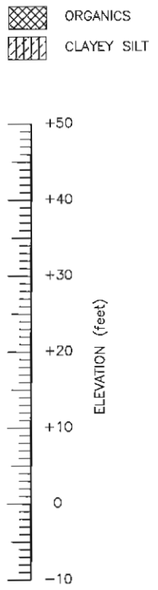
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-46









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL, DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

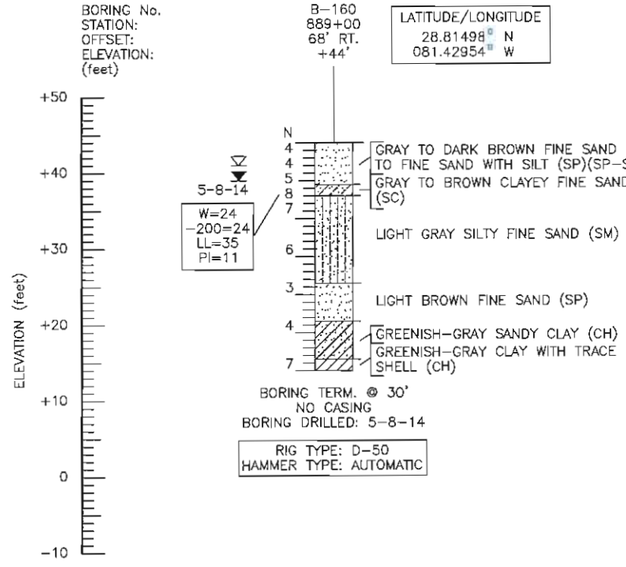
SILTS AND CLAYS

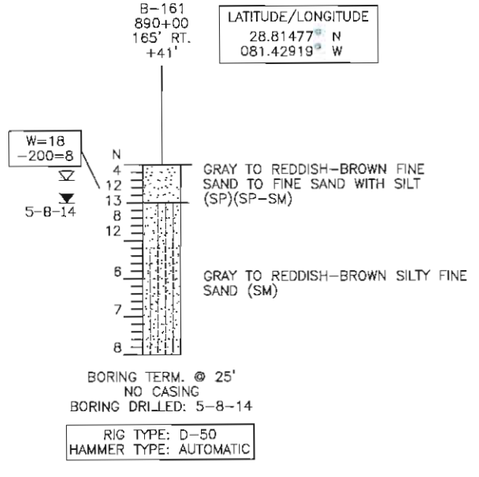
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

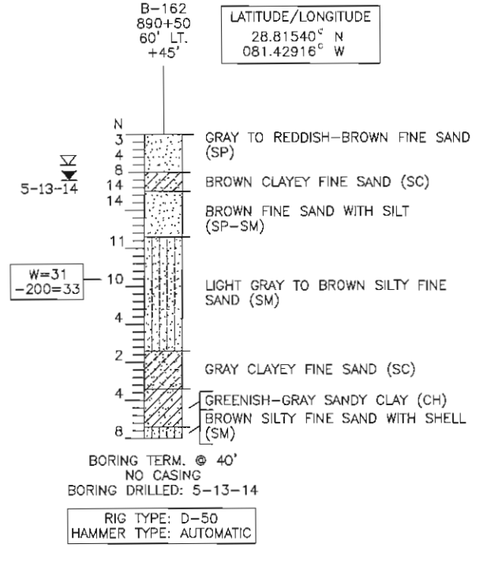
ENVIRONMENTAL CLASSIFICATION:

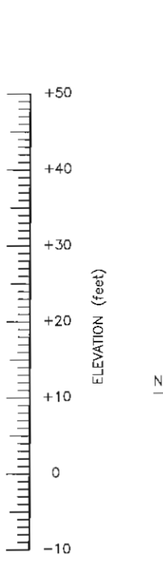
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.4









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014-1:57pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

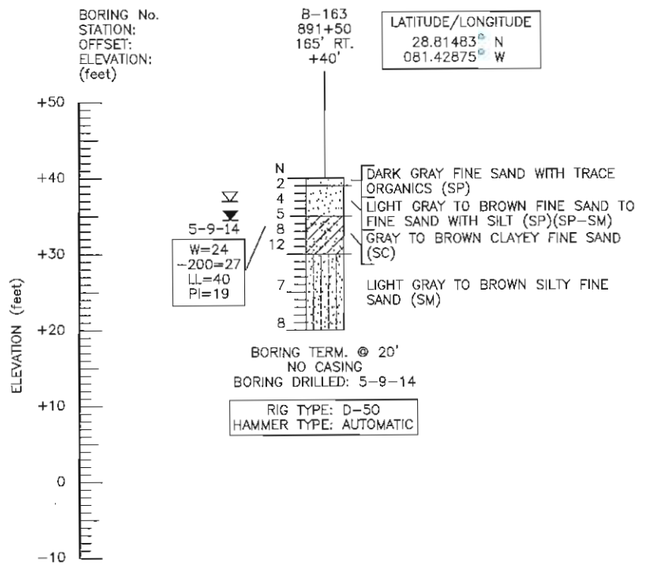
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

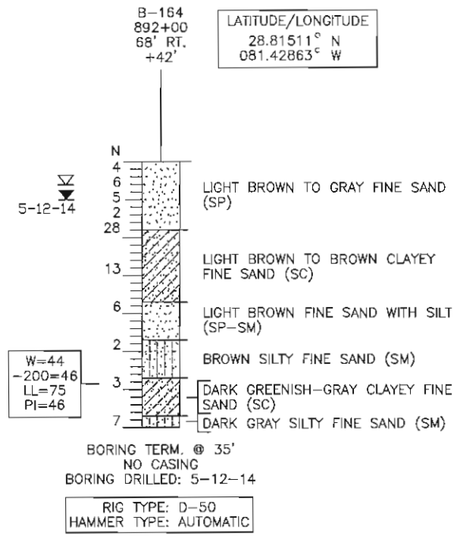
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

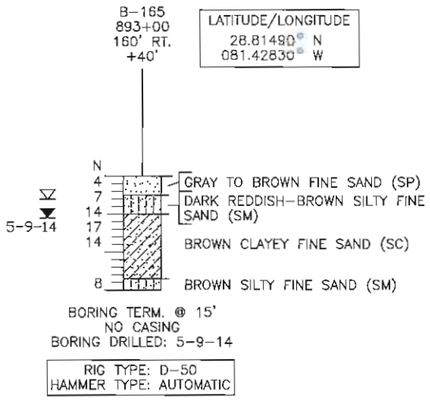
REF. DWG. NO.

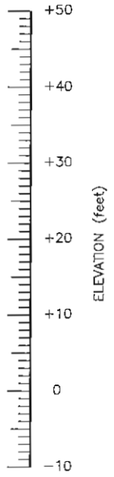
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-47









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL
DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0
-200=0
LL=0
PI=0
NP
OC=0

NATURAL MOISTURE CONTENT (%)
FINES PASSING No. 200 SIEVE (%)
LIQUID LIMIT (%)
PLASTICITY INDEX
NON-PLASTIC
ORGANIC CONTENT (%)

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED

50/6" NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES

WR WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON

WH WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

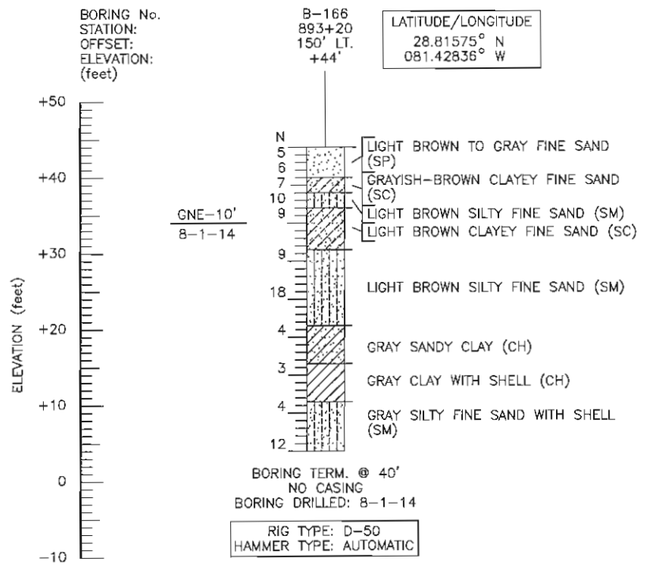
SILTS AND CLAYS

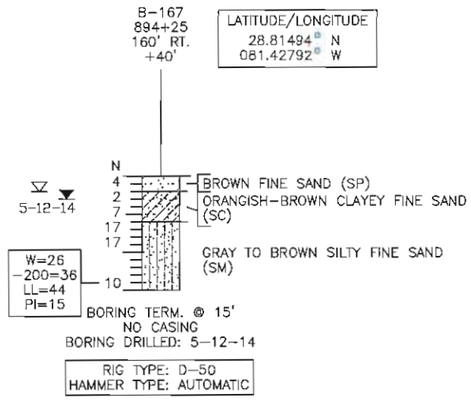
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

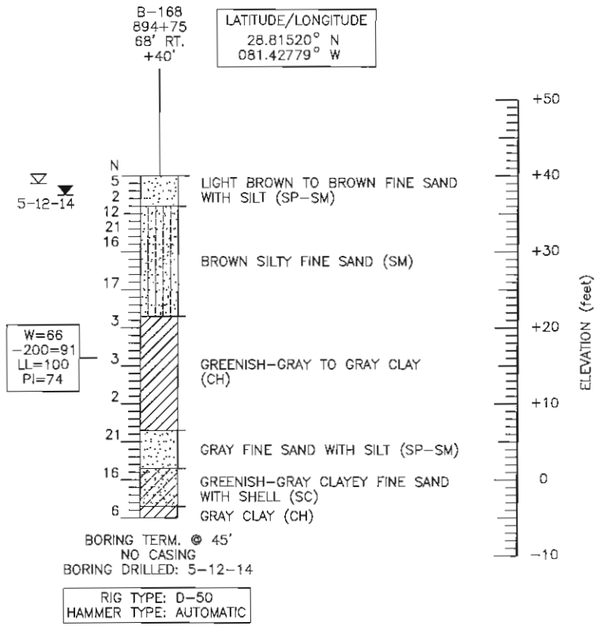
ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.4







100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014 - 1:58pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

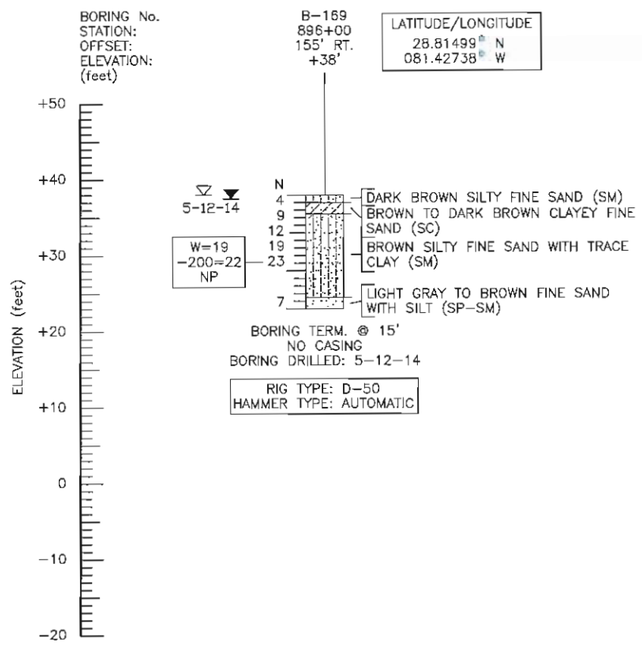
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

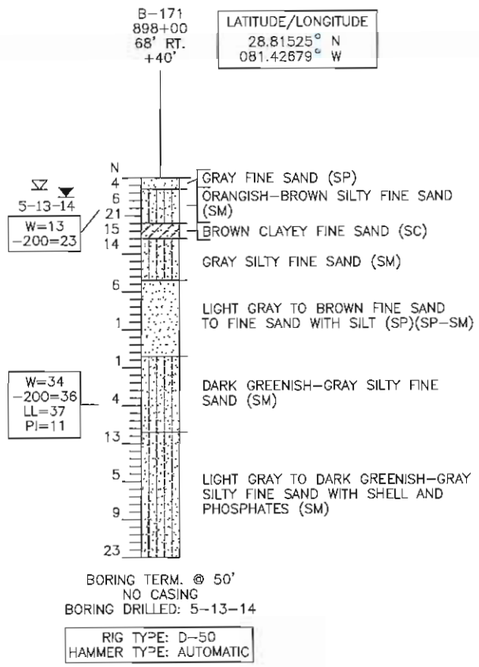
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

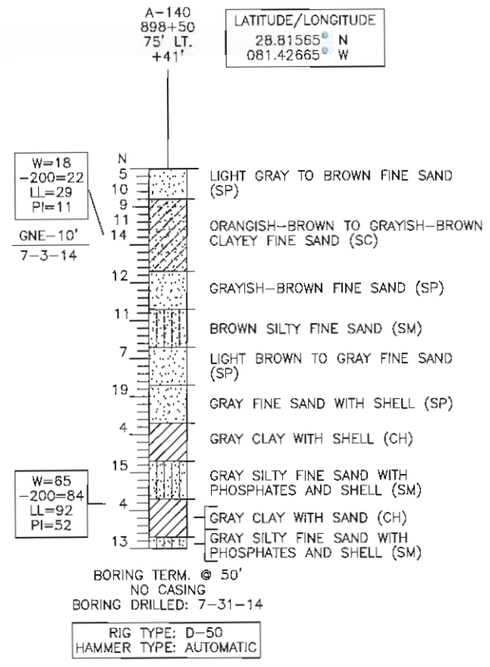
REF. DWG. NO.

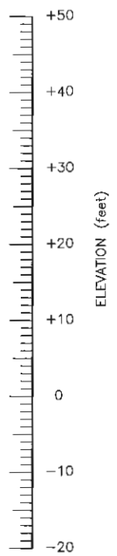
SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-48









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)

N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

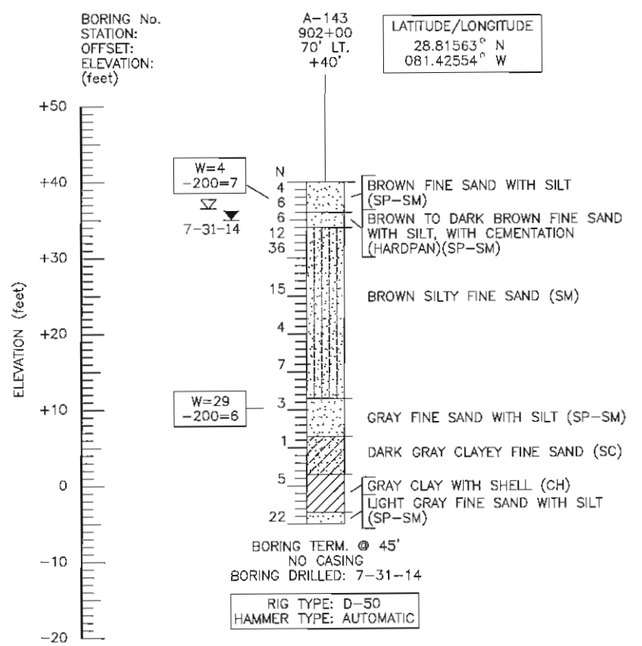
SILTS AND CLAYS

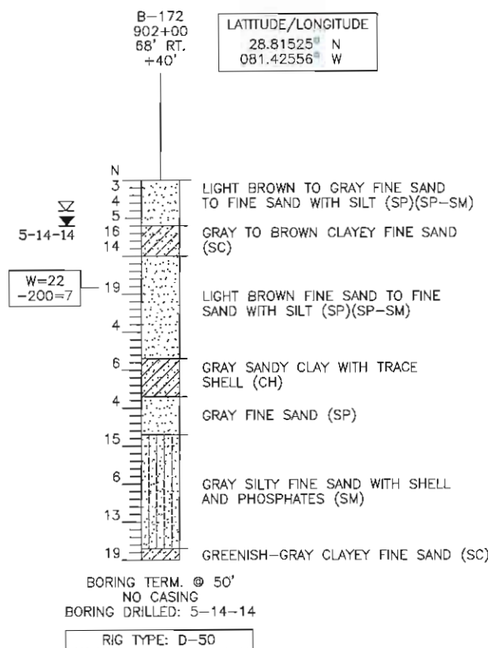
CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

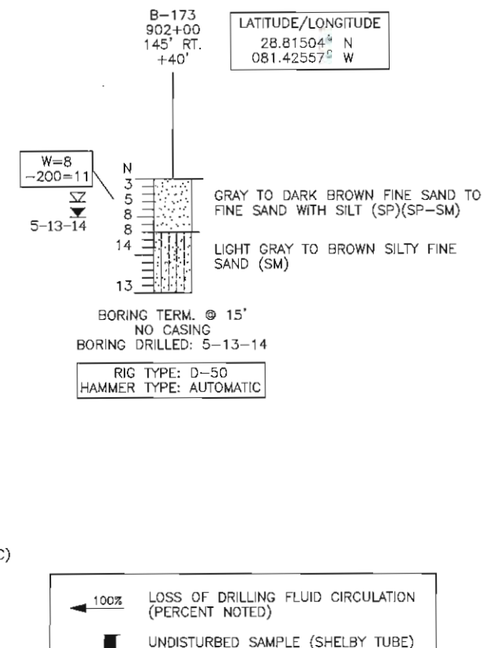
ENVIRONMENTAL CLASSIFICATION:

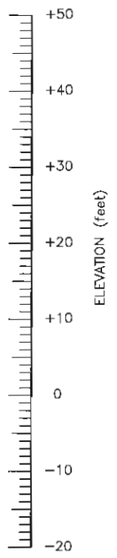
SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: MODERATELY AGGRESSIVE
pH=6.2









100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Nov26, 2014 - 2:00pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

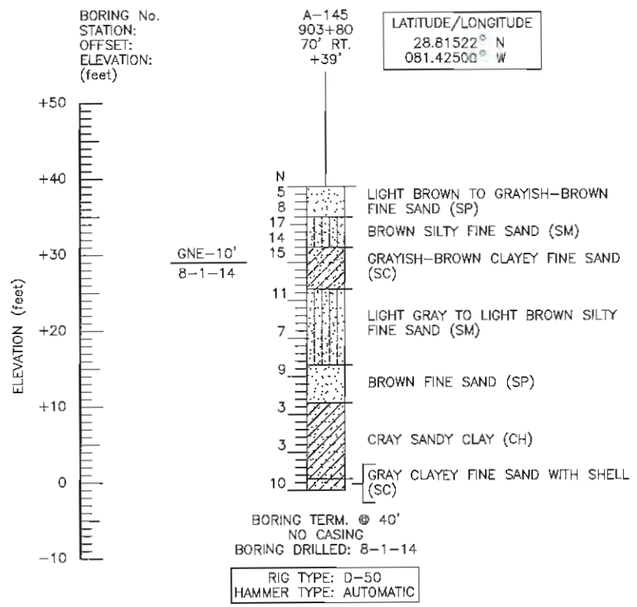
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

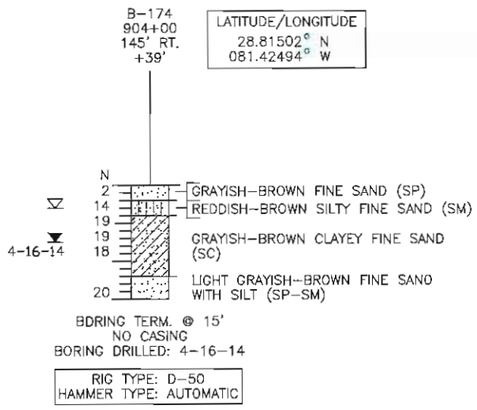
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

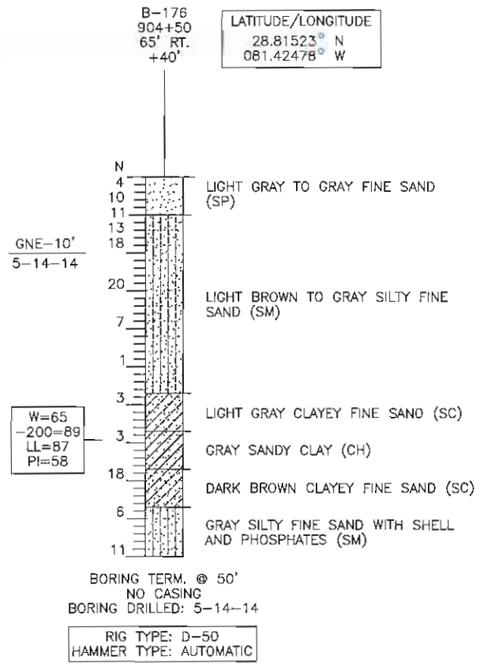
REF. DWG. NO.

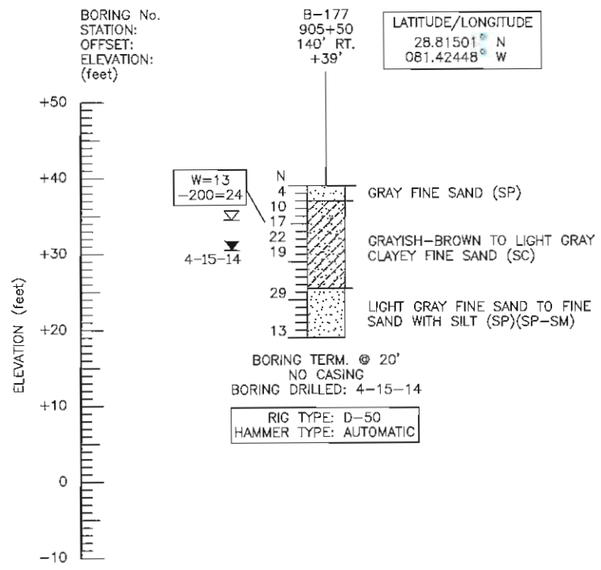
SHEET NO. -

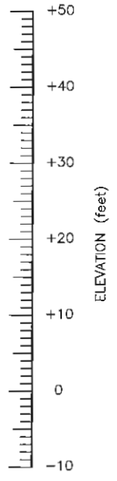
TERRACON No. H1 13 5080 EXHIBIT: A-49











ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

5-15-14 ENCOUNTERED GROUNDWATER LEVEL DATE NOTED

ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

GNE-10' GROUNDWATER LEVEL NOT ENCOUNTERED TO DEPTH OF 10 FEET

W=0	NATURAL MOISTURE CONTENT (%)
-200=0	FINES PASSING No. 200 SIEVE (%)
LL=0	LIQUID LIMIT (%)
PI=0	PLASTICITY INDEX
NP	NON-PLASTIC
OC=0	ORGANIC CONTENT (%)
N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
50/6"	NUMBER OF BLOWS REQUIRED (50) TO ADVANCE SAMPLE SPOON (6) INCHES
WR	WEIGHT OF DRILL ROD SUFFICIENT TO ADVANCE SAMPLE SPOON
WH	WEIGHT OF ROD AND HAMMER SUFFICIENT TO ADVANCE SAMPLE SPOON

STANDARD PENETRATION TEST DATA
AUTOMATIC HAMMER

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: MODERATELY AGGRESSIVE
STEEL: EXTREMELY AGGRESSIVE
pH=5.6

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

3) STATIONS AND OFFSETS REFERENCE THE BASELINE OF SURVEY OF SR 429 (WEKIVA PARKWAY).

4) BORING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

Nov26, 2014-2:01pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY: SW 11-26-14
CHECKED BY: ENJ 11-26-14
DESIGNED BY:
CHECKED BY:

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

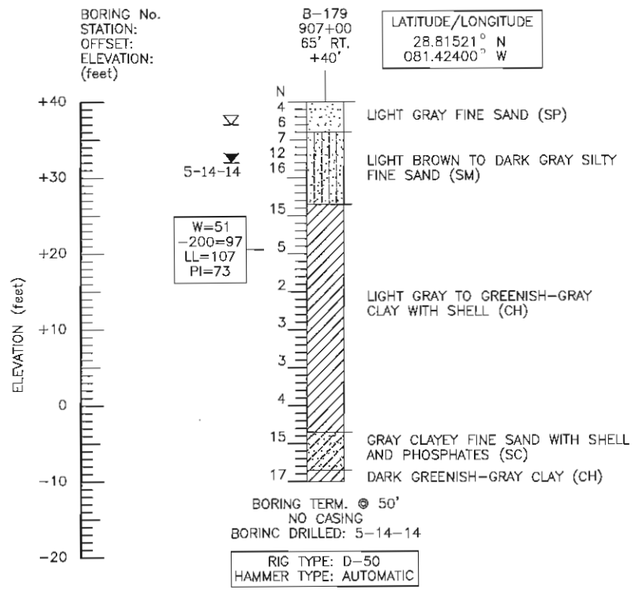
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

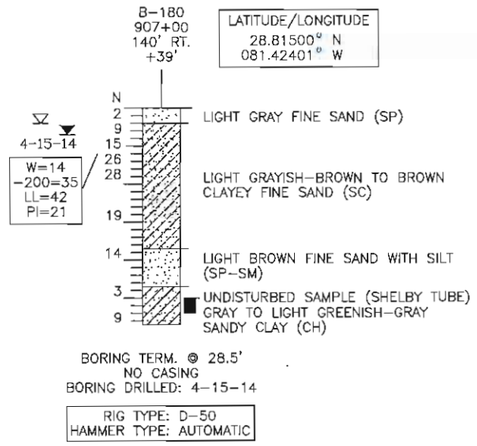
SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

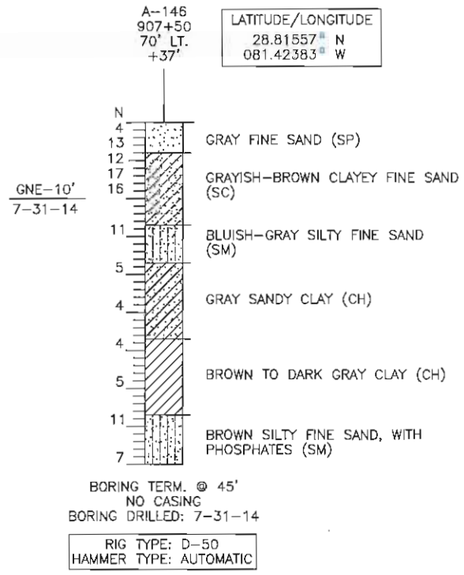
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

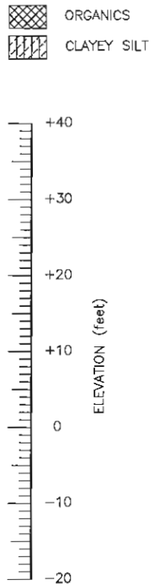
REF. DWG. NO.

SHEET NO. -









ORGANICS
CLAYEY SILT
SAND, SAND WITH SILT
SILTY SAND
CLAYEY SAND
DOLOSTONE, LIMESTONE
CLAY
SANDY CLAY
SILT
SANDY SILT

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

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ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL

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VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A

SUBSTRUCTURE: CONCRETE: SLIGHTLY AGGRESSIVE
STEEL: MODERATELY AGGRESSIVE
pH=7.0

NOTES:

1) SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED AS INDICATED IN SECTION 2-4 OF THE STANDARD SPECIFICATIONS.

2) ARTESIAN CONDITIONS WERE NOT OBSERVED BY THE DRILLER AT THE BORING LOCATIONS. BASED ON REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE FLORIDAN AQUIFER FOR THE PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO RANGE FROM +20 TO +40 FEET, (NGVD).

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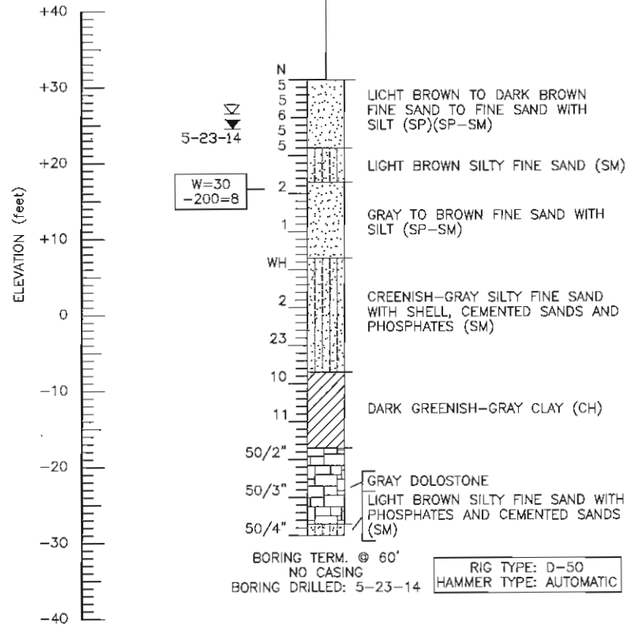

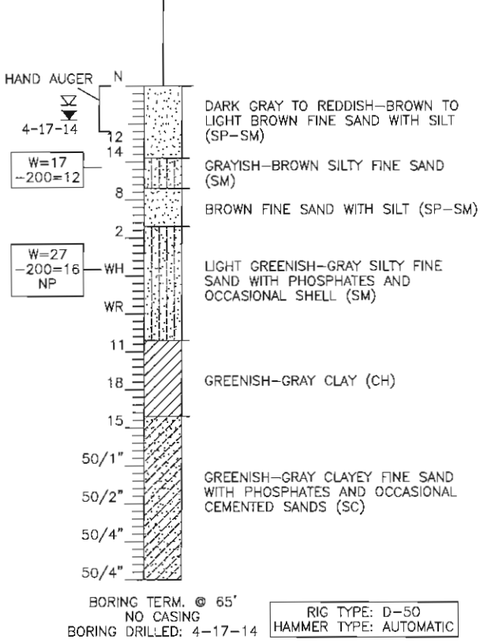

100% LOSS OF DRILLING FLUID CIRCULATION (PERCENT NOTED)

UNDISTURBED SAMPLE (SHELBY TUBE)

WALL AND HIGH FILL BORINGS

Nov26, 2014-2:02pm

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

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CHECKED BY: ENJ 11-26-14
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF SPT BORINGS FOR STRUCTURES

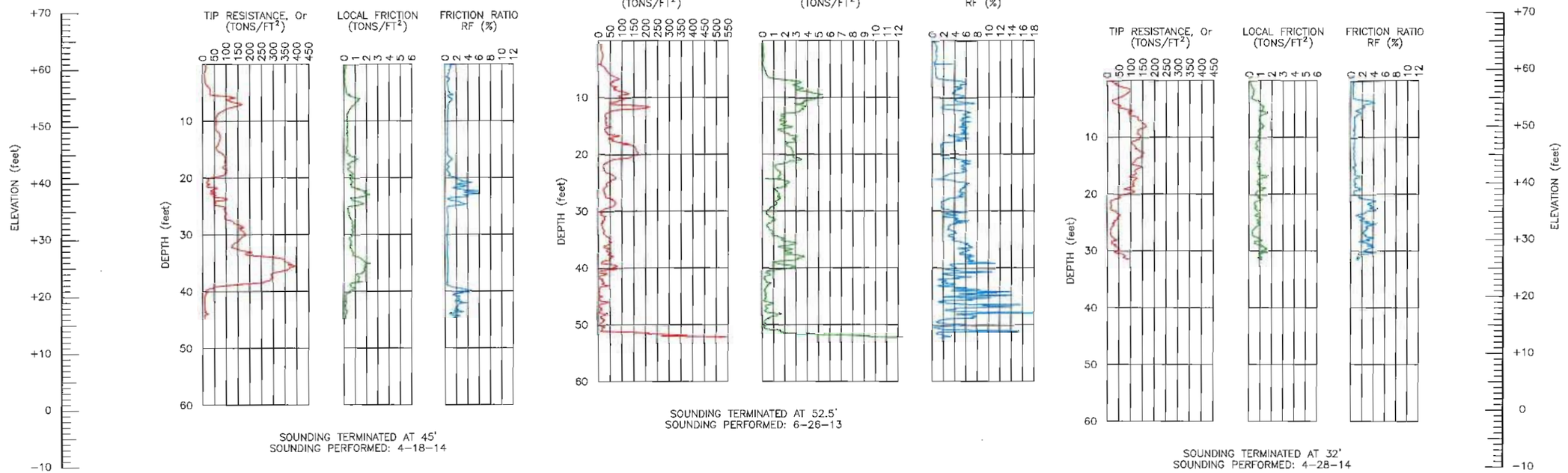
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. -

TERRACON No. H1 13 5080 EXHIBIT: A-51

SOUNDING No.	B-8	CPT-1	B-98
STATION:	681+50	761+00	768+70
OFFSET:	135' LT.	66' RT.	55' LT.
ELEVATION: (feet)	+61'	+65'	+58'



NOTES:

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4) CONE SOUNDING LOCATIONS AND ELEVATIONS ESTIMATED FROM REVIEW OF PROJECT PLANS.

WALL AND HIGH FILL BORINGS

Dec08, 2014-4:07pm

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SW 11-11-14	ENJ 11-11-14		

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE / SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF CONE SOUNDINGS FOR STRUCTURES

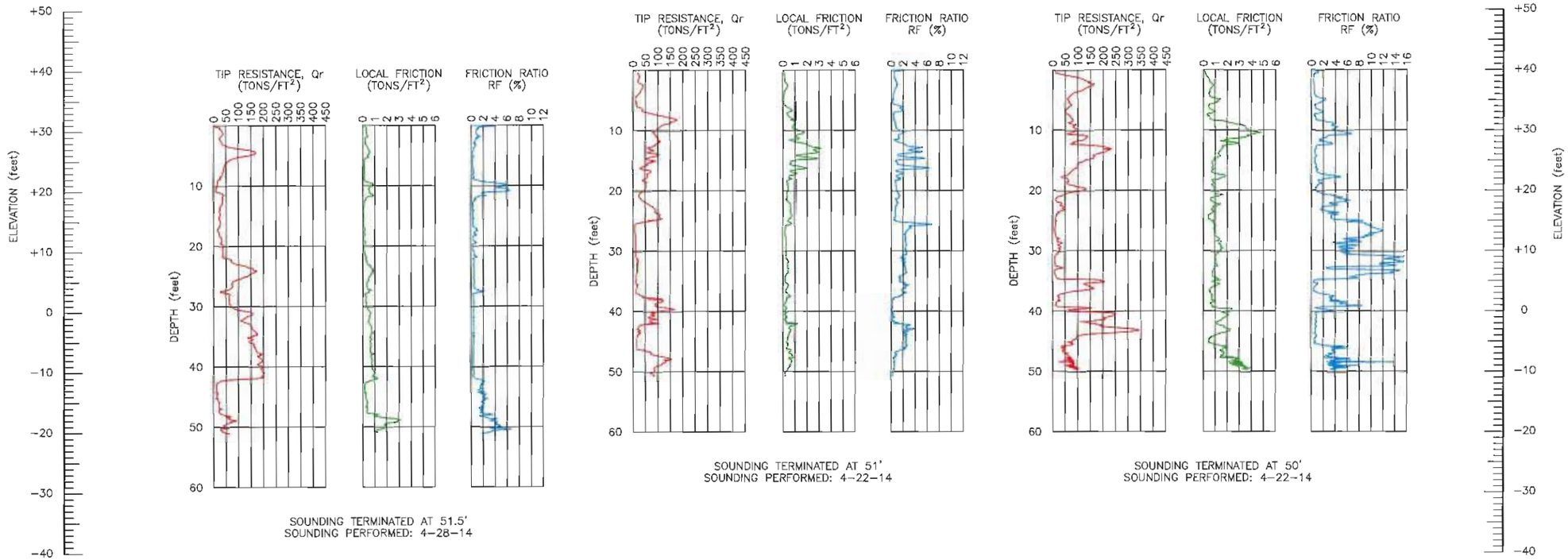
REF. DWG. NO.:

PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

SHEET NO.: -

TERRACON No. H1 13 5080 EXHIBIT: A-52

SOUNDING No.	B-120	B-170	B-175
STATION:	838+55	896+65	903+85
OFFSET:	40' LT.	35' LT.	32' LT.
ELEVATION: (feet)	+31'	+40'	+40'



NOTES:

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WALL AND HIGH FILL BORINGS

Dec08, 2014-4:07pm

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
P.E. LICENSE NUMBER 53962
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
TERRACON
CERTIFICATE OF AUTHORIZATION No. 8830

DRAWN BY:	CHECKED BY:	DESIGNED BY:	CHECKED BY:
SW 11-11-14	ENJ 11-11-14		

STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE / SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF CONE SOUNDINGS FOR STRUCTURES

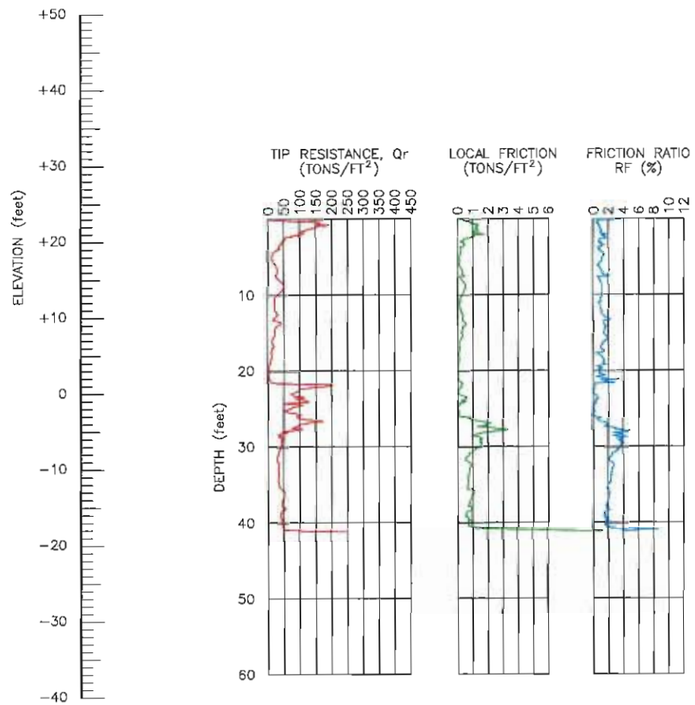
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6

REF. DWG. NO.

SHEET NO. –

TERRACON No. H1 13 5080 EXHIBIT: A-53

SOUNDING No. CPT-2
STATION: 927+40
OFFSET: 55' LT.
ELEVATION: +23'
(feet)



SOUNDING TERMINATED AT 41.4'
SOUNDING PERFORMED: 6-26-13

NOTES:

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WALL AND HIGH FILL BORINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RICHARD G. ACREE, P.E.
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1675 LEE ROAD
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORATATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-32-02

SHEET TITLE: REPORT OF CONE SOUNDINGS FOR STRUCTURES
REF. DWG. NO.
PROJECT NAME: WEKIVA PARKWAY (SR 429/SR 46) SECTION 6
SHEET NO. -

TERRACON No. H1 13 508D EXHIBIT: A-54

Nov11, 2014-2:57pm

EXTERNAL STABILITY ANALYSES FOR MSE WALLS

- **PROFILE / CASE 1:**
  - LRFD EXTERNAL STABILITY ANALYSIS
  - STABL FOR WINDOWS (w/result output for tallest wall height)
- **PROFILE / CASE 2:**
  - LRFD EXTERNAL STABILITY ANALYSIS
  - STABL FOR WINDOWS (w/result output for tallest wall height)
- **PROFILE / CASE 3:**
  - LRFD EXTERNAL STABILITY ANALYSIS
  - STABL FOR WINDOWS (w/result output for tallest wall height)

"PROFILE" 1

MSE WALL - LRFD External Stability Analysis

version 2.5

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (2006)

	H (ft)	* Ho (ft)	* D (ft)	* L (ft)	Minimum Reinforcement Length Requirement (SDG Fig 3.16)	Over-turning CDR >= 1	Eccen-tricity CDR <= 1	Sliding CDR >= 1	Bearing Resitance CDR >= 1	* β (deg)	* λ (ft)	* Water d (ft)	* γ[rf] (pcf)	* γ[bf] (pcf)	* ϕ [bf] (deg)	* γ[fs] (pcf)	* ϕ [fs] (deg)	* c[fs] (psf)	* ϕ u (deg)	* q1 (psf)	* q2 (psf)	CW
1	10.0	8.0	2.0	8.0	OK	2.09	0.95	1.07	1.58	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
2	14.0	12.0	2.0	10.0	OK	1.92	1.04	1.06	1.22	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
3	18.0	16.0	2.0	13.0	OK	2.14	0.93	1.15	1.20	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
4	22.0	20.0	2.0	16.0	OK	2.30	0.87	1.21	1.18	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
5	26.0	24.0	2.0	19.0	OK	2.43	0.82	1.25	1.16	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
6	30.0	28.0	2.0	21.0	OK	2.30	0.87	1.23	1.05	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
7	34.0	32.0	2.0	24.0	OK	2.40	0.83	1.26	1.05	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	0.50
8	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
9	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
10	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
11	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
12	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
13	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
14	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
15	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
16	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
17	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
18	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
19	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
20	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!

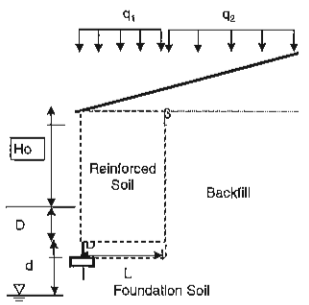
* Indicates required input

Note:

Disclaimer: No Warranty, expressed or implied, is made by the author or the Florida Department of Transportation (FDOT) as to the accuracy and the functioning of this program or the results it produces; nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the author or the FDOT in any connection therewith.

H Wall Height H = Ho + D
Ho Wall Height above ground (feet)
D Wall Embeddment Depth (feet)
L Reinforcing Strap Length (feet)
CDR Capacity-Demand Ratio for :
Overturning = Mr / Mo => 1.0
Eccentricity = e / (L/4) =< 1.0
Sliding = Fr / Fd => 1.0
Bearing Resistance = qr / q_{vb} => 1.0

β Slope of backfill soil (degrees)
λ Horizontal distance from the back of the wall to the top of the slope (for broken-back slopes) (feet)
Use λ >= 2*H when modeling infinite slopes
d Water depth below base of leveling pad (feet)
γ[rf] Reinforced fill unit weight (pounds per cubic foot)
γ[bf] Backfill soil unit weight (pounds per cubic foot)
ϕ[bf] Backfill soil angle of internal friction (degrees)
γ[fs] Foundation Soil unit weight (pounds per cubic foot)
ϕ[fs] Foundation Soil angle of internal friction (degrees)
c[fs] Foundation Soil cohesion (pounds per square foot)
ϕu Base Angle of Internal Friction (degrees) (Sliding)
q1 Surcharge load over reinforced soil mass (pounds per square foot) - Should be zero when modeling infinite slopes
q2 Surcharge load behind reinforced soil mass (pounds per square foot) - Should be zero when modeling infinite slopes
Cw Cw = 0.5 for d =< 0, Cw=1.0 for d => 1.5*L + D



MSE WALL - LRFD External Stability Analysis

version 2.5

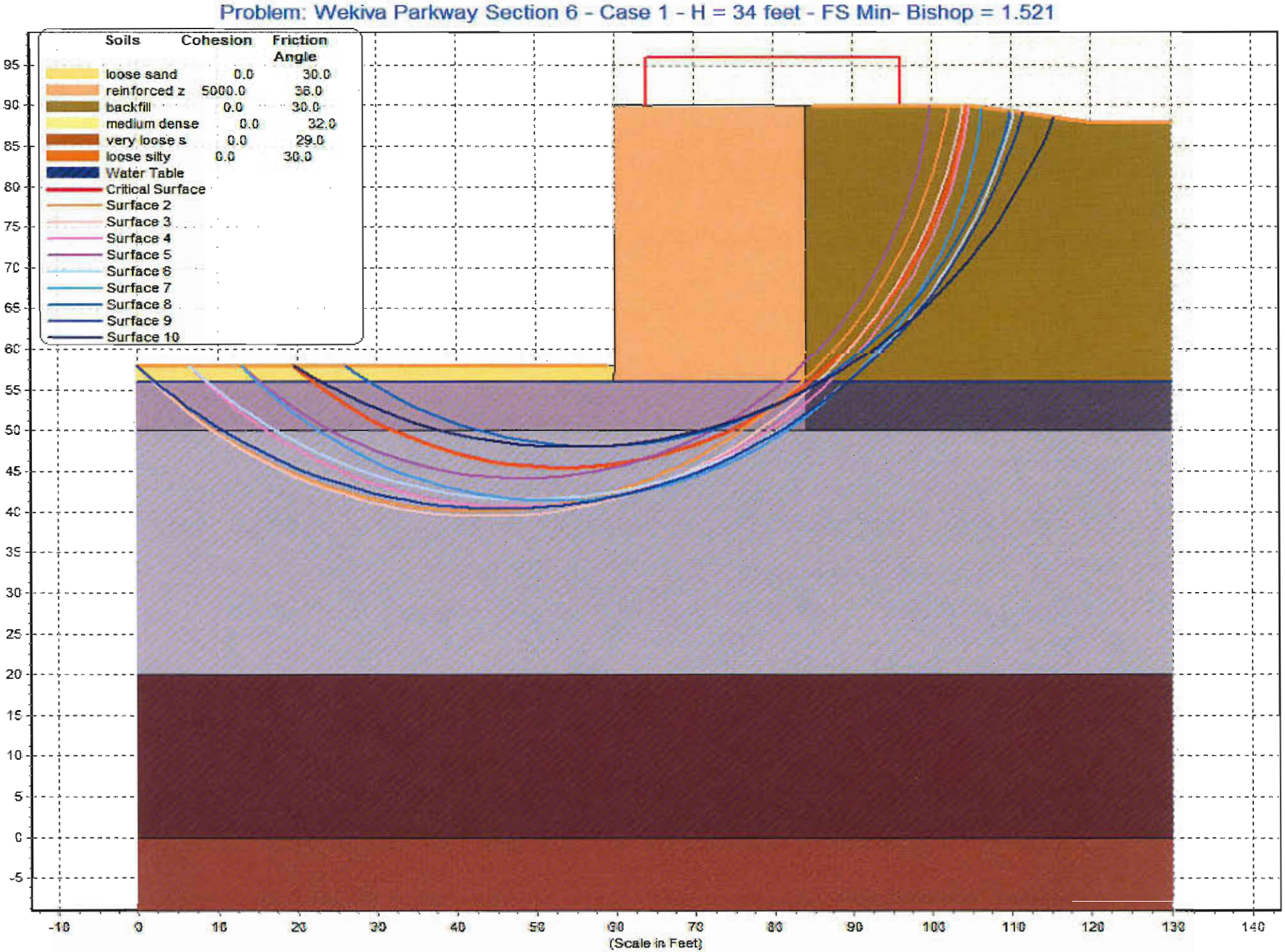
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (2006)

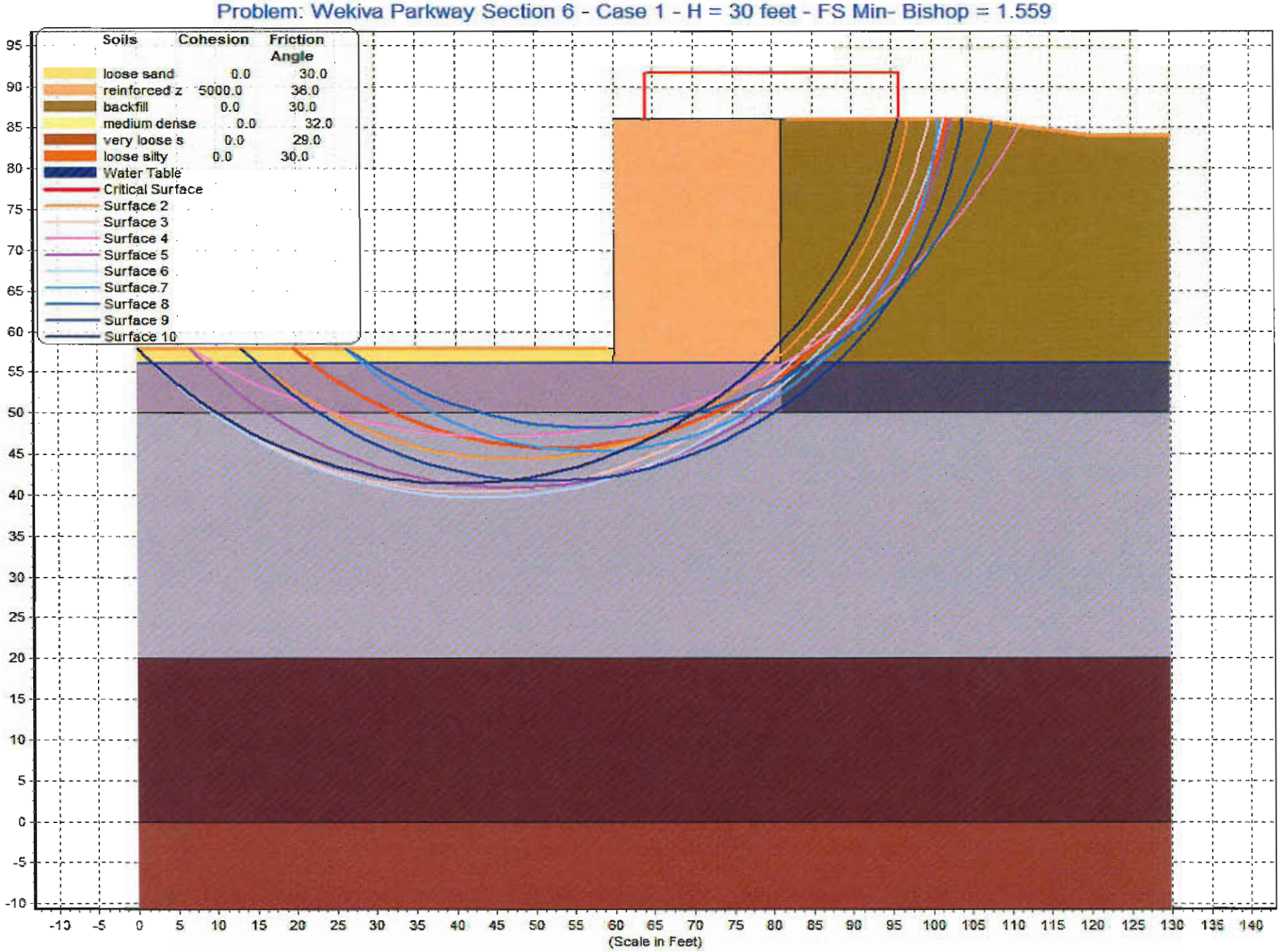
qvb (psf)	qr (psf)	h (ft)	W1 (lbs/ft)	W2 (lbs/ft)	W3 (lbs/ft)	q_{tv} (lbs/ft)	α (deg)	Ft (lbs/ft)	qt (lbs/ft)	Fd (lbs/ft)	Fr (lbs/ft)	Rv (lbs/ft)	Rv2 (lbs/ft)	Mr (lbs-ft/ft)	Mr_2	Mo (lbs-ft/ft)	Mo_2 (lbs-ft/ft)	e (ft)	e_2 (ft)	L' (ft)	Nc [fs]	Nq [fs]	Ng [fs]	Kabh [bf]	Kabs [bf]	Kabs2 [bf]
2542	**5012**	0.00	8400	0	0	3500	0.0	1750	833	2625	4365	8400	14840	33600	59360	16042	16042	1.91	1.08	5.84	30.14	18.40	22.40	0.333	0.000	0.000
3542	**5290**	0.00	14700	0	0	4375	0.0	3430	1167	5145	7638	14700	24220	73500	121100	38302	38302	2.61	1.58	6.84	30.14	18.40	22.40	0.333	0.000	0.000
4243	**6056**	0.00	24570	0	0	5688	0.0	5670	1500	8505	12767	24570	38857	159705	252571	74655	74655	3.04	1.92	9.16	30.14	18.40	22.40	0.333	0.000	0.000
4954	**6818**	0.00	36960	0	0	7000	0.0	8470	1833	12705	19205	36960	56896	295680	455168	128462	128462	3.48	2.26	11.48	30.14	18.40	22.40	0.333	0.000	0.000
5670	**7579**	0.00	51870	0	0	8313	0.0	11830	2167	17745	26952	51870	78337	492765	744202	203082	203082	3.92	2.59	13.82	30.14	18.40	22.40	0.333	0.000	0.000
6623	**7905**	0.00	66150	0	0	9188	0.0	15750	2500	23625	34373	66150	98490	694575	1034145	301875	301875	4.56	3.07	14.87	30.14	18.40	22.40	0.333	0.000	0.000
7330	**8669**	0.00	85680	0	0	10500	0.0	20230	2833	30345	44521	85680	126168	1028160	1514016	428202	428202	5.00	3.39	17.21	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000

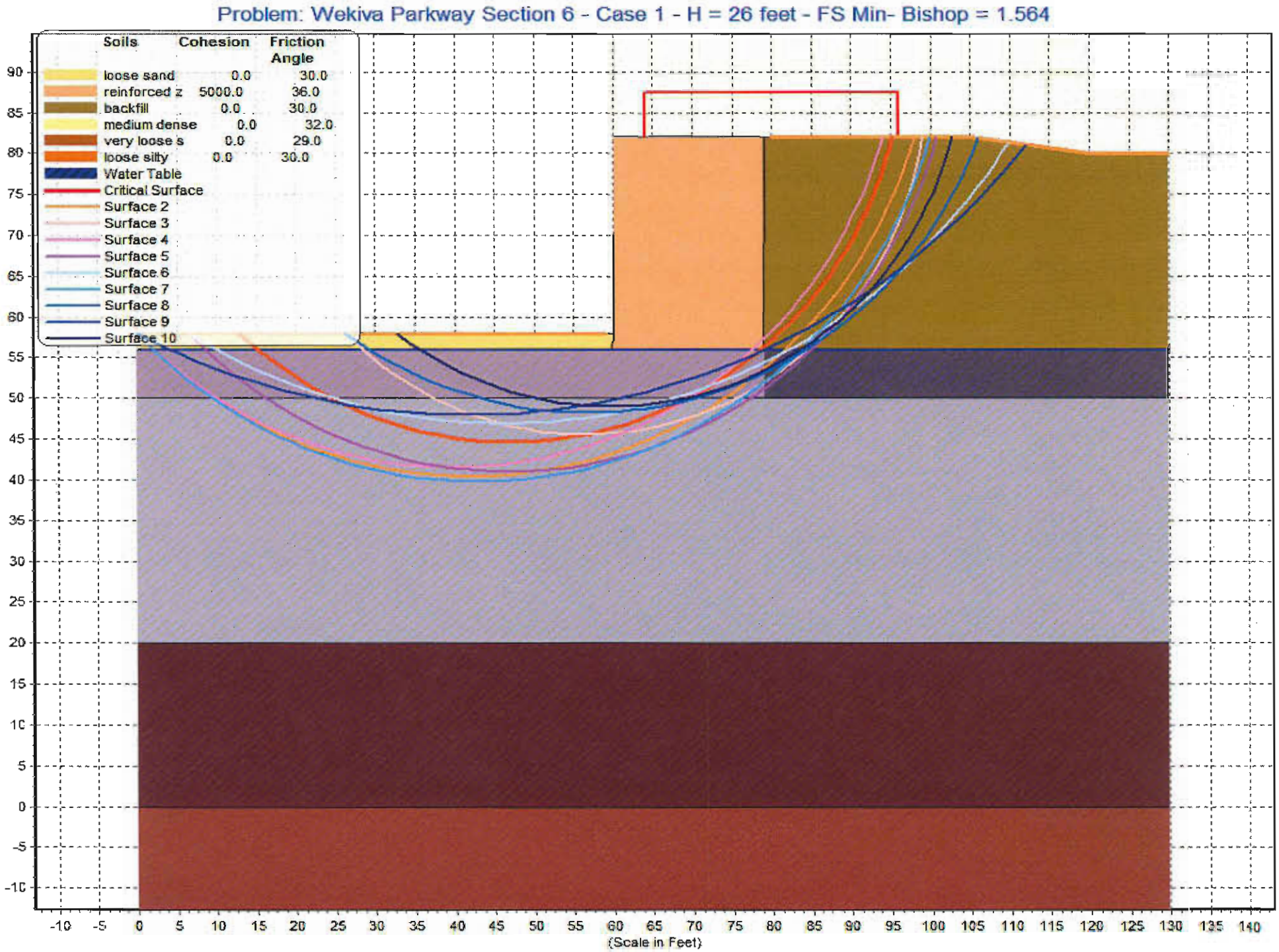
** **Note:** **This spreadsheet does not analyze Global Stability or Wall Settlement.**

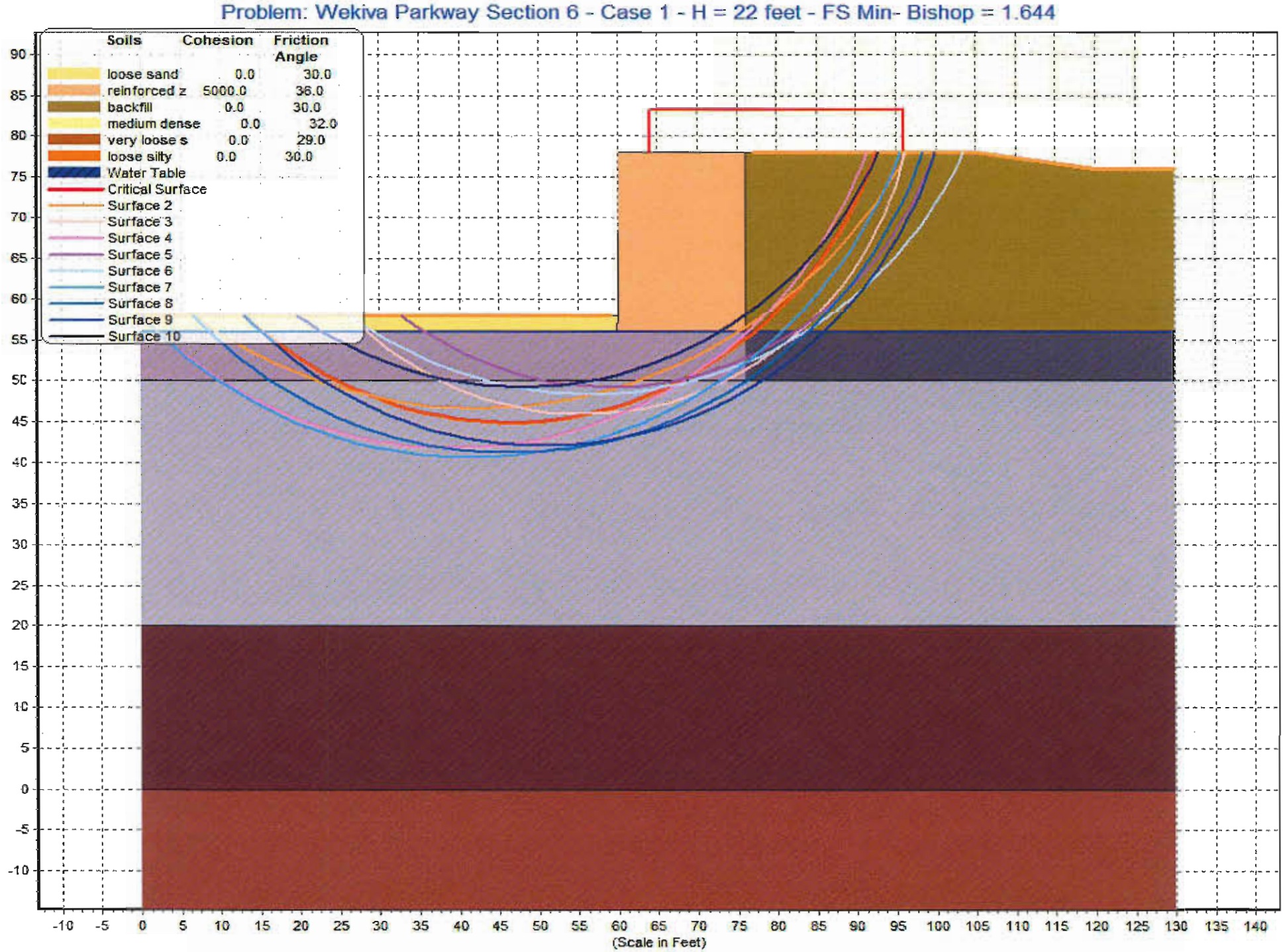
qvb	Vertical Pressure at base of the structure (psf): qvb = Rv_2 / L'
qr	Factored bearing resistance including footing embedment (i.e. overburden) term (qNq)
h	h = Wall height for backfill stress calculations (H+Ltanβ for infinite slopes and H+λTanα for broken back slopes with λ < 2*H) (ft)
W_1	Reinforced fill weight (lbs/ft)
W_2	Sloped backfill weight over reinforced area (lbs/ft)
W_3	Flat backfill weight over reinforced area (lbs/ft)
q_{lv}	Surcharge vertical force over reinforced area (lbs/ft)
α	Resultant earth pressure inclination (deg)
Ft	Total resultant horizontal backfill force (lbs/ft)
qt	Total resultant horizontal surcharge force (q_2) (lbs/ft)
Fd	Driving force (Sum of factored horizontal components of total horizontal foces) (lbs/ft)
Fr	Resisting foce (Sum of factored resisting foces * Tan ϕ_u) (lbs/ft)
Rv	Sum of factored vertical forces acting within reingorced soil mass without live load (q1t.) used in sliding CDR calculation (lbs/ft)
Rv_2	Sum of factored vertical forces acting within reingorced soil mass including live load - used in calculation of qvb for bearing CDR (lbs/ft)
Mr	Sum of Resisting Moments without live load (lbs-ft/ft)
Mr_2	Sum of Resisting Moments including live load - used in calculation of e_2 for bearing CDR (lbs-ft/ft)
Mo	Sum of Overturning Moments(lbs-ft/ft)
Mo_2	Sum of Overturning Moments from case S-1-b (lbs-ft/ft)
e	Eccentricity {L/2 - [(Mr-Mo)/Rv]} (ft) [for overturning]
e_2	Eccentricity {L/2 - [(Mr_2-Mo_2)/Rv_2]} (ft) [for bearing stress calculation]
L'	Effective foundation width (feet): L'= L - 2*e_2

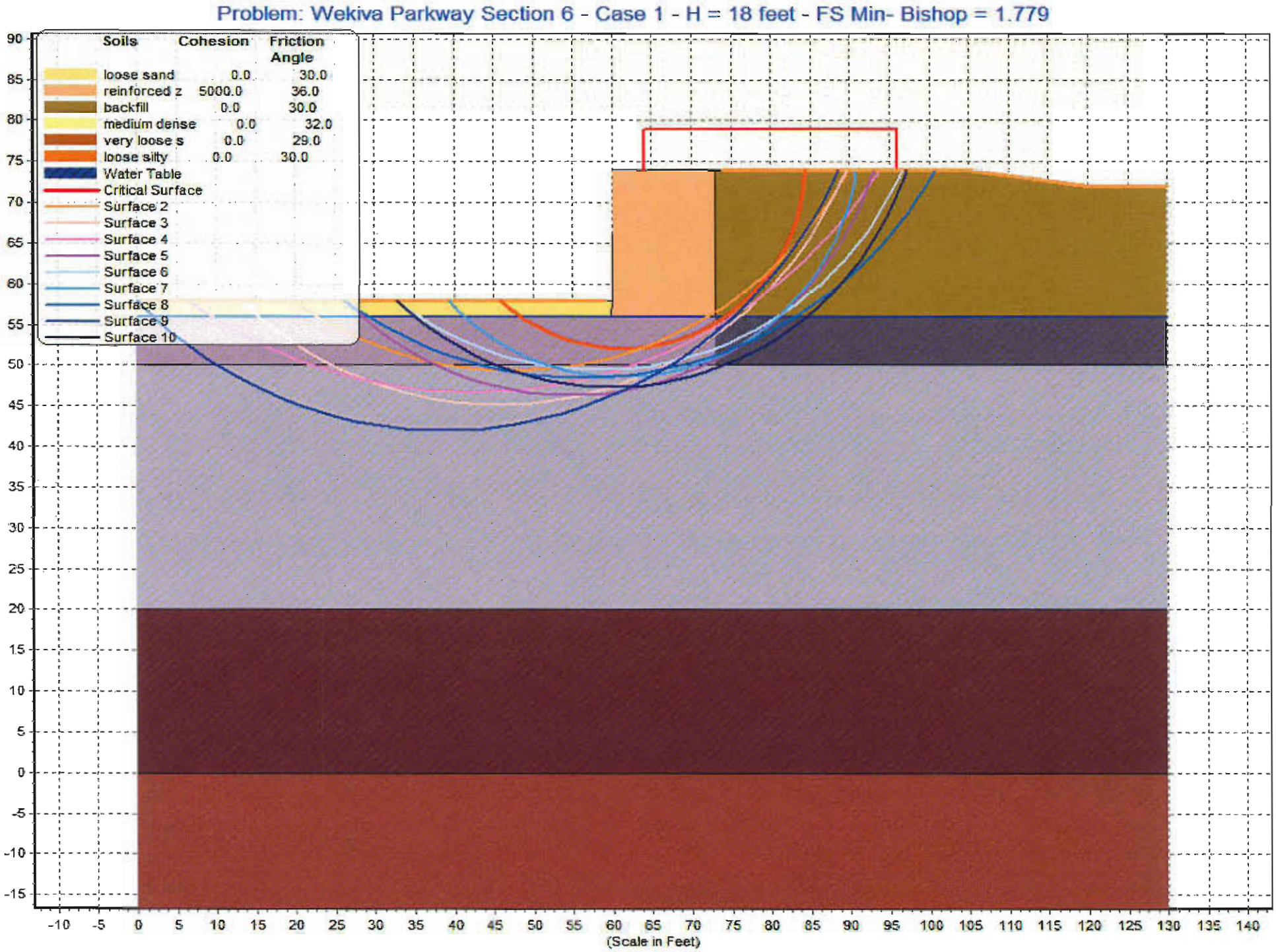
Nc	Cohesion Bearing Resistance Factor : Nc = (Nq-1)cot(ϕ) if f>0; for f=0 Nc=5.14
Ng	Footing Width Bearing Resistance Factor : Ng = 2*(Nq+1)*tan(ϕ)
Nq	Embedment Bearing Resistance Factor : Nq = [e^PI*tan(ϕ)]*N(ϕ); N(ϕ)=tan^2(PI/4 + ϕ/2)
Kabh	Backfill earth pressure coefficient when retained soil is horizontal
Kabs	Backfill earth pressure coefficient when retained soil is at slope β (infinite slope)
Kabs2	Backfill earth pressure coefficient for broken back slopes

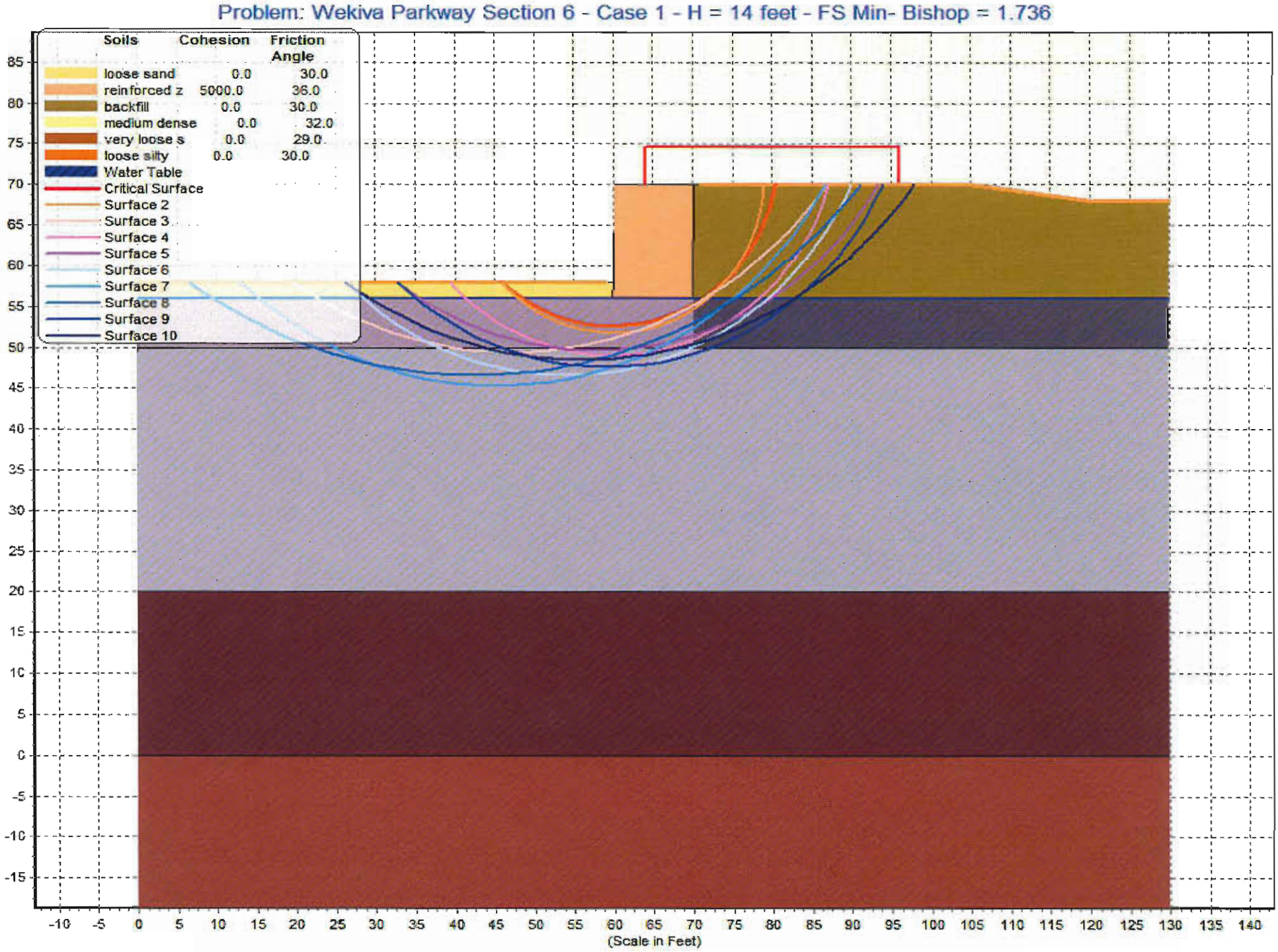

Problem: Wekiva Parkway Section 6 - Case 1 - H = 34 feet - FS Min- Bishop = 1.521
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
(Scale in Feet)

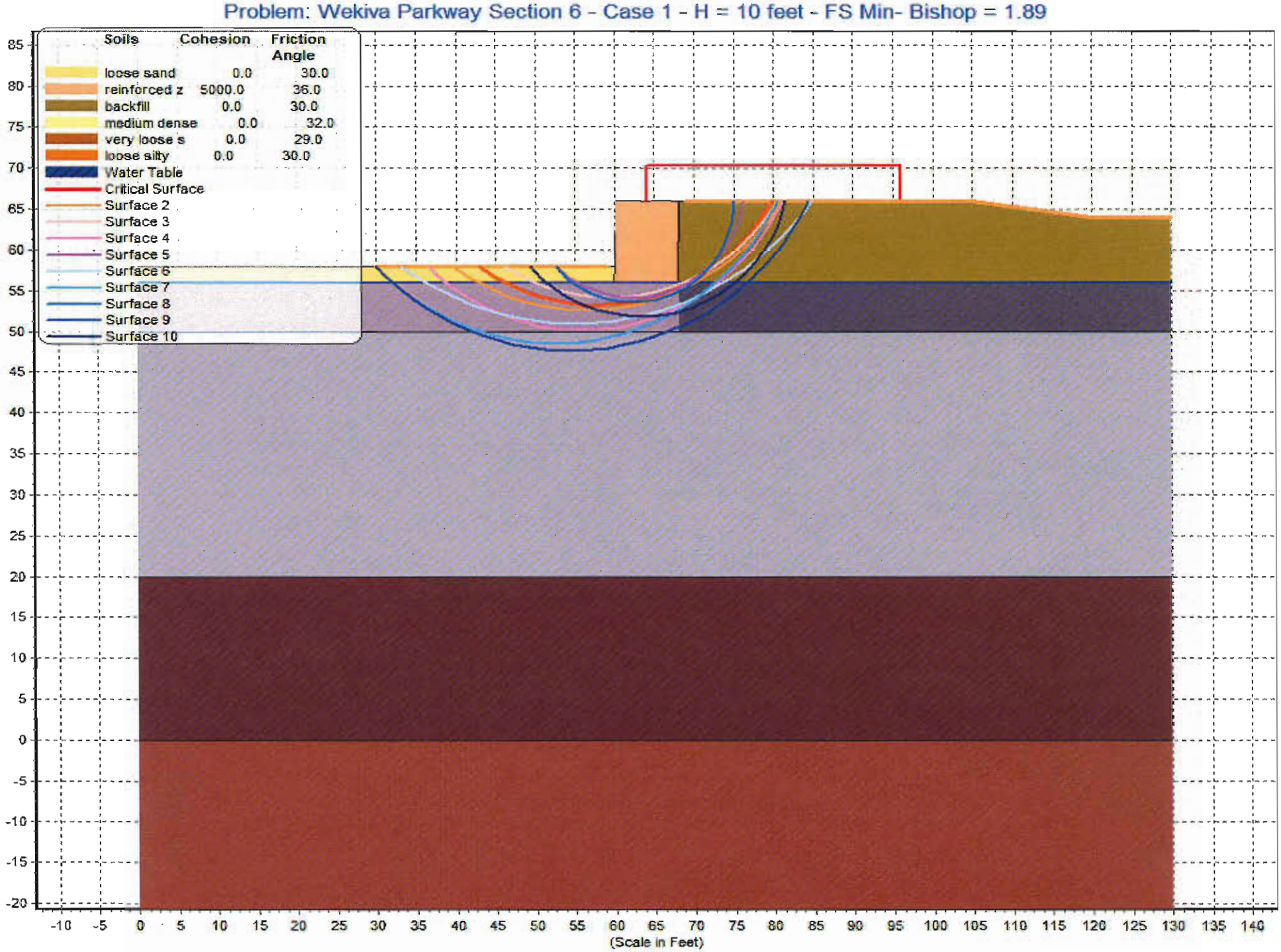

Problem: Wekiva Parkway Section 6 - Case 1 - H = 30 feet - FS Min- Bishop = 1.559
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 1 - H = 26 feet - FS Min- Bishop = 1.564
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 1 - H = 22 feet - FS Min- Bishop = 1.644
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 1 - H = 18 feet - FS Min- Bishop = 1.779
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 1 - H = 14 feet - FS Min- Bishop = 1.736
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 1 - H = 10 feet - FS Min- Bishop = 1.89
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 32.0
very loose s 0.0 29.0
loose silty 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)

result.out
** STABL for WINDOWS **
by
Geotechnical Software Solutions

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: U.S.C.
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION Wekiva Parkway Section 6 - Case 1 - H = 34 feet

BOUNDARY COORDINATES

6 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	58.00	60.00	58.00	2
2	60.00	58.00	60.10	90.00	6
3	60.10	90.00	84.00	90.00	6
4	84.00	90.00	105.00	90.00	1
5	105.00	90.00	120.00	88.00	1
6	120.00	88.00	130.00	88.00	1
7	59.90	56.00	60.00	58.00	2
8	59.90	56.00	84.00	56.00	2
9	84.00	56.00	84.10	90.00	2
10	0.00	50.00	130.00	50.00	3
11	0.00	20.00	130.00	20.00	4
12	0.00	0.00	130.00	0.00	5

1

ISOTROPIC SOIL PARAMETERS

6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	0.0	30.0	0.00	0.0	1
2	105.0	110.0	0.0	30.0	0.00	0.0	1
3	115.0	120.0	0.0	32.0	0.00	0.0	1
4	100.0	105.0	0.0	29.0	0.00	0.0	1
5	105.0	110.0	0.0	30.0	0.00	0.0	1
6	150.0	150.0	5000.0	36.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	56.00
2	130.00	56.00

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)

1	64.00	96.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 59.00 ft.

Each Surface Terminates Between X = 85.00 ft.
and X = 130.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 57 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	19.67	58.00
2	21.21	56.72
3	22.79	55.51
4	24.43	54.35
5	26.10	53.26
6	27.82	52.24
7	29.58	51.28
8	31.37	50.39
9	33.19	49.57
10	35.05	48.83
11	36.93	48.16
12	38.84	47.56
13	40.77	47.03
14	42.72	46.58
15	44.68	46.21
16	46.66	45.91
17	48.65	45.69
18	50.65	45.55
19	52.64	45.48
20	54.64	45.49
21	56.64	45.58
22	58.64	45.75
23	60.62	46.00
24	62.59	46.32
25	64.55	46.72
26	66.50	47.19
27	68.42	47.74
28	70.32	48.36
29	72.20	49.06
30	74.04	49.83
31	75.86	50.67
32	77.64	51.58
33	79.38	52.56
34	81.09	53.60
35	82.75	54.72
36	84.37	55.89
37	85.94	57.13
38	87.46	58.42
39	88.93	59.78
40	90.35	61.19
41	91.71	62.66
42	93.02	64.17
43	94.26	65.74
44	95.44	67.35
45	96.56	69.01
46	97.61	70.71
47	98.60	72.45

48	99.52	74.23
49	100.36	76.04
50	101.14	77.88
51	101.85	79.75
52	102.48	81.65
53	103.04	83.57
54	103.52	85.51
55	103.93	87.47
56	104.26	89.44
57	104.33	90.00

Circle Center At X = 53.3 ; Y = 97.0 and Radius, 51.5

*** 1.521 ***

Individual data on the 67 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.5	103.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.9	162.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.6	153.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0
4	1.6	535.5	0.0	133.8	0.0	0.0	0.0	0.0	0.0
5	1.7	756.8	0.0	273.8	0.0	0.0	0.0	0.0	0.0
6	1.7	975.1	0.0	405.8	0.0	0.0	0.0	0.0	0.0
7	1.8	1188.3	0.0	529.4	0.0	0.0	0.0	0.0	0.0
8	1.8	1394.4	0.0	644.5	0.0	0.0	0.0	0.0	0.0
9	0.9	743.0	0.0	347.5	0.0	0.0	0.0	0.0	0.0
10	0.9	850.4	0.0	403.4	0.0	0.0	0.0	0.0	0.0
11	1.9	1792.2	0.0	848.4	0.0	0.0	0.0	0.0	0.0
12	1.9	1979.2	0.0	937.0	0.0	0.0	0.0	0.0	0.0
13	1.9	2150.9	0.0	1016.4	0.0	0.0	0.0	0.0	0.0
14	1.9	2305.8	0.0	1086.6	0.0	0.0	0.0	0.0	0.0
15	1.9	2442.4	0.0	1147.4	0.0	0.0	0.0	0.0	0.0
16	2.0	2559.6	0.0	1198.8	0.0	0.0	0.0	0.0	0.0
17	2.0	2656.1	0.0	1240.7	0.0	0.0	0.0	0.0	0.0
18	2.0	2731.3	0.0	1273.0	0.0	0.0	0.0	0.0	0.0
19	2.0	2784.5	0.0	1295.6	0.0	0.0	0.0	0.0	0.0
20	2.0	2815.0	0.0	1308.6	0.0	0.0	0.0	0.0	0.0
21	2.0	2822.8	0.0	1311.9	0.0	0.0	0.0	0.0	0.0
22	2.0	2807.7	0.0	1305.5	0.0	0.0	0.0	0.0	0.0

23	2.0	2769.8	0.0	1289.4	0.0	0.0	0.0	0.0	0.0
24	1.3	1733.1	0.0	808.7	0.0	0.0	0.0	0.0	0.0
25	0.1	136.0	0.0	63.4	0.0	0.0	0.0	0.0	0.0
26	0.1	384.9	0.0	63.3	0.0	0.0	0.0	0.0	0.0
27	0.5	3248.4	0.0	328.2	0.0	0.0	0.0	0.0	0.0
28	2.0	12279.8	0.0	1228.3	0.0	0.0	0.0	0.0	0.0
29	1.4	8694.6	0.0	853.8	0.0	0.0	0.0	0.0	0.0
30	0.6	3413.5	0.0	329.5	0.0	0.0	0.0	0.0	138.5
31	1.9	11901.7	0.0	1128.9	0.0	0.0	0.0	0.0	485.7
32	1.9	11661.8	0.0	1065.0	0.0	0.0	0.0	0.0	480.8
33	1.9	11389.9	0.0	991.8	0.0	0.0	0.0	0.0	475.1
34	1.9	11087.7	0.0	909.4	0.0	0.0	0.0	0.0	468.7
35	1.8	10756.9	0.0	818.0	0.0	0.0	0.0	0.0	461.5
36	0.4	2114.8	0.0	153.3	0.0	0.0	0.0	0.0	91.6
37	1.4	8289.6	0.0	564.2	0.0	0.0	0.0	0.0	362.1
38	1.8	10037.6	0.0	608.3	0.0	0.0	0.0	0.0	445.2
39	1.7	9649.7	0.0	490.5	0.0	0.0	0.0	0.0	436.1
40	1.7	9242.3	0.0	364.2	0.0	0.0	0.0	0.0	426.2
41	1.7	8817.9	0.0	229.6	0.0	0.0	0.0	0.0	415.8
42	1.3	6492.3	0.0	80.1	0.0	0.0	0.0	0.0	312.6
43	0.1	360.7	0.0	2.6	0.0	0.0	0.0	0.0	25.0
44	0.3	962.9	0.0	4.3	0.0	0.0	0.0	0.0	67.0
45	0.1	497.0	0.0	0.6	0.0	0.0	0.0	0.0	34.7
46	1.4	5030.3	0.0	0.0	0.0	0.0	0.0	0.0	358.2
47	1.5	5151.6	0.0	0.0	0.0	0.0	0.0	0.0	380.6
48	1.5	4772.5	0.0	0.0	0.0	0.0	0.0	0.0	367.8
49	1.4	4392.3	0.0	0.0	0.0	0.0	0.0	0.0	354.3
50	1.4	4013.6	0.0	0.0	0.0	0.0	0.0	0.0	340.4
51	1.3	3638.8	0.0	0.0	0.0	0.0	0.0	0.0	325.9
52	1.2	3270.3	0.0	0.0	0.0	0.0	0.0	0.0	310.9
53	1.2	2910.5	0.0	0.0	0.0	0.0	0.0	0.0	295.5
54	0.6	1305.0	0.0	0.0	0.0	0.0	0.0	0.0	139.7
55	0.6	1257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	1.1	2226.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	1.0	1907.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.9	1605.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.8	1324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.8	1064.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.7	827.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.6	616.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.6	432.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.5	276.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.4	149.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.3	53.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
67	0.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Failure Surface Specified By 67 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.00	58.00
2	1.43	56.60
3	2.90	55.25
4	4.42	53.94
5	5.98	52.69
6	7.58	51.49
7	9.22	50.35
8	10.89	49.26
9	12.61	48.22
10	14.35	47.25
11	16.13	46.33
12	17.94	45.47
13	19.77	44.67
14	21.63	43.94
15	23.51	43.26
16	25.42	42.65
17	27.34	42.10
18	29.28	41.62
19	31.24	41.20
20	33.21	40.85
21	35.18	40.56
22	37.17	40.34
23	39.17	40.19
24	41.16	40.10
25	43.16	40.07
26	45.16	40.12
27	47.16	40.23
28	49.15	40.41
29	51.14	40.65
30	53.11	40.96
31	55.08	41.34
32	57.03	41.78
33	58.96	42.28
34	60.88	42.85
35	62.78	43.48
36	64.65	44.18
37	66.51	44.93
38	68.33	45.75
39	70.13	46.63
40	71.89	47.57
41	73.63	48.56
42	75.33	49.62
43	76.99	50.72
44	78.62	51.89

45	80.21	53.11
46	81.75	54.37
47	83.26	55.69
48	84.71	57.06
49	86.12	58.48
50	87.49	59.94
51	88.80	61.45
52	90.07	63.00
53	91.28	64.59
54	92.43	66.23
55	93.54	67.89
56	94.58	69.60
57	95.57	71.34
58	96.50	73.11
59	97.37	74.91
60	98.18	76.74
61	98.93	78.59
62	99.62	80.47
63	100.25	82.37
64	100.81	84.29
65	101.31	86.22
66	101.74	88.18
67	102.08	90.00

Circle Center At X = 42.8 ; Y = 100.2 and Radius, 60.1

*** 1.544 ***

1

Failure Surface Specified By 69 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.00	58.00
2	1.42	56.59
3	2.88	55.22
4	4.38	53.90
5	5.93	52.64
6	7.52	51.42
7	9.14	50.26
8	10.81	49.15
9	12.51	48.09

10	14.24	47.09
11	16.00	46.15
12	17.80	45.27
13	19.62	44.45
14	21.47	43.68
15	23.34	42.98
16	25.24	42.34
17	27.15	41.77
18	29.09	41.25
19	31.03	40.80
20	33.00	40.41
21	34.97	40.09
22	36.95	39.84
23	38.94	39.64
24	40.94	39.52
25	42.94	39.46
26	44.94	39.46
27	46.94	39.53
28	48.93	39.67
29	50.92	39.87
30	52.91	40.13
31	54.88	40.47
32	56.84	40.86
33	58.79	41.32
34	60.72	41.84
35	62.63	42.43
36	64.52	43.08
37	66.39	43.79
38	68.23	44.56
39	70.05	45.39
40	71.84	46.28
41	73.61	47.23
42	75.33	48.24
43	77.03	49.30
44	78.69	50.42
45	80.31	51.59
46	81.89	52.81
47	83.43	54.09
48	84.93	55.41
49	86.38	56.78
50	87.79	58.20
51	89.15	59.67
52	90.47	61.18
53	91.73	62.73
54	92.94	64.32
55	94.10	65.95
56	95.20	67.62
57	96.25	69.32

58	97.24	71.06
59	98.17	72.83
60	99.05	74.63
61	99.87	76.45
62	100.62	78.30
63	101.32	80.18
64	101.95	82.08
65	102.52	83.99
66	103.03	85.93
67	103.47	87.88
68	103.85	89.84
69	103.88	90.00

Circle Center At X = 43.8 ; Y = 100.4 and Radius, 61.0

*** 1.568 ***

Failure Surface Specified By 66 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	6.56	58.00
2	7.98	56.59
3	9.44	55.23
4	10.96	53.93
5	12.52	52.67
6	14.12	51.48
7	15.76	50.33
8	17.44	49.25
9	19.16	48.22
10	20.91	47.26
11	22.69	46.36
12	24.51	45.52
13	26.35	44.74
14	28.22	44.03
15	30.11	43.38
16	32.03	42.80
17	33.96	42.28
18	35.91	41.84
19	37.87	41.46
20	39.85	41.15
21	41.83	40.91

22	43.83	40.73
23	45.82	40.63
24	47.82	40.60
25	49.82	40.63
26	51.82	40.74
27	53.81	40.91
28	55.80	41.16
29	57.77	41.47
30	59.74	41.85
31	61.69	42.30
32	63.62	42.82
33	65.53	43.40
34	67.42	44.05
35	69.29	44.77
36	71.13	45.55
37	72.95	46.39
38	74.73	47.29
39	76.48	48.26
40	78.20	49.29
41	79.88	50.37
42	81.52	51.52
43	83.12	52.72
44	84.67	53.97
45	86.19	55.28
46	87.65	56.64
47	89.07	58.05
48	90.44	59.51
49	91.75	61.02
50	93.02	62.57
51	94.23	64.16
52	95.38	65.79
53	96.47	67.47
54	97.51	69.18
55	98.49	70.92
56	99.40	72.70
57	100.26	74.51
58	101.05	76.35
59	101.77	78.21
60	102.43	80.10
61	103.02	82.01
62	103.55	83.94
63	104.01	85.89
64	104.40	87.85
65	104.73	89.82
66	104.75	90.00

Circle Center At X = 47.8 ; Y = 98.1 and Radius, 57.5

*** 1.581 ***

1

Failure Surface Specified By 59 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.11	58.00
2	14.60	56.67
3	16.14	55.39
4	17.73	54.18
5	19.37	53.03
6	21.05	51.94
7	22.77	50.92
8	24.52	49.96
9	26.32	49.08
10	28.14	48.26
11	30.00	47.52
12	31.88	46.85
13	33.79	46.25
14	35.72	45.72
15	37.67	45.27
16	39.64	44.90
17	41.61	44.60
18	43.60	44.38
19	45.60	44.24
20	47.59	44.17
21	49.59	44.18
22	51.59	44.27
23	53.59	44.43
24	55.57	44.67
25	57.55	44.99
26	59.51	45.39
27	61.45	45.86
28	63.37	46.40
29	65.28	47.02
30	67.15	47.71
31	69.00	48.48
32	70.82	49.31
33	72.60	50.22
34	74.35	51.19
35	76.06	52.23

36	77.73	53.33
37	79.35	54.50
38	80.93	55.73
39	82.45	57.02
40	83.93	58.37
41	85.35	59.77
42	86.72	61.23
43	88.03	62.74
44	89.29	64.30
45	90.48	65.91
46	91.60	67.56
47	92.67	69.26
48	93.66	70.99
49	94.59	72.76
50	95.45	74.57
51	96.24	76.41
52	96.96	78.27
53	97.60	80.17
54	98.17	82.08
55	98.67	84.02
56	99.09	85.98
57	99.44	87.95
58	99.70	89.93
59	99.71	90.00

Circle Center At X = 48.3 ; Y = 95.9 and Radius, 51.7

*** 1.604 ***

Failure Surface Specified By 67 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	6.56	58.00
2	8.06	56.68
3	9.60	55.40
4	11.18	54.17
5	12.79	53.00
6	14.45	51.88
7	16.14	50.80
8	17.86	49.79
9	19.61	48.83

10	21.40	47.92
11	23.21	47.07
12	25.05	46.28
13	26.91	45.55
14	28.79	44.88
15	30.69	44.27
16	32.62	43.71
17	34.56	43.22
18	36.51	42.79
19	38.47	42.43
20	40.45	42.12
21	42.44	41.88
22	44.43	41.70
23	46.43	41.59
24	48.42	41.53
25	50.42	41.55
26	52.42	41.62
27	54.42	41.76
28	56.41	41.96
29	58.39	42.22
30	60.36	42.55
31	62.33	42.94
32	64.27	43.39
33	66.21	43.90
34	68.12	44.48
35	70.02	45.11
36	71.90	45.80
37	73.75	46.56
38	75.58	47.37
39	77.38	48.24
40	79.15	49.16
41	80.89	50.14
42	82.61	51.18
43	84.28	52.27
44	85.92	53.41
45	87.53	54.61
46	89.09	55.85
47	90.62	57.14
48	92.10	58.48
49	93.55	59.87
50	94.94	61.30
51	96.29	62.78
52	97.60	64.30
53	98.85	65.85
54	100.05	67.45
55	101.21	69.08
56	102.31	70.75
57	103.35	72.46

58	104.35	74.20
59	105.28	75.96
60	106.16	77.76
61	106.99	79.58
62	107.75	81.43
63	108.46	83.30
64	109.10	85.19
65	109.69	87.10
66	110.21	89.03
67	110.28	89.30

Circle Center At X = 49.1 ; Y = 104.6 and Radius, 63.1

*** 1.648 ***

1

Failure Surface Specified By 63 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.11	58.00
2	14.53	56.59
3	15.99	55.23
4	17.51	53.92
5	19.07	52.67
6	20.68	51.48
7	22.33	50.35
8	24.02	49.28
9	25.75	48.28
10	27.51	47.33
11	29.31	46.46
12	31.14	45.65
13	32.99	44.91
14	34.88	44.23
15	36.78	43.63
16	38.71	43.10
17	40.66	42.63
18	42.62	42.24
19	44.59	41.93
20	46.58	41.68
21	48.57	41.51
22	50.57	41.41

23	52.57	41.39
24	54.57	41.44
25	56.56	41.56
26	58.56	41.76
27	60.54	42.03
28	62.51	42.37
29	64.46	42.78
30	66.40	43.27
31	68.33	43.82
32	70.22	44.45
33	72.10	45.15
34	73.95	45.91
35	75.77	46.75
36	77.55	47.64
37	79.30	48.61
38	81.02	49.64
39	82.70	50.73
40	84.33	51.88
41	85.93	53.09
42	87.47	54.36
43	88.97	55.68
44	90.42	57.06
45	91.82	58.49
46	93.16	59.97
47	94.45	61.50
48	95.68	63.08
49	96.85	64.70
50	97.97	66.36
51	99.02	68.06
52	100.00	69.80
53	100.93	71.57
54	101.78	73.38
55	102.57	75.22
56	103.29	77.08
57	103.95	78.97
58	104.53	80.89
59	105.04	82.82
60	105.48	84.77
61	105.85	86.74
62	106.14	88.72
63	106.27	89.83

Circle Center At X = 52.2 ; Y = 95.8 and Radius, 54.4

*** 1.650 ***

Failure Surface Specified By 54 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	26.22	58.00
2	27.88	56.87
3	29.57	55.81
4	31.30	54.81
5	33.07	53.88
6	34.87	53.01
7	36.70	52.21
8	38.56	51.47
9	40.45	50.81
10	42.36	50.21
11	44.29	49.69
12	46.24	49.24
13	48.20	48.86
14	50.18	48.56
15	52.17	48.33
16	54.16	48.17
17	56.16	48.09
18	58.16	48.08
19	60.16	48.14
20	62.15	48.28
21	64.14	48.50
22	66.12	48.78
23	68.09	49.14
24	70.04	49.57
25	71.98	50.08
26	73.89	50.65
27	75.79	51.30
28	77.65	52.02
29	79.49	52.80
30	81.30	53.65
31	83.08	54.57
32	84.82	55.56
33	86.52	56.60
34	88.19	57.71
35	89.81	58.89
36	91.38	60.12
37	92.91	61.40
38	94.40	62.75
39	95.83	64.15
40	97.20	65.60

41	98.53	67.10
42	99.79	68.64
43	101.00	70.24
44	102.15	71.88
45	103.24	73.55
46	104.26	75.27
47	105.22	77.03
48	106.11	78.82
49	106.94	80.64
50	107.70	82.49
51	108.39	84.37
52	109.01	86.27
53	109.56	88.19
54	109.84	89.35

Circle Center At X = 57.4 ; Y = 102.0 and Radius, 53.9

*** 1.652 ***

1

Failure Surface Specified By 70 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.00	58.00
2	1.51	56.68
3	3.05	55.41
4	4.63	54.18
5	6.24	53.00
6	7.89	51.87
7	9.57	50.78
8	11.28	49.75
9	13.02	48.76
10	14.79	47.83
11	16.59	46.95
12	18.41	46.12
13	20.25	45.35
14	22.12	44.63
15	24.00	43.96
16	25.91	43.35
17	27.83	42.79
18	29.76	42.30

19	31.72	41.86
20	33.68	41.47
21	35.65	41.14
22	37.63	40.88
23	39.62	40.66
24	41.62	40.51
25	43.61	40.42
26	45.61	40.38
27	47.61	40.40
28	49.61	40.49
29	51.61	40.62
30	53.60	40.82
31	55.58	41.08
32	57.56	41.39
33	59.52	41.76
34	61.48	42.19
35	63.42	42.68
36	65.34	43.22
37	67.25	43.81
38	69.14	44.47
39	71.01	45.18
40	72.86	45.94
41	74.69	46.75
42	76.49	47.62
43	78.26	48.54
44	80.01	49.52
45	81.73	50.54
46	83.42	51.61
47	85.07	52.74
48	86.69	53.91
49	88.28	55.12
50	89.83	56.38
51	91.34	57.69
52	92.82	59.04
53	94.25	60.44
54	95.65	61.87
55	97.00	63.35
56	98.30	64.86
57	99.57	66.41
58	100.78	68.00
59	101.95	69.62
60	103.07	71.28
61	104.15	72.97
62	105.17	74.68
63	106.14	76.43
64	107.06	78.21
65	107.93	80.01
66	108.75	81.84

67	109.51	83.68
68	110.22	85.56
69	110.87	87.45
70	111.40	89.15

Circle Center At X = 45.8 ; Y = 108.8 and Radius, 68.4

*** 1.663 ***

Failure Surface Specified By 59 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.67	58.00
2	21.38	56.97
3	23.12	55.98
4	24.89	55.06
5	26.69	54.18
6	28.52	53.36
7	30.36	52.60
8	32.24	51.89
9	34.13	51.24
10	36.04	50.65
11	37.96	50.12
12	39.91	49.64
13	41.86	49.23
14	43.83	48.87
15	45.81	48.57
16	47.80	48.34
17	49.79	48.16
18	51.79	48.05
19	53.78	47.99
20	55.78	48.00
21	57.78	48.07
22	59.78	48.20
23	61.77	48.39
24	63.75	48.64
25	65.73	48.95
26	67.70	49.32
27	69.65	49.74
28	71.59	50.23
29	73.51	50.78

30	75.42	51.38
31	77.31	52.05
32	79.17	52.77
33	81.02	53.54
34	82.83	54.38
35	84.63	55.26
36	86.39	56.20
37	88.13	57.20
38	89.83	58.24
39	91.50	59.34
40	93.14	60.49
41	94.74	61.69
42	96.31	62.93
43	97.83	64.22
44	99.32	65.56
45	100.77	66.94
46	102.17	68.37
47	103.53	69.84
48	104.84	71.35
49	106.11	72.89
50	107.33	74.48
51	108.50	76.10
52	109.62	77.76
53	110.69	79.45
54	111.71	81.17
55	112.67	82.92
56	113.58	84.70
57	114.44	86.51
58	115.24	88.34
59	115.35	88.62

Circle Center At X = 54.6 ; Y = 113.8 and Radius, 65.8

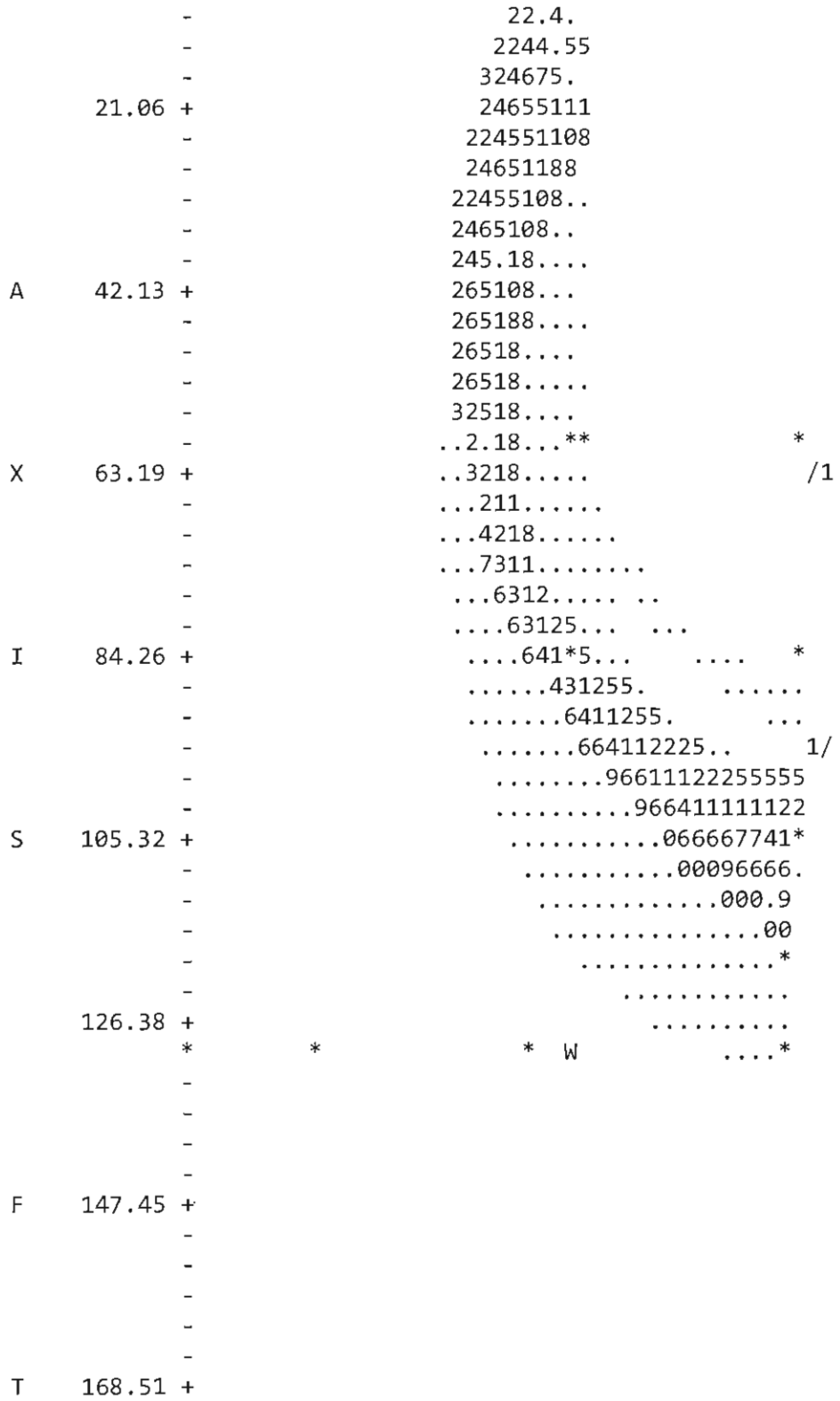
*** 1.679 ***

1

```
            Y           A     X     I     S           F     T

          0.00     21.06     42.13     63.19     84.26    105.32

X      0.00 *--------*+---------+---*--W*-+---------+---------+
            -                          2.
            -                        22.44
```


22.4.
2244.55
324675.
21.06 + 24655111
224551108
24651188
22455108..
2465108..
245.18....
A 42.13 + 265108...
265188....
26518....
26518.....
32518....
..2.18...**
X 63.19 + ..3218.....
...211......
...4218......
...7311........
...6312..... ..
....63125... ...
I 84.26 + ...641*5... .... *
......431255. ......
.......6411255. ...
.......664112225.. 1/
........96611122255555
..........966411111122
S 105.32 + ...066667741*
...........00096666.
.............000.9
...............00
..............*
....
126.38 + ...
* * * W ....*
F 147.45 +
T 168.51 +

"PROFILE" 2

MSE WALL - LRFD External Stability Analysis

version 2.5

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (2006)

	H (ft)	* Ho (ft)	* D (ft)	* L (ft)	Minimum Reinforcement Length Requirement (SDG Fig 3.16)	Over-turning CDR >= 1	Eccen-tricity CDR <= 1	Sliding CDR >= 1	Bearing Resitance CDR >= 1	* β (deg)	* λ (ft)	* Water d (ft)	* γ[rf] (pcf)	* γ[bf] (pcf)	* ϕ [bf] (deg)	* γ[fs] (pcf)	* ϕ [fs] (deg)	* c[fs] (psf)	* ϕ u (deg)	* q1 (psf)	* q2 (psf)	CW
1	10.0	8.0	2.0	8.0	OK	2.09	0.95	1.07	1.32	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
2	14.0	12.0	2.0	10.0	OK	1.92	1.04	1.06	1.02	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
3	18.0	16.0	2.0	13.0	OK	2.14	0.93	1.15	1.00	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
4	22.0	20.0	2.0	17.0	OK	2.60	0.77	1.28	1.10	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
5	26.0	24.0	2.0	20.0	OK	2.69	0.74	1.32	1.06	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
6	30.0	28.0	2.0	23.0	OK	2.76	0.72	1.34	1.04	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
7	34.0	32.0	2.0	26.0	OK	2.82	0.71	1.37	1.02	0.0	0.0	0.0	105.0	105.0	30.0	100.0	29.0	0.0	30.0	250	250	0.50
8	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
9	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
10	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
11	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
12	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
13	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
14	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
15	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
16	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
17	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
18	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
19	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
20	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!

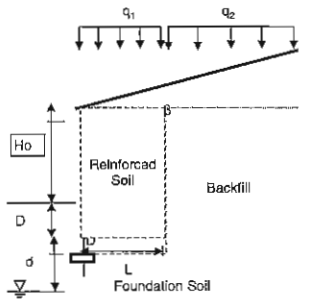
* Indicates required input

Note:

Disclaimer: No Warranty, expressed or implied, is made by the author or the Florida Department of Transportation (FDOT) as to the accuracy and the functioning of this program or the results it produces; nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the author or the FDOT in any connection therewith.

H — Wall Height H = Ho + D
Ho — Wall Height above ground (feet)
D — Wall Embeddment Depth (feet)
L — Reinforcing Strap Length (feet)
CDR — Capacity-Demand Ratio for :
- Overturning = Mr / Mo => 1.0
- Eccentricity = e / (L/4) =< 1.0
- Sliding = Fr / Fd => 1.0
- Bearing Resistance = qr / qvb => 1.0

β — Slope of backfill soil (degrees)
λ — Horizontal distance from the back of the wall to the top of the slope (for broken-back slopes) (feet)
Use λ >= 2*H when modeling infinite slopes
d — Water depth below base of leveling pad (feet)
γ[rf] — Reinforced fill unit weight (pounds per cubic foot)
γ[bf] — Backfill soil unit weight (pounds per cubic foot)
ϕ[bf] — Backfill soil angle of internal friction (degrees)
γ[fs] — Foundation Soil unit weight (pounds per cubic foot)
ϕ[fs] — Foundation Soil angle of internal friction (degreas)
c[fs] — Foundation Soil cohesion (pounds par square foot)
ϕu — Base Angle of Internal Friction (degrees) (Sliding)
q1 — Surcharge load over reinforced soil mass (pounds per square foot) - Should be zero when modeling infinite slopes
q2 — Surcharge load behind reinforced soil mass (pounds per square foot) - Should be zero when modeling infinite slopes
Cw — Cw = 0.5 for d =< 0, Cw=1.0 for d => 1.5*L + D



MSE WALL - LRFD External Stability Analysis

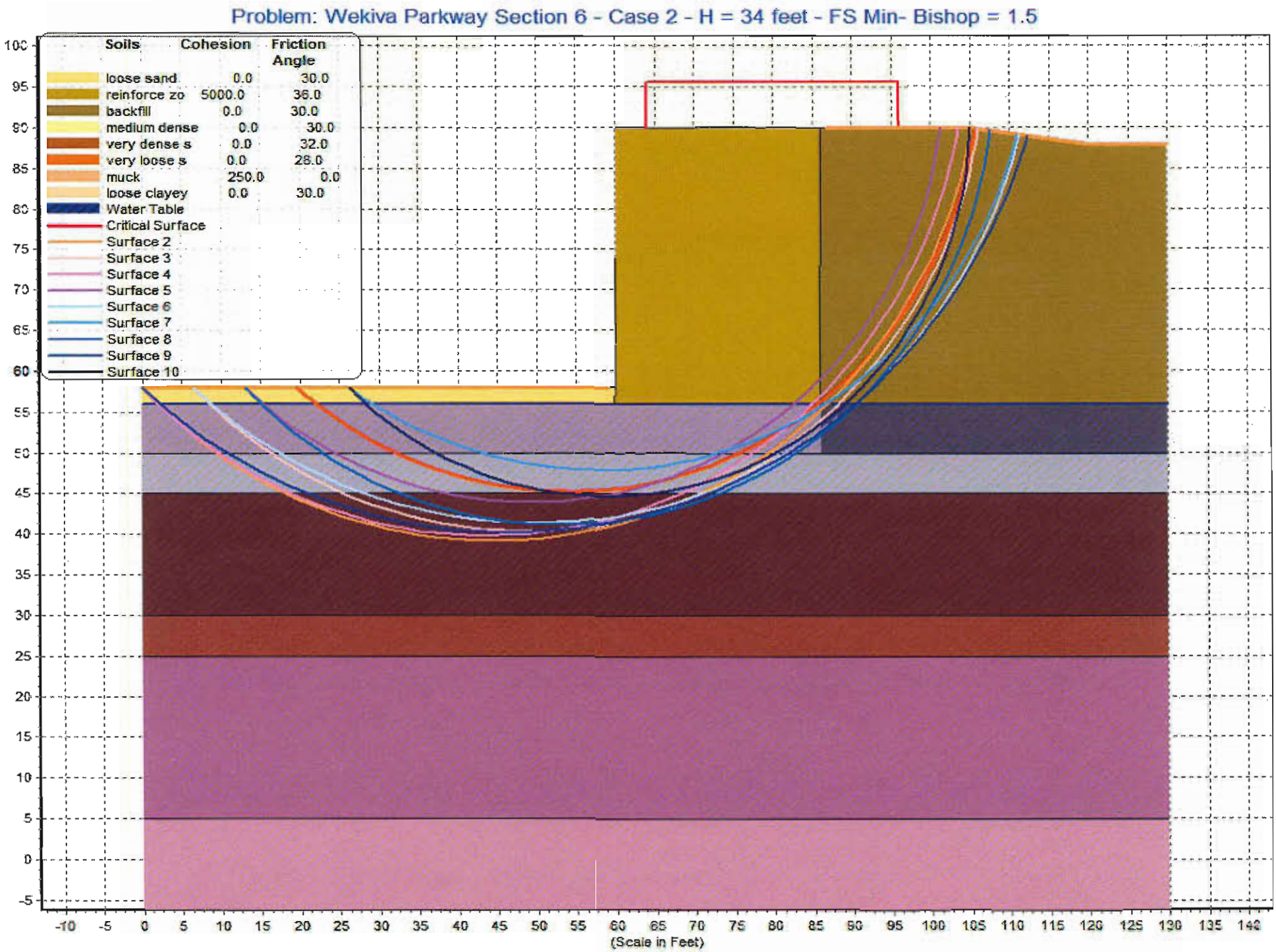
version 2.5

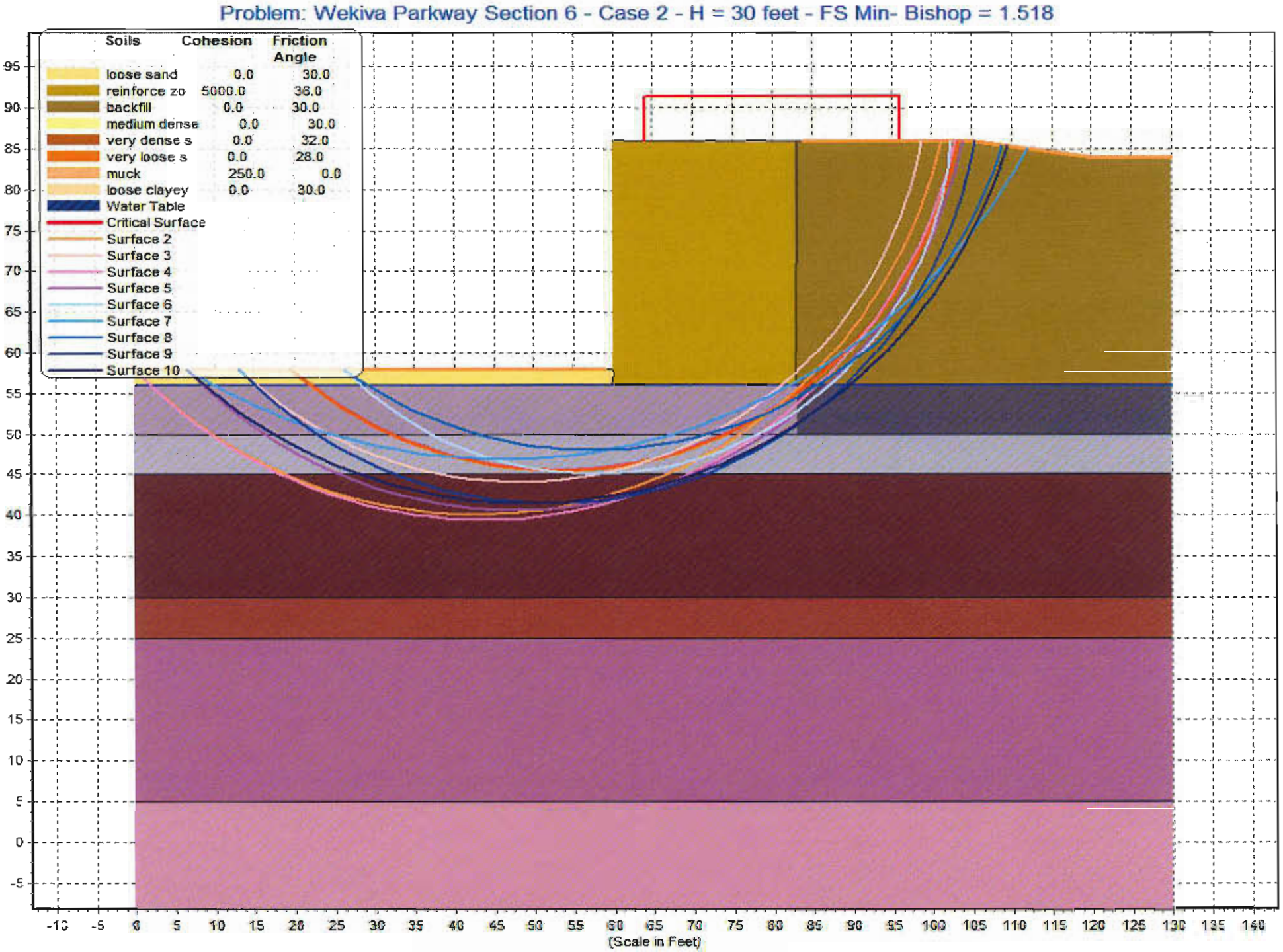
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (2006)

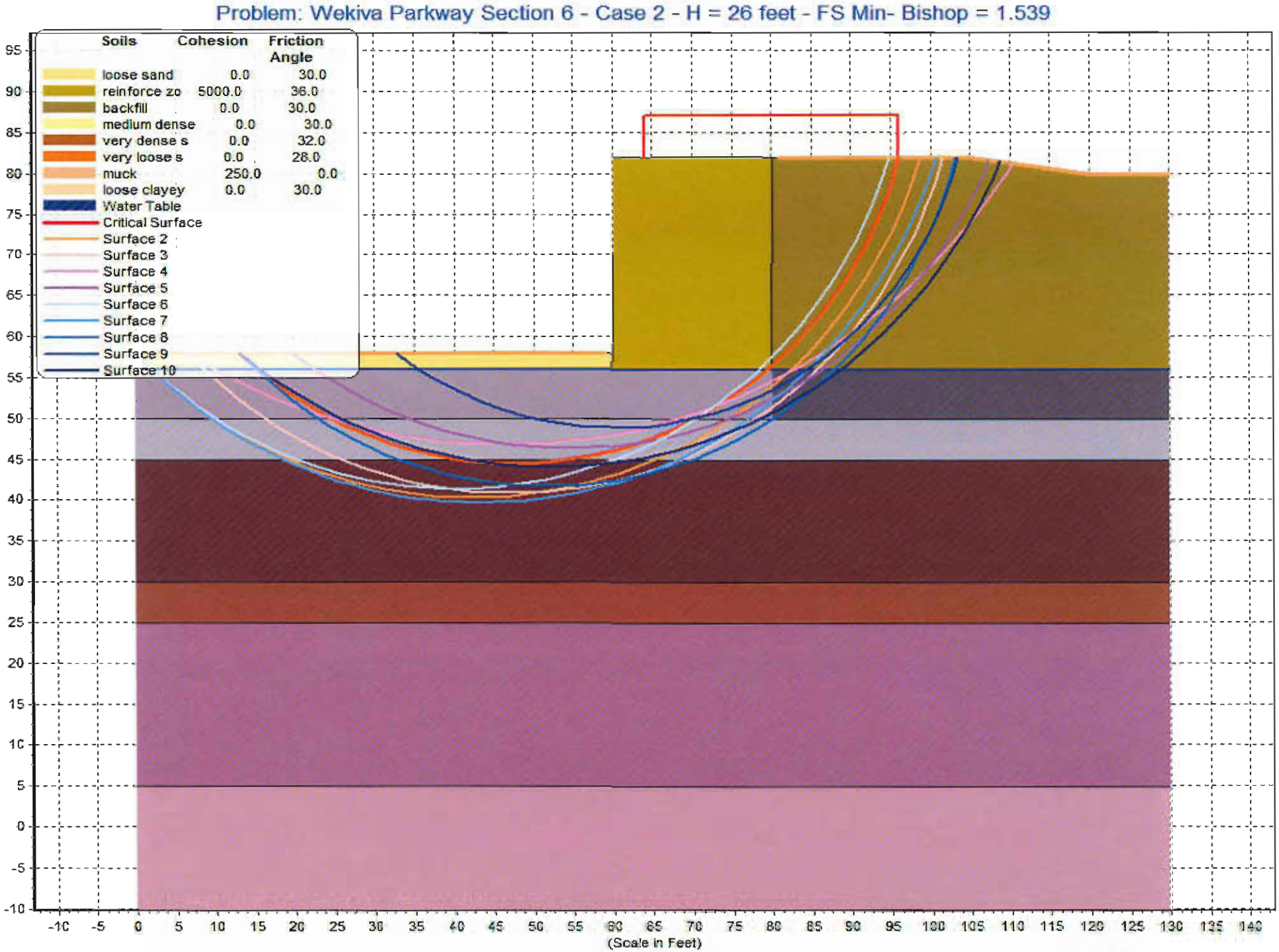
qvb (psf)	qr (psf)	h (ft)	W1 (lbs/ft)	W2 (lbs/ft)	W3 (lbs/ft)	q_{1V} (lbs/ft)	α (deg)	Ft (lbs/ft)	qt (lbs/ft)	Fd (lbs/ft)	Fr (lbs/ft)	Rv (lbs/ft)	Rv2 (lbs/ft)	Mr (lbs-ft/ft)	Mr_2	Mo (lbs-ft/ft)	Mo_2 (lbs-ft/ft)	e (ft)	e_2 (ft)	L' (ft)	Nc [fs]	Nq [fs]	Ng [fs]	Kabh [bf]	Kabs [bf]	Kabs2 [bf]
2542	**4182**	0.00	8400	0	0	3500	0.0	1750	833	2625	4365	8400	14840	33600	59360	16042	16042	1.91	1.08	5.84	27.86	16.44	19.34	0.333	0.000	0.000
3542	**4411**	0.00	14700	0	0	4375	0.0	3430	1167	5145	7638	14700	24220	73500	121100	38302	38302	2.61	1.58	6.84	27.86	16.44	19.34	0.333	0.000	0.000
4243	**5040**	0.00	24570	0	0	5688	0.0	5670	1500	8505	12767	24570	38857	159705	252571	74655	74655	3.04	1.92	9.16	27.86	16.44	19.34	0.333	0.000	0.000
4741	**6029**	0.00	39270	0	0	7438	0.0	8470	1833	12705	20405	39270	60452	333795	513842	128462	128462	3.27	2.13	12.75	27.86	16.44	19.34	0.333	0.000	0.000
5470	**6648**	0.00	54600	0	0	8750	0.0	11830	2167	17745	28371	54600	82460	546000	824600	203082	203082	3.72	2.46	15.07	27.86	16.44	19.34	0.333	0.000	0.000
6198	**7269**	0.00	72450	0	0	10063	0.0	15750	2500	23625	37646	72450	107870	833175	1240505	301875	301875	4.17	2.80	17.40	27.86	16.44	19.34	0.333	0.000	0.000
6926	**7890**	0.00	92820	0	0	11375	0.0	20230	2833	30345	48231	92820	136682	1206660	1776866	428202	428202	4.61	3.13	19.73	27.86	16.44	19.34	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000

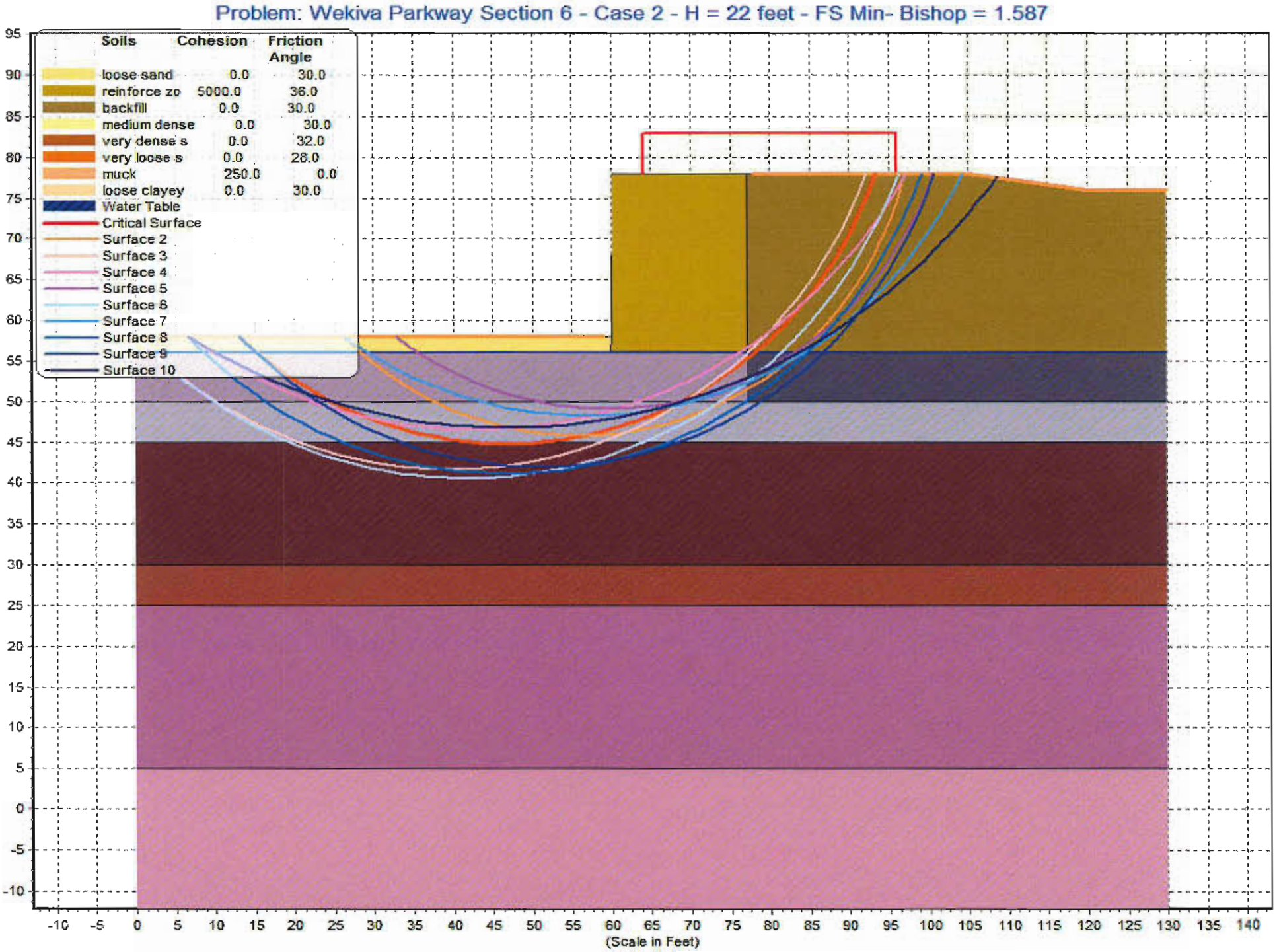
** **Note: This spreadsheet does not analyze Global Stability or Wall Settlement.**

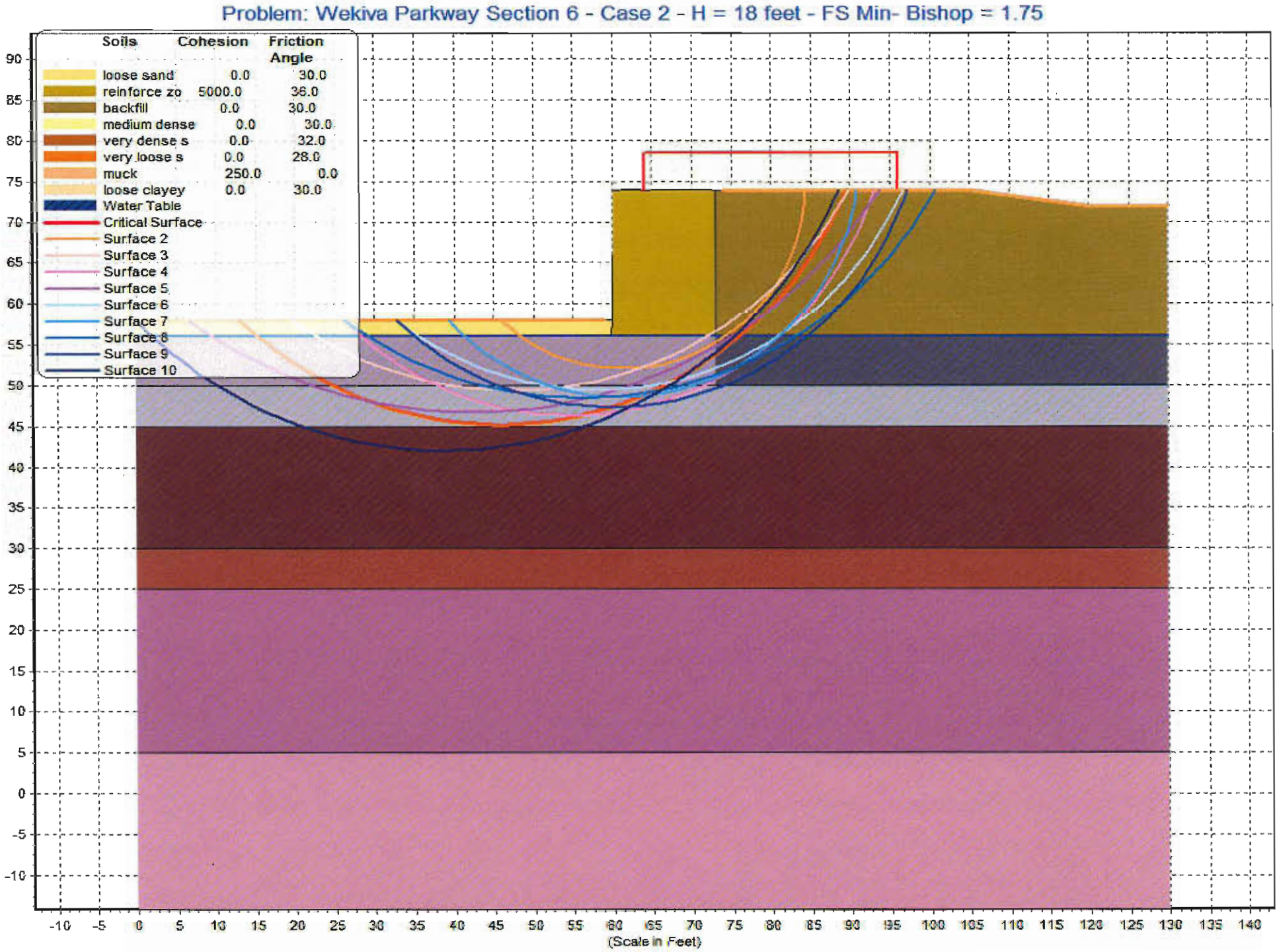
qvb	Vertical Pressure at base of the structure (psf): qvb = Rv_2 / L'
qr	Factored bearing resistance including footing embedment (i.e. overburden) term (qNq)
h	h = Wall height for backfill stress calculations (H+Ltanβ for infinite slopes and H+λTanα for broken back slopes with λ < 2*H) (ft)
W_1	Reinforced fill weight (lbs/ft)
W_2	Sloped backfill weight over reinforced area (lbs/ft)
W_3	Flat backfill weight over reinforced area (lbs/ft)
q_{1V}	Surcharge vertical force over reinforced area (lbs/ft)
α	Resultant earth pressure inclination (deg)
Ft	Total resultant horizontal backfill force (lbs/ft)
qt	Total resultant horizontal surcharge force (q_2) (lbs/ft)
Fd	Driving force (Sum of factored horizontal components of total horizontal foces) (lbs/ft)
Fr	Resisting foce (Sum of factored resisting foces * Tan ϕ_u) (lbs/ft)
Rv	Sum of factored vertical forces acting within raingorced soil mass without live load (q1L) used in sliding CDR calculation (lbs/ft)
Rv_2	Sum of factored vertical forces acting within reingorced soil mass including live load - used in calculation of qvb for bearing CDR (lbs/ft)
Mr	Sum of Resisting Moments without live load (lbs-ft/ft)
Mr_2	Sum of Resisting Moments including live load - used in calculation of e_2 for bearing CDR (lbs-ft/ft)
Mo	Sum of Overturning Moments(lbs-ft/ft)
Mo_2	Sum of Overturning Momants from case S-1-b (lbs-ft/ft)
e	Eccentricity {L/2 - [(Mr-Mo)/Rv]} (ft) [for overturning]
e_2	Eccentricity {L/2 - [(Mr_2-Mo_2)/Rv_2]} (ft) [for bearing stress calculation]
L'	Effective foundation width (feet): L'= L - 2*e_2
Nc	Cohesion Bearing Resistance Factor : Nc = (Nq-1)cot(ϕ) if f>0; for f=0 Nc=5.14
Ng	Footing Width Bearing Resistance Factor : Ng = 2*(Nq+1)*tan(ϕ)
Nq	Embedment Bearing Resistance Factor : Nq = [e^PI*tan(ϕ)]*N(ϕ); N(ϕ)=tan^2(PI/4 + ϕ/2)
Kabh	Backfill earth pressure coefficient when retained soil is horizontal
Kabs	Backfill earth pressure coefficient when retained soil is at slope β (infinite slope)
Kabs2	Backfill earth pressure coefficient for broken back slopes

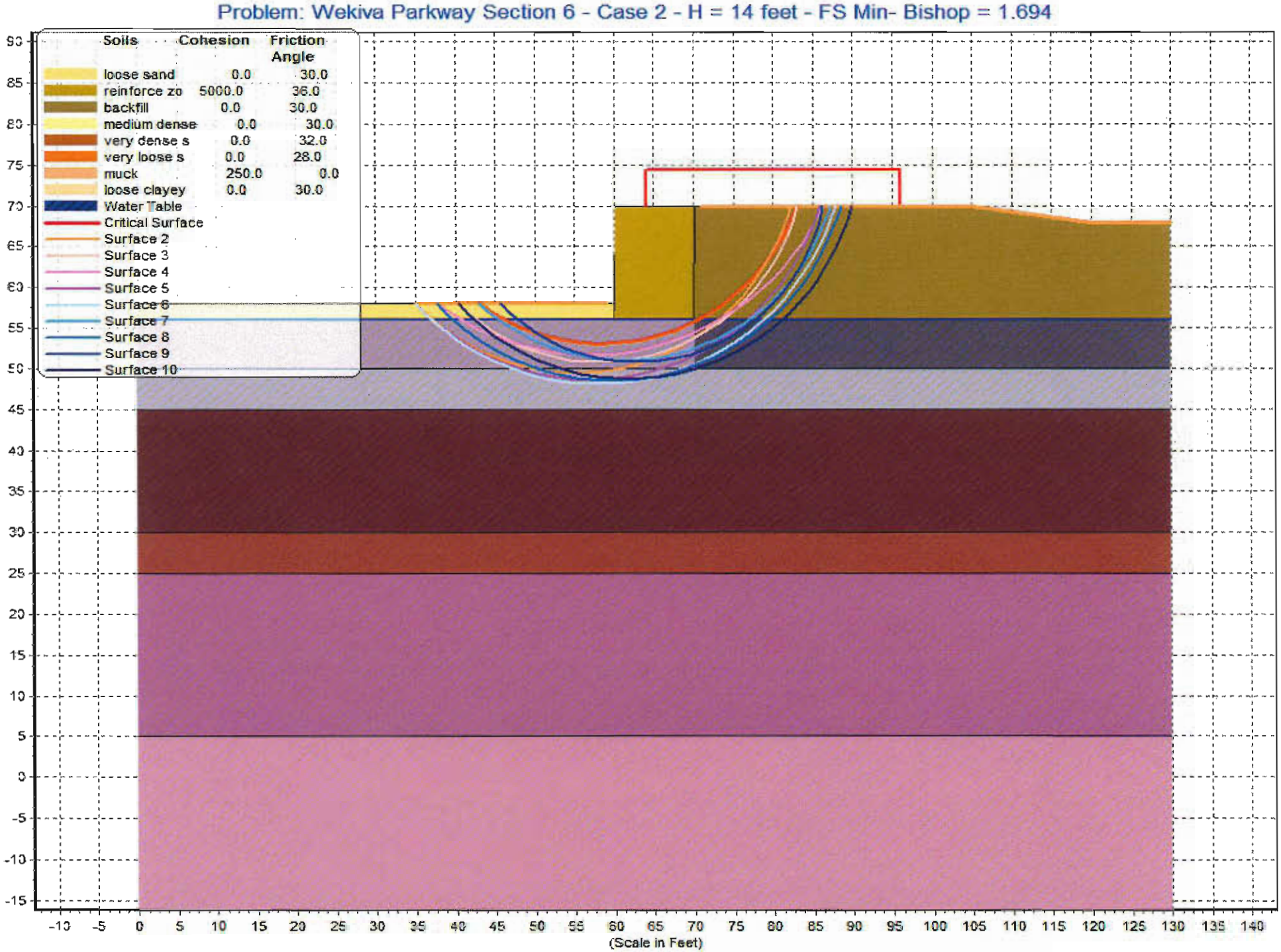

Problem: Wekiva Parkway Section 6 - Case 2 - H = 34 feet - FS Min- Bishop = 1.5
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)

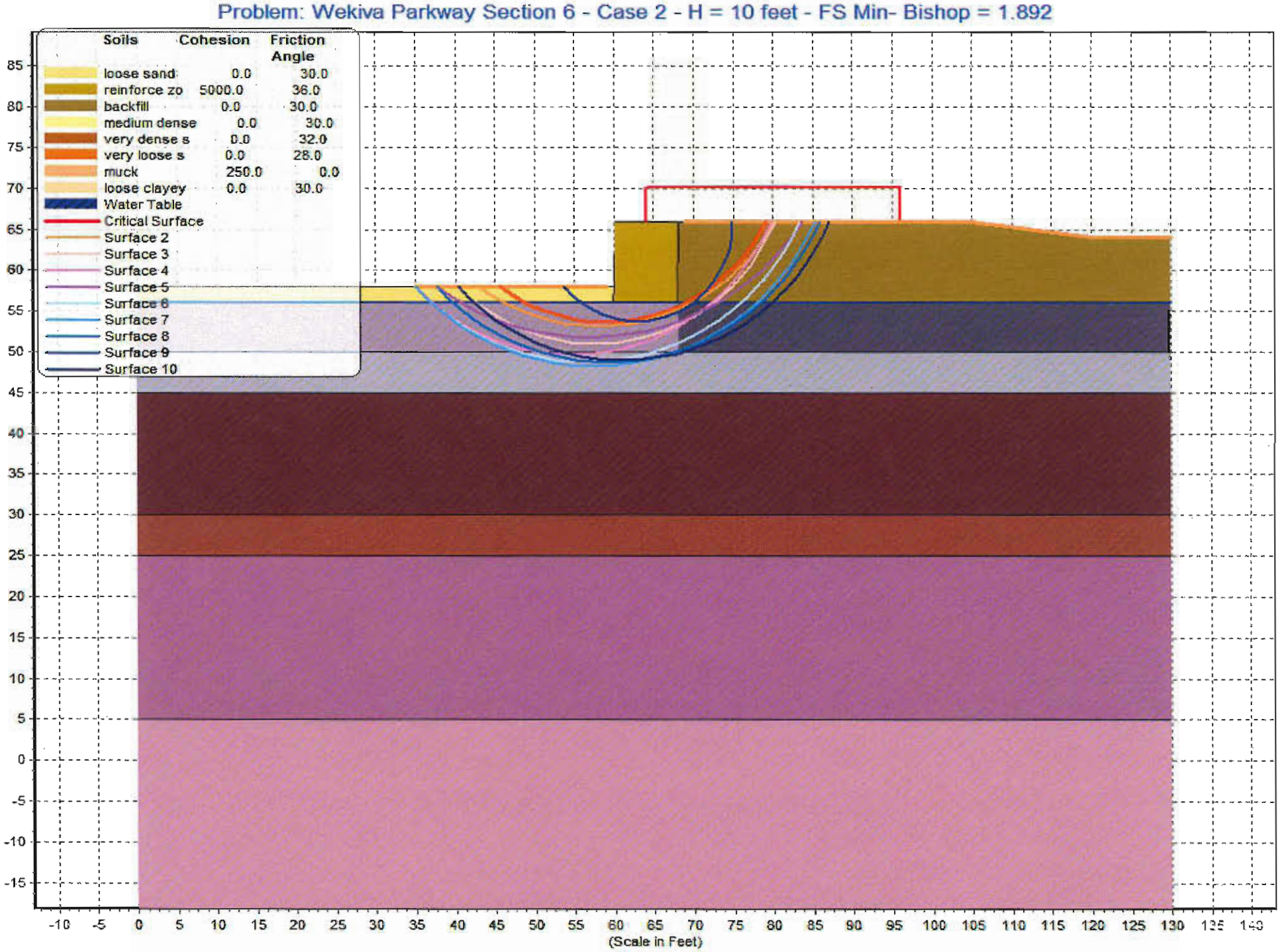

Problem: Wekiva Parkway Section 6 - Case 2 - H = 30 feet - FS Min- Bishop = 1.518
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 2 - H = 26 feet - FS Min- Bishop = 1.539
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 2 - H = 22 feet - FS Min- Bishop = 1.587
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 2 - H = 18 feet - FS Min- Bishop = 1.75
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 2 - H = 14 feet - FS Min- Bishop = 1.694
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 2 - H = 10 feet - FS Min- Bishop = 1.892
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforce zo 5000.0 36.0
backfill 0.0 30.0
medium dense 0.0 30.0
very dense s 0.0 32.0
very loose s 0.0 28.0
muck 250.0 0.0
loose clayey 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)

result.out
** STABL for WINDOWS **
by
Geotechnical Software Solutions

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: U.S.C.
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION Wekiva Parkway Section 6 - Case 2 - H = 34 feet

BOUNDARY COORDINATES

6 Top Boundaries
14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	58.00	60.00	58.00	2
2	60.00	58.00	60.10	90.00	8
3	60.10	90.00	86.00	90.00	8
4	86.00	90.00	105.00	90.00	1
5	105.00	90.00	120.00	88.00	1
6	120.00	88.00	130.00	88.00	1
7	59.90	56.00	60.00	58.00	2
8	59.90	56.00	86.00	56.00	2
9	86.00	56.00	86.10	90.00	2
10	0.00	50.00	130.00	50.00	3
11	0.00	45.00	130.00	45.00	4
12	0.00	30.00	130.00	30.00	5

13	0.00	25.00	130.00	25.00	6
14	0.00	5.00	130.00	5.00	7

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ISOTROPIC SOIL PARAMETERS

8 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	0.0	30.0	0.00	0.0	1
2	105.0	110.0	0.0	30.0	0.00	0.0	1
3	110.0	115.0	0.0	30.0	0.00	0.0	1
4	115.0	120.0	0.0	32.0	0.00	0.0	1
5	95.0	100.0	0.0	28.0	0.00	0.0	1
6	95.0	100.0	250.0	0.0	0.00	0.0	1
7	105.0	110.0	0.0	30.0	0.00	0.0	1
8	150.0	150.0	5000.0	36.0	0.00	0.0	1

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1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	56.00
2	130.00	56.00

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BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	64.00	96.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

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A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 59.00 ft.

Each Surface Terminates Between X = 87.00 ft.
and X = 130.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

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Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 57 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.67	58.00
2	21.21	56.72
3	22.79	55.50
4	24.42	54.35
5	26.10	53.25
6	27.81	52.23
7	29.57	51.26
8	31.36	50.37
9	33.18	49.54
10	35.03	48.79
11	36.91	48.10
12	38.81	47.49
13	40.74	46.95
14	42.68	46.48
15	44.64	46.09
16	46.62	45.78
17	48.60	45.54
18	50.60	45.37
19	52.59	45.28
20	54.59	45.27
21	56.59	45.34
22	58.59	45.48
23	60.58	45.69
24	62.56	45.98
25	64.52	46.35
26	66.47	46.80
27	68.40	47.31
28	70.32	47.90
29	72.20	48.56
30	74.06	49.30
31	75.89	50.10
32	77.69	50.98
33	79.46	51.92
34	81.18	52.93
35	82.87	54.00
36	84.52	55.14
37	86.12	56.34
38	87.67	57.59
39	89.18	58.91
40	90.63	60.29
41	92.03	61.71
42	93.37	63.20
43	94.66	64.73

44	95.89	66.31
45	97.05	67.93
46	98.16	69.60
47	99.20	71.31
48	100.17	73.06
49	101.07	74.84
50	101.91	76.66
51	102.68	78.50
52	103.37	80.38
53	104.00	82.28
54	104.55	84.20
55	105.03	86.14
56	105.43	88.10
57	105.73	89.90

Circle Center At X = 53.9 ; Y = 97.7 and Radius, 52.4

*** 1.500 ***

Individual data on the 68 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.5	103.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.9	161.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.6	153.2	0.0	12.6	0.0	0.0	0.0	0.0	0.0
4	1.6	535.4	0.0	134.0	0.0	0.0	0.0	0.0	0.0
5	1.7	756.8	0.0	274.5	0.0	0.0	0.0	0.0	0.0
6	1.7	975.3	0.0	406.9	0.0	0.0	0.0	0.0	0.0
7	1.8	1188.9	0.0	531.2	0.0	0.0	0.0	0.0	0.0
8	1.8	1395.7	0.0	647.1	0.0	0.0	0.0	0.0	0.0
9	0.8	688.6	0.0	322.9	0.0	0.0	0.0	0.0	0.0
10	1.0	906.3	0.0	431.5	0.0	0.0	0.0	0.0	0.0
11	1.9	1789.0	0.0	853.2	0.0	0.0	0.0	0.0	0.0
12	1.9	1971.3	0.0	943.1	0.0	0.0	0.0	0.0	0.0
13	1.9	2139.3	0.0	1024.1	0.0	0.0	0.0	0.0	0.0
14	1.9	2291.6	0.0	1096.0	0.0	0.0	0.0	0.0	0.0
15	1.9	2426.8	0.0	1158.7	0.0	0.0	0.0	0.0	0.0
16	2.0	2543.9	0.0	1212.1	0.0	0.0	0.0	0.0	0.0
17	2.0	2641.6	0.0	1256.3	0.0	0.0	0.0	0.0	0.0
18	2.0	2719.4	0.0	1291.0	0.0	0.0	0.0	0.0	0.0

19	2.0	2776.3	0.0	1316.2	0.0	0.0	0.0	0.0	0.0
20	2.0	2812.1	0.0	1332.0	0.0	0.0	0.0	0.0	0.0
21	2.0	2826.3	0.0	1338.3	0.0	0.0	0.0	0.0	0.0
22	2.0	2818.8	0.0	1335.0	0.0	0.0	0.0	0.0	0.0
23	2.0	2789.8	0.0	1322.2	0.0	0.0	0.0	0.0	0.0
24	1.3	1812.0	0.0	860.2	0.0	0.0	0.0	0.0	0.0
25	0.1	137.3	0.0	65.1	0.0	0.0	0.0	0.0	0.0
26	0.1	386.2	0.0	65.1	0.0	0.0	0.0	0.0	0.0
27	0.5	2986.3	0.0	309.5	0.0	0.0	0.0	0.0	0.0
28	2.0	12343.0	0.0	1268.1	0.0	0.0	0.0	0.0	0.0
29	1.4	8963.7	0.0	905.9	0.0	0.0	0.0	0.0	0.0
30	0.5	3226.1	0.0	321.1	0.0	0.0	0.0	0.0	130.4
31	2.0	12003.1	0.0	1176.4	0.0	0.0	0.0	0.0	487.6
32	1.9	11783.9	0.0	1116.6	0.0	0.0	0.0	0.0	483.0
33	1.9	11533.6	0.0	1047.5	0.0	0.0	0.0	0.0	477.8
34	1.9	11253.4	0.0	969.4	0.0	0.0	0.0	0.0	471.8
35	1.9	10945.1	0.0	882.2	0.0	0.0	0.0	0.0	465.1
36	1.6	9273.5	0.0	692.1	0.0	0.0	0.0	0.0	399.7
37	0.2	1337.0	0.0	94.2	0.0	0.0	0.0	0.0	58.1
38	1.8	10256.1	0.0	681.5	0.0	0.0	0.0	0.0	449.8
39	1.8	9882.4	0.0	568.3	0.0	0.0	0.0	0.0	441.1
40	1.7	9488.7	0.0	446.6	0.0	0.0	0.0	0.0	431.8
41	1.7	9077.2	0.0	316.7	0.0	0.0	0.0	0.0	421.9
42	1.6	8650.2	0.0	178.7	0.0	0.0	0.0	0.0	411.3
43	1.2	5935.2	0.0	38.8	0.0	0.0	0.0	0.0	288.3
44	0.3	1677.8	0.0	0.0	0.0	0.0	0.0	0.0	82.5
45	0.1	351.4	0.0	0.0	0.0	0.0	0.0	0.0	24.8
46	0.0	64.5	0.0	0.0	0.0	0.0	0.0	0.0	4.6
47	1.6	5389.6	0.0	0.0	0.0	0.0	0.0	0.0	388.4
48	1.5	5015.4	0.0	0.0	0.0	0.0	0.0	0.0	376.2
49	1.5	4638.8	0.0	0.0	0.0	0.0	0.0	0.0	363.3
50	1.4	4262.1	0.0	0.0	0.0	0.0	0.0	0.0	349.9
51	1.3	3887.7	0.0	0.0	0.0	0.0	0.0	0.0	336.0
52	1.3	3517.9	0.0	0.0	0.0	0.0	0.0	0.0	321.7
53	1.2	3155.2	0.0	0.0	0.0	0.0	0.0	0.0	306.8
54	0.1	278.2	0.0	0.0	0.0	0.0	0.0	0.0	28.0
55	1.1	2523.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	1.1	2460.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	1.0	2132.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	1.0	1820.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.9	1526.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.8	1252.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.8	1000.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.7	771.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.6	568.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.6	391.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.5	231.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

67	0.4	120.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.3	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Failure Surface Specified By 69 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.00	58.00
2	1.42	56.59
3	2.88	55.22
4	4.38	53.90
5	5.92	52.63
6	7.51	51.41
7	9.13	50.24
8	10.79	49.13
9	12.49	48.07
10	14.22	47.07
11	15.98	46.12
12	17.77	45.23
13	19.59	44.40
14	21.44	43.62
15	23.30	42.91
16	25.19	42.26
17	27.11	41.67
18	29.03	41.14
19	30.98	40.67
20	32.94	40.27
21	34.91	39.93
22	36.89	39.65
23	38.88	39.44
24	40.87	39.30
25	42.87	39.21
26	44.87	39.20
27	46.87	39.24
28	48.87	39.36
29	50.86	39.53
30	52.85	39.77
31	54.82	40.08
32	56.79	40.45
33	58.74	40.88
34	60.68	41.37
35	62.60	41.93
36	64.50	42.55
37	66.38	43.23
38	68.24	43.97
39	70.07	44.77

40	71.88	45.63
41	73.66	46.54
42	75.40	47.52
43	77.12	48.55
44	78.80	49.63
45	80.44	50.77
46	82.05	51.96
47	83.62	53.20
48	85.14	54.50
49	86.63	55.84
50	88.07	57.23
51	89.46	58.66
52	90.81	60.14
53	92.11	61.66
54	93.35	63.22
55	94.55	64.82
56	95.70	66.46
57	96.79	68.14
58	97.82	69.85
59	98.81	71.59
60	99.73	73.37
61	100.60	75.17
62	101.40	77.00
63	102.15	78.85
64	102.84	80.73
65	103.46	82.63
66	104.03	84.55
67	104.53	86.49
68	104.97	88.44
69	105.26	89.97

Circle Center At X = 44.4 ; Y = 101.0 and Radius, 61.9

*** 1.542 ***

1

Failure Surface Specified By 66 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	6.56	58.00
2	7.98	56.59

3	9.44	55.23
4	10.96	53.92
5	12.51	52.67
6	14.11	51.47
7	15.75	50.32
8	17.43	49.23
9	19.14	48.20
10	20.89	47.23
11	22.67	46.32
12	24.48	45.47
13	26.32	44.68
14	28.18	43.96
15	30.07	43.30
16	31.98	42.70
17	33.91	42.17
18	35.86	41.71
19	37.82	41.32
20	39.79	40.99
21	41.77	40.73
22	43.76	40.53
23	45.76	40.41
24	47.76	40.35
25	49.76	40.37
26	51.76	40.45
27	53.75	40.60
28	55.74	40.82
29	57.72	41.10
30	59.69	41.46
31	61.64	41.88
32	63.58	42.36
33	65.50	42.92
34	67.41	43.54
35	69.29	44.22
36	71.14	44.97
37	72.97	45.78
38	74.77	46.65
39	76.54	47.59
40	78.27	48.58
41	79.97	49.63
42	81.64	50.74
43	83.26	51.91
44	84.84	53.13
45	86.38	54.41
46	87.88	55.73
47	89.33	57.11
48	90.73	58.54
49	92.08	60.01
50	93.38	61.53

51	94.63	63.09
52	95.83	64.70
53	96.96	66.34
54	98.05	68.03
55	99.07	69.74
56	100.03	71.50
57	100.93	73.28
58	101.78	75.10
59	102.55	76.94
60	103.27	78.81
61	103.92	80.70
62	104.50	82.61
63	105.02	84.54
64	105.48	86.49
65	105.86	88.45
66	106.09	89.85

Circle Center At X = 48.4 ; Y = 98.7 and Radius, 58.4

*** 1.557 ***

Failure Surface Specified By 68 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.00	58.00
2	1.43	56.60
3	2.90	55.25
4	4.42	53.94
5	5.97	52.69
6	7.57	51.48
7	9.21	50.33
8	10.88	49.24
9	12.59	48.20
10	14.33	47.22
11	16.10	46.29
12	17.91	45.42
13	19.74	44.61
14	21.59	43.87
15	23.47	43.18
16	25.37	42.56
17	27.29	41.99

18	29.23	41.50
19	31.18	41.06
20	33.14	40.69
21	35.12	40.38
22	37.11	40.14
23	39.10	39.97
24	41.09	39.86
25	43.09	39.81
26	45.09	39.83
27	47.09	39.92
28	49.09	40.07
29	51.07	40.29
30	53.05	40.57
31	55.02	40.91
32	56.98	41.32
33	58.93	41.80
34	60.85	42.34
35	62.76	42.94
36	64.65	43.60
37	66.51	44.32
38	68.35	45.11
39	70.16	45.95
40	71.95	46.86
41	73.70	47.82
42	75.42	48.84
43	77.11	49.91
44	78.76	51.04
45	80.37	52.22
46	81.95	53.46
47	83.48	54.74
48	84.97	56.08
49	86.41	57.46
50	87.81	58.89
51	89.16	60.37
52	90.46	61.89
53	91.71	63.45
54	92.91	65.05
55	94.06	66.68
56	95.15	68.36
57	96.19	70.07
58	97.17	71.81
59	98.09	73.59
60	98.95	75.39
61	99.76	77.22
62	100.50	79.08
63	101.19	80.96
64	101.81	82.86
65	102.36	84.78

66	102.86	86.72
67	103.29	88.67
68	103.54	90.00

Circle Center At X = 43.5 ; Y = 100.8 and Radius, 61.0

*** 1.562 ***

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Failure Surface Specified By 59 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.11	58.00
2	14.60	56.67
3	16.14	55.39
4	17.73	54.18
5	19.36	53.02
6	21.04	51.93
7	22.75	50.90
8	24.51	49.94
9	26.30	49.04
10	28.12	48.22
11	29.97	47.46
12	31.85	46.77
13	33.75	46.16
14	35.68	45.62
15	37.62	45.15
16	39.58	44.76
17	41.56	44.44
18	43.54	44.19
19	45.53	44.02
20	47.53	43.93
21	49.53	43.91
22	51.53	43.97
23	53.53	44.11
24	55.52	44.32
25	57.50	44.60
26	59.46	44.96
27	61.41	45.40
28	63.35	45.91
29	65.26	46.49

30	67.15	47.14
31	69.02	47.87
32	70.85	48.66
33	72.66	49.52
34	74.43	50.46
35	76.16	51.45
36	77.85	52.52
37	79.51	53.64
38	81.11	54.83
39	82.68	56.08
40	84.19	57.39
41	85.65	58.75
42	87.06	60.17
43	88.42	61.64
44	89.72	63.16
45	90.96	64.73
46	92.14	66.35
47	93.25	68.00
48	94.31	69.70
49	95.30	71.44
50	96.22	73.22
51	97.07	75.03
52	97.86	76.87
53	98.57	78.73
54	99.22	80.63
55	99.79	82.54
56	100.28	84.48
57	100.71	86.44
58	101.06	88.40
59	101.28	90.00

Circle Center At X = 49.0 ; Y = 96.6 and Radius, 52.7

*** 1.614 ***

Failure Surface Specified By 67 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	6.56	58.00
2	8.06	56.68
3	9.60	55.40

4	11.17	54.17
5	12.79	53.00
6	14.44	51.87
7	16.13	50.80
8	17.85	49.78
9	19.60	48.81
10	21.38	47.90
11	23.19	47.04
12	25.03	46.25
13	26.88	45.51
14	28.76	44.83
15	30.67	44.20
16	32.58	43.64
17	34.52	43.14
18	36.47	42.70
19	38.44	42.32
20	40.41	42.00
21	42.39	41.75
22	44.38	41.55
23	46.38	41.42
24	48.38	41.35
25	50.38	41.35
26	52.38	41.41
27	54.37	41.53
28	56.37	41.71
29	58.35	41.95
30	60.33	42.26
31	62.29	42.63
32	64.25	43.06
33	66.19	43.55
34	68.11	44.10
35	70.01	44.71
36	71.90	45.38
37	73.76	46.11
38	75.60	46.89
39	77.41	47.74
40	79.20	48.64
41	80.95	49.59
42	82.68	50.60
43	84.37	51.67
44	86.03	52.78
45	87.66	53.95
46	89.24	55.17
47	90.79	56.44
48	92.30	57.75
49	93.76	59.11
50	95.18	60.52
51	96.56	61.97

52	97.89	63.46
53	99.17	65.00
54	100.41	66.57
55	101.59	68.18
56	102.73	69.83
57	103.81	71.51
58	104.84	73.23
59	105.81	74.97
60	106.73	76.75
61	107.59	78.56
62	108.40	80.39
63	109.15	82.24
64	109.84	84.12
65	110.47	86.02
66	111.04	87.93
67	111.36	89.15

Circle Center At X = 49.6 ; Y = 105.2 and Radius, 63.9

*** 1.617 ***

1

Failure Surface Specified By 55 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	26.22	58.00
2	27.88	56.87
3	29.57	55.81
4	31.30	54.81
5	33.07	53.87
6	34.87	53.00
7	36.70	52.19
8	38.55	51.45
9	40.44	50.78
10	42.34	50.18
11	44.27	49.64
12	46.22	49.18
13	48.18	48.79
14	50.15	48.47
15	52.14	48.23
16	54.13	48.05

17	56.13	47.95
18	58.13	47.93
19	60.13	47.97
20	62.13	48.09
21	64.12	48.28
22	66.10	48.54
23	68.07	48.88
24	70.03	49.29
25	71.97	49.77
26	73.89	50.31
27	75.80	50.93
28	77.67	51.62
29	79.53	52.38
30	81.35	53.20
31	83.14	54.09
32	84.90	55.04
33	86.62	56.06
34	88.30	57.14
35	89.95	58.28
36	91.55	59.48
37	93.10	60.74
38	94.61	62.05
39	96.07	63.42
40	97.48	64.83
41	98.84	66.30
42	100.14	67.82
43	101.38	69.39
44	102.57	71.00
45	103.70	72.65
46	104.77	74.34
47	105.77	76.07
48	106.71	77.83
49	107.59	79.63
50	108.40	81.46
51	109.14	83.32
52	109.82	85.20
53	110.42	87.11
54	110.96	89.03
55	111.00	89.20

Circle Center At X = 57.9 ; Y = 102.7 and Radius, 54.8

*** 1.624 ***

Failure Surface Specified By 64 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.11	58.00
2	14.53	56.59
3	15.99	55.23
4	17.51	53.92
5	19.07	52.67
6	20.67	51.47
7	22.32	50.34
8	24.00	49.26
9	25.73	48.25
10	27.49	47.30
11	29.28	46.42
12	31.11	45.60
13	32.96	44.84
14	34.84	44.16
15	36.74	43.54
16	38.67	42.99
17	40.61	42.52
18	42.57	42.11
19	44.54	41.78
20	46.52	41.51
21	48.51	41.32
22	50.51	41.20
23	52.51	41.15
24	54.51	41.18
25	56.50	41.28
26	58.50	41.45
27	60.48	41.69
28	62.46	42.01
29	64.42	42.39
30	66.37	42.85
31	68.30	43.38
32	70.20	43.97
33	72.09	44.64
34	73.95	45.37
35	75.78	46.17
36	77.59	47.04
37	79.36	47.97
38	81.09	48.96
39	82.79	50.02
40	84.45	51.14
41	86.07	52.31
42	87.64	53.55

43	89.17	54.84
44	90.65	56.19
45	92.08	57.58
46	93.46	59.03
47	94.78	60.53
48	96.05	62.08
49	97.26	63.67
50	98.42	65.30
51	99.51	66.97
52	100.55	68.69
53	101.52	70.43
54	102.42	72.22
55	103.26	74.03
56	104.04	75.88
57	104.75	77.75
58	105.38	79.64
59	105.95	81.56
60	106.46	83.49
61	106.88	85.45
62	107.24	87.42
63	107.53	89.40
64	107.56	89.66

Circle Center At X = 52.8 ; Y = 96.3 and Radius, 55.2

*** 1.627 ***

1

Failure Surface Specified By 71 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.00	58.00
2	1.51	56.68
3	3.05	55.41
4	4.63	54.18
5	6.24	53.00
6	7.89	51.86
7	9.56	50.78
8	11.27	49.74
9	13.01	48.75
10	14.78	47.81

11	16.57	46.93
12	18.39	46.09
13	20.23	45.31
14	22.09	44.58
15	23.98	43.91
16	25.88	43.29
17	27.80	42.73
18	29.73	42.22
19	31.68	41.77
20	33.64	41.37
21	35.61	41.04
22	37.59	40.76
23	39.58	40.53
24	41.57	40.37
25	43.57	40.26
26	45.57	40.21
27	47.57	40.21
28	49.57	40.28
29	51.57	40.40
30	53.56	40.58
31	55.54	40.82
32	57.52	41.12
33	59.49	41.47
34	61.45	41.88
35	63.39	42.34
36	65.32	42.87
37	67.24	43.44
38	69.14	44.07
39	71.01	44.76
40	72.87	45.50
41	74.71	46.30
42	76.52	47.14
43	78.31	48.04
44	80.07	48.99
45	81.80	49.99
46	83.50	51.05
47	85.17	52.14
48	86.81	53.29
49	88.41	54.49
50	89.98	55.73
51	91.51	57.01
52	93.01	58.34
53	94.47	59.71
54	95.88	61.12
55	97.26	62.58
56	98.59	64.07
57	99.87	65.60
58	101.12	67.16

59	102.32	68.77
60	103.47	70.40
61	104.57	72.07
62	105.62	73.77
63	106.63	75.50
64	107.58	77.26
65	108.48	79.04
66	109.34	80.85
67	110.13	82.69
68	110.88	84.54
69	111.57	86.42
70	112.21	88.32
71	112.42	89.01

Circle Center At X = 46.3 ; Y = 109.4 and Radius, 69.2

*** 1.631 ***

Failure Surface Specified By 55 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	26.22	58.00
2	27.68	56.63
3	29.19	55.32
4	30.76	54.08
5	32.38	52.91
6	34.05	51.80
7	35.76	50.77
8	37.52	49.82
9	39.32	48.94
10	41.15	48.15
11	43.02	47.43
12	44.91	46.79
13	46.84	46.24
14	48.78	45.77
15	50.74	45.38
16	52.72	45.08
17	54.71	44.86
18	56.70	44.73
19	58.70	44.69
20	60.70	44.73

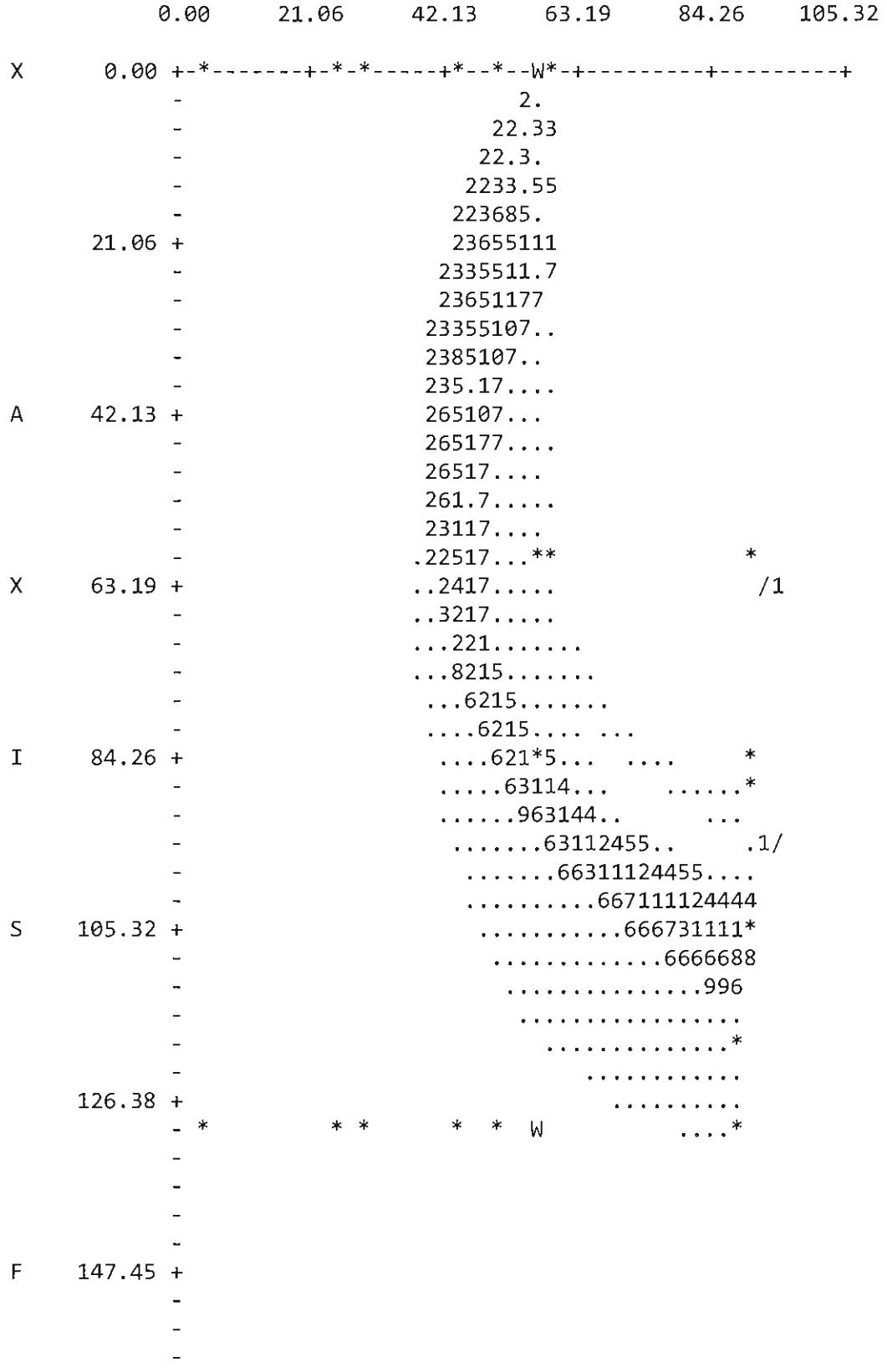
21	62.70	44.86
22	64.69	45.08
23	66.66	45.38
24	68.63	45.76
25	70.57	46.23
26	72.49	46.79
27	74.39	47.42
28	76.25	48.14
29	78.09	48.94
30	79.89	49.81
31	81.64	50.77
32	83.36	51.80
33	85.03	52.90
34	86.65	54.07
35	88.22	55.31
36	89.73	56.62
37	91.19	57.99
38	92.58	59.42
39	93.91	60.92
40	95.18	62.46
41	96.38	64.07
42	97.50	65.72
43	98.56	67.42
44	99.54	69.16
45	100.44	70.94
46	101.27	72.77
47	102.02	74.62
48	102.68	76.51
49	103.27	78.42
50	103.77	80.36
51	104.19	82.31
52	104.52	84.28
53	104.77	86.27
54	104.93	88.26
55	104.99	90.00

Circle Center At X = 58.7 ; Y = 91.0 and Radius, 46.3

*** 1.638 ***

1

Y A X I S F T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21.06
42.13
63.19
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105.32
X
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"PROFILE 3

MSE WALL - LRFD External Stability Analysis

version 2.5

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (2006)

	H (ft)	* Ho (ft)	* D (ft)	* L (ft)	Minimum Reinforcement Length Requirement (SDG Fig 3.16)	Over-turning CDR >= 1	Eccen-tricity CDR <= 1	Sliding CDR >= 1	Bearing Resitance CDR >= 1	* β (deg)	* λ (ft)	* Water d (ft)	* γ[rf] (pcf)	* γ[bf] (pcf)	* ϕ [bf] (deg)	* γ[fs] (pcf)	* ϕ [fs] (deg)	* c[fs] (psf)	* ϕ u (deg)	* q1 (psf)	* q2 (psf)	CW
1	10.0	8.0	2.0	8.0	OK	2.09	0.95	1.07	1.16	0.0	0.0	0.0	105.0	105.0	30.0	100.0	28.0	0.0	30.0	250	250	0.50
2	12.0	10.0	2.0	9.0	OK	1.99	1.00	1.07	1.01	0.0	0.0	0.0	105.0	105.0	30.0	100.0	28.0	0.0	30.0	250	250	0.50
3	16.0	14.0	2.0	14.0	OK	3.02	0.66	1.35	1.23	0.0	0.0	0.0	105.0	105.0	30.0	100.0	28.0	0.0	30.0	250	250	0.50
4	20.0	18.0	2.0	25.0	OK	6.62	0.30	2.03	1.88	0.0	0.0	0.0	105.0	105.0	30.0	100.0	28.0	0.0	30.0	250	250	0.50
5	24.0	22.0	2.0	31.0	OK	7.43	0.27	2.18	1.93	0.0	0.0	0.0	105.0	105.0	30.0	100.0	28.0	0.0	30.0	250	250	0.50
6	28.0	26.0	2.0	37.0	OK	8.07	0.25	2.29	1.96	0.0	0.0	0.0	105.0	105.0	30.0	100.0	28.0	0.0	30.0	250	250	0.50
7	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	100.0	30.0	0.0	30.0	250	250	#DIV/0!
8	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
9	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
10	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
11	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
12	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
13	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
14	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
15	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
16	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
17	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
18	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
19	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!
20	0.0	0.0	0.0	0.0	OK	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	0.0	105.0	105.0	30.0	105.0	30.0	0.0	30.0	250	250	#DIV/0!

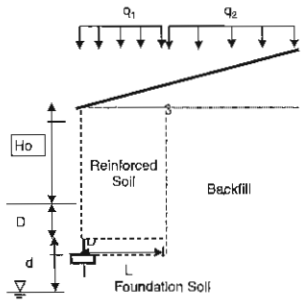
* Indicates required input

Note:

Disclaimer: No Warranty, expressed or implied, is made by the author or the Florida Department of Transportation (FDOT) as to the accuracy and the functioning of this program or the results it produces; nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the author or the FDOT in any connection therewith.

H — Wall Height H = Ho + D
Ho — Wall Height above ground (feet)
D — Wall Embeddment Depth (feet)
L — Reinforcing Strap Length (feet)
CDR — Capacity-Demand Ratio for :
- Overturning = Mr / Mo => 1.0
- Eccentricity = e / (L/4) =< 1.0
- Sliding = Fr / Fd => 1.0
- Bearing Resistance = qr / qvb => 1.0

β — Slope of backfill soil (degrees)
λ — Horizontal distance from the back of the wall to the top of the slope (for broken-back slopes) (feet)
Use λ >= 2*H when modeling infinite slopes
d — Water depth below base of leveling pad (feet)
γ[rf] — Reinforced fill unit weight (pounds per cubic foot)
γ[bf] — Backfill soil unit weight (pounds per cubic foot)
ϕ[bf] — Backfill soil engle of internal friction (degrees)
γ[fs] — Foundation Soil unit weight (pounds per cubic foot)
ϕ[fs] — Foundation Soil angle of internal friction (degrees)
c[fs] — Foundation Soil cohesion (pounds per square foot)
ϕu — Base Angle of Internal Friction (dagreas) (Sliding)
q1 — Surcharge load over reinforced soil mass (pounds per square foot) - Should be zero when modeling infinite slopes
q2 — Surcharge load behind reinforced soil mass (pounds per square foot) - Should be zero when modeling infinite slopes
Cw — Cw = 0.5 for d =< 0, Cw=1.0 for d => 1.5*L + D



MSE WALL - LRFD External Stability Analysis

version 2.5

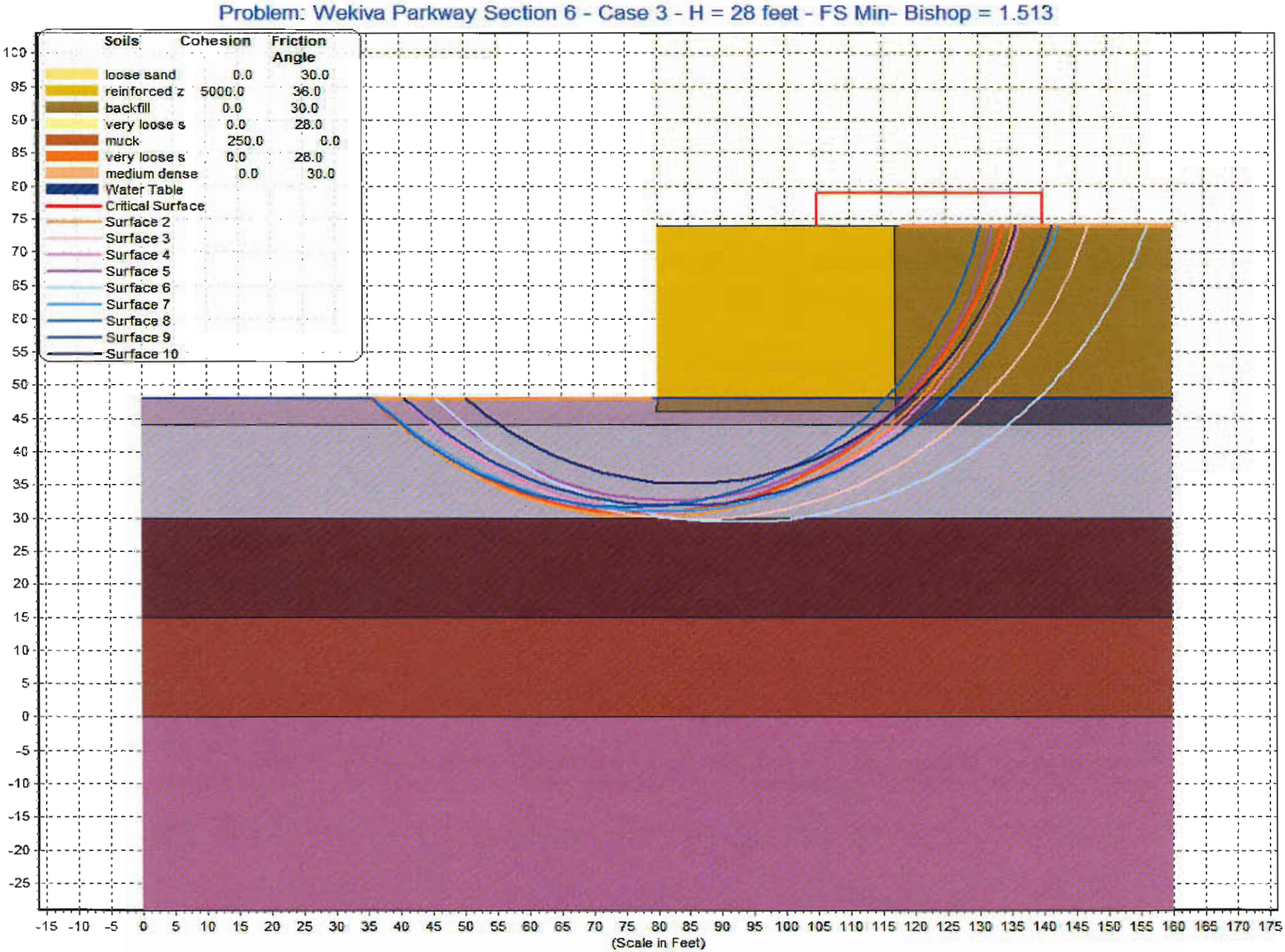
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (2006)

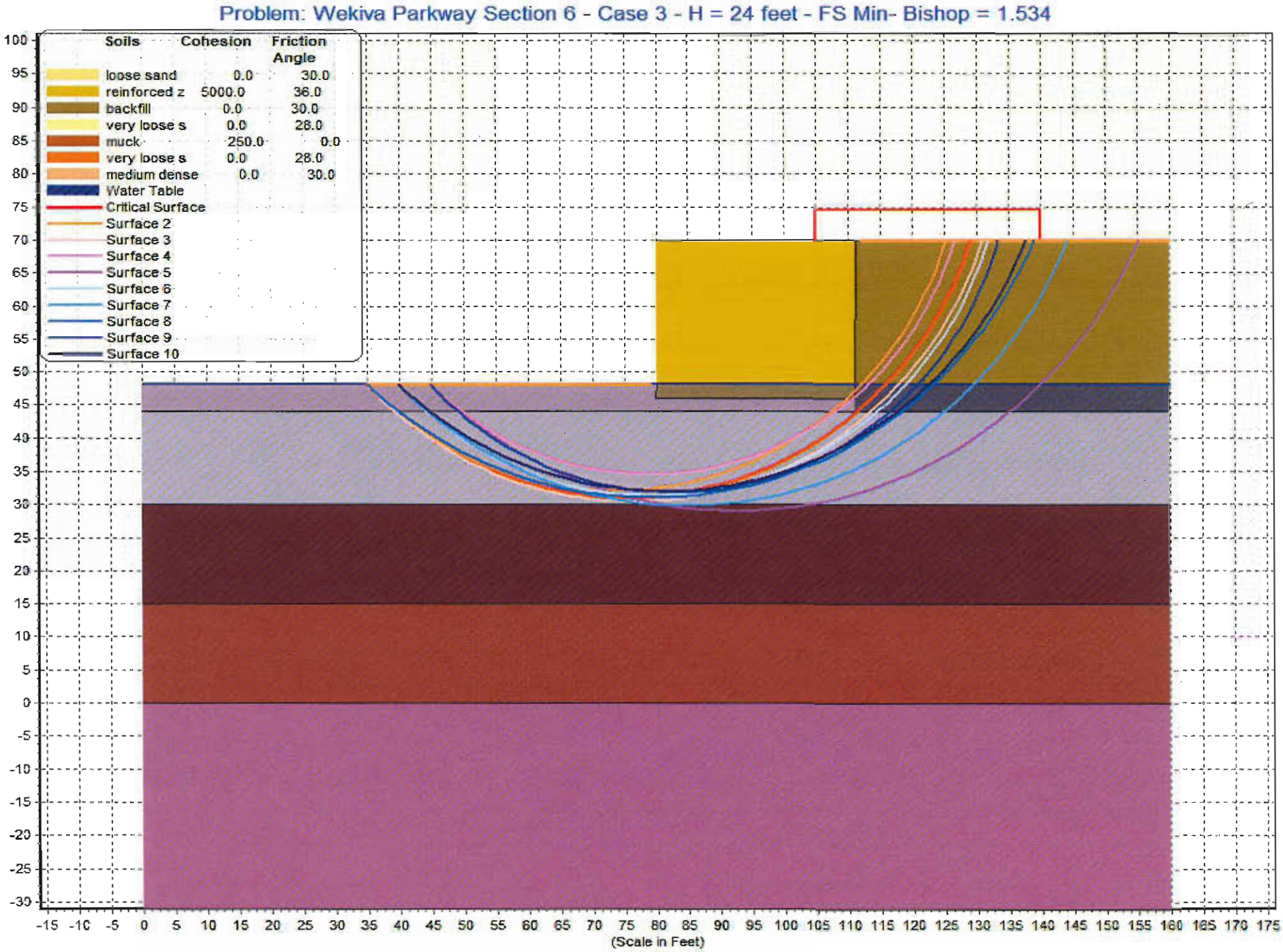
qvb (psf)	qr (psf)	h (h)	W1 (lbs/ft)	W2 (lbs/ft)	W3 (lbs/ft)	q_{1V} (lbs/ft)	α (deg)	Ft (lbs/ft)	ql (lbs/ft)	Fd (lbs/ft)	Fr (lbs/ft)	Rv (lbs/ft)	Rv2 (lbs/ft)	Mr (lbs-ft/ft)	Mr_2	Mo (lbs-ft/ft)	Mo_2 (lbs-ft/ft)	e (ft)	e_2 (ft)	L' (ft)	Nc [fs]	Nq [fs]	Ng [fs]	Kabh [bf]	Kabs [bf]	Kabs2 [bf]
2542	**3671**	0.00	8400	0	0	3500	0.0	1750	833	2625	4365	8400	14840	33600	59360	16042	16042	1.91	1.08	5.84	25.80	14.72	16.72	0.333	0.000	0.000
3037	**3766**	0.00	11340	0	0	3938	0.0	2520	1000	3780	5892	11340	19247	51030	86609	25620	25620	2.26	1.33	6.34	25.80	14.72	16.72	0.333	0.000	0.000
3406	**4939**	0.00	23520	0	0	6125	0.0	4480	1333	6720	12221	23520	37877	164640	265139	54507	54507	2.32	1.44	11.12	25.80	14.72	16.72	0.333	0.000	0.000
3624	**7798**	0.00	52500	0	0	10938	0.0	7000	1667	10500	27280	52500	81813	656250	1022656	99167	99167	1.89	1.21	22.58	25.80	14.72	16.72	0.333	0.000	0.000
4212	**9134**	0.00	78120	0	0	13563	0.0	10080	2000	15120	40592	78120	119025	1210860	1844880	162960	162960	2.09	1.37	28.26	25.80	14.72	16.72	0.333	0.000	0.000
4803	**10460**	0.00	108780	0	0	16188	0.0	13720	2333	20580	56524	108780	163041	2012430	3016249	249247	249247	2.29	1.53	33.94	25.80	14.72	16.72	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000
#DIV/0!	**#DIV/0!**	0.00	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	30.14	18.40	22.40	0.333	0.000	0.000

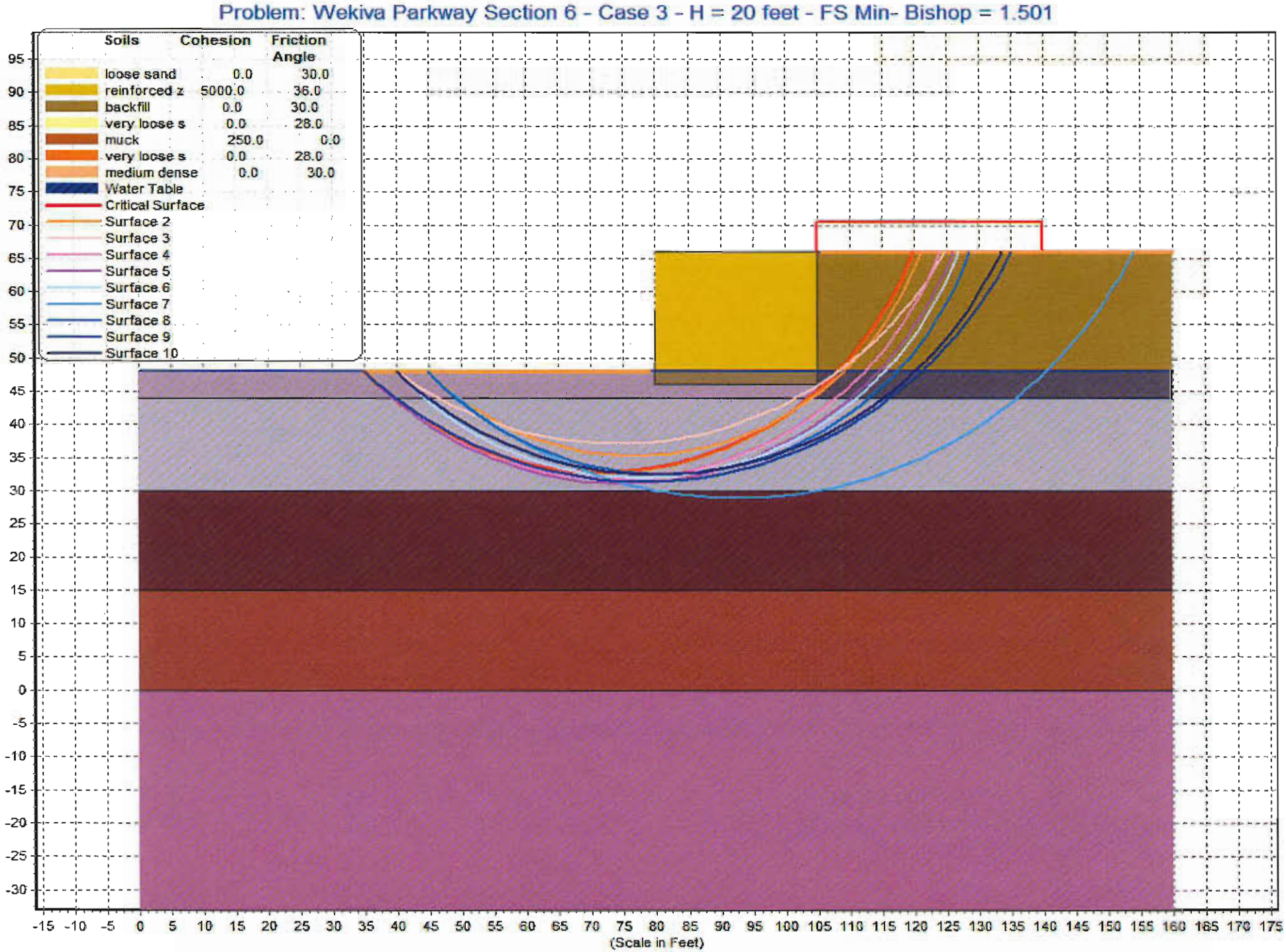
** **Note:** **This spreadaheet does not analyze Global Stability or Wall Settlement.**

qvb — Vertical Pressure at base of the structure (psf): qvb = Rv_2 / L'
qr — Factored bearing resistance including footing embedment (i.e. overburden) term (qNq)
h — h = Wall height for backfill stress calculations (H+Ltanβ for infinite slopes and H+λTanα for broken back slopes with λ < 2*H) (ft)
W_1 — Reinforced fill weight (lbs/ft)
W_2 — Sloped backfill weight over reinforced area (lbs/ft)
W_3 — Flat backfill weight over reinforced area (lbs/ft)
q_{1V} — Surcharge vertical force over reinforced area (lbs/ft)
α — Resultant earth pressure inclination (deg)
Ft — Total resultant horizontal backfill force (lbs/ff)
ql — Total resultant horizontal surcharge force (q_2) (lbs/ft)
Fd — Driving force (Sum of factored horizontal components of total horizontal foces) (lbs/ft)
Fr — Resisting foce (Sum of factored resisting foces * Tan ϕ_u) (lbs/ft)
Rv — Sum of factored vertical forces acting within reingorced soil mass without live load (q1L) used in sliding CDR calculation (lbs/ft)
Rv_2 — Sum of factored vertical forces acting within reingorced soil mass including liva load - used in calculation of qvb for bearing CDR (lbs/ft)
Mr — Sum of Resisting Moments without live load (lbs-ft/ft)
Mr_2 — Sum of Resisting Moments includiag live load - used in calculation of e_2 for bearing CDR (lbs-ft/ft)
Mo — Sum of Overturning Moments(lbs-ft/ft)
Mo_2 — Sum of Overturning Moments from case S-1-b (lbs-ft/ff)
e — Eccentricity {L/2 - [(Mr-Mo)/Rv]} (ft) [for overturning]
e_2 — Eccentricity {L/2 - [(Mr_2-Mo_2)/Rv_2]} (ft) [for bearing stress calculation]
L' — Effective foundation width (feet): L'= L - 2*a_2

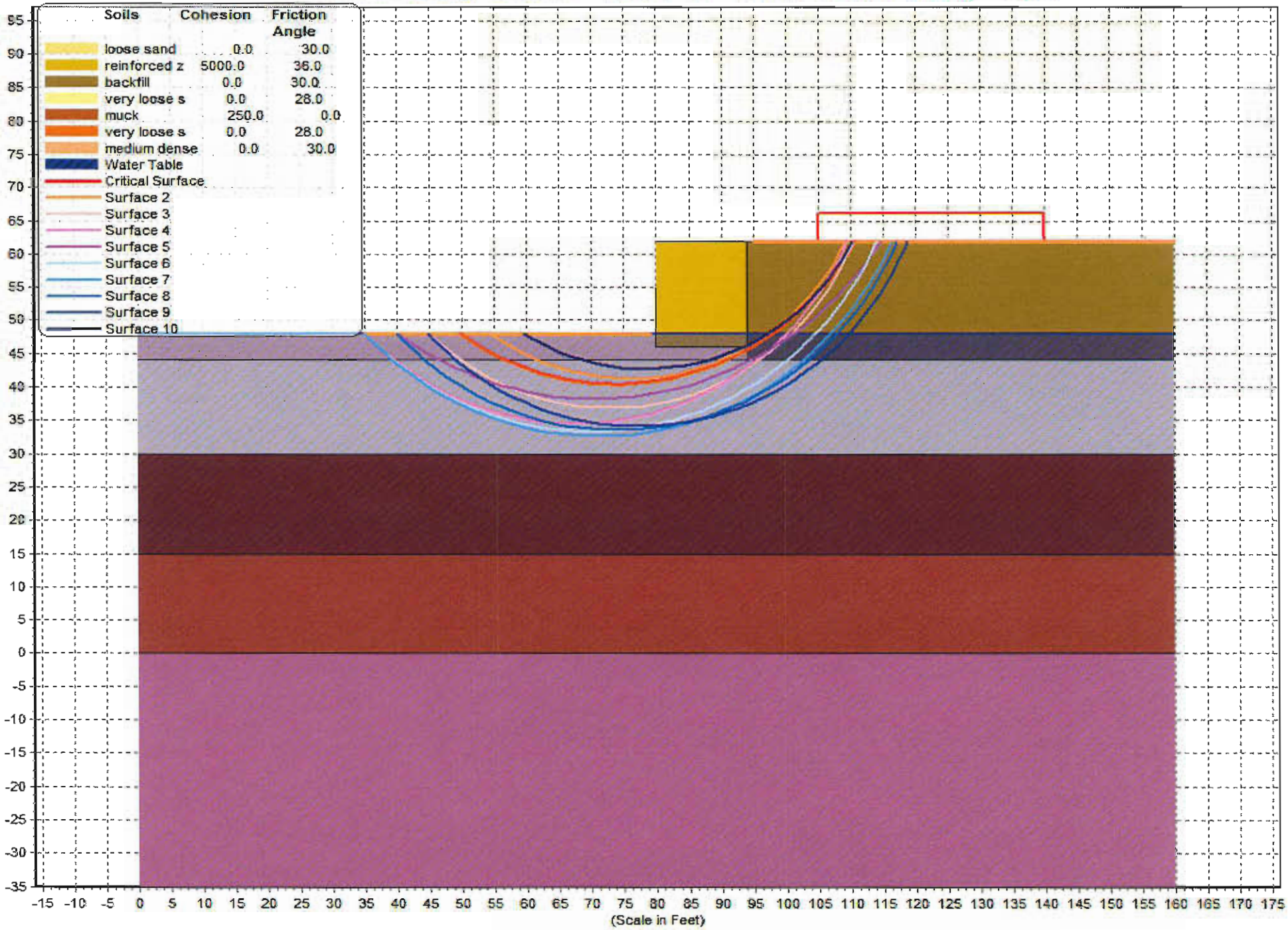
Nc — Cohesion Bearing Resistance Factor : Nc = (Nq-1)cot(φ) if f>0; for f=0 Nc=5.14
Ng — Footing Width Bearing Resistance Factor : Ng = 2*(Nq+1)*tan(φ)
Nq — Embedment Bearing Resistance Factor : Nq = [e^PI*tan(φ)]*N(φ); N(φ)=tan^2(PI/4 + φ/2)
Kabh — Backfill earth pressure coefficient when retained soil is horizontal
Kabs — Backfill earth pressure coefficient when retained soil is at slope β (infinite slope)
Kabs2 — Backfill earth pressure coefficient for broken back slopes

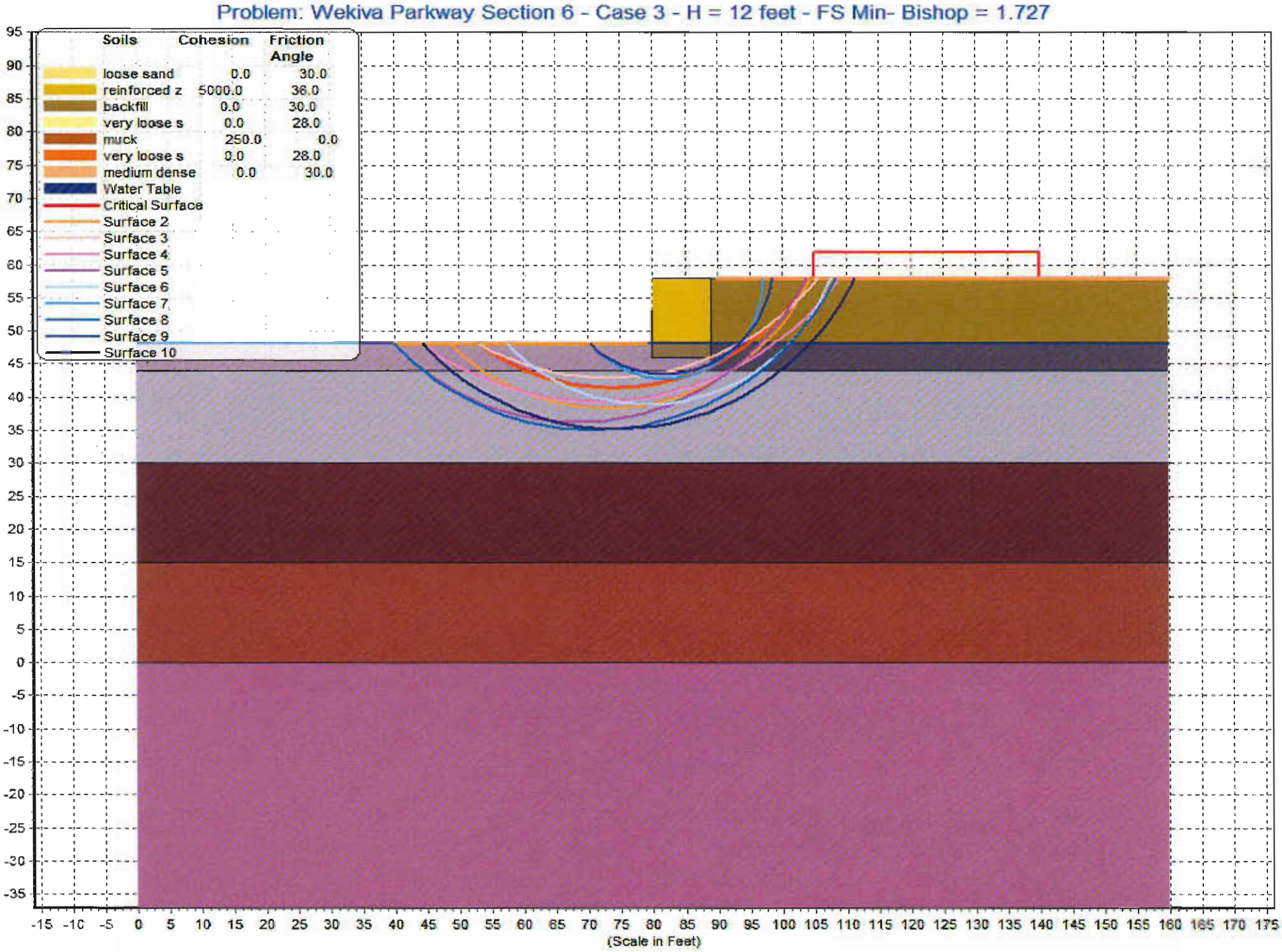

Problem: Wekiva Parkway Section 6 - Case 3 - H = 28 feet - FS Min- Bishop = 1.513
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
very loose s 0.0 28.0
muck 250.0 0.0
very loose s 0.0 28.0
medium dense 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)

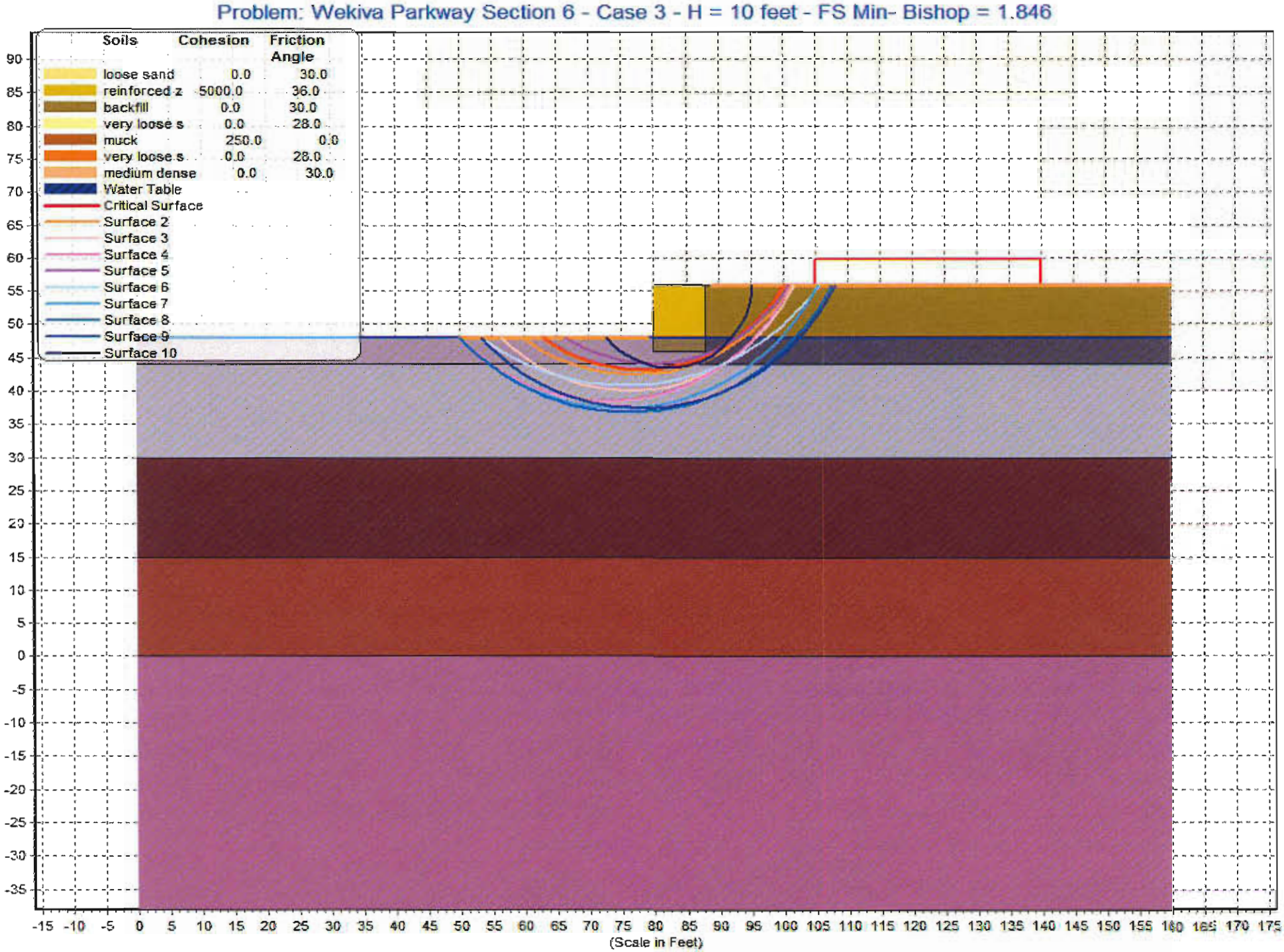

Problem: Wekiva Parkway Section 6 - Case 3 - H = 24 feet - FS Min- Bishop = 1.534
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
very loose s 0.0 28.0
muck 250.0 0.0
very loose s 0.0 28.0
medium dense 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 3 - H = 20 feet - FS Min- Bishop = 1.501
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
very loose s 0.0 28.0
muck 250.0 0.0
very loose s 0.0 28.0
medium dense 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30
-15 -10 -5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175
(Scale in Feet)

Problem: Wekiva Parkway Section 6 - Case 3 - H = 16 feet - FS Min- Bishop = 1.536




Problem: Wekiva Parkway Section 6 - Case 3 - H = 12 feet - FS Min- Bishop = 1.727
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
very loose s 0.0 28.0
muck 250.0 0.0
very loose s 0.0 28.0
medium dense 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)


Problem: Wekiva Parkway Section 6 - Case 3 - H = 10 feet - FS Min- Bishop = 1.846
Soils
Cohesion
Friction Angle
loose sand 0.0 30.0
reinforced z 5000.0 36.0
backfill 0.0 30.0
very loose s 0.0 28.0
muck 250.0 0.0
very loose s 0.0 28.0
medium dense 0.0 30.0
Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10
(Scale in Feet)

result.out
** STABL for WINDOWS **
by
Geotechnical Software Solutions

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:
Time of Run:
Run By:
Input Data Filename: run.in
Output Filename: result.out
Unit: U.S.C.
Plotted Output Filename: result.plt

PROBLEM DESCRIPTION Wekiva Parkway Section 6 - Case 3 - H = 28 feet

BOUNDARY COORDINATES

4 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	48.00	80.00	48.00	2
2	80.00	48.00	80.10	74.00	9
3	80.10	74.00	117.00	74.00	9
4	117.00	74.00	160.00	74.00	1
5	79.90	46.00	80.00	48.00	9
6	79.90	46.00	117.00	46.00	2
7	117.00	46.00	117.10	74.00	1
8	0.00	44.00	160.00	44.00	3
9	0.00	30.00	160.00	30.00	4
10	0.00	15.00	160.00	15.00	5
11	0.00	0.00	160.00	0.00	6

1

ISOTROPIC SOIL PARAMETERS

9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	0.0	30.0	0.00	0.0	1
2	105.0	110.0	0.0	30.0	0.00	0.0	1
3	105.0	100.0	0.0	28.0	0.00	0.0	1
4	105.0	100.0	250.0	0.0	0.00	0.0	1
5	105.0	100.0	0.0	28.0	0.00	0.0	1
6	110.0	115.0	0.0	30.0	0.00	0.0	1
7	105.0	100.0	0.0	28.0	0.00	0.0	1
8	125.0	130.0	0.0	34.0	0.00	0.0	1
9	150.0	150.0	5000.0	36.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	48.00
2	160.00	48.00

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load	X-Left	X-Right	Intensity	Deflection

No.	(ft)	(ft)	(psf)	(deg)
1	105.00	140.00	250.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 36.00 ft.
and X = 79.00 ft.

Each Surface Terminates Between X = 118.00 ft.
and X = 160.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 63 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.00	48.00
2	37.43	46.60
3	38.90	45.25
4	40.42	43.95
5	41.99	42.70
6	43.59	41.51
7	45.24	40.37
8	46.92	39.29
9	48.64	38.27
10	50.40	37.31
11	52.18	36.41
12	54.00	35.57
13	55.84	34.80
14	57.71	34.09
15	59.60	33.44
16	61.52	32.86
17	63.45	32.35
18	65.40	31.90
19	67.36	31.52
20	69.34	31.20
21	71.32	30.96
22	73.32	30.78
23	75.31	30.67
24	77.31	30.63
25	79.31	30.66
26	81.31	30.76
27	83.30	30.93
28	85.29	31.16
29	87.27	31.47
30	89.23	31.84
31	91.18	32.28
32	93.12	32.78
33	95.03	33.35
34	96.93	33.99
35	98.80	34.69
36	100.65	35.46
37	102.47	36.29
38	104.26	37.18
39	106.02	38.13
40	107.74	39.14
41	109.43	40.21
42	111.09	41.34
43	112.70	42.53
44	114.27	43.77
45	115.79	45.06

46	117.27	46.40
47	118.71	47.80
48	120.09	49.24
49	121.43	50.73
50	122.71	52.26
51	123.94	53.84
52	125.12	55.46
53	126.23	57.12
54	127.29	58.81
55	128.30	60.54
56	129.24	62.31
57	130.12	64.10
58	130.94	65.93
59	131.69	67.78
60	132.38	69.66
61	133.01	71.56
62	133.57	73.48
63	133.70	74.00

Circle Center At X = 77.5 ; Y = 88.8 and Radius, 58.2

*** 1.513 ***

Individual data on the 73 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.4	110.0	0.0	87.4	0.0	0.0	0.0	0.0	0.0
2	1.5	336.8	0.0	259.2	0.0	0.0	0.0	0.0	0.0
3	1.5	541.9	0.0	404.5	0.0	0.0	0.0	0.0	0.0
4	0.1	26.9	0.0	20.1	0.0	0.0	0.0	0.0	0.0
5	1.6	793.7	0.0	583.5	0.0	0.0	0.0	0.0	0.0
6	1.6	1010.8	0.0	735.7	0.0	0.0	0.0	0.0	0.0
7	1.6	1227.7	0.0	881.0	0.0	0.0	0.0	0.0	0.0
8	1.7	1442.6	0.0	1019.2	0.0	0.0	0.0	0.0	0.0
9	1.7	1654.1	0.0	1150.2	0.0	0.0	0.0	0.0	0.0
10	1.8	1860.6	0.0	1273.8	0.0	0.0	0.0	0.0	0.0
11	1.8	2060.7	0.0	1389.9	0.0	0.0	0.0	0.0	0.0
12	1.8	2253.0	0.0	1498.4	0.0	0.0	0.0	0.0	0.0
13	1.8	2436.1	0.0	1599.0	0.0	0.0	0.0	0.0	0.0
14	1.9	2608.8	0.0	1691.8	0.0	0.0	0.0	0.0	0.0

15	1.9	2769.8	0.0	1776.5	0.0	0.0	0.0	0.0	0.0
16	1.9	2918.2	0.0	1853.1	0.0	0.0	0.0	0.0	0.0
17	1.9	3052.8	0.0	1921.5	0.0	0.0	0.0	0.0	0.0
18	1.9	3172.8	0.0	1981.6	0.0	0.0	0.0	0.0	0.0
19	2.0	3277.4	0.0	2033.3	0.0	0.0	0.0	0.0	0.0
20	2.0	3365.8	0.0	2076.6	0.0	0.0	0.0	0.0	0.0
21	2.0	3437.6	0.0	2111.4	0.0	0.0	0.0	0.0	0.0
22	2.0	3492.2	0.0	2137.7	0.0	0.0	0.0	0.0	0.0
23	2.0	3529.2	0.0	2155.5	0.0	0.0	0.0	0.0	0.0
24	2.0	3548.4	0.0	2164.7	0.0	0.0	0.0	0.0	0.0
25	2.0	3549.7	0.0	2165.3	0.0	0.0	0.0	0.0	0.0
26	0.6	1042.6	0.0	636.7	0.0	0.0	0.0	0.0	0.0
27	0.1	181.0	0.0	108.1	0.0	0.0	0.0	0.0	0.0
28	0.1	380.0	0.0	108.1	0.0	0.0	0.0	0.0	0.0
29	1.2	6949.2	0.0	1304.5	0.0	0.0	0.0	0.0	0.0
30	2.0	11430.9	0.0	2140.8	0.0	0.0	0.0	0.0	0.0
31	2.0	11351.3	0.0	2115.7	0.0	0.0	0.0	0.0	0.0
32	2.0	11245.1	0.0	2082.1	0.0	0.0	0.0	0.0	0.0
33	2.0	11112.9	0.0	2040.0	0.0	0.0	0.0	0.0	0.0
34	2.0	10955.2	0.0	1989.5	0.0	0.0	0.0	0.0	0.0
35	1.9	10772.7	0.0	1930.6	0.0	0.0	0.0	0.0	0.0
36	1.9	10566.5	0.0	1863.4	0.0	0.0	0.0	0.0	0.0
37	1.9	10337.3	0.0	1788.0	0.0	0.0	0.0	0.0	0.0
38	1.9	10086.4	0.0	1704.5	0.0	0.0	0.0	0.0	0.0
39	1.8	9814.9	0.0	1612.9	0.0	0.0	0.0	0.0	0.0
40	1.8	9524.1	0.0	1513.4	0.0	0.0	0.0	0.0	0.0
41	1.8	9215.3	0.0	1406.0	0.0	0.0	0.0	0.0	0.0
42	0.7	3758.6	0.0	557.3	0.0	0.0	0.0	0.0	0.0
43	1.0	5131.5	0.0	733.7	0.0	0.0	0.0	0.0	254.8
44	1.7	8550.0	0.0	1168.5	0.0	0.0	0.0	0.0	431.3
45	1.7	8196.6	0.0	1038.5	0.0	0.0	0.0	0.0	422.3
46	1.7	7831.6	0.0	901.3	0.0	0.0	0.0	0.0	412.9
47	1.6	7456.7	0.0	757.0	0.0	0.0	0.0	0.0	402.9
48	1.6	7073.7	0.0	605.8	0.0	0.0	0.0	0.0	392.5
49	0.3	1229.5	0.0	93.4	0.0	0.0	0.0	0.0	69.4
50	1.2	5448.3	0.0	354.5	0.0	0.0	0.0	0.0	312.3
51	1.0	4417.5	0.0	216.3	0.0	0.0	0.0	0.0	259.7
52	0.2	704.4	0.0	27.3	0.0	0.0	0.0	0.0	42.0
53	0.0	19.4	0.0	1.0	0.0	0.0	0.0	0.0	1.6
54	0.1	271.9	0.0	14.1	0.0	0.0	0.0	0.0	23.2
55	0.2	508.9	0.0	24.7	0.0	0.0	0.0	0.0	43.6
56	1.4	4057.4	0.0	112.5	0.0	0.0	0.0	0.0	358.5
57	0.2	539.0	0.0	1.8	0.0	0.0	0.0	0.0	49.2
58	1.2	3167.9	0.0	0.0	0.0	0.0	0.0	0.0	297.2
59	1.3	3366.5	0.0	0.0	0.0	0.0	0.0	0.0	333.7
60	1.3	3031.7	0.0	0.0	0.0	0.0	0.0	0.0	320.7
61	1.2	2704.4	0.0	0.0	0.0	0.0	0.0	0.0	307.4
62	1.2	2386.5	0.0	0.0	0.0	0.0	0.0	0.0	293.6

63	1.1	2079.6	0.0	0.0	0.0	0.0	0.0	0.0	279.5
64	1.1	1785.6	0.0	0.0	0.0	0.0	0.0	0.0	265.1
65	1.0	1506.2	0.0	0.0	0.0	0.0	0.0	0.0	250.4
66	0.9	1243.0	0.0	0.0	0.0	0.0	0.0	0.0	235.4
67	0.9	997.7	0.0	0.0	0.0	0.0	0.0	0.0	220.1
68	0.8	771.6	0.0	0.0	0.0	0.0	0.0	0.0	204.5
69	0.8	566.2	0.0	0.0	0.0	0.0	0.0	0.0	188.7
70	0.7	382.9	0.0	0.0	0.0	0.0	0.0	0.0	172.6
71	0.6	222.9	0.0	0.0	0.0	0.0	0.0	0.0	156.4
72	0.6	87.2	0.0	0.0	0.0	0.0	0.0	0.0	140.0
73	0.1	3.7	0.0	0.0	0.0	0.0	0.0	0.0	33.3

Failure Surface Specified By 64 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.00	48.00
2	37.42	46.59
3	38.88	45.22
4	40.39	43.91
5	41.94	42.65
6	43.53	41.44
7	45.16	40.28
8	46.83	39.18
9	48.54	38.14
10	50.28	37.16
11	52.06	36.24
12	53.86	35.38
13	55.70	34.58
14	57.56	33.84
15	59.44	33.16
16	61.34	32.55
17	63.27	32.01
18	65.21	31.53
19	67.17	31.12
20	69.14	30.77
21	71.12	30.49
22	73.11	30.28
23	75.10	30.14
24	77.10	30.06
25	79.10	30.05
26	81.10	30.11
27	83.09	30.24
28	85.08	30.43
29	87.07	30.69
30	89.04	31.02

31	91.00	31.42
32	92.95	31.88
33	94.88	32.41
34	96.79	33.00
35	98.67	33.66
36	100.54	34.38
37	102.38	35.16
38	104.19	36.01
39	105.97	36.91
40	107.73	37.88
41	109.44	38.91
42	111.12	39.99
43	112.77	41.13
44	114.37	42.32
45	115.93	43.57
46	117.45	44.87
47	118.93	46.22
48	120.35	47.63
49	121.73	49.07
50	123.06	50.57
51	124.34	52.11
52	125.57	53.69
53	126.74	55.31
54	127.85	56.97
55	128.91	58.67
56	129.91	60.40
57	130.85	62.17
58	131.73	63.96
59	132.55	65.79
60	133.30	67.64
61	134.00	69.51
62	134.62	71.41
63	135.19	73.33
64	135.36	74.00

Circle Center At X = 78.4 ; Y = 89.0 and Radius, 58.9

*** 1.545 ***

1

Failure Surface Specified By 67 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	40.78	48.00
2	42.23	46.63
3	43.73	45.30
4	45.27	44.03
5	46.85	42.80
6	48.46	41.62
7	50.11	40.49
8	51.80	39.41
9	53.52	38.38
10	55.26	37.41
11	57.04	36.49
12	58.85	35.63
13	60.68	34.83
14	62.53	34.08
15	64.41	33.39
16	66.31	32.76
17	68.22	32.19
18	70.16	31.68
19	72.10	31.22
20	74.07	30.83
21	76.04	30.50
22	78.02	30.23
23	80.01	30.02
24	82.00	29.88
25	84.00	29.79
26	86.00	29.77
27	88.00	29.81
28	90.00	29.91
29	91.99	30.08
30	93.98	30.30
31	95.96	30.59
32	97.93	30.94
33	99.89	31.35
34	101.83	31.82
35	103.76	32.34
36	105.67	32.93
37	107.56	33.58
38	109.43	34.29
39	111.28	35.05
40	113.11	35.87
41	114.90	36.75
42	116.67	37.68
43	118.41	38.67
44	120.12	39.71
45	121.79	40.80
46	123.43	41.95

47	125.04	43.14
48	126.61	44.39
49	128.13	45.68
50	129.62	47.02
51	131.06	48.40
52	132.46	49.83
53	133.82	51.30
54	135.13	52.81
55	136.39	54.36
56	137.60	55.95
57	138.77	57.58
58	139.88	59.24
59	140.94	60.94
60	141.94	62.66
61	142.90	64.42
62	143.80	66.21
63	144.64	68.02
64	145.42	69.86
65	146.15	71.73
66	146.82	73.61
67	146.95	74.00

Circle Center At X = 85.7 ; Y = 94.3 and Radius, 64.5

*** 1.560 ***

Failure Surface Specified By 62 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.78	48.00
2	42.20	46.59
3	43.67	45.23
4	45.18	43.93
5	46.74	42.68
6	48.35	41.48
7	49.99	40.35
8	51.68	39.27
9	53.40	38.25
10	55.16	37.30
11	56.95	36.40
12	58.77	35.57

13	60.61	34.81
14	62.49	34.11
15	64.39	33.48
16	66.30	32.92
17	68.24	32.42
18	70.20	31.99
19	72.16	31.63
20	74.14	31.35
21	76.13	31.13
22	78.13	30.98
23	80.12	30.90
24	82.12	30.90
25	84.12	30.96
26	86.12	31.10
27	88.11	31.30
28	90.09	31.58
29	92.06	31.93
30	94.02	32.34
31	95.96	32.83
32	97.88	33.38
33	99.78	34.00
34	101.66	34.69
35	103.51	35.44
36	105.33	36.26
37	107.13	37.14
38	108.89	38.09
39	110.62	39.09
40	112.31	40.16
41	113.96	41.29
42	115.58	42.47
43	117.14	43.71
44	118.67	45.01
45	120.14	46.36
46	121.57	47.76
47	122.95	49.21
48	124.28	50.70
49	125.55	52.25
50	126.76	53.83
51	127.92	55.46
52	129.03	57.13
53	130.07	58.84
54	131.05	60.58
55	131.97	62.36
56	132.82	64.17
57	133.61	66.01
58	134.34	67.87
59	134.99	69.76
60	135.59	71.67

61	136.11	73.60
62	136.20	74.00

Circle Center At X = 81.3 ; Y = 87.4 and Radius, 56.5

*** 1.621 ***

1

Failure Surface Specified By 57 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	45.56	48.00
2	46.98	46.60
3	48.46	45.25
4	49.99	43.96
5	51.57	42.73
6	53.19	41.57
7	54.86	40.47
8	56.57	39.43
9	58.33	38.47
10	60.11	37.57
11	61.94	36.75
12	63.79	35.99
13	65.67	35.32
14	67.58	34.71
15	69.51	34.18
16	71.45	33.73
17	73.42	33.35
18	75.40	33.05
19	77.38	32.83
20	79.38	32.69
21	81.38	32.63
22	83.38	32.64
23	85.37	32.74
24	87.37	32.91
25	89.35	33.16
26	91.32	33.49
27	93.28	33.89
28	95.22	34.37
29	97.14	34.93
30	99.04	35.56

31	100.91	36.27
32	102.75	37.05
33	104.56	37.90
34	106.34	38.82
35	108.08	39.81
36	109.77	40.87
37	111.43	42.00
38	113.04	43.19
39	114.60	44.44
40	116.11	45.75
41	117.56	47.12
42	118.97	48.54
43	120.31	50.02
44	121.60	51.56
45	122.82	53.14
46	123.98	54.76
47	125.08	56.44
48	126.11	58.15
49	127.07	59.90
50	127.97	61.69
51	128.79	63.52
52	129.54	65.37
53	130.21	67.25
54	130.81	69.16
55	131.34	71.09
56	131.79	73.04
57	131.97	74.00

Circle Center At X = 82.0 ; Y = 83.5 and Radius, 50.9

*** 1.633 ***

Failure Surface Specified By 69 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	45.56	48.00
2	47.03	46.64
3	48.54	45.33
4	50.08	44.06
5	51.67	42.84
6	53.29	41.67

7	54.94	40.54
8	56.62	39.47
9	58.34	38.44
10	60.09	37.46
11	61.86	36.54
12	63.66	35.67
13	65.48	34.85
14	67.33	34.09
15	69.20	33.38
16	71.09	32.72
17	73.00	32.13
18	74.93	31.59
19	76.87	31.10
20	78.82	30.67
21	80.79	30.31
22	82.76	29.99
23	84.75	29.74
24	86.74	29.55
25	88.73	29.41
26	90.73	29.34
27	92.73	29.32
28	94.73	29.36
29	96.73	29.46
30	98.72	29.62
31	100.71	29.84
32	102.69	30.11
33	104.66	30.45
34	106.62	30.84
35	108.57	31.29
36	110.51	31.79
37	112.43	32.36
38	114.33	32.98
39	116.21	33.65
40	118.07	34.38
41	119.91	35.17
42	121.73	36.01
43	123.52	36.90
44	125.28	37.84
45	127.01	38.84
46	128.72	39.89
47	130.39	40.98
48	132.03	42.13
49	133.64	43.32
50	135.21	44.56
51	136.74	45.85
52	138.23	47.18
53	139.69	48.55
54	141.10	49.97

55	142.47	51.42
56	143.80	52.92
57	145.08	54.45
58	146.32	56.03
59	147.50	57.63
60	148.65	59.28
61	149.74	60.95
62	150.78	62.66
63	151.78	64.39
64	152.72	66.16
65	153.60	67.95
66	154.44	69.77
67	155.22	71.61
68	155.95	73.47
69	156.14	74.00

Circle Center At X = 92.3 ; Y = 97.2 and Radius, 67.9

*** 1.659 ***

1

Failure Surface Specified By 66 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.00	48.00
2	37.51	46.68
3	39.05	45.41
4	40.63	44.19
5	42.25	43.01
6	43.90	41.88
7	45.59	40.81
8	47.30	39.78
9	49.05	38.81
10	50.83	37.89
11	52.63	37.02
12	54.46	36.21
13	56.31	35.46
14	58.18	34.76
15	60.08	34.12
16	61.99	33.53
17	63.92	33.01

18	65.86	32.54
19	67.82	32.13
20	69.79	31.78
21	71.77	31.49
22	73.76	31.26
23	75.75	31.09
24	77.75	30.98
25	79.75	30.93
26	81.75	30.94
27	83.74	31.01
28	85.74	31.14
29	87.73	31.33
30	89.72	31.58
31	91.69	31.89
32	93.66	32.26
33	95.61	32.69
34	97.55	33.18
35	99.47	33.73
36	101.38	34.33
37	103.27	34.99
38	105.13	35.71
39	106.98	36.49
40	108.80	37.32
41	110.59	38.20
42	112.36	39.14
43	114.09	40.13
44	115.80	41.17
45	117.48	42.27
46	119.12	43.41
47	120.72	44.60
48	122.29	45.84
49	123.82	47.13
50	125.31	48.47
51	126.76	49.84
52	128.17	51.26
53	129.53	52.73
54	130.85	54.23
55	132.13	55.77
56	133.35	57.35
57	134.53	58.97
58	135.66	60.62
59	136.74	62.30
60	137.76	64.02
61	138.74	65.77
62	139.66	67.54
63	140.53	69.34
64	141.34	71.17
65	142.10	73.02

66	142.46	74.00

Circle Center At X = 80.4 ; Y = 97.2 and Radius, 66.3

*** 1.683 ***

Failure Surface Specified By 61 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.00	48.00
2	37.44	46.61
3	38.93	45.28
4	40.47	44.00
5	42.05	42.78
6	43.68	41.61
7	45.34	40.50
8	47.04	39.45
9	48.78	38.46
10	50.55	37.54
11	52.36	36.67
12	54.19	35.88
13	56.05	35.15
14	57.94	34.48
15	59.85	33.88
16	61.78	33.35
17	63.72	32.89
18	65.68	32.50
19	67.66	32.18
20	69.64	31.93
21	71.63	31.75
22	73.63	31.64
23	75.63	31.60
24	77.63	31.63
25	79.63	31.74
26	81.62	31.91
27	83.61	32.16
28	85.58	32.47
29	87.54	32.86
30	89.49	33.31
31	91.42	33.83
32	93.33	34.43

33	95.22	35.09
34	97.08	35.81
35	98.92	36.60
36	100.73	37.46
37	102.50	38.38
38	104.24	39.36
39	105.95	40.41
40	107.62	41.51
41	109.25	42.68
42	110.83	43.89
43	112.37	45.17
44	113.87	46.50
45	115.31	47.88
46	116.71	49.31
47	118.05	50.79
48	119.34	52.32
49	120.58	53.89
50	121.76	55.51
51	122.88	57.16
52	123.94	58.86
53	124.94	60.59
54	125.88	62.36
55	126.76	64.16
56	127.57	65.98
57	128.31	67.84
58	128.99	69.72
59	129.60	71.62
60	130.15	73.55
61	130.26	74.00

Circle Center At X = 75.7 ; Y = 87.9 and Radius, 56.3

*** 1.699 ***

1

Failure Surface Specified By 63 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.78	48.00
2	42.28	46.68
3	43.82	45.40

4	45.40	44.18
5	47.02	43.00
6	48.68	41.88
7	50.37	40.82
8	52.09	39.81
9	53.85	38.85
10	55.64	37.95
11	57.45	37.11
12	59.30	36.33
13	61.16	35.61
14	63.05	34.95
15	64.96	34.35
16	66.88	33.81
17	68.83	33.34
18	70.78	32.93
19	72.75	32.58
20	74.73	32.29
21	76.72	32.07
22	78.71	31.91
23	80.71	31.82
24	82.71	31.79
25	84.71	31.82
26	86.71	31.92
27	88.70	32.09
28	90.69	32.32
29	92.67	32.61
30	94.63	32.96
31	96.59	33.38
32	98.53	33.86
33	100.46	34.41
34	102.36	35.01
35	104.25	35.68
36	106.11	36.41
37	107.95	37.20
38	109.76	38.04
39	111.55	38.94
40	113.30	39.91
41	115.02	40.92
42	116.71	41.99
43	118.36	43.12
44	119.98	44.30
45	121.56	45.53
46	123.09	46.81
47	124.59	48.13
48	126.04	49.51
49	127.45	50.93
50	128.81	52.40
51	130.12	53.91

52	131.38	55.46
53	132.59	57.05
54	133.75	58.68
55	134.86	60.35
56	135.91	62.05
57	136.91	63.78
58	137.85	65.55
59	138.73	67.34
60	139.56	69.16
61	140.33	71.01
62	141.03	72.88
63	141.41	74.00

Circle Center At X = 82.6 ; Y = 93.9 and Radius, 62.1

*** 1.723 ***

Failure Surface Specified By 55 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	50.33	48.00
2	51.87	46.72
3	53.46	45.50
4	55.09	44.35
5	56.76	43.25
6	58.48	42.22
7	60.23	41.25
8	62.01	40.36
9	63.83	39.52
10	65.68	38.76
11	67.56	38.07
12	69.46	37.45
13	71.39	36.91
14	73.33	36.43
15	75.29	36.03
16	77.26	35.71
17	79.25	35.46
18	81.24	35.28
19	83.24	35.18
20	85.24	35.16
21	87.24	35.21

22	89.23	35.34
23	91.22	35.54
24	93.20	35.82
25	95.17	36.17
26	97.12	36.60
27	99.06	37.10
28	100.98	37.67
29	102.87	38.32
30	104.74	39.03
31	106.58	39.82
32	108.38	40.67
33	110.16	41.60
34	111.90	42.59
35	113.60	43.64
36	115.25	44.76
37	116.87	45.94
38	118.44	47.18
39	119.96	48.48
40	121.43	49.83
41	122.85	51.24
42	124.21	52.71
43	125.52	54.22
44	126.77	55.78
45	127.96	57.39
46	129.09	59.04
47	130.15	60.73
48	131.15	62.46
49	132.09	64.23
50	132.95	66.04
51	133.75	67.87
52	134.48	69.73
53	135.13	71.62
54	135.72	73.53
55	135.84	74.00

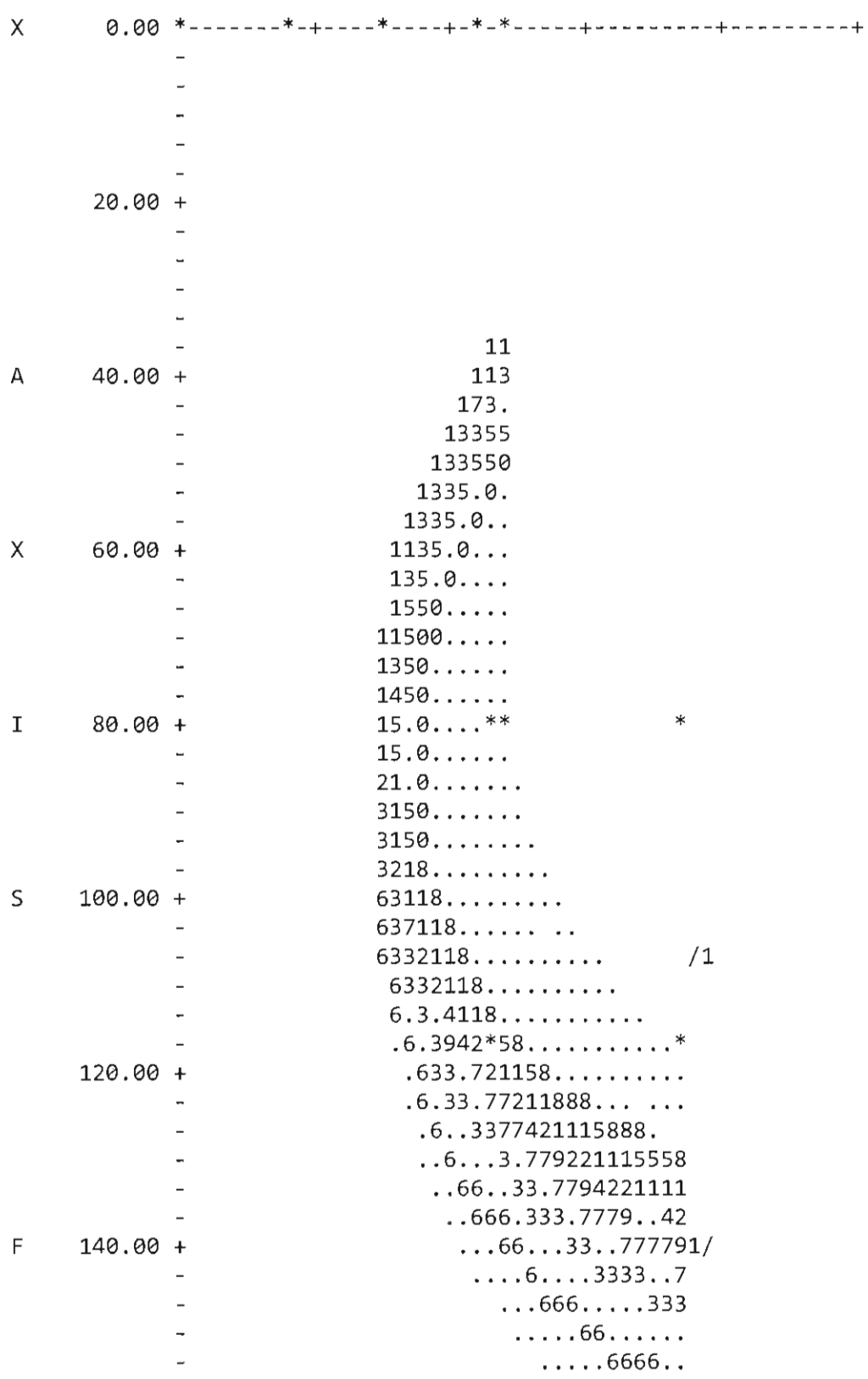
Circle Center At X = 84.9 ; Y = 88.0 and Radius, 52.9

*** 1.734 ***

1

Y A X I S F T

0.00 20.00 40.00 60.00 80.00 100.00


X 0.00
20.00
A 40.00
X 60.00
I 80.00
S 100.00
120.00
F 140.00

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            -                                       ......66
T     160.00 *        *       *       * W               ..*
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SETTLEMENT CALCULATIONS

Terracon

DATE

PROJECT No. #135080

SUBJECT WEKIVA - SECTION 6 (CASE I)
SHORT-TERM SETTLEMENT ESTIMATE

BY EJ

PAGE of

* BASED ON FHWA SOILS & FOUNDATIONS WORKSHOP MANUAL

GENERAL SOIL PROFILE

(1) 0-8' LOOSE FINE SAND $\bar{N}=5 \rightarrow P_o=(4)(105)= 420$ psf ($N'=8$ / $C=45$)

(2) 8-38' MED. DENSE SILTY/CLAYEY FINE SAND $\bar{N}=20 \rightarrow P_o=(8)(105)+(15)(120-62.4)= 1704$ psf ($N'=19$ / $C=80$)

(3) 38-58' VERY LOOSE FINE SAND/ SILTY FINE SAND $\bar{N}=4 \rightarrow P_o=(8)(105)+(30)(57.6)+(10)(105-62.4)= 2994$ psf ($N'=3$ / $C=40$)

(4) 58-60' LOOSE SILTY FINE SAND $\bar{N}=9 \rightarrow P_o=(8)(105)+(30)(57.6)+(20)(42.6)+(1)(110-62.4)= 3468$ psf ($N'=7$ / $C=45$)

$$\left\{\Delta H = H\left(\frac{1}{C'}\right)\log\left(\frac{P_o+\Delta P}{P_o}\right)\right\}$$

→ 34 feet EMBANKMENT → $\Delta P=(34)(105\ pcf)+ \underset{\text{TRAFFIC}}{250\ psf}= 3820$ psf

(1) $\Delta H= 8'\left(\frac{1}{45}\right)\log\left(\frac{420+3820}{420}\right)= 0.18' \approx 2.2"$

(2) $\Delta H= 30'\left(\frac{1}{80}\right)\log\left(\frac{1704+3820}{1704}\right)= 0.19' \approx 2.3"$

(3) $\Delta H= 20'\left(\frac{1}{40}\right)\log\left(\frac{2994+3820}{2994}\right)= 0.18' \approx 2.2"$

(4) $\Delta H= 2'\left(\frac{1}{45}\right)\log\left(\frac{3468+3820}{3468}\right)= 0.01' \approx 0.1"$

TOTAL ≈ 6.8"

Based on FHWA Soils & Foundations Workshop Manual

Case #: 1 (B-76)
Water Table: 8
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	8	8	SP, SP-SM	8	105
2	8	38	30	SM, SC, CH	19	115
3	38	58	20	SM TRACE CEMENTED SANDS	3	100
4	58	60	2	SM TRACE CEMENTED SANDS	7	105
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Existing Overburden Pressure P_o

embankment height= 34 feet total addition height= 35.6 feet
surcharge height= 2 feet equivalent pressure= 3738 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	N'/N	N'	C	Se (feet)	Se(inch)
1	420	840		8	45	0.177002	2.1240217
2	1629	2418		19	80	0.194179	2.3301473
3	2794	3170		3	40	0.18441	2.2129186
4	3213	3255.2		7	45	0.014896	0.17875S
					total	0.6	6.8

Based on FHWA Soils & Foundations Workshop Manual

Case #: 1 (B-85)
Water Table: 10
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	8	8	SP	6	105
2	8	10	2	SM	15	110
3	10	18	8	SM	42	120
4	18	33	15	SM	14	110
5	33	43	10	SP-SM/SM	2	100
6	43	48	5	CH	3	105
7	48	58	10	SC/SM	2	100
8	58	63	5	SC	12	110
9	63	70	7	SC	60	125

Existing Overburden Pressure P_o

embankment height= 34 feet total addition height= 34 feet
surcharge height= 0 feet equivalent pressure= 3570 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	N'/N	N'	C	Se (feet)	Se(inch)
1	420	840		6	45	0.173818	2.0858104
2	950	1060		15	50	0.027097	0.3251591
3	1540	1521		42	100	0.041672	0.5000642
4	1878	2234.8		14	48	0.144554	1.7346443
5	2423	2610.8		2	30	0.131104	1.5732489
6	2717	2823.8		3	35	0.052047	0.6245599
7	3012	3199.8		2	30	0.113173	1.3580742
8	3319	3437.8		12	45	0.03524	0.4228833
9	3657	3876		60	140	0.014792	0.1775034
					total	0.7	8.8

Based on FHWA Soils & Foundations Workshop Manual

Case #: 1 (A-140)
Water Table: 8
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	2	2	sp	12	110
2	2	18	16	sp/sc	22	115
3	18	28	10	sm/sp	13	110
4	28	33	5	sp	24	115
5	33	38	5	ch	5	110
6	38	43	5	sm/sp	17	110
7	43	48	5	ch	4	110
8	48	70	22	sm	13	110

Existing Overburden Pressure P_o

embankment height= 34 feet total addition height= 34 feet
surcharge height= 0 feet equivalent pressure= 3570 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	N'/N	N'	C	Se (feet)	Se(inch)
1	110	220		12	55	0.055435	0.6652168
2	1140	1561		22	60	0.164298	1.9715714
3	1799	2037		13	55	0.086344	1.0361331
4	2168	2299.8		24	75	0.028178	0.3381311
5	2419	2537.8		5	30	0.065623	0.7874797
6	2657	2775.8		17	60	0.030826	0.3699061
7	2895	3013.8		4	25	0.069787	0.8374477
8	3537	4061		13	45	0.148146	1.777756
					total	0.6	7.8

Consolidation settlement for: A-140 CASE I

OCR Determination			
Rule:	OCR=1	NC	Normal-consolidated clay
	OCR>1	OC	Over-consolidated clay

Equation:

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

Lab Result and OCR Determinatin

clay layer	Cc	Cr	e_o	Cec	Cer	P_i (psf)	OCR=Pc/Pi	OC or NC	thickness
33 to 38	0.65	0.065	1.72	0.238971	0.023897	2418.8	1.946083	oc	5
43 to 48	0.65	0.065	1.72	0.238971	0.023897	2894.8	1.9456083	oc	5

NC Clay Settlement Calculation

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

assume $\sigma_o' + \Delta\sigma' \le \sigma_c'$, $\Delta H =$

end of primary settlement due to traffic and embankment

embankment height: 34 feet

traffic: 0 feet

total additional pressure (psf): 3570 psf

clay layer	P_f (psf)	Seop (feet)
1	5988.8	0.047
2	6464.8	0.042

total settlement = 1.1 inches

end of primary settlement due to embankment and surcharge, no traffic

embankment height: feet

surcharge height: feet

total additional pressure(psf): 0 psf

clay layer	P_f (psf)	Seop (feet)
1	2418.8	0.00
2	2894.8	0.00
U%	#DIV/0!	#DIV/0!

U% need to be: 90%

Based on FHWA Soils & Foundations Workshop Manual

Case #: 2 (B-74)

Water Table: 10

Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	8	8	SP	6	105
2	8	13	5	SP	10	110
3	13	23	10	SC	23	115
4	23	28	5	SC	13	110
5	28	33	5	CH	9	115
6	33	38	5	SC	7	105
7	38	43	5	SP	16	110
8	43	48	5	SC	8	105
9	48	78	30	SC	2	100
10	78	80	2	SC	60	125

Existing Overburden Pressure P_o

embankment height= 34 feet total addition height= 34 feet

surcharge height= 0 feet equivalent pressure= 3570 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	SOIL	N'	C	Se (feet)	Se(inch)
1	420	840	SP	6	40	0.195545	2.3465367
2	1115	1203	SP	10	50	0.062343	0.7481217
3	1965	1729	SC	23	65	0.069193	0.8303171
4	1848	1966.8	SC	13	45	0.051908	0.6228907
5	2098	2229.8	CH	9	35	0.061655	0.7398604
6	2336	2442.8	SC	7	40	0.050348	0.6041803
7	2562	2680.8	SP	16	60	0.031587	0.3790428
8	2787	2893.8	SC	8	40	0.044761	0.5371335
9	3458	4021.8	SC	2	35	0.264017	3.1682008
10	4084	4147	SC	60	140	0.003897	0.0467628
					total	0.8	10.0

Consolidation settlement for: B-74 (CASE II)

OCR Determination			
Rule:	OCR=1	NC	Normal-consolidated clay
	OCR>1	OC	Over-consolidated clay

Equation:

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

Lab Result and OCR Determinatin

clay layer	Cc	Cr	e_o	Cec	Cer	P_i (psf)	OCR=Pc/Pi	OC or NC	thickness
28 TO 33	0.42	0.042	1.155	0.194896	0.01949	2098	4.27	oc	5

NC Clay Settlement Calculation

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

assume $\sigma_o' + \Delta\sigma' \le \sigma_c'$, $\Delta H =$

end of primary settlement due to traffic and embankment

embankment height: 34 feet
traffic: 0 feet
total additional pressure (psf): 3570 psf

clay layer	P_f (psf)	Seop (feet)
1	5668	0.042

total settlement = 0.505 inches

end of primary settlement due to embankment and surcharge, no traffic

embankment height: feet
surcharge height: feet
total additional pressure(psf): 0 psf

clay layer	P_f (psf)	Seop (feet)
1	2098	0.00
2	0	FALSE

U% #DIV/0! #DIV/0!

U% need to be: 90%

Based on FHWA Soils & Foundations Workshop Manual

Case #: 2 (B-82)
Water Table: 8
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	8	8	sp to sp-sm	4	105
2	8	13	5	sp to sp-sm	13	110
3	13	28	15	sp to sp-sm to sm	43	120
4	28	33	5	sm	2	95
5	33	53	20	pt	3	100
6	53	75	22	sc to sandy cl	5	105

Existing Overburden Pressure P_o

embankment height= 34 feet total addition height= 35 feet
surcharge height= 2 feet equivalent pressure= 3675 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	N'/N	N'	C	Se (feet)	Se(inch)
1	420	840		4	40	0.197801	2.3736111
2	959	1078		13	60	0.057011	0.6841374
3	1510	1942		43	140	0.057404	0.6888495
4	2024	2105		2	40	0.056207	0.674486
5	2481	2857		3	25	0.315737	3.7888497
6	3326	3794		5	30	0.237061	2.8447342
					total	0.9	11.1

OCR Determination			
Rule:	OCR=1	NC	Normal-consolidated clay
	OCR>1	OC	Over-consolidated clay

CASE 2: Consolidation Estimate

(B-82)

Equation:

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

Lab Result and OCR Determinatin

clay layer	Cc	Cr	e_o	Cec	Cer	P_c (psf)	Cv (ft^2/day)	P_i (psf)	OCR=Pc/Pi	OC or NC	thickness
1	0.25	0.025	0.75	0.142857	0.014286	500		2531	1	NC	20

NC Clay Settlement Calculation

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

$H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_c}{P_i}\right) + H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_c}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

end of primary settlement due to traffic and embankment

embankment height: 34 feet

traffic: 2 feet

total additional pressure (psf): 3780 psf

clay layer	P_f (psf)	Seop (feet)
1	6311	1.1

inches: 13.6

end of primary settlement due to embankment and surcharge, no traffic

embankment height: feet

surcharge height: feet

total additional pressure(psf): 0 psf

clay layer	P_f (psf)	Seop (feet)
1	2531	0.00
2	0	#DIV/0!
U%	#DIV/0!	#DIV/0!

U% need to be: 90%

Based on FHWA Soils & Foundations Workshop Manual

Case #: 2 (B-179)
Water Table: 3
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	6	6	sp	12	110
2	6	18	12	sm	27	115
3	18	43	25	ch	3	105
4	43	48	5	sc	19	115
5	48	70	22	sc	21	115

Existing Overburden Pressure P_o

embankment height= 34 feet total addition height= 34 feet
surcharge height= feet equivalent pressure= 3570 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	SOIL	N'	C	Se (feet)	Se(inch)
1	330	472.8	sp	12	55	0.117006	1.4040663
2	788	1104	sm	27	70	0.1273	1.5275941
3	1637	2169	ch	3	35	0.359021	4.308256
4	2301	2432	sc	19	55	0.036987	0.4438395
5	3011	3589.2	sc	21	60	0.124525	1.4942947
					total	0.8	9.2

Consolidation settlement for: B-179 (CASE II)

OCR Determination			
Rule:	OCR=1	NC	Normal-consolidated clay
	OCR>1	OC	Over-consolidated clay

Equation:

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

Lab Result and OCR Determinatin

clay layer	Cc	Cr	e_o	Cec	Cer	P_i (psf)	OCR=Pc/Pi	OC or NC	thickness
18 to 43	0.51	0.051	1.35	0.217021	0.021702	1637	2.38	oc	25

NC Clay Settlement Calculation

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

assume $\sigma_o' + \Delta\sigma' \le \sigma_c'$, $\Delta H =$

end of primary settlement due to traffic and embankment

embankment height: 34 feet
traffic: feet
total additional pressure (psf): 3570 psf

clay layer	P_f (psf)	Seop (feet)
1	5207	0.273

total settlement = 3.272 inches

end of primary settlement due to embankment and surcharge, no traffic

embankment height: feet
surcharge height: feet
total additional pressure(psf): 0 psf

clay layer	P_f (psf)	Seop (feet)
1	1637	0.00
2	0	FALSE

U% #DIV/0! #DIV/0!

U% need to be: 90%

Based on FHWA Soils & Foundations Workshop Manual

Case #: 3 (B-12A)
Water Table: 0
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	4	4	sand, fill	5	110
2	4	18	14	sm, sp-sm	0	100
3	18	33	15	peat	2	100
4	33	48	15	sm, sp-sm	2	100
5	48	53	5	sp-sm	14	115
6	53	68	15	sm	1	100
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Existing Overburden Pressure P_o

embankment height= 28 feet total addition height= 30 feet
surcharge height= 2 feet equivalent pressure= 3150 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	N'/N	N'	C	Se (feet)	Se(inch)
1	95	190		5	40	0.15326	1.8391254
2	454	717		0	27	0.4667	5.6003953
3	999	1281		2	20	0.463833	5.5659957
4	1563	1845		2	35	0.205447	2.4653603
5	1976	2108		14	70	0.029568	0.3548153
6	2390	2672		1	28	0.195607	2.3472805
					total	1.5	18.2

OCR Determination			
Rule:	OCR=1	NC	Normal-consolidated clay
	OCR>1	OC	Over-consolidated clay

CASE 3: Consolidation Estimate

(B-12A)

Equation:

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

Lab Result and OCR Determinatin

clay layer	Cc	Cr	e_o	Cec	Cer	P_c (psf)	Cv (ft^2/day)	P_i (psf)	OCR=Pc/Pi	OC or NC	thickness
1	0.9	0.07	3.035	0.223048	0.017348	1978		999	1	NC	15

NC Clay Settlement Calculation

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

$H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_c}{P_i}\right) + H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_c}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

end of primary settlement due to traffic and embankment

embankment height: 28 feet

traffic: 2 feet

total additional pressure (psf): 3150 psf

clay layer	P_f (psf)	Seop (feet)
1	4148.8	2.1

inches: 24.8

end of primary settlement due to embankment and surcharge, no traffic

embankment height: feet

surcharge height: feet

total additional pressure(psf): 0 psf

clay layer	P_f (psf)	Seop (feet)
1	998.8	0.00
2	0	#DIV/0!
U%	#DIV/0!	#DIV/0!

U% need to be: 90%

Based on FHWA Soils & Foundations Workshop Manual

Case #: 3(B-15A)

Water Table: 0

Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	2	2	SP	4	100
2	2	6	4	SP	6	105
3	6	28	22	SP/SM/SC	12	110
4	28	33	5	SP	6	105
5	33	48	15	SP/SM/SC	1	95
6	48	60	12	SM	18	110

Existing Overburden Pressure P_o

embankment height= 28 feet total addition height= 28 feet

surcharge height= 0 feet equivalent pressure= 2940 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	SOIL	N'	C	Se (feet)	Se(inch)
1	38	75.2	SP	4	40	0.094934	1.1392071
2	160	246	SP	6	45	0.11433	1.3719609
3	769	1293	SP/SM/SC	12	50	0.300626	3.6075124
4	1399	1505.8	SP	6	45	0.054612	0.6553451
5	1750	1994.8	SP/SM/SC	1	25	0.256853	3.0822345
6	2280	2566	SM	18	55	0.078478	0.941741
					total	0.9	10.8

Based on FHWA Soils & Foundations Workshop Manual

Case #: 3(B-50)
Water Table: 0
Existing Soil Condition:

Layer #	From	To	layer thickness	Description	Average N'	y_wet (pcf)
1	0	5.5	5.5	sp/sc	9	105
2	5.S	9	3.5	sm	4	105
3	9	13.5	4.5	ch	2	105
4	13.5	18.5	5	peat	7	100
5	18.5	28.5	10	sm/sc	15	110
6	28.5	38.5	10	pt	9	100
7	38.5	43.5	5	sp	7	105
8	43.5	53.5	10	pt	3	95
9	53.5	60	6.5	sp-sm	7	105

Existing Overburden Pressure P_o

embankment height= 28 feet total addition height= 28 feet
surcharge height= 0 feet equivalent pressure= 2940 psf

Layer #	Overburden Pressure at mid point (psf)	Overburden Pressure at full depth	SOIL	N'	C	Se (feet)	Se(inch)
1	117	234	sp/sc	9	40	0.194779	2.3373479
2	309	383	sm	4	35	0.102198	1.2263785
3	479	575	ch	2	25	0.153606	1.8432765
4	669	763	peat	7	30	0.121985	1.4638158
5	1001	1239	sm/sc	15	50	0.119028	1.428336
6	1427	1615	pt	9	30	0.161913	1.9429549
7	1722	1828	sp	7	45	0.048067	0.S768037
8	1991	2154	pt	3	25	0.15754	1.8904835
9	2293	2431	sp-sm	7	45	0.051768	0.6212173
					total	1.1	13.3

Consolidation settlement for: B-50 (CASE III)

OCR Determination			
Rule:	OCR=1	NC	Normal-consolidated clay
	OCR>1	OC	Over-consolidated clay

Equation:

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

case 1: $\sigma_o' + \Delta\sigma' \le \sigma_c' \rightarrow \Delta H =$

case 2: $\sigma_o' + \Delta\sigma' \ge \sigma_c' \rightarrow \Delta H =$

Lab Result and OCR Determinatin

clay layer	Cc	Cr	e_o	Cec	Cer	P_i (psf)	OCR=Pc/Pi	OC or NC	thickness
9 to 13.5	0.36	0.036	0.95	0.184615	0.018462	479	4.2	oc	4.5
13.5 to 18.5	2.01	0.21	4.585	0.359893	0.037601	657	3.7	oc	5
28.5 to 38.5	2.01	0.21	4.585	0.359893	0.037601	1402	1.7	oc	10
43.5 to 53.5	2.01	0.21	4.585	0.359893	0.037601	1966	1.24	oc	10

NC Clay Settlement Calculation

for NC clay: $\Delta H = H\left(\frac{C_c}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

for OC clay: $H\left(\frac{C_s}{1+e_o}\right)\log\left(\frac{P_f}{P_i}\right)$

assume $\sigma_o' + \Delta\sigma' \le \sigma_c'$, $\Delta H =$

end of primary settlement due to traffic and embankment

embankment height: 28 feet
traffic: feet
total additional pressure (psf): 2940 psf

clay layer	P_f (psf)	Seop (feet)
9 to 13.5	3419	0.071
13.5 to 18.5	3597	0.139
28.5 to 38.5	4342	0.185
43.5 to 53.5	4906	0.149

total settlement = 6.524 inches

end of primary settlement due to embankment and surcharge, no traffic

embankment height: feet
surcharge height: feet
total additional pressure(psf): 0 psf

clay layer	P_f (psf)	Seop (feet)
1	479	0.00
2	1966	0.00

U% #DIV/0! #DIV/0!

U% need to be: 90%